

those about it discharge into one or more larger tunnels, to be constructed far below the city, discharging into the river at a point as little as possible likely to be interrupted by back water from high floods; and build a pumping station to clear tunnels, if necessary, at high floods.

It would be presumption for any other than an engineer of great experience and much knowledge of the localities to undertake the task of considering this question in all its details, without obtaining full and perfect information as to all phases of the action of the ice and waters; and it is out of the question for any person not a first-class engineer, even then, to estimate and determine all questions connected with the perfect completion of works in all their details, and furnish precise figures to which the cost would amount. Canada need not import engineers fitted for the task, there is sufficient and reliable engineering talent available in Canada to estimate and direct the work without resorting to expensive experiments.

It is to be hoped that the Government, the Harbour Commission, the Corporation of Montreal, and all the adjoining municipalities, will not hesitate to join heartily in the important work of reclaiming Montreal and its neighborhood, as well as all places that suffer, and thus demonstrate the ability, the enterprise, and the power to subdue all difficulties necessary to retain for the commercial metropolis of Canada that supremacy which thus far has been so nobly earned by our people.

The whole respectfully submitted.

WILLIAM RODDEN.

PLANTAGENET SPRINGS,
April, 1886.

N.B.—Since the foregoing was written, Montreal and the surrounding municipalities have suffered from one of the most destructive floods that has been experienced. The ice shoves of last winter accumulated upon the shoals fronting the city and below it. The cold snap that followed ice shoves had the effect of holding the ice in compact masses, in many places resting on the river bottom, till the thaw set in on the river and lakes above, and there swelled the floods that raised the ice while yet strong, and brought it down before the harbor ice had weakened enough to be moved away by the force of the descending strong ice and flood. The resisting power of the piles of ice in and below the harbor caused the descending ice to fill the channels and back up the waters, till the flood reached a height over every other flood but one in the memory of the writer, and caused much more damage than any preceding flood. Some of this damage need not have occurred had there been a full appreciation of the signs of danger to be found in the strength and quantity of ice

near Montreal, when compared with the strength of ice above and the probability of its early downward movement being caused by the early thaw in the West.

W. R.

ON THE PACKING OF THE ICE IN THE RIVER ST. LAWRENCE,

A Paper by the late Sir William E. Logan, read before the Geological Society of London, and published in its Proceedings, Vol. III., p. 703, June, 1842. Reprinted, with the Author's permission, in the *Canadian Naturalist*, Vol. III., p. 115, anno 1853.

The island of Montreal stands at the confluence of the rivers Ottawa and St. Lawrence, and is the largest of several islands splitting up these mighty streams, which cannot be said to be thoroughly mingled until they have descended some miles below the whole cluster. The rivers first come in contact in a considerable sheet of water called Lake St. Louis, which separates the upper part of the island of Montreal from the southern main. But, though the streams here touch, they do not mingle. The waters of the St. Lawrence, which are beautifully clear and transparent, keep along the southern shore, while those of the Ottawa, of a darker aspect, though by no means turbid, wash the banks of the island; and the contrast of colour they present strongly marks their line of contact for many miles.

Lake St. Louis is at the widest part about six miles broad, with a length of twelve miles. It gradually narrows toward the lower end, and the river as it issues from it, becoming compressed into the space of half a mile, rushes with great violence down the Rapids of Lachine, and although the stream is known to be upwards of eight feet deep, it is thrown into high surges of nearly as many feet high as it passes over its rocky bottom, which at this spot is composed of layers of trap extending into floors that lie in successive steps.

At the termination of this cascade the river expands to a breadth of four miles, and flows gently on, until it again becomes cramped up by islands and shallows opposite the city of Montreal. From Windmill Point and Point St. Charles above the town, several ledges of rock, composed of trap lying in floors which in seasons of low water are not much below the surface, shoot out into the stream about 1000 yards; and similar layers pointing to these come out from Longueuil on the opposite shore. In the narrow channel between them, the water, rushing with much force, produce the *Sault Normand*, and cooped up a little lower down by the island of St. Helen and several projecting patches of trap, it forms St. Mary's Current.

The interval between St. Helen and the south shore is greater than that between it and Montreal; but the former is so flooded

and cross
Lawrence
effect in
latter it
and forty
part of it
to six m
by this c
of tons f

Between
about fif
age brea
its cours
ated or
presence
lake by
its deta
alluvial

The f
Novemb
strength
river an
rock in i
it is inn
ing on t
in variou
the stre
the outsi
the inter
ually an
ice-sheet
and, as t
moving
other, u
the oppo
ing ice b
and a n
across t
Montrea
of the ri
many c
split up

As soc
across
course r
gress of
has by t
siderable
of the et
quantity
supply,
tion of a
hypothe
on and c
where r
its origi
sive fiel
obstacle
mass br
fragmen
the obst
are driv
Beneath
mention
driven,
any pos