as 1894, Mr. Dennis, the then Chief Inspector of Irrigation, in his annual report, dwelt on the necessity for some scheme to provide an abundant water supply for those areas. In his report of 1895 he speaks of the necessity of diverting the water of the South Saskatchewan River to these plains for the purposes of irrigating what he termed as "the arid regions of Regina and Moose Jaw," as well as for the purpose of furnishing an adequate supply of drinking water to the settlers who were then coming in in large numbers to settle on this territory. Since this report was penned it has been demonstrated that this land can be, and is, successfully farmed without the necessity of irrigation, but the problem of diverting the waters of the South Saskatchewan River for the purpose of supplying water for stock and drinking purposes still remains.

The question was brought up by another engineer, Mr. T. Aird Murray, who, in 1911, made a report to the Commissioner of Public Health of the province, in which he pointed out the inadequacy of the water supplies for domestic purposes in the territory between Regina, Moose Jaw and Weyburn, as well as the Qu'Appelle Valley, and suggested that a supply of water be obtained for this country by diverting the waters of the South Saskatchewan River at Elbow by means of a dam across the Saskatchewan River, a tunnel through the height of land, allowing the water to flow by gravity down the Qu'Appelle to Buffalo Lake, from whence the water could be pumped to the various towns and cities as required.

## Mr. Francis' Report

Mr. Walter J. Francis, C.E., of Montreal, in a report in 1911 on the water supply problem of the city of Moose Jaw, also made reference to this project, and stated: "When the south half of the province of Saskatchewan will have become densely settled it is our opinion that the South Saskatchewan River will be found the only source of supply for domestic purposes. We cannot find any evidences at present of any other water suitable for cities of fifty thousand population and a densely settled surrounding district. We believe the Saskatchewan to be the proper source, primarily, because its supply is obtained from glacial districts, and, therefore, not dependent upon precipitation in the prairie country. It is, moreover, the only continuously flowing supply of any magnitude in the country. The most feasible route is doubtless that following the valley of Thunder Creek to its source and then crossing over the divide about five miles to the Saskatchewan. From the engineering point of view there are no serious obstacles. The location of the dam on the river, the details of the pumping station, the arrangement and size of the pipe line, and all such features can only be determined by careful study after surveys of the locality will have been made. The only real obstacle to this project is its cost, which will probably run into five million dollars or more."

## An Enquiry

The Saskatchewan government at this time appointed a commission to enquire into the whole question of the water supply of this district, and their first action was to apply for a license from the Department of the Interior diverting 200 sec. feet from the South Saskatchewan River for water supply purposes for the southern part of the province. The Department of the Interior, however, are the real pioneers in this matter, and carried out extensive surveys with the object of locating the best line for a gravity supply from the height of land at the Saskatchewan River to supply the territory already described, and very full reports of these surveys, together with plans, will be found in the irrigation reports for the years 1912-13 and 14. It is impossible for me in the short space of time at my disposal to present the problem to you in any detail, but the matter is of such importance to this section of the country that, in my opinion, the engineering profession would be derelict in its duty did it not take up this matter and point the way to a complete solution of the problem.

## Water Used

In a report recently issued by the Department of the Interior at Calga y, a statement was given of he quantity of water used in various urban communicies in the provinces of Alberta and Saskatchewan, and I find that in twenty of these places the average quantity of water used per day in 1917 amounted to 74.5 gallons per head. Eleven places in Saskatchewan are recorded, and the average quantity of water used in these communities, with populations ranging from 350 to 35,000, amounts to 47.9 gallons per head per day. These are figures which, to my mind, demonstrate clearly the inadequacy of our community supplies in the province of Saskatchewan, more especially when considered alongside the figures for the whole of Canada, which average III gallons per head per day. The population of the district to be served, by a rough computation which I have made, based on the 1916 census, figures out at approximately 50,000, to which should be added another 25,000 for the purely rural areas, making a total population to be supplied of 75,000, and if this population is doubled to allow for future growth, the problem is to supply a population of 150,000 scattered over 5,000 square miles with 150,000,000 gallons of water per day.

## Two Schemes Outlined

From the Hydrometric Records of the Department of the Interior the mean minimum flow of the Saskatchewan River at Saskatoon is given at 1,247 sec. feet in the period from 1911 to 1917, and this occurred in January, 1913. The maximum flow recorded in the same period is 60,566 sec. feet in July, 1916. If we take the figure of 20,000,c00 gallons, of 37 sec. feet per day, which, in my opinion, would serve this community for the next twenty years, it is found that this amount equals slightly less than three per cent. of the minimum flow of the river, so that there can be no question or doubt as to the adequacy of the South Saskatchewan River to supply now and at all times in the future the needs of the province in regard to water supply.

Two schemes have been surveyed by the Irrigation Department, one to secure a supply of water from the river at Elbow, which necessitates the carrying of the water over the height of land, which at this point is 88 feet; the construction of a small reservoir on the height of land, and the flow of gravity from the rese voir along the Qu'Appel'e River to Buffalo Lake, where it is proposed to construct a dam and impound the waters. From this dam it would be necessary to pump the water over a height of land approximately 300 feet high before it could be delivered to either Regina or Moose Jaw. The objections to this scheme, in my opinion, are many, the first and most important being that the river bed of the Qu'Appelle River north of Buffalo Lake is of black, swampy earth, and of such a character that any water turned into it for domestic purposes would be badly polluted; and again, the area draining into Buffalo Lake yields a flow of approximately 30,000,000 gallons per day, and the loss by evaporation and other causes amounts to practically the same figure, so that, until the consumption of water under this scheme reached the figure of 30,000,000 gallons per day, the communities