LORD BRASSEY NICKEL MINE.

This is on Section 1758-91M, 80 acres, at the top of a lofty hill of serpentine rock, called Nickel Hill, north of the bridge over the Heazlewood River at the 16 mile. The summit is about 700 feet above the river. Mining operations have been carried on here by the Lord Brassey Nickel Company for winning nickel-ore, which is found in two forms, viz., nickel-iron-sulphide and hydrated nickel carbonate, zaratite. The latter is more abundant near the surface, and often lines the walls of the numerous joints which intersect the serpentine. As a mineral, it is said to be the finest zaratite in the world. Its colour is pure emerald green, changing, in an encrusting variety associated with it, to a greenish-yellow. The sulphide occurs as a new mineral, called heazlewoodite, and is referred to by Dana. in his 1899 appendix to the System of Mineralogy, p.33, in the following terms:-

"Heazlewoodite. W.F. Petterd, Catalogue of Minerals of Tasmania, p.47, 1896. A sulphide of nickel and iron related to pentlandite, occurring in narrow bands in the serpentine of Heazlewood, Tasmania. Colour, light-yellow bronze; streak, light bronze. Highly magnetic. H. = 5. G. = 4.61. Rich in nickel, up to 38%, but not analysed."

In this mine the heazlewoodite occurs in small veins, running through the serpentine along irregular slickensided planes, and also disseminated in the country-rock itself in the neighbourhood of the joints. It seems often to be associated with a vein matrix of carbonate of iron. The company have spent money very perseveringly in working this nickel deposit, but when I was at the mine, underground operations had ceased, and work was confined to classifying the ores which had been raised, i.e., separating the carbonate from the sulphide. The shaft at the top of the hill is about 25 feet deep, and has yielded a fair quantity of zaratite. I saw here, too, a piece of the best sulphide vein stuff, being solid-looking heazlewoodite, 2½" to 3" thick. The fineness of the grain, and the very light colour, cause the mineral to be overlooked, unless the stone is examined carefully. A tunnel has been driven into the hill S.48° E. for 570 feet, attaining a maximum depth of 100 feet from surface at the extreme end. At 119 feet in, a crosscut (Skinner's drive) has been driven 90 feet inna crooked fashion to the S.W., and 222 feet further along the main tunnel is another crosscut driven 95 feet, also S.W., and also crooked. Both of these crosscuts have such sharp bends that they now head in a direction nearly parallel with the main tunnel. The entrance to the latter crosscut is just beyond the shaft from surface, and the tunnel beyond this, for 150 feet, is below the surface trenches at a depth of about 80 feet. The tunnel end seems to be about 80 feet from the E. boundary of the section. The nickeliferous veins and bands have been persistently followed in their windings along the numerous smooth planes, the polished serpentine faces of which mimic the slickensides of true fissure lodes. These shining surfaces tell of movement within the rock mass, probably consequent on swelling during the process of hydration. The plane faces also constantly cut off, and displace the veinlets of nickeliferous sulphide, showing that the ore had segregated from the surrounding rock before hydration set in.

The work done so far has not established the existence of ore at shallow level in remunerative quantities. The present levels, if continued, can gain no additional backs, and a lower tunnel from the Heazlewood side of the hill would be a long piece of work. The usual practice in mining is to aim at depth, but in working this kind of ore, that practice is not in accord with geological theory. We are not dealing now with fissures and injection-veins, but with segregations of sulphides from a heavy, cooling rock magma. According to Soret's principle the magmatic ore segregations take place in the coolest portions of the magma. These are the portions near the contact of the igneous rock with the adjacent rocks, into which the former was intruded. The surrounding and overlying rocks have been removed by denudation from the Nickel Hill serpentine, but the parts near the present surface must have been nearer to the original margin of the rock mass than those at a greater depth. The probability, therefore, is that greater success will not attend greater depth. The smallness of the quantity of ore obtained here bars profitable working, though fine nickel, 98-99 per cent, is quoted at £160. per ton. This Heazlewood ore has its peculiarities, and it is not

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likely that it can be mixed with other ores in the furnaces without disturbing the delicate reactions which are involved in the reduction of nickel ores. On the other hand, this bar may be removed at any time by metallurgical improvements, and as the increased demand for nickel steel is sustaining the market, the search for nickel ore should not be altogether abandoned.

JUPP'S NICKEL.

This section, 3273-93M (12 acres), situated south of the Lord Brassey property, was formerly held by the Roy's Luck Company, but is now known as Jupp's. It is serpentine country, and, like the preceding mine, is on the flat at the top of the Nickel Hill. Along the north line of the section a tunnel has been driven about 113 feet E., to intersect two veins bearing N. 60° W., which have been noticed and trenched at surface. A shaft has been sunk on the westerly vein to a depth of 24 feet, and the most solid nickel sulphidic ore got on the hill has been obtained from this shaft. At the N.E. angle of the section are veinlets bearing N. 70° W. and N. 25° W., trenched just at the section corner. These run into the Lord Brassey and Lacey's sections, and are of no use whatever to the Roy's Luck holders. The line of the principal vein is in a diagonal direction across the section, but its continuity must not be assumed without proof. For satisfactory prospecting, the nickel-bearing properties on this hill ought to be amalgamated. One drawback to mining work is the absence of good timber. The serpentine nourishes only stunted trees.

In the triangle formed by the Corinna Road, Heazlewood River, and 13 mile Creek is one of the hills called "The Pinnacles." On the W. side of the creek, about 40 feet up the hill, a short tunnel has been driven W., in actinolitic rock, to cut a copper formation, but was suspended before reaching it. On the side of the hill lumps of oxidised lode stuff are visible. Native copper has been found in the creek below. It is to the E. of the Heazlewood line of lode, and is probably connected in some way with the contact of hornblendic rock with serpentine. N. of this, just below the junction of the 13 mile Creek with the Heazlewood River, there is a low ridge, running N.W., and separated from the Pinnacles by the river. This hard spur has caused the river to make a wide loop, not charted in the map of mineral-sections. The rock is syenite, very rich in hornblende, and has, most likely, some relation to the actinolite rock at the Pinnacles.