Wheal Emily, Devon

[SX 540 498]

Introduction

The small, isolated Wheal Emily Mine [SX 542 498] is situated on the western bank of the River Yealm, close to Wembury and north of Newton Ferrers, in Devon (see (Figure 7.26)). It reputedly produced lead and antimony, and was reported by Dines (1956) to carry small amounts of silver. This metallic association is suggestive of an epithermal (hydrothermal) deposit, falling into zone 5b–6 of Hosking (1964).

A shallow adit to the mine lies on the northern side of a small stream, situated in a steep-sided wooded valley. Recent work has cleared the adit portal (see (Figure 7.27)).

There are no records of mine output. However, a specimen of dump veinstone showed a content of 6 oz of silver per ton (Dines, 1956). Probably due to its isolated and well-concealed position there appears to be only limited geological literature on this mine.

Description

Lying on the west bank of the River Yealm, just south of its junction with Cofflette Creek, Wheal Emily was notable for the presence of antimony in association with silver-lead mineralization. Dines (1956) described an antimony lode, coursing E 30°S and underlying south-west which was opened up by a vertical shaft and by two adit-levels. Following earlier working, the mine was re-opened in 1849 when the development consisted of sinking a vertical shaft and driving two adits. In 1849, assays of the ore in the 12-fathom level gave figures of 45 oz, 80 oz and 110 oz of silver per ton. A winze sunk below this level showed a branch of solid lead ore 1 foot wide which was opened up for a length of 24 fathoms. In this the assay value of the silver was said to have been as high as 375 oz per ton. Five assays were made in the following year by a Mr W Knott, of Wheal Langford, which gave values ranging from 14 oz to 53 oz per ton. A single stone of antimony selected from the dressing-floors yielded 19 oz of silver to the ton. Further rich silver ores were discovered in 1850 and the Deep Adit was cleared. However, it appears that all working ceased before 1852. There is only a limited literature on the mine, the best descriptions being given by Dines (1956), Hamilton Jenkin (1974), and Durrance and Laming (1997).

The shaft is situated in a piece of rough ground bordering the south side of Wembury Wood, about 60 m above river level. Shallow Adit lies in the steep wooded slopes below (90 m ENE of the shaft), and was driven 35 fathoms south-west to where it meets the lode, which it then follows 5 fathoms to the south-east and 20 fathoms to the north-west, passing the shaft on the northeast side. Deep Adit Level is about 30 fathoms below the shaft collar and passes on the southwest side of the shaft, and was driven 25 fathoms north-west and 225 fathoms south-east to its portal on the west bank of the River Yealm.

Dines (1956) reported that a fault trending N30°W passes through the sett but it is not mineralized. The Ivybridge 1:50 000 sheet (Institute of Geological Sciences, 1974) confirms a faulted junction between Lower Devonian Meadfoot Group beds and Middle Devonian slates. The fault is described as barren of mineralization, concurring with the report in Dines (1956).

The country rocks ('killas') consist of light-coloured slates of Devonian age. These dip at 60° to the east and can be seen in exposures above the adit portal. It has been reported that the clearance of the cross-cut adit now allows access as far as the vein (L. Haynes, pers. comm.) and some ore is said to have been worked. Some dumps (mostly killas) line the side of the hill below the adit, and small piles of the characteristic ore-assemblage are now scattered around the site.

A small worked cutting to the side of the mine buildings exposes killas with a little mineralization. Inspection of loose veinstone specimens shows siderite and calcite with blebs of grey, massive lead-bearing antimony sulphides. It has been reported that the ore was a complex intergrowth of jamesonite, with bournonite, boulangerite, semseyite and galena. Small heaps of ore near the mouth of the shallow adit were examined by the late Sir Arthur Russell in 1949 and yielded jamesonite with pyrite and quartz, together with a small quantity of bournonite and galena.

Interpretation

The mine lies in the area bordering the southeastern margins of the Dartmoor Granite, but is well to the south of the area of granitic mineralizing influence and would appear to be an isolated occurrence. The metallic association is suggestive of lower-temperature hydrothermal deposition, although it is suggested that the mineralized veins at Wheal Emily were not formed as late as the normal north–south cross-course lead lodes.

