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183

GOVERNMENT GEOLOGIST

REPORT ON COAL SEAMS AT THORNEDALE,
NEAR THOMPSON'S MARSHES, AND THE
JUBILEE COLLIERY, NEAR ST. MARYS.

*Government Geologist's Office,
Launceston, 12th December, 1901.*

As instructed by you, I visited St. Marys on 31st August to examine some coal seams in the neighbourhood of that township. These were at the Jubilee Mine, in the eastern part of the Mt. Nicholas Range, three miles north of St. Marys, and at Thornedale, near Thompson's Marshes, seven miles south.

Jubilee Mine.

This is situate on the S.E. flank of the Nicholas Range, 1800 feet above sea-level. The seam is in the Upper Mesozoic sandstone, which forms the slope of the mountain. The measures certainly continue for some distance ahead of the mine works, as over 100 yards in advance are sandstone cliffs, where the ground rises rapidly. The surface of the mountain is so thickly covered with detritus from the columnar diabase (dolerite) on the summit, that it is impossible, as a general rule, to see to what height the coal measure sandstones really continue, but, from the horizons at which they have been observed elsewhere in the range, I think it quite probable that they persist to within two or three hundred feet of the summit. Their boundary is obscured everywhere by talus, but the abrupt appearance of columnar igneous rock suggests a junction of the two formations at the base of the columns. The crown of the mountain consists of a columnar ridge of the basic trap or greenstone rock, called diabase (or dolerite). The same rock crowns the Tier on the south side of the Break of Day Valley, Mt. Logie (or Elephant), and St. Patrick's Peak. I quote the latter on the excellent authority of a former Government Geologist, Chas. Gould, and have marked it on the map accordingly. No mining works on Mt. Nicholas have yet proceeded far enough to test the question whether the coal measures continue underneath the eruptive rock, or whether the latter will cut them off. From the sections

afforded further south by streams which have carved their channels down through the diabase to the sandstone beds below, I am disposed to think that the coal measures will pass below the eruptive cap for some distance before they are cut off by the filled fissure, which was the channel of escape for the molten mass. This opinion is fortified by the appearance of the valley between Mt. Nicholas on the north, and the Tier on the south, where similar phenomena are repeated. On the south side of the valley the sandstones flank the greenstone-crowned Tier, producing irresistibly the conviction that the valley is one of denudation, and that the sandstones and diabase once extended across it. In due time, this valley will be worn down to the Permo-Carboniferous strata, which are below its present floor, and afterwards those, too, will be removed by the ceaseless agencies of nature, and the underlying Silurian slates will be exposed. Gould's fault, which brings up Silurian and Upper Palaeozoic strata against the Mesozoic, and cuts off the coal measures to the east, is to the east of the Jubilee Mine, and does not affect the seam on the property. This fault runs S. to St. Marys, passing S.W. of township, and continues S.E. to Seymour.

At the Jubilee, a tunnel has been driven N.W. into the hill for about 180 feet, on a well-developed seam, dipping very gently in the same direction. I took sections at two different places, as under:—

In the face, roof concealed—

	ft.	ins.
Clean coal	2	2
Parting	1	4
Clean coal	1	3
Parting	0	1
Clean coal, 1 ft. 8 ins. &	2	0
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	6	10

In tunnel, roof concealed—

	ft.	ins.
Clean coal	3	1
Parting	1	5
Clean Coal	1	0
Parting	0	1
Clean coal	2	0
	<hr/>	
	7	7

At short distances, headings have been driven E. 66 ft. 36 ft. and 30 ft. long. In these drives we can see that the upper parting is maintained. The coal there is stained by surface waters. I take no notice of the coal in these shallow drifts, as it suffers deterioration from being within the range of moisture from the surface. The lower band parts easily from the coal, and thins out towards the east.

The coal is black and clean; lustre, dull to brilliant, with shining layers throughout. The texture is dense, and fracture cubical. It has an occasional efflorescence of iron sulphate. The analysis, made in the Government Laboratory, by Mr. W. F. Ward, is—

Fixed Carbon.	Gases.	Ash.	Water.	
Per cent.	Per cent.	Per cent.	Per cent.	
45·7	29·2	18·9	6·2	Coke, crumbly.

Published analyses of coal from other seams on the range give—

Fixed Carbon.	Gases.	Ash.	Water.
Per cent.	Per cent.	Per cent.	Per cent.
48·5 to 50	32·2 to 36·5	7·25 to 14·83	3·8 to 7·6;

consequently, in the Jubilee coal the fixed carbon and gas are a little lower, and the ash a little higher, than the seams further west. The quality may improve somewhat a little further in, seeing that the present tunnel is not 30 feet below the surface. The coal burns well in the open grate, leaving a fairly clean ash, as Tasmanian coals go, and does not splutter. It ought to command a ready sale for household and steam purposes.

