The following 11 reports form part of a single volume of copies of original reports. The other reports in the volume, not transcribed and included here, are further reports on the lead mines, mostly submitted at quarterly intervals by Joseph Dickinson or the Crawhalls up to 1817.

18 Apr 1806 Joseph Dickinson

No.1 April 18th 1806

Coalcleugh, in general, is prosperous there being a prospect of regaining a good part of the Limestone East of the Cross Vein by pumping, which must be submitted to untill a better can be found. The Old level at Carrshield will never be of service in opening the East end of CCleugh veins being at too great a distance to the North, & continued too much in easterly direction. The place which I mentioned beside the Limekiln, will be by much the shortest, by directing it to the Low Coalcleugh Vein on what is supposed to be the east side of all the known Cross Veins, & may then be turned both ways in that Vein, & likewise continued Southward to High Coalcleugh Vein, on the East side of the Cross Veins, as before. And if I am not mistaken that level will be wanted before it can be driven up not-withstanding every exertion be used in forwarding it. The west end of the most bearing vein is Welhope with ore at the Boundary and in a little time, now wanting only about [space left] fathoms. The east end of that Vein hath been very unpromising for some time past notwithstanding hath been driven forward in hopes of being better, which was the case last Quarter. The forehead producing more ore in a fortnight or three weeks than in forty fathoms driving behind. The other tryals at Hartley Cleugh, Greenley Cleugh and Swinhope are not yet completed, but going briskly forward – there was a vein cut in Welhope Level about the middle way and worked for ore, being poor, the prices at that time would not carry her forward, the last year that Vein was let at 51/- per Bing, and is likely to work at that, and perhaps lower.

The Allenheads Mines are in general poor, the flatts in the west end doth not produce so much ore as before, & I fear is working out being upon the point of entering the Great Cross Vein. A tryal ought to be made to find the veins on the west side of that Cross Vein, where there is nothing at present discovered to interrupt them, but the throw of that Cross Vein is down on the West side, and be difficult to <win> the Great Limestone which is the principle Sill. The East End of Allenheads Veins is poorer being nearly under the highest part of the fell where the greatest weight or pressure is now acting upon them and the Veins not of the strongest kind believe to be the occasion of their poverty and fear the further the Water Level is driven the more water it produces and fear it will be too much for the Engine. There is a long level driven at a place called Sipton Head & two or three Veins cut by that level, & tryals made of them into the sills, which are only Grit, or firestone, which in general doth not produce much Ore, and no limestone to be found on that part of the common, they have all proved to have no ore in them, & by their appearance are likely for a Limestone Sill, I think a

continuance in driving that level not adviseable, unless the Great Limestone could be won, which I fear is at too great a depth.

In Weardale the forehead of Breckonsike Vein is confused at present by veins or strings crossing in all directions, and produces very little ore, the foreheads are driving forwards with all possible speed, in hopes of getting clear of that disturbance, and finding the vein in a prosperous state as before, otherwise the back ground will soon work out with the number of men employed and workable state of the vein. – The veins at Blackdene level, appear to me not strong enough to bear Ore in these under Sills, when the weight or pressure of the upper Sills comes on about Mr Lee's House, and of course another level will be to drive for the more effectual working the Sills above, The Burtree Pasture Vein being the most likely to produce Ore at present, but a part of the ore workings being under Level, makes it more difficult to work, & of course more expensive, some method must be taken to relieve the Water drawing otherwise that expense will be heavier every day. The old mine at Sedlin is nearly worked out, only some of the top sills at present working, the Kilhope Mines are likewise nearly worked out, and Puddingthorne at present will hardly pay the expense of driving the Level, the Limestone being found to be thinner up the fell, which is contrary to expectation. The Level at Levelgate is driving forward, with all the expedition possible, to underwater Longsike & Middlehope Vein, at a greater depth than hath been worked before, and likewise for discovering, & working other Veins that may be found by driving that Level. – The old Workings at Middlehope still continue to raise Ore at a great pace, and likely to continue until the Level reaches them. – A low level is likewise going forward to relieve the forehead of Slitt Lead Mine but is a considerable way behind the forehead, that mine is producing Ore very well at present. A long level is driving on the East side of Middlehopeburn to cut the veins which hath been worked on the West side to a considerable advantage, is still short of the Veins intended, but expected to cut them in a year, or less. –A level is likewise driving at Wolfcleugh to discover Veins there, and to be continued to the old Vein, & is expected will relieve the Engine by taking off a stand of Pumps, it hath already discovered a Vein, which hath produced a considerable quantity of Ore in the Little Limestone on the West side, and hath likewise opened the Veins in Coal Sills, on the East side, which hath produced a very good sample of Ore last Quarter.- Another level below the Smelt Mill was driven Northward to cut Middlehope Veins, on the West side of Rookhope Burn, & hath discovered one of them which at present hath not a favourable appearance in the Great Lime. – At Brandon Walls let Alex Whaley &Co a Bargain to raise ore in Col Beaumont's Liberty at 90 /- per Bing for Ore fit for smelting and to work regularly with at least 4 men the Bargain to be renewed every Quarter at the pleasure of Col Beaumont if they work according to conditions. The tryal is still going on in the fields above Stanhope, where there hath been some old workings, it raises Ore which covers the expense of Dead Work &c Mr Chris Emerson took a Bargain to raise Ore in one of the Veins at Harehopefell, now entering into Col Beaumont's liberty.

Bollihope Leadmine hath produced a considerable quantity of Lead ore the two last quarters, but in cutting thro' the vein to West side is a quantity of Water filled all their workings, it is now settled to sink on the south side of the Vein and if Ore is found there to bring up a level, to let off the water & if sinking doth not answer, some other method must be taken. – The Vein at Green Laws is now producingOre in the four fathom Limestone, another will join the present Vein about 20 fathoms west, and is then expected to produce something considerable in the Limestone above, & <Mazel> under – there was great expectations from a Vein above the Cross Hill called Highfield, but hath hitherto frustrated their expectation, by the Great Limestone being in a broken and disjointed state, although under the highest part of the fell, and was found on Lord Darlington's side of the fell in a firm state and produced a large quantity of Ore. – Two or three more places are working, but only in a very poor way, & unless something unexpected is found, will be very likely given up in a little time.

Jos. Dickinson

10 Jul 1806 Joseph Dickinson

No.2 Dufton 10th July 1806

I send you a Copy of my remarks made this Midsummr Bargains, at Col Beaumonts Lead Mines, whereby you will see the general state of the Mines, and likewise observations necessary to their future working and shall begin with Coalcleugh, at the East end where the Water level is driven to the forehead, and sump nearly sunk for the Pumps to win the great Limestone on the east side of the Cross Vein. – A considerable quantity of Ore hath been raised in the background this quarter, and the best working is in the west flatts, where it had been given over some time past, but is now opening out again and expect will produce Ore for several years to come. – Wellhope West end hath produced very well of Ore last Quarter, is now poor but hope will not be long in that situation and may produce a considerable quantity of Ore in the 24 or 25 fathoms yet to drive before We come to the end of the Boundary. – The East end of Wellhope Vein hath produced more Ore this quarter than for several quarters past, and hope it will relieve the other that is working out. – The Level at Hartley Cleugh is not up to the Vein, but there are some workmen getting Ore in the great Limestone by the old Level, but when the new one is up will make a more effectual tryal in the Vein, and may be continued southward for further discovery if thought adviseable. – The Level at Greenly Cleugh driven in the Vein in the four fathom Limestone hath a better appearance than before, & is only wanting about 20 fathoms of the most suitable place for sinking a shaft, which will Air that Level, and from that Shaft will prove the Great Limestone; both the shaft sinking and driving to it is now Let. – The old Level at Carr Shield is opened that the Workmen can go up, but a quantity of Sludge remains about a yard deep for a considerable way which will be to remove before any fresh tryal can be made. – The new Level besides the Lime Kiln is

secured by Walling at the entering and a bargain let to drive 20 fathoms. – The sinking in Swinhope into the great Lime, to prove the Vein is nearly completed, the Workmen is now cutting into the Vein in that Sill and hath produced a very good sample of Ore which was sent to me in Weardale. – Joseph Little believes the Company's Workmen have driven into Col Beaumont's liberty, and the Ore is now lying at Coalcleugh until the dispute is settled.

At Allenheads the Mines are considerably poorer than before, and were under the necessity of advancing the prices, the West end flatts nearly worked out and in driving the East end level gains so much more water that I fear the Engine will not be able to take it all. – The two last quarters have been opening out an old Shaft at the West end, to see what the old Man had been doing in order to discover the Veins on the West side of the Cross Vein, called Burtree Dikes and find he had sunk the shaft in a part of the Cross Vein, and hath driven Westward from that Shaft about 40 fathoms without finding any Vein or making any Crosscutt for that purpose, and believe the forehead is standing in the Quarry Sill under the Great Limestone; we intend to drive cross to the Southward first, thinking the Vein is more likely to be on that side adn if they do not find the Vein must try the other there being a very good opportunity of fixing a water <blast> at a light expense, that being the principal tryal to be made at that Mine which if it should produce as much Ore on the Westside of the Cross Vein, as it hath done on the East, will make Allenheads flourish once more.

