148

REPORT ON COAL IN THE BICHENO AND ST. ALBYN DISTRICTS

Introduction:

The examination of the above districts was carried out with the object of selecting sites for bores to test the coal seams of the district.

Coal was worked in the Bicheno district about the year, 1850. Numerous shafts were sunk and bores put down during this period, but only incomplete and contradictory records exist. Moreover the greater part of the coal bearing country in both districts consist of level and well-soiled land in which outcrops of the rocks and coal seams are few. This adds considerably to the difficulties met with in endeavouring to decipher the geological structure of the districts.

Location and Access:

The above districts are situated within the vicinity of the township of Bicheno on the east coast of Tasmania. Bicheno is connected by good motor roads with all parts of the State being 113 miles by road from Hobart and 106 miles from Launceston. The terminus of the St. Marys railway is 27 miles to the north of Bicheno, on the road to Launceston. If the proposed private railway from Coles Bay to Piccaninny Point be constructed it will pass within a mile of Bicheno which will then be 23 miles from the above mentioned part.

Adequate shipping facilities are not available at Bicheno at present. The coal produced about 1850 was loaded from a jetty in Waub Boat Harbour. In recent years a jetty was constructed in Waub Harbour for shipping. Both the above jetties have been removed by fire and other causes and loading and unloading is now carried out by row about between the ship and a landing stage in Waub Harbour.

It is stated that Waub Boat Harbour offers the best site for a jetty and that loading could be carried out for the greater part, if not the whole, of the year.

Topography:

Topography is somewhat varied, in parts being of low and in others of high relief. A coastal plain extends to the North-west of Bicheno and ranges in width up to one and a half miles. The height above sea-level ranges up to 200 or 300 feet.

Another low-lying tract is the St. Albyn plains extending along the Apsley River at a general altitude of 200 to 400 feet above the sea-level.

The above two plain tracts are separated by a range of hills extending to heights of 700 to 1200 feet above the sea. The range has a general trend from north west to south east, junctioning with the main East Coast range at its north western extremity. This range has a very low saddle (altitude 250 feet) about 3 miles to the N.N.W. of Bicheno which permits of easy access to the St. Albyns district.

The main East Coast Range runs parallel to the coast and at a distance of several miles therefrom. It rises to heights of over 500 feet.

The Apsley River is the principal stream within the district. Though within two miles of the coast near Bicheno, it does not enter the sea here, but flows southerly into Moulting Lagoon. The remainder of the drainage of the district is effected by short streams flowing directly into the ocean, the most important of which is the Denison River.

Geology

The oldest rock occurring within the district is the granite of Devonian age. This rock is intrusive into Cambro-Ordovician strata which however, do not outcrop within the district. The Triassic system is the most important one within the district. The Ross series does not outcrop except possibly for a small patch of grits on the eastern side of the St. Albyn district, one mile south of the Apsley River. The felspathic sandstone series occupy a considerable portion of the surface. They consist mainly of felspathic sandstones with interbedded mudstones, shales and coal seams. Of particular interest are the pebbley or conglomerate members of the felspathic sandstones. The strata of this series are either horizontal or dip at small angles in various directions.

Diabase (dolerite) of late Triassic or lower Jurassic age occurs intrusive into the Triassic rocks. The most important body is that occurring to the west of Bicheno and extending in a north-westerly and south-easterly direction. This body appears to terminate as a narrow dyke a short distance north of the Denison River. To the south-east or south, it extends for many miles. The greater part of this body is undoubtedly transgressive [illegible] is in the form of a large dyke cutting through the Triassic strata. In a road cutting a few chains west of Mr. Marshall's house, the diabase appears to overlie the sandstones and so part of it may be a sill at this locality.

Another body of diabase is that occurring to the west of the district and forming the East Coast Range. This is a very extensive body and is reported by H. G. W. Keid to be transgressive with regard to the Triassic strata.

River gravels and alluvium occur along the courses of the present streams, the largest tract being that along the Apsley River in the St. Albyn district. These deposits range in age from probably Pleistocene to Recent.

The relation between the granite on the east and the Triassic rocks and the diabase on the west, is a faulted one, the younger rocks being on the down throw side of the fault. This fault is a conspicuous feature of the East Coast, being apparent from St. Marys on the north, to Schouten and Maria Island on the South.

