

UR 1928B/24-30

REPORT ON THE MT. PETER-MT. PAUL COALFIELD.LOCATION AND ACCESS

The Mt. Peter-Mt. Paul coalfield is situated on the northern side of Oyster Bay, a large indentation in the central part of the East Coast of Tasmania.

Access can be gained by land from either Swansea or Llandaff. Swansea is distant 85 miles by road from Hobart and Launceston, while Llandaff is about 15 miles by road from Swansea. From Swansea, constructed roads are followed for one mile, and then a sandy beach for 10 miles to the mouth of Great Swanport. This estuary is crossed by row-boat, and cart tracks can be followed to Mt. Peter, Mt. Paul, and Cole Bay. These tracks now follow the formation of the proposed railway for the greater part of their length. From Llandaff a cart track skirts the northern side of Moulting Lagoon and finally follows the formation of the railway.

For shipping coal etc., a railway would have to be completed to Cole Bay and shipping facilities provided there. A T shaped jetty has already been almost completely constructed and requires completing. A proposed railway from Cole Bay to Dalmaine has been surveyed and the formation partly constructed as far as the sixteen mile peg approximately. Connection to Mt. Paul could be made from a point between the 5 and 6 mile pegs, and to Mt. Peter from near the 8 mile peg.

LEASES

Applications have been made for the following leases of which the areas and applicants respectively are shown :-

<u>119P</u> M	240 acres	A. A. Dehnert
<u>118P</u> M	320 "	A. A. Dehnert
<u>10276</u> M	640 "	George Bell ^{Gill}
<u>10277</u> M	640 "	James McIntosh
<u>10278</u> M	640 "	John McIntosh

TOPOGRAPHY

Mts. Peter and Paul are the highest points within the district and rise to heights of 1400 feet above sea level. These mountains are flat topped, Mt. Peter having a much greater area than Mt. Paul. The sides of the mountains are very steep near the top, with more gradual slopes at the bottom. The greater portion of the district has elevations less than 600 feet above the sea while considerable portions are below 300 feet.

The drainage is effected by a number of short streams rising in the elevated country around the mountains and flowing in various directions. Portions of the drainage enter Moulting Lagoon, Great Swanport, Oyster Bay, and Southern Ocean.

GEOLOGY -

Cambro-Ordovician - The oldest rocks within the district are quartzite and slates, of which the quartzites are the most numerous type. In the vicinity of the granite, mica hornfels and other metamorphic types occur. These rocks occupy a narrow tract of country on the western side of the district. The presence of metamorphic types near the granite proves that they have been intruded by the granite (which is considered to be Devonian in age) and are therefore older than Devonian.

Their relation with the Permo-Carboniferous and Triassic strata is a faulted one within the district. On general lithological and structural grounds, the quartzites etc. are considered to be of the Cambro-Ordovician system.

Devonian - Granite occurs in the western and southern parts of the district. Numerous varieties exist ranging from the coarse grained porphyritic to the fine and even grained varieties. The rock is composed essentially of felspar (plagioclase apparently predominating over orthoclase) quartz, and biotite.

The granite intrudes the quartzites ascribed to the Cambro-Ordovician system and is overlain unconformably by the Permo-Carboniferous strata. In common with other granites in Tasmania it is considered to be of Devonian age.

Permo-Carboniferous - The rocks belonging to this system outcrop most extensively in the eastern part of the district, but isolated areas also occur in the western part. They also underlie the later Triassic rocks and probably also the diabase.

The rock types are conglomerates, grits, limestones, sandstones and siliceous mudstones. The strata are either lying horizontally or dipping at very low angles. The general stratigraphical succession is given in the following descriptions. The basal beds consist of conglomerates and grits or pebbly sandstones. The conglomerates occur in the vicinity of Salt Water Lagoon, while the grits are prominent in Cave Creek, and the pebbly sandstones to the south-west of Mt. Peter. The basal beds rest unconformably on the Cambro-Ordovician rocks or the granite.

The basal beds are unfossiliferous and are succeeded by the fossiliferous Lower Marine series. The grits and sandstones pass upwards into fossiliferous sandstones and mudstones some 100 to 300 feet thick. These are followed by the Lower Marine limestone beds with a thickness of 150 to 200 feet.

The Lower Marine series passes up into less fossiliferous siliceous mudstones and sandstones which may extend into the Upper Marine Series.

The fossiliferous beds of this system contain fossils typical of the Permo-Carboniferous system of Tasmania and Australia.

Triassic - Triassic rocks occupy almost the whole of the central part of the district. They consist of sandstones, felspathic sandstones, shales, mudstones and coal seams. The strata are either horizontal or dipping at very low angles.