In Weardale the Breckonsike Vein, is not yet clear of the Cross Vein, neither in the upper nor under Levels, notwithstanding the background produces a considerable quantity of Ore and may do for years to come. The Burtree Pasture Vein is now Rich in the forehead but the Ore workings is under Level and of course the Water is to draw by hand to the water Level. – If a quantity of Water could be collected to drive a small Engine, to lift 10 or 12 fathoms would relieve the Vein for several years, until a more durable way be found out, and the water in that Level does not go to the Engine but out at the Tail race. –We sent the Engineer, Michael Elliott, to view that at Coal Cleugh, it takes the least room, and considerably less water than the wheel Engines and he is of opinion that one of the same construction will be most suitable. Mr Emerson will take him underground the view the place and then you will hear further. – I have not the least doubt about the success and until that can be done we shall be under the necessity of giving an extra price for raising ore in that part. Sedlin and Midlep or Longsike old Mines are poor, but working at a long price per bing and no alteration for the better expected until the Great Level cuts them at a deeper sett. The flatt Veins in the upper Sills hath raised a considerable quantity of Ore the last quarter, but the same Veins in the under Sills are very poor. The Level on the Eastside of Midlip Burn is yet short of the intended Vein.—The Wolf Cleugh Mines are poor, and likely to continue for another Quarter and then expected to be better. – Bollihope Mine hath produced more Ore in the last Quarter than was expected, but the South end of that Vein will not carry Ore. We have fixed to sink a shaft in the south Forehead both to air the forehead and prove some upper Sills which hath produced Ore in that Country. The Veins in Blackdene Level are very poor, and expect very little more Ore in that depth, but the

level must be carried forward for the more Effectual working the upper Sills in that Vein. – The Great Level at Level Gate, is driving forward as fast as possible. The other old Workings in Kilhope, Pudding Thorn and Chapel Pasture nothing material, and remain

&c Jos Dickinson

14 Oct 1806 Joseph Dickinson

(no3) October 14th 1806

Coalcleugh Lead Mine upon the whole is not in so prosperous a state as at Midsummer, some of the old Workings are obliged to be advanced in price, and such a quantity of Water loosed by working in the back forehead, about the Cross Vein, is like to be too much for the Engine, in order to remedy that, ordered the Workmen to Dam the Water back, which comes from the Companys Works on the West end, which expect will give us the relief wanted; if not must seek relief some other way. The prospect for Ore about the East Cross Vein is flattening. There is likewise a Cross Vein near the West end boundary which had been left working for some time past, and by giving a little for a few fathoms driving, is now working northward to a considerable advantage, and from its present point, will continue in Col Beaumont's liberty. – The principle Vein in Welhope is very poor in the West end at present, but hope for another hole of Ore (as the Miners say) before the Vein goes out of the liberty, which is something more than 20 fams The east forehead of that Vein is more promising, but cannot be worked effectually, without carrying a level forward, which had been left working for two or three quarters, and is now wanting to air the forehead. Hartly Cleughhead is near holing to the Ore workings, which consist of several small veins or strings, and by their present points are drawing together, the way we are driving which makes the prospect at the place more promising. Greenlee Cleugh Level Shaft is going forward but not joined, When that happens, will enable us to prove the Vein in the Great Limestone. – The new Level below C. Cleugh is going forward with all possible expedition, and the intended level in Swinhope pointed out to prove the Vein is about one Hundred fathoms driving, and then may be driven along the side of the Veins as far as may be found necessary.

Allenheads Lead Mine hath been more prosperous the last Quarter in the east end than was expected, the Vein to the South of the other, which produced that good sample of Ore, is a very weak one, and hardly will bear the name of Vein, and denominated a string, is very likely to carry Ore, and if any more strings join, maybe a valuable Vein – the West End flatts hath been more productive the last quarter than was expected, and may continue for two or three quarters more, the other parts of the mine are very poor, and of course the prices advanced. – The Cross cutt at the West End, to discover the Vein on the West side of the Great Cross Vein, hath not yet succeeded but intend to continue untill we find a Vein; or ortherwise find there is none.

The Mines in Weardale, in general are poorer than last quarter, Breckonsike Vein at the east end broke into strings, by some cross Veins, sometime since, both in the upper, & under Sills, and is not yet collected again, and of course must not expect the quantity of Ore from that mine as before, untill that happen.

The Burtree Pasture Vein is the most promising at present, but the principal part of the bearing Sill is gone under Water, and cannot be recovered untill Water is collected underground to drive an Engine, we have considerably increased the quantity of water the last Quarr, by rising to prove the Vein in the Sills above the Level, and expect is rising further to prove the Vein in the Limestone, will compleat the quantity required.

The Slitt Lead Mine is much declined the last quarter, both in The upper and under Sills, by cross Veins intersecting the principle Vein, and may be sometime before the Vein recover the former strength. – The Levels on the east side of MiddlehopeBurn are still continued, and the Vein they were intended for not yet found – Middlehope Old Vein still continues to raise Ore in small quantity, and so doth Kilhope and some other mines in that part of the Country. Greenlaws not up to the place where the principle expectation lay, but at present not very hopeful. – The two BlackDean's Levels very poor. The Levelgate great Level still driving on to relieve Middlehope Vein at an undersett

Wolfcleugh doth not answer in the low Sills at present, so well as was expected, and Bollihope Vein doth not carry Ore in the South end of the Vein, the North end still continues to raise Ore, but there is only a little way to the old Works, standing full of Water. --- You will say this is a melancholy picture, but a true one according to my judgement.

Jos. Dickinson

14 Nov 1806 John Mulcaster to James Cockshutt

James Cockshutt Esq, Huthwaite Nov 14 1806

Along with this I have sent you an Acct of the operation of Roasting the Lead Ore previous to its being smelted according to your direction as exact as it could possibly be made, as I attended to the weighings necessary at the different works myself which were performed with the utmost scrupulous exactness. –

Yet you will observe that the results are very different at each place – I have attempted to account for the difference between the results of Allenheads and Rookhope Mills in the manner that struck me as the most likely at the time – and which I submit to your consideration and I rather think from the manner in which I understand the roasting was conducted at Dukesfd the same reasoning will equally apply there. – The difference arising from the roasting at Allendheads compared with that of Rookhope Dukesfd may in great measure be accounted for from the different kinds of Lead Ore, as there is little doubt that the benefit will vary in the Ore of different Mines independent of its quality as well as the degree of roasting it has

undergone altho the benefit of roasting the ore appears less at Dukesfd than Rookhope Mill yet the general benefit at Dukesfd exceeds that at Rookhope as you will observe that the quantity of lead made at Dukesfield in both the operations is greater than at Rookhope from the same quantity of Ore of the same quality as they were both from the same heap at the mine, the Agent there having particular directions to that effect.

You will observe from the papers that the roasted Ore requires less fuel to smelt it for the full quantity smelted but requires more fuel during the time the Hearth is at work as the Lead runs considerably quicker and sooner heats the Hearth which has made some people imagine that it may injure its quality but I cannot say that I observe any difference, but we will be better able to determine that afterwards as I had a particular mark set upon the Lead made at each Mill to distinguish the Roasted from the unroasted Ore Lead, and when we receive it at Blaydon we intend to refine it there and get it made into Whitelead and if it should answer that purpose there is little doubt but it maybe used for any thing that Lead is applied to.

The above are all the observations I have at present to make. I hope they will answer the purpose intended. As I assure you that every attention was given by the Agents at the different works as well as by myself in order that the greatest degree of accuracy might be obtained

I am J Mulcaster

Dukesfield Smelt Mill 1 Nov 1806

Taken 30 Bings of Breckonsike Bouse Ore and worked it at the Ore Hearth in the ordinary Way

Produced at	c q lb		hours	fothers
Ore Hearth	112 ps Lead Wt	154 - 24 worked	53 1/2 used	6/7 coals
Slag Hearth	3 1/2 ps	4 3 8	7 3/4	1 cinders
In all	115 1/2 Ps Lead Wt	159 - 4 worked	61 1/4 used	1 6/7 Frs

NB. The grey Slags made at the Ore Hearth from the above Ore weighed previous to being smelted in the Slag hearth 30c[wt] –q -lb

Taken 30 Bings more of Breckonsike Bouse Ore exactly of the same quality as the preceding --the Ore being weight from the same heap to the Ore Hearth and the Roasting Furnace alternately 1/8 of a Bing at each weight.

The Roasting Furnace required 59 ¼ hours to roast the Ore, in which time 2 4/7 Frs of coals were consumed in that operation. The Ore after roasting had lost 6c –q -lb of its original weight. It was then taken to the Ore hearth and smelted in the same manner as the preceding and produced as below.

