

connection between the prairie provinces and the Pacific, as the distance between Edmonton and Vancouver would be 190 miles shorter than the distance from Edmonton to Prince Rupert.

Main Line Grades.—The grades on the main lines of the new consolidation from Montreal, Toronto and Quebec to Winnipeg and Vancouver would be truly remarkable for such a length of line, and one through so many hundreds of miles of mountains. From Edmonton to Montreal, Toronto and Quebec, there would be no grades steeper than 0.4% against eastbound and 0.6% against westbound traffic. From Edmonton to Vancouver there would be no grades steeper than 0.7% against the eastbound and 0.4% against westbound traffic.

The main lines, as now constructed, have many miles of 1% grades, or steeper.

The Grand Trunk from Montreal and Toronto to Cochrane has grades of 1% or steeper against both eastbound and westbound traffic.

The main line of the Canadian Northern in Manitoba, Saskatchewan and Alberta, and from Port Arthur to Winnipeg, has many grades of 1% or steeper against both eastbound and westbound traffic.

The Canadian Pacific has, on its main line between Montreal and Fort William, in Alberta, and from the Columbia River to Vancouver, many grades of 1% and steeper against both eastbound and westbound traffic, and in the Rocky and Selkirk Mountains many miles of 2.2% grades against both eastbound and westbound traffic.

Thus the new consolidation would have the shortest line, and the best grades from all such points as Halifax, St. John, Portland, Quebec, Montreal and Toronto to Winnipeg.

It would also have a shorter line, with much better grades, than either the present Grand Trunk or Canadian Northern between Winnipeg and Vancouver, and while the Canadian Pacific would be eight miles shorter from Montreal to Vancouver, and 45 miles shorter from Toronto to Vancouver, the new route would have decidedly better grades, no snowslides, much less rise and fall, and would require less train-miles in its operation.

Less Cost to Complete.—The National Transcontinental and Grand Trunk Pacific, as now built, consists of a main line of 3,550 miles long, with only about 1,200 miles of branches.

MONTREAL AQUEDUCT COMMISSION.

Montreal's Board of Control has outlined the information that it expects from the St. Laurent-McRae-Vautelet Commission which will investigate the aqueduct scheme. The following resolution has been adopted by the Board, upon motion of Controller Villeneuve:—

That for the purpose of obtaining from experts a report on the value, as a whole, of the enlargement of the aqueduct for the development and municipalization of motive power, and in order to avoid all misunderstanding and controversy in the future, these gentlemen be asked to state clearly and firmly, their opinion as experts in the form of answers to the following questions, which they may add to whatever expression of personal opinion they deem expedient and interesting to make:—

(a) What is the value of the capital cost of the first enterprise, chargeable (that is, the total capital engaged plus the interest accumulated during the ten years that this undertaking has been under way, as well as interest

that may accrue until completion) to the installation, as it will be when fully completed and in course of operation:

- 1—For the production of hydraulic motive power.
- 2—For pumping 100,000,000 gallons per 24 hours.
- 3—For electric lighting of all the city (distribution and lighting).

(b) The same question, under the same three heads, regarding annual operating cost, including financial charges for interest, sinking fund, depreciation, etc.

(c) To establish by a comparison of the respective figures for the cost of the first enterprise and annual operating cost, the advantage or disadvantage (pecuniary profit or loss) to the municipal treasury, by continuing to full completion this undertaking of the development of the aqueduct under present conditions of the project in course of execution. The comparison should be made showing respectively each item, for each of the following alternative propositions:—

- 1.—Present project of municipalization, continued as a whole up to the point of service and operation.
- 2.—Present conditions of annual cost of pumping by steam (low-level station) and by electricity (high-level station) of yearly lighting of the whole city by virtue of the contract in force with the companies. Taking into account the relative capacities of pumping and lighting between the conditions and needs of the present and those which are claimed will be realized by the project under way.
- 3.—An hypothesis of a central steam plant, assuring at the same time pumping and lighting, on the basis of modern operation and installation, with the respective yield and capacity of the project in course of execution—in a word, the substitution of steam for hydraulic power.
- 4.—Pumping assured, purely and simply, by acquiring power from one of the companies which produce it. The present low-level station being in this hypothesis, utilized as much as possible by the judicious adaptation of the existing turbine pumps, and by merely substituting the motors, the cost of operation to be at the expense of the city. In which the lighting will remain, as at present, supplied and ensured by a company.

(d) A table, giving for an average year, the yield minimum minimorum, month by month, in kilowatts, of the development of the aqueduct in course of construction.

(e) A statement of the effect of frazil ice on the production of hydraulic power under conditions existing at the site of the project under discussion, taking into consideration the difficulties experienced by other power development companies in the district contiguous thereto, and what difficulties may be reasonably looked for from ice conditions based on the actual experience of a number of years past.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

A general section meeting was held at the Society's rooms, Montreal, Thursday evening, February 8th. Col. Arthur Mignault, M.D., formerly in charge of the Laval University Hospital Unit, addressed the meeting, relating some experiences at the Front. The paper by G. W. Craig, city engineer, and J. F. Greene, bridge engineer, both of Calgary, on the construction of the Calgary Centre Street Bridge, which paper was presented to the Society at the meeting on January 9th, was read and discussed.