NOTES ON SOME DENSE LIMESTONES SUITABLE FOR AGRICULTURAL PURPOSES

(1) FLOWERY GULLY DISTRICT:

(a) Location and Access

The Flowery Gully district is situated on the west side of the River Tamar near the junction of its estuary (Port Dalrymple) with Bass Strait. The most convenient means of access is from the City of Launceston, which is situated at the head of the River Tamar. A first class motor road connects Launceston with Flowery Gully via Exeter and Winkleigh (23 miles). Beauty Point, the present deep water port of the Tamar, is seven miles from Flowery Gully by road.

(b) Limestone.

This limestone occurs near the head of Johnson's Creek in the Flowery Gully district, and covers a considerable tract of country. It outcrops boldly on both sides of the Flowery Gully to Winkleigh road on the ascent of Adams Hill. The limestone and enclosing strata have a strike of north-west or north-north-west and a dip to the north east at angles of 40° and 50°.

Quantity. The outcrop of the limestone is 110 chains long and with a maximum width of 20 chains. The width at the outcrop is somewhat less in places due to a covering of younger rocks, the minimum being 12 chains. An average width of 16 chains could be taken for working purposes without involving the removal of any large thickness of overburden. (It must be remembered that it is the width at the outcrop that is 20 chains and the actual thickness of the bed at right angles to the dip would be about 14 chains). The total area over which the limestone outcrops is therefore about 160 acres. The altitude of the limestone at its north end is 290 feet above sea level. The surface rises along the road to Winkleigh to an altitude of 690 feet but the limestone to the east and west of the road occurs at greater heights. The greatest height attained by the limestone is 710 feet. It is difficult to average the average depth of limestone available down to the depth of 290 feet in order to determine the quantity of rock which could be obtained by quarrying methods. It is safe to assume, however, that 200 feet would be a conservative estimate. Using the above figures the quantity of limestone to be obtained by quarrying methods above the 290 foot level deducting 33 per cent for cavities, loss in working etc. Would be 70,000,000 tons. In addition, every 100 feet in depth over the area below the 290 foot level would add a further reserve of 43,000,000 tons. Of the total area, 80 acres occurs on the property of Mr. F.N. Beams and 30,000,000 tons would be available under the above conditions. About 50 acres occurs on the property of Mr. C. McKercher being situated on the 100 acre block charted in the name of J. Ellis. The amount to be obtained by quarrying on this property is approximately 10,000,000 tons. The remainder of the limestone occurs on the properties of Mr. Quigley; E.L.Douglas; A.E. Cowie; etc. but the quantities are small compared with those on the above two properties.

Quality. The limestone is a dense bluish-grey type with veins and bunches of white crystalline calcite which, however, form only a small part of the rock. Except for the veins of calcite, the rock appears to be of a very uniform nature and composition. The following analyses taken from "Mineral Resources No. 2, 1917" by the late W.H. Twelvetrees show the composition of it.

	Total	Calcium Carbonate	Magnesium Carbonate	Oxides of Iron and Aluminium.	Silica of Insoluble.	Moisture
Lutwhche's Quarry	99.98	95.40	1.22	1.79	1.44	0.13
Caves	99.97	95.65	0.83	1.70	1.61	0.18
Quigley's Quarry	99.91	94.75	1.17	2.81	0.98	0.20
Main Outcrop	100.00	95.45		1.65	1.85	1.05
Outcrop at face	100.00	94.00		3.15	0.98	1.87
Outcrop over caves	100.00	93.72		0.55	5.53	0.20

These analyses prove that the limestone contains 93 to 96 per cent of calcium carbonate and is therefore a very high grade one.

As far as appearances go the rock should maintain this composition over the greater part of its outcrop. At several localities, however, it contains impurities in the form of veins of white quartz and black chert. The white quartz veins were observed at one place only, viz. along the road cutting near the foot of Adams Hill. They are not numerous and would have only a small effect on the quality of the limestone in that vicinity. A few chert veins also occur at the above locality. At the south end of the limestone outcrop the chert veins are very numerous. They are exposed in road cuttings near the top of the hill at the head of Flowery Gully, and pieces are strewn over the surface in that vicinity. In a small quarry for road metal south of the road junction on the hill between Flowery Gully and Winkleigh, the chert veins occur to the almost total exclusion of limestone. Where the veins are plentiful large quantities of the limestone would be useless owing to its high silica content.

