

Cammock Isle- the story of a Weardale mine

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The portal of Cammock Isle Level, near Eastgate

Cambokeels Mine, an abandoned lead and fluorspar mine, is situated on the north bank of the river Wear between the villages of Eastgate and Westgate in upper Weardale close to the site of the Cement Works.

The mine occupies the site of an abandoned medieval village and is adjacent to the route of the upper part of the Weardale railway.

The mine was known as 'Cammock Isle' when it was first worked but has had several aliases over the years including 'Cumnock Isle' 'Cammock Eals' and in later years it became known as Cambokeels or locally simply as 'Cambo'.

This article outlines the history of the Cammock Isle Lead Mine and tracks some of the reasons why its fortunes, and those of other mines in the area, varied over the years.

In order to be successful a mine has to produce a product for which there is a current demand and to be able to sell its product at a high enough price to make a profit. In this regard geology is very important, ie is there an ore present in economic quantities and how easy is it to extract. Equally important though, is the market for its product, whether the product itself is remains in demand and whether or not other producers can supply it more cheaply. Some of these factors will be looked at in relation to Cammock Isle Mine.

Geology

Weardale is part of the Alston Block which forms the northern part of the Northern Pennine Orefield an upland area criss-crossed with mineral veins. These veins are geological faults that were conduits for the passage of mineral-rich hot brines. As these fluids slowly cooled they deposited a range of minerals on the walls of the fissures through which they flowed forming almost vertical, ribbon like

deposits known as veins. Where these hot brines flowed through limestone rocks they sometimes also dissolved and replaced areas of the host rock adjacent to the vein to form horizontal deposits known as ‘flats’. These flats could be from a few inches to several metres thick, up to, in the order of, ten-twenty meters wide and several hundred meters long. Some of these flat deposits were among the richest workings in the orefield. The mineralisation was emplaced in the late Carboniferous to early Permian, (around 290 million years ago. (Dunham 1990)).

The main productive mineral veins of the orefield trend East North East and these are intersected by a second set of so called ‘Cross Veins’ which tend to be less productive and have a more North-westerly trend. In addition to these there are also a second set of productive veins known as the ‘Quarter-Point’ Veins, these are few in number but are strong and persistent and can be traced for long distances, one of these which runs through Weardale is called Slitt Vein, trending WNW, it is at least twelve miles long. Cammock Isle Mine exploited part of Slitt Vein.

Many different minerals are found in the Northern Pennine veins and a few of them have been of economic importance at different periods of time.

Some North Pennine Minerals and Their Uses		
Mineral name	Chemical composition	Industrial uses
Galena	Lead sulphide	The principal ore of Lead.
Cerussite	Lead carbonate	An ore of lead
Sphalerite	Zinc sulphide	An important ore of Zinc.
Siderite	Iron carbonate	An ore of iron.
Fluorite (fluorspar)	Calcium fluoride	Used as a flux in steel making and aluminium smelting and as a source of fluorine to the chemical industry.
Barite	Barium sulphate	Used as a drilling mud in oil exploration and as a filler in paint and paper manufacture.
Witherite	Barium carbonate	Also used in paint manufacture.

Fig 1 Northern Pennine economic minerals.

These minerals do not have a uniform distribution throughout the orefield and the significant ones in Weardale have been lead ore (galena), iron ore and fluorspar.

Along with these useful minerals in the veins, there also occur a range of other minerals such as quartz, calcite and ankerite known collectively as ‘gangue’ for which no industrial use has yet been found.

History of Cammock Isle Mine

Cammock Isle Mine was, originally, a lead mine, closing in 1871 as it became uneconomic to work. With the beginning of demand for fluorite at the turn of the century it reopened as a producer of fluorspar and became one of the major regional producers of this industrial mineral, joining other mines such as Stanhopeburn and Frazers Grove in becoming far more successful as producers of ‘spar’ than they had been as lead mines.

The story of Cammock Isle Mine begins in the 1840’s, the lead mines of the Weardale district were, then, largely under the control of the Beaumont family who, s W. B.

Lead Company operated them mostly on lease from the Bishop of Durham. The Beaumont's also operated mines on their East and West Allendale estates and they employed agents to oversee each of these mining districts.

In 1845 Thomas Sopwith was appointed as Chief Agent by Thomas Wentworth Beaumont to oversee operations in all three districts. There were, by this time, already some workings on Slitt Vein including Blackdene Mine and Slitt Mine and it was decided to investigate whether the vein bore workable concentrations of ore further to the east.

