



REPORT ON THE SANDFLY COAL MINE.

Geological Surveyor's Office, Launceston, 12th April, 1893.

SIR,

I HAVE the honor to report to you on the Sandfly Coal Mine, visited by me on the 28th of March last.

Coal has been known to exist in the Sandfly District for many years past, and several attempts have been made from time to time to form companies to work it; but hitherto none of the various owners have been able to lay out the capital required for opening the mine, and connecting it with deep water at North West Bay. The work done is confined to mere prospecting, the outcrops of a number of seams having been cut into by short drives to the dip of the coal. As regards mining, the property is therefore practically in a state of nature; it is covered with dense forest, and the only roads through it are the old road to Woodstock, and the bush tracks that have been cut between the various outcrops. It is necessary to explain this, as from the length of time during which the mine has been talked about, it would be natural to suppose that a good deal of permanent mining work had been done. Any coal taken out up to the present has been packed out of the bush on men's backs, so it is evident that the output cannot have been large.

The Sandfly Coal Mining Company's property consists of 977 acres of ground, situated on the south slope of the watershed between the Huon and North West Bay Rivers, close to the saddle on the road from Hobart to Woodstock, about 16 miles by road from Hobart. The sections are numbered 1706-91M (293 acres), 242-91M (74 acres), 911 (210 acres), 1279M (100 acres), 1278M (200 acres), and 1699-91M (100 acres). A high ridge runs nearly east and west through the two northern sections, and it is on the south slopes of this that the outcrops of coal have been discovered, generally in the beds of watercourses draining into the Sandfly Rivulet, a tributary of the Huon River. The junction of the road from Woodstock, which passes through the eastern section with that from North West Bay to Hobart, takes place close to the eastern side of the property. This saddle is about 1400 feet above sea-level according to my aneroid.

The right of constructing a railway from the mine to deep water at North West Bay has been conceded to the Company by Parliament, and two surveys of possible routes have, I am given to understand, been made, one 9 miles, the other 11½ miles in length. The latter has been lately partly re-surveyed, and the engineer is said to be confident of being able to shorten it by about a mile. As the railway route comes up the valley of the North West Bay River, it has to cross the saddle above mentioned before coming on to the mine, and this fact has an important bearing on the method of winning the coal that will have to be adopted. It will not be possible to bring the railway so far down the slope on the west side of the saddle as to enable much work to be done on the seams from adits, a mode of opening the ground which its slope would otherwise favour. Any main adit put in to work all the seams, and at the same time drain the workings, would be too low down to be reached by the railway. This is not of so much consequence as it would be if the seams dipped the opposite way, for they all dip to the north-west, or into the hill, and therefore the adits would have to be driven a long distance before cutting them. Owing to this, shaft-working would probably be preferable under any circumstances, even if the railway could be brought in low down the hillside. The same consideration shows us that not much advantage is to be gained from the steep slope of the hill being favourable for the employment of self-acting inclined tramways, for these would only be useful in lowering coal to the railway, not in raising it.

The country in this vicinity is composed of strata belonging to the Coal Measures, intersected, broken, and possibly overlaid in parts by diabase greenstone of probably Mesozoic age. On the road from Hobart fine sections of the marine beds of the Permo-carboniferous system are frequently exposed, and near Port Cygnet coal seams belonging to the Lower Coal Measures have been found; but in the neighbourhood of the Sandfly mine the strata belong to a higher horizon than any of the above, being part of the Upper Coal Measures (probably Mesozoic). The most characteristic rock of this formation all over the Colony is a soft tufaceous sandstone, containing much felspathic or altered felspathic matter, and often exhibiting fossil ferns and carbonaceous markings, which also are frequent in the associated shales. The diabase greenstone is an altered dolerite which has been forced up through the coal-bearing strata subsequent to their deposition, and doubtless spread out to a great extent over them; it is met with in all our coal-fields in this Colony, and is without doubt the main cause of their so frequent occurrence in small detached areas. Being an igneous intrusive rock, besides breaking the sedimentary strata it is liable to cause serious alteration in the character of the contained coal, which is sometimes found to be altogether useless in the vicinity of the dykes. Where, however, there is a large area of ground free from the greenstone we may expect to find the coal unaffected by it; and this is the case with the property now under consideration. The nearest mass of greenstone is at the Saddle, and to the east from it, and this appears to be a very large dyke, but in the sections themselves no solid outcrops of it have been discovered, though loose superficial boulders are rather common in parts. These must have come down from a mass somewhere up the hill not yet discovered. The coal outcrops having been discovered for over a mile in length without indications of noteworthy disruptions, there are grounds for believing that no dykes of large size will be found in the coalfield. On the north side of the hill in the northern sections the greenstone is reported to be again present in large quantity, and will probably cut off the seams in that direction, though they may perhaps dip under it. The extent of probable coal-bearing ground is, however, sufficient to render this limitation of the field a matter of little consequence, being over 1000 acres, an area large enough to supply the demands of a large colliery for many years. After describing the various seams an attempt will be made to roughly calculate the available quantity of coal.