Produced at	c q lb	hours	fothers

Ore Hearth	117 Ps lead Wt	161 1 14 worked	46 used	11/14 Coals
Slag Hearth	3 1/2	4 3 22	6 1/2	12/14 Cinders
Roasted Ore	120 1/2 Ps Ld	166 1 8 worked	52 1/2	1 9/14 Fothers
Unroasted	115 1/2	159 0 4	61 1/4	1 12/14
More Lead by Roasts 5 ps		7 1 4		
More time & fuel by unroasted			8 3/4 hours	3/14 Fothers

NB The grey slags made from the roasted ore weighed previously to be smelted at the Slag Hearth 33c 3q 0lb

	c q lb		c q lb
Roasted Ore made common Lead	161 1 14	Slag Lead	4 3 22
Unroasted ore &c	154 – 24		4 3 8
Difference	7 – 18		14

Expenses incurred by Roasting & Smelting 30 Bings of Lead Ore

Roasting 30 Bings of Lead Ore	@ 1/6	2 5 0	
Coals consumed for do 2 4/7 Fo	@ 6/6	16 8 1/2	3 1 8 1/2
Smelters Wages for 7 tons 5 p Lead	@ 7/4	2 13 7 1/2	
Weighing Ore for 7 8	@ 4d	2 6	
Do Lead for 7 8	@ 3 1/2d	2 2 1/4	
Getting in Peats 7 8	@ 2 d	1 3	
Peats consumed ----5 1/2 Sacks	@ 9d	4 1 1/2	
Coals -do - 11/14 Fothers	@ 6/6	5 1 1/4	3 8 9 1/2
Slag hearth Smelter Wages for 4c 3q 22 lb lead	@16/-	3 7 1/2	
Cinders assumed for do 6/7 Fo	@ 8/-	6 10 1/2	10 6

Total Charge of Roasting Smelting 30 Bings of Ore £7 1 0

Expenses incurred by smelting (common way) 30 Bings of Lead Ore

Smelters Wages for 7 tons of lead	@ 7/4	2 11 8	
Weigh Ore & Lead for 7 do &3 ps do	@ 7 1/2d	4 6	
Getting in Peats for 7 3	@2d	1 2 1/2	
Peats consumed 7 sacks	@ 9d	5 3	
Coals do 6/7 Fos	@ 6/6	5 7	3 8 2
Slag Hearth Smelters Wages for 4c 3q 8lb lead	@16/-	3 6	
Cinders consumed for do 1 Fo	@ 8/-	8 0	11 6
Total charge of smelting 30 Bings Ore (Common way)			£3 19 8 1/2

Extra expense occasioned by roasting 3 bings ore £3 1 3 1/2

More lead obtained by roasting 7c 1q 4lb @ £36-3–3 pr F £12 10 10 3/4

Deductg the expense of Carr: to Blaydon	16–9		
Extra expense occasioned by roasting as above		3 1	3 1/2
Net profit remaining in <favour> of roasting the Ore		9 9	7 1/4

The above Profit is = 6/3 3/4 per Bing of Ore or £1–4-11 1/2 per Fr of lead

Observations

The roasting the 30 Bings Lead Ore for this experiment was performed Bing after Bing untill the whole was completed as done at Rookhope Mill the Furnace being continued working from the beginning to the end of the Operation – As I was not present during the time of roasting I could not make any observations of the comparative heat used here with Allenheads & Rookhope Mills. The average time required to roast each Bing of the Ore was 1.975 hours, the Coals consumed 0.0805 Fo[the]rs and the loss of weight 0.26 cwts for each bing of Ore or 2.5 p Cent.

Previous to smelting both the roasted and unroasted Ore the Lead <laid> out of the Pan of the Hearth with the Brouse necessary to begin smelting with were weighed as well before as after each operation, the same as at Allenheads & Rookhope Mills so that by this means the exact quantity of Lead obtained from the Unroasted and Roasted Ore was ascertained.

The average & comparative time as well as the consumption of fuel in each operation was as below

Unroasted ore	1.783 hours	0.0285 Fo.s of Coals required for each Bing of ore
Roasted	1.533	0.0262 for each Bing
do		0.0170 Fo.s of Coals for each hour of working
Unroasted		0.0159 for each hour

J Mulcaster

<u>Rookhope Smelt Mill 18th October 1806</u>
Experiment of Roasting Lead Ore

Taken 30 Bings of Breckonsike bouse ore and worked it at the Ore Hearth in the ordinary way which produced as below

			c q lb		Loads
at the Ore Hearth	105ps of lead	q	145 3 -	worked 62 1/2 hours	used 7 Coals
Slag Hearth	3		3 3 19	10	7 Cinders
In all	108	Cwt	149 2 19	72 1/2	14 loads

NB the grey slags made at the Ore Hearth from the above Ore weighed before being smelted at the Slag Hearth Cwt 32 – 2-0

Taken 30 Bings more of Breckonsike Ore exactly of the same quality as the above – the Ore being weighed from the same heap to the Ore Hearth, and to the roasting furnace alternately 1/8 of a Bing at each weigh – the Roasting furnace required 59 hours to roast the above Ore in which time 14 Loads of Coals were consumed. - The Ore by roasting had lost 7c 2st 4lb of its original weight – it was then taken to the Ore Hearth and Smelted in the same manner as the preceding which produced as below

Ore hearth	113 ps lead	155-1-20 worked	45 3/4 hours used	6 1/2 coals
Slag hearth	3	4 2	7 3/4	6 cinders
Roasted	116	159 1 22	53 1/2	12 1/2
Unroasted	108	149 2 19	72 1/2	14
More lead				
By roasting	8	9 3 3		
More time & fuel by the unroasted			19 hours	1 1/2 loads

NB the grey slags made at the Ore Hearth from the roasted Ore weighed before being smelted at the Slag Hearth 30c 2q 0lb

	c q lb	c q lb		
Roasted ore made from Lead	155 1 20	Slag lead	1 - 2	
Unroasted do	145 3 -	do	3 3 19	
Difference	9 2 20		- - 11	

Expenses incurred by roasting and smelting 30 Bings of Lead Ore

Roasting Ore for 7 Tons 1 p lead		@5/4	1 17 8	
Coals consumed 14 loads		@1/6	1 1 -	2 18 8
Smelting wages for 7 tn & 1 p		@7/4	2 11 9 1/2	
Weighing Ore for 7 4		@4	2 5	
Weighing Lead for 7 4		@4	2 5	
Peats consumed for 7 tons 4 ps		@1/4	9 8	
Coals do	6 1/2 loads	@1/6	9 9	3 16 1/2
Slag Hearth Smelting Wages 3 ps		@16/-	3	
Cinders consumed for do 6 loads		@1/4	8	11
Total charge of Roasting and smelting 30 Bings of Lead ore				£7 5 8 1/2

Expenses incurred by Smelting (Common Way) 30 Bings of Lead Ore

Smelters wages for 6 Tons 9ps		@7/4	2 8 1 1/2	
Weighing Ore and Lead for 6–12		@8	4 6	
Peats consumed for 6–12		@1/4	9 -	
Coals	7 loads	@1/6	10 6	3 12 1 1/2
Slag Hearth Smelting Wages 3 ps		@16/-	3	
Cinders consumed - 7 Loads		@1/4	9 4	12 4

Total charge of smelting 30 ps lead (Common way)	£4 4 5 1/2
Extra expense occasioned by roasting 30 Bings ore	£3 1 3

	C q lb		
More Lead obtained by roasting	9 3 3	@ £35 17 6 pr Fo	
allowing for expense Carrge to Blaydon	1 2 6		16 13 11 1/2
Extra expense occasioned by roasting as above			3 1 3
Neat profit remaining in favor of roasting the ore			£13 12 8 1/2

The above profit is 9/1 per Bing of Ore or £1 -18-2 1 ½ per Fo[the]r of lead. The ore and lead carriage will be £13-4-0 so that the above Saving will more than repay that expense

Observations

The roasting of the Lead Ore at this Mill was performed bing after bing untill the whole was completed the furnace being continued working from the beginning to the end of that operation. The Ore was subjected to a greater degree of heat here than at Allenheads Mill, the temperature of the furnace being kept higher as well as being exposed a longer time to its influence – the furnace at this place is considerably smaller and more powerful than that at Allenheads.

The Average time required to roast each bing of the Ore was 1.966 hours the Coals consumed 0.466 loads and the loss of weight by roasting 0.254 Cwts to each bing of ore or 3.177 per Cwt but probably was more, as the Ore after being roasted lay at the Door all night, before being weighed, and a considerable quantity of rain having fallen during that time it would of course absorb a little water and consequently increase its weight & therefore make the diminution of its original weight appear less that it really was – Previous to smelting both the unroasted and roasted Ore the Lead in the pan of the Hearth with the Brouse were weighed as well before as after each operation the same as done at Allenheads Mill by which means the exact quantity of Lead obtained from the unroasted & roasted Ore were calculated. – The average time consumption of fuel was as follows

Unroasted ore	2.083 hours	0.0233 Loads of Coals for each Bing of ore
Roasted	1.5025	0.0216 for each Bing
Unroasted	0.112 loads Coals for each hour of working	
Roasted	0.142 for each hour	

Mem: the benefit arising from the Roasting the Lead Ore previous to its being smelted appearing so very different at Allenheads & Rookhope Mill I think may arise from the Ore being exposed to a stronger heat at Rookhope Mill, and consequently more of the

Sulphur evaporated, and probably the loss of the Lead in the operation of smelting may be in the inverse ratio the Sulphur bears to the metallic part of the Ore

J Mulcaster

Allenheads Mill 11th Octr 1806
Experiment of Roasting Lead Ore

Taken 25 Bings of Allenheads Bouse Ore and worked it at the Ore Hearth in the ordinary way which produced as below.

	c q lb		Loads	
Ore Hearth `	131ps of lead q	130 3 - worked	67 hours used	8 1/2 Coals
Slag Hearth	2	2 1 23	5 1/2	3 1/2 Cinders
In all	133	Cwt 133 - 23	72 1/2	12 loads

NB the grey slags made at the Ore Hearth from the above Ore weighed before being Smelted at the Slag Hearth 22 – 3- 7

