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LEAD MINING IN THE WIRKSWORTH DISTRICT DURING THE LATE EIGHTEENTH AND EARLY NINETEENTH CENTURIES

by

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The following article is based on some of the material collected by the author and used in a University of Nottingham thesis on the growth and development of Wirksworth since the year 1800 (Ottery, 1966).

Wirksworth lies some fourteen miles north of Derby at the head of the Ecclesbourne valley. It is situated at the junction of the Carboniferous Limestone with the shales of the Millstone Grit.

The Carboniferous Limestone provided lead ore and until the end of the last century the extraction of this ore afforded one of the main means of livelihood. Much of the limestone is heavily mineralized and most of the veins, which form a very intricate pattern, have been mined for the lead. The map which is a copy of an 1826 map shows the occurrence of these veins and their proximity to Wirksworth. The underground drainage of the limestone is such that practically the whole of the outcrop is devoid of surface water. The drainage due to the natural jointing and fissuring in limestone has been accentuated by the network of soughs or drainage channels constructed to "unwater" the lead mines. The most important of these have been studied and described in detail by Miss Nellie Kirkham (1951).

Defoe in the 1720's stated that the "town of Wirksworth was a kind of market for lead" and he attempted to explain the laws of the Barmote Court appertaining to lead mining. Pilkington (1789, II, p. 300) and the Lysons (1817, p. 293) in their "Magna Britanica" confirmed that Wirksworth's main functions in the latter half of the 18th century were still as a market and as a lead mining town.

The original of the accompanying map was compiled by J. Wheatcroft in 1826; it shows and names the main lead veins and soughs. The map shows five main veins and two groups of smaller veins. In addition there was a group of small veins on Middleton Moor, a mile and a half to the north-west of Wirksworth, although thisgroup is not depicted on the map. The largest and richest of the lead veins was the Gang Vein;

this ran parallel to the Oakerthorpe Turnpike Road at Middleton and into the neighbouring parish of Cromford. Allied to this vein was the Venture Vein running through Cromford hillside. At Bolehill, under the edge of the Millstone Grit shales were the Wall Close and Bage Veins. The latter was probably second only to the Gang Vein amongst the Wirksworth veins in the quantities of lead it produced. Finally there was the Grey Mare Vein which ran in an east-west direction under Wirksworth Hollow and the Wirksworth-Cromford road. The majority of the smaller veins were concentrated in a north-west to south-east direction, at Bolehill and to the east of the Wirksworth-Middleton road. The Bolehill group included the Brownson, Burton, Sandy and Butler Veins, whilst the second group included thirty veins of which the most important were Raventor and Good-luck Veins and to the west of the road the Northcliff and Middlepeak Veins. At Middleton-by-Wirksworth the most important were the Slack Rake, Samuel, Burrows and the veins tapped by Jackson's Mine. The map adds emphasis to Ince's remarks (1827, p. 19) on the spoilation of the land to the north of Wirksworth by lead mining. Most fields between the limekilns at Wirksworth (now the site of the Lime Kiln public house) and Rise End, Middleton, by the Rising Sun public house, had at least one lead vein in them and the two small fields at the junction of the Wirksworth-Middleton road with the Oakerthorpe-Turnkpike road had eight veins running through them. The spoil heaps can still be seen today.

Glover (1829, p. 70) estimated the Derbyshire production of lead at between 5,000 and 6,000 tons per annum, and the number of miners at 2,280. If his figures are correct, it seems that lead mining remained remarkably stable for a good many years, until 1861 in fact. Yet he stated that the lead trade was on the decline, caused in the main by the necessity to "unwater" the deeper veins by soughs or by pumping. Both these rendered the mines more difficult to work as well as more expensive, but improvements in smelting counterbalanced the increased costs. Another factor which indirectly added to the expense of mining was the payment of mineral rights to the King's lessee and tithes to the vicar. Richard Arkwright held the mineral rights of the Wapentake of Wirksworth and one thirteenth of the ore raised was due to him, but seldom was more than one twenty-fifth taken. By agreement made in 1778, the vicar consented to take one fortieth, reserving, however, the right to take every tenth dish of ore on each new freeing.

