

BRITISH MINING No.28

MEMOIRS 1985



Chapman, N.A. 1985
"Messrs Boulton and Watt to Messrs Easterby Hall & Co."
British Mining No.28, NMRS, pp.30-36

Published by the

THE NORTHERN MINE RESEARCH SOCIETY
SHEFFIELD U.K.

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This publication was originally issued in the A4 format then used by the society. It has now been digitised and reformatted at A5. This has changed the original pagination of articles, which is given in square brackets.

ISSN 0309-2199

MESSRS. BOULTON AND WATT TO MESSRS. EASTERBY HALL & CO.

N.A. Chapman

SYNOPSIS

Letters from Messrs. Boulton & Watt to Messrs. Easterby Hall are highlighted which were preparatory to the erection of two large pumping engines at the Shildon and Beldon Mine, in Northumberland by the latter company. These eventually proved too expensive to run and were replaced by water power. The writer has visited the sites and has made detailed drawings of the extant engine house.

For many years an interest in the physical remains of any form of mining has provided opportunities to visit and record buildings in various parts of the country. It was following a report of an engine house still on the Shildon lead mine (NY960570) that we were first introduced to the mines of Northumberland. Measured drawings were made and we tried to identify the engine which had once worked within the structure. About a year later we learnt of the remains of the Beldon mine (NY928496) and its engine house. A visit was made to the site but little of the building was left.

Recently, while studying the papers of Messrs. Boulton & Watt, the name of Easterby Hall & Co. once lessees of the Derwent mines that included Shildon and Beldon mines, appeared among the papers and the following information gathered.

November 4th. 1805, Messrs. Boulton & Watt to Messrs. Easterby Hall & Co. "We were favoured with yours of the 14th. ult. containing an order for a 40 inch by 8 feet stroke pumping engine which we immediately put in hand. We shall forward the drawings and a schedule of materials to be provided all for the sum of £1380 delivered, payable in 3 months from such delivery."

B & W then made enquiries about the credit worthiness etc. of the company even though over the years three Birmingham built engines had been purchased by them. The enquiries came to the notice of E.H. & Co. and one of the partners, Frederick Hall must have written to B & W complaining, as the following gem shows.

Boulton & Watt to F. Hall. November 16th 1805.

"Upon the renewal of our connections with your house after a long cessation of intercourse we judged it eligible to make enquiries respecting the present state as we had sometime ago understood that it was to a certain extent involved in the embassments of the bank of Messrs. Surtees & Co. We may indeed observe that our late enquiries afforded no motive for any disadvantagous deviations in your case from our usual practice."

Boulton & Watt to Easterby Hall. March 14th 1806.

"We have pleasure in stating that the materials of your engine will be completed and that the whole will be ready to be forwarded from hence by the end of the month."

Boulton & Watt. July 15th 1806.

“We have sent the bearer Thomas Pearson for the purpose of erecting your engine. We trust he works completely to your satisfaction.”

The above is a copy of the letter that was given to Thomas Pearson as an introduction to Easterby Hall when he arrived on site. By this time all of the engine was on site awaiting erection.

Boulton & Watt. to Easterby Hall. July 17th 1806.

“We are favoured with yours of the 14th. ult. and the draft for £1400. Mr. Pearson whom we intend to erect your engine left us a few days ago in order to proceed to your mine and we should wish to know when he arrives.”

From the papers it appears that an engine was packed into a series of wooden boxes, loaded on to a canal boat and taken along the canals to the nearest point to the engine house and taken overland. In this case, we know that the boats went to Hull, probably transhipped to a sea going vessel and taken up the coast to the Tyne. Here it would be unloaded at the wharf of Easter by Hall at Bill Quay where the company operated a lead mill already equipped with a rotative Boulton and Watt engine supplied in 1801. The boxes of engine parts must then have been put into a smaller boat for the journey along the Tyne to a suitable point to be transferred to horses and carts for the last part of the journey to the mines. All the items were addressed to “Blanchlande, Hexham, Northumberland.”

