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# Killhope Head, Durham

[NY 820 433]

## Introduction

The Great Limestone (Namurian) exposed in the bed and banks of Killhope Burn is cut by Old Moss Vein, one of at least 11 roughly NE–SW-trending veins formerly worked at Killhope Head both at surface and underground from Park Level at Killhope Mines. Old Moss Vein here carries abundant galena, siderite and fluorite, together with a little sphalerite. The adjacent limestone is extensively replaced by siderite and ankerite, forming a small metasomatic flat deposit which may be seen to extend for a few metres on the east side of the vein. Well-crystallized fluorite, quartz and some galena occur in cavities in the flats. The vein and its associated flats form a low waterfall in the stream. The Killhope Head veins, including Old Moss Vein, have been described by Dunham (1948, 1990).

## Description

Where exposed in the small waterfall in Killhope Burn, Old Moss Vein strikes approximately north-east-south-west and exhibits a small downthrow to the south-east. The vein is almost 1 m wide and contains abundant fresh galena as large crystalline masses up to 10 cm across, and a little dark-brown sphalerite in an abundant matrix of partially oxidized siderite and ankerite. The limestone adjacent to the vein, particularly on its east side, is extensively replaced by siderite and ankerite forming a small 'flat'. Partial oxidation of these carbonates has produced an abundance of dark-brown 'limonite', and the vein, together with its associated flat, contrasts strikingly with the unaltered grey limestone. Cavities within this 'flat' contain abundant, well-crystallized pale-purple fluorite, quartz and some galena.

A few metres downstream of the vein outcrop, the bed of Killhope Burn provides a fine exposure of the 'Frosterley Band', a distinctive bed within the Great Limestone characterized by the abundance within it of solitary corals, most notably *Dibunophyllum bipartitum* (McCoy) (Johnson, 1958). This bed occurs widely across the Northern Pennines and was formerly much worked as an ornamental stone under the name of 'Trosterley Marble'. Examples of its use in architecture may be seen in several local churches, but its most extensive use in the area is in Durham Cathedral. The 'Frosterley Band' occurs near the base of the 'High Flat' horizon of the Great Limestone. This, together with the terms 'Low Flat' and 'Middle Flat', were names applied by the former lead miners to horizons within the Great Limestone at which metasomatic replacement was most intense. The small flat exposed adjacent to Old Moss Vein occurs at the 'High Flat' horizon.

About 20 m upstream from the outcrop of Old Moss Vein, another vein, probably the Tweed Vein, crosses Killhope Burn, although 'the exposures of this are not as good as those of Old Moss Vein.

## Interpretation

Old Moss Vein occurs within the central, fluorite-rich, zone of the Northern Pennine Orefield. The outcrop of Old Moss Vein appears to be representative of the veins formerly worked in this part of the field where extensive iron mineralization is commonly present, especially replacing limestone wall-rocks. The relative abundance of sphalerite, accompanying galena, is characteristic of deposits in parts of the orofield, including the head of Weardale and the Nenthead area. The outcrop of Old Moss Vein provides a fine illustration of the development of a metasomatic flat deposit within one of the main 'flat' horizons of the Great Limestone.

It is noteworthy that the galena and sphalerite show little evidence of supergene alteration, and the siderite and ankerite exhibit only comparatively minor oxidation. This is consistent with Dunham's (1990) observation that in valley bottoms, unoxidized minerals should theoretically be found at the surface. The mineralized outcrops in Killhope Burn clearly confirm that this is the case. A similar situation may be observed in the lead- and zinc-rich flat deposit associated with Carr's Cross Vein exposed at the waterfall near Smallcleugh Mine (see GCR site report, this chapter).

## **Conclusions**

The outcrop of Old Moss Vein is typical of fissure veins within the central fluorite zone of the Northern Pennine Orefield. The stream also provides very fine exposures of an associated iron-rich metasomatic replacement flat deposit within the Great Limestone at one of the principal horizons for this type of mineralization. The site provides a readily accessible means of demonstrating and studying these important aspects of mineralization.

## **[References](#)**