
Devon United Mine, Devon

[SX 521 795]

Introduction

The Mary Tavy mining area stretches for some 9.5 km along the Tavy and Lyd valleys to about 1 km north of Lydford, and has an east-west breadth of about 4.75 km. It is situated on the western side of the Dartmoor Granite (see (Figure 7.38)), and the country rock ('killas') consists of metamorphosed grits and shales of Carboniferous age with extensive intrusion of greenstones (altered basic igneous rocks).

Within this area the east-west lodes of Wheal Friendship and Devon United Mine were worked mainly for copper and arsenic, whilst small amounts of tin (cassiterite) and tungsten (scheelite) are also recorded from some of the mines.

The former chief producer in the area was Wheal Friendship [SX 508 794], which is located on the northern fringe of the village of Mary Tavy. Overgrown dumps in open ground containing chalcopyrite and other ore minerals are still accessible from a small road opposite Wheal Friendship House. At the northern end of this orefield the Wheal Betsy north-south lead lode (a 'cross-course') has been proved for some 6.5 km and worked to a depth of 310 m.

This mine [SX 510 812] yielded lead- and zinc-ores, the lead ores containing substantial silver. The Wheal Betsy engine-house and surrounding dumps are preserved (see (Figure 7.39)).

The Devon United group of mines were all situated on the south and east side of the River Tavy (therefore strictly in the Peter Tavy parish). The mines were North Devon United Mine [SX 520 790], Central Devon United Mine [SX 520 790] and South Devon United Mine [SX 513 786]. The mines were worked initially for copper, and later for tin and arsenic. Virtually the entire infrastructure of the mines has long gone, but there are several overgrown dumps at various sites especially within the wooded area on the east bank of the river.

It is the dumps associated with the former North Devon United Mine that comprise this GCR site, which are located in small woods close to the river bank and the Horndon footbridge. The footpath from the village of Horndon to the bridge passes across the Teat built to serve the mines. Much of the dump material is of 'killas' with pieces of white vein quartz. However, some small dumps have recently yielded an interesting mineralogical assemblage, mostly of vein quartz but with abundant scheelite, native bismuth and well-crystallized arsenopyrite. Other rare minerals have recently been reported by Rumsey and Savage (2004), including the first British occurrence of the rare nickel bismuth sulphide parkerite. It has been suggested that scheelite has probably developed rather than wolframite due to the calcareous nature of the feldspars associated with the greenstones and calc-flintas of Lower Carboniferous age. Scheelite is also found with arsenopyrite at the nearby Wheal Friendship. This mine worked similar lodes on the north-west side of the River Tavy.

The mines were described by Dines (1956), and Hamilton Jenkin (1981). Some details of both Wheal Friendship and the Devon United mines are given by Durrance and Laming (1997).

Production, from figures presented by Durrance and Laming (1997) from the Mary Tavy area, was dominated by the output from Wheal Friendship, which according to Collins (1912) and Dines (1956) was at least 160 000 tons of copper ore, 18 000 tons of arsenopyrite, 165 tons of tin, and 7053 tons of pyrite. At various times amalgamation occurred of Wheal Friendship with the Devon United mines and also Wheal Jewell [SX 528 813]. Recorded production figures may therefore be somewhat confused, but it is believed that the Devon United mines produced 15 000 tons of copper ores, 1500 tons of refined arsenic and 373 tons of tin concentrates.

The beginnings of mining are obscure. Wheal Friendship is known to have been working in the late 18th century (Barclay, 1931), and along with the Devon United group of mines continued in production periodically until 1925.

Description

The main workings of Wheal Friendship occurred within a series of interlaced lodes and branches, extending for about 1.6 km westward from the Tavy Valley, and underlie the Tavistock to Okehampton road. To the west of this road, the Main Lode (varying from 0.5–9 m in width) courses E30°N but eastwards changes to nearly east-west; both portions underlie 45°N. Along the course of the worked lodes there were 11 shafts and two inclined planes. The deepest shaft was Taylors, just west of the main road, which was sunk vertically to the 90-fathom level. An important north–south cross-course heaves the lodes from 10–30 fathoms to the left. Filling is mainly of 'fluccan' (clay-gouge), but with a little galena and sphalerite. This cross-course is believed to be the southerly extension of the Wheal Betsy structure. Barclay (1931) recorded the mine as paying dividends before 1790 and being actively worked by various companies up to 1925. At a later date the dumps were worked over for tin, arsenic and tungsten.

