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REPORT
ON THE
CATAMARAN COAL SEAMS

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REPORT ON CATAMARAN COAL SEAMS

by Fitz Noetling M.A., Ph. D. etc

Situation

The Catamaran Colliery is situated almost in the South east corner of Tasmania, about $1\frac{1}{2}$ mile east of the shore, and north of a small creek known as the Catamaran Creek. This is one of the numerous small creeks that discharge their water into Recherche Bay. In a direct line the distance from Hobart is not more than 57 miles (See sketch plan).

Accessibility

Though situated perhaps in one of the remote parts of Tasmania, the Colliery is easily accessible, there are no natural obstacles that would in any way interfere with the transport of Machinery or Coal.

At present it has to be ~~crushed at South Port~~ ^{reached via Southport} and thence by mail cart travelling about 15 miles overland, but this has only to be done because there is no regular communication by steamer between Hobart and Recherche Bay. This Bay forms a splendid well protected harbour opening towards East and is divided into two branches. The Northern west is the largest, but apparently the shallower, the southern part known as "Rocky Bay" or "Cockly^e Creek Bay", is smaller but it has deeper water up to the shore. According to the Admiralty Chart the depth at the entrance is 21 feet 6 inches, close to the shore 30 feet.

Present Tram Line

Hitherto the coal has been brought down by a tram which terminated on the northern bank (right) of the Catamaran Creek, close to its outlet. But even if the terminus of the tram were not situated on private property, the present route

Proposed Tram Line

from the colliery to the sea shore could not be retained, because the mouth of the Catamaran is too shallow for any vessel of fair size. It is ^{now} observed that the natural outlet for the coal is not the northern part of Recherche Bay (i.e. the mouth of the Catamaran) but its southern portion known as Cockles Bay. The deeper water reaching up to the shore, the high shore itself about 25 to 30 feet above sea level, the solid *Diabase* joining the shore forms a splendid place for the construction of a jetty from which the coal can be discharged directly into the vessels. With commendable foresight an easement 66 feet in width and approximately $1\frac{1}{2}$ miles in length has been secured, with a ^{view} to the construction of a tram line, branching off the present line about $1\frac{1}{2}$ miles east of the shafts.

This line would run in approximately south eastern direction after it branches off the present or old line, and affords so far the ^(see photo) *only means of connection between the sea and the Mine.* It may be sufficient for preliminary work and for the carriage of the machinery required for more extensive operations, but it is obvious not sufficient for the carriage of a larger output.

Though, as ~~it~~ ^{route} already stated, the present ^{route} affords the means of an easy access to the mine it must be condemned for the following reasons:-

1. It terminates on privately owned land near shallow water.
2. The substructure of the old timber tram is perfectly rotten and much too weak.

On the other hand the proposed new route will

* The present follows the track of an old timber tram line

have the following advantages;-

1. It terminates on land belonging to the colliery.
2. There is deep water (30) feet) close to the shore.
3. Owing to the high shore there is no difficulty in constructing discharge bins.
4. The trucks need not to be hauled up, but arriving approximately 30 feet above sea level can be discharged directly into the vessels.
5. As the new route deviates only about half a mile* from the old tramline, only a small portion of the latter would have to be repaired.

* East of the shaft

The only disadvantage I could see is that the proposed ~~new~~ route would have to cross the Catamaran Creek, but as the latter is small and narrow at the point where the proposed route would cross it I foresee no difficulty^s what-so-ever and consider it a small matter only.

Mining Lease

The property is held under a Mining Lease 4866/M from the Government of Tasmania for the usual period and comprises 317 acres. The present holder of the lease is Mr. F.H. James of Hobart. In addition to the Mining Lease, there is a Timber lease and a tram easement.

Geology

The geological features as far as they can be made out in the rather dense scrub appear to be very simple and as far as I can see there are no disturbances or dislocations which would materially influence the seams. The claim is situated on the northern (left) bank of the Catamaran Creek and extending in northern direction towards a

This hill is capped by low hill* has a width of $47\frac{1}{2}$ chains, and a length ^{Diabase} and below it sandstone is seen to crop from $57\frac{1}{2}$ Chains (Western side) to 85 chains (East-out. This sandstone apparently overlies the coal measures. ern side).

