

Lead Mining in Nidderdale AONB

Nidderdale AONB has a long history of mining. Lead-bearing veins in the rocks around the Greenhow Hill area and Ashfold side have had mining activity even as far back as Roman times. The process became organised and commercialised in the Medieval period when the lords and monasteries secured income from royalties paid to remove the lead ore.

In Medieval times lead was in demand for roofing. The AONB's limestone geology gave rise to an abundant supply of lead which develops as vertical veins in the faults in the limestone. Mining at this time was generally shallow surface workings. Smelting was done using charcoal-powered burners. The demand for charcoal was high and by the 15th century the landowners became concerned about the destruction of their woodlands taken to fuel the furnaces. So, to supplement the charcoal, peat was cut to burn.

The expansion of mining needed more workers so the settlements gradually increased in size. The older villages and monastic granges such as Dacre and Beverley expanded first, then, by the 17th century, new villages at Greenhow were established. The smelting settlement of Smelthouses

came next. Lead mining continued in Nidderdale until the early 20th century.

Main process of medieval lead mining

1. Shallow shaft sunk through limestone rock to a lead vein. Extraction of lead ore could begin immediately.
2. Removal of lead ore was haphazard. Miners would simply concentrate on the richer deposits and the ore was hauled by hand through shafts.
3. Underground workings spread and additional shafts were sunk for ventilation and access.

In medieval times mining was organised into "Meers" - an area of ground which followed a vein. A Meer was supposedly the distance you could throw a hammer. Meers were operated in by different miners which could cause disputes in over-allotted areas as lead was very valuable and sought-after.

Medieval smelting was very basic. The ore was broken up by smashing and the largest pieces hand-picked for smelting. Ore was placed in bonfire-like furnaces in which the lead became molten and ran along a channel into set blocks.



'Harris' grinding mill, Greenhow Hill, circa 1860



Changes in mining methods

Mining went from hands and handtools to horsepower and waterpower; from pickaxes, through gunpowder to dynamite.

Industrialisation

In the late 18th century and early 19th century lead demand increased along with development of the industry so more profit could be made. The different industries involved in turning ore into useful objects appeared in what was once a peaceful valley. Blacksmiths, smelting chimneys, mills and waterwheels all sprang up and flourished here so that, although industrialisation caused disruption it also brought employment to the area.

In the mines workers used picks and shovels to extract the lead from the rock. This is where the initial sorting took place as lead-rich ore was easily distinguished as it weighed twice as much as normal rock. Gunpowder was used to start tunnels and a maze of different levels was created to get to different parts of the vein.

For industrial lead mining, smelting power is essential and this was supplied by waterwheels. They were connected to machines used to crush the ore and to bellows to fan the furnace flames.

The ore needs to be refined to get rid of the worthless earth it was mixed with. First the ore is crushed into uniform pieces. These were placed in "Hotching tubs" (mesh-bottomed trays) which are plunged up and down repeatedly in a water-filled

tank causing the lighter material to rise to the top so that it could be removed. The heavier lead-rich ore sank to the bottom.

Ore hearth smelting developed in 16th century. This is a process where lead ore is mixed with peat and coal and placed into a hearth. The temperature is increased by air being blown in using bellows. When the temperature reaches about 750° molten lead is produced and poured into moulds to create ingots or "pigs" (so called because the array of ingots branching in a line from the main channel looked like a litter of piglets suckling their mother).

A smelting mill generally needs a watercourse running parallel for the waterwheel and a hillside for the flues (chimneys) to run up so that the noxious fumes are expelled well away from the smelting area.

Decline of the Lead industry

The industry fell into decline as a consequence of falling prices and foreign competition. This happened despite the great advances in technology which, initially, had enabled veins with lower lead levels to be mined profitably.

Industrial Archaeology

Today the lead mining industry in this area is long gone and it's remnant can only be found as ruins of industrial buildings, derelict sites, old dams and rusted pieces of machinery. Evidence can be seen on the ground and even current maps show the location of the disused mines. Old photographs give us an idea of the working conditions in these old mines and we can see the tools and equipment they used to win the lead.

'Harris' shaft , Craven Cross (c1860)



1. William Longthorne 2. Jim Busfield 3. Thy Pratt 4. Tom Marshal 5. Fred Stockdale (clerk) 6. Joss Pounder
7. Will Marshall 8. Julian Watson 9. Butcher Joe (Mackwell) 10. Arthur Mackwell 11. Jack Storey 12. Tom Wilkinson Marshall

On Greenhow Hill by Rudyard Kipling

“...Greenhow Hill stands up ower Pately Brig. I reckon you’ve never heard tell o’ Greenhow Hill, but yon bit o’ bare stuff if there was nobbut a white road windin’ is like ut; strangely like. Moors an’ moors an’ moors, wi’ never a tree for shelter, an’ gray houses wi’ flagstone rooves, and pewits cryin’, an’ a windhover goin’ to and fro just like these kites. And cold! A wind that cuts you like a knife.

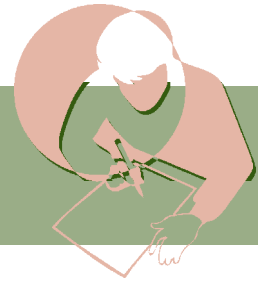
You could tell Green-how Hill folk by the red-apple colour o’ their cheeks an’ nose tips, and their blue eyes, driven into pin-points by the wind. Miners mostly, burrowin’ for lead i’ th’ hillsides, followin’ the trail of th’ ore vein same as a field-rat. It was the roughest minin’ I ever seen. Yo’d come on a bit o’ creakin’ wood windlass like a well-head, an’ you was let down i’ th’ bight of a rope, fendin’ yoursen off the side wi’ one hand, carryin’ a candle stuck in a lump o’ clay with t’other, an’ clickin’ hold of a rope with t’other hand.’

‘An’ then yo’ came to a level, where you crept on your hands and knees through a mile o’ windin’ drift, an’ you come out into a cave-place as big as Leeds Townhall, with a engine pumpin’ water from workin’s ’at went deeper still. It’s a queer country, let alone minin’, for the hill is full of those natural caves, an’ the rivers an’ the becks drops into what they call pot-holes, an’ come out again miles away.’”



John Busfield 1916

More about lead mining, the Victorians and sustainability



Websites

www.bbc.co.uk/history	- enter search term " <i>lead mining</i> " or " <i>Victorians</i> "
www.sowerby-bridge.org.uk/greenhow	- select mining - basic website but lots of historical photos and plans of local mines
www.channel4.com/history/guides/index	- look for Victorian Britain
www.suschool.org.uk	- sustainability website for schools
www.e4s.org.uk	- sustainability - help for teachers
www.recyclezone.org.uk	- information on recycling for teachers & children

Books

Non-fiction

"First Encyclopaedia of History"	(Usbourne Encyclopaedia series)	ISBN: 0746047290
"Victorian Schools (Life in the Past Series)" <i>Others in the series include "Victorians at Home"</i>	Mandy Ross	ISBN: 0431121451
"You wouldn't want to be a Victorian schoolchild."	John Malam and David Antram	ISBN: 0750236019
"Bewerley Industrial Heritage Trail"	- leaflet available from Nidderdale AONB Office, Tel. 01423 712950 or download from www.nidderdaleaonb.org.uk	



Above and above right: Swindon Quarry 1905. Below: Hammond Shaft, Craven Cross.