Two series are recognisable in the district as in other parts of the State. The lower one is the Ross series and consists mainly of normal sandstones with associated shales which are sometimes carbonaceous. The lowest beds are pebbly grits and stones and appear to overlie the Permo-Carboniferous conformably, but it is more probable that a disconformity is present. Within the district this series must be at least 300 to 400 feet in thickness.

The overlying series is known as the Felspathic Sandstone series. As its name implies it consists essentially of felspathic sandstones, i.e. sedimentary rocks consisting largely of grains of more or less altered feldspars, with quartz, mica etc. Mudstones and coal seams are interbedded with the felspathic sandstones. Within the district this series is at least 400 feet in thickness.

A third series (the Upper Sandstone series) is recognised in some parts of the State, but does not appear to be present in the district under review.

The fossils contained in the above rocks are, with a few exceptions, plant remains which are more or less restricted to the Felspathic Sandstone series. The plant remains have been recently described by Mr. Walkom who considers the enclosing rocks to be of the Triassic system.

Mesozoic - Diabase (dolerite) occupies the uppermost parts of Mts. Peter and Paul. It is the typical rock type so plentifully developed in Tasmania. It is generally a fine to medium grained rock composed essentially of feldspar (plagioclase) and augite.

The diabase intrudes the Permo-Carboniferous and Triassic strata and occurs in a number of forms such as dykes, sills, etc. in the different districts. In the district under review, the field relations prove almost certainly that the diabase capping Mt. Paul is a sill several hundred feet in thickness. The same applies to Mt. Peter, but the extension on the north-western flanks to low levels suggests the possibility of a dyke-like intrusion in that direction. The relations of the diabase to the Felspathic Sandstone series has a very important effect on the extent and area of the coal-fields.

The diabase is post Triassic and is pre-Tertiary and is -- generally referred to as Mesozoic in the absence of more definite evidence.

Tertiary to Recent - The Recent deposits consist of alluvium along some of the streams and in the swampy areas along the shores of Moulting Lagoon.

Somewhat older deposits are the shell beds (probably raised beds of shallow estuaries) exposed in a water hole about one mile north of Swanage.

The gravels, sands, clays, etc. in the railway cuttings -- between the 4 and 5 mile pegs and between the 7 and 8 mile pegs represent deposits along the courses of former streams.

No evidence of older Tertiary deposits was obtained though such may occur.

STRUCTURAL GEOLOGY -

The bedrock of the district is represented by the old surface of the Cambro-Ordovician and granitic rocks. This was probably reduced to a peneplain before the deposition of the Permo-Carboniferous and Triassic strata. These latter strata were intruded by the Mesozoic diabase largely if not wholly in the form of a thick and wide spread sill. These intrusions were accompanied by much faulting within the Permo-Carboniferous and Triassic strata and also in the basement

of older rocks although possibly not to the same extent. The effect within the Permo-Carboniferous and Triassic strata was to produce a number of blocks at different elevations with respect to one another. Correct delineation of these faults is necessary and essential for the study of the economic geology of the coal and limestone deposits.

The most prominent fault is that which traverses the western side of the district in a general north and south direction. The downthrow of this fault is to the east and must amount to several hundred feet in amount. The Lower Palaeozoic rocks outcrop to the west of the fault and Triassic rocks to the east thereof.

Another fault exists to the south of Mt. Paul. It has a general direction from north-west to south-east and a downthrow to the north-east of probably 300 to 500 feet. Felspathic sandstones outcrop to the north-east and Ross sandstones to the south-west of this fault. It passes within a chain of the north of the adit. At its north-western extremity this fault would either be intersected by another, or undergo an abrupt change in direction as shown on the accompanying map.

Another probable fault occurs to the east of Mt. Paul and has a general north north west bearing towards the eastern end of Mt. Peter. Generally felspathic sandstones occur to the west of this line and Ross sandstones to the east thereof. The downthrow would be to the west.

Other faults probably occur but are difficult to detect especially where similar rock types occur on opposite sides of the fault. These are likely to have throws of less magnitude than the above.

ECONOMIC GEOLOGY -

The materials of economic importance within the district under review consist of coal, limestone, tin ore, and building stones.

The building stones include the Ross sandstones and the -- granite.

Tin ore occurs in association with the granite in the areas to the south-east of that shown on the accompanying map.

Limestone occurs in the Permo-Carboniferous System. The present investigation although not a detailed one showed that the outcrops of limestone are restricted to the north-eastern part of the district.

This investigation was, however, carried out in connection with the coal deposits, and these will be the only ones described below.

