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REPORT ON THE SANDFLY COAL MINES.

*Government Geologist's Office,  
Launceston, 12th October, 1903.*

SIR,

As requested by you, I visited the Sandfly Coal Mines on the 29th September—2nd October, and now have the honour to report to you thereon.

The properties are situate between 1400 and 1500 feet above sea-level, on the divide between the Huon and North West Bay basins; the Sandfly Rivulet flowing south-westerly into the River Huon, and Allen's Rivulet falling north-easterly into the North West Bay River. The position of the mines is on the south side of the divide, which forms here a strong east and west range. The various coal seams crop out at different elevations on this range, with a general strike of north-east to south-west, and dip into the hill 5° to 10° in a north-westerly direction. The general pitch of the strata is southerly, so that each seam is higher at the northern end of the properties than it is at the southern.

Mr. A. Montgomery reported on these seams in 1893, and since then a little work has been done by way of opening them out and exploring the ground. Lately interest in the field has revived, and two associations have acquired control of the properties, viz.: The Sandfly Coal-mining Company, and the North-West Bay Prospecting Association, No Liability. The first has the 319 acres in the names of A. Browne and R. L. Slide, 481-M, with 20 acres, 246-M, R. L. Slide, and has applied for further 320 acres to the west, as well as the mineral rights on 47 acres to the south in the name of A. Westgarth. The latter association has 104 acres, 456-M, in the names of T. A. Spencer and S. Matthews, at the east end of the ridge, and has applied for the ground lying west of Westgarth's.

A good road from Longley, 6 miles, leads to the ground, and a carriage can descend from the mine to North-West Bay, following approximately the route of the proposed tramway from the mine to the coast about 11 miles. The strata in which the coal seams are enclosed are soft sandstones and shales of Mesozoic age. The sandstones are

of the felspathic nature common to those containing the upper coal measures in other parts of the State. The fossil imprints of ferns found in the clays adjoining the seams suffice to fix the age of most of the Sandfly coal as that of the upper measures in Tasmania. The No. 9 seam may be an exception, for the stone, on the new Woodstock Road, immediately below it, resembles a mudstone, and possibly belongs to the Permo-Carboniferous.

The seams crop out on the hill side on both properties, and an obvious part of any working programme would be to connect them from one exposure to another. In referring to them, it will be convenient to follow the numbers adopted in Mr. Montgomery's report, as they are in use locally. That report reduces the number of outcrops to four seams, but several have been uncovered subsequently.

Until more work is done in the way of tracing and exposing the seams along the line of outcrop, it will be difficult to determine their exact relations with one another. I observed over a dozen different outcrops, some of which certainly belong to one and the same seam. All these occur in a zone of sediments approximately 400 feet in thickness; but I was told of outcrops still higher; and it is very probable that seams still undiscovered exist in the higher ground.

Here and there on the sections of the two properties boulders of loose diabasic greenstone are embedded in the surface soil, which in places covers the bedrock with a layer of clay 10 or 12 feet thick; but on the properties themselves I did not see any solid outcrop of this intrusive rock. On M. E. Roberts' 51 acres, purchased land, the profusion of greenstone *débris* suggests its occurrence in the solid, underfoot, though this is by no means certain. Outside the sections on Roberts' hill it occurs apparently solid, but it is overlaid there by a subsequent basaltic sheet of Tertiary age.

In depth, the greenstone most probably exists everywhere below the sandstones as an intrusive mass. It was met with at 644 feet in the No. 1 bore put down on the east boundary of M. E. Roberts' 51 acres in June, 1895, and was pierced  $27\frac{1}{2}$  feet by that bore.

To enable me to judge of the ground north of the main seams, a track was cut through the bush to the north boundary of the 20 acres, 246-M, R. L. Slide, and as loose sandstone was seen all the way, I have no fear of any objectionable intrusion for at least that distance ahead of the No. 3 seam.

I will now deal with the different outcrops, first considering those of the

SANDFLY MINES.

