IRON DEPOSITS AT PENGUIN CREEK

During the early years of this century, the Tasmanian Iron Company obtained some forty thousand tons of iron ore from these deposits. This ore consisted of boulders of hematite contained in a matrix of limonite, clay and hematite, rather like plums in a pudding. The hematite lumps, some weighing many tons, were picked out of this matrix which was then dumped. Today, Mr. A. Pearson is again working this deposit, but it is the limonite content which is now important and the hematite lumps are discarded.

Some three and a half miles along the Iron Cliffs Road from Penguin, a turn-off to the right leads to the pits where Mr. Pearson is obtaining the iron oxide. The larger open cuts, once worked by the Company, are located about thirty chains further north on both sides of Penguin Creek. The track to them and the cuts themselves are much overgrown with bracken and saplings.

Penguin Creek, here about three miles from the sea, flows through a narrow alluvial plain and the banks on either side rise fairly steeply for a hundred feet or more to the basalt plateau above.

Very little in the way of outcrop can be seen in this area but the rocks exposed beneath the basalt, and in which the iron occurs are Cambrian beds of slates, quartzites and breccia. This breccia may be the result of faulting but, at any rate, it is this bed that has largely been replaced by iron solutions and to a lesser degree by silica. The slates also show some replacement and the weathering of these accounts for much of the clay of the deposits.

On either side of Penguin Creek then, the Cambrian rocks have been exposed by the erosion of the basalt cover and the sediments underlying this area, which is some forty chains in width, have been more or less replaced by hematite. At, and near the surface, this hematite has been largely weathered to limonite and in places this limonite has been precipitated from solutions to form hard lumps. The hematite occurs mainly as the hard residual nodules, but analyses show that some hematite is contained in the fine grained matrix. Two or three feet of soil occurs as overburden.

The pits now being worked are situated to the south of the major openings on the eastern bank of Penguin Creek. No. 1 has been opened in two benches each of 6 feet in height. A sample across the upper one showed a percentage of 56.5 of limonite, 32.7 of hematite and 8.2 of insoluble material, while from the lower bench a sample gave 46.2% of limonite, 24.5 of hematite and 25.3 of insoluble. Patches of clay are visible here and there and lumps of unaltered hematite are present. No. 2 Pit has not been worked for some time and is another small one, 200 feet north of No. 1. A composite sample taken from 15' in one wall and 10' in another, showed 52% of limonite and 20% of hematite. Four hundred feet further north and at the end of the cart road, a larger pit has been

re-opened. A sample taken over 7' from the north-west face showed 76% of limonite and 8.8% of hematite; while 15' taken from the south-east face showed 53.7% of limonite and 4.3% hematite. In the north-west face are quite appreciable seams of hard re-precipitated limonite. These lumps of material contain 90% of limonite.

Samples obtained from the larger openings operated by the Tasmanian Iron Company show much lower percentages of limonite and more than 50% insolubles once the hematite lumps have been discarded. The deeper the sample taken from the surface, the lower the percentage of limonite. Thus from the pits on the east side of Penguin Creek which have faces up to 70 feet high, the percentage of limonite is only 10 and the hematite 30. From Hudson's Workings on the western side, these percentages are reversed.

It thus appears that the faces that have been worked recently (that is in Pits 1 and 3) have the highest percentages of limonite. The extent of this better grade material can only be determined by sampling ahead. The country rock has been replaced by hematite over quite a wide zone and there is little to indicate where the replacement has been almost complete or where only partial, within the zone. However, the ratio of limonite to hematite is greater closer to the surface than at depth and the present practice of operating shallow pits should continue.

It should be noted that the hematite boulders are of good quality and contain little impurity. A grab sample of hematite from all the workings showed 97.3% of Fe_2O_3 and only 2.3% of insolubles. Earlier assays have shown that the sulphur and phosphorous content of these ores is practically negligible.

The following are the results of analyses. Except in Sample 11, all lumps of hematite were excluded. The limonite content was calculated by assuming the theoretical formula $2Fe_2O_3\ 3H_2O$ and thus allotting 14.5% for H_2O (that is Ignition Loss). The Fe_2O_3 unsatisfied by this amount was assumed to be hematite.

Sample	Place	Width	Insol.	Fe_2O_3	Ig. Loss	Limonite	Hematite
1.	Pit 1 Upper Bench	6'	8.2	81.1	8.2	56.5	32.7
2.	Pit 1 Lower Bench	6'	25.3	64.0	6.7	46.2	24.5
3.	Pit 2 Two walls	25'	22.0	65.0	7.6	52.3	20.3
4.	Pit 3 Re-pptd Limonitic material N.W. Wall	Grab	6.2	78.2	12.1	90.3	-
5.	Pit 3 N.W. Wall	7'	10.0	73.7	11.0	76.0	8.8
6.	Pit 3 S.E. Wall	15'	36.6	50.3	7.8	53.7	4.3
7.	Ellis' Workings S. Pit (60' from surface)	6'	59.5	36.6	1.7	11.7	26.6
8.	Ellis' Workings N. Pit (30' from surface)	6'	55.2	41.2	1.4	9.7	33.0
9.	Hudsons No. 3 Pit	6'	51.8	39.0	4.1	28.2	14.8
10.	Hudsons No. 1 Pit	6'	57.5	32.2	4.7	33.1	4.0
11.	Whole Area	Grab	2.3	97.3	-	-	97.3

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