The map sent herewith shows the position of the various outcrops as located by a survey by Mr. Chauntler, C.E., kindly supplied to me by Mr. W. H. Westgarth, one of the owners of the leases. The heights given in figures at each outcrop are as determined by myself by aneroid barometer; they differ considerably from Mr. Chauntler's in absolute elevation, being generally about 260 feet higher than his, but agree very fairly as to the relative difference between the seams. Mineral lease No. 911-91m, of 100 acres, held by H. Simpson, it is to be observed, does not belong to the same proprietary as the other sections. The outcrops are numbered consecutively in the order in which they are most conveniently visited.

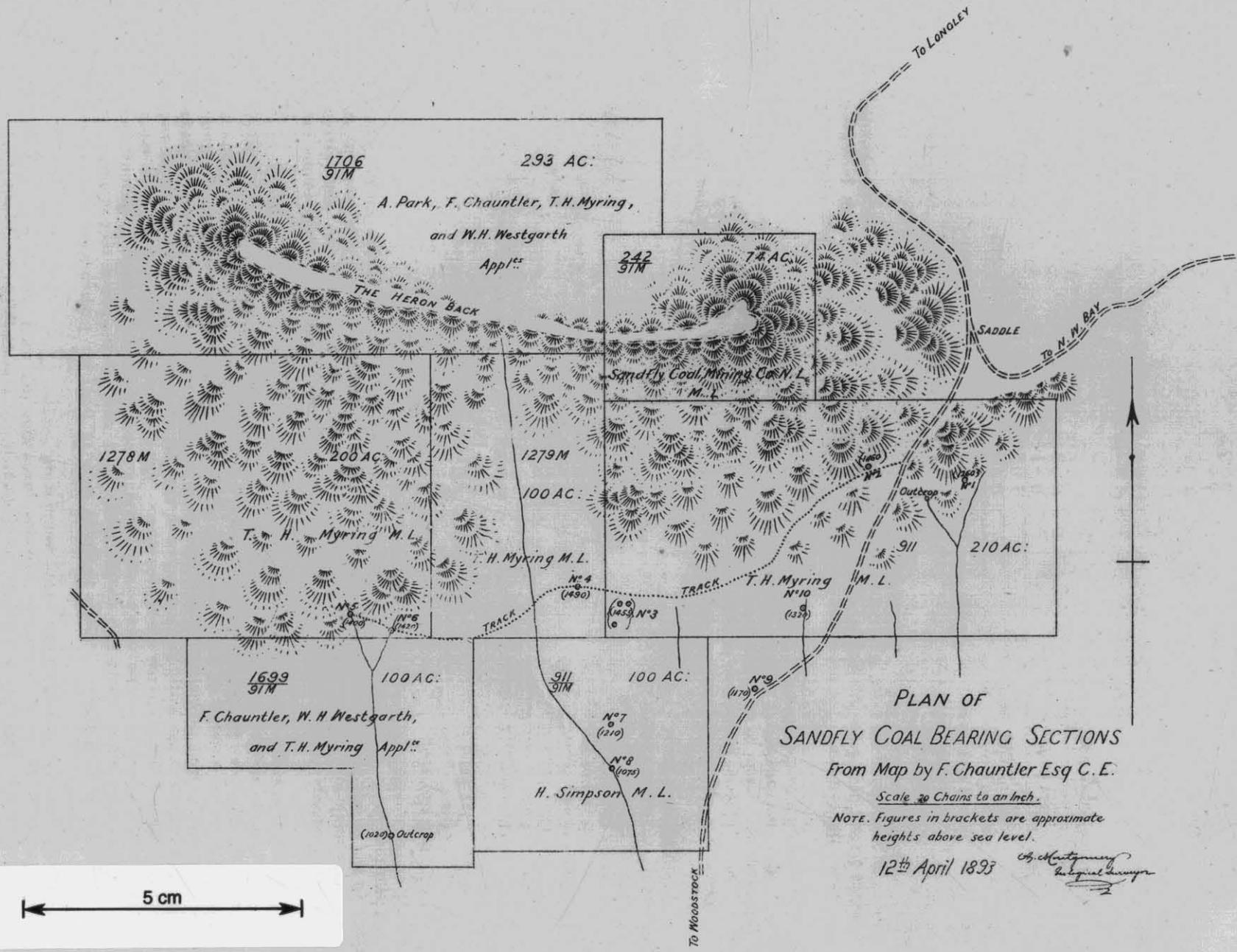
The general strike of the seams is N. 50° E., the dip being on the average 10° to N. 40° W. The line of strike follows the same course very much as the contour lines along the slope of the hill, but owing to the unevenness of the surface of the ground the outcrops of the same seam are not found quite at the same level in different places, being generally lower towards the western end than at the eastern. It is probable that one or more faults exist which have altered the levels of different parts of the same seams, for the differences of elevation of outcrops of the same coal do not seem to be explainable altogether satisfactorily as owing to the angle of dip alone. Such faults, however, cannot be of any great magnitude, and are not likely to seriously interfere with working.