It is interesting to note that the draft for £1400 was in the hands of Boulton & Watt before the engine was erected. As operators of Watt engines it seems to say much for the confidence they had in the products of this engine building firm.

At this point, the letters stop until September 7th 1808 when Boulton & Watt reply to another lost letter.

“We have conversed with Thomas Pearson (the engine erector) respecting the articles which you said to have been omitted to be sent with the 40 inch (pumping engine), but he does not recollect any shortages. The cateract (sic) for regulating the speed which he made upon the spot. We shall thank you to inform us what they were, as it is our wish on all occasions to send out materials as complete as possible and with a view to saving time and trouble in the erection.”

The last mention of this engine occurs in a letter of February 7th. 1809, from Boulton & Watt to Easterby Hall.

“The boiler for your 40 inch pumping engine is more than ample for the working of your 9 inch pumps, 30 fathoms, 12 strokes per minute. We suggest under the circumstances as we have stated (it would have been too large to fit a canal boat) to erect it as its present dimensions or to lengthen it by 7 feet as before proposed, for which purposes additional plates might be sent to you.”

MESSRS. BOULTON AND WATT TO MESSRS. EASTERBY HALL & CO.

Unfortunately the information in the Boulton & Watt collection mentions only companies who buy engines without giving too many details apart from sometimes supplying an address. Here we are minus a location of the mine to which the engine was delivered.

A further pumping engine was required for the Derwent mines within a couple of years of the 40 inch engine being supplied.

Boulton & Watt to Easterby Hall. September 7th. 1808. "A 64 inch pumping engine with an 8 feet stroke going at $7\frac{1}{2}$ strokes per minute would raise the whole of the water from the 4 lifts and during the time the 3 upper lifts were only worked it would raise the water at 5 strokes per minute for which your present boiler would suffice. No addition need therefore be made to it until the 4th or bottom lift be added." Here a shaft is being sunk or deepened, hence the need for a 4th lift of pumps to be put into the bottom of the shaft once it is deep enough.

Easterby Hall decided to buy the suggested 64 inch engine as the following letter shows.

Boulton & Watt to Easterby Hall. October. 1808.

"In consequence of the wish expressed in your letter of the 20th. ult. We will despatch the estimate, schedule of the materials of the engine, which we are preparing pursuant to your obliging order. The materials as specified in the enclosed schedule we shall engage to deliver here, properly fitted for the sum of £2054 payable in 3 months from such delivery and you may rely that every care and attention will be bestowed in the execution of them."

Boulton & Watt to Easterby Hall. October 29th. 1808.

"the drawings of your engine were forwarded this morning to your address at Stanhope by the Sheffield Mail Coach." The subject of the boiler to be used when the 4th lift of pumps was fitted is again mentioned in the last letter of the series.

Boulton & Watt to Easterby Hall. February 7th. 1809.

"Your wish to have a new boiler for the 64 inch pumping engine which we are producing for you, we understand that it is your wish that this should be similar to the one represented upon our drawings. But as the period for sending off the materials of the engine is at hand and it would not be possible for us to complete a boiler of that description for 10 to 12 weeks. The materials of your engine are in a great forwardness and all the principal castings are finished."

With this letter ends the information available apart from the drawings also in the Birmingham Libraries. These drawings were produced before the engine was even cast so are somewhat suspect as regards being actual drawings of the buildings and engines as erected. Usually one set of the drawings went out on site to help with the construction as still happens with most buildings. As with modern construction, alterations take place on site because of many unforeseen

problems, so this would have applied more so in the early nineteenth century. Yet a close study of the 64 inch pumping engine house at Shildon and the drawings make it apparent that they are one and the same engine. The main dimensions are within 6 inches of each other, with the front elevation being remarkably similar to the structure as existing.