Economic Geology

The Triassic system is the most important one from an economic viewpoint. The felspathic sandstone series of this system contain numerous coal seams and form the most important coal measures in Tasmania. The maximum number of seams developed in it is eight, this number having being determined in the

eastern districts. The seams range in thickness from 1 to 16 feet in thickness. The nature of the coal varies from seam, and from place to place even in the ore seam. These variation are, however, not large and the coal is generally of the one type viz humic or bituminous. The coal is characterised by high contents of ash and fixed carbon, while the volatile combustible matter and sulphur are low. The calorific value (10,000 b.t.u.) is rather high for a coal of this type.

The felspathic sandstones occur in two separated areas with the large body of transgressive diabase dividing them. These areas will be known as the St. Albyn and the Bicheno areas and will be discussed separately below.

The St. Albyn Area

This area is situated along the Apsley River about 3 to 5 miles west of Bicheno. It embraces the St. Albyn Plain on the north and south banks of the Apsley River, and the foothills to the north and south of the river. Practically the whole of the country is privately owned, the greater part being held by Mr. Wm. Cornish and a portion by Mr. J. Gillies.

A motor road branches off the main road and traverses the country north of the Apsley River as far as Mr. Cornish's homestead. A branch road crosses the river by a ford and serves the southern part of the area, but is only suitable for a cart track.

Extensive flats of Pleistocene to Recent gravels and alluvium occur along the river. Felspathic sandstones form the bedrock under these deposits and occupy the surface of the remainder of the area. The sandstones are bounded on the east south and west side by diabase, but appear to extend to the north between two more or less parallel bodies of diabase. The field relations prove the diabase to be transgressive with regard to the Triassic strata (H. G. W. Keid also arrived at this conclusion) and so it definitely limits the area of the coal-bearing strata. The total area of possible coal-bearing country is about 3,000 acres of the 2,600 acres belonging to Mr. Wm. Cornish, it is probable that 2,000 to 2,200 are coal bearing.

Previous reports on the property are two in number viz:- Twelvetrees W. H. Report on the Coal-field of Llandaff, the Denison and Douglas Rivers, etc., 1901.

Keid, H. G. W., the Coal Resources of Tasmania Part IV, Chapter 11.

Twelvetrees reports the outcrop of only one seam of a hard stony coal. This is situated in Marshall Creek and at a distance of one mile south from the Apsley River and an altitude of 400 to 500 feet above the sea.

Keid reports the same outcrop and numerous others. Of these six stated to occur in the creek running through A. T. Gillies' orchard and at the following altitudes above sea-level:- 325 feet, 540 feet, 570 feet, 630 feet, 670 feet, and 780 feet.

Owing to the presence of two hard blackstone bands, Keid considers the seam at the 780 feet altitude to be equivalent to the seam in the Douglas River which is the Gamma seam of the series. The above would therefore, represent the Kappa, Iota, Theta, Eta, Delta and Gamma seams. Keid reports another seam to the east of the creek and at 870 feet above the sea. This might be the Alpha or Beta seam.

Another outcrop occurs in a small tributary of Champ Creek about 3/4 mile N.N.E. of the Ferndale Homestead. This has been opened up in a small open cut which however has partially collapsed. The outcrop is 400 feet above sea level and is considered by Keid to represent the main or Delta seam of the series.

The above information is all that is available in the present undeveloped state of this field. It serves to show that at least six of the full series of eight seams are present in the north-western part of the field. These probably also extend towards the north-eastern part except in so far as they may be affected by faulting. If not affected by faulting the greater number if not all of these seams will also occur in the foothills to the south of the Apsley River. With regard to the plains and low-lying country adjacent to the river it is probable that only the lower seams of the series occur.

The whole position however depends entirely on the faulting which may be present in the area, which cannot be accurately or completely determined. From the evidence that what is probably the Delta seam occurs at an elevation of 670 feet in the creek through Gillies' orchard while a mile to the west, a seam comparable with the main or Delta seam occurs at 400 feet. Keid deduced the presence of a meridional fault. This fault would have a downthrow of 270 feet approximately to the east. Evidence of other faults does not exist, but in his vertical sections, Keid shows either an east-west fault along the Apsley River or else the fault first mentioned is assumed to have a direction from N.W. to S.E. and is thus shown on both sections. It seems more probable however, that he assumed an east-west fault. The difference in the direction of the dips (being northerly, south of the river and southerly, north of the river) is possible supporting evidence for the presence of this east-west fault.