No. 1 Outcrop.—(1260 feet above sea level). Two seams of coal have been found in the bed of a small watercourse towards the eastern side of Section 911. A drive has been put in to the dip in the lower seam some 30 or 40 feet, and in the end of this the coal is said to be 4 feet 9 inches in thickness: I could not examine this, however, as the drive was full of water. A few yards higher up the gully another heading has been driven 6 or 8 feet into this seam, and a small cutting has also been made into the upper seam. The section presented is as follows:—

	ft.	in.	
Tufaceous sandstone roof.			
Bright Coal.....	0	9	} Upper seam 2 feet of Coal. Dip 13° to N. 35° W.
Soft clayey band.....	0	0 $\frac{3}{4}$	
Bright Coal.....	1	3	
Fireclay (about).....	5	0	
Coal.....	1	2	} Lower seam 3ft. 1in. of Coal. Dip 13 $\frac{1}{2}$ ° to N. 40° W.
Soft clayey band.....	0	4	
Coal.....	1	0	
Soft clayey band.....	0	1	
Coal.....	0	11	
Hard sandy black shale floor.			

There is said to be another seam below these two, but I did not see it, the old workings having got covered up. The coal is good-looking, hard, and strong, and consists of interlaminated bright and dull layers: it is known as the anthracite seam, but is not a true anthracite by any means, but a non-caking steam coal. The 4-inch band in the lower seam would be a very useful "holing," as

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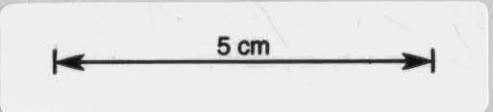
PLAN OF
SANDFLY COAL BEARING SECTIONS

From Map by F. Chautler Esq C. E.

Scale 20 Chains to an Inch.

NOTE. Figures in brackets are approximate heights above sea level.

12th April 1893
F. Chautler Esq
Geological Survey



the floor is hard, and the small bands are so soft that they could easily be removed in working. The fireclay between the seams is fossiliferous: as far as I know, neither practical tests nor analysis have yet been made to determine its value for the manufacture of fire-bricks and other clay goods. As far as I could see in the old tunnel, the statement made that the seam increased in thickness appeared to be correct. This should be a very useful seam.

