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THE FIRST STEAM ENGINE ON THE LEADHILLS MINES

by W.S. Harvey and G. Downs-Rose

SYNOPSIS

This article is a sequel to the account of the engine on the White Gritt lead mine published in British Mining No.25.

A feature of mining operations, probably as true today as it was two hundred years ago, is that the expense of new plant is avoided if the old will serve. This was certainly a policy of Alexander Popham and his partners of the Leadhills Company, Leadhills Lanarkshire, when they opened a mine on Minehill in 1783. Sufficient water to work a water-powered pump was not available, so they looked around for a steam engine and were able to purchase a second hand Watt engine from the White Gritt mine in Shropshire. Its history there is recounted by N.A. Chapman in British Mining No.25. It then became the first steam engine to be erected at the Leadhills mines where, in spite of mechanical problems, it gave good service into the next century.¹

The Leadhills Company was floated to work mines which had been previously leased from the Earl of Hopetoun by Antony Tessington and, led by Alexander Popham of Hungerford, the company were London based.² They agreed to take the old White Gritt engine sometime in 1786 and in June of that year, John Southern, the chief draughtsman for Boulton & Watt at Soho, sent off a set of drawings. These included modifications – not specified – to “suit your situation” and instructions for the building of the engine house.

The next reference to the engine is in February, 1788, when James Batterley, the manager at Leadhills, wrote to ask that “Robert Muir be sent to build the engine for it was him that took it down and if there be any parts hurt he would be the likeliest to know”. Muir had left Boulton & Watt the previous year to set up in business in Glasgow. Although given the job this could explain why the re-erection was badly carried out. Muir was an experienced and capable erector of Watt’s engines, and that the Leadhills engine was put up out-of-line; with “the cylinder too far into the house and the beam even further than the cylinder”, suggests he was too occupied with his own affairs to give the job the attention it required.

In an attempt to get the engine working, “Mr Symington” was brought in to “put her to rights.” It seems likely he was William Symington, the inventor and engineer, for at the time he was building an engine of his own design on the Bay Mine at Wanlockhead, and saw himself as a professional engine builder.³ But, in spite of his efforts, the engine was still “much out of line” when John Rennie, the celebrated engineer, saw it in 1792.⁴

Even three years after Popham had agreed to purchase it, the engine was still not fully operational, a situation in marked contrast with its previous history at White Gritt. There it had been built and set to work within a year of the order being

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placed. The erector was James Law. He was one of Watts most capable engine builders, and prior to the White Gritt assignment had been erecting engines in Cornwall where mine owners suffered neither delays nor poor workmanship.

When built, the Leadhills engine lifted water 20F to an adit 50F below the engine house. To balance the dry rods there was at first a wheel in the shaft, but this was “laid aside” after an unsuccessful attempt to work another pump from it via slide rods. Instead, the beam inside the engine house was weighted with a lead counter-balance.

Water for the Leadhills Company’s works was a particular problem for their lease apparently did not allow them to use the stream in the adjacent valley. Water for the engine injection had therefore to be pumped as well, and the effluent was used to wash the ore.

Unlike White Gritt, the mine on Minehill proved productive at depth, and in 1794 it was decided to deepen the shaft by another 20F. To work the extra load a new cylinder, 33 ins. in diameter, was obtained from the English foundry of John Wilkinson. Although Carron Company of Falkirk supplied the pumps, and although they supplied the cylinder for the engine Symington built at the Bay Mine, Watt would not agree to their supplying cylinders for his engines.

The modified engine was set to work in January, 1797. A letter of the period refers to two boilers. One was made of copper and measured 8ft 6ins wide, and 7ft 9ins high. The other was said to be larger and, like the engine, was second hand for it had been bought from Wanlockhead where it had been installed in 1779 for the first Watt engine built on those mines. To balance the longer pitwork, Watt recommended that the old balance-wheel should be coupled up. There were two columns of pumps, the upper 9.9/16 ins diameter and the lower 9.11/16 ins. In addition, a pump for the injection water, 8½ ins in diam, drew from a source 25 feet down the shaft. All worked a 8ft stroke. But misalignment still dogged the engines operation for even the new cylinder was “not truly perpendicular.” As engineers have found before and since; an engine badly built is troublesome always.

Such mechanical problems may have influenced the choice of the next steam engine to be built at Leadhills. In 1791, the directors of the Scots Mines Company decided they should have a steam engine to pump a new mine on the Humby Vein, and they instructed the manager, Archibald Stirling, to “look at Mr Watt’s and Mr Symington’s engines to see which has given preference.” The order went to Symington who had a large engine of his own design working on the mine by the spring of 1794.

Building engines was one thing; paying for them could impose even greater difficulties and for some years the Leadhills Company paid for their engine in lead bars. The early Watt engines could seldom be purchased outright. As he himself put [46] it, “our profits arise not from making the engine but from a

proportion of the saving in fuel it makes over the common (Newcomen) engine.” This proportion was paid as a annual premium, spread over twenty five years.

At the best of times many mine owners met this annual burden with reluctance. When trade was bad they found it difficult to meet it at all. Watt had to put the matter in the hands of his Scottish lawyer before he got any payment for an engine at Wanlockhead, and in 1793 no less than eight Cornish mine owners refused to meet their annual payments. One result may have been that Watt and his partner Matthew Boulton were open to alternative methods of payment, for about that time the Leadhills Company came to some arrangements where they paid in the value of lead bars. These were shipped from Leith to Hull and thence taken on to the Soho works in Birmingham.

But the arrangement did not prove satisfactory, and in June 1797 Boulton & Watt wrote to Leadhills “our ignorance of the lead trade has caused us to be considerable losers.” So in future they wanted to be paid by money order, and in May of the following year they were sent a draft of £48 to meet a six month premium, with the promise of more to follow by the end of the year.

In 1804 another, and slightly larger cylinder was purchased. No further details have been noted, but such expenditure meant the engine was seen as being capable of working for some years more. There is no record as to when it was finally taken out of service.

No trace now remains of the great building that housed the engine. The country rock, Greywacke, made for a poor quality building stone, and all the engine houses at Leadhills and Wanlockhead were pulled down to get at any re-usable materials. This has left a mining landscape that now gives but little indication of the many remarkable steam and water engines that once pumped the mines.

NOTES AND REFERENCES

This article is based on research made some year ago by one of the authors, G.D.R., in the Boulton & Watt MSS held in the Birmingham Reference Library. Background details are from W.R. Dickinson & Rhys Jenkins: *James Watt and the Steam Engine*. Moorland 1981.

1. There are a number of references to ‘engines’ being used at Leadhills prior to 1786, and to the supply of castings etc. from Carron Ironworks. But the authors’ researches over a considerable number of years show all these devices were water powered. They are therefore confident that the steam engine from White Gritt was the first on the Leadhills Mines.
2. For further details see W.S. Harvey. Pumping engines on the Leadhills Mines, *British Mining No.19* 1980-1982, pp.5 to 14.

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3. For details of William Symington's career, and of the Watt engines at the Wanlockhead mines, see W.S. Harvey and G. Downs-Rose. *William Symington, Inventor and Engine Builder*, 1980.

4. Ibid p.76

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