# Foster's Hush, Durham

[NY 8556 2040]

## Introduction

Foster's Hush is an abandoned opencast working on Hunter's Vein, one of the complex of veins formerly worked for lead ore and barite at Lunehead Mines. The partially landscaped spoil-heaps at this site are of importance for the abundance within them of fine examples of the rare barium calcium carbonate mineral barytocalcite ($BaCa(CO_3)_2$). Whereas Blagill Mine, near Alston, is described in this volume (see GCR site report, this chapter) as the type location for this mineral, Foster's Hush is an important source of fine specimens and, in addition, provides small exposures of the mineral *in situ* in its parent vein. Barytocalcite and witherite are also known from the Dolyhir Quarry GCR site (see GCR site report, Chapter 5)

Little is known of the earliest history of lead working at Lunehead prior to the London Lead Company's tenure of the mines between 1770 and 1880. The mines were re-opened for barite mining in 1884, and production of this mineral continued, intermittently, until 1937 (Dunham, 1990). Further intermittent working, including unsuccessful exploration for workable witherite, took place between 1939 and 1981, since when the mines have lain idle.

## Description

South of the Brough to Middleton-in-Teesdale road (B6276), the Great Limestone and overlying Namurian beds up to the Crow Limestone, are cut by a number of sub-parallel fissure-veins which strike between WSW–ENE and southwest-north-east. All carry galena in a gangue dominated by barite, although with local concentrations of witherite and barytocalcite, together with minor amounts of aragonite (Young, 1985c; Dunham, 1990). Small replacement flats in the Great Limestone are known to have been worked adjacent to several veins. Extensive underground workings for lead ore, and later workings for barite, exist in several of the veins, although none of these are accessible today. Opencast workings and trials mark the outcrop of several veins, and a number of spoil heaps provide representative samples of the mineralization. Detailed descriptions of the geology and mining have been published by Dunham (1990).

The easternmost of the Lunehead group of veins is the SW–NE-trending Hunter's Vein, the course of which may be seen today as a conspicuous shallow gully, known as 'Foster's Hush', which extends south-westwards from the roadside at [NY 8590 2045] (Figure 3.16). The vein here lies within the Great Limestone. Brown limonitized limestone wall-rock adjacent to the vein can be seen locally in the sides of the hush. In addition to opencast working, Hunter's Vein has been worked underground from a level driven south-westwards towards it from the south bank of Lune Head Beck at Rennygill Bridge [NY 8638 2058]. Dunham (1990) noted the presence of replacement flats associated with the vein. Little is known in detail of the content or productivity of Hunter's Vein in these workings, although Dunham recorded unsuccessful trials for witherite between 1959 and 1962.

Recently fenced-off areas surround portions of the floor of the hush that have collapsed into the underground workings. The sides of these collapsed areas expose partially limonitized Great Limestone with a few clear, although rather inaccessible, unworked portions of the vein, or branches of it. These reveal vein widths of up to approximately 30 cm, comprising crude bands of barite, witherite and barytocalcite with included slices of partially limonitized limestone wall-rock (Figure 3.17). A few small scattered crystals of galena are present locally. Near-surface supergene alteration has produced crusts of rather chalky barite on some of the barytocalcite and witherite. In places, the former presence of masses of barytocalcite or witherite is indicated by more extensive cellular masses of tiny barite crystals which exhibit the distinctive morphology described by Dunham (1990) as characterisitic of this mineral where it has formed by alteration of a pre-existing barium carbonate mineral.

Although the small vein exposures provide unique opportunities to examine *in situ* the inter-relationships of the barium mineral suite present within this vein, the nearby spoil-heaps offer an abundance of material for detailed study. A

substantial heap of spoil, derived from surface workings in Foster's Hush, lies adjacent to the road at the north-eastern extremity of the hush. Although portions of this spoil heap were removed about 25 years ago, and the remaining material levelled and partly landscaped, the poorly vegetated remaining spoil is an important source of material representative of the mineral assemblages found in Hunter's Vein.

Especially common are blocks of barytocalcite-rich veinstone (Young, 1985c). Many of these are wholly or partially encrusted with supergene barite, either as dull chalky masses or as coral-like aggregates of tiny, commonly iron-stained, crystals with the characteristic morphology noted above and described by Dunham (1990).

The site has yielded numerous notable examples of beautifully crystallized barytocalcite (Figure 3.18). These closely resemble specimens from Blagill Mine, the type locality for this mineral (see GCR site report, this chapter), and typically comprise white to colourless slender monoclinic prisms up to 3 mm long, sharply terminated by prominent (121) faces, lining numerous open cavities within compact crystalline barytocalcite/witherite/barite veinstone. In some specimens, the barytocalcite crystals exhibit a thin superficial coating of barite, almost certainly of supergene origin. Crude pseudomorphs of fine-grained barite after barytocalcite crystals are occasionally seen.