The Devon United group of mines includes three separate mines, namely the North Devon United (also known as 'East Wheal Friendship'), the Central Devon United and the South Devon United. East Wheal Friendship was developed as a southern extension of one of the northern lodes of Wheal Friendship. Work had started here before 1835, and in 1846 the property was taken over by a London company. The sett consisted of two parts. The major portion, 600 fathoms in length, lay east of the river in the parish of Peter Tavy. The smaller section, 50 fathoms long, lay west of the river. About this time East Wheal Friendship was incorporated into the Devon United setts. The East Friendship lode was developed in North Devon United Mine, 550 m north of Cudliptown, and in the period 1846–1850 returned a production of 14 271 tons of copper ore (Dines, 1956). The workings consisted of an adit and two shafts. The lode was said to average 3 m in width.

Central United Mine was situated 550 m south-west of Cudliptown and worked a nearly vertical east-west lode called the 'Main Central'. A shaft was sunk near the river to 26 fathoms below adit, the 10-fathom level extending 140 fathoms and the 26-fathom level extending 90 fathoms east of the shaft. Barclay (unpublished manuscript) recorded that the lode varied from 30 cm to 90 cm in width and was filled with quartz, chlorite and brecciated killas (an assemblage commonly found on the dumps). The ore-rich parts of the lode consisted mainly of arsenopyrite with small amounts of cassiterite and occasional chalcopryite bunches. The lode walls were of altered killas with small tongues of greenstone.

South Devon United Mine was situated east of the Tavy, 900 m south-west of Cudliptown, and was sited on the east-west, N-dipping Main South Lode. Engine Shaft, 65 m from the river, is said to be 50 fathoms deep. Adit level, commencing 26 fathoms west of the shaft, follows the lode for 290 fathoms to the east. The last period of activity ended in 1922. During the last working the Main South Lode was the most important. It averaged 9 m in width, and was recorded as consisting of quartz and chlorite, as well as carrying cassiterite and arsenopyrite. The ground is heaved by several small cross-courses. Values of cassiterite are said to have run to 30 lbs per ton in places.

The Devon United group of mines started working copper about 1820, and between 1842 and 1862, and 1882 and 1884, were worked in conjunction with Wheal Friendship. South Devon United Mine was re-opened mainly for tin in 1904, and Central Devon United Mine mainly for arsenic in 1909, the two continuing producing up to 1922. The outbreak of war in 1914 gave an added impetus to arsenic production, but subsequent depression led to closure in 1923.

Interpretation

The mineralized lodes of the area are interconnected between the east and west banks of the Tavy, and therefore connect the mining setts of Wheal Friendship and Devon United. Their origin is therefore common. The area is one of hydrothermal sulphide veins with predominant or significant contents of copper sulphide ore minerals, and generally fits the main-stage hydrothermal mineralizing event. The mineralization is fairly typical of the tin-copper zone boundary. As has already been stated, the presence of scheelite rather than wolframite may be due to the availability of calcareous rocks in the immediate vicinity.

The outstanding feature of the relatively small Mary Tavy–Peter Tavy mineral area is the rich development of arsenopyrite in association with the copper ores. Similar mineralization is relatively rare and is seen only on a similar or

greater scale in Devon Great Consols and the Botallack area of Cornwall (see Botallack Mine and Wheal Owles GCR site report, this chapter). It is therefore suggested, from the evidence of such areas, that the controlling factor for such rich copper-arsenic deposits is the presence of mafic intrusive rocks (epidiorites or greenstones) within thermally metamorphosed sedimentary rocks on the gently dipping flanks of a granite mass.

