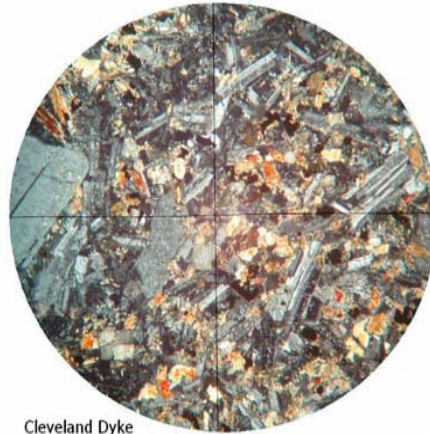


## CLIFF RIGG GEOTRAIL EXTRA

Further information especially about features of interest noted on the Geotrail by the sign 'Ψ'.

### NATURE OF THE DYKE ROCK

Geologists traditionally examine rocks under the microscope using thin sections that are made by grinding the rock down until it is wafer thin and light can be shone through it. The individual minerals that make up the rock can best be seen in cross polarised light. The picture shows the typical appearance of the basaltic rock that forms the Cleveland dyke (the proper name is basaltic andesite). It is made up mostly of the minerals feldspar (grey) and augite (brightly coloured). The closely interlocked texture is the reason why it makes such a good roadstone.



Cleveland Dyke

**View under the microscope.  
Magnification X100 in cross  
polarised light**

At the margins of the dyke it becomes very finely crystalline, even glassy, as a result of the very rapid cooling. The dyke rock may weather readily and, also in the interior it may be altered and softened by condensed volcanic gases. Only a few inches of the Jurassic strata next to the dyke are affected by the heating; the main obvious affect being hardening.

### MINING AND QUARRYING

#### Roadstone

The city of Leeds expanded rapidly in the mid 19<sup>th</sup> Century and street maintenance became important. The corporation acquired the lease of Cliff Rigg in 1869 as a source of high quality setts and road aggregate. The whinstone was quarried at first on several benches high up on the hill and was brought down on inclines on the south side to the works where the raw stone was shaped into the setts (where Cliff Rigg Cottage now is). The finished products were dispatched on the newly constructed railway to