Assuming that a load of lead weighed five hundredweights and assuming that Glover's estimate of Derbyshire lead production is correct, the Barmaster's account of ore raised within the Soke and Wapentake of Wirksworth from 1811 to 1829 showed that the district produced just over half of Derbyshire's output during the early years of the century (P.R.O., DL 41-62). The lessee made a profit of just over £800 per annum on the mineral rights during the period 1811-1819. In 1811 Wirksworth produced 1801 loads, Middleton 2440 loads and Cromford 4470 loads out of a total of 12,021 for the Wapentake. The majority of the Cromford ore came from the Dove Gang Mines which adjoined the Wirksworth and Middleton boundaries.

Nevertheless, in spite of the war-time demand for lead in the very early years of the 19th century, it appears that lead mining had declined somewhat from its earlier peak of the 1780's. Farey remarked in 1811 (p. 385) that the smelters "are doing but little, and some of their works shut up occasionally, owing to the supply of ore being so greatly inferior to what it was about twenty years ago". Glover, about 1827, stated that "250 families of Wirksworth parish were engaged in working the lead mines, engaged in professional pursuits" (presumably in connection with lead) "or were unemployed". This means that approximately one third of Wirksworth's eight hundred families were connected with lead mining so it would seem that his claim that lead was still the town's staple industry was justified, although production had fallen. It was during this period of slacker production that slag from the primitive, early holes was collected and smelted to supplement the new ore (Glover, 1829, I, p. 81).

As the lead mines under and around Wirksworth became deeper so the soughs to "unwater" the veins had to be driven longer and deeper. The first of these appears to have been the Longhead Sough constructed by Sir Cornelius Vermuyden in the middle of the 17th century to drain the Gang Mines. This led into the Cromford Sough and drained many of the western group of Wirksworth mines. Glover noted in 1827 that they were being drained ineffectually as they were now below the level of the sough. It was the stream from this sough which Sir Richard Arkwright used to work his Cromford cotton mill and which was also used to supply Cromford Canal. The second big Wirksworth Sough was called Wirksworth Moor Sough, later the Meerbrook Sough, and ran for three miles from Wirksworth Moor to the Derwent. This sough drained the Bolehill group of mines and according to Farey cost £45,000. Its later section drained some of the western group of mines below the level of the Cromford Sough. Other soughs in Wirksworth included the Hannage Sough, which drained water from the vicinity of the churchyard into the Ecclesbourne and a reputed sough which Pilkington and others reported as draining back to the south of the town and entering an Ecclesbourne tributary near Millhouses. Wirksworth was, and still is, undermined by both lead mines and soughs and this has presented difficulties with water supplies as it has meant a lowering of the water table and also a reduction in the water flowing into the Ecclesbourne, since the two main soughs conduct water to the Derwent.

Glover listed 55 lead mines in the Wirksworth district, 23 actually in Wirksworth, 11 in Middleton-by-Wirksworth, 10 in Cromford, 3 in Carsington, one at Alport, one at Hopton, 4 extending into both Wirksworth and Middleton and one between Hopton and Wirksworth. Unfortunately he did not distinguish between those which were still working and those which were worked out at the time of his writing. He did, however, go into considerable detail as to the geological conditions and subsidiary minerals found in each mine. His list tallies