It is now being won on a small scale, carted to St. Marys, and sold freely in Launceston. This mode of conveyance to St. Marys restricts the output. A tramway will have to be constructed, connecting the mine with the Fingal railway; this will be about three miles in length. The colliery will then be in direct communication with State markets.

Just now, when federation has brought with it inter-colonial free trade, is a trying time for our collieries, and new ventures are apt to meet with a somewhat hesitating reception. The existing industry will have to be fostered, and every encouragement given to open up new sources of supply. The Jubilee seam has every appearance of being able to support a healthy mine.

Thornedale Seams.

These are situated 7 miles S.E. of St. Marys by road, and 6 miles N.W. of the coastal township of Seymour as the

crow flies. Going out from St. Marys we pass over Silurian strata, which form a narrow strip between the granite of the East Coast and the Mesozoic sandstones of the Break o' Day Plain. We pass a little distance east of the site of the boring trial, at Harefield, in this plain. The boring results were instructive, though not economically valuable. The drill went down 264 ft. through Mesozoic sandstone, and then 313 ft. through the fossiliferous shales, conglomerates, sandstones, upper marine Fenestella limestone of the Permo-Carboniferous system, and 97 ft. 9 ins. through the Lower Coal Measures strata, striking Silurian slates at 674 ft. 9 ins. From this we know that the Upper Coal Measures strata descend nearly 300 ft. below the plain, and, as they ascend Mt. Nicholas about 800 ft., their known thickness is somewhere in the neighbourhood of 1100 feet.

Mt. Logie (Elephant), on the east, forms a N. and S. ridge a mile long. This is also capped with diabase, and fringed with Mesozoic sandstones and Permo-Carboniferous limestones. Beyond this, on the east, granite stretches away to the coast-line. This fringe of Upper Palaeozoic and Mesozoic strata is a characteristic accompaniment of diabase-crowned mountains all over the Island, and, to my mind, is susceptible of only one interpretation. Why should these strata always be associated with the greenstone, even when the latter (as, for instance, St. Patrick's Peak) forms mountains in areas of granite? I take it to be that the fringe has survived, because it has not long been deprived of its protective cover of eruptive rock.

On the road to Thornedale, which, south of Logie, passes over the Mesozoic sandstones which skirt the Tier, a dyke of diabase is seen traversing the sandstone, and ascending the Tier. It would be interesting to follow this dyke up the hill, and observe how it connects with the eruptive sheet above.

The property at Thornedale consists of three ²⁰⁰~~100~~-acre Sections, in the name of E. C. James, Nos. 5358, 5344, 5345-93M. The road enters the upper section at about 1400 ft. above sea-level. The highest seam of coal is about 1200 ft. above the sea, and the lowest, 1000 ft.; from 300 to 500 ft. below the principal seams on Mt. Nicholas, but, nearly on the same level as some lower seams on that range.

The sections are wholly in the Upper Coal Measures' sandstones, regarded as broadly equivalent to the Jura of Europe, or the Rajmahal of the Indian gondwana system. These sandstones are characteristically soft, felspathic in nature, and greenish-grey in tint, of a type readily

recognised wherever occurring in Tasmania. I observed indistinct impressions of the fossil plant *Zengophyllites* in some shale or underclod found below the tunnel in the low seam. Coal measures of this period have been the most productive in the State.

Descending the hill towards the east, a thin scattering of water-worn pebbles of quartz, sandstone, and granite may be seen. The fact that no pebbles of diabase are noticeable, makes it improbable that this drift represents the remains of a raised beach. It most likely has resulted from the release of stones from a conglomerate bed. The surface of all the sections is strewn more or less with boulders and fragments of columnar diabase. The creeks and ravines are sometimes veritably choked with this *débris*, and the fragments are, occasionally, of enormous size, attaining a weight of many tons. These blocks may be seen embedded in the soil, from which they project, and may be easily mistaken for bosses of rock *in situ*. The soil in which they lie covers solid sandstone beds. There does not appear to be any diabase *in situ* on the property, and the sandstone beds are nowhere disturbed by eruptive rock.

I saw three sets of seams on the claim. The lowest outcrop is just inside the northern boundary-line of the northern section (No. 5358), where it is seen in the side of a small creek. A short tunnel was driven on it twelve years ago; first, for 27 ft. S.E., then, turning S.W., for 12 ft. The seam is 2 ft. 3 ins. to 2 ft. 7 ins. thick, with a half-inch striped clay parting. It is, as nearly as possible, horizontal. The western end of the drive has not been left quite clear by the last workers, and I could not measure the full thickness of the seam there; the face requires squaring down to see whether the thickness is maintained. The roof is sandstone, the floor dark clod. The seam is free from deleterious bands, and is the best looking on the claim. The samples which I took were fair average ones, and yielded the following results when analysed by Mr. W. F. Ward, Government Analyst:—

Fixed Carbon.	Gases.	Ash.	Water.	
Per cent.	Per cent.	Per cent.	Per cent.	
56.5	31.6	7	4.9	Coke, fairly firm.