These outcrops and works are chiefly on the central and eastern parts of the range. The principal seam, or group of seams, is the No. 3 (1450 feet above sea-level).

These works are in the south-east part of the 20 acres section, 4 chains west of the boundary, 30 or 40 feet below the track to M. E. Roberts' 51 acres. A tunnel has been driven north-westerly into the hill for over a chain, the approach of which was an open cut, now worked away. The seam is a double one, separated by from 5 to 6 feet of fireclay between the seams (at the outcrop). There is thus an upper seam and a lower seam. The heading has been driven on the lower one, but a short jump up exposes the upper one in the end. The complete section shown in descending order is as follows:—

Clay roof.		ft.	in.	
Coal ...	...	2	5½	} Upper seam 5 ft. 0½ in. of coal.
Clay band ...	...	0	0½	
Coal ...	...	2	7	
Fireclay ...	...	4	0	
Coal ...	...	0	1	
Fireclay ...	...	0	10	} Lower seam 4 ft. 3 in. of coal.
Coal ...	...	2	0	
Band ...	...	0	1	
Coal ...	...	2	3	
Fireclay ...	...	19	0	

The dip of the seam is to the north-west, at an angle of about 7°. Since the date of Mr. Montgomery's report, the upper seam has been somewhat more fully exposed, and has proved to be thicker than it appeared to be at that time. I could, however, only measure the upper part by inserting a rod up a narrow cleft.

The upper seam is rather a dull coal, and is not so long-flaming as the coal from the lower seam; but on the open fire, soon lights up, crackling a bit from contained water, and appears to emit a fair heat. The coal from the two seams would make an admirable market blend. The lower seam consists of long-flaming coal; the bottom portion of it is very brilliant and friable; the rest is a good hard coal. On the fire it burns readily without spitting, opening out quietly. It is low in sulphur, and will certainly make a good household, steam, and forge coal. It only contains 9 per cent. of ash, which is unusually low for Tasmanian coals.

The fireclay between the seams is charged with imprints of Mesozoic ferns, proving the coal to belong to the upper measures. Some commercial use may be found for it, though the tests applied by Mr. W. F. Ward, in the Government Laboratories, both to it and the clay above the seam, show them to have only moderate fire-resisting power. The clay below the bottom seam has not been tested, and may prove of better quality, as it is freer from carbonaceous matter.

In a trench a little west of the tunnel, one of the seams (I think the upper one) is again exposed, with a thickness of 3 feet 10 inches. It is rather soft on the outcrop, and the coal has a dull appearance; but the cover here is only the superficial clay soil, and the quality of the coal cannot be judged from the surface exposure. The large blocks of coal in the Museum came, I was told, from this spot many years ago. The dip is flat, not more than 5° to the north-west. Further west an open drive has been put in about 1/2 a chain, on a seam, which was considered to be the lower one in No. 3 tunnel; but taking into account that the seams have a southerly or westerly pitch, this one would be above even the upper seam in the tunnel. It shows 4 feet of coal as per following section:—

Clay roof.		ft.	in.	
Coal	...	0	11	} Seam contains 4 feet of coal.
Clay band	...	0	2	
Coal	...	1	0	
Band	...	0	3	
Coal	...	1	2	
Band	...	0	4	
Coal	...	0	11	

It dips about 8° in a north-westerly direction. The coal is fair quality, very friable in parts, breaking into cubes, has dull to bright appearance, and will no doubt grow harder under increased cover; it has not more than 12 per cent. of ash, and has the highest proportion of volatile matter of any. On the fire, it is long-flaming, with white blaze; gives a good heat, opens out quietly and burns quickly, with no marked sulphur fumes; and forms no clinker.

The coal does not resemble that of the upper seam in tunnel, but it is difficult to say what else it represents. I am inclined to take it as belonging to the No. 3 seams, which have been exposed more or less in this direction for 3 or 4 chains.

These seams vary somewhat in their extensions, but it seems safe to take an aggregate of 8 feet of workable coal as a basis of calculation, which may be increased by another foot in the case of the upper seam as shown by the work in the tunnel.