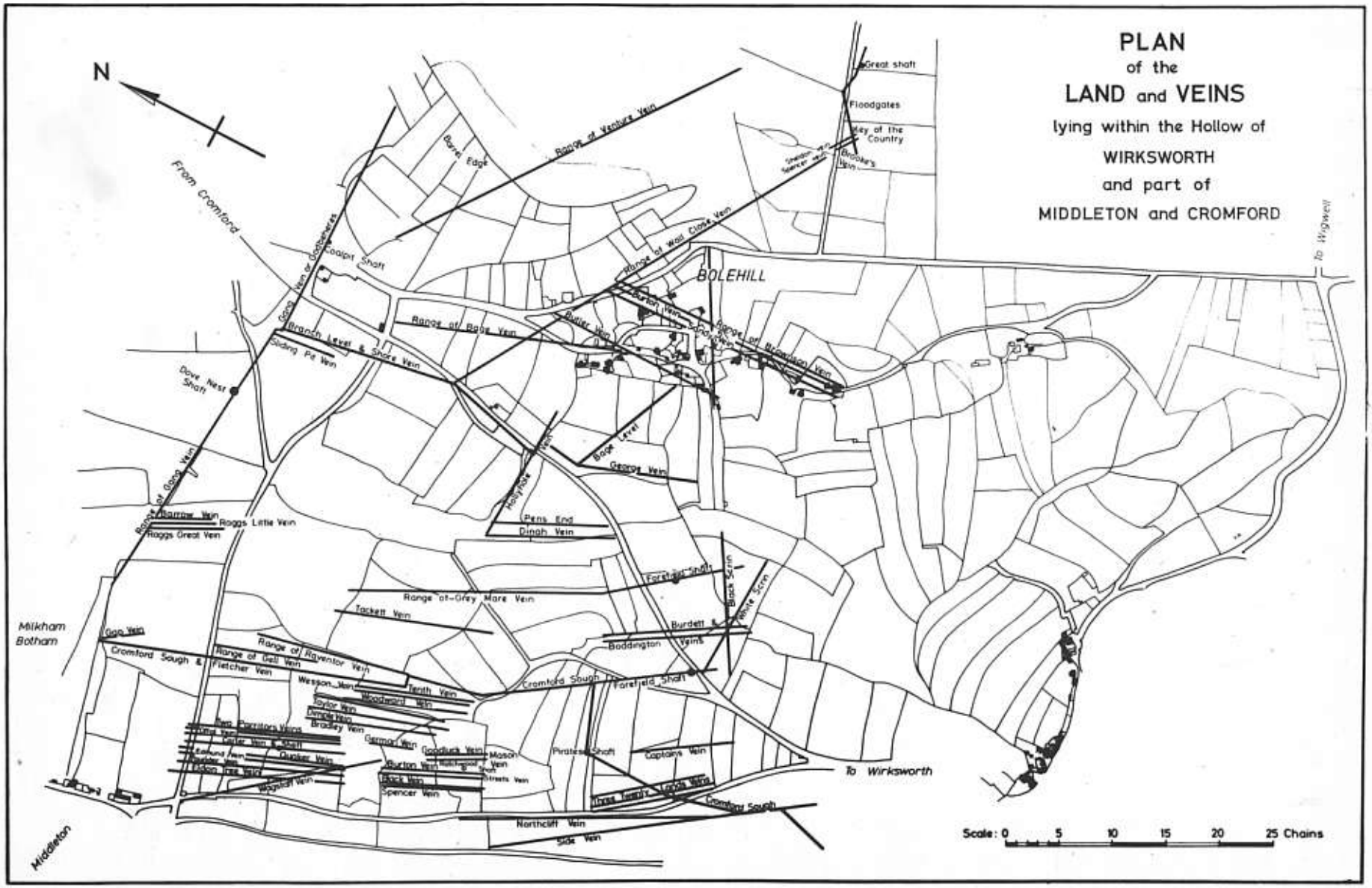
remarkably well with Farey's a few years earlier and this leads one to suspect that he may have copied the list. Even if Glover originally copied the list, in view of his extensive local knowledge, it seems likely that he would check and correct it, for he lived in Wirksworth where he endeavoured to earn a living between the years 1815 and 1824 (Glover MSS, Derbys. C.B.C. Library).

Lead Smelting in the Wirksworth District

By the beginning of the 19th century hearth furnaces for the smelting of lead were obsolete. Cupolas which could smelt up to 18 cwts of ore at a time were in use. (These were introduced into Derbyshire by Wright, a Quaker physician, in 1724). Farey (1811, p. 385) mentioned five in the vicinity of Wirksworth: one at the Devil's Bowling Alley on the Wirksworth-Alderwasley boundary, owned by Francis Hurt; one at Cromford Moor and one at St. Helen's Lane to the east of Wirksworth, owned by Francis and Charles Hurt respectively, one in the Via Gellia, owned by Saxleby and Company, and one at Lea, east of the River Derwent, owned by Shore and Company. Glover, twenty years later, mentioned the Devil's Bowling Alley, Lea, the Via Gellia Cupola and another at Bonsall, but made no reference to either the St. Helen's Lane or the Cromford Cupola. In view of his local knowledge and the known decline in demand, consequent on the end of the Napoleonic Wars, it seems reasonable to assume that these two ceased to function between 1815 and 1827.