## Interpretation

Also present in this spoil are minor amounts of coarsely crystalline white to pale-cream witherite and small amounts of aragonite in white, or very rarely, extremely pale-blue fibrous crystalline masses. Apart from barite, supergene minerals present here include rare examples of pale turquoise-blue aurichalcite (Young *et al.,* 1985a) and tiny colourless crystals of hemimorphite (Dunham, 1990).

Smaller amounts of barytocalcite-rich veinstone are also present on the dumps adjacent to an old shaft sunk on Hunter's Vein, approximately 380 m south-west of Foster's Hush [NY 8564 2016]. In this veinstone cavities up to 5 cm across are lined with terminated barytocalcite crystals up to 4 mm long.

Specimens of barytocalcite, very similar in appearance to those present at Foster's Hush, have also been found on the spoil heaps from the main adit-level of Lunehead Mine [NY 8460 2051], approximately 1 km west of Foster's Hush. It is impossible to determine whether these have been derived from underground workings in Hunter's Vein, accessed from this level, or from other veins within 'the Lunehead complex. It may, however, be significant that no witherite or barytocalcite has been seen elsewhere in the Lunehead area on surface spoil-heaps from any vein other than Hunter's Vein. Foster's Hush lies in the outer zone of mineralization of the Northern Pennine Orefield in which barium minerals, including notable concentrations of barium carbonate minerals, comprise the typical gangue assemblage (Dunham, 1990). A remarkable feature of this orefield, noted by Dunham (1990), is the great abundance of barium carbonate minerals in this outer zone. Most common of these is witherite, though Young (1985c) has demonstrated the widespread occurrence of the barium calcium carbonate minerals alstonite and, more commonly, barytocalcite.

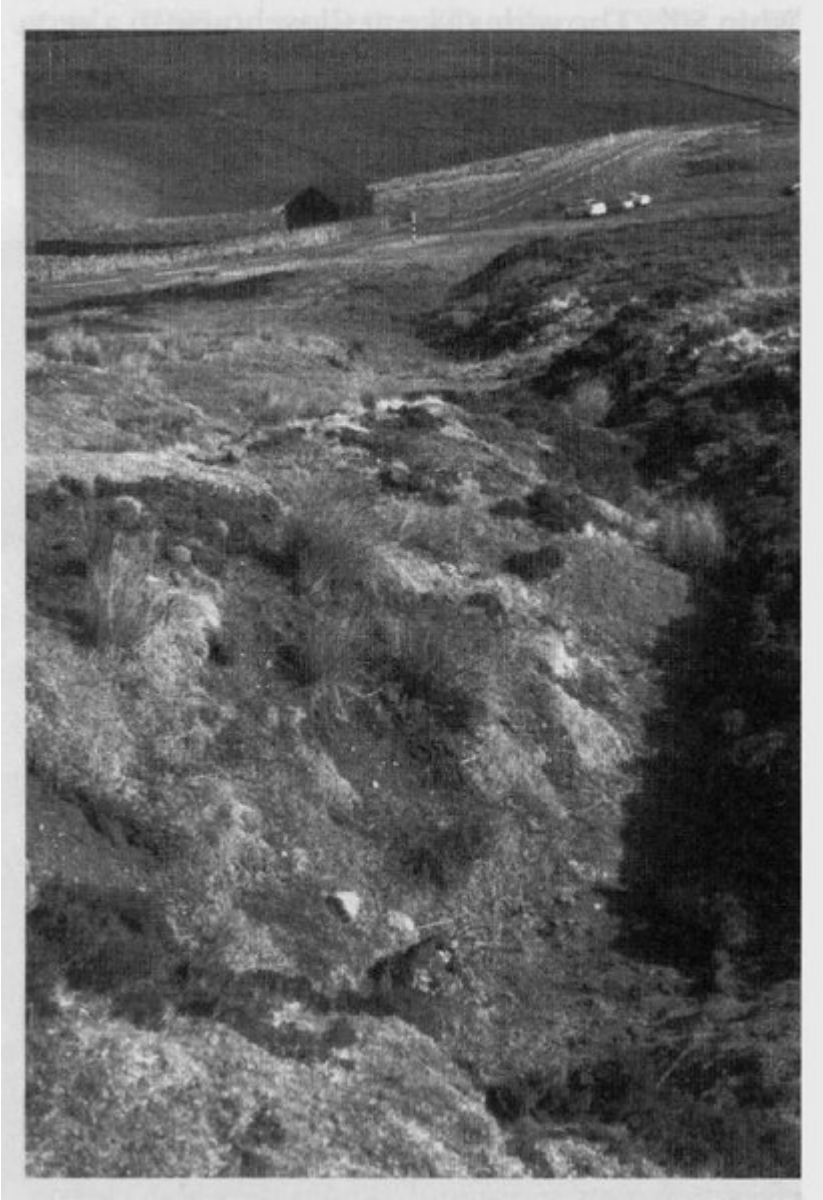
Aspects of the distribution of barytocalcite, its place in the paragenetic sequence of Northern Pennine deposits and the possible influence of wall-rock lithology on its occurrence are important in relation to Blagill Mine, the type location for barytocalcite.

