corners of the central pocket, and four other posts on the diagonals between these latter and the corners of the crib. These pockets are 8 ft. square inside dimensions and the entire crib is 23 ft. high. Thirteen of the horizontal timbers are bolted to each vertical post. A drift bolt was used at each intersection of horizontal timbers. In walls of continuous timbers, butt joints were permitted, with a drift bolt in each timber. In the walls having alternate timbers, half-lap joints were required, giving a 12-inch lap, and fastened together with two 12 x 6 x 24-inch fish plates fastened with three one-inch bolts; the splices breaking joints at least 4 feet. It is provided that ultimately all the compartments be filled to the top with loose stone, excepting those through the centre of the crib (through which the outlet pipe passes), these being filled only to the bottom of the pipe; and excepting those at right angles to the outlet pipe and in line with the two T outlets at the end of the pipe, these compartments being filled up to the level of these outlets, at which level the compartments were floored over with 3-inch plank from the outlet pipe to the sides of the crib, thus providing a channel through the crib connecting the side outlets with the surrounding water. When finally in position, the crib is to be surrounded with rip-rap, as shown in the illustration.

WINNIPEG AND ITS WATER SUPPLY.

For some time the municipal authorities and certain ratepayers have been facing a problem which they felt must be solved with all possible speed and expediency or the industrial future of this city would be marred. This problem was the same as has been faced, and will be faced, by many cities in Western Canada; that is the supplying of the citizens with a water supply that is beyond question as to its quantity and quality. To this end and for a conclusive movement in the matter the authorities engaged the services of Professor C. S. Slichter, of Madison, Wis., to prepare a report.

The chief available sources of supply are the Winnipeg River, the Poplar Springs, the Crystal Springs, artesian wells and Shoal Lake; the last named is the source recommended in the report, and is about ninety miles distant from the eastern extremities of the city as defined at present.

According to Professor Slichter, the water of this lake would require no treatment before being delivered to the taps of the consumers. No fear need be felt that the sanitary qualities of the water would be poor at any time in the future. The shores of the lake are hard rocks of the Laurentian series, entirely unfitted for agriculture, and the country thereabouts must remain in its present wild state indefinitely. There need be no fear of the growth of cities or towns upon the shore of Shoal Lake. The Lake of the Woods constitutes an enormous reservoir of clear, pure and soft water, situated 300 feet above the city of Winnipeg.

The well system of Winnipeg covers a north and south range of about five miles, and the amount of water intercepted is less than 2,000,000 gallons per day per mile. In several of the river valleys of the plains, similarly situated, it is possible to withdraw over 10,000,000 gallons per day from each mile of section. The mutual interference of the wells has been considerable. Well 5 has been especially active in cutting down the supply of wells 2, 3 and 4, but well 5 has, of course, greatly increased the yield of the group..

The above average yield of 2,000,000 gallons daily per mile can be materially increased by deepening existing wells 1 and 2, by the distribution of a more uniform draw-down or draft throughout the cross-section.

The amount of ground water pumped at Winnipeg in the past ten years is not large. The total pumped since the installation of the well system would cover a township of land with about two feet of water, an amount of water that the city of Winnipeg will require in a single year in the not distant future.

It must be borne in mind that a part, at least, of the water taken from the ground in the last ten years represents water that was merely stored there, and not flowing on. The static head has materially dropped. Some of the water used represents actual depletion, just as there is depletion when one draws upon a deposit of oil or of coal.

The group of springs known as Poplar and Crystal Springs seems to have a combined flow of between ten and fifteen million gallons per day. From measurements submitted by Col. Ruttan it seems that the flow is increased within less than a mile to 5,800,000 gallons per day. Prof. Slichter's own measurement of Poplar Springs, at the outlet to the same, was 1,190,000 gallons per day. The measurement made by J. F. Henson in August, 1910, at practically the same point, was only 894,000 gallons per day.

In spite of more or less discrepancy in the various gaugings, and notwithstanding the lack of sufficient number of weir readings, the natural available flow of the Springs is possibly more than 10,000,000, and probably less than 15,000,000 gallons per day.

There can be no question of the sanitary purity of the Spring water. It is amply protected from surface contamination by the impervious surface deposits. There need be no fear that any portion of the water naturally flowing from the Springs is bog water. The temperature of the bog just above the water plane on August 25th, 1912, was 51 degrees Fahrenheit. The temperature of the Spring water is about nine degrees lower.

A visit was made to the proposed intake at the Seven Portages of the Winnipeg River. The quality of the water at this point, it is assumed, was settled by the report of the commission of 1907. Rough tests were made of its turbidity and color by means of a white disk. The water, in the condition found on August 25th, 1912, would require the treatment recommended in the report of 1907. The suspended matter and color were both high on the date seen. In addition to the spores of water plants, algæ and minute particles common in nearly all river waters, there were numerous small bits of moss, etc., in suspension, which seemed to have been dislodged by the rapid current. The color and all of the suspended matter would be removed by the treatment proposed in the report of 1907, and the sanitary character of the water after proper treatment would be satisfactory.

The estimates of the cost of the supply from the Winnipeg River are printed on page 88 of the report of the commission of 1907. The proposed pipe line was to be 58.3 miles in length, about seven miles of which is in rock, and to consist of 35,000 feet of 45-inch pipe, 26,400 feet of 54-inch pipe, and 229,700 feet of 48-inch pipe. For a daily capacity of 23,000,000 gallons the estimates were:—

1—Land and right-of-way	$ 18,000
2—Intake works	150,000
3—Pumping station at Winnipeg River	325,000
4—Pipe lines	1,737,000
5—Coagulating basins	65,000
6—Filters	250,000
7—Filtered water reservoir	270,000
8—Winnipeg pumping station	370,000
9—Keepers' houses	12,000
10—Telephone lines	11,000
11—Tramway	150,000
	$3,358,000
Add 15 per cent.	504,000
Total	$3,862,000