

Jet sources

[Bygone Bilsdale Review](#)

Last update 14/05/16

Sources

Byones of Bilsdale Exhibition and Bygone Bilsdale book

Carol Cook talks July 1983 and May 1997

Whitby Jet Heritage Centre <http://www.whitbyjet.co.uk/about-jet/mining.html> .

Draft review new text [in blue](#)

Jet Mining in Bilsdale – Update v1

The shale tips which still scar the hillsides after 100 years provide evidence of Bilsdale's industrial past. Jet was extensively mined here during the nineteenth century

Jet, which is fossilised wood, was formed some 140 million years ago when driftwood, washed into the sea, became waterlogged and then sank. Cleveland jet is of the finest anthracite type, a hard jet usually found randomly distributed in the 30 feet of jet shale. The best jet is usually found in the top 10 feet of the seam. A geological marker of impure limestone is found on top of the jet shale, known as the top jet dogger.

Jet has been known to man since the earliest times; beads, buttons and toggles have been found in prehistoric burial mounds. The Romans and Saxons made and wore jet jewellery but it became immensely popular during the latter half of the 19th century when Queen Victoria wore it as a sign of mourning for Prince Albert who died in December 1861. It is possible that the fashion started even earlier after the death of the Duke of Wellington in September 1852. Certainly there was a thriving jet industry in the early 1850s.

Prior to 1840 jet was picked up on beaches or obtained by small scale quarrying. Inland it was mined throughout most of Cleveland. Adits or parallel drifts were driven into the hillsides after the position of the base of the jet shale had been found. The only tools used were pick and shovel, the pick having two sharpened points. The drift would be about 6 feet high and the width depended on the nature of the shale. Wooden roof supports were rarely used. Several parallel drifts were driven in and then some cross drifts giving a chequer board pattern. Drifts would rarely be longer than 100 yards. No plans have so far come to light. The top jet dogger made a reasonably stable roof.

The mining team was comprised of not more than 6 men, usually multiples of 3, one to wield the pick, one to barrow out the shale and one to sort the shale. Candles at 1s per 1lb would originally supply the light and these would be attached to the wall of the drift with a piece of clay. Later jet miners' lamps, made in Stockton, would be used.

Various types of jet were mined, "plank" jet, seldom less than 2ft long and half inch thick, "cored" jet which had a silica core and a hard jet cover, "soft" jet which was also known as "cannal coal" Between 1860-1870 hard jet was worth between 4s and 21s per pound weight, and soft jet only brought 5-6s per stone. In 1886 it was estimated that 4,660 lb had been mined. The jet shale contained 12-19 gallons of oil per ton and sometimes the tips were ignited, giving rise to the bright orange-red shale which can still be seen today.

Wages for miners in 1873 were about 25s per week but by 1887 the industry was in decline and men at Osmotherley were only earning 16s (80p) for a 6 day week. There is a record for a jet mining lease in Bilsdale in 1875. The following "having lease from the Earl of Feversham to mine jet":

William Thomas Weighill	Intack Rent	£50 p.a
George Gibson, Garbutts	Intack Rent	£25 p.a
Robert Harper, Trennet End		£25 p.a
John Moore, Gt Broughton		£50 p.a

Each of the above four gentlemen employed 4 miners at 2s-4s per day. This did not include food and candles. The same four gentlemen in that year also bought 190 feet of larch poles and 70 feet of 'rider poles'. These would be used as grooved tramlines for the barrows. Two of the most successful jet mines were at Ellermire and Breckon Hill Farm.

Whitby, of course, was the centre of the jet working industry and by 1872 had over 200 shops employing 1500 people.

Harry Todd [who was](#) born at Northwoods in 1883 and farmed at Holme Farm for 50 years had memories of Jet Mining in Bilsdale. [Translated into English!]

"Just up above Nor Woods was seven or eight big heaps – they'd put a drift in every ten yards. One of Skate Cook's brothers worked in a jet mine above Ingleby Bank. I went in with him but I could see nothing, then he showed me the seams he had clayed over, he rubbed the clay off until they shone bright black, then he rubbed the clay over again, they didn't work the seams as they went in, just clayed them over, then worked out as they came back over.

