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PRELIMINARY REPORT ON SCHOUTEN ISLAND COAL FIELD.

INTRODUCTION.

In the early years of colonisation one of the coal seams of this field was worked by an English Company to provide supplies of fuel for the people of Hobart. The coal is described in the records of that time as far superior to that obtained from Tasman Peninsula, especially in regard to its application to domestic uses. Although it came into general favour the mine, for reasons unknown, was closed in 1847 and the field has since been abandoned. After a long period of inactivity the field is likely to come into prominence again this time because of its proximity to the large industrial works of the National Portland Cement Company at Maria Island. Supplies of 300 to 400 tons a week for these works are now drawn from Newcastle, a source too far distant. The advantage in having large quantities of coal available near the works is at once apparent, and has long been recognised by the Company.

AREA, SITUATION, ETC.

Schouten Island is separated from Freycinet Peninsula, East Coast, by Geographe Strait, a passage of water three quarters of a mile wide. The mainland lies eight miles to the west, and Maria Island is 16 miles to the south. Schouten Island is retained by the Government as a scenic reserve, and the lease of the grazing rights is held by Signor Bernacchi of Maria Island. It is 4½ miles from east to west and two miles from south to north. A portion only of the western half, amounting to acres, is occupied by the coal measures.

ACCESS.

The island is easily accessible from the north and west sides, and there are safe anchorages in all weathers, even for fishing-boats. North-westerly winds create a sense of uneasiness, but the heaviest gales only from that quarter are regarded as very dangerous to shipping. Small boats find shelter in a small indentation at the waist of the island; larger vessels seek shelter on the lee-side of the main shoreland. Gales are of extraordinary occurrence, the seas usually being remarkably calm even during the winter.

When the coal mine was in operation a jetty was constructed off the northern shore and was in use for a long time. It gradually fell into disrepair and collapsed.

The sea-bed slopes steeply away from the coast line allowing ample water for the entry of large vessels and their close approcah to the shore. Only short jetties, therefore, are required for the accommodation of vessels likely to be employed in this trade.

TOPOGRAPHY.

Granite on the eastern side rises abruptly from the sea into hills over 1000 feet in altitude and presents a very rugged appearance. In contrast the other side, occupied by diabase and Trias-Jura coal measures is formed of gently moulded hills sloping westward. The soil from the waste of these rocks is more prolific of vegetation than the granite section and supports a forest of eucalypts and Oyster Bay pine and grasses suitable for grazing. It is stated that the island was at one time stocked with 800 sheep.

The grass is now rank and forms a thick carpet underneath bushy she-oaks. Small streams flowing from the granite highlands enter the sea at evenly spaced intervals. Lagoons, two of which were formed by the collapse of the sediments near the point of intrusion by diabase, provide reservoirs of fresh water.

GEOLOGIC RELATIONS.

The whole eastern half of the island is of massive Devonian granite. It forms part of the great intrusive body fringing the East Coast of Tasmania, cropping out again on the eastern side of Maria Island. The coal measures about this sharply drawn line of granite and overlie the intruded Cambro-Ordovician clay slate a small outcrop of which appears at the point of junction on the north end of the island. On the upturned edges of the Cambro-Ordovician slates beds of Permo-Carboniferous strata were laid down, continuous with which were deposited the coal measures of the Trias-Jura. In Cretaceous time these measures were intruded by diabase in the forms of dykes and sills. This igneous body found egress along the line of weakness at the granite contact and spread out in irregular sill-like sheets between the beds of sandstone and shale lying to the westward. The subsequent exposition of a portion of the diabase was brought about by the denudation of the sedimentary cover.

STRUCTURAL GEOLOGY.

The presence of diabase is sufficient indication of the disturbance and dislocation of the coal measures. A close examination shows that in addition to the major fault coinciding in direction with the line of intrusion along the granite contact a number of transverse faults connecting therewith completely intersect and displace the seams of coal, and divide the field into separated mine areas of comparatively small extent. The displacement of the strata at the major or meridional fault is westward; the minor faults are almost vertical. These latter are clearly marked in the cliff face especially those appearing in the southwest quarter of the island.

The general direction of dip of the strata is a little east of north, and the angle of inclination varies from 5 to 7 degrees, except at a few points where the beds are highly tilted and turned.