In 1805 Messrs. Easterby Hall & Co. the lessees of the Arkengarthdale Mines near Reeth, Yorkshire, entered upon the Beldon mines near Blanchland, Northumberland, belonging to Mr. Silvertop. In the same year they also entered Ramshaw, then belonging to Mr. Ord, now to his great nephew, the Rev. D. Capper, and on the expiration of the London Lead Co. lease in 1807, those belonging to Mr. Stottowe and the trustees of Lord Crewe. Thus having gained possession of the whole district, the comprehensive plans of the managing partner, Frederick Hall, could be carried into full effect, the several royalties being so situated as to be in a great measure linked and dependant upon each other for watercourses, reservoirs, roads and other facilities and accommodation.

On commencing work at the Derwent mines, the first object, after opening the engine shafts so far as they had been sunk and some of the old workings, was to consider the most practical and economical mode of proceeding, having so large a field to work upon. It was soon discovered that, though the mines had been wrought for many hundreds of years, the Great Limestone had not been reached in any part of the district. This was known in most of the other northern districts as the most productive strata for lead ore, and from which, it is said, that in Alston Moor, Weardale, Teesdale and Allendale, more lead has been raised than from all the other strata put together. In the Derwent mines the Hipple Sill, High Grit Sill, Low Grit Sill and the Crag Sill had hitherto been the strata most productive. The London Lead Co. having mistaken the Little Limestone, about 2 fathoms thick for the Great Limestone, nearly 10 fathoms thick and about 18 fathoms deeper, had left a wide extent of ground below their old workings unexplored. Mr. Hall therefore, determined to attempt to reach the Great Limestone with all speed, and at such points as would afford the best accommodation for later operations etc. He therefore erected a powerful steam engine, made by Messrs. Boulton and Watt, on Mr. Silvertop's royalty at Beldon, sunk the shafts for pumping and drawing, each 60 fathoms deep, through and 4 fathoms deeper than the Great Limestone, laying open several productive veins and some quick strings.

At Old Shildon he erected another Boulton & Watt engine, more powerful than the Beldon engine. He widened and repaired the pumping shaft which had been sunk by the London Lead Co. to 57 fathoms, continued it, with two drawing shafts, 102 fathoms deep and through the Great Limestone. A winding engine was erected for drawing ore up the two winding shafts.

The "Old Man" had sunk the engine shaft 57 fathoms and used three waterwheels, one below the other for pumping and sunk a sump 17 fathoms deeper to the top of the Little Limestone in which he placed 3 stands of pumps that required 72

men to work them, but could not keep down the water. Crosscuts and drifts were made in various levels above and under the Great Limestone by which several veins were laid open and the mines of Old Sildon, New Sildon, Fellgroove and Standalone [31] could be unwatered and worked, besides a number of veins lying to the south of Old Sildon, from whence large quantities of ore had been raised in the upper strata by the London Lead Co. and former lessees. Stables were cut out of the limestone and horses kept underground to haul the ore from distant points to the foot of the drawing shafts. In the latter part of 1811 the affairs of the lessees became somewhat embarrassed, and to relieve themselves from the difficulty, they determined to dispose of a portion of their interest in the Derwent mines and also in the Arkengathdale mines, to a company of gentlemen formed in London, under the designation of the Arkindale and Derwent Mines Co. who with a large subscribed capital, supplied the means to carry on the works as originally projected. For some time after, the mines were so far laid open as to require little further outlay.

The profits were not sufficient to satisfy the expectations of the proprietors, several of whom retired in 1817; the workings in the Great Limestone were hard and costly, lead did not bear a proportionate value to the prices of iron, steel, timber, ropes, candles, powder, and wages and it became a serious question for consideration as to how far it might be advisable to supersede the use of steam engines by water power. Coal was expensive, and had to be carried 10 to 12 miles over bad roads, and it was, therefore resolved to substitute water wheels and water pressure engines for the steam engines then in use for pumping. Consequently all the water obtainable within the limits of the district was brought by water courses to the highest point possible (where reservoirs were made) and from thence carried over the several wheels and engines for pumping, crushing, washing and smelting, in series, from the highest to the lowest point. Thus, using the same water to work a water pressure engine at Whitecap's then a water wheel for drawing at Ramshaw's and a 44 feet wheel for pumping at the same place, then over two wheels, for crushing and washing the ore at Jeffrie's washing floors, and over a 48 feet wheel, which by the action of sliding rods, pumped water out of two shafts upon Jeffrie's Rake. It then flowed over the smelting mill wheel and a little further below, over one water wheel for crushing and one for driving a runking chain with buckets and working a great number of sieves in the washing tubs. Water from the same reservoirs also served to work a very powerful double acting water pressure engine on a deep shaft in Jeffrie's Sun vein, in Deborah's level. Many improvements were also made by means of machinery and other appliances to economise labour. By these means the Derwent mines went on increasing in produce and realising profits for several years.