Taken 25 Bings more of Allenheads bouse Ore exactly of the same quality as the above – the Ore being weighed from the same heap to the Ore hearth, and to the Roasting furnace alternately ¼ Bing, at each weigh. – The Roasting furnace required 45 ¾ hours to roast the above Ore in which time 13 loads of Coals were consumed. The Ore after roasting was diminished c s lb 6 - 7 of its original weight. – it was then taken to the smelting hearths and produced -

Ore hearth	131 ps lead	133 - 14 worked	49 1/2 hours used	6 1/2 coals
Slag hearth	2 1/2	3 2	7 1/2	3 1/2 cinders
Roasted	133 1/2	136 - 16	57	10
Unroasted	133	133 - 23	72 1/2	12
More lead				
By roasting	1/2	2 3 25		
More time & fuel by the unroasted			15 1/2	2 loads

NB the grey slags made at the Ore Hearth from the roasted Ore weighed previous to smelting at the slag hearth 23 – 3 – 0

	c q lb	c q lb
Roasted ore produced common Lead	133 - 14 Slag lead	3 - 2
Unroasted do	130 3 -	2 1 23
Difference common lead	2 1 14 Slag	- 2 7

Expenses incurred by roasting & smelting 25 Bings Lead Ore			
Roasting 25 bings lead ore	@1/6	1 17 6	
Coals consumed 13 loads	@1/6	19 6	2 17 -
Weighing Ore to furnace for 6 tn	@3	1 6	
Smelting wages for 5 21 p	@7/4	2 3 8	
Weighing Lead for 6	@4	2 -	
Peats consumed for 6	@1/10	11 -	
Coals do 6 1/2 loads	@1/6	9 9	3 7 11
Slag Hearth Smelting Wages 2 1/2p	@16/-	2 2	
Cinders consumed 3 1/2 loads	@1/6	5 3	7 5
Total charge of Roasting and smelting 30 Bings of Lead ore			£6 12 4
Expenses incurred by smelting 25 Bings of Ore (Common way)			
Smelters wages for 5 Tons 21ps	@7/4	2 3 8	
Weighing Ore and Lead for 6 tons	@7	3 6	
Peats consumed for 6	@1/10	11 -	
Coals 8 1/2 loads	@1/6	12 9	3 10 11
Slag Hearth Smelting Wages 2 ps	@16/-	1 9	
Cinders consumed – 3 1/2 Loads	@1/6	5 3	7 -
Full expense of smelting 25 ps lead (Common way)			£3 17 11
Extra expense occasioned by roasting 25 Bings ore			£2 14 5
	C q lb		
More Lead obtained by roasting	2 3 21	@ £35 15 pr Fo	
Deducting the expense Carr to Blaydon		1 2	5 - -
Extra expense occasioned by roasting as above			2 14 5
Neat profit remaining in favor of roasting the ore			£2 5 7

The above profit is 1/9 ¾ per Bing of Ore or £~ 7 2 ½ per pig of lead

Observations

The Roasting of the 25 Bings of Lead Ore at the Mill was performed at 2 shifts or changes of work a sufficient quantity of ore not being at the Mill (belonging the tryal) to keep the furnace at work the whole time of the operation so that the consumption of Coals would be a little increased but could not exceed ½ load as it was only 3 ½ hours between the finishing of the first, and the beginning of the second shift. The average time required to roast each bing of the Ore was 1.83 hours. The Coals consumed 0.52 loads & the loss of weight 0.2423 Cwts to each Bing of Ore or 3.003 per Cwt

Previous to the experiment being commenced The old brouse was laid aside, and the lead ore laid out of the pan of the Hearth, and their weight ascertained, as it was necessary to make use of them at the beginning of the 1st shift of smelting. At the

end of each of the operations of smelting the unroasted as well as the Roasted Ore the weighing of the Lead left in the hearth with the Brouse remaining always after each operation was again repeated as above, by which method the exact quantity of Lead, obtained in each of the operations was ascertained. The average time and consumption of fuel occasioned by Smelting at the Ore Hearth each of the <…….> was as below.

Unroasted Ore	2.68 hours	0.34 loads of Coals for each Bing of Ore
Roasted -do-	1.98	0.26 for each Bing
-do-		0.131 loads of Coals for each hour of working
Unroasted		0.126 for each hour

J. Mulcaster

17 Jan 1807 Joseph Dickinson

No 4 Jany 17 1807

The Upper Coalcleugh Vein in the east End, is now supposed to be through the principle part of the Cross Vein, and at present is in a promising situation, being let for at 20/-per Bing the ensuing Quarter, notwithstanding its disconvenient situation for taking the Work to Bank. Should it continue another quarter will be under the necessity of driving the Waggon Level forward, and sinking another Whimsey, down into the forehead, which expense will be soon repaid, by reducing the price per Bing for raising Ore, and put a fresh circulation of air into the forehead, which at present is very much wanted; and by damming the water back which came out of the Companies works as much as possible, the Engine is now master of the rest, which I very much feared the last quarter; the back ground in the Great Lime still continues to raise a considerable quantity of Ore and the flatts to the East and West likewise. Welhope Vein to the West is likely to continue to raise Ore to the end of the Boundary; the East End not in a situation to make further tryal, untill the air level be worked forward, and a Sump down to Air the limestone forehead, which will take a considerable time in doing. –

Hartley Cleugh Level is still driving forward, and some Ore raised, but there is still more Veins before, untryed and are drawing nearer one another, where we intend to drive to. The Shaft at Greenley Cleugh not yet down into the level when that is done, will be able to prove the Vein in the Great Limestone. The two new Levels are below Coalcleugh and the other in Swinhope is driving forward, with all the expedition possible.

Allenheads- the Vein to the West of the Great Cross Vein, is not yet discovered being obliged to give over driving to fix a Water <Blast> for Air, which is nearly finished, and then will drive forward again. – The West flatts and the old workings on that side hath raised more Ore than was expected last Quarter. The East end not so

hopeful as present as before, but we have the opportunity of employing Workmen to try both the Vein and Flatts further East than they have been proved before, and upon the whole this Mine hath done very well last Quarter, and likely to continue for another. <Britain> Vein hath been upon the decline for some time past Eastward and not knowing of any other Vein working which is likely to join, hath for the present declined driving her further.

Weardale Leadmines – Breckonsike still continues poor, and confirms what I expected, when the first of the cross Veins was discovered, that it woud be to her disadvantage, and is generally so with a rich Vein, and a poor one the contrary, the Back ground is working out so that we shall not be able to raise the quantity of Ore in that Vein as usual, untill the Vein in the foreheads collect their wanted strength. Burtree Pasture. by rising to prove that vein in the upper Sills, a considerable quantity of Water hath been lossed this quantity and more is expected when we come to the bottom of the Firestone, which believe will be sufficient to carry an Engine, to clear the Water out of the Great Limestone which could be a very great saving, and recover a great part of that Sill which cannot now be <entered>, & the further we drive the more <tell> is going under Water. Sedling & Midlip a Long Sike old Mines still continues to raise small quantities of ore and very likely will continue until the <peat> Level unwater them, at an underset. The upper level on the east side of Middlehope Burn hath not a Vein in the Slate and is now rising to the Firestone to prove her. The under Level at that place is short of the Vein about eight fathoms according to calculation and from the situation of that Level shall be able to prove the Vein in all the principle Sills. Wolfcleugh is poor at present and does not produce Ore so well as might be expected from appearances. The Vein below Rookhope Mill I fear will not answer unless some other Vein or <String> join her. The Slitt leadmine hath been poor last Quarter <Crawlah> Bollihope Greenlaws Lasply head, Hasley Gill & Killhope hath all been upon the decline last Quarter. A Fresh Vein from a collection of <Strings> was discovered last Quarter at Blackdean leadmine by making a Cross cut to a shaft now sinking, the appearance is favourable, but no satisfactory trial made, to know her value.

You will see by the above statement some of the Mines are poor and others upon the advance, which is the general case in all leadmines, and perhaps some of these which are now poor will be prospering next Quarter.

I am etc Jn Dickinson

10 Jul 1807 Joseph Dickinson to Christopher Blackett

No.6

Chris: Blackett Esq Dufton 10 July 1807

I take the liberty of forwarding you a Copy of the remarks made on Viewing the Leadmines belonging to Col Beaumont at Midsummer. Beginning with Coalcleugh the

east end of which looks poorer at present, but hath raised a considerable quantity of Ore last quarter; the West End of which, and the small cross Vein, with the flats attending them, never looked better, but still continue hard to work. Welhope old vein at the West end very poor, but expect another opening for Ore before the end of the Boundary, being about Twenty Fathoms. The east end of which is more promising, having raised a small quantity of ore last quarter, and expect more when completely relieved with Air, which will take another quarter at least. The Cross Level at Wellhope, driven westwards out of the main level, in order to cut out the Vein called the <Mess> cross vein hath completed that undertaking, but no trial made in the Limestone where the Ore may be expected. Another quarter will make further discovery, that from the present appearance are not without hopes. The level at Hartley Cleugh is up to the Veins before worked there, and is now driving westward in one of them which is raising Ore, and expect another vein to join in a little further driving, and we have the Cross vein at no great distance before us, mentioned to be cut in Wellhope, which Cross Vein was very rich in Ore at coming out of Alston Moor liberty. We are now pressing the Vein near Greenley Cleugh in the great Limestone, the forehead of which hath a better appearance than heretofore, and pieces of Ore hath been found in the Vein before, but infrequently of late. The new level below Coalcleugh is driving briskly forward & likewise the other Level in Swinhope, but now slowly owing to a quantity of Clay which causes Walling and Arching. I expect to be in hard ground in a few fathoms driving, and the Vein not far of which hope will repay.