From the Catamaran Creek the country slowly rises, and it is along this rise, a few chains north of the Creek that the outcrop of the seam that is now worked ^{was} ~~and~~ discovered in 1890 if I am correctly informed. The low ^{elevation} ~~deviation~~ ~~thence~~ formed slopes again towards north, and on its northern side the two shafts were sunk. The greatest part of the claim is formed by a plain which may be about 40 to 50 feet lower than the mouth of the shafts and extends up to the foot of a low range, which is situated outside the proposition. This plain was originally covered with *dense* scrub, now mostly burnt down, and is intersected by a small riverlet running in eastern direction. The surface is wet and marshy. On the top of the low ridge between the plain and the Catamaran numerous loose boulders of Diabas can be noticed imbedded in the soil. This feature has given rise to a most unfortunate mistake on the part of the Government Geologist who on the map accompanying his report depicts a ridge of Diabas south of the shaft. Now there is not the slightest doubt, that if the Diabas did occur in the way assumed by the Government Geologist, that it would seriously interfere with the extension of the seams. Therefore I paid special attention to this feature in order to ascertain whether the view taken by the Government Geologist is correct or not, and I am in the position to state emphatically, that it is not. Quite apart from the fact that the old headings extended for about 1000 feet (that is to say about 15 chains) to the south of the shaft, and ^{all} therefore well under

According to this map the Catamaran coal measures would be enclosed between two large Diabas intrusions, which would naturally limit the extension of the seams.

the "Diabasridge, I have been able to prove that there is no compact or continuous mass of Diabas to the south of the shaft; the boulders as seen on the surface are only loose and isolated fragments imbedded in a clayey matrix. A small tunnel (now closed by the Inspector of Mines) had been ^{driven} ~~owned~~ east of the shaft in western direction. At the beginning of this tunnel several large boulders of Diabase can be seen imbedded in the argillaceous matrix, and on the opposite face a large fragment of coal apparently detached from the seam was exposed. It is obvious that coal and Diabase cannot occur together in the same bed if the latter were Diabas throughout, (because the coal would have been burnt) ~~but~~ but it is quite possible that coal and Diabas in the shape of fragments of loose boulders can occur together in some other, for instance, argillaceous matrix. And this represents our case. The top of the ridge south of the shafts is formed by an argillaceous bed containing loose boulders of Diabas; and it almost looks as if this argillaceous matter had been pressed and worked into the outcrops. The origin of this rather remarkable bed is however of no concern, least ways not economically. What concerns us here is the question whether the Diabase occurrence as depicted on the sketch map drawn by the Government Geologist does exist or not. My observations have proved conclusively that it does not exist and that it was based on the observation of loose boulders found on the surface.

Immediately below this cap of clay and Diabase boulders occurs a seam of coal well seen in both shafts. This seam has not been opened up and therefore nothing can be said about it. It has a thickness of about 4 feet, but the quality of the coal is not known to me. Below the coal follows a bed of shale measuring 7 feet 4 inches in thickness.

Then follows the main seam, approximately 34 feet from the surface, which I will presently describe in detail.

Below the main seam follows shale again, 6 to 7 feet in thickness, if I am correctly informed, and below that, in the sump of the main shaft, a third seam measuring some 6 feet in thickness is said to occur. As I have not seen the latter, I am unable to say anything about it, but samples of coal of fairly good quality coming from this seam can be seen in the engine room. There are therefore 3 coal seams within a vertical distance of about 50 feet from the surface, viz.

3. Top seam 4 feet not worked
2. Main seam 8 feet (5 feet worked)
1. Bottom seam 6 feet not worked.

I have not the slightest doubt that all these three seams can be worked successfully under good management; but for the present nothing can be done to seams Nos. 1 & 3.

I am unable to give a reason for this except that I believe that No. 1 was too deep down and offered great difficulties with regard to water, while No. 3 was too close to the surface and on account of its argillaceous roof difficult to work. However, a good manager ought to be able to overcome

then difficult

The Main Seam

As the Main Seam is well exposed in the headings a reliable opinion can be formed as to its thickness and composition. These are, in descending order :-

Shale

Coal, poor quality.....	4 feet 0 inches
Coal, good quality.....	1 " 5 "
Fire Clay.....	$\frac{1}{2}$ "
Coal, good quality	9 "
Fire clay	1 "
Coal, good quality.....	2 " 4 "

Shale.

Total thickness of coal 8 feet 6 inch.

Thick-ness of good coal 4 feet 6 inch.

The thickness of the whole seam is therefore over 8 feet, but the top portions of poorer quality than the bottom part; it has been found advantageous to take out only the lower part and to leave the top portion which thus forms an excellent roof.