No. 2 Outcrop.—(1460 feet). About 13 chains W.N.W. from No. 1 outcrop two small seams of coal have been discovered about two chains apart. The eastern one has a roof of tufaceous sandstone and floor of fireclay, the seam being about 8 inches of rather poor coal. A heading has been driven some 6 feet or so to the dip of this seam. The western outcrop appears to be a seam lying below the fireclay bed which forms the floor of the first described, the roof being fireclay and soft sandy fireclay. The floor also is fireclay, the depth of which is not seen. A heading has been put in some 8 feet on the seam of coal, which is 15 inches thick, bright, and of laminated structure. It looks like a good coal, but the seam is rather small to work: it is possible, however, that there is more coal under the fireclay floor, as from its elevation this seam appears likely to be the top seam seen at the next outcrop. Dip 10° to N. 45° W.

No. 3 Outcrop.—(1455 feet). Three outcrops of what are evidently the same seams are found in the south-west corner of section 911. On the eastern one a heading has been driven about 75 feet on the lower of two seams lying close together. The upper seam has been driven into about four feet. The coal in this is a little "perished" by long exposure to the weather, but appears of fair quality in the face. The section shown is:—

	ft.	in.	
Soft clay roof			
Coal	1	8	} Upper seam 2ft. 4in. of Coal. Dip 5° to N. 40° W.
Clay band	0	1	
Coal	0	8	
Fireclay	3	0	(about).
Coal	0	$10\frac{1}{2}$	} Lower seam 3ft. 3in. of Coal. Dip 5° to N. 40° W.
Clay band	0	$1\frac{1}{2}$	
Coal	0	11	
Shale band	0	$1\frac{1}{2}$	
Coal	1	0	
Hard clay band	0	9	
Bright Coal	0	6	
Fireclay floor.			

The coal is strong, hard, and full of bright layers, closely resembling the Mt. Nicholas coals in appearance. It forms a cinder in burning, and when retorted yields a coherent coke. A small parcel from here is said to have been tried by the chief engineer of H.M.S. "Orlando" in a steam launch, with very satisfactory results, being considered as good as the best Newcastle coal (N. S. Wales) generally used on board.

About 100 feet west from the above workings the lower seam has been laid bare for a length of about 50 feet by a drive run level along the outcrop. The coal is a little soft from prolonged weathering, and the upper seam does not show at all, the superficial soil being all loose and disintegrated on top of the main seam. The section is:—

	ft.	in.	
Soft clay roof			
Soft weathered Coal	1	2	} Seam 4ft. 7in. of Coal. Dip to N.W.
Soft clay band	0	2	
Coal	1	1	
Sandy clay band	0	$0\frac{1}{2}$	
Coal	1	7	
Clay band	0	1	
Coal	0	9	
Fireclay floor.			

About three chains S.S.W. from this the seam is again exposed in a heading driven about 16 feet into the coal. The crop is close under the grass roots, and the upper seam therefore is not seen. The section obtained was:—

	ft.	in.	
Fireclay roof			
Coal	1	0	} Seam 3ft. 6in. of Coal. Dip 10° to N.W.
Soft clay seam	0	3	
Coal	0	$11\frac{1}{2}$	
Clay band	0	4	
Coal	1	$0\frac{1}{2}$	
Fireclay	0	11	
Bright Coal	0	6	
Fireclay floor.			

This is a fair coal, but will no doubt improve in quality when cut further away from the action of the atmosphere.

Comparing the above three sections, it is evident that the second two are the lower seam seen in the first. The average thickness of this is therefore 3 ft. 9 in. of coal, a very nice workable seam.

No. 4 Outcrop.—This is about 7 chains N.W. from the last three, and at a height of 1490 feet above sea level, that is, 35 feet above them. From its position it should be a higher seam than the last, for it is situated fairly to the dip of these, and is nevertheless at a greater elevation. The section, however, is very similar, and I am disposed to think this is the same seam as those at No. 3, and that the latter have been thrown down by a fault, a distance of about 115 feet if we take the dip of the seams into account as well as the difference of elevation of the outcrops. I have omitted to mention that a small fault is seen in the drive on the easternmost of the No. 3 outcrops, which throws down the seam about 18 inches. No. 4 and No. 3 seams may, by a coincidence, have nearly the same section, however. The former shows:—

	ft.	in.	
Soft clay roof.			
Bright Coal	1	0	} Seam 2 ft. 9 in of Coal. Dip to N.W.
Clayey band	0	2	
Bright Coal	1	0	
Band	0	1	
Coal	0	3	
Clay	0	8	
Bright Coal	0	6	
Clay floor.			

