SECTION 3 — UNDERGROUND WATER

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Water Supply for Hospital, Whitemark, Flinders Island

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The western coast of Flinders Island, in the vicinity of Whitemark, is occupied by a gently sloping plain extending a mile inland and rising to 100 feet above sea level. This plain is fringed by low granite hills. The sea opposite Whitemark is dotted by several granite islands.

Water is plentiful beneath this plain but, unfortunately, it is usually poor in quality. Numerous wells and bores in the vicinity of Whitemark may be studied. Many institutions and individuals are in need of a permanent water supply and this investigation concerns a supply for the hospital. The water is needed for domestic and garden purposes, including water for a hot-water service. Although hills and mountains of granite and sedimentary rocks are common in the island, much of the surface is covered by flat plains formed of Tertiary and Recent sands and limestones. The sedimentary rocks are metamorphosed siltstones belonging to the Mathinna Group and considered to be of Silurian age. These rocks have been intruded extensively by Devonian granite so that granite outcrops are more numerous than those of the Mathinna Group. During the Tertiary, limited volcanic activity caused the formation of small areas of basalt and associated tuffs. Basalt outcrops to the north and east of Whitemark and tuff has been encountered in a bore at the hotel. Tertiary limestone is plentiful on the island. It can be seen in outcrop near the school and underlies the tuff in the hotel bore.

Most of the residents in the vicinity of Whitemark obtain water from shallow wells or bores. The Tertiary sediments above bedrock usually contain plentiful water supplies at shallow depths, but in the area of a mile radius from Whitemark the quality is very bad. Limited supplies of water are also obtainable from the Mathinna rocks. These metamorphosed siltstones are not themselves aquifers, but they are well cracked and jointed and water occurs in these openings. Thus wells yield better supplies in these rocks than bores. The following table summarises the information concerning wells and bores near Whitemark.

