
Robert Bald, mining engineer: a view of the early 19th-century collieries of Fife

Stuart Farrell

'An attention to system is attended with the best consequences not only to the proprietor, but to the tenant whose interests are so intimately combined.'

Robert Bald 18/2/1814 (CB 27/1, 397)

The above statement almost summarises the reports of Robert Bald. His attention to detail and the need for a system of working dominate his writings. But his writings which survive, from 1808 to 1825, cover a period when the increasing complexity of industrialisation made the need for a 'systematic' approach more evident in day-to-day life. Also included in his reports are notes of royalty practices, the use of machinery, methods of removing water, waggonways and saltworks associated with the collieries.

Background

Robert Bald was born in 1776 in Alloa into a family with a deep involvement in coal mining; his father and his eldest brother were both coal proprietors. He himself managed, and later ran, his own collieries; at times he had to restrict his opinions of certain collieries because of his own interests. His views were not always taken seriously by land-owners, in particular the 11th Earl of Kellie in Clackmannanshire, who 'disagreed with Robert Bald's unpopular puritanical paternalism' (Ward 1971, 74). His ideas on the future of certain works did not always materialise. For instance, his report on the Balgonie Ironworks in 1817 (CB 27/2, 273-86) suggested that the ironstone rights might be taken up by the Carron Iron Company, but without success; the works went out of use in 1823 after running at a loss for 5 years.

Working practices

During this period the most common practice of working coal in the Fife coalfield was the 'room-and-pillar' system. The system known as the Shrop-

shire or long-wall method was occasionally used, both methods using 'day' levels to drain water away.

The room-and-pillar method involved leaving pillars of coal in place to support the roof, and, as each room was completed, the pillars would be wholly or partially extracted. However, there was no regulation of pillar size to prevent accidents or cave-ins and in Bald's report on the Baldrige colliery in 1814 (SRO CB 27/1, 387-97) it was noted that the pillars varied in size from 6 x 9 feet and 8 x 7 feet, while the lease stipulated that pillars were to be 18 x 12 feet. This had led to a crush or fall of the roof, the impetus of financial gain over-riding that of safety.

The use of the Shropshire or long-wall method (as the name implies, involving the use of a long face) was a rarity in this period, even if it did enable a more complete extraction of coal. This was due to the coal seams in west Fife being too shallow, at generally less than 5 feet thick.

Drainage of water

The use of 'day' levels to draw off water were of the greatest importance to the effective running of a colliery. Time and again references are made by Bald to the need for well-maintained levels in sufficient numbers for the winning of further seams of coal. Although a 'level-free' (naturally drained) colliery meant cheaper running costs, as a rule, maintaining drainage levels was a major part of the collieries' operations. A number of collieries were closed for long periods, or even abandoned completely, because of the problems of water. The 'day' levels were those in an area of a large number of separate collieries, such as the Dunfermline

coalfield, which were maintained at a standard which safeguarded the interests of all the collieries.

Prior to the introduction of steam engines, water had been drawn by windmills or by the use of hand pumps. The latter were still being used at the time of Bald's reports (Wilson 1985). On numerous occasions, descriptions on the engines, pumps, and water barrels used are given. At Townhill Colliery in 1810, Bald wrote that 'this colliery is drained by a steam engine of the common construction cylinder 40 inches diameter, stroke 6 and a half feet; depth of pit 40 fathoms; 2 piles of cast-metal pumps; the lower level of 9 and a half inches diameter; the upper 10 inches diameter; two boilers 17-11 feet diameter' (SRO CB 27/1, 165-6). Elsewhere the engine in use was not powerful enough to cope with the amount of water to be removed causing flooding; a common feature in many reports.

Royalties

The issue of royalty payments by tenants features commonly in Bald's reports. On occasion the problem of royalties hampered the development of the colliery as proposed by Bald. Townhill colliery paid a royalty to the town of Dunfermline of one tenth per ton, while the town burgesses were allowed to purchase at a rate below the retail charge, causing a loss of £400 in 1817, a sum greater than the rent.

Likewise, the town councils' refusal to commit to the development of the coalfield at their own expense led to the colliery nearly being abandoned. The expansion of Townhill was first proposed by Bald in 1815; ten years later the council had still refused to agree that they, rather than a tenant, should fund the development, despite expecting the same or a larger royalty. In a period of falling prices this would cause any prospective tenant to think twice about taking on the lease. Bald argued that the development would secure a royalty rather than lose one. In contrast, private landowners were more open to the need for improvements at their own cost, if it led to the coalfield being let and gave them a regular income.