I have given the thickness of the lower part as $4\frac{1}{2}$ feet; this is however a very conservative figure, and I think that 5 feet is much nearer to the mark, as in many places it exceeds 5 feet in thickness, and in parts is even as high as 6 feet.

The presence of the two fire clay bands particularly the lower one is of great advantage in taking out the coal.

I measured the dip at different places, it varies slightly between 4° and 5° , the latter is perhaps the more predominant.

The direction of the dip also varies somewhat, north of the main shaft it appears to be almost due north, at other localities it is 10° degrees West of north up to 15° degrees West of North.

The strike varies therefore from 10 to 15 degrees north of East.

Composition of the Coal*

*The Government Geologist gives the following results:- the Government Analyst giving the following result:-

Sample No.1	Sample No.2		Sample No.1	Sample No.2
65.8	66.7	Fixed Carbon	69.6%	66.20%
21.0	20.3	Gas at red heat	24.0%	25.72%
8.2	8.6	Ash	5.0%	3.84%
5.0	4.4	Moisture	1.4%	4.24%

The above analysis would classify it as a flaming coal (Bituminous No.2) of good quality, and wherever used it gave general satisfaction.

Estimate of Quantity of Coal

The above figures permit to estimate the quantity of coal existing in (a) the whole of the main seam, (b) the lower part of the main seam, (c) the upper seam (d) the bottom seam, provided there are no faults to disturb the regular stratification. No indications of faults or other disturbances having been observed in that part of the seam which is opened up, it is therefore not too hasty to assume that no such faults exist in the other part of the proposition. Taking the strike to be 15 degrees East of North, the length of the seam on a line passing through the shaft would be 40 chains (2640 feet). This length would somewhat decrease in South-eastern direction but this does not matter very much because most of the coal has already been taken out in that part. In North-western direction it would increase till the seam intersects the western boundary line.

On the average the length in that direction may also be taken at 40 chains (Of course the inclined length of the seam will be somewhat larger but we may disregard the difference).

The total volume of the main seam (No.2) would therefore be 44,756,800 cubic feet, of which 29,848,000 cubic feet would be contained in the lower part. If we take the spec. gravity of the Catamaran coal to be 1.25 (it is probably heavier) one cubic foot in bulk would weigh 77 lbs. and therefore 30 cubic feet in round figures would go to the ton.

The Main Seam would therefore contain:-

	Cubic Feet	=	Tons.
Top part	14,908,800	=	496963
Lower part part	29,848,000	=	994930
Total	44,756,800	=	1,491893

Allowing 10% for waste there would be 896,437 tons of coal in the lower part of the working seam and if we assume a production of 600 tons per week equal to 31,200 tons per annum, the above quantity would be sufficient to keep the mine going for 28 years.

Taking the value of the coal at 15/- per ton it would represent a total value of £671,577. Again assuming that the annual production be 31,200 tons, the value of the coal raised would be £23,400, and if we deduct from that sum the cost of mining and transport to Hobart, say 9/- per ton, the net profit would be £9400 per annum.

According to the observations made the total quantity of the coal within the boundaries of the claim is however much larger.

I have mentioned above that there exist# two seams which have not even been touched yet, the top and the bottom seam.

The top seam should contain 23,878,400 cubic feet equal to 795,946 tons,

The bottom seam should contain 35,817,600 cubic feet equal to 1,193,920 tons.

The total estimated quantity of coal would therefore be:-

Top seam	795,946 tons
Working seam	1,491,893 "
Bottom seam	<u>1,193,920 "</u>
Total	3,481,759 tons

To my mind if not the whole at least 75% of this quantity say 2½ million tons in round figures would be recovered and this would naturally prolong the life of the mine considerably as well as enhance its value.

I refrain from expressing an opinion as to the value of this quantity because no figures are available to judge the value of the coal in the top or bottom seam.

Even if the coal was not quite of the same value as that of the lower part of the working seam it represents a great asset, whose value could and should be realised.

The working seam is well opened up by two shafts each about 50 feet in depth, and a considerable length of underground workings. The main object of these workings has been to scratch out the lower part of the working seam, from the shaft in southern direction that is to say following up the dip towards the outcrop.* P.T.O.