A boring campaign would be an essential preliminary procedure before any mining work is undertaken in this area. This work would prove the number, size, nature etc. of the seams in the various parts of the area and accurately determine the geological structure.

The mining works could then be located to the greatest advantage. With regard to the boring campaign, the following facts should be taken into account.

(1) The greater number of seams would be intersected by drilling on the more elevated land in comparison with the less elevated. Moreover, many of the seams proved could be worked by adits.

(2) East-west lines of bores should be sunk on both the north and south sides of the river to confirm the probable north-south fault and its continuation.

(3) Two or more north-south lines of bores should be put down to prove the possible existence of the east-west fault.

It is probable that the most satisfactory scheme would be to put down lines of bores in the following order.

(1) An East-west line near the northern boundary of Lot 896.

(2) An East-west line near the southern boundaries of Lot 894 and the 125 acre-block in the name of H. Marshall Jnr.

If the seams are considered satisfactory and further evidence is needed, other lines would be

(3) An East-west line across Lots 894 & 795 within say 20 chains of the river.

(4) A North-south line through Lots 896 & 894.

(5) " " " " " Lot 795.

Bicheno Area

This area is situated along the coast to the north of Bicheno and extends as fas as the Denison River. It has length of 2½ miles and a width ranging up to 1½ miles. The main road traverses the area as does also the old tramway (only the formation is left) of the Douglas River Coal Company. A tram line of 3 to 5 miles would connect any part of the area with a jetty at Bicheno.

The whole of the area is privately owned Mr. Walter Marshall is the owner of the two 100 acre blocks in the name of H. Lyne and also leases the 2096 acre block in the names of J. Barnard, J. Foster and R. Officer.

The field consists of a low coastal plain rising to the south and east into the foothills of the range of hills running parallel to the coast. The whole of the plain and foothills consist of Triassic felspathic sandstones while the hills are occupied by diabase. The greater part of this diabase body is transgressive and the field is therefore definitely limited in southern and eastern directions. The Denison River as the Northern boundary is purely an arbitary one as the Triassic strata extends continuously to Seymour and ever further north. The eastern

boundary as regards the surface is the coast, but the geological boundary is the fault which occurs a short distance say 20 chains off the coast. The Triassic rocks occur on the western side of this fault and Devonian granite to the east. The down-throw is to the west and must be many hundreds of feet in amount. The maximum area of possible coal bearing land is 1900 to 2000 acres. This includes nearly the whole of the 2096 acre block and portions of the two 100 acre blocks.

Previous Reports on the area include those of Milligan J. Fingal & East Coast Coalfield, Prox. Roy. Soc. V.D.L. Vol 1, part 1, 1849.

Selwyn, A.R.C. Report on the Geological Relations of some of the Coal Seams of V.D.L. Proc. Roy. Soc. V.D.L. Vol 111, Part 1, 1855.

Gould, Chas. Coalfields (Fingal & East Coast) 1861.

Twelvetrees, W. H. Report on the Coalfield of Llandaff the Denison & Douglas Rivers, 1901.

Keid, H. G. W. The Coal Resources of Tasmania, Part IV, Chapter 11. 1922.

It would appear that the Douglas River Coal Company was formed during or soon after 1850 to work the coal seams on the land now included in the 2096 acre block. Active operations were carried out till 1853 or 1854 at the Inner mines on the south bank of the Denison River in the N.W. corner of the property. These were abandoned on account of the greater length of tramway and cartage from these mines to Bicheno and the Outer mines were then begun about the centre of the property which was much closer to Bicheno. At the time of Selwyn's visit the shafts at the Outer mines had been sunk and winding machinery was being installed. Mining operations were probably continued for a few years, the coal being trammed to Bicheno, and then ceased. No other operations have been conducted since then. In addition to the working shafts a considerable number of prospecting shafts and bore-holes were sunk but unfortunately the records are not available.