In places the sill-like bodies of diabase transcend the coal seams forming an effective block to mining. The great part of it, however, rests on the measures in comparatively thin sheets.

The position and direction of minor faults are marked by gullies, but others occur that are not reflected in surface features.

MINING DEVELOPMENT.

None of the workings in now accessible for examination. They consist of three shafts and two level headings, all but one in the northern section. In a report appearing in the Papers and Proceedings of the Royal Society of Van Dieman's Land (1849) Joseph Milligan describes the old workings as follows:-

also in Royal Society of Tasmania 1851 No 1 by another author.

"One main drift begun a little above high water mark, and nearly 6 feet by 6 feet, has been carried in the direction (S.S.W. to W.S.W.) or range of the seam more than 100 yards. From this two branch galleries have been worked towards the crop, so as to communicate round a massive square pillar.

A narrow air course had been carried thence to the surface of the bank. The main drift has a slight rise inwards so that when the floor is clear of obstructions, water finds its way to the beach at the entrance. The drift ended abruptly, and apparently in massive clay, having a smooth surface.

There is a second drift 30 yards to the westward and about 15 feet higher up the bank of course, nearer the crop of the seam. This drift proceeds horizontally in the same direction as the former for about 50 yards. Other openings have been made and abandoned and they are now filled with rubbish".

The abrupt ending of the seam in these workings is due to faulting caused by the interception of diabase. A shaft over 50 feet deep was sunk about 10 chains to the eastward. An examination of the dump shows that none of the seams was intersected in passing through felspathic sandstones and dark grey shales.

Besides the workings described which are situated in the northern section of the island a shaft was sunk by Signor Bernacchi on the right bank of a small creek emptying into the sea north of Black Reef. This shaft, which is 72 feet deep, did not penetrate any of the seams, the productive (felspathic sandstone) beds, apparently having been removed. At sea-level nearby siliceous sandstones representing the upper beds of the Ross series are exposed. The site of this shaft, therefore, was not well chosen.

It is futile to search for coal in any but the felspathic sandstone member of the Trias-Jura formation.

PRODUCTION.

It has been variously estimated that five to ten thousand tons of coal has been removed through the adit openings in the northern part of the island. The greater part of the coal so obtained was shipped to the Hobart market.

THE COAL SEAMS.

Five seams of coal have been discovered on this island conforming to the Gamma, Delta, Eta, Theta and Iota seams of the East Coast Series.

The main seam and the one worked by the original company of explores is that known as the Delta seam. It is over six feet in thickness, and consists in its upper part of anthracite, porous and coke-like in character, with several successive layers of bitaminous coal separated by thin bands of hardened clay and shale. The coke-like character of the uppermost layer is suggestive of the destructive erfect of heat that emanated from the diabase at the time of intrusion. White fire-clay, replete with vegetable impressions and succeeded by sandstone forms the roof and floor of the seam.

Gamma seam consisting of a thin bed of hard, earthy anthracite lies 35 feet above Delta seam. It is contained in shale and is overlain with soft conbonaceous shale.

Eta seam outcrops at the summit of the cliff near Cape Faure in the south-west corner of the island. The outcrop rolls slightly along the cliff face and the seam dips at a low angle to the east of north. It is a 3 foot seam contained in six feet of shale between felspathic sandstone.

Theta seam lies 40 feet lower and consists of 30 inches of coal in grey shale between hard sandstone.

Iota is a thin seam of coal contained in a thick bed of grey shale. The coal is capped with a two-foot band of graphite shale. It is 25 feet lower than Theta seam.

Below this seam are two beds of fire-clay replete with impressions of Thinnfeldis and other plant remains and very thin bands of coal.

QUALITY OF THE COAL.

Owing to the collapse of the old workings samples of Gamma and Delta seams could not be obtained. The coal of Gamma seam is described in early reports as worthless stony anthracite. Delta seam consists of an upper antracite layer and several succeeding bituminous layers. This coal, containing so considerable a proportion of bituminous material in the lower part of the seam and so large an amount of carbon in the upper portion possesses heating powers of a high degree. In an open hearth the bituminous material burns with a long yellow flame, emitting much smoke, and producing great heat in the process. Coal of this quality is suitable for domestic as well as steam raising purposes. Probably the coal of this seam is the best on the field.