This is a very good quality, and compares well with the coal on the Nicholas Range. The coal is black; lustre, dull, with shining faces and layers; structure, dense; fracture,

tabular to cubic; no pyrites; a fairly heavy coal. The drawback is the thinness of the seam. The aim would have to be to utilise it for blending with the produce of the other seams. If a thicker seam of this quality could be found on the property, it would materially assist matters. The fact that a seam of this quality does exist should stimulate search.

The intermediate, or large seam, crops out on Section 5344, about half a mile south-east of the preceding, and about 100 ft. higher up the mountain. A tunnel has been driven in it for 40 ft. S. 50° W. It has fallen in at the entrance, which is now an open approach. The seam is a double one, comprising an upper and a lower portion, separated by a band of clay 4 ft. 5 ins. thick, with thin partings and layers of coal. The bottom seam, which is the brightest, measures 4 ft. 9 ins. thick; the top one is 5 ft. 7 ins.; but I could not examine this upper portion without a ladder, except near the entrance, where the weathering makes any examination unreliable. The roof is sandstone, the floor a kind of pipe-clay. Samples of the 4 ft. 9 ins. have been assayed in the Government Laboratory, with the following result:—

F. Carbon.	Gases, &c.	Ash.	Water.	
Per cent.	Per cent.	Per cent.	Per cent.	
48.7	23.3	23.5	4.5	Powder only slightly coherent

This coal is duller in lustre than that of the seam previously described. Its fracture is rectangular, also uneven; structure, dense; has a white iron sulphate efflorescence. It is better in appearance than the coal above the 4 ft. 5 in. band. The ash is high, which is unfortunate, as the seam is the most important one in respect of size. Some further work ought to be done on this, and tests made up of the coal further in the hill. These daylight cuts are very unsatisfactory data for conclusions. It is highly necessary to push the work well into cover, beyond the reach of surface-water. More reliable tests can then be made. The hill forms a spur running S.E., about six miles N.W. of Seymour, and I should not think that the descent would offer any great difficulty. Bullock-drays have been got up to this level, and this would be the point of departure for a tramway to Seymour.

The third or upper seam is half a mile further south-east, and 100 ft. higher than the preceding one. It is exposed in

the bed of a creek on the eastern fall of the mountain, on Section 5343, about 20 chains south of the north boundary-line, and the same distance from the east boundary. It measures 4 ft. 2 ins. thick, and the roof is not shown, as the seam crops out just below the surface soil. The floor is not exposed either, as the seam passes downwards into clay bands and coal streaks too poor to work. The descending section is—

Soil, with coal—

	ft. ins.
Parting	0 1
Coal	1 1
White clay parting	0 3
Coal	1 6
Parting	0 1
Coal	1 4
	<hr/>
	4 4
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Mr. W. F. Ward's assay of this coal, in the Government laboratories, returned the following result:—

F. Carbon.		Gases, &c.		Ash.		Water.	
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
44.9	27.2	21.5	6.4	Coke somewhat powdery.			

This is not such a good-looking coal as in the other seams, but still of fair quality, though the ash is somewhat high. Partakes somewhat of the nature of splint coal, and would answer for household purposes. It is a heavy variety, with brilliant black layers; breaks in cubes, is hardened in places, and then has an irregular fracture, inclined to be sub-conchoidal. In one place it has a stony roll, with a little pyrites. Wherever it is hardened, it does not soil the fingers. This occurrence is not quite so promising as the other outcrops, but no work has been done on it yet, and the seam is not fully exposed.

Taking the property as a whole, and in its present undeveloped state, the large intermediate seam is substantially the measure of its value. The others are likely to be of subsidiary importance, and may possibly be used as adjuncts to help the main output. The big seam is an important one, but requires developing. It would no doubt have been worked before now, but for the position of

22/9

8

the property with respect to harbour facilities. The drawbacks of Seymour, as a place of shipment, do not enter within the scope of my Report. If Seymour can be used, it will be the outlet for this district.

I have the honour to be,

Sir,

Your obedient Servant,

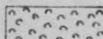
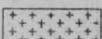
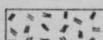
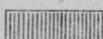
W. H. TWELVETREES,
Government Geologist.

W. H. WALLACE, *Esg.*,
Secretary for Mines, Hobart.

JOHN VAIL,
GOVERNMENT PRINTER, TASMANIA.

GEOLOGICAL SKETCH-MAP COUNTRY NEAR ST MARYS

Scale 40 80 120 Chains

	Alluvium		Permian-carboniferous strata
	Tertiary basalt		Granite
	Mesozoic diabase (dolerite)		Silurian slates
	Mesozoic sandstones and shales		

f.s.

W.H. Twiss
Gov. Geologist
12 Dec. 1901