"The richest place for jet was between Hasty Bank and Garfit, that rich they didn't put drifts in, they faced it. There must have been a hundred men on from Broughton and around about – they took barrows up from Broughton to Garfit, and barrowed the jet down at night. [They](#) cut hundredweights out it all went to Whitby, buyers would come round to Jet Miners Arms [here](#) in Broughton.

"Jetting did a lot of harm to Bilsdale – made a lot of holes, and shale tips, and let a lot of water out – red gor stuff ruined many [an](#) acre".

1861 JET MINERS IN BILSDALE

NUMBER	NAME	RESIDENCE	BIRTHPLACE
1	William Peckit	Mount House	Thirsk
2	John Cook	Orra	Moorsholm
3	William Bugnall	Orra	Lofthouse
4	Richard Garbutt	Orra	Bilsdale
5	John Dalton	Orra	Ireland
6	Francis Blades	Orra	Kirby
7	William Atkinson	Mounts (Orra)	Bilsdale
8	Christopher Wilcote	Town Green	Castleton
9	John Baker	Hill House	Carlton (Helmsley)
10	Adamson Robinson	Hill House	Whitby
11	William Wood	Staindale	Bilsdale

1871 JET MINERS IN BILSDALE

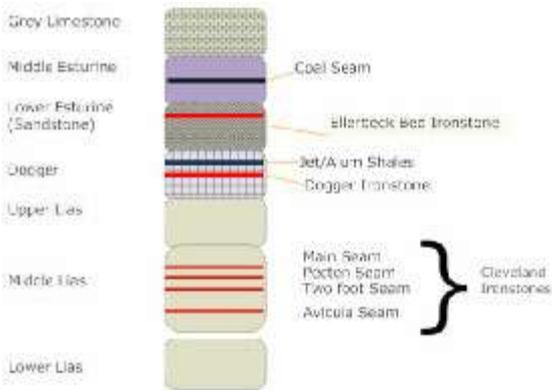
NUMBER	NAME	RESIDENCE	BIRTHPLACE
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		BILSDALE KIRKHAM	
1	William Hodgeson	Stonehouse Cote [employs 5 men]	Hinderwell
2	William Bell	Town Green [carpenter & senior partner in jet mines employs 12 men]	Yarm
3	Barker C Watson	Town Green	Hawnby
4	William Boyes	Town Green	Boltby
5	Robert Easby	Orra	Bilsdale
6	John Cook	Orra	Moorsholm
7	Thomas Jackson	Orra	Bilsdale
8	John Dawson	Orra	Bilsdale
9	Benjamin Garbutt	Orra	Helmsley
10	John Russell	Orra	Yorkshire
11	Mark Cowling	Orra	Whorlton
12	Edward Cook	Orra	Bilsdale
13	William Atkinson	Mounts (Orra)	Bilsdale
14	Tom Boyes	Cowslip	Felixkirk
15	Thomas Carpenter	Stockin	Kirkdale
16	Robert Parker	Stockin	Whorlton
17	William Weatherill	Stockin	Bilsdale
18	William W Reed	Hill House	Stockton on Tees
		BILSDALE MIDCABLE	
19	Christopher Wood	Westcote	Hawnby
20	George Gill	High Westcote	Westerdale
21	William Gill	High Westcote	Westerdale
22	John Garbutt	High Westcote	Bilsdale
23	John Fletcher	High Westcote	Danby
24	Joseph Richmond	High Westcote	Gedney
25	John Greenwood	Stone Intake	Oldstead
26	John Dalton	Stone Intake	Ireland
27	Abraham Trousdale	Thwaites	Bilsdale
28	William Collier	Thwaites	Egton
29	John Stephens	Thwaites	Alderton (Glous)
30	James Galloway	Staindale [employs 12 men]	Broughton
31	Thomas Medd	High Crossletts	Bilsdale
32	James Cornforth	Breck House	Hawnby
33	Thomas Knaggs	Breck House	Hawnby
34	John Todd	Hawterley	Bilsdale
35	George Barr	Hawterley	Bilsdale
36	John Barker	Hawterley	Osmotherley
37	Thomas Parker	Coniser	Galphay
38	Thomas Leng	Stone House	Bilsdale
39	J S Dunning	Stone House	Helmsley
40	John Robinson	Fangdale Beck	Ampleforth
41	Thomas Atkinson	Fangdale Beck	Ladhill gill
42	Jonathan Boyes	Fangdale Beck	Bilsdale Westside