The workings are very irregular, apparently following out no well laid out plan (no map

Previous Working

* I am unable to say how much coal has so far been taken out, but if a careful plan of the underground workings it should be easy to get at a fair estimate.

be prepared

or plan of the underground workings is available up to the time of writing this report) and a considerable quantity of coal estimated to be between 4000 and 5000 tons is still left above the main level. No attempts have been made to open up the seam in western, eastern or northern directions.

Reason why work was discontinued. It is easy to see why the company which previously owned this mine stopped working it. The seams make a good deal of water, and opening up the seam in the north-western direction would have required a strong pump to keep the water under control and this the company were apparently not prepared to instal. On the other hand owing to lack of a properly regulated ventilation the air in the upper headings became so foul that work had to be stopped of necessity.

Besides the underground workings there are a number of short surface drives of no importance.

It is difficult to see why they had been started. A shallow shaft has been sunk in the plain a few chains to the north west of the main shaft, but at the time of my visit it was full of water and no coal had been reached.

A bore hole of about 28 feet in depth had been drilled between the old and the new shaft; Coal was said to have been struck at a depth of 28 feet from the surface, but owing to difficulties or inexperience the hole was not drilled deeper.

There is any amount of timber available on the section, and no fear need be entertained on that point.

Timber

Water

As already stated the mine makes a good deal of water and a pump has to be kept going to keep it dry. This is a point that should not be overlooked in the future when the workings will be farther towards north, under the plain, where a good deal of water must be expected.

Future Working Plan

* See Plan.

I would recommend that for the purpose of opening up the mine, a shaft be sunk about 20 chains to the north west of the present old shaft; * the latter being not wide enough for the production of 100^{Tons} per day. The working seam should be met with in a depth of 114 feet below its level in the main shaft. This figure must, however, be considered as approximately only, and will be subject to revision. It must be understood that it does not mean that the working seam will be reached at that depth from the surface, it only says that at a distance of 20 chains from the main shaft, the working seam ought to be found at a depth of 114 feet below the top of the working seam in the main shaft. If this point can be accurately fixed, and its absolute height above or below the plain is ascertained we are in a better position to fix the absolute depth in which the main seam should be reached. I do not think that the difference will be very great because the top of the working seam is hardly more than 20 feet, if as much, above the point where the new shaft was to be sunk. If this was correct the main seam should be found about 94 feet from the surface.*

It is not very probable that the depth will be smaller, in fact 94 feet should be the highest point at which the working seam would be found.

For the present nothing more definite can be said on this point but that the depth of 114 feet may serve as an approximate guide in boring operations.

Should, contrary to all observations, the main seam not be struck at that depth, we are bound to assume the existence of a fault probably running in eastern western direction indicating a downthrow in the direction of the plain. In that case the main seam would be found at a greater depth but I am not in the position to state in what depth, unless the amount of the downthrow was known.

In order to prevent unnecessary expense and perhaps disappointment, I would strongly recommend that before the site of the future main shaft is definitely decided upon, a series of borings be carried out in the plain. Unless there were very strong reasons against it, none of these drillings should be less than 200 feet in depth.

While these operations were carried out, a tunnel estimated to be not more than 42 feet in length should be driven east of the smaller shaft in order to take out the remaining quantity of coal estimated to be 4000 to 5000 tons.

Should this quantity be taken out before the new shaft is finished the heading west of the main shaft might be continued in order to keep up the supply, but I do not recommend this except as a last resource. In my opinion the country around the two shafts should be disturbed as little as possible in order to prevent creeps. Once a definite plan as to the working of the seam

has been decided upon, that portion of the working seam lying to the west of the main shaft and between the sump and the outcrop can be easily recovered. Of course it will be necessary to instal a more powerful winding plant, and above all a more powerful pump. The pump used at present is not strong enough to keep the water under control, once the workings would reach a greater depth, neither is the winding plant strong enough for an increased production.

Previous to taking out the coal in the upper levels, the tram line to Everalls point should be constructed, in order that everything be in readiness when the production from the new shaft will commence.

SUMMARY

I consider the colliery under examination known as the Catamaran Colliery is one of the finest coal propositions in Tasmania. The Geological features of the surface indicate a stratification not disturbed by Diabas~~d~~ dykes or sills, and not dislocated by faults, though the latter may be expected. The undisturbed stratification warrants^a the continuation of the seams and this in its turn guarantees the existance of a quantity of coal which according to a very conservative estimate aggregates to 2½ Million tons, of which some 900,000 tons will be of excellent quality.

Hobart, February 12th 1912.

(Signed) FITZ NORTLING