The ground was surveyed and the likely position of the vein projected, then in 1847 the Cammock Isle Level was begun from the bank of the Wear in the shale below the Scar Limestone. The inscription on the level mouth reads 'TWB 1847' TWB being the initials of Thomas Wentworth Beaumont, Sopwith's employer.

Note. This Level, was undertaken for the Discovery of the Supposed Continuation of Slitt Vein, as suggested by Mr. Pro. Roddam and according to Surveys and Examinations of the ground by, myself, and to Plan, and Sections made under my direction, by Mr. T. J. Bewick. The result has entirely realized the anticipations formed, and the Vein having been cut within a very few feet of the place where the Surveys indicated & having been found productive of Lead ore the further Cost of proceedings are now included in the Ordinary Lead Mine Charges for Weardale Mines.

T. Sopwith

Entry in the Exploration and Improvement Fund Cash Journal for 1848 by T Sopwith

It was common practice throughout the orefield to drive levels in the softer shale beds beneath competent strata in which ore might be expected to be found, as the driving of the level was easier in the softer bed, and ore and waste rock could be easily loaded into wagons from the harder beds above.

By 1848 Slitt Vein had been reached and the mine began producing lead ore. The entry in the Weardale Mines Quarterly Accounts (NRO 672/E/5E/4) for the

September Quarter in 1854 shows that William Kirk and partners were driving the Wagon level Westward in the vein while John Vickers and partners were driving the barrow drift westward in the vein. By the December quarter in addition to these two levels Thomas Fleming and partners were 'rising in the vein from the wagon Level to the Barrow Drift. Such a rise would have the function of cutting down the distance that ore had to be barrowed before it could be dropped down to the Wagon Level to be taken from the mine and it would also help ventilation somewhat by allowing air to circulate within the mine.

The rough lead ore, called 'bouse', recovered by the partnerships would be drawn out to 'day' along the waggon level and would have been 'washed' at the mine before being sent to the smelt mill.

This washing process was to separate out the ore from waste rock and other minerals so increasing the percentage of galena in the product that was sent to the smelters. Washing, in the Northern Pennines, was carried out by boys from about 10 to 18 years of age, before they began underground work.

First lumps of pure galena would be picked off by hand and then the larger lumps of bouse would be broken up. In 1848 it was still common for this to be done by hand by boys using a type of hammer known as a 'bucker' but mechanical water-powered crushing machines superseded these and by the 1860's 'bucking' was rarely used except at very small independent mines. (Hunt 1984)

The broken bouse would then be taken to a hotching tub where the mixture of ore and rock was agitated in water allowing the heavier galena to settle to the bottom of the tub while the lighter rock would rise to the top.

The mine does not appear to have been particularly successful as a lead mine, judging by the numbers employed during this working period. Slitt Vein, in this part at least, is more strongly mineralised with fluorite and iron minerals than with lead ore. Between the Cammock Isle workings and Slitt Mine extensive ironstone flats were worked at West Rigg, the remains of which are probably the most spectacular surface working in Weardale. Despite somewhat disappointing results W. B. Lead Co. continued to work the Cammock Isle until 1871 at which point it was abandoned.

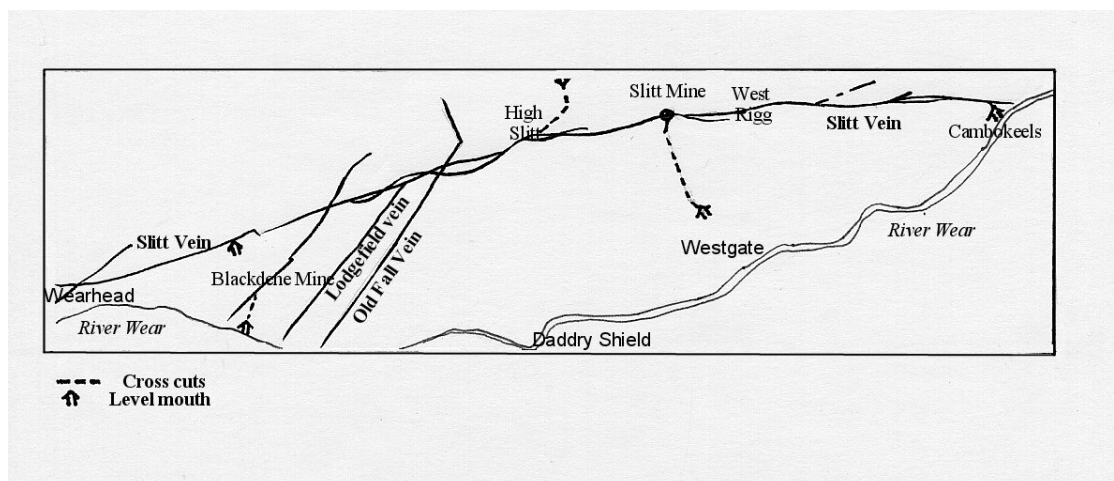


Fig 2 Sketch showing some of the veins and workings in Upper Weardale- not to scale