From the above report we note that the first steam engine delivered was the 40 inch by 8 feet stroke single acting condensing pumping engine supplied to the Beldon lead mine during 1806 and probably removed from the mine by 1820. A valuable piece of plant such as this would have found a home probably at one of the collieries of the Tyne Valley, but so far nothing more is known of its later life. A report on the mine in 1870 mentions a 60 foot water wheel pumping from a 60

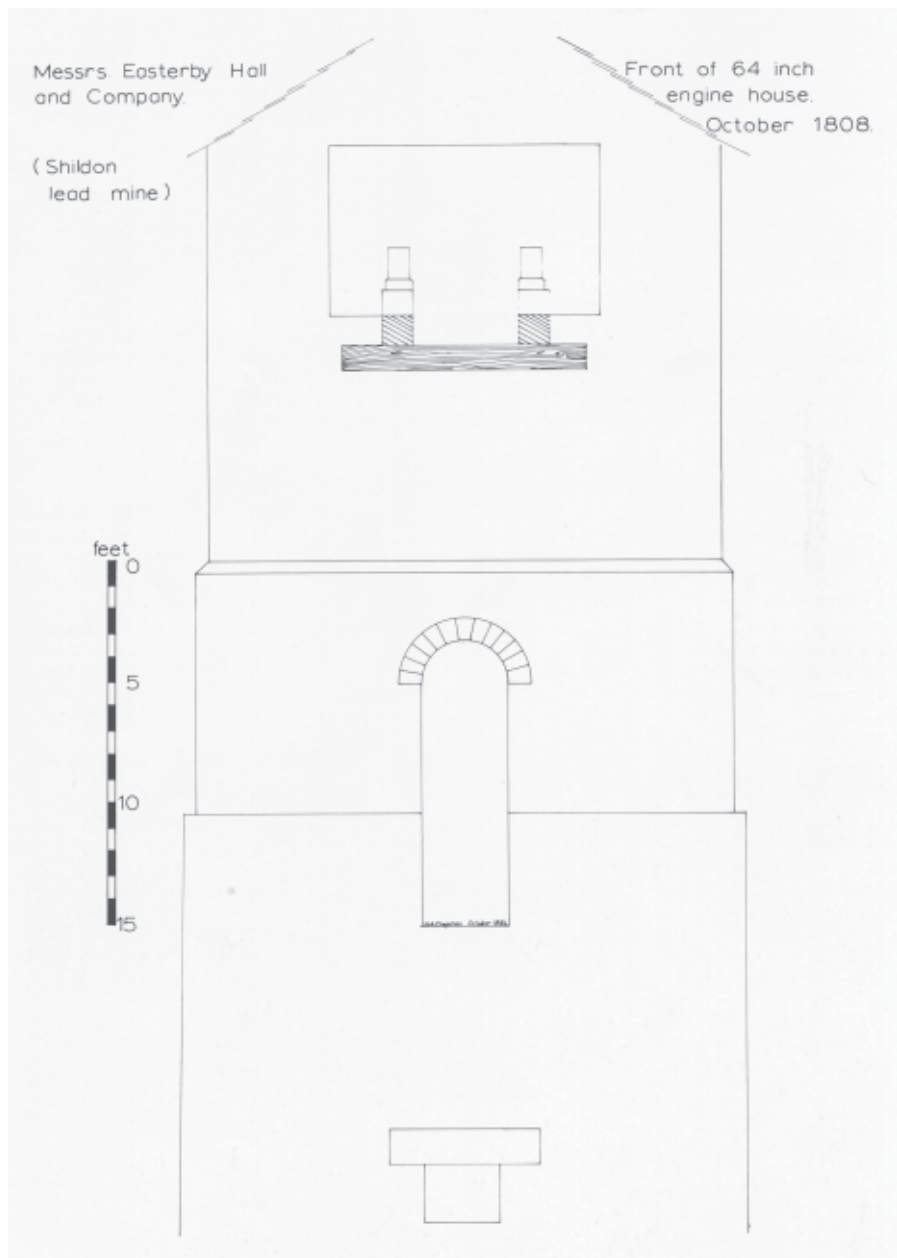
fathoms shaft as well as driving the crushing plant, so steam did not return to the mine.

