

Nenthead

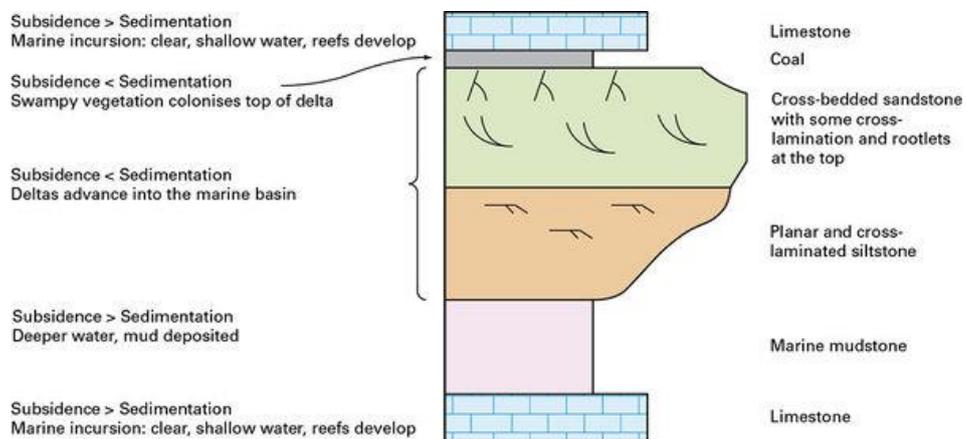
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Some brief notes on what can be seen at Nenthead Mines. We will look at some of the surface geology and some interesting features that can only be seen underground.



Photo Paul Winskill One side of a fault visible in Carrs Mine

Nenthead lies within the Carboniferous Alston block. The geology is characterised is by a succession of flat-lying marine, coastal and fluvial sediments that represent a repeated shallowing upwards sequence known as Yoredale cyclothems. These consist of marine limestones and siltstones, coastal sandstones passing into fluvial sandstones, and some coal seams which are not always present in each cycle.



Lithological sequence of an idealised cyclothem

The mineralisation that occurred is dome shaped and follows the form of the underlying Weardale granite and consists of different mineral zones with the central zone dominated by fluorite and the outer zone by barium minerals.

Minerals were deposited from a mixture of highly saline metalliferous brines and low salinity ones at temperatures between 200 C to 70 C initiated by the cooling of the Whin Sill (c295 Ma). This may have continued into the Permian. Interaction with the Weardale Granite may also have occurred

The mineralised faults occur in two main trends, ENE to WSW and NNW to SSE as shown below



BGS Map - from Nenthead geology and mineralogy, Brian Young

A characteristic of the ore deposits is the development of *flats* where the mineral fluids spread laterally from feeder veins partially replacing the limestone to form horizontal ore deposits. Within the Great Limestone, which was extensively mined in Smallcleugh mine, there were three well developed flat horizons.

On the surface rock exposures are confined mainly to the banks of the River Nent. Solid geology is covered by glacial till and mine dumps. Looking at the latter can indicate the geology that has been penetrated by the underground workings.

Location 1

The upper part of the bank above the river shows boulder clay/glacial till, mainly cobble sized blocks

in a sandy or silty clay matrix. This is very unstable and has partly covered the underlying laminated mudstones and silty mudstones which lie between the Four Fathom and Iron Post limestones.

Location 2

Looking across the river a hard grey compact limestone can be seen. This is the Iron Post limestone. Close examination can reveal brachiopods and crinoid fragments and beneath it a silty seat-earth with root and rootlet traces. The name is derived from its hardness and not any trace of iron.

Location 3

Along the narrow gorge downstream of the waterfall on the east side of the river the base of the Great Limestone rests on a thin impure coal seam. The limestone above this is rather sandy with mats of the sponge *Chaetes* as undulating pale bands. The colonial coral *Siphonodendron* can also be seen. These are in their life positions and form an important stratigraphical marker bed across much of the North Pennines. (Along the river side footing is rough and can be wet.

There are exposures above the Carrs mine portal that are easier to access).

At the waterfall around the metal walkway the limestone has been metasomatised to a hard ankerite rich rock, pale brown in colour with some exposures of galena and zinc coated with brown simithsonite.

Location 4

Walking upstream from Smallcleugh Mine entrance the upward succession from the top of the Great Limestone to the base of the Little Limestone and then to the sandstone bed above can be seen. At the small waterfall a medium grey bioclastic limestone, weathered to orange brown colouring with well developed rectilinear joints and containing abundant crinoid fragments can be seen. This is the base of the Little Limestone and if water levels are low a sandy seat-earth beneath the limestone at foot of waterfall may be visible.

Location 5

Continuing upstream towards the Middlecleugh compressor house outcrops of sandstone can be seen on both sides of river. These lie approx. 7 metres above the Little Limestone and is medium to fine grained with brown weathering. Casts of large crinoid fragments are present.

Bibliography

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