

LIME DEPOSITS OF KING ISLAND.

Lime available for agricultural needs abounds on King Island in several different forms and it is largely a matter of locality which deposits are the most favourable.

Types of Deposit:1. Lime Sands.

On the West and South coasts of the Island are long stretches of beach, behind which the "sand" has accumulated to form hundreds of acres of dunes. These dunes may appear as mounds of bare sand, they may be covered by grass or by low but thick scrub. This "sand" is in reality composed largely of shell and other marine organism fragments and often has a calcium carbonate of as much as 90%. In places it is quite shallow but in others appreciable thicknesses should cover the sandy soil or bedrock.

These dunes have been formed by wind, the prevailing westerlies blowing the fragments in from the shore line. Thus the contour of the country, especially where bare of grass and scrub, is constantly changing.

Four of these dune areas have been examined during recent visit but it should be pointed out that other deposits of lime sand occur in many places down the West Coast.

a. Surprise Bay.

Surprise Bay is located at the extreme South of the Island, a distance of about twenty miles from Currie. A well formed road may be followed most of the way, although the last couple of miles consists of an unmetalled track across the dunes. A sample taken from dunes just behind the beach showed the following constituents :-

Acid Insoluble	3.2%
Fe ₂ O ₃ Al ₂ O ₃	0.2
CaO	48.2
MgO	2.7
Ignition Loss	44.0

Calculations based on the CaO MgO content show a calcium and magnesium carbonate percentage of 91.3. A screen test of this lime sand resulted as follows:-

<u>Screen Sizes.</u>	<u>Percent Weight.</u>
44	17.4
60	43.3
100	37.4
-100	1.9

b. Badger Box Creek.

A visit to this area was made in company of Mr. D. Handley of the Agricultural Bank, for it is from this deposit that the Closer Settlement Board are contemplating drawing supplies.

The dunes cover a large area near the mouth of the Creek. The spot from which samples were taken is about a mile and a half from the South Road near

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its junction with the Grassy Road and can be reached by driving a vehicle over the paddocks and dunes.

Two samples were taken, one from the surface and the second from three feet. The depth of this deposit varies and is, in places, quite shallow, bottoming on a brownish sandy soil.

An analysis of these samples showed:-

	<u>Surface</u>	<u>3 feet.</u>
Acid Insoluble	44.0	35.1
Fe ₂ O ₃ Al ₂ O ₃	1.3	1.1
CaO	28.4	32.5
MgO	1.2	1.2
Ignition Loss	24.1	29.1

giving a calcium and magnesium carbonate content of 53% and 60.4% respectively.

Screen tests showed the following :-

<u>Screen Sizes.</u>	<u>Percent Weight.</u>	
	<u>Surface</u>	<u>3 feet.</u>
44	3.3	18.4
60	7.9	27.0
100	68.8	45.7
-100	20.0	8.9

c. Buttons Deposit.

This is a dune deposit which has been used as a source of lime for Closer Settlement and other farms. A track may be followed for 2½ miles from the North Road at a point one mile north of Pass River. Trucks may be driven right to the dunes where two small pits have been opened. The deposit covers several hundred acres from the beach to some hundreds of yards inland and portion is covered by grass and scrub.

Two samples were taken, one from the surface of the dunes, fifty yards from the beach and the other from the present pit at three feet from the surface. Analysis of these showed:-

	<u>1.</u>	<u>2.</u>
Acid Insoluble	4.7	17.8
Fe ₂ O ₃ Al ₂ O ₃	0.5	0.6
CaO	47.7	41.6
MgO	2.4	2.0
Ignition Loss	42.8	36.7

which indicated a calcium magnesium carbonate content of 90% for the surface sample (1) and 78% for the other. Screen tests showed the following partical size :-

<u>Screen Sizes</u>	<u>Percent</u>		<u>Weight</u>
	<u>1.</u>	<u>2.</u>	
44	1.5	3.4	
60	17.4	11.3	
100	68.7	62.5	
-100	12.4	22.8	

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d. Loorana.