Again from the report, there is mention of the larger engine being the 64 inch by 8 feet stroke single acting condensing pumping engine supplied to the Shildon lead mine in 1808 and probably removed from the mine by 1820. Here it appears that the cylinder mounting block was taken out and windows altered or added to convert the building into a dwelling. This change of use was the means of preserving the engine house until recent years. Now the roof has gone, the floors removed and the only residents are several families of pigeons. How much longer will this relic of an early attempt at steam power on a Northern lead mine exist?



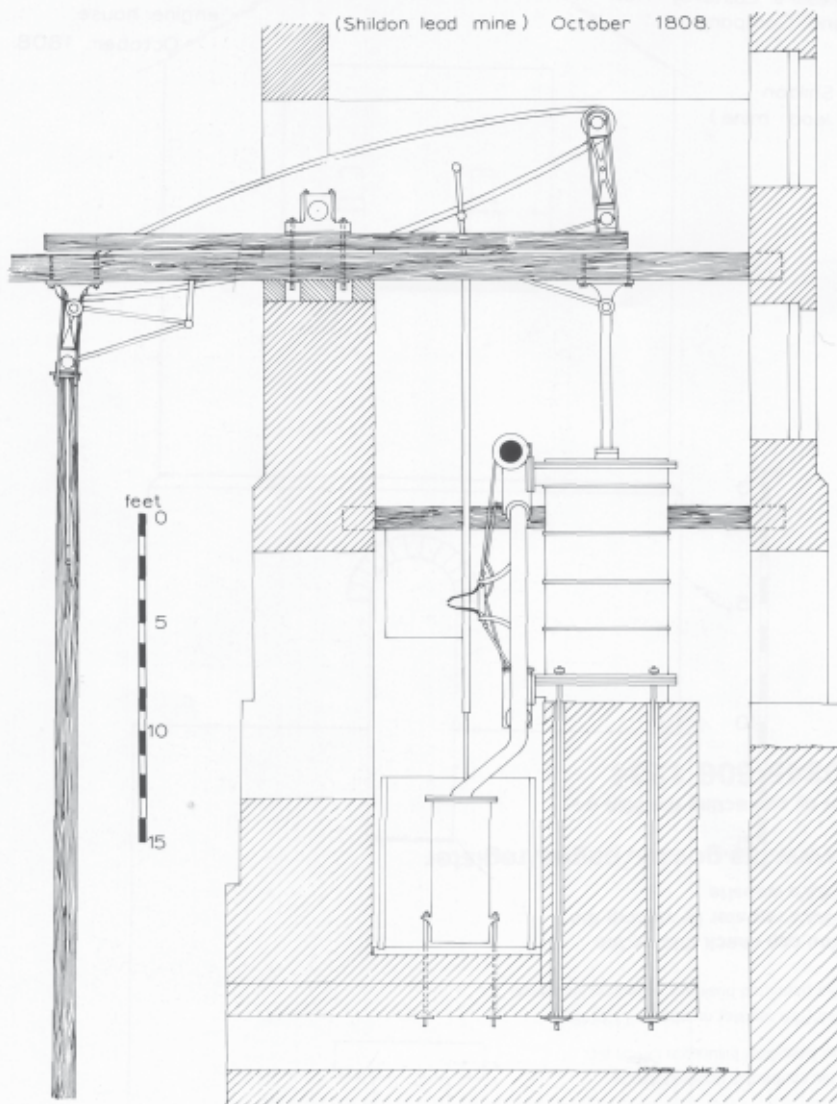
View of the shaft and lever wall at Beldon lead mine.