Allenheads Lead Mine hath raised more Ore the last quarter than for several quarters before particularly in the east end; both in the flats and Vein foreheads, some of the leading foreheads we reduced the prices considerably, the West flats still certain to riase Ore, and are now worked to a great width, and shall be under the necessaity of taking out the Ore with all the expedition possible before the roof break down, which would put a stop to our proceedings then, except at a very great expense of Wood &c. The Crosscut begun at Xmas lat on the west side of the great cross <Vein> is now driven Southward about twenty fathoms. The vein discovered, but we have cut a considerable quantity of Water, which is very useful, going directly to the Engines, and is assisting in drawing out the bottom Water. I hear our orders for going forward with a finishing Crushing Mill here and at Coalcleugh which upon a small scale would soon repay.

Weardale Leadmine still continues poor upon the whole, and being in general soft workings where the Ore lays, particularly Breckonsike, will be under the necessity of picking out the Ore in the Old Workings, before the Old <runnings> breaks down, we expect an underset of Ore at Breckonsike, which cannot be come at untill the low Level be carried up, which we are pursuing with all possible expedition.—There is a better prospect at Blackdean, than for sometime past, having raised more Ore last quarter than for some quantity before, owing to some more strength being come to the Vein from the North, and continuing with the Vein so far.--- A string Vein was cut the last quarr in that long level on the East side of Midlip Burn, a Bargain was let the last quarter to rise into the limestone above the level to prove the Vein, which they have not

accomplished, but the further up to the limestone the better appearance the Vein makes. – We have bargained again with Alex. Whaley at Brandon Walls Engine, for the same price & <Qiza> as before, to Michaelmas 1808, and by that time expect he will prove the Vein at a considerable distance from the Engine, and then may be worked in whatever way may be thought most convenient to Col Beaumont, Alex. Whaley proposed to take a Bargain in the Upper Sills & break fresh ground, a considerable way westward before the Engine, but did not think right to let him that ground untill a further consideration. Sedling, Midlip, Slitt, Wolfcleugh, Kilhope &c &c are all raising Ore, but the quantity will be considerably up upon the whole than before, and have upon the whole reduced the prices where it would bear it, and left off all the dead work, that would not injure the general working of the Mines, upon account of the falling prices of Lead.

If you wish anything further to be done, desire You will procure me general directions I remain Yours &c Jos. Dickinson

16 Sep 1807 Michael Elliott

Hexham Sept 16th 1807

Description of a Crushing Mill to be erected at Allenheads

Water Wheel 36 feet Diameter & 3 feet wide in the <Clear> will require 14 pair of Arms & 98 Bucketts

The Shrouds - of Cast Iron - 10 In wide or deep in the <Clear> and ½ an In thick with flanges to hold the Buckets & the Shrouds to extend ½ an inch or ¾ beyond the Buckets

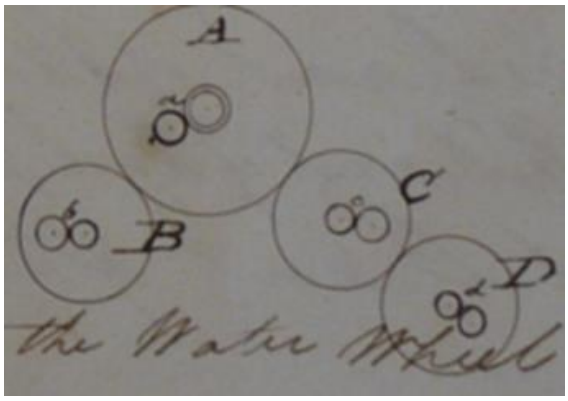
The Arms of Oak - Width at the Shroud end 8 Inches
Do- at the centre <….> 11
thickness 3
The flat part of the Arm may be tapered ¼ of an inch
The arms at the centre 3 inches Further apart on each side than at the shrouds & <sprung> to the Shroud.

[Inserted as a marginal note apparently applying to all of the above:] I have this 3 inches to be 4 or 5 inches which arms of this length will very well allow

The Axle tree – say 2 ½ feet Diam.

Rolls - 4 Pairs one pair Fluted & three pairs Plain, (one of these Pairs to crush Chatts instead of <Stampers>) The Diam of the four Pairs Rolls 13 in each

a the Fluted Rolls
b & c the 2 plain Rolls
d the Chat Rolls



These three Wheels [ie. B, C, D] each 2 feet Diam with 39 teeth. A has 80.

A the large Wheel upon the Water Wheel Shaft 6 ½ ft Diam. --
B & C the 2 Wheels giving Motion to the 2 plain Rolls
D a Wheel the same as A & B giving Motion to the Chat Rolls. --- Diameter of B, C & D 8 feet with 39 teeth in each.

Provision to be made for a Fly Wheel to be added if thought needful. The Wheel when finished to be well painted over with Tar & fine Charcoal Dust mixed to a proper consistency & put on quite hot.

Crushing Mill for Coalcleugh

Water Wheel Shrouds & Arms - The same as at Allenheads

Rolls – also the same as at Allenheads except the 3rd pair for crushing the Chatts, not here to be used – but instead to have a set of 3 Stampers – here thought necessary from the excessive hardness of the materials.

Here as well as at Allenheads let provision be made for a Fly Wheel- which will not only regulate the Motion but also preserve the Wheels &c from the effect of the irregular Motion which will in time effect the joints of the Wheel &c.

at both places the outer end of the Wheel Shaft to have a [blank space] to receive a coupling Box at any time for purposes that may be needful.

Mr Morrison to direct when the Castings shall be made
the Diam. of the Gudgeons to be 6 inches
the Diam. of the wheel to give Motion to the fly 10 feet

the Diam of the lesser wheel upon the Shaft of the Fly < 1-6 / 16>
Diam of the Fly Wheel 18 ft

An Estimate of the Workmanship for Building a Crushing Machine at Allenheads Lead Mine For Thos Rd. Beaumont Esq. –

The Water Wheel 36 feet Diam, 3 feet in the Clear with two sets of Arms & 4 sets of Rollers with 4 <Spur> Wheels, 8 pinions fitted up with Laying Shafts universal joints & Hitching Boxes in the best way and manner with oak frames and head stocks suitable to the said Machine all in a workmanlike manner & to the satisfaction of the Agents of each place The Workman to find all the Patterns at his own Expense for the Sum of £137 -0 -0

The above Estimate is without Casing the Water Wheel in a <ring> Waggonways or Water Troughs, to be made by day Work.

Also, an estimate for a Crushing Machine at Coalcleugh with 3 Sets of Rollers and one Set of Stamps The Water Wheel the same as above, with laying shafts to the Rollers universal joints &c in the same manner as the above described. Estimate for the sum of £137 conformable to the attached description – This Estimate is without Casing in the Water Wheel &c as above

Witness my hand this 16th day of September 1807

Signed Michael Elliott

13 May 1808 John Mulcaster to Martin Morrison

[Note: John Mulcaster refers to his father. This was Robert, the long standing Blaydon agent, who had died not quite 2 months previously, on 19th March 1808.]

Blaydon Refinery, 13 May 1808.

Mr Morrison,

Conformable to your directions I herewith send you a Report of Colonel & Mrs. Beaumont's Smelt Mills & Refinerys with other occurrences relating thereto and am Sir &c, Jno Mulcaster.

Dukesfield Mill.

As considerable Sales of Lead have lately taken place and the demand for some time being principally for Refined lead we have only a small stock of that kind in hand not sufficient to complete the present Sales - and as a large quantity of common Lead is still remaining unsold, it will be necessary to have also ready a proportion of Refined

for any future Sale that may be made. As Mr Morrison was desirous that we should have as much Refined Lead made as soon as possible, and a considerable quantity of refinable lead was laying at this Mill I thought it best to commence the Refinery again, which had been discontinued some time ago on account of their making a bad produce, or over great waste of the Lead in the operation of Refining and Reducing. The Reducing Furnace being very much out of repair and not of a good construction, I desired Mr Westgarth to take it quite down and I sent up one of the Masons we employ to build our Reducing Furnace at Blaydon to superintend the rebuilding of theirs which he has now completed very much to my satisfaction and have little doubt with good reducers of it answering a good purpose - the Refining Furnaces have also undergone the necessary Repairs and expect in a week or two the will be ready to begin Refining.

As Mr. Dixon's Reducers are at present off work at Allen Mill I have desired him to send them over to Dukesfield and stay there a week or fortnight and instruct the Reducers that are intended to remain there, and as one of our Reducers at Blaydon has been obliged to leave off his work on account of ill health, I have taken in his place a young man from Dukesfield who I intend to keep at Blaydon until he is properly instructed in the business after which I will send him back to Dukesfield to remain there as a Reducer.

There is now at this Mill a very large quantity of Lead which the Carriagemen take away very slowly and I am rather doubtful before we can get the whole delivered will be under the necessity of advancing the price of the Carriage, but as the weather has been very unfavourable and as we have not an immediate occasion for the lead, with the approbation of Mr. Morrison, I have resolved to wait a little longer before an advance is offered them.