The quality of the coal is excellent, and we have in the No. 3 the makings of a good mine, provided no serious interruptions occur from faults or intrusions, of which the country on the dip of the seams shows no indication. The samples taken from the top seam in No. 3 tunnel yielded on assay a large proportion of ash, and was low both in gas and fixed carbon. These seemed to be fairly representative of the coal in the seam, but it must be remembered that this is close below the surface, and the seam is being drenched with water. This action, which has been going on for ages, is no doubt responsible for a good deal of the deterioration in quality of the upper portion of the No. 3 seam at the tunnel.

*No. 4 Outcrop.*—The original drive has fallen in, and I could only see a small cut in a drain a little lower down, where about 18 inches of soft coal are exposed below the clayey soil. The seam proper is not shown, however, and the samples taken cannot be considered fairly representative ones. This seam is 30 feet above No. 3, and was considered by Mr. Montgomery as identical, the latter being thrown down by a fault. This opinion was based, however, merely upon a similarity in the sections shown. It is true there is a little surface disturbance here, but this may be only due to a creeping of the clay, which seems to be in motion. Some of the coal on the heap is bright enough, and this suggests that it will be good under proper cover.

*New Find on Track.*—To the north-east of No. 3 a higher outcrop has been recently opened into by a small cut, just exposing a section as follows:—

Surface soil.			
Soft seam coal	...	...	3 feet.
Clay...	...	...	3 feet.
Coal...	...	...	1 foot.
Clay band	...	...	2 inches.
Coal...	...	...	1 foot.
Band	...	...	4 inches.
Soft coal and clay	...	...	1 foot.

This is at surface, and perhaps more coal exists in the bottom, but as the cut is all soft and was filling with water while I was taking measurements, the above, though it was

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all that could be seen, is very likely not all that exists there. The coal was too softened by water to be suitable for samples. The beds here dip into a spur, which is strewn with boulders of greenstone.

This seam is a good height above No. 3, and it is probable also that more and higher seams exist yet undiscovered. The highest outcrop known is one 30 chains higher up the hill to the north of Roberts' block. All through the island a feature of the Mesozoic coalfields is the occurrence of strong seams in the upper beds of the series, and it is likely that the Sandfly will not prove an exception to the rule.

About 1/4 mile west of the No. 3 workings a bore was put down in June, 1895, No. 1, which passed through 643 feet of sandstone and shale containing six seams of coal and ten smaller veins. The identification of the different seams, however, is uncertain, owing to the distance of the bore site. At 270 feet a seam of coal and bands 6 feet 3 inches thick was passed through, at 287 feet a seam 3 feet 7 inches, at 335 feet a seam 1 foot 5 1/2 inches, at 344 feet a seam 1 ft 1 inch, at 348 feet a seam 2 feet 3 inches, and at 358 feet a seam 1 foot 3 inches. The first seam struck is the only one which corresponds at all in size with the No. 3, but it does not correspond in position, being a good deal lower than would be expected. In point of fact, the bore is too far from the tunnel to give any reliable guidance.

*No. 5 Outcrop (1390 feet).*—This is outside the eastern boundary of M. E. Roberts' 51 acres. A short tunnel has been driven into the outcrop, but has fallen in, and the approach has silted up, leaving only 2 feet of coal visible above the water. Mr. Montgomery saw 3 feet 9 inches of workable coal here. I could only get wet and somewhat perished samples, but their assay shows a fair result, and indicates a good quality coal.

*No. 6 Outcrop (1400 feet).*—This is in the south-west corner of M. E. Roberts' block, and is practically on the same level as No. 5. The two outcrops either belong to the same seam or to two closely-associated seams.

The section is:—

Fireclay roof.	in.	
Black coal	... 11	} 1 foot 3 inches of coal.
Band ...	... 6 or 7	
Coal	... 4	

The dip is about 10° to the north-west. The assay exhibits a good coal, with 7 per cent. more gas than No. 5.