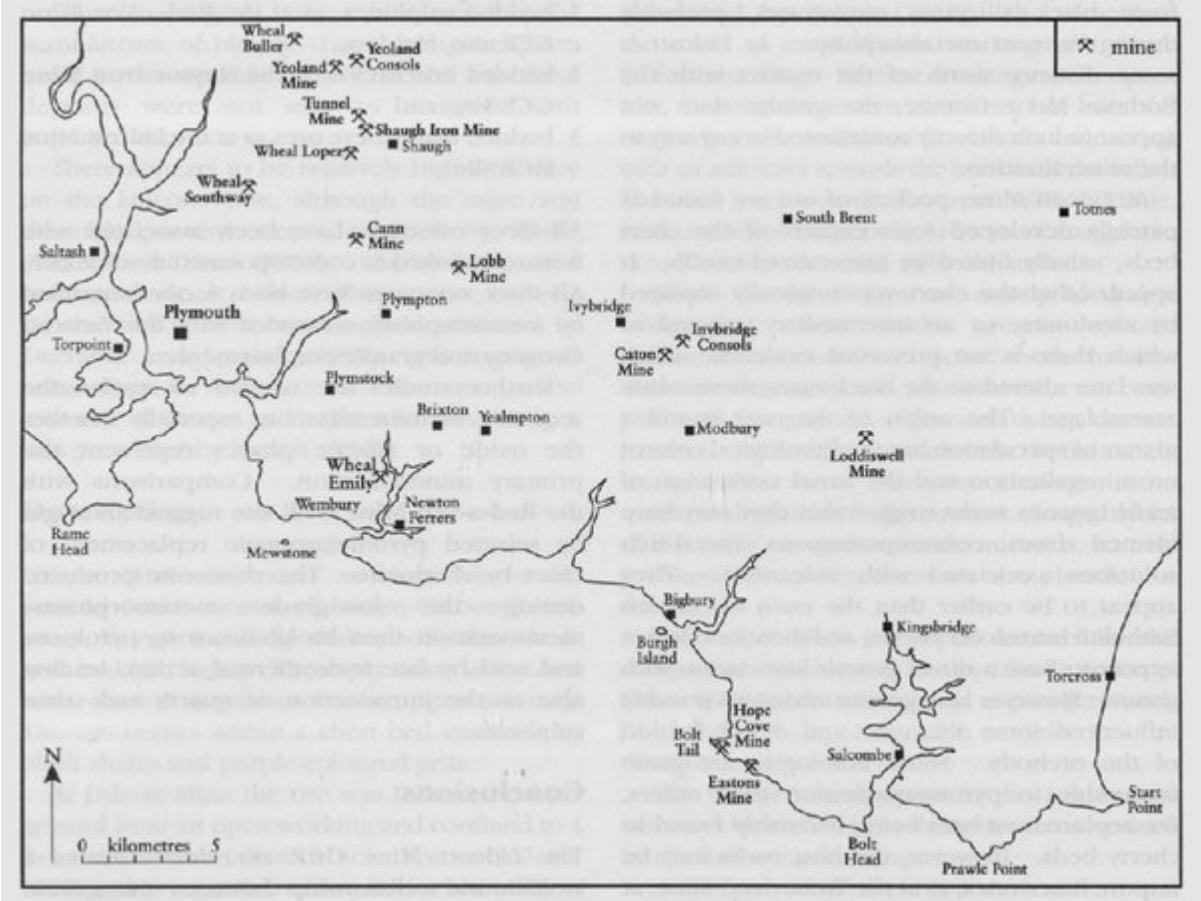
L. Haynes (pers. comm.) has likened the structural and stratigraphical setting of the mineralization at Wheal Emily as similar to that at Loddiswell Mine [SX 721 515], some 5 km east of Modbury in the South Hams area (see Stanley *et al.,* 1990b). Mineralized faults at Loddiswell are described as having a similar trend to those at Wheal Emily. These faults are described by Stanley *et al.* (1990b) as dextral wrench faults occupying major, linear, NW–SE-trending fracture zones of Variscan age, some of which were re-activated during the Tertiary as dextral wrench faults and hence guided late- and post-Variscan hydrothermal circulation. Although Dines (1956) described the fault at Wheal Emily as being barren, some evidence of faulting of similar trend has been reported in the area, and maybe a fault of pre-Tertiary age parallels the fault at Wheal Emily.

Recent work at Loddiswell has suggested a strong relationship between Au-As-Sb-Pb mineralization along NW–SE-trending faults and stratiform pyrite deposits closely associated with volcaniclastic material in the Devonian sequence. Certainly parts of the stratigraphical sequence in south Devon contain evidence for some volcanic activity; the Yealm Formation contains pyroclastic beds and conglomerates with volcanic debris, and the Meadfoot Group beds are recorded as containing some agglomerate and tuffaceous horizons. Also, there are certainly described examples of exhalative pyrite mineralization in highly altered tuffaceous rocks, as at Ugborough, near Ivybridge (Leake *et al.,* 1985). The deposit at Wheal Emily could have formed due to remobilization of some of these types of deposits. Alderton (1993) recorded the sporadic occurrence of antimony in many cross-courses in South-west England, occurring as thin stringers and brecciated veins in sedimentary and volcanic rocks, suggesting a volcanic-epithermal link, as seen at the Bwlch Mine GCR site, in North Wales (see GCR site report, Chapter 5). At Loddiswell the mineralization is considered to be the result of fluid extraction during shear movements on north-west-southeast structures, with structural pathways guiding post-Variscan hydrothermal circulation.