The South Turnpike road upon which a great part of the Dukesfield and Rookhope Lead is brought to Blaydon is in a very bad Condition especially a branch to Bank Foot, upon which a Tollgate is erected, is almost impassable - Upon representing it to Mr. Morrison he desired me to call upon Mr. Gibson Clerk to the Commissioners, and inform him that unless they would repair the Road immediately, Coll. Beaumont would be under the necessity of enditing it, Mr. Gibson said he doubted they would not be able to do anything more than they have generally done as the Tolls collected were not sufficient to keep the Roads in repair, I told him that in that case there was not any alternative, therefore the road must certainly be endited, & then either the Commissrs. or the Parish would be obliged to make it good, as there was little doubt of getting the enditement passed, which he admitted & promised to speak to the Commissrs. on the subject and inform me of their determination. Unless the do make very considerable repairs it is my opinion that no time should be lost in enditing the road, which will be a great benefit to the Country as well as to Coll. Beaumont and may be the means of making the Surveyors of the other Roads upon which our Carriers travel be more attentive in repairing them in their respective districts, I am certain that in the present condition of the Turnpike we will not get the Lead at present laying at Dukesfield brought in especially at the latter end of the Year without encreasing the

price of Carriage and perhaps not even then without the Road is in a better condition than it was last winter.

The price of Ore Carriage to this Mill not being upon an equality Mr. Westgarth & I have agreed to reduce the price from Breckonsike 6d/Bing, and to advance the price from Coalcleugh and Allenheads 5d/Bing which will be saving on the whole as the quantity from Breckonsike will exceed that from Allenheads & Coalcleugh.

Rookhope Mill.

The Carriage of coals to this Mill having for some time past been conducted in a very irregular manner it was the intention of my Father if he had lived to adopt some new regulations this year to endeavour to remedy that inconvenience.

Many of the Carriagemen took Coals from the Pitt in Cart Loads and laid them down at their own Houses after which they filled them into Sacks of very different sizes, some making the Fother into 10, others into 12 Sacks, and sometimes a greater number just as their sacks were of size, the price of the coals, and for the carriage being charged at the Mill by the Sack or Load, they were in many instances paid for Coals that were never delivered. Upon consulting with Mr. Morrison at the Blanchland Pay it was his opinion that I had better fix a day to meet Mr. Smith the Agent at Rookhope Mill and the Carriagemen at Medomsley, and there state to them such regulations as I thought necessary and endeavour to make a Bargain for the ensuing year. Accordingly Mr. Smith and I met at Medomsley and went both to Mr. Hunter's and Mr. Surtees's Pitts where we saw the Banksmen. I told them that as we had before, the Coals delivered at the Mill in Sacks of very different sizes, we intended for the future to keep a measure of 3 Winchester Bushels which we expected the Carriagemen to carry as a load, but as their future fother was 16 Bolls we would proportion the fothers by that Quantity, for which they would be paid 2s/6d the same as they were charging Country People and not 3s. pr. Load as formerly had been done, which made the fother amount to 2s/8d after some hesitation they agreed to our proposal by which 2d pr. fo. will be saved to Col. & Mrs. Beaumont.

Mr. Smith and myself being of opinion that the price paid for the Carriage of Coal & Cinders was over much We informed the Carriagemen that instead of 1s/3d pr. load for Coals and 10d for Cinders we intended for this year to give only 1s for Coals & 8d for Cinders and that a measure of 3 Winchester bushels would be kept at the Mill for the purpose of measuring the Coals delivered there & any Carriagemen bringing Sacks short of that measure would forfeit the pay for the Carriage of such Coal and Cinders. They all agreed to the regulations but would not accept the price, so we left them, at the same time informing them, that we had other means of furnishing the Mill at a lower price.

As soon as I came home I immediately applied to Mr. Geo. Todd who has taken the Grey-mare Colliery one third nearer to Rookhope Mill than Medomsley and agreed with him, that for the Coals we should want this year either at Dukesfield or Allenheads (which are principally supplied from thence) or Rookhope Mill we were to pay 2s/9d pr. For. of 16 Bolls instead of 3s/ pr. For. of 15 Bolls the price formerly paid,

he also offered to make a further reduction, Provided he could have his payments every 6 Months but as I could not say whether that wd. be Convenient I told him I would <name> his proposal - the allowance [I] believe would be 3d. pr. for.

There has very few coals been sent from this Pit to Rookhope as Mr. Smith does not approve so much of them, as the Medomsley Coals although Mr. Westgarth at Dukesfield gives them the preference for Smelting in the latter opinion I know my Father coincided, I should rather incline to Mr. Westgarths opinion, as they always make a better produce at Dukesfield than at Rookhope , the Medomsley Coals are much better than the Greymare Pit Coals and probably Mr. Smith's Smelters may prefer them as they are enabled to finish their work sooner perhaps at the expence of their employers; I therefore intend to have a Trial made at both places to determine which are the best.

As soon as the Medomsley Carriers understood I was treating for Coals from the Greymare Pit a deputation of them came down to Blaydon and agreed to the terms I had offered them at Medomsley. I accordingly drew up an Agreement to that effect which they signed. The price paid for the Carriage from the Greymare Pitt to Rookhope was 1s/3d pr. sack the same as from Medomsley but I think that 9d. is insufficient for the distance the Carriagemen have to carry them, they have offered to take them at 10d. which if agreed to will make them come considerably lower than the Medomsley Coals.

The following is a statement of the old & new prices from both Medomsley and the Greymare Pit.

<u>Medomsley Coals</u>

Old price		
1 Fothr. or 16 Bolls at the Pit	2- 8	
Carrge. of do. 1/3 p Sack or 10d. p Boll	13- 4	£- 16- 0
New price		
1 For. or 16 Bolls will cost	2- 6	
Carrge. of do. 1/ p Sack or 8d. p Boll	10- 8	- 13- 2
Leaves a saving of p Fo[ther]		2-10

<u>Greymare Coals</u>

Old price		
1 For. or 16 Bolls at the Pit	3- 2	
Carrge. of do. 1/3 p Sack or 10d. p Bol	13- 4	- 16- 6
New price		
1 For. or 16 Bolls at the Pit	2- 9	
Carrge. of do. 10d or 6 2/3 d. p Boll	8-11	- 11- 8
Leaves a saving [per For.] of		4-10

By the above alteration on the quantity of Coals consumed at Rookhope Mill if taken from Medomsley, the saving will be upwards of £100 pr. year and near double that if taken from the Grey-mare Pit provided they answer equally well for Smelting.

As it was Mrs. Beaumont's wish that as many Coals as possible should be taken from Mr. Hunter's Pit the Carriagemen the latter end of the last Year were ordered to load here, and am sorry to find it represented by Mr. Smith that they are very inferior to the Coals they have had from Mr. Surtees, to prove which he pointed out the operation of 2 Months, where each was used 1 Month in Smelting the same kind of Ore, which if the Trial was accurately made, was very much in favour of Mr. Surtees Coals, more than the value of them, but as they will answer well enough for the Roasting Furnace I have ordered the Carriagemen to take a part from each and told the Banksmen, that who furnished the best Coals would have the preference, as I think a little competition may make them both more careful.

I have for some time observed with regret that the Ore delivered here was not properly separated, the Ore of several Mines being put promiscuously with into one Bingstead, and in the monthly operation classed all under one head, which is attended with many inconveniences, first it prevents a comparative view of the produce made at different Mills of the same kind of Ore, it also prevents the selecting that part for Refining which will best bear or repay the necessary expences of the refining operation, as the generality of Col. Beaumont's Lead ore is very poor of Silver and the demands for Refined Lead being almost constant to supply that kind to the market to the best advantage in a concern of such magnitude as Coll. Beaumont's is certainly of the utmost importance & the price of Lead lately having been so very fluctuating it becomes the more necessary as what Lead at one time may be refined to advantage will at another time be attended with considerable loss but if the Ore be smelted separate and the necessary Assays made it then becomes very easy for the Refining Agent to select such Lead as will best suit that purpose, and at all times to take that which will be attended with least loss in order that a quantity of refined Lead may be ready to facilitate the sale of the common [un-refined lead] which can seldom be sold separate. As I was fully convinced of the propriety of keeping the Ore separate I have marked out such situations most convenient to the Mill for erecting an additional number of Bingsteads which will soon be prepared, and have desired Mr. Smith to be careful for the future in keeping the Ore from each Mine separate which I expect he will attend to, and altho' the building the Bingsteads will incur some expence, I make no doubt that the erecting them will be a considerable advantage.

Allen Mill.

The Refining at this Mill is for the present laid off as the old wheel which carried the Bellows is now taken out to make room for the new machinery which is in a great state of forwardness and expect in a very short time the whole will be completed, the 2 new hearths in the new Mill are quite finished, and are now working with the new wheel.

When the Refinery was laid off the old Chimney being in a bad state and not large enough to admit the flue of another furnace it was tho't best to take it down, and a new

one is now building which will be finished as soon as the Machinery for the Refining Bellows, and as it is very inconvenient to work a Refinery with only one furnace it is intended to erect another immediately which as the Refining is performed here under Mr. Dixon's direction as well as any other of Coll Beaumont's works, it may be found necessary to do more of that kind at this place than has hitherto been done.

