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VISIT TO WHEAL JANE TIN MINE

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During our Easter field excursion to Dartmoor the other year, we were privileged to be given permission to visit the newly opened Wheal Jane tin mine, near Redruth, Cornwall. We had to set off from our lodgings in Ashburton at 6.00am to be underground by 8.30am. Lamps, belts, helmets and safety boots were all provided, and at the shaft top our party was divided into two groups. One group was left at the 2nd level, and shown around the dry workings, while the rest of us, because we had gone in supposedly waterproof clothing, were taken down to the 7th level, known as the 'wet level'.

Three main lodes are mined at Wheal Jane, two of which are associated with a porphyritic 'elvan' dyke and dip at a shallow angle to the S.E. down to the 70 fm. level. The elvan dyke was previously thought to have controlled the deposition of the lodes, but careful study has revealed that the tin ore was deposited in several phases, some of which precede the dyke, and the presence of the two features in such close proximity is probably due to an earlier shear zone being a favourable site for both. The two lodes are known as W and Is? lodes, and the third lode, apparently unrelated to this shallow fracture zone, dips much more steeply, and is known as Moorshaft lode. It is formed of complex vein systems containing mainly sulphides, the richest portions being located at the intersections with the other two lodes.

At the seventh level., near the shaft station, water dripped steadily from the roof, and the flow increased along the development level till it streamed from the walls and roof at the development head. The lode was the width of the level, lying in 'killas', and was mined for copper, tin and zinc. Copper and zinc sulphides were visible, but cassiterite, the tin oxide, could not be seen by the naked eye, although the ore averaged 1-3% tin. Colourfully tarnished pyrite is a common accessory mineral.

After walking to the skip shaft, we climbed the shaft ladders to the 6th level, where ore was trammed to a jaw crusher from stopes in upper levels. Broken ore from the crushers is stored in ore bins which fill the skips with controlled amounts of ore. The shaft stations are lined with concrete and rock bolts, but the rest of the levels, for the most part, are self supporting. [8]

The 6th level is also the main drainage level, and water from the upper levels drains down to it, and water from the lower levels is pumped up to it. Here larger pumps transfer to the surface the rigorous flow of water channelled along the floor of the level.

Before climbing up to the 5th level, we went to see the development head on Moorshaft lode on the 6th level. At this level the lode had changed character,

both in the ore mineral content, and the degree of wall rock alteration. On the 5th level, we were shown stopes on the A and B lodes. These large stopes often have the elvan dykes as the hanging wall and are left as unsupported cavities, despite their shallow dip. The irregular nature of these lodes means that the stopes are never very extensive, one of the many problems experienced in mining at Wheal Jane. Where timbering is used, it is rarely replaced, as the workings will have been abandoned long before the timber rots. Zinc and copper present in the wall rocks soon develop soft, furry encrustations of sulphates in the abandoned stopes.

Zoning of mineral deposits, classically developed on a regional scale in Cornwall, is general not obvious in individual mines, and at Wheal Jane, tin, copper and zinc all occur together at the same horizons, and high temperature wolframite is seen to have grown on galena formed at lower temperatures in the cross-cutting Caunter lodes.

Three hundred men are employed underground at Wheal Jane, working on 24 hour operations, raising 600 tons of ore per day. The biggest problems are experienced with controlling a constant grade of ore being fed to the mill. Tin generally runs 1-3%, but can occasionally be as high as 20% in isolated pockets. Stannite, the tin sulphide, is lost in large amounts with the other sulphides like chalcopyrite, pyrite and sphalerite. The cassiterite frequently occurs in a finely disseminated form in the lodestuff, giving trouble with the milling, and has to be separated by flotation. Wheal Jane is the only mine using a flotation process to extract tin ore. The copper and zinc are also recovered in reasonable quantities.

Exploration at Wheal Jane shows that prospects are good along strike of the orebodies, but little is known of the persistence of ore in depth. Trouble may occur with exploration along strike due to the line of old workings along the lode to the east, many probably filled with water, and the existence of the larger disused workings of the Mount Wellington Mine to the west. Workings in Wheal Jane are connected with those of Mount Wellington, and our party was shown the [9] large concrete plug where the workings join at the 6th level. When the pumps are temporarily shut down at Mount Wellington, the steel door in the plug is closed to prevent Wheal Jane from flooding. Assuming the persistence of the ore in depth is good, and the price of tin remains high, the present price being over £3000 per ton, then the mine predicts a working life of at least 25 years.

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