

THE SHEPHERD AND MURPHY MINE = MOINAHISTORY OF MINING.

The Shepherd and Murphy ore body, situated at Moina, 36 miles S.W. of Devonport and 22 miles from Sheffield, was discovered by Shepherd and Murphy in 1893. Production was intermittent between 1893-1906, but from 1907 to 1918 regular production of tin, tungsten and bismuth was maintained, mainly due to successful metallurgical treatment. In 1919, a bush fire destroyed all surface equipment and it was not until 1921 that milling was resumed by the New Shepherd and Murphy Mining Co. However, the only ore treated before closure in 1924 was previously mined and stored ore, together with some dump material.

In 1953, the Moina Tungsten Tin Mining Co. N.L. unwatered the mine and a new mill and concentrating plant were erected. However, only 40 tons of metallic tin were produced during the period 1955 - 1957 and the mine was again closed down late in 1957. Total production from the mine between 1893 - 1957 has been approximately 540 tons metallic tin, 242 tons tungsten and 71 tons bismuth.

GENERAL GEOLOGY.

The host rocks for mineralization are the Gordon Limestone and conformably underlying Moina Sandstone of Ord Vician age, which have been locally converted to garnet-pyroxene skarn and quartzite respectively by contact metamorphism. The rocks appear to occur within the contact aureole of the Dalcoath Granite of Devonian age, which probably extends beneath the mine area at a shallow depth, although the nearest surface exposure is some 3 miles to the east. The Ordovician sequence which trends approximately N-S and dips 30° - 50° west is cut in the Bismuth Creek area by a post mineralization, N.W. - trending fault which downthrows to the west. The continuation of the lodes on the eastern side of the fault has not been found, probably due to an estimated vertical displacement of 1200 feet (Blake, 1955). A further handicap in locating further lodes is the extensive Tertiary gravel and basalt cover, which locally obscures the western extension of the ore bodies at the surface.

ECONOMIC GEOLOGYOre Deposits.

The orebody at the Shepherd and Murphy Mine is a sheeted vein system comprising four main and two subsidiary veins, with an average width of 15 inches. The veins, which probably occur in subparallel tension fractures, are approximately perpendicular to bedding in the host rocks with a consistent dip of 85° to the south. A vertical N.W. branch lode occurs on the western extremity of the most northerly vein (No. 6 lode), and is the only deviation from a general E.-W. trend. The lodes apparently plunge to the west at moderate angles in each case.

The veins comprise cassiterite, wolframite and bismuthinite with minor pyrite, sphalerite, chalcopyrite, molybdenite, galena, magnetic and scheelite in a hangue of predominantly quartz with fluorite, mica, topaz, calcite, beryl and laumontite as accessories. The ore occurs sporadically within the vein in the form of bunches and small blebs with large patches of cassiterite, wolframite or bismuthinite in places. Minor mineralization of the wall rock occurs in places, generally with sphalerite and bismuthinite extending for a few feet on either side of the lode. In the upper levels of the mine the ratio cassiterite: wolframite: bismuthinite was 20:12:3 (Williams, 1958) but in depth there was an increase in wolframite and subsequent decrease in bismuthinite, as in the Aberfoyle and Storeys Creek Mines.

Williams (1958) presents evidence to indicate that mineralization of the limestone and quartzite followed contact metamorphism in the history of the deposits.

MINE WORKINGS.

The lodes have been worked from the surface to a depth of 340 feet from four adits. They have been developed below No. 3 adit (the lowest) to a depth of 150 feet in two levels from a main shaft. Above No. 3 adit level the lodes have been almost completely stoped out to the surface. No. 6 lode has been stoped over a length of 700 feet on all levels, No. 5 lode to a maximum of 270 feet on No. 4 Creek Drive level, No. 4 lode to a maximum of 800 feet on No. 3 adit level and No. 2 lode to a maximum of 450 feet on No. 4 Creek Drive level and No. 3 adit level. Samples of "run of mine" ore taken in 1954-1955 indicate an average grade of 0.38% and 0.66% WO₃ in No. 6 lode, 0.50% Sn. and 0.81% WO₃ in No. 4 lode and 0.18% Sn. and 0.24% WO₃ in the NW. Branch lode.

Mining and treatment of ore during 1955-1957 indicated a general decline in the overall grade of the lodes towards the lower levels, particularly towards the extremities of the drives.

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