

13th March, 1921.

Loftus Hills Esq.,
Government Geologist,
LAUNCESTON.

Dear Sir,

In conversation with Mr. Leahy, Engineer to the Electrolytic Zinc Company, who called here to see me a day or two ago, I learnt that it is the intention of the Company to apply for an advance report on the Cygnet Coal Mine. Anticipating this application to the Hon. the Minister for Mines and later your instruction I have prepared a report which I enclose herewith.

I shall not touch upon the Cygnet area as the report submitted gives sufficient detail for your information. Here the lower members only are found and so far as I have gone there is no likelihood of coal occurrences. I learn that at Gordon prospecting pits have been sunk for coal. This locality I shall visit for a few days next week. I have found that the Cygnet group of alkaline rocks occur here in dyke form intruding the diabase and Permo-Carboniferous formations. There is a large area to examine here, but I shall complete the work before the end of this month.

Yours faithfully,

A. McIntosh Reid,

ASSISTANT GOVERNMENT
GEOLOGIST.

This coal field lies five miles east of Cygnet, a small town situated on an inlet of Huon River.

The coal beds are readily accessible from the valley of Nichols Creek on the east side of which outcrops are exposed unbroken for three miles. Because of the south-eastward dip of the strata the seams rise towards the north, but at all places along the outcrop the hill slopes are moderate and approach to the coal is relatively easy. The rise from No. 1 dip tunnel of the Cygnet Mine to Berry's workings, three miles northward, is only 510 feet.

This field consists of a narrow strip one to two miles wide and ten miles long, a remnant of a very much larger coal bearing area now completely dissected and greatly reduced in extent. On the north and east sides the continuity of the seams is interrupted by intrusive masses of diabase represented by Grey and Cygnet Mountains. This diabase rock was thrust up through the coal bearing formations displacing all coal beds. West of Mt. Cygnet the coal beds underlie a sill of diabase jutting out from the main mass and have not been greatly affected, but east of it the seams have been upturned and faulted badly. It is quite impossible to determine without extensive and costly prospecting to what extent the coal beds underlie the diabase sill, but it is probable that as the Main mass of Mt. Cygnet is approached the quality of the coal becomes greatly diminished. This intrusion of igneous rock, besides displacing the coal beds and cutting them into comparatively small areas, had the effect of throwing the seams and their associated rocks into undulations producing several small faults that are annoying to the miners and render, in some cases, the results of prospecting unreliable. The throw of most of the faults in the Mt. Cygnet area is very slight but the amount can be determined only in the most exposed and best developed parts of the field. Perhaps the area least affected lies between O'Neil's land and Woodbridge Road.

The coal has been opened in trenches and in dip and strike tunnels along the outcrop for a distance of about three miles. Measurements of the main seam were obtained at many of these openings showing an average of 2' 6" of coal free from bands. Naturally the mine openings were selected where there was the best showing of coal at the surface and the average at these points is about three feet.

Throughout the main workings the coal is overlain by a massive, felspathic sandstone, but at some places as at Heeney's Tunnel a dark carbonaceous shale intervenes between this and the coal. Where it occurs the shale is made to serve as the roof of the mine, elsewhere the roof is hard, unbroken sandstone. This sandstone is very strong and not only forms a safe protection for the workings but is doubtless one of the causes of the comparative regularity of the beds under extraordinary stresses. In the Cygnet Mine area the strata, except for minor internal movement, moved as a more or less rigid mass contrasting strongly with other areas of this field where the seams have been greatly faulted and broken. The shale, however, which occurs on the roof at isolated points only everywhere constitutes the floor of the seam and one particular "dig" directly below the coal is used for holing. The underlying shale is not jointed and the lamination is more or less destroyed by crushing or shearing as exhibited by numerous slickensided surfaces. Lolls occur in the roof for several hundred feet thence it is remarkably

regular and firm. The coal parts readily from the roof and breaks in large blocky masses.