These dunes, which lie to the South of those at Buttons, are very similar but of slightly lower grade. They may be reached by driving across the paddocks for half a mile from the North Road at Loorana. The dunes cover several hundreds of acres, a great deal of which is covered by thick scrub. All stages of gradation from pure wind blown fragments to consolidated rock may be seen in this area. The rock, although solid, can be easily broken and has been laid down in beds which have all sorts of angles of false dip. Some of the lime has been dissolved and then re-precipitated to form cementing material. A sample of the dune "sand" from the surface gave the following analysis.

Acid Insoluble	26.7%
Fe ₂ O ₃ Al ₂ O ₃	0.8
CaO	37.1
MgO	1.6
Ignition Loss	32.6

representing a total carbonate content of 70%. A sizing test showed the following :-

44	34.1%
60	20.9
100	31.4
-100	13.6

The consolidated material was also sampled and resulted:-

Acid Insoluble	22.3%
Fe ₂ O ₃ Al ₂ O ₃	1.2
CaO	41.4
MgO	0.7
Ignition Loss	33.5

which shows a carbonate content of 74%.

II Consolidated Lime Sands.

In other parts of the Island are beds of rock similar to those described at Loorana. That is consolidated rock showing bedding planes but at the same time very soft and easily crumbled. These beds of rock are still of recent origin and owe their consolidation to cementing agents and not to pressure. They have not been formed under the sea but under such conditions as now exist.

Of the three deposits examined, the Loorana is the poorest in lime and also does not show the width of outcrop of the other two.

Camp Creek.

Just outside the township of Currie and bordering the North Road to the east and Camp Creek to the South are small cliffs of lime rock. The actual outcrop is about a chain in length and twelve feet high but pieces of similar stone may be found on the surface up to fifty feet above the road. A sample taken

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over this twelve feet was analysed with the following result :-

Acid Insoluble	17.3%
Fe ₂ O ₃ Al ₂ O ₃	1.0
CaO	43.2
MgO	1.0
Ignition Loss	36.7

This represents a calcium and magnesium carbonate content of 80%.

Dripping Wells.

On the sea coast just south of the mouth of the Etrick River and close to the South Road are small cliffs of earthy material from which there are constantly running springs and seepages. This outcrop is fifteen feet in height and extends for three chains or more. The lime sand has not become quite so consolidated or bedded here as at Camp Creek but due to the amount of water an appreciable percentage of it has been dissolved and re-precipitated as hard stalactites.

A composite sample of the earthy and stalactite material was tested as follows :-

Acid Insoluble	0.4%
Fe ₂ O ₃ Al ₂ O ₃	0.5
CaO	53.4
MgO	0.5
Ignition Loss	45.2

which shows an abnormally high calcium carbonate content.

III Re-precipitated Calcium Carbonate.

On the east bank of Little Porky Creek, just north of the North Road and near the Butter Factory is a third type of deposit. This is lime that has been dissolved and then re-precipitated, not as at Dripping Wells as stalactites, but as a powder, in a much finer state than the original shell fragments. This deposit has a similar origin to that near Sorell and the calcium carbonate content (80%) is much the same. A sample gave the following analysis :-

Acid Insoluble	10.4%
Fe ₂ O ₃ Al ₂ O ₃	2.2
CaO	44.3
MgO	0.6
Ignition Loss	41.9

Unfortunately this deposit is very limited in extent.

IV Tertiary Limestone.

All the abovementioned deposits are of Recent origin and are not limestones in the true sense of the word. However, on King Island are some deposits of hard Tertiary Limestone. One such deposit on the East Coast has been described in a previous report. Another is situated in the extreme South of the Island, some miles from the nearest road. On the west bank of a creek which flows into a marsh, east of Big Lake

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may be seen a small, well-bedded outcrop of limestone. The total exposed width of the beds is 15 feet and the deposit extended over two chains. It is covered and surrounded by recent sand. A sample taken across the beds showed the following analysis :-

Acid Insoluble	4.4%
Fe ₂ O ₃ Al ₂ O ₃	2.6
CaO	51.1
MgO	0.6
Ignition Loss	41.7

which represents a calcium carbonate content of 92.5%

In spite of its high grade, the inaccessibility and small exposure of the deposit makes it at present an unlikely producer of agricultural lime.