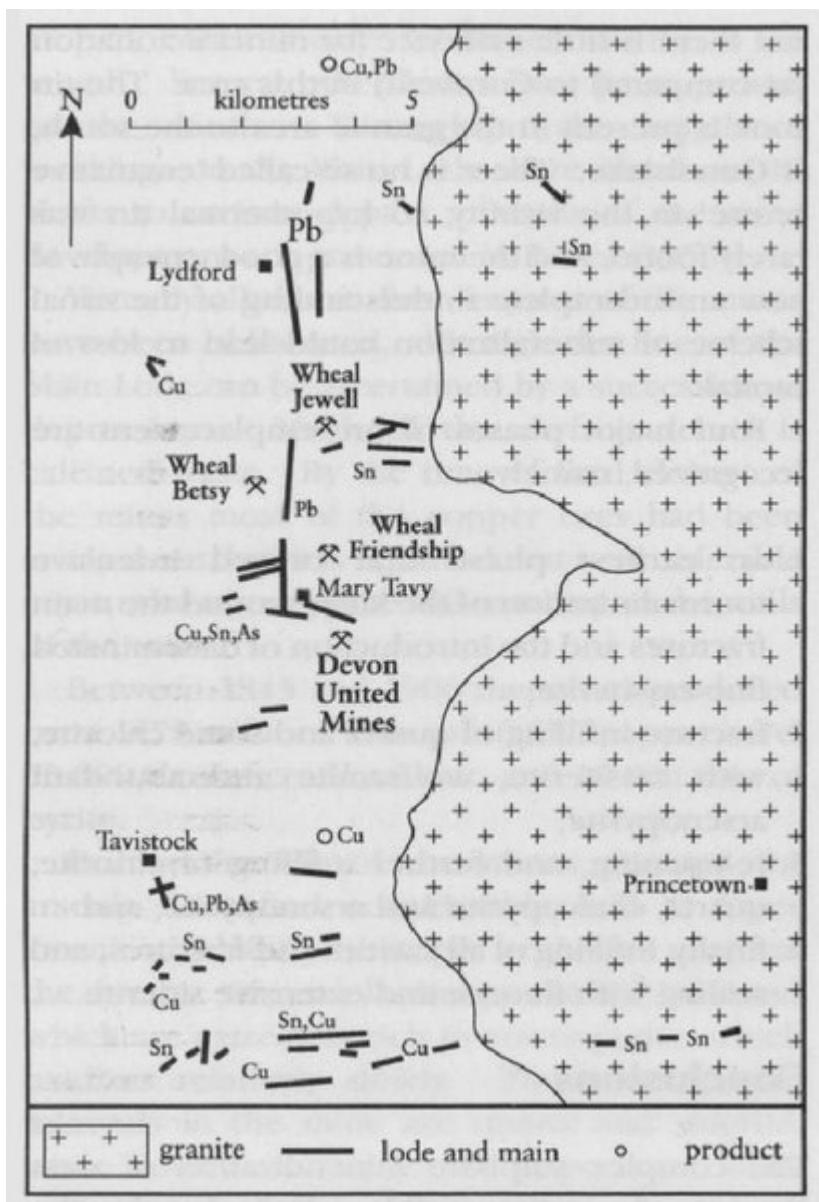
Conclusions

This GCR site, especially the shaft area of the original North Devon United Mine, still provides dump material important for studies of the main-stage copper-arsenic mineral assemblages of South-west England, which were integral in the evolution of the Cornubian Batholith. All three Devon United mines worked typical hydrothermal east–west lode structures. The dominance of copper and arsenic mineralization provides particular interest.