1881 JET MINERS IN BILSDALE

NUMBER	NAME	RESIDENCE	BIRTHPLACE
1	Garbutt Sunley	Orra	Bilsdale
2	Thomas Wright	Crosset	Bilsdale
3	John Barker	Hawterley	Osmotherley
4	John Rain	Hawterley	Osmotherley

following transcribed from <http://archmetals.org.uk/geology-and-geography.html>

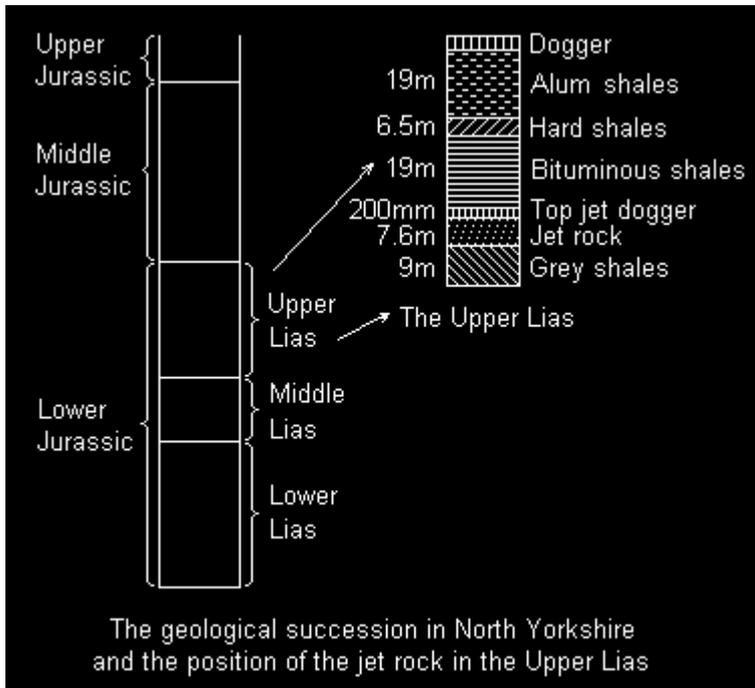


Bilsdale Jurassic strata using old terminology

Grey Limestone	
Middle Esturine	Coal Seam
Lower Esturine (sandstone)	
Dogger	Jet/alum
shales	
	Dogger
ironstone	
Upper lias	
Middle lias	Main
	Pectin
	2 foot
	avicular
Lower lias	

<http://www.whitbyjet.co.uk/about-jet/mining.html>

Whitby Jet heritage Centre



Upper lias	dogger
	Alum shales
	Hard shales
	Bituminous shales
	Top jet dogger
	Jet rock
	Grey shales

The geological succession in North Yorkshire and the position of the jet rock in the Upper Lias

Whitby jet centre

What is jet

It has a cultural heritage that extends back to early tool making man. This history can be charted from the Bronze age, through the Roman occupation and Viking invasions and onwards to its meteoritic climb to fame in the mid 19th century Victorian England. Its geological history starts in the middle of the Jurassic era, some 150 million years ago at the bottom of the Liassic Sea, which then covered much of our homeland. Fossil evidence from this fascinating era is abundant and easily detected in the cliffs and on the beaches that adjoin [Whitby](#) to the North and South. From a literary perspective, Whitby Jet has captured the imagination of many famous authors, the venerable Bede, Drayton, Prior and John Donne have all used the deep lustrous shine of Jet as a descriptive analogy and the well known phrase "as black as Jet", coined by Shakespeare, is still in common usage.

During the mid Jurassic period some 150-180 million years ago what was to be the British Isles was located further south in the area of Northern Spain and Portugal. It was thus much nearer the equator and had a climate to match. The dominant species of tree was the Araucaria very similar to the Araucaria araucana we see today. Its common name is the Monkey-puzzle tree or Chilean pine. On the floor of the sea there had already been deposits of materials that subsequently became the Main Seam Ironstone, on top of this there were deposits of mud being washed down the rivers from adjoining landmass and forming an ever-increasing sedimentary layer. The Araucaria trees that formed a significant part of the vegetable debris were washed into the Liassic Sea and gradually became waterlogged. This served to introduce trace elements not found naturally in the wood and also took them to the bottom of this shallow sea where they became embedded in the thick sedimentary layer.