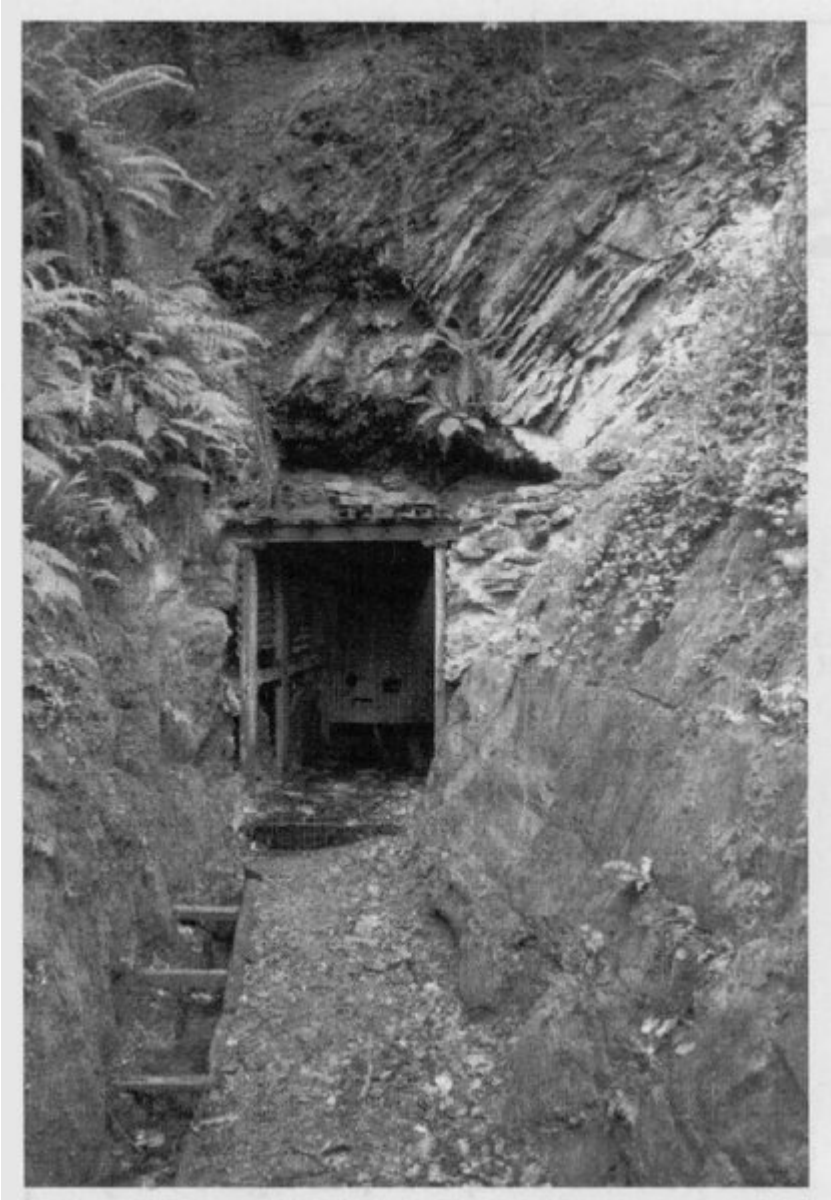
Conclusions

Wheal Emily demonstrates a rare occurrence of lead-antimony ore in South-west England. At present the cross-course mineralization at Wheal Emily is readily accessible in a small, isolated mine-working. Parts of the underground workings allow for the killas and mineralization to be studied. Further research investigations will add to the debate on the influence of volcanic horizons in the stratigraphical record of south Devon and the relationship of the deposit to Variscan and post-Variscan faulting.

References



(Figure 7.26) Map of Plymouth and the south Devon coast showing the position of the mines in the area, in particular the Wheal Emily GCR site. After Hamilton Jenkin (1974).



(Figure 7.27) The re-opened and gated mine adit at Wheal Emily. The adit cuts through Devonian (Meadfoot Group) beds. (Photo: Natural England.)