Foster's Hush has many similarities to the Blagill Mine GCR site. It occupies a similar position within the outer margin of the orefield above the flanks of the concealed Weardale Granite. As at Blagill Mine, barytocalcite appears to have been, at least locally, the most abundant barium carbonate mineral within the vein. Unlike at Blagill Mine, no evidence has been seen at Foster's Hush of barytocalcite or witherite replacing earlier primary barite. However, there seems no reason to regard the barium carbonate mineralization at Foster's Hush as anything other than part of the widespread episode of barium carbonate emplacement that affected the entire Northern Pennine Orefield, including Blagill Mine. In the few specimens seen at Foster's Hush where witherite and barytocalcite co-exist, barytocalcite invariably encrusts witherite, a relationship that is entirely consistent with the paragentic sequence for barium carbonate minerals within the orefield proposed by Young (1985c).

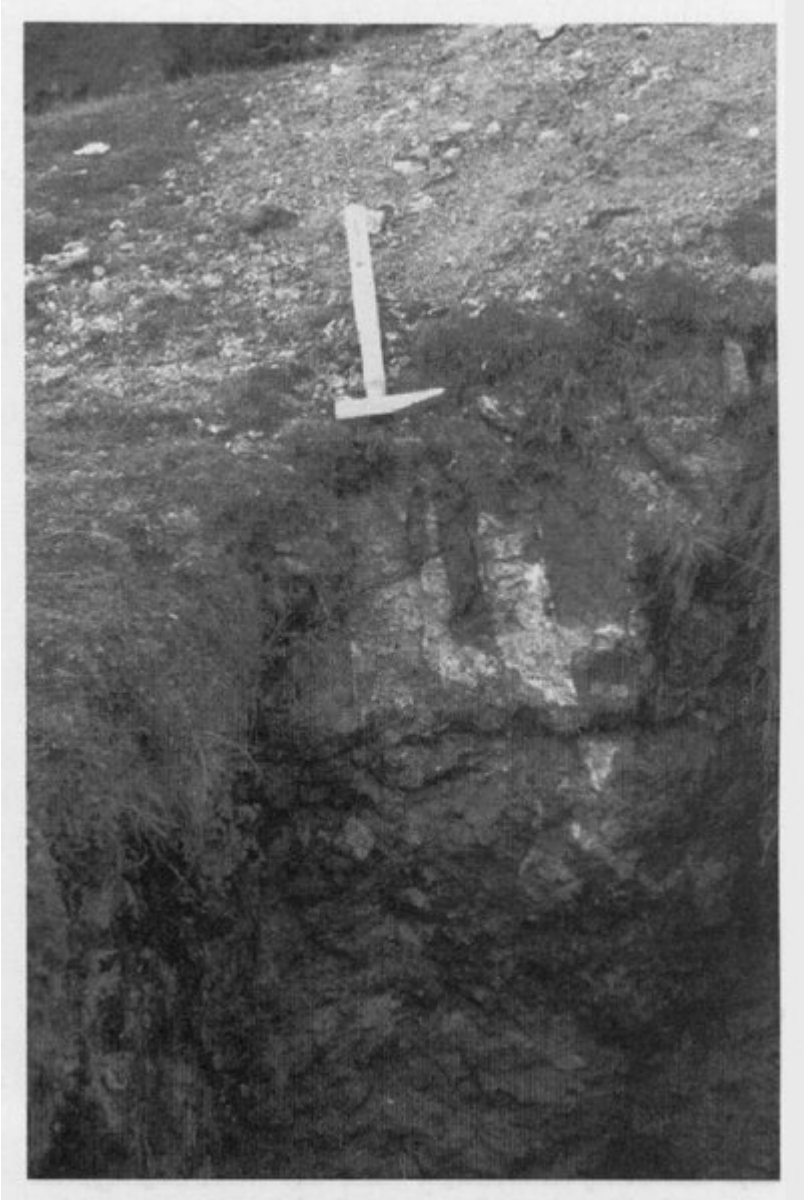
## Conclusions

Foster's Hush is an important site at which fine examples of the rare barium calcium carbonate mineral barytocalcite may be seen, both in abundant spoil and in a small number of exposures of the parent vein *in situ.* In this latter regard, the locality is certainly unique within the Northern Pennine Orefield and may be unique in the world.

**References**



*(Figure 3.16) Foster's Hush, looking north-east towards the B6276 road. The cars in the distance are parked on the partially landscaped spoil-heap derived from the hush. (Photo: B. Young.)*



*(Figure 3.17) Hunter's Vein, exposed, composed of bands of barite, witherite and barytocalcite with inclusions of limonitized limestone wall-rock, exposed in the sides of collapsed workings in Foster's Hush. (Photo: B. Young.)*

*(Figure 3.18) Specimen of crystallized barytocalcite from the spoil heaps adjacent to Foster's Hush. Sharply terminated monoclinic crystals project into vug in compact crystalline barytocalcite. The specimen is 80 mm across. (Photo: B. Young.)*