Fifty feet down the hill a small seam has been cut showing nearly a foot of coal. The best of it appears to be of good quality, but until more work has been done on it, much cannot be said. The fireclay in the roof is reddish, and has a burnt aspect, and the coal too has thin seams of red clay. A little further down what appears to be the same seam is exposed in an open drain, showing about 3 feet of soft coaly matter below the surface clay.

Along the track westwards on the western 320 acres a seam of coal has been exposed by holes and trenches: about 1 foot of dark coal is shown.

Going down towards J. K. Clark's purchased block a seam (the lowest of six) has recently been pricked into below the surface clay. At the outcrop it appears about 3 feet thick, with 3 inches of yellow clay band in the lowest half of the seam. The real thickness and nature of the seam cannot be ascertained until more work has been done. This outcrop is  $\frac{3}{4}$  mile west of the No. 3 workings, and would seem to be a continuation of one of the seams below those. If so, it demonstrates the persistence of the seams on these properties for at least a mile on the level course.

*No. 10 Outcrop (1300 feet).*—This is in the south-east corner of the 319 acres. A heading has been driven into the seam for about 20 feet in the solid. In the approach a lower seam, No. 7 (?), with 3 inches of bright cubical coal, goes underfoot below 3 feet 3 inches of clay. The dip of these seams is 10° in a north-westerly direction. The section exposed in the tunnel is:—

		ft.	in.	
Clay at surface	...	6	0	} No. 10 seam.
Coal	...	3	3	
Band	...	0	2	
Coal	...	0	4	
Band	...	0	3	
Coal	...	0	2	
Fireclay floor with Mesozoic fossil plants.				

The sole in the end of the tunnel is the 2-inch band, below which will be found the remaining 9 inches of the seam, not taken up in the drive.

The coal is a black variety, coming out in good blocks, burning rather dull. A strong coal, somewhat low in gas.

*No. 9 Outcrop (1150 feet).*—This is south-west of the preceding, lower down the hill on the 47-acre block just

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above the new road to Woodstock. The outcrop has been just cut into, showing dark coal of a rather soft description, but not exposed sufficiently to judge of its quality. The dip is steeper than in any of the other seams. The roof is a brown shale and floor clay, and about 9 or 10 inches of coal are showing.

The following table is a list of the assays:—

*Assays made in the Government Laboratories by  
Mr. W. F. Ward, Government Analyst.*

	Fixed Carbon.	Ash.	Colour.	Moist- ure.	Gases, &c.	Coke.
No. 3 tunnel, bottom seam	63.6	9.0	Buff	2.4	25.0	Moderately firm
Ditto, top seam ...	48.9	27.6	Whitish	4.2	19.3	Powdery
No. 3 seam west. ....	55.2	12.2	Pale buff	3.0	29.6	Moderately firm
No. 4 outcrop .....	48.0	19.4	Ditto	3.6	29.0	Ditto
No. 5 ditto .....	61.6	15.8	Pinkish	4.0	18.6	Powdery
No. 6 ditto .....	55.9	15.2	Grey buff	3.0	25.9	Ditto
No. 10 tunnel ...	64.4	19.4	Light grey	1.8	14.4	Ditto
No. 1 outcrop, Clark...	54.5	9.0	Light red	12.0	24.5	Ditto

It would be unsafe for me to attempt to correlate these different outcrops with particular seams, at any rate with the available data. From what I have detailed it is evident, however, that important seams have been laid bare on the property, and the pressing question is which to select first for exploitation. I think there can be no doubt but that the No. 3 is the one upon which attention should be first concentrated. Its situation on the property is favourable, and there are two seams of workable thickness which would at once produce a large quantity of marketable coal. The quality as shown by the assays is such as will command a ready market for household and steaming purposes. The bottom seam coal is lower in gases than that from the Mount Nicholas Range, but exceeds it in fixed carbon, and the proportion of ash is low. It ought to make an excellent steam coal. The fires made with it, as well as with coal from the other seams, on an open hearth while I was staying at the mine, were highly satisfactory, giving ready ignition, a good heat, quiet burning, and with a notable freedom from sulphurous gases. I feel sure that bulk trials would confirm the favourable opinion which I have formed from these small tests.

