

UNDERGROUND WATER FOR CLOSER SETTLEMENT FARMS
AT KING ISLAND.

Large areas of land on King Island have been acquired by the Closer Settlement Board for land settlement purposes. The Board is at present engaged in clearing and cultivating this land and splitting it up into dairy farms of approximately 200 acres in area. For all these farms, and there are eventually to be 150 or so of them, water is required for dairying purposes. Of these 150 farms, 28 are regarded as first priority and it was in the area covered by these that the principal investigation was made. The majority of the dairy farms on the Island obtain their water from wells but it was hoped that owing to the expense of well sinking, underground water might be obtained by boring.

LOCATION:

The farms in question are located in two areas in the central Southern portion of the Island. The Northern or Pegarah area lies between the Sea Elephant and Fraser Rivers, north of the Pegarah Road, while the southern or Mt. Stanley area is situated to the south and west of the Grassy Road beyond its junction with the Etrick Road. There are eleven blocks in the Pegarah area and seventeen in the Mt. Stanley area.

TOPOGRAPHY:

The topography of these districts, in common with that of most of King Island, is of great monotony and represents a mature peneplain, which in Pleistocene times was elevated a hundred feet or so. The drainage on this low level plateau had reached a very mature stage with sluggish meandering streams of no great size and indefinite direction. After the uplift, certain of the larger ones developed new cutting power

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and the Sea Elephant and Fraser Rivers have cut fairly steep sided narrow valleys up to 100 feet below the plain level. Thus the Pegarah Area has a definite drainage pattern but the Mt. Stanley Area has no well defined natural drainage.

GEOLOGY:

Although there are few rock outcrops in the district, the depth of soil is usually so shallow that the rock types may^{be}/gauged with reasonable accuracy by a study of this soil. Areas that have been ploughed - and most of the blocks under discussion have been ploughed - show good indications, not only of the soil types but also of the underlying rocks themselves. The blocks concerned are underlain almost exclusively by a Lower Palaeozoic Series of slates, quartzites and tuffs; the principal rock type being an arenaceous slate. The uprising of the neighbouring granite mass has caused many small breaks in these rocks. No definite fracture pattern is apparent but the fractures appear to have a greater vertical than horizontal component of dip. Intruding this series are an indefinite number of small basic dykes. These are not themselves apparent in the area examined but patches of secondary iron oxides are probably derived from these. Most of the soil covering the blocks has been described by Stevens and Hoskin, in Bulletin 70 of the C.S.I.R., as Pegarah Fine Sandy Loam. This consists of a fine sandy loam a few inches in thickness underlain by a few feet of yellow clay resting on the parent rock. The clay is not a water carrier and even if it were there is generally insufficient depth of it to reach the water table. In some parts of the area, particularly in the North, are patches of more sandy soil but it is probable that clay underlies this at

no great depth.

Several small springs occur at the bases of low hills and are caused by the drainage from these hills seeping out of some large fracture in the rock.

RAINFALL:

The average annual rainfall taken at four different stations over the past eight years is $37\frac{1}{2}$ inches. Fortunately for the farmer this rainfall is spread fairly evenly over the year. Except for June, July and August, the average monthly rainfall in the past eight years has been between 2 and 3 inches for any one month. In June and August the figure is over 4 inches and in July over 6 inches. It should be noted that these rainfall figures are higher than those given in earlier years.

UNDERGROUND WATER RESOURCES:

The chief purpose of this enquiry is to decide the relative efficiency of bores or wells. Certainly boring is cheaper than well sinking but would a bore or two on each property yield sufficient water for dairy requirements? I do not think they would. The rocks which reach within a few feet of the surface are themselves not good aquifers. In fact, I should not expect to find any water in the rocks at all were it not for two factors - that is, the shattered nature of the slates etc., and the poor natural drainage over much of the area. Rainfalls fairly evenly throughout the year on King Island and due to the lack of a good drainage system, a fair proportion of this rainfall is absorbed in the cracks of the rocks. A point that should be stressed is that water is not contained in the rock itself, as in a sandstone, but in the many small fractures within the rock. That is why I suggest wells will be more efficient

than bores. As the fractures tend to be vertical a well with a cross section of 3 x 3 feet will tap many more of these fractures than a bore of 5 inches diameter. And even in wells, water is not plentiful. Those in neighbouring country are often pumped dry and in many cases there is just sufficient for dairy purposes. Another question that must be asked is - are all the rocks fractured or, in other words, can water be obtained from any position in the rocks? - this is, of course, very doubtful.