The market for lead

The lead ore from Cammock Isle is most likely to have been taken, by packhorse, to a Beaumont smelter at Rookhope (Lintzgarth) and from there to

Newcastle where there was a thriving lead industry. The records from one lead company with an office in Newcastle, Walkers, Parker and Co show the range of uses for lead at this time.

Deliveries of Lead Products, Walkers, Parker and Co. 1855

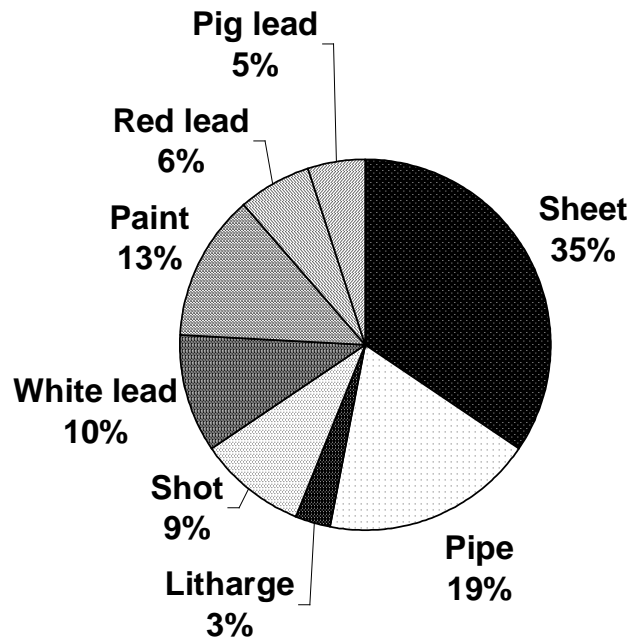


Fig 3 (Source of data Rowe (1983))

As can be seen from figure 3, the chemical uses for lead are almost as important as the metallic ones by this date. Litharge is the product that remains after the removal of silver from lead by cupellation. Red lead is lead oxide for which an increasing market came with the rise in production of iron and steel and the need for protective paint for it. White lead is lead carbonate and was widely used as a white pigment for paint. Pig lead is metallic lead sold in cast bars or 'pigs' from the smelter.

The consumption of lead and its products rose rapidly in the UK throughout the second half of the 19th century so it was not a fall in demand for its product that led to the closure of Cammock Isle Mine in 1871. As can be seen from figure 4 the rise in demand was supplied increasingly from foreign imports and the failure of Cammock Isle as a lead mine was probably the result of a combination of poor ore values and increasing competition from cheaper foreign imports.

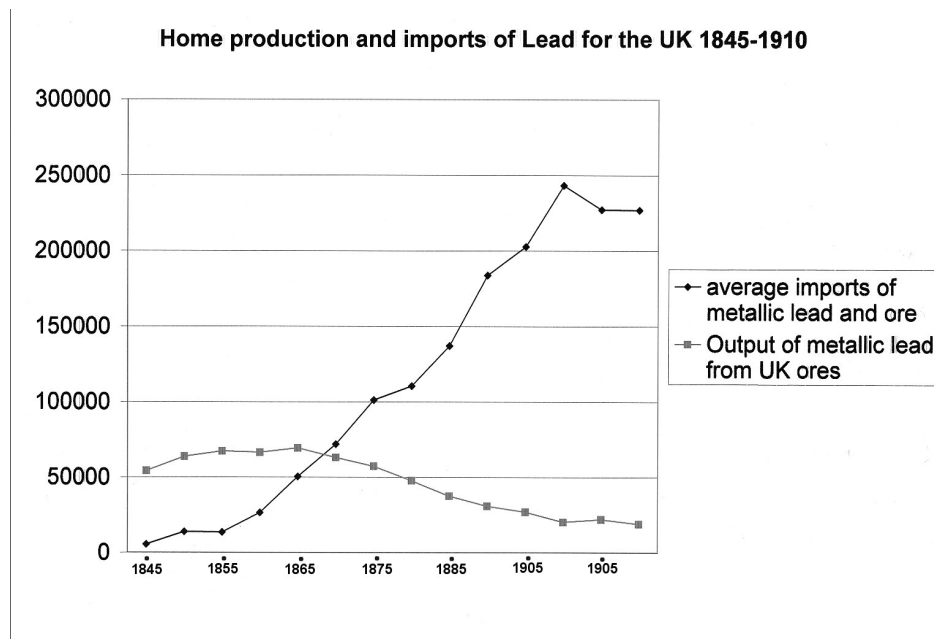


Fig 4 The relative quantities of metallic lead gained from home production and imports in the UK from 1845-1910. The data (Rowe (1983)) take no account of red or white lead.