These seams have lain idle a long time, but this evidently has been owing to the want of communication with a port.

It is now proposed to run a tramway from the mine to North West Bay at Margate, a distance of about 11 miles. A jetty would be built out to deep water, where, close to the shore, I understand, a depth of 7 fathoms is easily attained. North West Bay forms an ideal land-locked harbour within 16 miles of Hobart. Once the tramway is built the coal can be delivered to calling steamers and the Hobart market at rates which should secure a large business. The saddle on W. W. Spicer's 90 acres, which the line must cross in its egress from the mine, is lower than the No. 3 outcrop, and the only part of the route where any ingenuity will have to be exercised is after leaving the saddle. Once the descent is negotiated, which involves a drop of 1000 feet in the first half of the route, the line follows a level road to the Bay.

The company which takes the mine work in hand will have no difficulty in working the No. 3 seam by adit: the dip is gentle, and the seam can be worked to the rise. Concurrently with exploitation, the seam should be traced on its level course east and west, and the ground ahead of the works proved by boring. It is only by this exploratory work that a sound knowledge of the field can be acquired, and some of the capital that is to be raised should be allotted to it.

The property appears to me to be one which, if properly financed and managed, ought to reward its owners amply.

#### NORTH WEST BAY PROSPECTING ASSOCIATION.

The seams belonging to this association are to the east and south of the Sandfly Syndicate's ground, but are in the same hill, and are no doubt continuations of seams on that property.

*No. 8 Outcrop (1050 feet).*—This is in the section applied for south of R. L. Slide's 20 acres, and is supposed to be a continuation of No. 1 seam, a mile to the north-east. This supposition is supported (1) by the seam being a double one at both places, (2) by the high percentage of fixed carbon characteristic of both. Thus, coal from the bottom seam at No. 1 assayed 83.3 per cent. fixed carbon, and from the lower seam at No. 8 72.8 per cent. This betokens coal of anthracitic nature. The drive on the lower seam at No. 8 could not be entered on account of water,

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but the section is seen very well at the entrance. It is as follows:—

Fireclay roof.		ft. in.	
Impure coal, no value	...	0 10	} 3ft. 8in. coal.
Band	... ..	0 3	
Coal	... ..	0 10	
Band	... ..	0 1	
Coal	... ..	0 2½	
Band	... ..	0 3	
Coal	... ..	0 2½	
Band	... ..	0 2	
Coal	... ..	1 0	
Band	... ..	0 1	
Hard coal	... ..	1 5	
Clay floor.			

The dip of the seam is between 5° and 7° to the north-west. Some sort of an outcrop is visible a few feet above, which may represent the upper seam at No. 1. Outside the drive is a pile of strong, hard coal, which has been exposed to the weather for between 15 and 20 years, and is good clean stuff. The coal from this seam yields only 10·8 per cent. of ash. I did not see the No. 7 outcrop to the north of this, as the drive was said to be fallen in, and there is very little to be seen. A coal seam 1 foot 8 inches thick is reported to have been exposed. It is believed to be the same as No. 10 on the adjoining property.

The North West Bay Prospecting Association has done some good work tracing the No. 10 seam on its level course. A cutting has been put into the hill about 6 chains east of the tunnel: some coal 2 feet to 2 feet 6 inches thick has been exposed in the approach, but it is not under any solid cover, and is insufficiently bared. This was too soft to sample. Again, on the north side of the old road to Woodstock, and near the No. 4 bore, a heading has been driven on the continuation of No. 10. The section here is:—

Sandstone roof.		ft. in.	
Hard coal	... ..	0 2	} dip 15° N.W.
Coaly matter	... ..	1 0	
Coal	... ..	3 0	
Shale floor with fossils.			