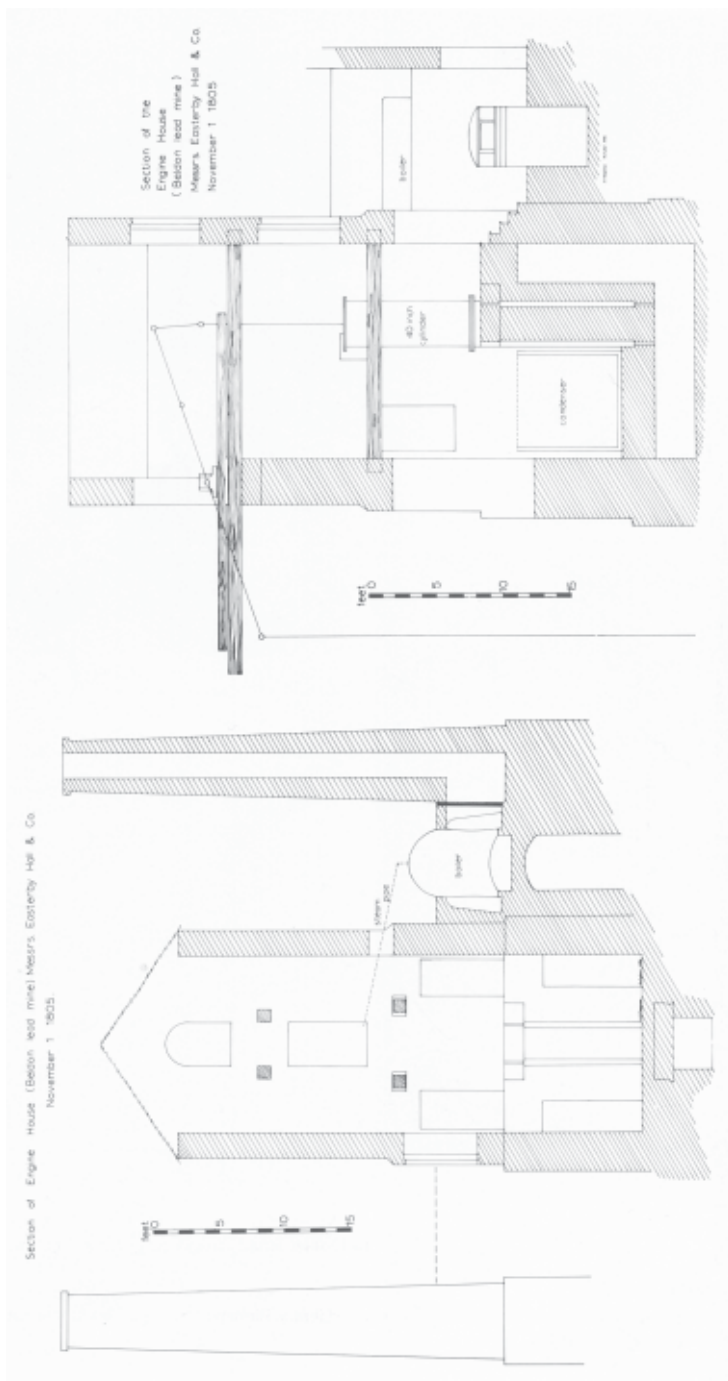
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64 inch pumping engine Messrs Easterby Hall & Co.

(Shildon lead mine) October 1808





Shildon lead mine Blanchland Northumberland. View of engine house from the south.



Shildon lead mine Blanchland Northumberland. View of lever wall with the blocked beam opening

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REFERENCES

Letters and drawings held by the Archives Department, Reference Library, Birmingham Public Libraries and used to produce this article by their kind permission. Mining Journal 1853, pages 88 and 175.