Extractive Industries Connected with Lead Mining

Both Farey and Glover listed the subsidiary minerals found in each lead mine. Once again the similarity of their lists leads one to suspect that Glover copied Farey. Besides lead, the following were found in the vicinity of Wirksworth: calamine, manganese, gravel, black jack or blende, barytes, pyrites, various spars, mainly fluorspar, ochre, white gypsum and petroleum (Glover, 1829, I, p. 234). The quantities of each mineral were small, but they did provide an additional source of income for the small-scale miner. Economically, the most important of these minerals were the black jack, calamine and ochre. Both Farey and Glover noted that black jack, otherwise known as blende or mock lead, and formerly thrown away, was used in the manufacture of brass. Both black jack and calamine were purchased by the Birmingham Brass Foundry Company who had a warehouse at Cromford. The calamine was mixed with quicklime for making cement and was used by Arkwright in the construction of his mills as well as being roasted in a reverberatory furnace to make zinc (Farey, 1811, p. 403). Five hundred tons per annum were prepared, picked and washed in Wirksworth and Cromford. The ochre was mainly bought by the paint manufacturers of Wirksworth and the Via Gellia. The latter company also used barytes in the manufacture of their products.


PLAN
of the
LAND and VEINS
lying within the Hollow of
WIRKSWORTH
and part of
MIDDLETON and CROMFORD
N
From Cromford
Milkham
Botham
Middleton
To Wirksworth
To Wigwell
BOLEHILL
Great shaft
Floodgates
Key of the Country
Brooke's Vein
Range of Venture Vein
Barrel Edge
Range of Wall Close Vein
Coalpit Shaft
Gang Vein or Godbeheres
Branch Level & Shore Vein
Sliding Pit Vein
Range of Bage Vein
Butler Vein
Burton Vein
Range of Brownson Vein
Dove Nest Shaft
Bage Level
George Vein
Holyhole Vein
Pens End
Dinah Vein
Range of Gang Vein
Barrow Vein
Raggs Little Vein
Raggs Great Vein
Forefield Shaft
Black Scrin
White Scrin
Range of Grey Mare Vein
Tackett Vein
Burdett & Veins
Boddington
Gap Vein
Range of Raventor Vein
Range of Gell Vein
Cromford Sough & Fletcher Vein
Wesson Vein
Tenth Vein
Woodward Vein
Taylor Vein
Dimple Vein
Bradley Vein
Cromford Sough
Forefield Shaft
Two Partitors Veins
Cutler Vein & Shaft
Quaker Vein
Eldon Tree Vein
Wagstaff Vein
German Vein
Goodluck Vein
Mason Vein
Burton Vein
Black Vein
Spencer Vein
Streets Vein
Pirates Shaft
Captains Vein
Three Twenty Lands Veins
Cromford Sough
Northcliff Vein
Side Vein
Scale: 0 5 10 15 20 25 Chains

The End of Large-Scale Lead Mining in Wirksworth

Hunt's mineral statistics show that lead mining in Derbyshire between 1848 and 1910 reached its peak in 1859 when 10,929 tons of ore were mined and produced 5,883 tons of lead. During the late 1840's and 1850's, Wirksworth and Middleton produced approximately one third of the Derbyshire total or 3 per cent of the national total, but after 1859 the difficulties of draining the deeper mines led to a long and steady decline. The optimistic composers of directories tried to instill confidence in the public, but to no purpose. Bagshaw (1846, p. 392) thought that as draining the mines became more efficient Wirksworth would regain its former position, i.e. that of the previous century as "head of the lead markets". His rival, White (1857, p. 455) was just as hopeful, reporting that the Ratchwood mine had realised more than £30,000 from lead in the three years 1854 to 1856 and it was expected that other mines would be equally as productive.

It is fortunate for the lead miners that the quarrying of limestone and gritstone became nationally important during the 1850's and provided an alternative source of employment.

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