Utilization of Deposits.

Certain farms on King Island require the application of lime. Many on the West Coast of the Island, where the dairying industry has, in the past, been concentrated contain soils rich in lime as over countless years the wind has borne shell fragments from the coast inland. On the farms now being developed by the Closer Settlement Board at Mt. Stanley and Pegarah, however, the soil is formed mainly from slates and quartzites, which lie at shallow depths. Consequently this soil is deficient in lime and the Board has been overcoming this deficiency by earthing and spreading lime sands from the dune deposits at Buttons. However the distance is quite considerable and they are interested in deposits, such as Badger Box, which lie much closer to the farms.

In considering the use of a lime material for agriculture, the following factors must be considered.

1. Distance from source to market.
2. Quantity of material available.
3. Grade of material.
4. Grain size.
5. Ease of obtaining material.

Provided the other four factors are not insurmountable the most important consideration is the distance the lime has to be carted. That is the reason the Board decided to abandon the Button deposit for use in the Mt. Stanley and Pegarah Districts and concentrate on Badger Box. This in spite of the fact that the latter is of poorer grade and has a larger grain size.

All the lime sands cover large areas and there should be no difficulty as far as quantities are concerned.

As they are loose deposits of no great depth they can be shovelled from shallow pits straight into the trucks.

The grain size of the deposits is important. It has been shown that shell fragments are not as readily available to the soil as pulverised limestone of the same grain size - that is shell fragments to be equally as efficient must be of smaller size than the crushed rock. Screen tests of these lime sands show that they would be of sufficiently small size if they were of crushed limestone. Whether they are fine enough for immediate availability is a question that will have to be answered by experiment. It should be noted that the Surprise Bay deposit in spite of its high grade is of larger fragment size than those at Buttons and Badger Box and perhaps

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could be considered where immediate availability is not of first importance.

The secondary deposit at Porky Creek is probably the most suitable material for immediate availability but because of its limited extent is only of interest for small neighbouring utilization.

The Tertiary deposits are, at present, of only academic interest.

The most interesting and encouraging results will probably be obtained from the consolidated deposits of Dripping Wells and Camp Creek. The Dripping Wells deposit is close to areas requiring lime, is of very high grade, and, as the deposit occurs in small cliff faces, should be easily obtained. Most of it is in an earthy, lightly consolidated form, which could be easily broken into a fine grain size. However, there are two problems to be considered. Some of the material has been dissolved and then re-precipitated in the form of large and small stalactites which may require more involved crushing. Secondly there is a doubt as to the quantities available, which could only be determined by boring. Small cliffs fifteen feet in height and extending over several chains, can be seen along the shore but the question is to what distance do these deposits extend inshore. I do not think that they would extend very far but even so there is sufficient lime in sight to warrant an investigation.

The deposit at Camp Creek is rather different. As the name Dripping Wells suggests, it is a deposit with which are associated several seepages. The Camp Creek Deposit on the other hand is quite dry and consequently the hard stalactites are absent here. The quality of the stone is not as high as at Dripping Wells but it should be much easier to pulverise. Quantities here, too, are rather doubtful and although a face of only twelve feet is exposed lumps of stone may be seen over a vertical range of fifty feet. Here, again, the thickness should not be very great but because of its central position, it should be investigated for local requirements.

Thus, while the lime sands may be used for immediate requirements, the semi-consolidated deposits of Dripping Wells and Camp Creek offer greater possibilities and warrant further investigation.

These investigations should follow three lines :-

1. A hand boring campaign to establish larger quantities than are at present in sight.
2. Methods of Crushing to be adopted.
3. Means of curtailing the water at Dripping Wells and getting the material to road level.

Signed: T.D. Hughes

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