Working Facilities. The conditions over the whole of the area are suitable for working the limestone by quarrying methods. The best point to commence would be at the northern end where the altitude of the surface is lowest, thus making available the greatest depth of rock. This commencement point would be on the property of Mr. F.N. Beams on which the greatest amount of limestone is available. Quarrying operations could also be commenced on Mr. McKercher's property (100 acre block) from the road level, but a smaller face would be obtained.

(2) MELROSE AND PALOONA DISTRICT

(a) Location and Access

Melrose and Paloona are adjacent agricultural areas traversed by the Don-Barrington railway. Melrose is 8½ miles and Paloona is 10 miles by rail from Devonport, the chief shipping centre of the north-western district. The railway passes through the centre of the limestone deposit and large quantities have been opened at Melrose and Paloona stations.

(b) Limestone

On properties owned by James Leary and others at Melrose and Paloona extensive deposits of high grade limestone are known. The limestone beds of this area extend over 1000 acres. The same beds crop up again at Railton where the Tasmanian Cement Company is operating.

The limestone stands out in bare massive knots in some places and in others it rises into high clay-covered hills. The exposed limestone 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 fresh material in conical form with rounded outlines. 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 effected. With modern appliances the fine grinding of this material can be accomplished at a low cost.

Quantity. There are enormous bodies of both limestone and clay in the area. At least 50,000,000 tons are available above sea level, and below they have been drilled to a depth of 250 feet. There is no doubt that the formation continues to a depth far below the reach of mining operations.

Quality. By an inspection of the table given below 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.

Regd. 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

Production. On the east side of Don River the lime kilns of Messrs. Cornelius and Dally have been in operation many years. The product has been sold in local markets for building and agricultural purposes, but the quantity has not been very great. Adjoining these works are the Broken Hill Proprietary Company's quarries from which 50,000 tons per annum of high grade limestone are taken and shipped to Newcastle.

Method of Operation. As the limestone formation rises into hills of considerable height open cutting methods of operation could be employed. The country has been cleared of almost every tree and stump, therefore the cost of breaking would be small.

Situated in an agricultural area within easy reach of populous 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 markets are favourable.

(3) BERRIEDALE AREA

(a) Location and Access

The limestone of this area is situated 6 miles north-west of Hobart and about a mile west of the River Derwent at Berriedale. Situated so close to Berriedale, through which the main road and railway pass from Hobart to Launceston, the deposit is easily accessible.

(b) Topography

In the immediate vicinity of Berriedale the country is gently undulating, but half a mile westward the foothills of Mts. Faulkner and Hull rise steeply to heights of 1000 to 1500 feet above sea level. It is on the eastern flanks of these hills, between the 700 and 1300 feet contours, that the beds of limestone are exposed. The countour is such that the rock can be removed on an extensive scale by open cutting or quarrying methods at a low cost.

(c) Limestone.

The members comprising the limestone zone in this area are calcareous and thickly bedded. The limestone beds are separated by bands of calcareous shale containing many rounded pebbles of quartz which vary in thickness from three to eight inches. The limestone beds vary in thickness from twelve to thirty inches, The whole aggregating 250 to 350 feet in thickness.

In the upper beds are found occasional bands of chalcedony which was deposited from infiltrating solutions containing silica; and in the lower quartz pebbles are not uncommon.

In general the beds are horizontally disposed, but a slight inclination is noticeable varying in degree and direction in different localities.

Quantity. No attempt has been made to estimate the tonnage of limestone in this area. It is sufficient to state that the deposits extend nearly 20 chains into the hill before being intercepted by dolerite and that they are fully 200 feet thick.

From the foregoing it will be seen that no apprehension need be felt regarding supplies.

Quality. Although the quality of the limestone varies slightly, each particular bed retains a fairly uniform composition over large areas.

The results of analyses show that the average composition of the limestone, taking into consideration the varying thicknesses of the layers is as follows:-

Silica	Ferric Oxide and Alumina	Calcium Carbonate
22.37%	4.16%	72.92%

The average composition of the shale, taking into into consideration the varying thicknesses of the bands, is as follows:-

Silica	Ferric Oxide and Alumina	Calcium Carbonate.
54.08%	14.19%	24.47%

The average composition of the deposit as a whole, that is, the layers of limestone and the bands of shale separating them, is as follows:-

Silica.	Ferric Oxide and Alumina	Calcium Carbonate
28.51%	6.10%	64.15%

Production These limestone beds have for long been quarried at Granton near Bridgewater, at Glenorchy, and in recent years, at Berriedale. At present the Granton quarries are in active operation, the lime product supplying the Hobart market for this class of material.

No statistics of actual production are available.

F. Blake
ASSISTANT GEOLOGIST

Hobart,
5th May, 1932.