INVESTIGATION OF THE POSSIBILITIES OF AN UNDERGROUND WATER SUPPLY AT PATON AND BALDWIN'S KNITTING MILLS, LAUNCESTON

Introduction:

This report was prepared as a result of a brief examination of the locality last week, and in view of the lack of vital data relating to underground water supplies, any attempt to estimate available quantity must be regarded as very approximate.

The relative heights were determined by means of aneroid readings and are, therefore, only approximate.

Physiography:

The area is one of relatively low relief; consisting as it does of portion of the dissected Launceston Tertiary Basin, bounded on the western side by low dolerite hills.

Windmill Hill, rising approximately 330 feet above sea level of the mill site, divides the valley of Glen Dhu from the main North Esk valley. T o the west, low hills rise over 450 feet above the level of Glen Dhu road.

Southwards the country rises rather steeply to Prospect, approximately 500 feet, and then continues as low undulating plains; there is also a gradual slope eastwards to the North Esk, Carr Villa being 150 feet above the mill level.

Geology:

The basement rock in this area is the typical Mesozoic dolerite which outcrops about ten chains west of the mill and rises several hundred feet above the level of the Glen Dhu valley.

It is not known at what depth the dolerite underlies the Tertiary basin but it is considered likely to be at least 200 to 300 feet in the main axis of the valley. This is based on the scanty evidence of the depth of the Launceston Tertiary basin available. A bore put down on the Carr Villa Estate in 1886 for coal revealed over 530 feet of clays, sands and lignite before reaching the dolerite.

The valley fill consists essentially of the Lower Tertiary Freshwater series of sands, clays, arenaceous clays and argillaceous sands, lignite etc. A section from the highest part of Windmill Hill to the Tamar Brdige exposes a thickness of about 300 feet of alternating beds of ferruginous sandstones and variously coloured beds of clays.

Underground Water Supply:

As the source of underground water depends entirely upon rainfall, the nature of the rocks and geological structures governs the existence or otherwise of underground water supplies.

The sands and clays of the Tertiary basin would have a relatively high porosity, while that of the dolerite would be extremely low. The porosity of a rock is indicative of its capacity to hold water, but does not indicate the

specific yield, that is, the percentage of water with which it will part. In this respect, although clay has a porosity equal to sand and gravel, the interstices are so minute that it yields water so tardily as to be virtually impervious, therefore, great care should be excersied in recording the stratum passed through during the sinking of test holes in order that full advanhage may be taken of favourable beds of sands and gravels.

Representative samples should be taken of each stratum passed through in boring in order that porosity and ultimately the specific yield may be determined.

Generally, geological conditions are very favourable for ground water supplies, consisting as they do of a "basin" structure of impervious dolerite filled with loosely compacted clays and sands.

The most serious difficulty appears to be that the mill is located almost on the western limit of the Tertiary basin and may be too far from the main axis of the valley to obtain adequate supplies.

As pointed out above rainfall is the primary factor in ground water supply and its dispersal is of the utmost importance. Generally, it is disposed of in three ways:-

(1) Direct run-off that carried away by surface streams

(2) Evaporation and transpiration

(3) Percolation - that is the amount of water which soaks through to saturate the underlying porous rocks if they exist.

No data relating to actual dispersal is available. In the absence of these data, percolation may be estimated as 20 per cent of the annual rainfall with some degree of accuracy.

The annual average rainfall at Launceston for the past 52 years was 28.23 inches. The average of three consecutive dry years was 23.23 inches. Taking 20 percent of the later figure, the amount of underground water available is 6,736,000 gallons per square mile of catchment area. Until further information is available from the boring campaign at present being undertaken little can be gained in speculating as to the probable yield.

The present boring campaign should be extended to enable the depth to the water-table to be determined, some distance from the mill, in order to indicate the gradient of the ground water.

The number, size and depth of wells required to supply an adequate quantity of ground water is dependent upon the following:-

(1) The depth to the water-table

(2) Seasonal fluctuations of the water-table

(3) Storage required to maintain pumping rate

(4) Depth to level of water-table in driest summer

and it is regarded as better practice to increase the number of wells rather than increasing the depth of fewer wells.

Conclusions and Recommendations:

The Launceston Tertiary basin is favourable geologically for underground water supplies, although the mill is unfavourably situated in relation to the main axis of the valley.

The City Council's drainage system may considerably reduce the amount of ground water available.

Several holes should be drilled east and south of the mill to supply information relative to the water-table gradient.

If insufficient water is available from wells serious consideration should be given to a scheme employing infiltration galleries.

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