

Another increase of cost is due to the fact that Lake Nipissing cannot now be raised by damming its outlets, as was proposed in 1860.

The country around the summit lakes is now well settled and has many cultivated farms. The town of North Bay, which would have to be moved back to prevent overflow, has some 2500 inhabitants. Thirty miles of the Canadian Pacific Railway would have to be moved or raised.

The level of Lake Nipissing must still be maintained from French River to the Mattawan, 57 miles. This means lowering the level of Trout and Turtle Lakes to coincide with that of Nipissing, which can be done. This is the only way in which sufficient water for lockages can be obtained. The total lockage will be reduced from 715 to 682 feet.

The amount of excavation will be increased, but it is believed that the extra cost of this will not exceed what would have to be paid for damages if Lake Nipissing were raised.

The plan of 1860, which raised existing levels by dams on the French and Mattawan Rivers and on the Ottawa as far east as Chats Lake, can still be followed, as the shores are steep and rocky, and but little land will be overflowed. There are a few places where sites of locks and dams may have to be changed, but not at an increased cost.

In 1860 the whole Upper Ottawa was a wilderness. All materials and supplies above Deep River must then have been transported partly by teams and partly in batteaux towed by horses, or poled by men. Now, the Canadian Pacific Railway can deliver materials, supplies and men all along the route, and at far less cost.

Several locks of low lift can now be concentrated into one, as in accordance with the best modern practice. This will reduce cost.

I am in favour of locating the locks so that a duplicate lock can be built hereafter alongside of the one first to be built.

I now advise constructing the locks of concrete (made from the stone near by) and Portland cement. The lock walls can be protected by waling pieces of steel and oak, thus saving much costly cut stone masonry.

The most important item of economy comes from the fact that the cost of the rock excavation, which is the largest item of cost, can be greatly reduced by the improvements which have been made during the past few years in the use of power drills, high explosives, and better kinds of machinery for handling materials.

The air compressors and other machinery can in many cases be driven by electric power derived from the river. The latest price paid for rock excavation on the Chicago Drainage Canal was 9c. per cubic yard, while the average price estimated for the Ottawa improvements in 1860 was generally from \$1.50 to \$2.00 per yard.

I am not now prepared to revise the figures of cost made in 1860, as this cannot be done without further examinations and surveys, which will take several months to properly carry out.

There are several very important economies in construction that can now be made available, which could not in 1860.

It is proper to point out that the most important change in the situation since 1860 has come from the development of electrical transmission of power. The dams which were designed by me in 1860 were then, and are now, absolutely necessary to give sufficient depth for navigation. These dams will also be the means of developing and controlling water power for electric appliances.

I can state unreservedly that I know of no other place in any manufacturing country, Niagara Falls not excepted, where there is such an amount of water power as this scheme can make available, both for manufacturing purposes and possibly for moving vessels rapidly through the locks.

It is proposed to construct 20 dams on the Ottawa with an average of 20 feet fall each. The low water discharge of the Ottawa never falls below 1,500,000 cubic feet per minute, of which one third should be allowed to run over the crests of the dams to