The horizontal Chimneys erected here have answered the utmost expectation, my observation upon them I have sent to Mr Cockshutt, but as the extension of them at the other works will be attended with considerable expence, it must rest with Coll and Mrs. Beaumont to give directions how far they would wish to adopt them.

A Roasting furnace will be very necessary here, as well as an additional number of Bingsteads as soon as the Masons are at liberty, but expect before that time, Coll & Mrs. Beaumont will be down in this Country.

Allenheads Mill.

The Old [water] Wheel having been for some time in a very precarious State after having undergone small repairs, at length broke down again, by which the work was entirely laid off, as Mr Morrison was at Allenheads at the time he gave orders to Michael Elliott to repair it again and I think as much has been done as the decayed state of the wheel would allow, which will probably make it serve for 12 months or perhaps more; a new crib has been put on all around on one side of the Arms, and new pieces on several parts of the other side wherever they were needful, with pieces of flat iron to bind the shrouds where they were cracked.

Blaydon Refinery.

The Slag hearth just built when Mrs. Beaumont and Mr Cockshutt were last here, I am glad to say has as far as its power extends answered very well as it has enabled Us to procure a considerable quantity of Lead which would otherwise have been laying upon the Roads at present, but as it was only fitted up in a very temporary manner, not being certain we could procure a proper flux, and the power of our waterwheel being very limited we can only work the Slag Hearth at the time the Refinery is off work, as we make use of the same Bellows which are also not powerful enough for it, we therefore cannot work above half we would otherwise do, if we had a power sufficient to Carry a proper blast, so we are still unavoidably accumulating a great deal of work until we can either encrease our power or dispose of our extra stock of wastes, which I suppose will be very difficult.

We have got the Reservoir cleaned out and the communication with the Shaft that supplies the Water from the waste deepened and Mr. Morrison is at present casting the Iron pipes for conveying the water to the Refinery which I expect in a little time will be Completed.

I made an application to Mr. Townley's agent for leave to convey a stream of Water through one of his fields which might be done without any other damage than making a close Conduit through it, and offered to be at every expence and make them a yearly acknowledgement for it, and am sorry that I could not for the present obtain his

consent, but We can carry in another way thro' a small piece of common ground cross the Turnpike into Coll Beaumont's own ground which altho' it will be attended with a little more expence will save the Rent.

We have now introduced thro' the whole of Coll. & Mrs. Beaumont's works running the Slag from the Slag hearth into water which has entirely supressed the use of Stamp Mills which were attended with considerable expence, another improvement has since been adopted of having the Slag run over a Pott with a moveable partition which does not quite reach the bottom, one Part only of which is kept fetled with ashes as before in which the Lead subsides and rises in the other part of the Pot which at the beginning is empty, out of which the Lead is ladled into the Moulds without the necessity of removing the Ashes out of the Pott as formerly done.

Since the above alterations have taken place, the Black Slags are rendered so poor that we have been under the necessity of doubling the price paid for the Lead obtained in working them and rather doubt that it will not be found sufficient, as they are paying much higher at Langley Mill.

I am glad to say that our Lead wharfs here are now in a very different state to what they were when Mrs. Beaumont was last here, We have not now a piece of Lead unsold but are rather in debt to the Mills where we have a large Stock to supply the deficiency and fill up many of the vacancies occasioned by the late extensive sales.

Jno Mulcaster.

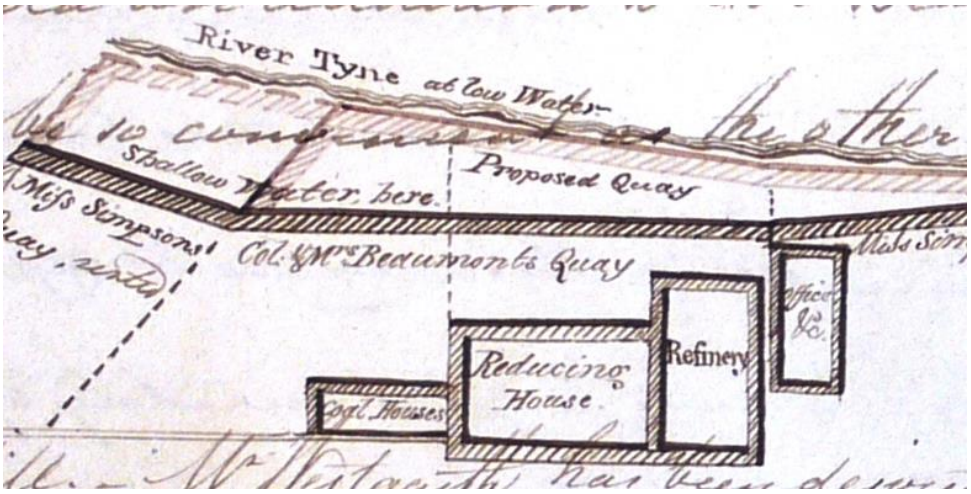
29 Oct 1808 John Mulcaster to Martin Morrison

J.Mulcaster's Report Octobr 29th 1808

Blaydon Refinery.

The Iron Pipes are now all laid & the joints caulked according to the directions given by Mr. Cockshutt; the Pipes are laid in such a manner that the Water can be taken from either Reservoir without stopping the Refinery. The new Reservoir pointed out to Mr. Cockshutt & approved of by him for collecting the Mud etc. which are brought down from Winlaton by the Rain in great quantities, is now forming & will be much easier cleaned than the large Reservoir. Mr. Townley's agent has been again applied to & his acquiescence to use the waste water is expected, which is very desirable as we have a great quantity of old wastes lying at present quite useless in the Refinery - a new Blowing Machine will be wanted as the Slag Hearth is now wrought by the Refinery bellows. It will also be necessary to increase the Power of the Water Wheel, at present unequal. Michael Elliott thinks the Wheel cannot with advantage be widened, and recommends a Cast Iron one which will be very little more expensive than a wood one & considerably more durable. If it is determined to erect Horizontal Chimnies at this place the sooner in the Spring they are proceeded with the better; the advantages of such erections are ascertained from the experiments & calculations already in the

possession of Mr. Cockshutt. - the Quay rented of Miss Simpson and Lord Strathmore is so decayed that it is dangerous to lay Lead upon some parts of it, and to make it useful it is thought that it will be necessary to take it down to the foundations; however, as Coll & Mrs. Beaumont are now only Tenants at Will, it will be prudent to endeavour to obtain a Lease even at an advance. If the Quay is taken down it is recommended to set it out in the manner shewn in the enclosed sketch, considerably more Quay Room being procured thereby, which is necessary; the present Quay therefore must either be put in a state of Security, or, build an addition to Coll Beaumont's own, which will not be so convenient as the other.



Dukesfield Mill.

Mr. Westgarth has been desired to employ the Roasting Furnace as much as possible this Winter and to make repeated Trials of Lead ores to ascertain the benefits to be derived from that operation. If it should be found beneficial to employ the Roasting Furnace constantly at this place it will be necessary to erect a new one in a larger house, as the confined situation of the present place, renders it unpleasant & probably injurious to the health of the Workman. It will make a Coal house & save the expence of building one as projected.

Rookhope Mill.

The new Bingsteads are now completed & part of them in use, an opportunity is now afforded of separating the different Ores, the advantages of which have been pointed out. Clay for making Bricks and Stones for the Foundation of Horizontal Chimnies are preparing, so that We shall be ready to commence building early in the Spring. The Roasting of Ore is here constantly practised as usual.

Allenheads Mill.

Nothing worthy of observation has occurred.

Allen Mill.

The Water Wheel shaft has been examined and additional hoops applied & which has in a great measure cured the Wheel of the noise observed before; a small Stream of Water has been conveyed in a Tin Pipe enclosed in a wood Box to fall upon the Gudgeon. The Bingsteads and the new road leading to them are in progress and expect both will be ready for the reception of Ore early in the Spring. The Counting house and Roasting Furnace is deferred 'til Spring that they may be built in better weather. The old Corn Mill and old low Mill House have been taken down and the Stones applied to building the Bingsteads etc.

The Mill Agents who have Furnaces for Roasting Ore, have been desired to attend particularly to that operation and that the Lead so produced be marked with R which is to be continued upon the Lead after Refining as well as upon the labels attached to the Litharge Casks by which the difference of quality (if any) may be observed & pointed out.

30 Jun 1809 John Mulcaster to Martin Morrison

J Mulcaster's Report of Smelt Mills & Refinery 30 June 1809

[Blaydon]

The reservoirs for the water for Blaydon refinery are now fully completed and Mr. Townley has given leave to convey the Water thro' his Estate which formerly ran waste for which he charges the yearly rent of £2. 2. 0. One of the springs we have got conveyed to the reservoir, the other and most considerable one we will no be able to procure untill a field of Corn is cut, the pipes having to pass thro' a part of it, the distance is very inconsiderable and can be done in two or three days.

A new water wheel with Cast Iron shrouds, Arms and flanges with a new Wheel Case has also been finished, We have also put in a Cast Iron Cistern, the Whole of the conveyance for the Water with the wheel, being now of Cast Iron, I hope their duration will be very considerable. We are at present making a pair of Slag hearth bellows, and wood of sufficient size for the boards being very difficult to procure, and as We shall probably be wanting more for the other Mills, I have adopted the suggestion of Mr. Cockshutt and got them made of Cast Iron, which if they be found to answer we need never be at a loss for boards as the Pattern will always be ready when wanted, the present are very good Castings and I have great expectations that they will answer the purpose.