Milligan does not refer to any coal or workings on the property. Selwyn however reports that Milligan stated seams were cut in the various shafts and bore-holes.

Selwyn refers to the Inner mines but gives no details of the seams in them. He describes a 50 foot shaft and a bore-hole on the northern bank of the river opposite the Inner mines. The shaft cut 5 or 6 thin seams, but the bore, situated 300 yards to east cut no coal in a depth of 292 feet. From this evidence and the sections exposed, he assumed the presence of a north south fault. Selwyn gives the section of the lower seam at the Outer mines and also refers to one or two seams in the tramway cutting ¾ mile south of the Outer mines.

Gould quotes sections of the two seams cut in both the Inner and Outer mines and considers them to be different. He also states that the outcrop of the upper seam in the Inner mines was traced by prospecting shafts to the east of the mine. Reference is also made to two other seams cut in two prospecting shafts to the south of the Inner mines while a third shaft in between these shafts proved the presence of a fault. With regard to the Inner mines, Gould states that "the seams dipped to the S. W. and are cut off within 50 yards of the shafts by a fault running in a north and south direction and which may possibly be a continuation of the ore exposed in the "Denison River". It is not quite clear whether the fault is to the east or west of the shafts but it is presumably to the west.

Twelvetrees discusses the old reports particularly that of Gould, but was unable to obtain any further information.

It is unfortunate that the reports of the old bore holes have been lost, otherwise the information might have enabled the identity of the seams to be recognised and also the geological structure to be determined. It would appear that at least four and probably five or six seams (counting those cut on the shafts at the head of the Badger Creek) are present, but the correlation of this with known seams in other fields cannot be attempted.

The presence of a few faults have been proved, but one or more of these may be identical. The most prominent is that in the Denison River between the 50 foot shaft and the bore-hole, but the directions of the down-throw is not known. It must be remembered that thin seams of coal occurred to the west of the fault and no seams to a depth of 290 feet to the east of it. This fault should in a southern direction traverse the country near the Inner Mines. Actually Gould refers to a fault within 50 yards of the shafts and it appears that the fault was west of the shaft. If the above information is correct, these two faults must be different and it is probable that the fault in the Denison River passes to the east of the Inner mines.. Such a fault would tend to account for the different sections exposed in the Inner and Outer mines. Gould also refers to a fault between the two prospecting shafts in Badger Creek to the south of the Inner mines. This may probably be the southern continuation of the one proved in the Denison River. One of the above faults (either passing to the east or west of the Inner mines) is shown by Keid as the Foster fault and is assumed to represent the southern extension of such fault from the Seymour field.

The sections of the known seams are stated to be:-

Inner Mines — Upper Seam	Feet	Inches
Soft Fire clay	0	8
Black Bass	0	10
Clean coal	1	1
Brown band	0	7½
Clean Coal	0	8
Brown rib	0	1
Clean Coal	0	5
Brown rib	0	3
Black bass	0	10
Brown stone	0	3
Clean coal	1	0
Brown stone	0	3
Clean coal	1	2
	8	1½

Bottom Seam	Feet	Inches
Upper gas coal	1	3
Soft band	0	3½
Coal	1	4
Black band	0	5
Clean coal	1	0
Band of coal with stone	1	0
	5	3½

Outer Mines

Bottom Seam	Feet	Inches
Black Shale	2	0
Coal	0	6
Parting	0	3
Coal worked	1	8
Parting	0	3
Coal	0	6
Black Shale	2	0

The amount of possible coal-bearing land that could be worked by adits is small and so there is little to be gained by boring the slightly more elevated ground along the western boundary of the property. Mining would therefore be restricted to the lower country and this should be systemically bored to prove the number extent and quality of the seams and also the geological structure. As a beginning three east-west lines of bore-holes should be put down across the 2096 acre block. These might be sufficient to give all desired information but if discordant results are obtained it might be necessary to put down intermediate east-west lines and possibly also one or two north-south lines.

Conclusion

The geology and geological structure of the

St. Albyns and Bicheno areas have been elucidated as far as possible under the existing conditions and with the meagre data available. In accordance with this, lines of bore-holes have been selected on both areas and the order in which they should be put down has been indicated.

The suggested sites for these lines are shown on the accompanying plan.

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