The coal is hard and black, semi-bituminous, with Vitreous to dull lustre, conchoidal to splintery fracture and possesses a fine banded texture. In some places it has contorted laminae and slickensided faces. In other places the banding has been completely destroyed by the shearing movements resulting from the intrusion of the diabase to which the coal has been subjected. Jointed structure is lacking for the same reason. There are no persistent partings and little bedded impurity, and there is a remarkable uniformity in character throughout the whole area.

An average of fifteen samples of coal taken from various parts of the Cygnet Mine shows the following content:-

Volatile hydrocarbons and other gases	10.7 %
Fixed Carbon	64.5 %
Ash	23.2 %
Sulphur	0.5 %
Moisture at 110°C.	1.3 %

Pyrites is found as small nodules and circular blebs between laminae, but is nowhere prominent.

No folds have been encountered in the developed portion of the Mt. Cygnet Mine, but the beds are warped to some extent, the dip varying from five to eight degrees. Several small faults and slips have been met with in the workings but with the exceptions of an east-west fault between Nos. 1 and 2 pits and a downthrow fault at the bottom of the latter there have been no serious dislocations.

The entrance to the present workings of the mine is by dip tunnels, the No. 1 is 1,160 feet and No. 2 over 300 feet long. The general design of the workings is by single entry pillar and stall system. From the main entries driven along the strike the stalls are turned up the rise, and extended to the next main entry above. In the worked out areas the pillars are drawn by the retreating method. It was evidently the intention of the late management to discontinue work from the No. 1 pit as the pillars have been removed over a large area and the coal on both sides of the dip tunnel has been taken out also thus jeopardising the safety of the mine. Despite the removal of the supporting pillars there has not been a serious fall and except for a slight lateral movement westward the highly resistant sandstone roof has remained undisturbed.

In the design of future operations it has been considered advisable to drive a strike tunnel from a gully 20 chains northward of No. 2 pit. This tunnel would command a very large area extending beyond Heeney's workings and would have the advantages of gravity drainage and transport.

Hitherto the work of the operating company has been more exploratory than developmental, but the results have proved so satisfactory that a more ambitious scheme has been drawn up with the object of exploiting the coal seams on an economic scale.

Two coal beds occur in Mt. Cygnet area and there are indications of a third. The upper or main seam only has been developed, although it is stated the lower seam contains coal of superior quality. The comparative thinness of the lower seam at the outcrop has discouraged

exploration. At the southern extremity of the workings the main seam has a maximum thickness of 3'6" thinning out gradually towards the northern workings on Berry's land where it is only 1'3" thick.

The Mt. Cygnet mine is owned by Robert Harvey of Cygnet and at the present time is operated by the Electrolytic Zinc Company whose works are situated at Risdon. This coal is eminently suitable for the metallurgical process involved in the extraction of zinc oxide from zinc residues for which purpose it is required by the operators. It has been used with success in the hearth; and is a fair steaming coal, but it has the disadvantage of clinkering under forced draught and its value for the latter purpose is thereby diminished. This clinkering is due to the extreme fusibility of the ash. A fused incrustation forms on the surface of the coal gradually cementing the particles together and enclosing in the resultant viscous mass a considerable amount of unburnt material.

It is estimated that the average thickness of the seam in the 180 acre block enclosing the mines is 2'9". On this basis the gross tonnage amounts to 485,000. If from this quantity 25 % be deducted for losses and less 60,000 tons already extracted the nett tonnage available amounts to 303,750. In this vicinity the total coal-bearing area of economic import exceeding 1,000 acres contains 1,500,000 tons of workable coal.

The coal has been exploited in the Cygnet field only in the places where it is most easily accessible. There are considerable areas containing coal of equal quality in which little prospecting has been done. It must be admitted, however, that the seam becomes much thinner northward and beyond Margate Road is faulted badly.

It has been suggested that these seams belong to the Sandfly group because there is a certain similarity in the constitution of the coals but the Sandfly coals are younger. The Bruni Island coal seams, however, are identical with those of Cygnet.

The precise localities where prospecting should be concentrated will be indicated in the publication on the coal resources of Tasmania.