

itself, but upon the hydraulic gradient available when a reservoir is built east of Transcona, and its size has been computed accordingly. Somewhat similarly, the next two portions of the aqueduct east of the reinforced portion, covering a total length of 46,000 feet, have been made a little larger than the size due to the gradient of these portions, on account of the possible back water effect from the proposed reservoir.

The flow through the pipe line is, of course, dependent upon the hydraulic gradient and not upon the gradient of the pipes. For a flow of 25,000,000 gallons daily, this amounts to .37 of a foot per 1,000 in the 5-foot pipe and .81 of a foot per 1,000 in the 4-foot pipe, making a total fall through these pipes of the McPhillips Street reservoirs of 26 feet.

Table I. gives various statistics relating to the various portions of the aqueduct, including lengths,

gradients, elevations and dimensions of the different sections.

To. T. R. Deacon, mayor, is to be accredited a great deal of the developments which the City of Winnipeg has experienced this year in the interests of a better and a safer supply of water. The city engineer, H. N. Ruttan, has been one of the strongest advocates of the Shoal Lake scheme, and it was largely through his persistent emphasis last year that the thorough and accurate investigation of the project was made, as the prospective cost had vied so strenuously with the very desirable qualities of Shoal Lake as a source of supply as to render the proposition an apparently prohibitive one.

In a succeeding issue *The Canadian Engineer* will describe the extensions which were recommended by the Board of Consulting Engineers, to be provided when the increased consumption of water renders the capacity of the pipe lines inadequate.

Table I.—Lengths, Slopes, Elevations and Dimensions of the Various Sections of the Aqueduct from the McPhillips Street Reservoirs in Winnipeg to Shoal Lake.

Total Distance from McPhillips St. Reservoirs		Length of section. Feet	Dimensions of Aqueduct		Slope in feet per 1,000 feet	Elevation of hydraulic gradient at end of section. Feet	Remarks
Feet	Miles		Height Feet	Width Feet			
0	0					41.31	High water in McPhillips Street Reservoirs.
12,000	2.27	12,000	4 in. diam.	C. I. Pipe	0.81	51.03	These slopes and elevations are for a discharge through the pipes of 25,000,000 gals. daily.
56,100	10.62	44,100	5 in. diam.	Steel Pipe	0.37	67.35	
82,100	15.55	26,000	8 in. diam.	Rein. Conc.	0.025	68.00	
56,100	10.62					61.00	Proposed high water in reservoir east of Transcona.
82,100	15.55		8.0	8.0	0.29	68.54	This slope based on 85,000,000 gallons daily.
						Elevation of inside of aqueduct bottom at end of section	
						83.0	Beginning of grade conduit.
82,100	15.55					72.92	
113,100	21.42	31,000	7.5	8.5	0.32	83.42	
128,100	24.26	15,000	6.4	7.4	0.70	100.02	
141,600	26.82	13,500	5.7	6.4	1.23	141.05	
156,100	29.57	14,500	5.1	5.1	2.83	150.05	
165,100	31.28	9,000	5.8	6.7	1.00	184.93	
229,700	43.54	64,600*	6.6	7.6	0.54	216.90	
246,500	46.69	16,800	5.3	5.7	1.90	224.90	
262,500	49.71	16,000	6.7	7.7	0.50	238.10	
306,500	58.65	44,000	7.4	8.4	0.30	297.44	
392,500	74.34	86,000	6.3	7.3	0.69	314.37	
445,400	84.35	52,900	7.3	8.3	0.32	316.77	
455,400	86.25	10,000	8.0	9.0	0.24	320.37	
470,400	98.09	15,000	9.0	10.0	0.24	324.00	
503,359	95.34	32,959	9.0	10.0	0.11	324.00	
503,400	95.35	41			0.00	324.00	Gate and screen chamber.

\*13,000 ft. of this length at Brokenhead River Crossing is 7.2 ft. in diameter and reinforced.

## TUNNEL THROUGH JURA MOUNTAINS.

The Mont d'Or Tunnel, between France and Switzerland, on which boring operations were begun nearly three years ago, was pierced recently. The two boring gangs, advancing from the Swiss and French side respectively, met and shook hands. It was found that the engineers had calculated the cutting with the greatest accuracy. The tunnel, which is three and three-quarter miles long, penetrates

through the Jura Mountains, from Gresne to Vallerbe, thus obviating a seven-mile detour by Pontarlio. It should have been completed two months ago, according to contract, the work, however, being delayed by the tapping of a number of springs, which had to be pumped dry. The flow of water at one time reached 2,200 gallons a second. It is hoped that the new line will be opened early next year.