COAL DEPOSITS -

The coal seams of the East Coast of Tasmania are interbedded with the felspathic sandstones and mudstones of the Felspathic Sandstone series of the Triassic System. The Permo-Carboniferous (except possibly one or two thin seams which have not yet been discovered within the district) and the Ross sandstone series do not contain coal seams. It is obvious, therefore, that coal will only be found in

those areas in which the Felspathic Sandstone series outcrop. Geological mapping can, therefore, delineate the coalfields with a fair degree of accuracy, although without indicating the extent of individual seams. It will be noted from the accompanying map that the boundaries of the coalfield are determined almost entirely by the faults described above.

COAL SEAMS AND OUTCROPS -

Coal has been discovered in only a few places within the Mt. Peter-Mt. Paul coalfield. The most important outcrop is that to the south of Mt. Paul, and upon which the adit of the Mt. Paul mine was driven.

About 20 chains to the west-north-west of the Mt. Paul adit a trench has been cut on a seam of carbonaceous shale or coal. The trench has fallen in and it is impossible to inspect the face, but the material on the dump suggests carbonaceous shale rather than coal. The containing rocks are Ross sandstones, which makes it more probable that the material is carbonaceous shale.

A somewhat similar occurrence has been exposed in a small trench in a gully on the eastern boundary of lease 119P/M at a distance of 20½ chains from the south-eastern corner.

The trench shows three feet of thinly bedded carbonaceous and micaceous shales which must occupy an horizon near the base of the Ross sandstones. This outcrop has no commercial importance.

On the south-western slopes of Mt. Peter, a recent wash-out-crop in a small creek exposes fragments of coal. The wash-out is situated 15 to 20 chains south-west of the north-west corner of lease 10276/M. The coal fragments are not in situ, but occur in the lower bed of gravels in the creek. The seam should exist a short distance uphill from this wash-out.

Coal is known to occur therefore at only two localities, viz, the adit at Mt. Paul and on the south-western slopes of Mt. Peter. The Felspathic sandstone series on the East Coast of Tasmania contains a series of eight seams. Other seams will almost -- certainly be found in the Mt. Peter-Mt. Paul field by prospecting or boring. The felspathic sandstone country is generally covered with a good depth of soil and surface prospecting is difficult, outcrops of coal being found only in cliff faces and creeks in which the bedrock is showing.

The seam in the tunnel at Mt. Paul has been correlated by H.G.W. Keid (Mineral Resources NO. 7 - The Coal Resources of Tasmania) with the Delta seam of the series. The Delta seam is the main one of the series and that worked in the chief mines of the East Coast districts.

THE MT. PAUL MINE -

The main working at the Mt. Paul Mine is an adit. This adit is approximately 400 feet in length and has been driven in a general northerly direction. It has followed the seam, being driven in the lower part thereof, and as the seam has a low dip of about 2° to the north the adit correspondingly slopes to the north. The adit has a height of 5 to 5½ feet and a width of ranging from 4 to 10 feet. The adit is in good order as the roof is standing well and a small

amount of water which collects in it is pumped out several times a week. A few short adits etc. were driven immediately to the west of the main one, but have since fallen in.

NATURE AND QUALITY OF THE SEAM -

The tunnel was driven in the lower part of the seam exposing a height of 5 feet 2 inches. The remainder of the seam is only exposed at one point, viz., a hole made above the roof of the tunnel a short distance in from the outcrop. An additional 2 to 2½ feet of the seam is exposed in this hole, making a total thickness of 7 feet 2 inches to 7 feet 3 inches.

Near the face of the adit the section of part of the seam exposed is as follows:-

Roof of Adit (Coal)

	5½	ins	coal
		"	brown band
		"	coal
		"	brown band
	5½	"	coal
	¾	"	interbedded bands and coal
	7½	"	coal
	1	"	soft black band
2 ft.	5	"	coal
	5	"	mudstone band
	7	"	coal
			sandstone floor
<hr/>			
	5 ft. 2	"	total thickness
<hr/>			

The above section shows 4 feet 6½ inches of coal in the total of 5 feet 2 inches. The only thick band is that near the floor of the seam. This band persists through the seam as so far exposed, but ranges in thickness from 3 to 6 inches. This band could possibly be excluded during mining operations, but the thinner bands would have to be included with the coal.

Two samples were taken by the writer for analysis. No. 1 was taken at the point where the above section was measured (west side of adit and 50 feet south of face). Only the 4 feet 2 inches of the seam above the bottom band was sampled.

No. 2 sample was taken from the east side of the adit, 45 feet from the face. It included 4 feet 11 inches of coal, but not the bottom band of mudstone which was here only 3 inches thick.

Samples 745 and 746 are extracts from Mineral Resources No. 7 (these samples were taken by H.G. W. Keid, Government Geologist.)