Nothing has been done to the Quay Wall represented in my last report as being in a dangerous state, the River Jury being upon a view of the River, were shewn the Situation and a sketch of the projection into the River, which they seemed to think too great an encroachment and might probably alter the course of the River. I am not of the same opinion & without We can get the Quay set out considerably farther than it is at present, it would not be worth the expence of rebuilding it; but as we can for the present year dispense with the low Quay, part of which has fallen down, when we

have occasion for more Quay-room I think we had better build an addition to the present range of the new Quay, which would be upon Coll Beaumont's own property. - Having been at considerable expence with the Iron Pipes and Reservoirs the horizontal Chimnies have also been deferred this Season.

[Allen Mill.]

Two new Bingsteads and the road across Mr. Dixon's field to the back of them has been made at Allen Mill and two or three more will be added as soon as possible - a Roasting furnace is also in considerable forwardness and will soon be completed. - The Water wheel shaft has lately again begun to have crackling noise and I have had Michael Elliott [a millwright?] to examine it, who thinks the fault is in the Shaft not being sufficiently strong which makes it bend, and occasions the working of the barrelling - Mr Robson is of opinion that it may be cured by drawing every other stave of the barrelling and reducing them as he thinks that the crackling is occasioned by the barrelling being over tight. - But as Mr Cockshutt will probably be in the Country Shortly, I shall not do anything untill I have his directions. Timber still continuing very dear the building the Counting house here, has been deferred.

[Rookhope Mill.]

The building of the horizontal Chimnies at Rookhope Mill was late in commencing owing to the very uncertain state of the weather this Spring. I thought that the cheapest and most expeditious [way] to get them done was to advertise the building them by proposals, and have accordingly agreed with the lowest on reasonable terms, the person agreed with is a very good mason & qualified for the undertaking.

Having experienced considerable difficulty last year in procuring Carriers for a sufficient quantity of Lead Ore to the different Mills and especially to Dukesfield, we have been under the necessity of advancing the prices this year which yet appears to be insufficient as the Alston Moor Proprietors have more extensively advanced theirs and in all probability would continue to do so if Coll: Beaumont's were again to be advanced, as many of those miners are under the necessity of having the Lead Ore brought to market to procure money to carry on these mines & therefore will give any price to secure the Carriers. From there being such a demand for Carriers occasioned by the great quantities of Ore being raised at Cross-fell and in Alston Moor which has mostly this year been carried to a considerable distance, it becomes the more necessary for Coll: Beaumont to have a sufficient number of his own Carriers who can be depended upon & therefore the more urgent necessity for enforcing as many of Coll Beaumont's Tenants as have convenience for that purpose to keep Galloways.

The Greenwich Hospital having nearly changed all their old Tenants and very considerably advanced their rents, We have had very little assistance from them this year, which has also made our Lead carriers very scarce & obliged us to raise that carriage considerably from Rookhope & Dukesfield Mills, but I have little fear but that We shall be able to get all the Lead brought in that will be wanted.

28 Oct 1809 John Mulcaster to Martin Morrison

J. Mulcaster's Report of Smelt Mills, Refineries etc

Dukesfield Mill.

The late great Flood having carried away the Mill Dam a little suspension of the works has therefore been occasioned - a temporary Dam has been made in its stead which has enabled the Mill to begin work again, and should there be no great Floods this winter, it may serve untill the spring, when it will be necessary to build a new Dam, which I think will be better placed a little further up the Water where a better foundation may be procured - Owing to the scarcity of Carriers & very wet season there will be a deficiency of Ore here of nearly three Months consumption. Very little Lead is left on hand except what the Mill is making, which may all be delivered so long as the Weather permits the Carriers to travel - The Roasting Furnace is still continued at work with the same advantage as formerly observed.

Rookhope Mill.

The foundation for the Horizontal Chimnies is completed & nothing further could be conveniently done without us roofing part of the Mill where the communication arches join which might endanger laying the Works off, should any bad weather happen - I thought it advisable to delay the building until the Spring but the materials necessary for completion of the Work will be got ready this Winter; as the bulk of the building is now finished I expect to have the Horizontals at work early next year. The Mill has a sufficient Stock of Ore to keep it working untill the Carriage commences next Season, and the Lead I expect will be very near all delivered up to the end of this month.

Allen Mill.

The Roasting Furnace & two additional Bingsteads have been finished there & two more in hands will be as many as wanted for the use of the three east Hearths, a Peat, Coal & Cinder House will be wanted for the three Mills which I have marked out & they will be proceded [sic] in soon as the Bingsteads are finished - A very Large Stock of Lead Ore is lying at this Mill which will require additional Ore Hearths to smelt it. Wood & Stones have been provided for two new Smelting Hearths, but the season being so far advanced, the building them has been postponed untill the Spring - a very considerable quantity of Commn. Bricks will be wanted for the Chimnies which it is desirable to have made near the Mill, on examination two situations appear for that purpose; one where Bricks have formerly been made was awarded to Mr. Ruddock at the late Division the other upon the Comn. at Catton considerably more distant & has no convenience for drying the Bricks, unless leave can be procured from the Proprietor of an adjoining Field. Mr. Williamson's Opinion is that Coll. Beaumont has no right to dig Clay in any of the Allotments without the Proprietors permission, it will therefore

be necessary to obtain the consent of the Parties, who will expect a consideration for leave and damages - the less eligible situation is preferable to having them brought from Summer Rods Bar near Hexham, where they have lately been supplied from, the expence of Carriage from that place is considerable, on the quantity that will be wanted, would amount to upwards of £100 - Wm. Robson has had another job at the Wheel Axle tree & cured the crackling noise formerly observed, in his & Dixon's opinion the defect is perfectly cured. Blowing Machines, as well as the Machinery for working them will be wanted for the two new Hearths. I will be obliged if Mr. Cockshutt will give his directions soon as convenient how he intends to have it done that we may proceed with them as soon as possible.

Allenheads Mill,

There being a pair of Double Bellows lying at Rookhope Mill, not used, we have removed them to this Mill and have got them new covered - Mich Elliott is at present fixing them to the No. E Hearth, where there were no Bellows before, this Hearth never having been used since the Arch and Chimney were built. This Mill being so near to the Mines will not have any want of Ore & I expect all the Lead will be got delivered.

Blaydon Refinery.

We have worked a tryal of our New Slag Hearth Bellows with the Cast Iron plates instead of Boards and find they answer extremely well. We have worked up part of the waste washings procured from the Road adjoining the Refinery & have got about 3 [or 5?] Tons of Lead. I dont fear to procure 15 or 20 Tons more, tis and next year. - A considerable saving might still be adopted here by building Horizontal Chimnies which I wod recommend being built in the Spring, the benefit of them having been sufficiently ascertained.

General Observations.

The Smelters at Rookhope Mill on the 11 Sept. Left off their Work alledging as a reason that they could not make sufficient Wages to keep their families, from the Ore being so very bad - and that they would not go to their Work again unless their Wages were advanced to 10s/. pr For. for every kind of Ore. - I wrote to Mr. Smith that I was not sorry his Smelters had left their work as I believed they had some very bad ones amongst them and was glad of an opportunity of selecting the best and supplying the deficiency with better workmen and that none of them should be set to work till I saw him. I went to Dukesfield & selected 12 of the Smelters there (Dukesfd. Mill being then off Work for want of the Dam) & ordered them to make a tryal of the same Ore the others had left off working to ascertain whether it was the quality of the Ore or want of skill of the Rookhope Smelters that caused the deficiency of their produce and Wages - the difference of Produce was considerably in favour of the Dukesfield Smelters but there certainly was great cause of complaint in the quality of the Ore. When the Rookhope Smelters found there was some danger of losing their employment, they

were desirous of being set to work again, requesting the cause of their complaint might be examined into.

I find they have earned upon an average this year about 10s/9d. pr. week but being over many men to each Hearth is part of the cause. - The Wages divided among the proper number would be about 14s/6d for each man - there is now the proper Complement of 4 Men to each Hearth. The Smelters earnings at Dukesfield have been about 9s/8d pr. Week, but there they have also over many. There the proper number would have earned about 13s/6d each pr. Week. When Allen Mill is enlarged we will remove part of the superfluous Men from Dukesfield there. - At Allen Mill the Smelters having constant work and not over many men, earn about 14s/6d each pr. week. At the present price of the necessities of life & considering the Wages paid to common Labourers I think it would be advisable to allow the Smelters a small advance and I wod therefore recommend that they be paid at each Mill 8s/. pr. For. for the Bouse Ore & 9s/4d pr. For. for the Cutting Ore, which will make them earn from 16s to 17s pr. Week allowing not more than 4 men to each Hearth. - As there has been repeated complaints of the Lead Ore not being well dressed, especially that which is made up at this Season after the Carriage ceases & which lays at the Mines over Winter, I took the opportunity to go round the different Mines with the Washing Agents and examined each parcel, and was sorry to find some of them so dirty that I was under the necessity of informing the Washing Agent that unless three parcels were again washed over (which they promised to see done) we could not receive them at the Mill. - From a calculation which I made of the Ore lying at the different Mines and what we have got at the Mills, I find we have a full years consumption of Smelting on hand according to the present power of the Smelt Mills.

Jno Mulcaster
Blaydon Refy. 28 Octo 1809.