Samples of Eta and Theta seams were taken from outcrops at the southern end of the island. They are not truly representative but may be accepted as an indication of the quality of the coals exposed at that point.

ETA SEAM. (3 feet)

	No. 1 Sample.	No. 2 Sample.
Moisture	9.00 per cent	6.50 per cent
Volatile Combustible matter	27.94 per cent	28.46 per cent
Fixed Carbon	37.66 per cent	48.25 per cent
Ash	25.40 per cent	26.41 per cent
Sulphur	0.27 per cent	0.34 per cent

THETA SEAM (2 feet)

Moisture	4.20 per cent
Volatile Combustible matter	19.10 per cent
Fixed Carbon	58.50 per cent
Ash	18.20 per cent
Sulphur	0.57 per cent

IOTA SEAM (1 foot)

Moisture	2.50 per cent
Volatile Combustible matter	16.10 per cent
Fixed Carbon	38.96 per cent
Ash	42.40 per cent
Sulphur	0.34 per cent

The determination of the fusibility of the ash of each sample was attempted by the Segar Cove method, the pyrometer being out of order. In each case it was found that there was no indication of softening at 1730 degrees centigrade. The non-clinkering of the ash is most important if the coal is to be used in powdered form. These are hard, brittle coals with a dull lustre and cuboid fracture. On weathered surfaces they are rather tender and inclined to slack, but the fresh coal is hard and some layers are tough. The coal of Delta seam is much brighter and more bituminous. Eta and Theta coals ignite slowly, burn with a short bluish flame, and retain heat longer than Delta coal.

QUANTITY OF COAL AVAILABLE.

Although the coal measures occupy over 800 acres the extent of workable ground is much smaller. Consideration in the estimate of quantity should be given to those portions only that have been proved by boring, mine openings, and coal outcrops. Preliminary exploration by boring is not only necessary to provide data for the calculation of the coal reserve, but to determine also the direction and degree of dip of the seams and the location of faults. It is known that the field is traversed by several north-easterly trending faults, yet no exploratory works have been performed. However, the investigation has shown that, although the inter-fault areas are not extensive the aggregate acreage of coal lands is large and the greater part may prove workable. Separate mines will have to be opened between faults. This is a matter not for consideration in the calculation of the coal reserve, but for consideration in the discussion of the commercial value of the deposits.

In addition to the difficulties presented by faults the effects of the intrusion ahd furrowing of the diabase comes into question. Between the two outcrops in the northern section diabase projects from the main body in a narrow dyke to the sea-coast completely isolating the eastern coal area. The western area is similarly affected but to what extent is not known. If the dip remain northerly the quantity available from Delta seam is not large. However, the lower seams Eta and Theta extend over a larger area and greatly augment the reserve. Approaching the valley in which Bernacchi's shaft was sunk all the coal seams disappear and the unproductive Ross sandstones occupy the surface. Farther south opposite Black Reef the felspathic beds reappear between a succession of three faults and extend eastward towards Sarah Ann Bay where they are pierced and dislocated by diabase. From the foregoing statement it will be seen how difficult it is to collect sufficient data upon which an estimation of the probable reserve can be based with any degree of exactitude. The quantity is undoubtedly large, but an estimate cannot be attempted at this stage.

GENERAL REMARKS.

The first work to be performed is that of exploration, by boring intervals from the south to the north coast. The bores should be so placed as to form the points of equilateral triangles with due regard, of course to lines of faulting. This preliminary operation is an absolute necessity in order to arrive at a true conception of the commercial value of the deposits. Boring would indicate also whether the seams extend westward under the sea.

Oyster Bay, between Schouten Island and the mainland, is a very large expanse of shallow water. Coal seams are known at many points near the northern shore and may extend in faulted position across the bay.

It is possible that the coal area of Schouten Island represents a small remnant only of a much larger submerged coalfield. Credence is given to these speculations by the general evenness of the submerged area and by the absence of diabase. Considering that the felspathic or productive sandstones are 400 to 450 feet thick and that eight seams of coal constitute the complete series the prospect of finding coal in the subaqueous strata of Oyster Bay is not improbable. It may be stated in conclusion that the prospects of this field are decidedly favourable and that fairly large mine areas uninterrupted by faults and intrusions will be proved by drilling.

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Hobart, 25th August, 1924.