This outcrop had been driven into about 15 feet. The whole of it is a good deal broken by superficial disturbances, and the dip, therefore, was not measured. In order to ascertain if this is the same seam as at No. 3 outcrop, it would be advisable to cut into the hill above it so as to find out if there is an upper coal as in the latter case. The coal at this crop is of a bright appearance, and burns very well in an open fire, caking together to some extent while doing so. The ash does not appear to be excessive.

No. 5 Outcrop (1400 feet).—This is towards the south-east corner of Section 1278M. It has been cut into for 20 or 30 feet by a drive which goes in level for a distance, and then turns down the dip of the seam, holing into an old drive full of water in the face. This is a very nice seam, as will be seen from the section:—

	ft.	in.	
Fireclay roof.			
Coal	3	9	} Workable Coal, 3 ft. 9 in. Dip 22° North.
Clay band	0	1½	
Bright Coal	0	1½	
Fireclay floor.			

There are a great many boulders of greenstone in the bed of the creek which comes over this outcrop. The coal is of good quality, but a little softened by long exposure to the weather. It is bituminous, and forms cinders on burning.

No. 6 Outcrop (1420 feet).—This is between six and seven chains south-east from No. 5, and is very probably the same seam. It has been cut into about 12 feet, and shows:—

	ft.	in.	
Fireclay roof.			
Coal	1	0	} Coal 1 ft. 4 in. Dip 14° to N. 40° W.
Fireclay	0	7	
Bright Coal	0	4	
Fireclay floor.			

This coal burns well, caking together in doing so. If not identical with No. 5, it probably underlies it at no great depth.

No. 7 Outcrop (1210 feet).—This is near the middle of Simpson's Section, 911-91M. The drive on the coal is a good deal fallen in, and the exposure of the seam is consequently not very good. The old drive is said to go in some 35 feet. The section seen is:—

	ft.	in.	
Fireclay roof.			
Coal	1	0	} Coal 1 ft. 8 in. Dip 17° to N. 5° W.
Clay parting	0	2	
Coal	0	8	
Fireclay floor.			

There is said to be three feet of coal in the end of the drive. The coal is full of bright streaks, and seems to be of good quality.

No. 8 Outcrop (1075 feet).—About six chains due south of No. 7 in the same section, the same seams as were seen at No. 1 outcrop are again laid bare. A drive has been put into the dip of the seam, but was full of water and could not be examined. The following section is, however, visible:—

	ft.	in.	
Fireclay roof.			
Shaly <i>Coal</i>	0	9	} Workable Coal 3 ft. 6 in. Dip 5° to N.W.
Good <i>Coal</i>	0	8	
Carbonaceous clayey band	0	5	
Poor <i>Coal</i>	0	1½	
Clayey band	0	1	
Good <i>Coal</i>	1	0	
Clay parting	0	1½	
Hard dull <i>Coal</i>	1	1	
Hard dark shale floor.			

About three feet above this seam some black carbonaceous earth indicates the outcrop of the top seam seen at No. 1, and above this comes the tufaceous sandstone. Some 3 ft. 6 in. or 4 ft. below the main seam, another one, 14 or 15 inches thick, is said to have been worked, but could not be seen at the time of my visit. A heap of coal taken from the workings was lying outside the cutting, and is said to have been broken out some ten years ago. If so, and it has evidently been standing a long time, it has resisted the action of the atmosphere splendidly, being hard, strong, and clean. It is plentifully streaked with bright bands, but does not cake on burning, being quite similar to No. 1.

