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## **THE DUKE'S LEVEL, GRASSINGTON, A COMMENT ON JOHN TAYLOR'S VIEWS**

by M.C. Gill

Following my review of Dr. Burt's book, *British Metal Mining Technology in the 18th and 19th Centuries*, in which I expressed the hope that various statements would stimulate discussion, I have attempted to amplify those relating to the Grassington Mines.

On the High Moor, the greater part of the veins had been located by the 1780s and most had meers granted on them. From the mid 1760s the output of the mines had steadily declined, even the extremely high prices of the Napoleonic War years (1796-1815) only caused a slight upturn in the trend. To what extent this falling output was related to the restrictions of working by the Meer system, introduced from Derbyshire by the early miners, or the lack of a deep adit, cannot be gauged with present knowledge. It is likely that the latter was most greatly felt at that time.

In 1796, the Duke's Level was commenced, from a point of Hebden Gill, and driven in a direct line towards the Beevor Mine at Yarnbury, on the Low Moor. After a drive of 500 metres the level was realigned to cut the Yarnbury Veins at Cockbur and still be at a convenient point for continued driving to cut the High Moor Veins.

In 1818, John Taylor was appointed the Duke of Devonshire's Mineral Agent. In his customary style, Taylor's arrival marked a new paradigm in mining operations at Grassington. There was an injection of capital and expertise for a programme of rationalisation. John Barrett, Taylor's resident agent, appears to have concentrated efforts on the Yarnbury Mines, which had been reached by the Duke's Level by 1820. It was here that the various innovations in the layout of surface plant were carried out. On the High Moor, Taylor tells us that some of the deeper mines had been standing for some time, for want of an adit. Here, he erected a 50 feet diameter waterwheel, the Brake House wheel, and in two or three years had the mines producing again. It is likely that two of the mines thus treated were Coalgrove Beck Engine Shaft and Old Moss (Pit Moss) Shaft, a line of rods being shown on an old plan, and evident in the field. This gives us a date for the early part of the true mechanisation of Grassington Moor, i.e. c1820.

From 1825, however, the price of lead (metal) fell until, in 1832, it reached £11.65 per ton. Regrettably, the annual production figures are not available for this period, although Dr. Raistrick gives a histogram, in blocks of five years, which indicates a considerable upturn. By 1836, prices had risen to a new level of £24.25, before settling back to an average of about £18.05 for the following ten years, which no doubt provided a stimulus to speculation in matters mining.

Taylor's enterprises in Mexico were also struggling against massive losses by the mid 1830s, the heady days of 1824, when the first Cornishmen arrived at Real del Monte Mine, being long forgotten. He was subjected to great pressure regarding these losses and must have been casting around for other examples of highly capitalised

ventures where he could claim to have cut costs, no doubt having an eye on the upturn in trade.

These were the conditions which Taylor had in mind when he wrote, in 1837, about the efficacy of steam powered pumps in preference to adits, which often failed to prove significant new ore deposits. It is interesting that he chose to compare the Duke's Level with the Gwennap (County) Adit and Nent Force Level, which apart from being adits have little in common, the former touching only shallow depths on a whole complex of deep deposits, and the latter being a very long crosscut in virgin ground thought likely to carry ore. The Nent Force Level can only be regarded as an abject failure, finding no valuable new deposit and never significantly adding to the drainage of the mines in the Upper Nent valley.

True, with hindsight, Taylor was able to point to the great expense incurred in the fulfilment of such adits, which, in the case of the Grassington Mines, had not produced ore of any value. It must be remembered, however, that the bulk of lead production from the High Moor did not commence until the late 1830s, by which time the adit was connected to the system of haulage shafts, laid out by Taylor. It was then that the graph of price compared to that of production shows a close relationship, and production was able to rise quickly in response to higher prices during the Crimean War (1854-1856).

Very little ore came from below adit, and was mainly confined to the narrow horizons of the Bearing and Top Grits, with some in the top of the limestone. In the instances of deeper trials, into the underlying limestones, at Coalgrovehead (Moss) and Brunt's Shafts, waterwheel-powered pumps were employed as indeed they were at Old Moss [59] Shaft, where the 72 fathom (adit) level was continued to the east, but not westwards to the adit at Coalgrovehead, some 300 metres away. This entailed pumping water into the inter-connecting 60 Fm. level. Ore was also raised from a 12 fathom under-level at Yarnbury, which was pumped into the adit.

### CONCLUSION

Certainly, the initial scheme, which was to drive the level to the dimensions of a boat level, now appears both grandiose and ill thought out, the dressing and smelting mills being on the moor! Purely as an adit, it was a logical and well laid out development. The relatively short distance to the Yarnbury Veins ensured some 50 fathoms of backs there, and the longer one to the High Moor gave 72 Fathoms of backs, both nominal. From Coalgrove Beck Engine Shaft, the adit was continued principally as a drift, along various inter-connecting veins, to Coalgrovehead Shaft.

The unfortunate factor was the ten year drop in the price of lead which started at a time when the first benefits of the adit should have been reaped. The cost of the level, given as £33,000, would have been spread over the 28 years taken for the drive, of which only a few later years gave any return. This was the crux of Taylor's argument for the use of steam engines in favour of adits, which is counter to a conclusion that he had reached a year earlier, "The adit levels of some of the lead mines of the North of England are so advantageous, as almost to render unnecessary,

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to their latest working, the expense of much machinery; arising from the great height of the mountains, and from the vein which there produce lead ore, not continuing to be productive to a very great depth, like those which are productive of copper and tin”.

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