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REPORT ON FINGAL COAL MINE

INTRODUCTION

This report is based upon the results of a short visit of inspection last year. The main object of the visit was to determine the most economical method of transporting the product of the mine to the Fingal railway, but whilst engaged on this work the writer took the opportunity of inspecting the mine openings and the several seams of coal exposed on the south-western side of Fingal Range. Only five days were occupied in the performance of the necessary trial surveys of the proposed lines of transport and only an hour or two each day was spent on the investigation of the coal deposits. A thorough investigation of the whole area in the time available was impracticable. In consequence, the writer has to rely largely upon information obtained by H.G.W. Keid (late Government Geologist) regarding the outlying parts of the area. The present report is designed to supplement that written in 1921 by Mr. Keid in which an adequate description is given of the coal seams and the general geological features of the area as a whole.

LOCATION AND EXTENT

The Fingal Coal Prospecting Syndicate holds under leases from the Crown 680 acres of land for mining purposes. The following sections comprise the holdings:- 8607-M of 320 acres; 8621-M of 20 acres; 8690-M of 20 acres; and 8724-M of 320 acres. The coal seams do not extend outside these section.

The Coal Mine is situated 2½ miles from Fingal in the north-eastern part of Tasmania. The seams belong to the Trias-Jura group occurring at Mt. Nicholas, Cornwall, Dalmayne and other important coalfields.

ACCESS

The St. Marys railway passes through Fingal, and junctions with the Main Hobart-to-Launceston line at Conara. Fingal is 34 miles by rail from Conara, which is 35 miles distant from Launceston and 98 from Hobart. It will be seen from the foregoing that Launceston will become the more suitable port for the shipment of coal overseas from the mine.

It is proposed by the Syndicate controlling the mine to construct a branch railway of standard gauge from the present siding to the site of storage bins at the foot of the range, and connect the mine openings to the bins by means of a self-acting, endless-rope, ground tramway. The route of the branch railway passes over grassed plains on grades not exceeding 1 in 50 with the load, the rise being gradual all the way from the siding. The length of railway line is 1½ mile and the tramway 60 chains. It is estimated that the cost of these works will amount to £4204.

GENERAL FEATURES

Between the railway and the foothills of Fingal Range the old valley floor of South Esk River is occupied by 3 to 30 feet of alluvial material. This plain is almost denuded of vegetation and is free from irregularities. The lowest member of the coal measures is exposed in the foothill country, but the productive or coal-bearing member is 500 feet higher reaching an ultimate altitude of 1050 feet above the plain or nearly 2000 feet above sea-level. These coal measures have been intruded by diabase which outcrops in bold bluffs of very considerable extent on the north and south sides of the coal area and in small protrusions here and there on the western side of the workings. The form this intrusive takes is doubtless that of an enormous laccolith, out of which have sprung minor injections of sills and dykes. Apparently the sills were injected generally at the horizon of the coal measures, but large masses of this igneous rock are found at lower horizons in both Trias-Jura and Permo-Carboniferous formations. So far as the intrusion affects the coal seams of this area it may be stated that the body of the diabase represents a great transgressive mass which has completely dislocated the coal-measures and separated them from neighbouring fields. Although the diabase underlies the coal-bearing strata at no great depth there is little evidence of serious interruption in the continuity of the seams on the properties held by the Syndicate. The Silkstone and Cornwall faults of Mt. Nicholas pass through Fingal Range outside the coal area. Minor faults probably occur but the various mine openings show no indication of their presence.

COAL SEAMS

On these properties five coal beds have been definitely located and there are indications of others. All of these seams are of workable thickness, but two contain thick bands of fire-clay and clayey sandstone. The variation in the nature of the coals, the seaming of some beds by clay and shale, and the change in the character of the intervening rocks is so great that the correlation of the several beds is attended with considerable difficulty. The main seam (Delta) outcrops in many parts of the area and is the main source of production. Sections of this seam have been observed from west to east along the range at a fairly constant altitude. The following section was measured in the main workings:-

Sample No. 492 Delta Coal Bed

Hard Sandstone (roof)	Feet	Ins.
Coal Bright		4½
Clay Band		½
Coal Bright		11
Shale Band		1½
Coal Bright		5
Clay Band		1½
Coal, stony		5½
Coal, rather dull	1	5
	3	10½

	Feet	Ins.
	3	10½
Coal, dull		3½
Clay Band		½
Coal, dull	4	6
Shale Band		2
Coal, bright		3
Clay Band		¼
Coal, bright		1½
Clay Band		½
Coal, bright		3½
Shale Band		1
Coal,bright	1	6
Shale (floor)		
	11	2

This seam outcrops in Crouch's Creek where it is seven to eight feet thick, and again in a creek south of Aulick's property.

Sample 492 was taken from a fresh face of coal 400 feet from the entrance to the main tunnel. The coal here is hard and black, withvitreous to dull lustre, conchoidal to splintery fracture and possesses a fine banded texture.

Throughout the workings the coal is overlain by a massive felspathic sandstone, but shale a few feet thick everywhere constitutes the floor of the seam. The sandstone is very sound and forms a safe protection for the workings. The coal parts readily from this roof-stone and breaks in large blocky lumps.