No. 9 Outcrop (1170 feet).—This is close to the old Woodstock Road to east of Section 911–91m, and to the south of 911. It has not been cut into any distance. It shows 13 inches in thickness of a fair looking hard coal, somewhat weathered by exposure, dipping 35° to N. 30° W. The floor is a poor fireclay, and the roof is a hard dark shale, similar to the floor of the last described seam and that at No. 1 outcrop. It is therefore probable that this is the seam underlying the main one of the two latter places, and that search would reveal two more seams accordingly overlying it.

No. 10 Outcrop (1320 feet).—From its elevation this is probably identical with the seam at No. 7. It is close to the south boundary of Section 911, and about half way between the east and west boundaries. A heading has gone about 20 feet into the seam, and lays bare the following section:—

	ft.	in.	
Fireclay roof.			
Clean good <i>coal</i>	2	10	} Coal 3ft. 2in. Dip 11° to N. 40° W.
Shaly parting	0	1½	
<i>Coal</i>	0	4	
Band	0	4	
Bright <i>coal</i>	0	1	
Fireclay	3	0	
Bright <i>coal</i>	0	2	
Fireclay floor.			

This is a bright streaked coal, with cubical fracture, strong, and standing exposure to the weather well. It cakes on burning. As fireclay is found both above and below the seam it is very likely that there are other associated seams, and as the hillside is steep at this point a little trenching up and down the slope might be done with advantage to lay bare the strata.

Other Outcrops.—Two other outcrops shown on the plan were not visited by me for want of time; neither of these has yet been opened up so as properly to expose the coal. One is in the extreme south of Section 1699–91m, and is likely to be either the No. 7 and 10 seam or that seen at No. 8; its height above sea-level is about 1020 feet; the other is about six chains south-west of No. 1 outcrop, and most likely belongs to the same seam.

Comparing the different sections and the positions and levels of the outcrops, it appears probable that there are the following seams, reading from the highest downwards:—

- (A.) Seam seen at Nos. 5 and 6 outcrops. If these belong to one seam its average thickness is 2 ft. 6 in. of coal; if different, the total thickness is 5 ft. 1 in. of coal.
- (B.) The seams seen at Nos. 4, 3, and 2 outcrops, giving a total thickness of, say 5 ft. 10 in. of coal (upper seam 2 ft. 4 in., lower seam average 3 ft. 6 in.) if No. 4 is the same seam as is seen at No. 3, and 8 ft. 10 in. if No. 4 is a separate seam.
- (C.) The seam seen at Nos. 7 and 10 outcrops, giving an average thickness of 2 ft. 5 in. of coal.
- (D.) The three seams seen at Nos. 1, 9, and 8 outcrops, aggregating 6 ft. 4 in. of coal (upper seam 2 ft., middle seam, average of Nos. 1 and 8, 3 ft. 3 in., and lower seam, No. 9, 1 ft. 1 in.)

Summing these up, the lowest calculation gives 17 ft. 1 in. of workable coal already exposed in these four seams or groups of seams, and it is probable that others exist in addition. Taking the area of the coalfield at 1000 acres, and reckoning an acre to contain 1600 tons of coal in a seam a foot thick, we find the quantity of coal to be 17 x 1600 x 1000 tons, that is 27,200,000 tons. Deducting one quarter for loss in working, we get approximately 20 millions of tons as the quantity of coal likely to be available in the field. In 1891 the total consumption of coal in Tasmania was between 85,000 and 90,000 tons, so it is evident that the Sandfly colliery could supply the wants of the whole Colony at the present demand for over 200 years. These figures are not of much absolute value, but serve to show the importance of the coalfield, and to give some approximate notion of what it could supply.