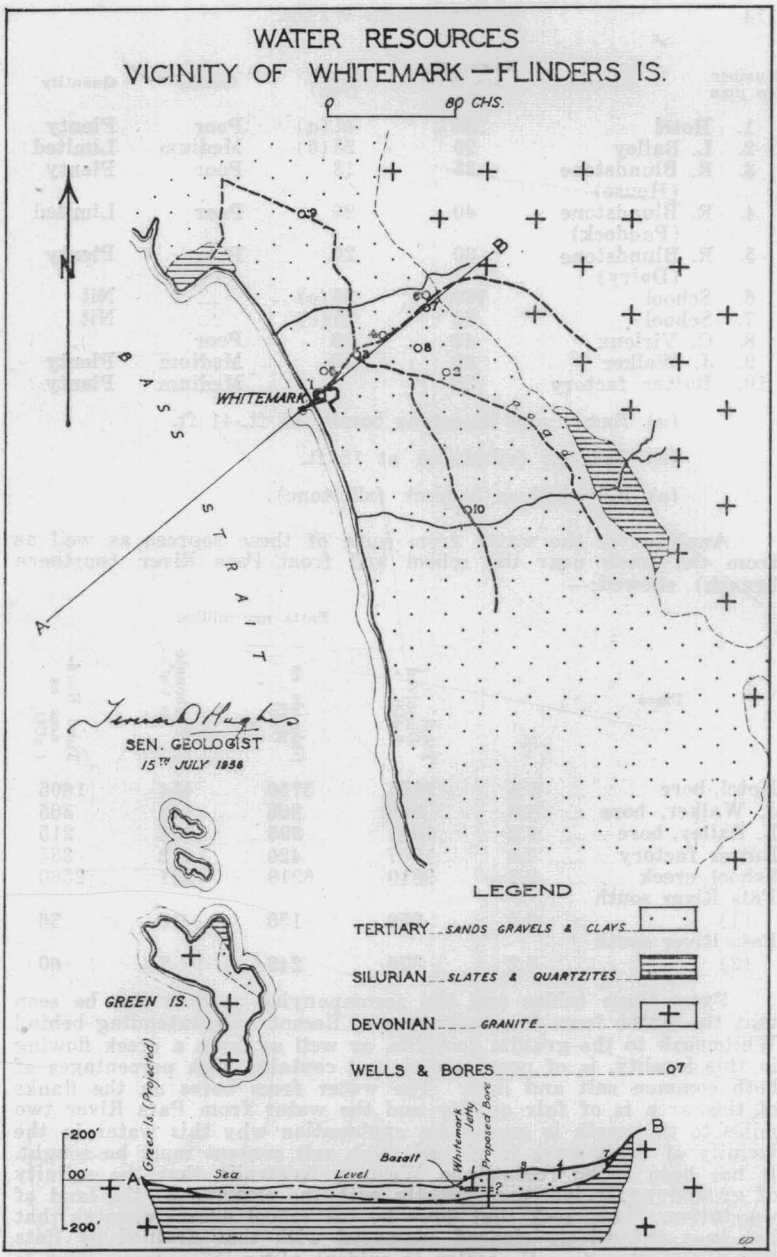

Figure 24

5 cm

Number on plan	Owner	Height above sea level (feet)	Depth (feet)	Quality	Quantity
1.	Hotel	20	41 (*a*)	Poor	Plenty
2.	L. Bailey	20	25 (*b*)	Medium	Limited
3.	R. Blundstone (House)	35	13	Poor	Plenty
4.	R. Blundstone (Paddock)	40	20	Poor	Limited
5.	R. Blundstone (Dairy)	30	20	Poor	Plenty
6.	School	100	35 (*c*)	....	Nil
7.	School	75	25 (*c*)	....	Nil
8.	C. Virieux	40	20	Poor	....
9.	J. Walker	60	18	Medium	Plenty
10.	Butter factory	35	....	Medium	Plenty

(*a*) Basalt and limestone bands, 35 ft.-41 ft.

(*b*) Bedrock (siltstone) at 18 ft.

(*c*) Bottomed on bedrock (siltstone).

Analyses of the water from some of these sources as well as from the creek near the school and from Pats River (northern branch) showed:—

Parts per million

Place	pH	Total Dissolved Solids	Chloride as NaCl	Bi-Carbonate as $CaCO_3$	Total Hardness as $CaCO_3$
Hotel, bore	7.5	5155	3710	454	1605
J. Walker, bore	7.3	806	305	348	365
L. Bailey, bore	7.2	1041	395	384	215
Butter factory	7.0	1007	420	412	385
School creek	8.2	9810	6910	291	2560
Pats River south (1)	6.4	250	150	18	36
Pats River south (2)	6.2	370	249	7	60

From these tables and the accompanying map it can be seen that the water from the Tertiary and Recent beds extending behind Whitemark to the granite foothills, as well as from a creek flowing in this locality, is of poor quality and contains high percentages of both common salt and lime. The water from bores on the flanks of this area is of fair quality and the water from Pats River two miles to the north is good. An explanation why this water in the vicinity of Whitemark is of such high salt content must be sought. It has been found recently in Western Australia that the salinity of ground water increases greatly with the clearing of the land of vegetation. The creek that flows by the school drains country that has been extensively cleared compared with that drained by Pats River, and already soil erosion is evident along its course. This is the same water which seeps into the Cainozoic beds behind the town.

Originally it was proposed that the Education and Health Departments should combine in obtaining a joint water supply for school and hospital. However, the school authorities are proceeding independently and contemplate sinking a well on the site of the bore near the headmaster's house. This bore bottomed on siltstone at 25 feet. Limited supplies of water have been obtained in this rock by Mr. L. Bailey at his house half a mile away and it is reasonable to suppose that the school authorities could obtain a similar supply.

The drill used at the school, and the one presumably to be used if it is decided to bore for water for the hospital, is owned by the Closer Settlement Board. It should be noted that in its present state the drill is useless for rock boring. Five-inch casing is used, but the percussion bit is the size for six-inch casing and consequently cannot be used unless the hole will stand without casing. This mistake should be rectified at once and either a new bit obtained or the present one trimmed down to fit the casing.

Recommendations

Three alternatives appear to be offering:—

1. A bore in the hospital grounds, penetrating the country rock (Mathinna Group siltstones). This would reveal the depth to rock, the quantity of water available and its quality. If the two latter were satisfactory then a well could be sunk and the top water (that occurring in the alluvium) cased off. This proceeding, however, is not favoured. As a comparison, Bailey's well may be cited. The water here is not really suitable for a hot-water service, and the quantity is doubtful. Moreover, it would be exceedingly difficult to seal off the top bad-quality water. The cost of a well at least seventy feet deep and its pumping plant would not be light.

2. A bore either in the vicinity of J. Walker's dairy or the butter factory: that is, outside the limits of the heavy salt concentration. This would involve the laying of nearly two miles of pipes and the installation of a pumping plant. It should be noted that this water again is not suitable for a hot-water service without some softening treatment.

3. The pumping of water from Pats River to a storage tank on a hill south of the river and gravity reticulation to Whitemark. The distance the water would have to be piped (about two and a half miles) is the only unfavourable factor in this scheme. Pats River is a strong permanent stream, and the water is purer than any found in wells or bores on the island. It should be considered too that this water could serve other institutions and individuals in Whitemark.

If (3) is not proceeded with, then it would appear that the only alternative is to use rain-water for the hot-water service and drinking, and to have a separate water system for sewerage. This water could be obtained from a shallow bore in the hospital grounds.