

that reach from the surface downward to about 300 feet. This reference is to the central part of the area. The thickness to east and west is greater owing to the large flat arch form assumed by the underlying rocks. These beds contain porous layers which may contain water in the upper part, but they are not to be depended upon throughout a long period of drought, as they are losing their water through evaporation by capillary attraction toward the surface and by the draining action of the deep cut coulees which cross the district. The porous beds that are at from 300 to 350 feet beneath the surface in the country north of Etzikom coulee are found also to have a supply which probably is derived from a sub-channel drainage down the coulees, induced probably from the spilled water at their heads from the irrigation canals. During the past year many farm wells in the country between Chin coulee and the Crow's Nest line of the C. P. R. have been reported as obtaining water at depths of between 350 and 400 feet, so that it seems quite within reason to suppose that the spilling of irrigation water into the coulees has had an effect. The fact that the rocks have a general slope toward the north practically with the general slope of the country suggests that if it is possible even in a small way to send water under the surface toward the north, the more definite flooding of these coulees would well repay the loss of bottom land or the added cost of road construction across them. It might even be assumed that were the supply maintained in these coulees some of the wells to the north might even flow at the surface or the water come to a much higher level than at present.

One acknowledged drawback against the water obtained in this manner from the lower beds is that it contains the soluble salts found in the beds, but it must be pointed out that continued passage of the water along the beds tends to a purification. That is saturated beds from which no water is drawn will be found to be salty or alkaline at first, but tend to become less so with use.

Artesian Wells—So far as known the dry belt of the southern part of the plains contains but one area in which the structure seems favorable to the obtaining of water in any large amount by deep drilling. This has been outlined for depths less than 800 feet as being east of the head of Chin coulee and to the hilly country

south of Winnifred, but extending south eastward to include Pakowki lake. Under this country beneath the water bearing beds which were discussed as affording a somewhat constant supply at 350 to 400 feet, there lies a very close shale, in places a brown clay, through which water does not easily penetrate. It is about 300 feet thick and overlies a fairly porous sandstone. The situation can be well understood when you consider that at Burdett this sand lies at about 750 feet beneath, but comes to the surface in the Milk river in ranges 11, 12, 13, 14 and 15, and very much above the surface at Burdett, that is nearly 500 feet, so that it dips northward in that distance 1200 feet. As it is quite porous the water of Milk river is no doubt keeping it filled with water and the cover of clay shale retains it so that there is developed a considerable pressure. By studying the surface elevation and allowing for a loss of pressure by friction through the sandstone it is seen that there should be a large part of this area in which the water will flow at the surface. The study of the cause and source of supply was made necessary by the discovery of an artesian flow at Etzikom coulee following one at Taber. The assurance of this supply led to the deepening of the well at Foremost and of others in the district to the west near Taber. The last one reported is at Nieldpath at a depth of 784 feet. The central portion between Purple Springs and Bow Island having no published occurrences it was urged upon the Dominion government that test wells should be put down. The required funds were obtained late in the year, but drillers were started in the fall on two wells on the road allowances, one south of Grassy Lake and another south of Bow Island. These we had hoped would be completed during the winter, but severe weather and the lack of trained men caused a delay and it will not be until after the meeting is over that the announcement of their completion can be made. In the meantime the drilling of new gas wells at Burdett has shown that all the old wells and the new ones as well, have passed through this water layer and that its presence was not very much desired by the drillers owing to the great flow of water. The wells that bear out the theoretical placing of the water stratum at about 700 to 800 feet beneath the surface are now about ten in number and are given in the forthcoming report of the geolog-