The Sandfly coal has been frequently analysed, and proved to be of good useful quality, confirming the favourable impression formed of it by ocular inspection. The first five of the following analyses are taken from the Tasmanian Official Record, 1892; No. 6 is one made by Mr. Ward, Government Analyst, on 17th February, 1888, quoted in a collection of reports circulated by the "Sandfly Bituminous Coal Syndicate"; and No. 7 is one made 25th February, 1893, also by Mr. Ward, and given to me by Mr. W. H. Westgarth:—

	1.	2.	3.	4.	5.	6.	7.
	Per cent.						
Fixed carbon.....	59·20	81·40	62·20	63·50	67·00	60·0	62·59
Mineral matter (ash)	9·20	14·00	8·70	14·70	14·30	12·0	4·60
Sulphur.....	?	0·80	0·80	0·80	0·60	0·9	0·88
Volatile hydro-carbons.....	25·8	2·85	23·30	16·70	12·70	24·9	25·43
Water (lost at 212° F.)	5·8	1·85	5·0	5·3	5·4	2·2	6·50

No. 2 is an anthracitic coal; the others more or less bituminous. No. 7 yields a firm and coherent coke, and has an evaporative power of 13·86.

The fireclay lying above and below several of the seams has never been tested, so far as I am aware, either by analysis or by practical tests: as the seams are of workable thickness this should be done. A seam of really good fireclay would be very valuable, and even inferior bricks, not good enough for smelting purposes, would command a ready sale.

In quality the coal appears to be quite up to the average of the Tasmanian coals in the market, and though not equal to the best New South Wales coal, is not far behind it. It is to be remembered that all the Sandfly coal has come from outcrops, where it is sure to be somewhat inferior to that from the unweathered portions of the seams. Some of it is caking coal, and if it should prove, on practical trial, to make a good quality of coke, there is likely to be a good demand for this on the West Coast mining fields for smelting purposes. Experiments should be made with coal-washing apparatus to determine if any large percentage of the mineral matter can be mechanically removed, as much better coke would result.

It is proposed to take the coal from the mine to North-West Bay by railway, a distance of from 10 to 12 miles, and ship it there. North-West Bay is a well-sheltered deep-water harbour, capable of accommodating the largest vessels, and is only about 18 miles by water from Hobart. It would therefore be a very convenient coaling station for the vessels of Her Majesty's Fleet and for the lines of ocean steamers that call at Hobart. This coal ought to be able, from the advantages of its position, to beat all other competitors in the Hobart market, and if a practical monopoly of this could be secured there would be little fear of the venture not being able to pay interest on the large capital required to make the railway, build the wharves at North-West Bay, and open the mine so that it would be capable of a large output. Probably not less than £50,000 would have to be expended before the coal could be freely put into the market, but it seems to me that there is a very good prospect that this would prove a payable investment. Till the estimates for making the railway and wharves, and sinking shafts, driving levels, and otherwise opening the mine have been gone into in detail, it is impossible to arrive at any conclusion as to the profit per ton of coal raised that could be fairly anticipated, other than a general one as given above. The matter presents itself to me in this light:—As far as one can judge without detailed estimates there are good prospects of this mine becoming a profitable investment: the amount of money required to be spent in getting details on which to found an accurate estimate is not large, and may be well hazarded on the strength of the prospects as they appear at the present time: if the detailed estimates bear out the opinion now formed on general grounds, the money will be well spent, for all the information obtained will be required in the construction of the permanent works; and, on the other hand, should they show that the mine could not be made to pay, the amount lost would not be considerable enough to be of much consequence to a strong company.

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I would therefore recommend the formation of a company with an available capital of, say £75,000, of which £5000 should be subscribed in the first instance for the purpose of surveying the railway line permanently, designing and making estimates for the harbour works, getting all information as to marketing the coal, laying out the mining works, and, above all, proving the mine by diamond-drill borings. Not less than six bores should be put down in different parts of the field, and more would be desirable. These would, at a low cost, give complete data for estimating the area of the coal ground, the size and number of the seams, their relative position, and the depth to which shafts would have to be sunk, and would prove whether or not any trouble is to be anticipated through the influence of intrusions of the igneous greenstone. This diamond-drill boring is almost absolutely necessary for the proper location of the mining works. The money spent on all these preliminary works should be looked upon as an insurance premium, guarding against possible loss of a much larger amount through starting without sufficient information. The prospects of the property amply justify this preliminary expenditure, and there is much reason to believe that it will result in showing that the mine can be worked so as to be a very profitable investment.

I have the honour to be,

Sir,

Your obedient Servant,

A. MONTGOMERY, *M.A., Geological Surveyor.*

The Secretary of Mines, Hobart.