

GRAVITY WATER SUPPLY SCHEME FOR CALGARY

ABSTRACT OF REPORT PREPARED FOR PURE WATER COMMITTEE OF CITY COUNCIL, ADVOCATING GRAVITY EXTENSION, WITH SEDIMENTATION RESERVOIR, AT CAPITAL EXPENDITURE OF ABOUT \$380,000.

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WATER is at present delivered, for consumption in Calgary, from the Elbow River by means of a 30-in. wood-stave pipe line, having its intake at a point approximately 10 miles west of Calgary; also from the Bow River at a point within the city limits where a pumping station, containing two $7\frac{1}{2}$ million gallons direct-connected centrifugal pumps, has been erected.

Elbow River Intake.—Owing to the nature of the Elbow River intake, it has been found impossible to maintain a full head on the pipe all the year round, with the consequence that the full discharge, which is about 8 million gallons under certain adverse conditions, is cut down to half, and sometimes less than half, which in turn compels the pumping station to assume a greater part of the burden than otherwise would be required, with a consequent higher power consumption.

Bow River Pumping Station.—The pumping station consists, as before mentioned, of two centrifugal pumps direct connected to two 450-h.p. motors, with an individual capacity of $7\frac{1}{2}$ million gallons per 24 hours, coupled in parallel, and in series a combined maximum discharge of 10,000,000 gallons per 24 hours with a 25 per cent. overload on motors, and a pressure of 145 lbs. There is, further, an Inglis pump of 5 million gallons capacity which is occasionally used, mainly to secure high pressure for fire purposes.

The annual expenditure for the operation of this pumping station was, for the year 1915, \$30,119.19,

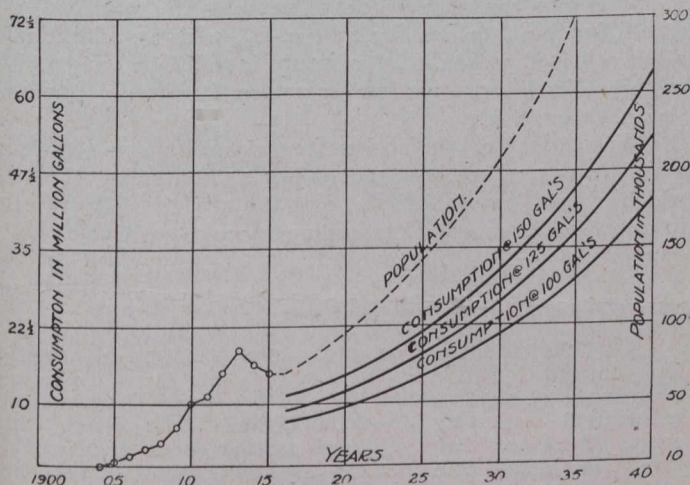


Fig. 1.—Curves Showing Prospective Population and Water Consumption, City of Calgary.

which amount, the writer understands, is considerably less than expenditures of previous years. This expenditure, as stated above, is dependent solely on the discharge of the gravity.

Comparative Merits of Pumping and Gravity.—Other things being equal, and generally speaking, it can be stated that a gravity scheme, well designed and of permanent construction, can nearly always supply water for distribution cheaper than one or several pumping units.

When, as in the case of the city of Calgary, there is a distinct advantage in taking the water solely from the Elbow River, and considering the annual expenditure of the pumping station, and the already invested capital in the pipe line from the Elbow River, it seems that any proposed improvement and extension would naturally be undertaken in connection with the now existing gravity line from the Elbow River.

Elbow and Bow Rivers.—The Elbow River has a drainage area of 482 square miles, with a scattered popu-

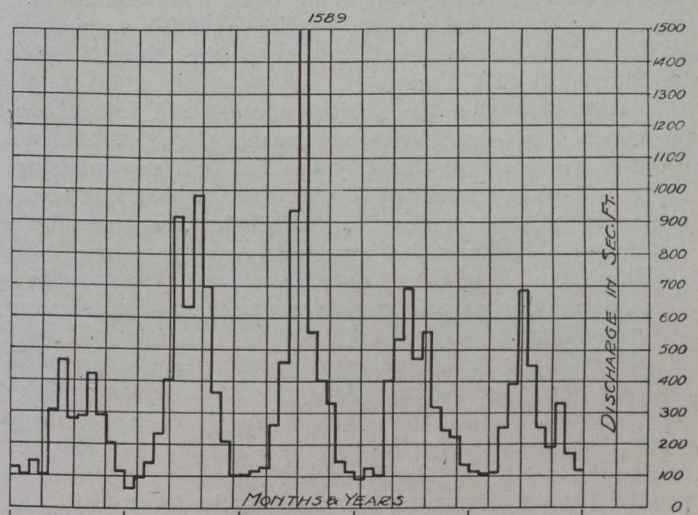


Fig. 2.—Hydrograph of Elbow River.

lation for the first 8 miles west of the intake. From here the river traverses the Forest Mountain Reserve, an extremely wild and mountainous country, devoid of any settled population.

The Bow River has a drainage area of 3,200 square miles above Calgary, and for a distance westerly of about 90 miles it has on its drainage area a fairly large farming community, interspersed with several small towns and villages.

I would here quote an abstract from the city chemist's report of September 28, 1916, as follows:—

"The turbidity and pollution curves do not coincide exactly, thus furnishing a part of the evidence available in proving that the pollution does not have its source identical with that of the flood waters.

"Also the popular belief that the muddy waters indicates the period of dangerous pollution is not likely true.

"The pollution curve reaches its maximum after the turbidity curve has receded to a comparatively low point.

"The point of highest degree of pollution occurs August 3rd. The highest degree of turbidity occurs during the month of July. Comparative analyses of Bow and Elbow River waters show a higher degree of pollution for the Bow than for the Elbow River water. This is borne out by all tests made during the past three years. This is further plainly indicated by the fact that the entire Elbow River basin above the intake does not have a population in excess of five hundred people.