Waggonways

One of Bald's foremost requirements in the development of various coalfields was the use of waggonways, both above and below ground. This advice was certainly acted upon at Fordell and Balbirnie, among others. At Balbirnie in 1814 Bald recommended the substitution of iron railways and trammers below ground 'as the expense of horses is uncommonly great and every colliery is now giving up horses and resorting to the tramming system' (CB 27/1, 425-6).

Prior to this, many collieries had employed the use of women and children in the movement of coal to the pit bottom, a practice which Bald had long deplored (Bald 1812), though he makes no mention of its continued use in any of his reports. At Fordell in 1817 (CB 27/2, 437-62) he proposed the replacement of not only the horses in the pits but also the former wooden railway which ran from the colliery to St David's harbour. Replacing horses with rails would, he believed, halve the cost of bringing coals to the pit bottom from one shilling per ton, creating a saving of £22 per fortnight for the movement of the coal from coalface to pit-head.

The wooden waggonway to be replaced had been built between 1750 and 1760 (Dott 1947, 5). It was of 'double rail, beech over fir, laid on wooden sleepers 2 feet apart, on which a 3-ton waggon was drawn by one or two horses' (OSA 1794; Dott 1947, 5).

According to Bald's report the waggonway needed between £400 and £500 a year for its maintenance, being 5 miles in length. As part of this replacement Bald saw the need for a steam engine on the hill near Fordell House 'for regulating the descent of the waggons' (CB 27/2, 457). Although the iron waggonway was not constructed until 1836, the engine was incorporated and an engine house is depicted upon the hill on the 1st edition OS of 1854 (Sheet 39; map reference NT 148/829).

Saltworks

Two saltworks are noted by Bald, those at Preston Island (NT 007852) and Dysart (NT 304929). Both operations relied on the availability of cheap coal and a ready market for their product. The late 18th century saw a rise in both coal and salt prices, making production of the latter more commercially viable.

In 1814 Bald noted that the two saltpans at Preston Island (CB 27/5, 461-73) were operated by four men and a woman producing 130 bushels of salt fortnightly at a profit of £10 4/-. But this was not a balanced situation as 'attention must be paid to observe that in working the coal to supply the salt works, the loss occasioned in working the coal, does not more than exhaust all the profits made by the salt' (CB 27/5, 471). Bald saw no reason to extend the saltworks until the problems of the coalfield were sorted out, even if the water from the pit bottom produced better salt than drawn directly from the sea. The repeal of the Salt Duties in 1823 soon ended the works at Preston Island. A more detailed history and the results of recent archaeological excavations have been described elsewhere (Ewart et al 1996).

The saltworks at Dysart were owned by the Earl of Rosslyn, and by the time of Bald's report of 1817 (CB 27/2, 397-418) there were only six pans

in operation. He noted that 'without the salt pans at Dysart to consume the small coal, the Dysart coal cannot be wrought on account of its spontaneous ignition if left below ground' (CB 27/2, 413–4). This situation had led to a series of fires, one of which burned for a number of years. The nature of this coal may have put onward costs on the production of salt. Bald recommended that 'the pans can either be let at a fixed price or by certain royalty paid on the small coal consumed on them' (CB 27/2, 417). But this was to no avail as the result of the repeal of the Salt Duties of 1823 led to the end of the saltworks at Dysart soon after.

Conclusions

The reports of Robert Bald from 1808 to 1825 give an interesting insight into the early collieries of Fife, but they are inevitably limited in their scope. Little or no mention is made of the conditions of the employees in the collieries, only of the number of colliers employed. Only in Balds' report on the colliery at Urquhart, Dunfermline (CB 27/3, 123–45) is a comment made that the colliers housing although inhabited was to be removed soon after (p. 144). Further work is required to give a better picture of the collieries that Bald knew, and to provide a more detailed history of the collieries he described.

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Abstract

For over 40 years Robert Bald (1776–1861) wrote and gave his opinions on the working practices of a few of the collieries in Fife. He saw the industry go through tremendous changes, particularly as a result of the changing economics of the market and the rise of industrialisation. His writings not only show us the condition of these mines but also the attitudes with which they went 'hand in hand'.

Key words: coal, salt, collieries, waggonways, Fife