Examination of well on Mr Lambert's property Merseylea

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An inspection of a well on the property owned by Mr Lambert of the Merseylea Pastoral Company was made on 30 August 1972. The well is said to have had a pump installed about 1954 when the output was measured at 1,250 gall/hr, whereas the output during last summer was measured at about 330 gall/hr. The reduction in flow is thought by the owner to be associated with the construction of the Parangana Dam which has resulted in a reduction of flow in the Mersey River. The present owner has occupied the property since about November 1971 and an attempt was made by him to increase the flow by deeping the well.

The well is situated about ½ mile east of the Merseylea bridge.

GEOLOGY AND RELIEF

The well has been sited near the eastern margin of the flood plain surrounding the Mersey River, the flood plain being about 1¼ mile wide in this area. The flood plain is underlain by Recent gravel (of widely varying size) and sand, with some clayey horizons which in turn are underlain by Permain rocks. When the well was deepened pebbly mudstone was encountered. A slightly higher terrace than the flood plain on which the well is situated occurs to the east.

Upstream and on the same side of the river as the well, the gravels have been extensively quarried for construction work and pits have been dug over almost the entire width of the flood plain. Probable Permain rocks were encountered in the bottom of these excavations. The Permian rocks are also said to be exposed at some localities in the bed of the river.

HYDROLOGY

The well is about 18 ft deep and on the day it was inspected it contained about 8 ft of water. It is rectangular in section and has been lined with cement except for the bottom 2 ft where the water enters.

There are at least three possible causes for the decrease in the water flow.

(1) The pore spaces in the gravel which supplies the water have become clogged over the years, thus reducing the permeability.

(2) The quarrying operations in the gravels just upstream from the well could have interfered with the flow of water towards the well as the excavations have reached probable Permian rock.

(3) When the water is very low in summer it may be in contact with much less permeable beds in the recent deposits than in previous years when larger flows occurred. It is also possible that undulations in the top of the Permian strata could confine the river water to areas near the channel when the river is very low.

If silting of the aquifer around the well is the reason for the reduced flow, gentle surging might clear the fine material. This could be done by filling the well with water and pumping it out several times. If fine material enters on the pumping stage, then some improvement should occur in the flow rate and the process could be continued until no more sediment enters the well.

It is unlikely that deepening the well by hand would appreciably increase the flow as Permian rocks have been reached in the bottom. However, if the well was extended by drilling to, say 50-100 ft, it is quite likely that significant additional quantities of water could be obtained. Flow rates of 200-500 gall/hr are commonly obtained from water bores drilled in Permain rocks in other areas.

The alternatives to obtaining additional water from the well or from a hole drilled in the bottom of the well are:

(1) Obtain a supply directly from the river;

(2) Dig a well in an area where the gravel beds overlying the Permian rocks are thicker. Such areas apparently occur, as a well on the property adjoining Mr Lambert's (downstream) is deeper and has a good summer supply.

The difficulty might be to locate such a zone, but geophysical methods such as seismic and resistivity traverses would probably define such an area. In both of these cases, some measures would have to be undertaken to see that the scheme was not damaged by floods.

CONCLUSIONS

The decrease of flow to the well in summer could be due to any of three causes, *i.e.* silting of the well, the gravel quarrying upstream or because the river is in contact with material of lower permeability when it is very low.

Gentle surging might improve the flow if silting is the cause. Drilling to 50-100 ft below the bottom of the well in the Permian strate could significantly increase the supply.

The alternatives to obtaining extra water from the well is to get a supply directly from the river or dig a hole in an area where the gravels are thicker. The use of geophysical methods would probably locate areas where thicker gravel beds occur.

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