

CEMENT MATERIALS AT MELROSE, TASMANIA.Introduction

At Melrose are very extensive beds of limestone and clay eminently suitable for manufacture into Portland Cement of high quality. In the neighbourhood are equally extensive beds of coal and of shale oil, the most important of the accessory materials required in the industry. The Devonport Cement Company of Melbourne has recently acquired options of purchase over very large areas of limestone, clay and coal lands there and intend to erect works of large capacity.

Area, Situation etc.

The limestone and clay beds of Melrose extend over 1,000 acres. Of this area, the company has secured 700 acres in the most central part adjoining that owned by the Broken Hill Proprietary Company.

Don and Tarleton Coalfields lie in adjacent areas within radius of 5 miles of the limestone deposits.

Access

Melrose is an agricultural area traversed by the Don Railway, a branch from the North-west line. The settlement is $8\frac{1}{2}$ miles by rail from Devonport, the chief shipping centre of the North-western district.

The Railway system is conveniently situated in relation to the Coalfields.

Topography

Melrose is an area of undulating land surface surrounded by hills that rise upwards of 400 feet.

The limestone stands out in bare massive knots in some places and in others it rises into high clay-covered hills. Don River, a perennial stream of considerable magnitude, flows through the area from south to north.

Geology

The exposed surface of the beds of limestone present a small portion only of an extensive formation that outcrops here and there a distance of 30 miles. Their exposure in comparatively small isolated areas is due to the denudation of younger formations by meteoric agents of erosion. The age of the rock is still in doubt, but the evidence is suggestive of the Ordovician, and it has been assigned tentatively to that division. The material is wavy and even schistose in character and where unweathered it is hard and compact, and of a bluish grey colour. It weathers along bedding planes to a brown and lilac coloured clay leaving the unaltered material in conical form or with irregular, rounded outlines.

The clays that overlie the limestone represent the accumulation of the insoluble residue or original limestone. They contain silica, alumina and iron in the desired proportion for admixture with the limestone in the

manufacture of Portland Cement.

Eastward about a mile are strata of Permo-Carboniferous age containing a seam of high quality coal 18 to 24 inches thick.

Chemical Composition of Limestone

By an inspection of the accompanying table it will be seen that the rock is of high grade throughout, and of fairly uniform composition. The quality varies between 85 and 93 per cent calcium carbonate, but the impurities consisting of silica, alumina and iron are nicely proportioned and a well balanced "meal" can be obtained by the judicious admixture of the accompanying clays:-

Registered Number of Sample	Magnesia	Silica	Ferric Oxide	Alumina	Calcium Carbonate
773	1.37	7.84	1.82	2.70	86.57
		3.68	1.79	2.17	90.41
		3.30	0.89	1.65	93.13

Physical Properties of the Limestone

The rock is very dense and compact, schistose in parts, and brittle. In the process of crushing a considerable portion is reduced to powder, the ultimate comminution of which is easily affected.

Chemical Composition of the Clay

The large deposits of associated clay representing the insoluble residue from the dissolution from the lime carbonate component of the rock, are of excellent quality for the purpose in view. Samples from widely separated points indicate the various grades of clay in the area. Registered number of samples 768, 770, 771, 772.

Ignition loss	Potassium and Soda	Magnesia	Ferrous oxide	Silica	Ferric oxide	Alumina	Calcium carbonate
				65.48	8.87	16.63	0.93
	3.63	1.30	0.39	60.60	11.30	18.00	-
7.40	-	1.60	-	62.60	5.36	22.02	trace
9.78	-	1.40	-	55.56	8.46	20.62	2.84
8.50	-	1.42	-	50.28	13.82	24.86	-

The analysis of some of the samples indicate that a high iron cement suitable for use in sea water can be made. This cement is quick setting and is capable of resisting almost indefinitely the corrosive action of the salt contained in sea waters. Light yellow clays (the deposition of diabase) containing a higher relative proportion of silica are found in abundance in the neighbourhood, and white clays associated with the coal seam can be used in the manufacture of white cement.

Quantity of Limestone and Clay Available

There are enormous bodies of both limestone and clay in the holdings of the company. At least 50,000,000 tons are available above sea level, and below they have been drilled to a depth of 250 feet.

Production of Limestone

On the east side of Don River on properties now included in the holdings of the company are the Lime Kilns of Cornelius and Dally. The products of these kilns has been sold in local markets for agricultural and building purposes.

Adjoining these works are the Broken Hill Proprietary Company's quarries from which 50,000 tons of high grade limestone are removed and shipped to Newcastle annually. About 100,000 tons of second grade limestone perfectly suitable for the manufacture of Portland Cement has been dumped.

Method of Operation

All the requisite conditions for open cutting methods of operations are here. The limestone formation rises into hills of considerable altitude, and the country is clear of almost every tree and stump. As both clay and limestone will be broken from the one opening the cost will be very small.

Site of Works

Perhaps the most suitable site for the works is the flat area between Don River and the Cornelius Lime Kilns. This site is served by a main road and is within a quarter of a mile of the Railway siding of the Broken Hill Proprietary Company. There is room for a plant of very great dimensions, close to large bodies of Limestone already opened, close to Forests of Eucalyptus and to the Don River.

Coal Supplies

Coal bearing strata of Permo-Carboniferous age occupies a great extent of country between Don and Mersey Rivers. The coal seam is 18 to 24 inches thick, and is opened by shafts and adits at many widely separated points. Mining of coal is now on a small scale only, sufficient to supply domestic requirements. The most important collieries are at Don, Tarleton, Spreyton and Dulverton all served by railways.

The seam has been worked intermittently since 1850 but owing to its thinness and the faulty nature of the strata, not with marked success.

The reason for its limited applicability to industrial uses is that it contains a comparatively high proportion of sulphur. In other respects the coal is of excellent quality, and if required as a fuel in the manufacture of Portland Cement it will serve the purpose admirably. An idea of the quality of the coal may be obtained by reference to the analysis in the sub-joined tables:-

<u>Proximate Analysis</u>	<u>No. 1 Sample</u>	<u>No. 2 Sample</u>
Moisture at 105°C	13.58	13.42
Volatile Hydrocarbons	36.28	35.06
Fixed Carbon	45.30	46.88
Ash	4.84	4.64
<u>Ultimate Analysis</u>	<u>No. 1 Sample</u>	<u>No. 2 Sample</u>
Sulphur	4.39	4.04
Hydrogen	6.83	6.13
Oxygen	18.05	26.22
Carbon	65.05	58.03
Nitrogen	0.87	0.94
<u>Heat Value</u>	<u>No. 1 Sample</u>	<u>No. 2 Sample</u>
Calories	61.42	59.50
B.T. Units	110.56	107.11
Evaporation Power	11.43	11.08
<u>Specific Gravity</u>	1.31	1.32

The ash content of this coal is low as given here but even if under working conditions it were doubted it would not be excessive. A high sulphur content is not seriously detrimental.

The Company has secured the working rights over 2,000 acres of coal land.

Summary.

In this district are found all the raw materials required in the manufacturing of Portland Cement, limestone, clay and coal are here in abundance and are of such a quality as to leave no doubt as to their suitability for cement making. In addition to these materials an ample supply of water is available, and forests of eucalyptus are in the neighbourhood.

The properties are close to the well settled townships of Devonport, Latrobe, Hamilton, Don and Sheffield, from which labour can be drawn, obviating the necessity for Workmens' Homes.

Situated in an agricultural area within easy reach of popular districts and connected by rail and road with the chief shipping port of Northern Tasmania the conditions for economical operation and the facilities for the transportation of the product to overseas markets are very favourable.

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