

Sketch No. 3 shows the general layout for community dugouts on flat open prairie.

### Losses from Open Reservoirs

Just here I might add a few remarks concerning the estimated water losses from open reservoirs. There are two noticeable agents of losses. First, evaporation, and second, percolation. The first means evaporation into the air due to atmospheric conditions, and degree of shade from the mid-day sun and hot winds. The second means that portion taken up by seepage into the ground, plus that portion taken up by plant life. Generally speaking, open reservoirs lose about forty inches per year from these agents, depending largely on the protection as well as the depth. It is advisable to locate the reservoir with these points in view, *viz.*, a minimum surface area with a maximum depth.

### Lethbridge Conference

To those who had the pleasure of attending the conference called by the Lethbridge Board of Trade on June 22nd, 1917, and had the pleasure of hearing the discussion on "More and Better Water for Our Farms" will probably find this paper merely a further discussion on the subject, devoid of any radical recommendations which might be considered new. However, as stated before, it was my intention to stick to personal observations as far as possible, and I trust that you have been able to find a certain amount of information in them.

For the benefit of those who have not even had the pleasure of reading the very excellent report of this conference, I might quote a few of the conclusions arrived at, with perhaps an odd personal remark.

1. "That the drill test is the only true test of underground water supply."

Just here I might say that I am very sorry that I have been unable to find anybody who was willing to prepare a paper on "Deep Well Drilling." Few engineers have had very much practical experience in drilling, and therefore it is most difficult to prepare specifications which do not conflict with the practice, and which will cover any contingencies which might occur.

2. "That the governments should undertake these tests for the benefit of the farmer."

The Dominion Government has already explored a part of the artesian water area in Southern Alberta, with most excellent results. I had the pleasure of visiting one of their wells near Pakowki Lake, where a discharge of about 30,000 gallons per diem is obtained of most excellent fresh water. This well was about 650 feet deep, having been drilled with a 3-inch rotary drill, and only cased at the top and bottom. The top is efficiently capped and the bottom protected from caving by means of a packer.

3. "That efforts should be concentrated on making the drilling of these test holes as inexpensive as possible and the best way to do this is to use the rotary method of drilling."

This, I suppose, covers the test wells for artesian water.

4. "That no water witch or water machine has yet been developed which is in any degree efficient or to be relied upon."

### Sapper Kelley at Gallipoli

This is rather contrary to the experience of Sapper Stephen Kelley, known as an expert diviner in Australia, having located many shallow sources of water supply for the sheep herders of his country. It appears that the

water supply for the Gallipoli campaign was brought to the troops from outside sources by tank steamers. This being very difficult on account of the gun fire from the Turks, the troops were often short of water. Sapper Kelley being a sufferer from wounds as well as from thirst, got up from his bed, straightened out the flange of a Turkish shell which he used as a divining rod, and located a prospect, which, on digging to a depth of six feet was found to yield a flow of 2,000 gallons of water per hour. The shortage was at once obviated and the trench manned with a rejuvenated army. The extreme shallow depth and Mr. Kelley's keen observation had undoubtedly much to do with this success.

It does not seem reasonable, however, that scientific electrical water finders should be entirely failures.

5. "That the provincial government road department should aid in the construction of surface reservoirs in places along the road allowances where roads must be built across coulees."

The provincial government of Saskatchewan has carried out this policy in a very effective and considerate manner.

6. "That a law should be passed forcing drillers to keep a log of every well and send it to the government."

7. "That a law should be passed making it unlawful to allow any artesian wells to flow unchecked, as the conservation of underground waters is important, being in fact, the most important of all our natural resources."

This law should be passed and understood before the wells are drilled because once the water starts to come to the surface outside of the casing it is almost impossible to stop it. I know of one flowing well near Nakomis, Sask., where this well is causing considerable damage to land and roads, but it cannot be stopped as the drill did not enter rock, and more water is coming up around the casing than through it. The government well at Pakowki Lake also has a leak around the casing and it is my opinion that if a valve is placed on the pipe, this condition will simply grow worse. These leaks can, however, be cut off, as solid rock was encountered at 65 feet.

8. "That the laws governing the pollution of streams should be enforced in connection with settlers living along irrigation canals."

9. "The farmers should take greater pains to conserve the rain water from roofs; waste in this direction being one of the worst forms of waste in Western Canada."

I have found many well-constructed rain-water cisterns in the dry belts. They are often equipped with hand pumps at the kitchen sink, for the convenience of the household.

10. "That the farmers should endeavor to conserve surface water for stock by building reservoirs and dams in coulees."

In addition to the public schemes along the highways almost 50 per cent. of the farmers have private reservoirs of some kind of their own for the purpose of watering stock, but they are generally nothing better than duck ponds, and being close to buildings and uncared for, they are often very rank. Occasionally I find the dam built of nothing better than manure.

These seem to be the main and essential points of the Lethbridge convention, but I would certainly recommend that those who have not read their report should do so at the first opportunity.

### Conclusion

It is my opinion that the problem of water supply is going to become more acute as the country becomes more

(Concluded on page 166)