Thus this new stratum of rock then being formed contained a plethora of these trees, scattered entirely at random. The trees had already received a certain amount of 'pruning' during their journey to the seabed and the huge pressure from the ever-increasing sedimentary layer caused the dispersal of the partly decayed sections of the trees leaving the more resistant sections in situ to gradually become hard Jet.

This layer is readily seen as the Jet shale and is dense and composed of fine layers reminiscent of the pages in a book. The average thickness of this layer is between 7-10 metres and other evidence of Jurassic marine life may be found contained within these 'leaves' in the form of several species of ammonite. This shale contains an estimated 0.055 to 0.086 cubic metres of oil per ton and there is also a relatively high percentage of iron pyrite (fool's gold). Some geologists have postulated the future economic importance of this fact and some investigation as to the economic extraction has been done. It has also been suggested that the presence of this oil may have some association with the quality of Whitby jet.

J.E.Hemingway (Leeds University 1933) produced a PhD thesis that gives insight into the 'jetonization' of these trees. The accumulation of mud plus the weight of sea above produced enormous pressures and the individual trees were flattened into narrow 'seams'. The

glutinous nature of the sedimentary layer completely sealed these seams and pockets of wood and an anaerobic fossilisation slowly took place. This geological process occurred from the outside in and worked along the medullary rings of the tree. In some specimens of Jet there is a hard stone like centre with a surrounding skin of Jet, this was caused by the centre of the tree becoming silicified before the process of jetonization. However, Jet is usually found in seams ranging from 5mm to 50mm thick and in a variety of lengths. The latter is known as 'plank jet' and the former 'cored jet'. This rare and elusive raw material with which I work is now found as a result of natural coastal erosion and many hours of diligent searching as one can never rely on the sea to give up its harvest when needed! The finest seam jet that I have worked with was found fifteen years ago by my father-in-law at Kettleness point approximately two miles North of Whitby. The seam produced just short of 90 kilos at 40mm thick! It was a truly auspicious find and we have kept a large piece of this seam to remind us of that happy day.

On top of the Jet shale there is a clearly visible layer of limestone about 100 to 150 mm thick. This is known as the 'Top Jet Dogger' and served as a good guideline for the Victorian miners as very little if any good quality Jet is found above this layer, it also provided a relatively stable 'roof' for their excavations. This light coloured section meanders its way along the cliffs and appears at a variety of levels, sometimes at eye-level sometimes very much higher up the cliffs. Ironically at Whitby it is 5 metres below sea level and does not emerge until Sandsend at the furthest end of Whitby's west side beach, never the less it is still possible to find sea washed pieces of Jet along this part of the coastline

A further sedimentary layer is composed of Alum bearing shale, which was once extensively quarried and often extended to 37 metres. On top of this is a variable layer of ferruginous rock called the 'Dogger' comprised of sandstone, limestone or sometimes a conglomerate. In the 19th century it was worked as an ironstone band and was referred to as the 'Top seam of Cleveland'. Above this layer there exists an accumulation of rocks that were formed under fresh water conditions. For a time the sea receded which allowed the development of indiscriminate vegetation this produced a thin layer of low-grade coal, which was sometimes mined and is still found on the beaches today. These fresh water conditions gave rise to streams that eventually cut out channels that were then the repositories of 'log jams'. Accumulations of sand and silt buried these and a source of 'soft' Jet was created. This is of inferior quality but was occasionally used in Victorian times for some carvings. The carvings were then set into a large cabochon of the hard and more resistant Jet. Safe to say that the finest work would only contain the very best (3-4 Moh scale) Whitby Jet.

About Jet

In the following pages we have attempted to explain what jet is, describe how it was formed and give details of it's cultural history.

[What is jet?](#) - Jet, defined, including how it was formed and where it is found.

[A Brief History of Jet](#) - From the Stone age, through the peak of the carving industry in the Victorian era, to the present day.

[Jet Mining](#) - Jet mining on the North Yorkshire coastline including geology and history.

[Victorian Jet Workshop](#) - We are proud to host the last remaining example of an authentic Whitby Jet Heritage Centrehop shown here in pictures and text.