In Cardiff Creek a short tunnel has been driven on Theta seam at an altitude of 1200 feet above sea-level. The following section was measured in this tunnel:-

Sandstone (roof)	Feet	Ins.
Coal, dull		2
Coal, bright		½
Coal, dull	2	2
Clay Band		1
Coal, dull		9½
Clay Band		½
Coal, dull		6
Shale Band		¾
Coal, dull	1	7
Sandstone (floor)		
	5	5

Sample 495 was taken from the end of the tunnel on this seam and represents the quality of the coal exposed there. The coal had been exposed to the action of the atmosphere, and ercolating waters for many years, and probably had suffered deterioration. This is a sub-anthrcitic coal, posssessing a dull to bright lustre, conchoidal fracture and banded structure. It is hard and brittle, but stands transportation without excessive stacking. A considerable part of the ash is intrinsic, but there are minute films of mineral matter between the laminae and thicker partings of clay between thebands of coal.

Eta seam is exposed in a cutting below the main workings. It is only thirty inches thick at this point and has not been opened up by mine workings. The roof and floor consist of hard sandstone.

Gamma seam is fairly prominent in the area. At an altitude of 1670 feet above sea-level this seam is exposed in the bed of a small creek about ten chains to the east of the main workings. The seam is four feet thick, but a six-inch band of fireclay in the middle detracts from its value. Southwards the seam outcrops again at an altitude of 1405 feet above sea-level. The difference in altitude of these outcrops is accounted for by the southerly dip of the strata. At this point the seam is eight feet thick and appears of much higher quality. Some years ago a tunnel was driven on this coal bed, but the entrance has collapsed, and, in consequence, samples could not be obtained of the coal under cover.

Alpha and Beta seams have been located, but no work has been performed to ascertain their size, extent, and quality.

MINING OPERATIONS

The mining operations performed by the Fingal Syndicate have been of a developmental character only. Attention has been directed particularly to the Delta seam on the western side of Fingal Range. Here two tunnel headings have been driven on the seam and bords have been cut preparatory to the excavation of coal. One heading has been driven 300 feet and the other 400 feet. Outcropping high on the mountain side all the seams can be advantageously operated from adit or dip tunnel openings, but in some cases level headings or "strike tunnels" may prove more suitable. The conditions generally are favourable for mining.

QUALITY OF THE COAL

No particular description is applicable to all the coals, but generally they have a pitch to dull black colour, vitreous to brilliant lustre, brownish-black to black streak, an irregular to conchoidal fracture, and a dense texture. As a rule they are hard and slightly brittle coals, and are capable of withstanding the effects of weather, and possess good storing properties. They ignite readily, and, after a little preliminary crackling - due to contained moisture and thin films of pyrite - burn quietly, emitting jets of yellow flame, swelling and agglutinating in the operation. According to Keid the decrepitating coal is confined to bands near the roof, and as the coal gains cover decrepitation is not so pronounced. Belonging to the

Mt. Nicholas-Cornwall-Dalmayne series the composition and quality of the coal in these seams are similar and the properties vary only in the slightest degree.

The following analyses represent the average grade of coal mined at Fingal:-

No. of Sample	Nature of Coal	Moisture at 105°C.	Volatile Matter	Fixed Carbon	Ash	Sulphur
492	Non-Caking Humic	2.70	26.82	48.18	22.30	0.03
493	" "	2.40	26.10	48.29	23.21	0.37
494	" "	1.00	24.00	48.80	26.20	0.24
495	" "	2.54	26.36	42.00	29.10	0.41
513	" "	4.69	27.81	52.30	15.20	0.50

An ultimate analysis of sample 494 showed the following compositions:-

Ultimate Analyses					Heat Values		
Sulphur	Hydrogen	Carbon	Oxygen	Nitrogen	Calories	British Thermal Units	Evaporative Power
0.24	3.85	57.83	10.80	1.08	5068	9122	9.43

It will be noted that the ash content is rather high, but in every other respect the coal is of good quality. For use in the powdered form this coal will prove particularly suitable. It has been used with success in locomotives and as a household coal it has been for long in local demand.

PRODUCTION

Altogether, not more than 600 tons of coal have been produced from these workings. The present rate of output - only two men being employed - is 10 to 15 tons a week. This small output is sufficient to supply local requirements.

QUANTITY OF COAL AVAILABLE

Although eight seams are known in the area no attempt can be made to determine the quantity of coal available in this mine until more exploratory work has been performed. A little development work has been performed on Delta seam and a few openings have been madeinto Gamma and Theta seams, but insufficient data are available in regard to the others to allow of an estimate being made.

Consideration, in the estimates of quantities, has not been given to coal beds less than 30 inches in thickness. Again only the portionsof the area proved to be coal-bearing by mine openings and outcrops have been taken into account. On the 30-inch basis, and assuming the rate of workable coal at 1200 tons per foot per acre, the available coal from Gamma, Delta and Theta seams (13 feet) over an area of 500 acres is put at 7,000,000 tons. This quantity would be augmented by the reserve contained in the other seams.

CONCLUSION

The foregoing statement shows that the Fingal area contains a large reserve of coal in seams of considerable thickness. It shows also that the coal is of simiar quality to that occurring in the Cornwall, Mt. Nicholas and Dalmayne properties, and that the conditions for mining and transport of the product to market are not less favourable. In fact the Fingal mine is more favourably situated as regards transport, being only 70 miles from the port of Launceston. At one penny per ton per mile the cost of transport by rail is not excessive. The low freightage will enable this Mining Company to compete successfully with local producers. Another great advantage this field possesses is its easy accessibility from the main lines of transport. In effect, the enterprise should be attended with success if the operations ofthe Fingal Syndicate are conducted on sound business lines.

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GEOLOGICAL SURVEY

LAUNCESTON

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