The Twentieth Century

Cammock Isle never reopened as a lead mine though it did produce lead again as a by product of fluorspar mining. Throughout most of the 19th century fluorspar was regarded as gangue mineral, of no economic importance but by the end of the century and throughout the 20th century it found an increasing market.

Fluorspar has three main uses

- As a flux in the production of steel, glass, enamel and ceramics
- In aluminium smelting
- In fluorine chemicals, hydrofluoric acid and chlorofluorocarbons (CFCs) for example

(F W Smith, 2003)

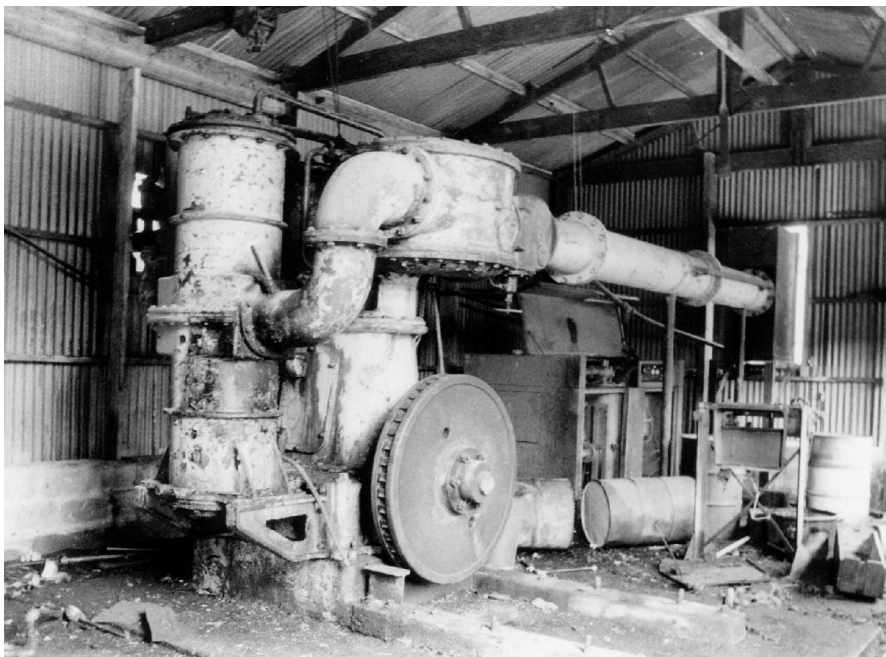
With the replacement of open-hearth steel furnaces with Kaldo and L D type furnaces in the 1970's there was a threefold increase in the requirement for fluorspar for steel making. The advent of aluminium industry brought an increased requirement, as did the rise of refrigeration as fluorite was used in the manufacture of CFCs. Mining in Weardale prospered.



Decline sunk in the 1970's now flooded

The first record of fluorspar production from Weardale is a return from the Weardale Iron Co in 1882. In 1906 'Cumnock Isle' mine is reported to have produced 350 tons of fluorite, employing 6 miners underground and two surface workers. John Coulthard and Son are listed as the mine owners. (Burt R 1983) After more than quarter of a century this was the start of a new period of working for the mine that saw it grow to be a leading producer of fluorspar. However the discovery of the effect of CFCs on the ozone layer curbed that market and the discovery of huge ore resources elsewhere, notably in Mexico and China meant an inevitable slump in world price of this commodity.

With a succession of owners including local partnerships as well as global companies such as Anglo Austral Mines Ltd – a subsidiary of Rio Tinto Zinc and a few short periods of standing idle Cambokeels Mine operated as a fluorite mine until 1987 contributing about 1100-1700 tonnes per week to the over 2.1 million tonnes mined in the district as a whole up to that point (Dunham (1990)).



Cambokeels mine 1999 A Belliss and Morcom compressor abandoned

Cambokeels was not the only mine to suffer the consequences of a falling demand for its product and competition from cheap foreign imports and in 1999 Frazer's Grove, the last working mine in Weardale closed down ending a centuries old tradition of mining in the dale.

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