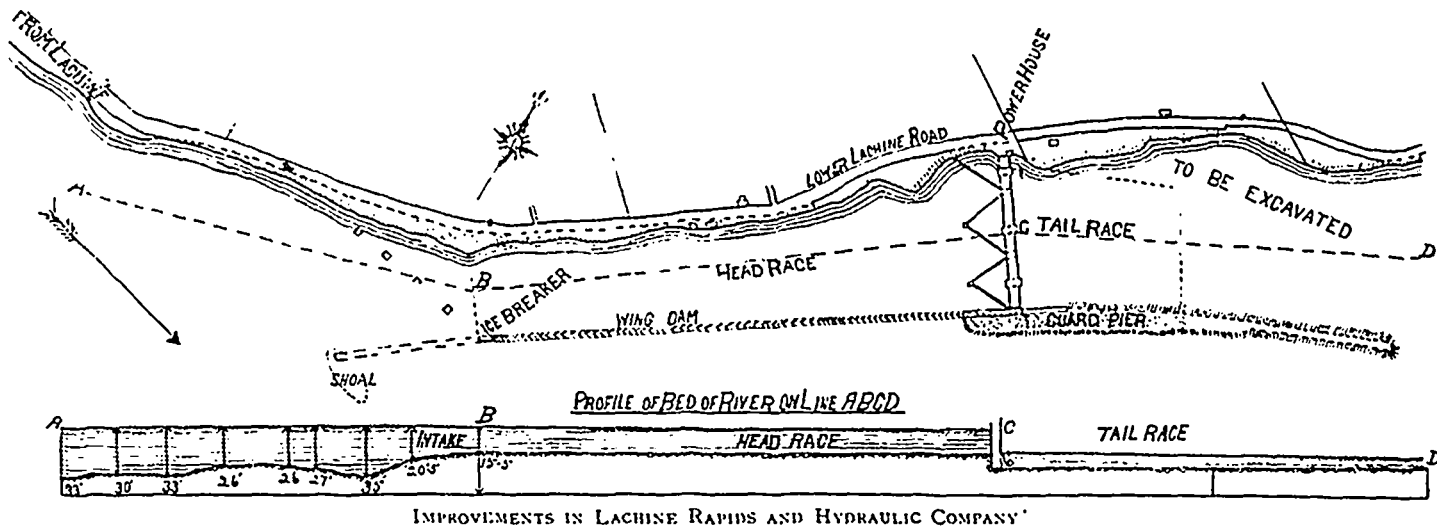


here outlined. He says, in his report: "The closing of this cross river channel will not only send the river current and its ice above and outside of, instead of below and inside the shoal, and move it at least one thousand feet from the comparatively narrow and shallow entrance to your head race, but it will destroy the current leading to its mouth. It will move the entrance from its present position to a line opposite the head of the shoal, where the water is both wider and deeper, so that it will be three times greater in area than at present. Above McDonald's Point, the shore line trends to the right, and its course, if produced down stream, would strike the shoal about where the extended wing dam would have its ice breaker. When this extension is made, the shore line of river current, instead of rounding McDonald's Point and flowing in shore, will flow nearly in a straight line toward the new ice breaker and outside the shoal. Your entrance basin, instead of being five hundred feet wide and twelve feet deep, will be about four times as wide and three times as deep. Its current will, even when all your wheels are going, have little attraction for the frazil compared with that of the St. Lawrence, where it has a fall of twelve inches per mile. At present you have no entrance basin, but feed

the bordage ice. The extension of the wing dam will have the effect of raising the level of the head race (thus increasing the water power), but to what extent it is impossible to say, probably not exceeding six inches. The level of your wing dam should be such that no water can flow over it when ice is running in the river, especially frazil, because the draught caused by this overflow might exceed that caused by your wheels and bring in too much ice. When the cross river channel is closed, I do not think there would be any tendency of 'field' ice to enter the new basin for reason stated above, and then the level of the wing dam could be governed by the frazil level, as that will be after the extension."

Mr. Keefer further endorses a separation of the tail race from the river and the deepening of its channel, but was of opinion that the glance pier was unnecessary. The company has decided to immediately carry out these works, and the contract has been awarded to W. J. Poupore, M.P., Ottawa, as mentioned in the last issue of the Canadian Engineer, and whose firm are now making good progress in the work, the contract calling for its completion by December 1st. In addition to the foregoing, the Lachine Rapids Co. will protect its



direct from one of the deep channels of the river which brings its frazil to your doors, but with the proposed extension you will have a deep basin covering over two acres of surface, which will freeze over nearly to the line between McDonald's Point and the shoal on which your new ice breaker will be planted. This bordage ice on its river edge will be thickened by wind and wave, and act as a boom to exclude passing frazil. It will not entirely exclude it, for when the river above is covered at its wider part, and its ice is crowded into the narrower width, as it approaches the rapids the frazil will flow deeper and some of it will be forced under the bordage ice and out of the influence of the river current, when it immediately rises to the under side of the bordage, is frozen to it and thus thickens the ice boom. When the full draught of all your wheels is in force, some of the frazil elbowed out of the river may descend farther down, but will be arrested by its friction against the surface ice and laid up for the winter in the new basin before it can reach your head race. This ice boom will probably take a curved form (chiefly toward the lower end), and more frazil be forced under on the side toward the wing dam than near McDonald's Point, leaving an inshore unobstructed channel under

patrons by installing an auxiliary steam plant, which will place the works beyond any question of being able to supply their demands.

CANADIAN WATER POWER AND ITS ELECTRICAL PRODUCT IN RELATION TO THE UNDEVELOPED RESOURCES OF THE DOMINION.*

(Concluded from last issue.)

In order to present more fully the recently enhanced value of our Canadian water power, some reference is necessary to certain properties of electricity, the power which has happily been described as "the most romantic form of energy," by Wm. Henry Preece, C.B.F.R.S., in his recent address as president of the Institution of Civil Engineers. Inasmuch as the cost of production of electrical energy depends upon continuity of output, water power must be the ideal one for this purpose, at least until some cheaper power is discovered. In some places where steam is now used for electric light, other industries have been added to secure the more continuous use of the power in daylight hours. The only quality in which any deficiency has been exhibited by electricity is for lighthouse purposes,

*Presidential Address read before the Society, May 23rd, 1893, by Thos. C. Keefer, C.M.G., President of the Royal Society of Canada.