The analyses were made in the Mines Department Laboratory, Tasmania, with the following results:-

	<u>No. 1</u>	<u>No. 2</u>	<u>No. 745</u>	<u>No. 746</u>
Moisture	1.20	1.00	1.58%	1.00%
Volatile matter	18.24	18.58	15.32	10.80
Fixed Carbon	55.64	54.82	49.32	51.74
Ash	14.92	25.60	33.78	26.46
Sulphur	0.68	0.74	0.37	0.44
Hydrogen				4.06
Carbon				56.51
Oxygen				11.60
Nitrogen				0.93
Calorific value	9607 B.t.u. 9564 b.t.u.			9963 b.t.u.
Evaporative Power				10.30

The above table includes proximate analyses of the four samples and an ultimate analysis of No. 746. The analyses are typical of the Triassic coals of Tasmania with the relatively high percentage of ash and fixed carbon and low content of volatile combustible matter. The calorific value is high for a coal with a composition as given above.

The coal is a bright laminated type with a specific gravity of 1.36. It differs in no way in appearance and physical properties from other East Coast Coals.

QUANTITY -

In the present state of development of the field, it is impossible to attempt to give reliable estimates of reserves. The best that can be done is to indicate the areas occupied by the coal-bearing strata. If desired the possible reserves could be calculated by assuming the known seam (say 7 feet thick) extends over the coal-bearing areas.

LEASE 119P/M of 240 acres -

This lease included about 180 acres of felspathic sandstones assuming that they extend beneath the diabase which is very probable. The seam on which the tunnel is driven should extend throughout practically the whole of the 180 acres. Other seams probably also exist and could be proved by boring.

LEASE 118P/M of 320 acres -

About 250 acres of felspathic sandstones occur on this lease. No coal has yet been found outcropping on this lease, or otherwise proved to exist. It is anticipated that the tunnel seam would exist in part of the 250 acres and others may also be present.

LEASE 10276/M of 640 acres -

This lease includes about 260 acres of felspathic sandstones. Discoveries of outcrops of coal has not yet been made, although fragmentary coal has been found just outside the north-western corner. There is no indication as to whether this is the tunnel seam or otherwise. It is probable that some of the series of eight seams will occur on the more elevated areas in the north-western and south-western corners of the lease. A smaller number of seams may occur in the less elevated country in the central part of the lease.

LEASE 10277/M of 640 acres -

Felspathic sandstones occupy at least 40 acres, with a possible maximum extent of 100 acres. There is no known outcrop of coal although one is indicated near the south-western corner.

LEASE 10278/M of 640 acres -

The coal-bearing strata do not occur on this lease.

POSSIBILITIES OF THE COAL -

The coal is essentially similar to other East Coast coals and could be used for similar purposes. The East Coast coals are used on the Tasmanian Railways with or without an admixture of Newcastle coal. The Tasmanian coal is used on lines with the lighter grades and the mixture on lines with heavier grades.

The coal is also used for steam raising and domestic purposes.

The Tasmanian coal is specially adapted for use in the pulverised form, as its ignition point renders the chance of spontaneous combustion improbable. Use in this form would give it a greater efficiency for locomotives and general steam-raising purposes, and enable it to be used in the cement industry.

As to markets, the following general considerations apply. The Tasmanian market is limited and the Mt. Paul coal would have to be somewhat better in quality or else be marketed at a lower price to enable it to successfully capture the local market. The other possible market which has always been considered in connection with the mining of coal on the East Coast is the export to South Australia - a State which has no black coal deposits. The exploitation of this market in competition with Newcastle coal would have to be subjected to economical considerations.

WORK NECESSARY TO ENABLE COAL TO BE MINED -

This would depend largely upon the contemplated output. As already described above, the mine has an adit 400 feet in length driven on the seam. A small handpump and siphon is installed to effect the drainage, while a rough-stone furnace has been erected to assist the ventilation. Only a cart road exists between the mine and Cole Bay jetty.

To enable production on a commercial basis headings would have to be driven from the tunnel to provide sufficient working faces. The mine would have to be equipped with the necessary mine-tracks and haulage. Bins and all other accessory plant would also have to be provided.

Transport facilities probably in the form of a light or narrow gauge railway would have to be constructed to Cole Bay and the rolling stock provided.

At Cole Bay the jetty would have to be completed and loading facilities provided.

CONCLUSIONS -

The Mt. Peter-Mt. Paul coalfield has been described and many of the factors connected with the working thereof have been discussed above.

The coal-bearing areas are indicated by the felspathic sand-stones on the map and they have been described in the text. Very few outcrops of coal are known, and only one seam can be definitely stated to exist. Extended prospecting work and/or a boring -- campaign would probably reveal the presence of other seams. Such work would also assist in determining the detailed geological structure of the field and enable the mine workings to be sited to the best advantage.