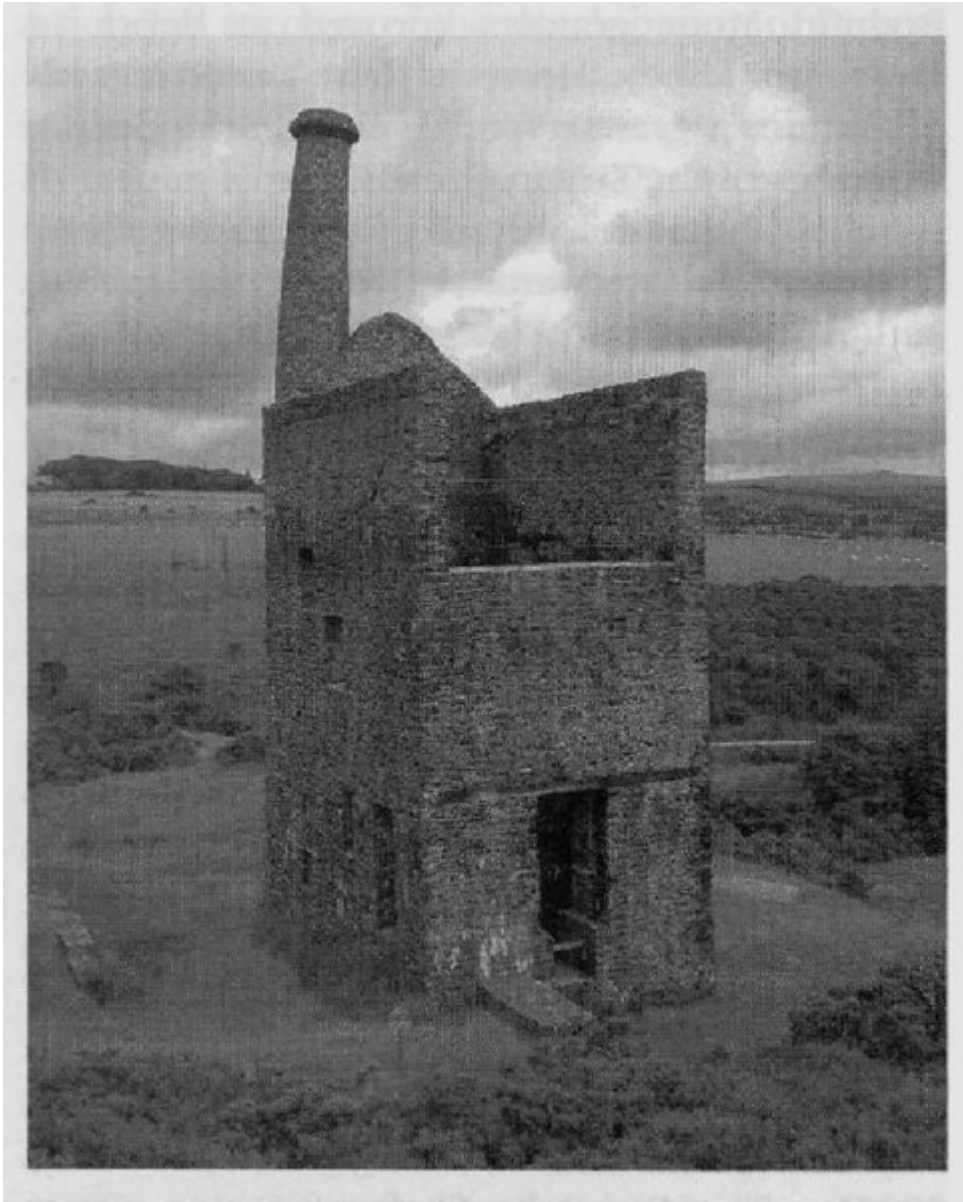
An interesting mineral assemblage of chalcopyrite, arsenopyrite and cassiterite in vein quartz-chlorite lodes can still be collected. Quartz vein material with abundant scheelite, native bismuth and arsenopyrite, along with the first British occurrence of parkerite, has been recorded from dump specimens of veinstone.

Evidence of north–south lead-bearing cross-course mineralization 'heaving' earlier structures can be found in the neighbourhood of the copper-bearing lodes, especially in the Wheal Friendship mining sett, suggesting main-stage mineralization for the Devon United Mine. The presence of cassiterite in the lodes indicates tin-copper zone mineralization.

References



(Figure 7.38) Location of the Devon United Mine GCR site on the north-west edge of the Dartmoor mining area. After Durrance and Laming (1997).



(Figure 7.39) Wheal Betsy Engine House, Devon United Mine. (Photo: Markles55.)