Another seam is said to underly this. The tunnel has been driven into the solid for 50 or 60 feet. The coal is dull on the whole, with a good deal of smalls, and upon assay yields a large quantity of ash. About 8 chains further

east presumably the same seam is exposed again by a small cut in the roadside.

This work of connecting the outcrops should be continued with a view of selecting the best part of the seam for opening it up. Though the lowest part of No. 10 seam would seem to be below the proposed tramway, some parts of it could be connected, as it rises eastwards.

*No. 1 Outcrop (1250 feet).*—This is an important outcrop of good hard coal in at least two seams. Mr. Montgomery reports the upper seam as containing 2 feet of coal, and the lower one 3 feet, separated by about 5 feet of fireclay. I found it impossible to examine the upper drive on account of water, and the trench on the lower seam had fallen in. The coal piled outside is dull, with shining layers and glassy planes. The analysis of coal from the bottom seam shows an anthracitic nature, containing as it does over 83 per cent. of fixed carbon. I think the analysis No. 2 in Mr. Montgomery's report must certainly refer to this seam. A little to the west it is again partially exposed (18 inches) in the creek.

It is a pity that this coal is situate below the proposed line of tramway, for its working will involve haulage. It is a fine strong coal of its class, and should be in request once it is made available. I would recommend that work here be deferred until the line is located for the tramway, when the best means of connecting with it can be selected. The upper seam does not appear to be so anthracitic, but good samples were not obtainable.

*No. 2 Outcrop (1450 feet).*—This is in the western part of the 104 acres. The most easterly opening in it is above Roberts' track, showing 8 inches of very poor coal between a floor of clay and a roof of sandstone. A little further west, however, there is a heading into what appears to be the same seam, or at any rate belonging to a group of which the seam is a part, and here it shows 15 inches of good-looking coal. The analysis yields a good percentage of fixed carbon, with only 8 per cent. of volatile matter.

From its position this has been looked upon as the continuation of No. 3 seam on the adjoining property, but this reference is uncertain. There is a group of seams here, and the one exposed is not the only one existing. It dips about 10° to the north-west, and as both roof and floor are clay, further search will probably reveal a second seam.

The samples which I took from the workings on the North West Bay Prospecting Association's properties were

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analysed in the Government Laboratories by Mr. F. W. Ward with the following results:—

	Fixed carbon.	Ash.	Colour.	Moisture.	Gases, &c.	Coke.
No. 1 top seam ...	43·2	46·8	Grey	2·8	7·2	Powdery.
No. 1 bottom seam...	83·3	8·0	Reddish	3·4	5·3	ditto.
No. 2 seam ...	69·5	19·0	Buff	3·4	8·1	ditto.
No. 8 seam ...	72·8	14·6	Light red	1·8	10·8	ditto.

It is noteworthy that all the coal at the eastern end of this range has a tendency to be anthracitic. This is probably due to the greenstone intrusion on Roberts' Hill in the neighbourhood. On the sections themselves I did not see any solid intrusive rock; and the bores which have been put down with the diamond drill have not disclosed any except at a depth which may be left out of consideration in valuing the properties.

The course most advisable for the North West Bay Association to follow for the present would be to confine work to tracing and connecting the course of the No. 10 seam on its property, leaving No. 1 and development generally until the construction of the tram line is decided upon. Without means of communication with the port these properties cannot be worked profitably; but once cheap transport is assured there is a future for both of them.

Providing the line is to be constructed, the Sandfly Syndicate has a seam at its No. 3 upon which work can be laid out forthwith and arrangement made for a regular output.

Sufficient testing work has not been done on these properties to admit of any useful estimate being made of the quantity of coal which can be probably raised from the seams. But, considering that 100 tons per acre may be reckoned for each inch of coal worked, it is evident that, if the seams continue with unimpaired strength, a very large quantity of coal will be available.

I have the honour to be,

Sir,

Your obedient Servant,

W. H. TWELVETREES,

*Government Geologist.*