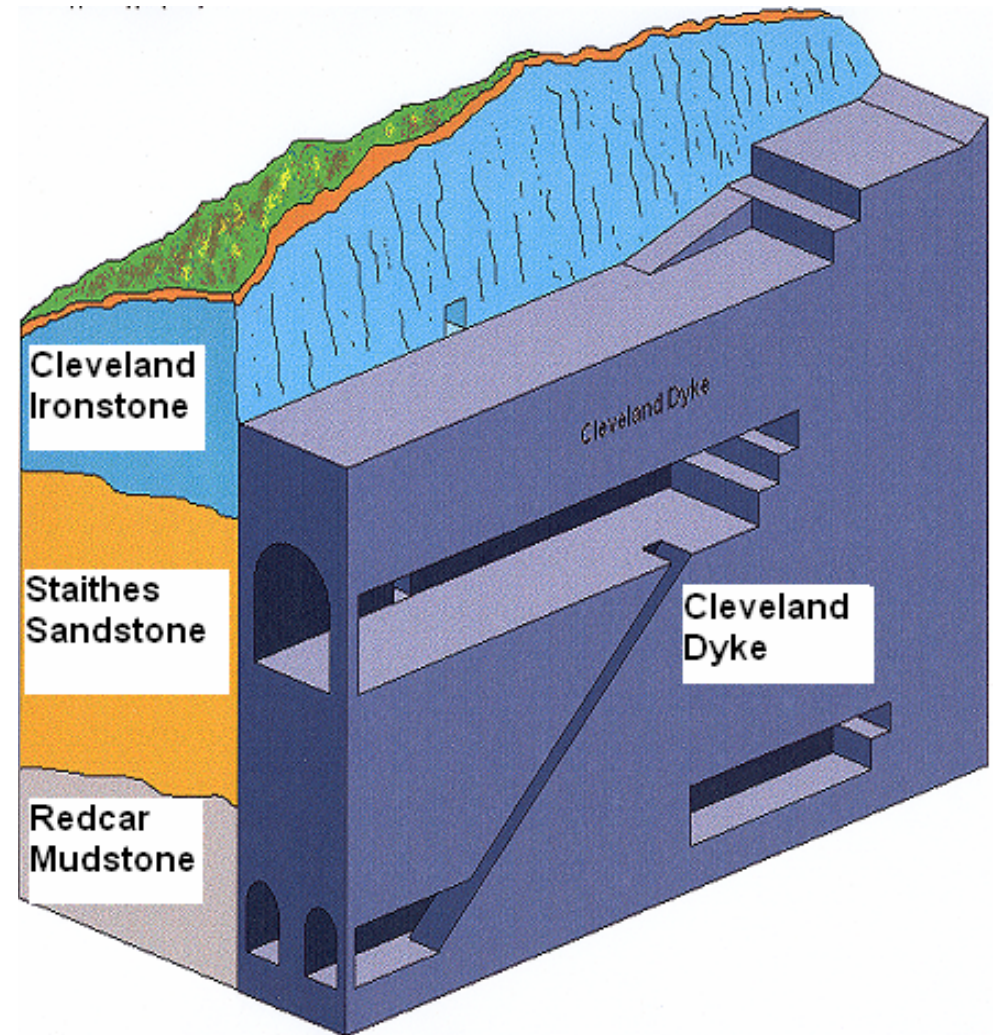


Diagram showing how the dyke was mined and quarried.

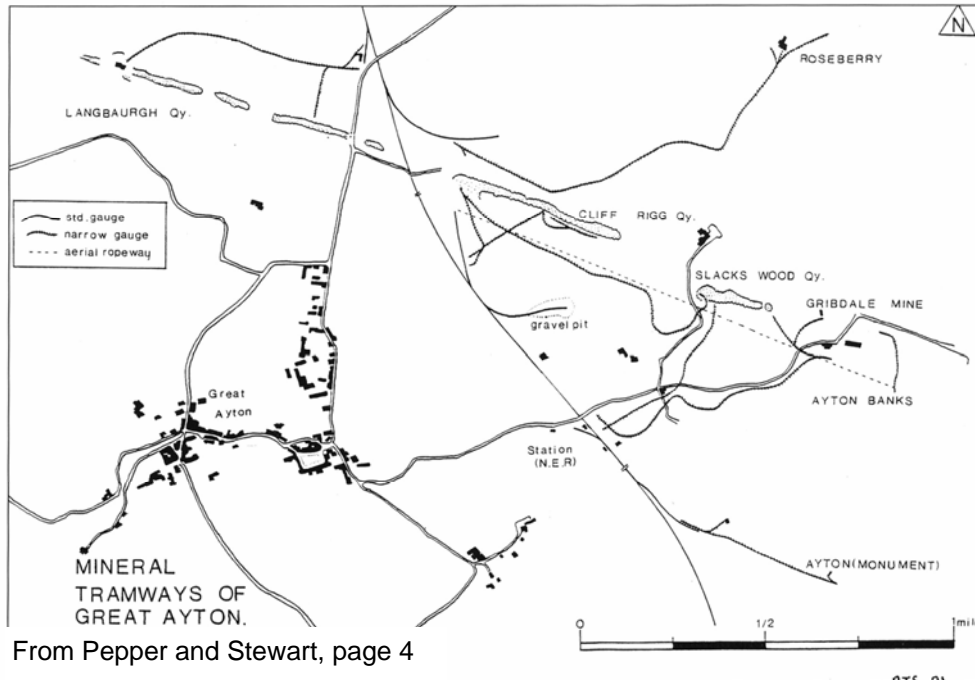
Northallerton and thence on to Leeds.

It was soon found that better quality stone could be obtained by mining at lower levels and also as the quarrying went deeper there was the problem of maintaining the stability of the quarry walls.

The diagram gives an impression of the working methods.

Percy Winn took over the royalties in 1884 and continued working Cliff Rigg as well as Slacks Wood Quarry immediately to the east. Both operations were taken over by the Gribdale Mining Company in 1913 but working ceased in 1918. However, the working of other sections of the dyke elsewhere continued until the 1950s.

### Tramway network



4

The rigg is a maze of footpaths that often follow the old tramways not only from local dyke workings but also from the Roseberry ironstone mine and Slack's Wood whinstone quarries and mine.

Some of these routes now make pleasant, additional walks. More information is about the tramways is available in the booklet by R. Pepper and R. J. Stewart.

### Fossils you may find

Locality	Rock unit	Fossils
Lower Quarry (Stop 4)	Staites Sandstone (loose blocks)	Bivalves such as <i>Liostrea</i> (oysters), <i>Protocardia</i> (cockles) and <i>Pseudopecten</i> (scallops)
	Redcar Mudstone	Bivalves, rare ammonites
Upper Quarry (Stop 6)	Cleveland Ironstone	Bivalves such as <i>Pseudopecten</i> (scallops)

### FURTHER READING

A list follows that provides more information about various aspects of dyke geology and whinstone mining and quarrying.

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