For two reasons, the yield from wells in the Mt. Stanley Area should be greater than those from Pegarah wells. The rocks appear more shattered in the former area but more important still the natural drainage system is better developed at Pegarah and the run off of ground water is, therefore, greater.

A few wells in the immediate vicinity of, and in the same type of country as, the new farms were examined and samples taken from four of these. The quality of the water from these is considered very good but analysis will be appended later.

Two wells have been sunk on the East side of the Grassy Road in the Mt. Stanley Area. That on Graham's property is 13 feet deep of which the bottom 5 feet is a shattered micaceous slate. Sample 1 was taken from this well. About a mile south east of this well is another 12 feet deep of which the bottom 6 feet is in a well jointed rock. This well is often pumped dry and when empty takes two days to fill. Sample 2 was taken from this well.

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In the Pegarah Area are two old wells which are not at present pumping. The depth to water in one is 11.5 feet and in the other at slightly higher elevation 19 feet. This apparently represents the height of the water table in this area. On T.H.Woods 249-acre block South of the Pegarah Road near the Fraser River is a well 18 feet deep from which just sufficient water for dairy requirements is pumped. Sample 3 was taken from this well. On E.G.Lancaster's property on the Pegarah Road, east of the Closer Settlement Blocks, is a well 28 feet. This provides sufficient water for dairy requirements but has sometimes been pumped dry. Sample No. 4 was taken from this well.

RECOMMENDATIONS:

As the underground water in these districts is contained in the rock fractures, rather than in the rock itself, it is considered that wells would be more reliable than bores. However, the cost of well sinking being high and the possibility of tapping underground water not always certain, it is recommended that when a hand boring plant is available it should be despatched to the island for preliminary testing. Wells, particularly in the southern portion of the area, should not have to exceed 15 to 20 feet of which not more than 10 feet should be in rock. The actual position of the wells on several blocks was discussed with Mr. A.B. Wherrett, Field Supervisor. As far as possible wells should be sited in accordance with the contour of the country. That is, wells should not be placed at or near the top of hills but in natural basins or depressions, this for two reasons - not only would natural soakage accumulate better at lower elevations but the rocks themselves

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would be less hard and compact. Any natural springs or soakage should be exploited.

In discussing the relative benefits of bores and wells a third possibility of water must not be overlooked. That is actual surface water. Wherever the contour of the country permits it is recommended that small dams be constructed. The clay that occurs just below the ground surface should make a very satisfactory wall and with the mechanical equipment at present operating small dams be constructed. The clay that occurs just below the ground surface should make a very satisfactory wall and with the mechanical equipment at present operating small dams could be constructed very quickly and cheaply. As the rainfall occurs fairly evenly throughout the year these dams should never be empty.

T. D. Hughes.
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ANALYSES OF KING ISLAND WATER.

	Sample			
	1. Parts per million.	2. Parts per million.	3.	4.
Total Dissolved Solids.	247.0	563.0	199.0	435.0
Fe ₂ O ₃ , Al ₂ O ₃ .	1.3	2.7	0.7	1.3
Ca.	1.9	19.1	0.5	8.1
Mg.	13.5	28.8	10.6	22.7
Cl.	82.3	128.9	71.6	136.0
SO ₄ .	12.0	8.0	15.0	7.0
SiO ₂ .	7.0	10.0	8.0	6.7
Free & Combined H.S.	-	7.6		
	5.2	6.2	6.3	5.2

Unpleasant Odour
after boiling off H₂S.