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Report on groundwater surveys for the period 1 January to 30 June 1968

by P. C. Stevenson

Staff

The section has consisted of a senior geologist and three geologists for most of the period. The fourth geologist was detached to the University of Tasmania in February for two years. 67% of the time of the four active geologists has been occupied by groundwater studies.

Field assistants have been used to the extent of 16 man-weeks, mainly in collection of borehole information and in assisting geophysics. Much more information remains to be gathered, and an assistant could be used full-time.

Surveys in progress

The Longford Basin

The Scottsdale–Bridport area

The Coal River

Minor surveys and bore siting

Coal River survey

Taking the last first, the Coal River survey was completed by D. Leaman before he left, and occupied him for three weeks at the beginning of the half year. It is now awaiting drafting and publication. Contours are still not available for this area, although promised. Three geologist weeks.

Longford Basin

The area covered by the work now extends as far south as Campbell Town, as far north as Hadspen, and as far west as Westbury, and includes all the plain land up to the face of the Great Western Tiers and Eastern Tiers. This area is, in my opinion, too large to be handled easily, but it is late in the progress of the survey to split it up.

The geology, covering parts of the Longford, Quamby and Lake River sheets, is virtually complete, final checking of faults is in progress and drafting is in hand.

The recording of existing wells, bores and springs was completed by G. Pitcher (Field Assistant) last summer for the Longford sheet, and this work on the other sheets is being completed by W. L. Matthews.

Some resistivity work was tried last year to determine the depth of basement under the clays of the basin, but the low resistivity of the clay blanketed penetration. Some seismic profiles indicated depths down to 1500 feet but it has not yet been possible to check these directly (see below on drilling).

A gravity survey showed that very considerable depths of clay exist in the basin, and a calculated model suggested that depths well over 1000 feet to basement were possible. This is in reasonable agreement with the limited amount of seismic work done.

Drilling is in progress in the basin using the Failing WW1, and since April a G33 percussion rig. The Failing has drilled ten holes as under:

28	Longford (Gatenby)	126 ft	Bottomed in dolerite	1300 gph
29	Longford (Bailey)	412 ft	Bottomed in dolerite	90 gph
30	Cressy (Research Farm)	222 ft	Bottomed in dolerite	
31	Cressy (Research Farm)	432 ft	Bottomed in dolerite	3500+ gph, artesian
32	Cressy (Research Farm)	132 ft	Bottomed in dolerite	3500+ gph, artesian
33	Cressy (Research Farm)	157 ft	Bottomed in dolerite	baler lost, abandoned
34	Cressy (Gatenby)	253 ft	Bottomed in dolerite	3500+ gph
35	Cressy (Gatenby)	87 ft	Bottomed in dolerite	100 gph
36	Cressy (Green)	507 ft	Bottomed in dolerite	3900 gph, artesian
37	Cressy (Richmond Hill)	502 ft	Bottomed in sandy clay	3400+ gph

Water of good quality has been produced from fine sand and sandy clay at about 350 feet. Probably more than one sand layer exists.

The G33 has drilled three holes as under:

Longford	163 ft	Bottomed in dolerite	100 gph
North of Conara	200 ft	Bottomed in clay	350 gph, with insignificant drawdown
South of Diprose Lagoon	180 ft	Bottomed in clay	350 gph, with insignificant drawdown

Water of good quality has been produced from gravel at about 70 to 130 feet.

The Longford Basin is a very large area, and geophysics is of relatively slight assistance. These factors combine to indicate that a large number of bores will be needed to determine the water resources. Further geophysical efforts may enable the drilling to be limited but at present it appears that there are two main targets, deep sand and shallow gravel.

The deep sand, at about 350 feet below surface, has been discovered in the Longford–Cressy area, and has a known extent of about nine miles, but could extend discontinuously over twice this distance. Whether analogous aquifers exist in other parts of the basin, for example near Nile and Evandale, is at present unknown. To determine the full extent of the deep sand aquifers in the eastern half of the Longford Basin a total of 24 further holes would be required of which 18 would be to 500 feet and six to 1000 feet.

The shallow gravel is at present known over an extent of about seven miles centred on Cleveland and Conara, but could extend from Campbell Town to Evandale in a strip from 2 to 6 miles wide, in all over 100 square miles. Resistivity measurements have given disappointing results on the gravels due to an upper blanket of clay, but efforts will be continued. At present it appears that about 12 bore holes to about 200 feet and eight deeper holes to 1000 feet would determine both deep and shallow resources in the western half of the Longford Basin.

The survey of the Longford Basin has, in this half year, occupied 29 geologist-weeks, five weeks by a field assistant, and 28 weeks by drilling crews.

Scottsdale–Bridport area

The area extends 16 miles from north to south and about 14 miles from east to west and is a geological unit of Tertiary gravel, sand and clay underlying basalt and surrounded on the three landward sides by basement of granite and Mathinna metasediments.

Work began in July 1967 and has consisted of detailed geological mapping by W. R. Moore and about 100 resistivity probes to 200 feet.

This work has revealed that the granite surface on which the Tertiary lies is not flat but is cut into leads or immature valleys sloping downwards to the north. A similar picture is known, although imperfectly, from the northeast tinfield, from the Devonport area, and from the opposite side of Bass Strait.

At Scottsdale–Bridport the leads are filled with granite-derived and Mathinna-derived sand, gravel and clay, and the area is remarkable for the absence of surface drainage. Even though rainfall is annually up to

40 inches and may be at times intense, the small valleys carved in the Tertiary deposits almost never carry streams. This indication of high infiltration rates has encouraged the belief that large supplies must exist in the leads, and during the last six months efforts have been made to locate these as closely as possible. The resistivity work gave indications of deep Tertiary deposits in some areas but was unable to penetrate deeply enough to show bottom and is essentially a poor method for absolute depth measurement. More powerful resistivity equipment has been built, and is at present on trial, and a seismic profile across one suspected lead has been observed.

No drilling has yet been projected, as much remains to be done at Longford, and more geophysical work is required in the Scottsdale–Bridport area. Nevertheless, if drilling equipment was available it could be incorporated into the whole exploration, beginning during the next half year. Some Proline auger holes have been used to check surface geology and water levels. The Scottsdale–Bridport survey has occupied 26 weeks by geologists, 11 weeks by field assistants, and 3 weeks by Proline crew.

Minor surveys

The Scottsdale survey has attracted local interest, and enquiries from large landowners has resulted in work of about a week's duration in each of three locations outside the main survey area. These minor surveys were north of Bridport, west of Gladstone and at Tomahawk. These have been undertaken partly because they helped to shed some light on the wider geological implications of the main survey, and have in two cases resulted in good supplies being discovered.

Bore siting

This service has continued and has occupied, with collection of records, nine geologist-weeks.

Talks to interested groups

The work in the Longford area has attracted some public attention and P. C. Stevenson has addressed two meetings of the Tasmanian Farmers Federation at Bracknell and Hagley.

[17 July 1968]