

# St. John River Affords Big Opportunities

For Development of the Natural Resources of the Maritime Provinces—Deeper Waterway to Fredericton—Flood Control—Reclamation of Waste Land by Drainage—Utilization of Water Powers—Site Proposed for New Tideless Harbor

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THE St. John River rises in the Appalachian Highlands, flows northeast across Maine, then turns south through New Brunswick and empties into the Bay of Fundy at St. John, after a course of 450 miles. It has a drainage basin of 26,000 square miles, the largest along the Atlantic coast between the St. Lawrence and the Susquehanna. The mean annual rainfall is given as 30 to 35 inches, but information on this point is very incomplete.

It is navigable at low water for vessels drawing 9 feet as far as Fredericton, a distance of 85 miles, and has a number of navigable tributaries which together with the main stream make an inland waterway having a minimum depth of 9 feet for a total distance of about 230 miles or two-thirds the length of the Erie Canal. The main river is tidal for 100 miles. In St. John harbor, the maximum tidal variation is 27.7 feet, while at Indiantown, less than half a mile up the river, the tidal range is about two feet. The explanation of this is found in the action of the great ice sheet which pushed across New Brunswick during the Glacial Period. Prior to that time the river entered the Bay of Fundy somewhat to the west of its present outlet and had eroded a bed to a depth below that of the floor of the bay as it now is. Across this channel the glacier constructed an effective earth dam, the crest of which is now occupied by the town of Fairville. This resulted in the formation of a great inland lake and forced the river to find an outlet for itself over the ridge of hard rock just north of the present harbor of St. John. Thus there is a natural dam across the mouth of the river through which it is slowly eroding a channel for itself, and it will help to understand the lower St. John and its tributaries if we remember that what we now have is the remains of a large inland lake which has been slowly drained as the river wore away the barrier at its mouth.

## The Famous Reversible Falls

It has now been eroded to such a depth that mean low water on the river is about 11.9 feet lower than high tide in the harbor. As, however, the channel worn by the river is very narrow, the water in the bay rises much faster than it does in the river, with the result that at the time of high tide in the harbor there is a fall of about 10 feet from the harbor to the river, while at low tide there is a descent in the opposite direction of about 15 feet. This phenomenon is the famous Reversible Falls and it has several very important effects on the river and harbor.

Farther to the east, the Petitcodiac River empties into the Bay of Fundy through a broad estuary offering free passage to the tides. At high tide the Petitcodiac is a broad, navigable but very turbid river. At low tide it consists of two wide, impassable mud flats with a small stream of very muddy water oozing down the channel between them. Except for a few minutes at flood tide its currents are very swift and dangerous. But for the rocky barrier at its mouth the St. John would be nearly as bad as the Petitcodiac in so far as tides are concerned. Currents would race up and down it with such velocities as to render it practically useless for business or pleasure

and instead of being one of the most beautiful rivers in the world, it would be one of the least attractive. Also in the harbor where the currents now are sufficiently troublesome, they would but for the dam be so swift as to render the harbor useless.

This submerged dam across the narrow gorge at the river's mouth has a very important effect on flood conditions. The enormous volume of water draining from the St. John basin in the spring and early summer cannot pass this barrier very quickly, with the result that the lower river holds its flood stages for a remarkably long time. At these times, the flood level of the river is higher than flood tide in the bay and the lower river becomes a non-tidal inland lake, having an area estimated at 600 square miles, or twice that of the artificial reservoir on the St. Maurice created by the dam at La Loutre. Thus the lower river becomes a great flood detention basin and very little sediment is carried into the harbor. In fact, the delta of the St. John is scattered all along the river from the head of tidal influence to Grassy Island 25 miles from its mouth. The higher portions of this delta, such as the plain on which the city of Fredericton stands, were formed when the river first began to cut its new channel through the rocks at St. John and when the level of water was much higher than it is now. These older portions of the flood plain are well above all ordinary present day floods.

## Nature Operates the Locks

Passing down the river we find the flood plains gradually getting lower and evidently as the glacial lake was drained the river kept extending its delta until now, as mentioned above, the lower end is at Grassy Island. This is a rapidly growing deposit below which the river suddenly enlarges and from this point to within a mile of its mouth it has a width of several miles and a depth of 60-70 feet or more.

From another point of view, we may say that nature has canalized the lower St. John and its principal tributaries to a total distance of 300 miles or more, and not only that, but four times a day she operates the locks herself, there being two brief periods at each tide when vessels may safely pass the Reversible Falls.

The effects of the obstruction at the mouth of the river have been described at some length for two reasons. First, because it gives the key to present conditions on the river; and second, because some few years ago it was proposed to enlarge the channel through this barrier. From what has been said above, it will be seen that any such work should be undertaken only after a very mature consideration.

As already said, the river is navigable at low stages as far as Fredericton for vessels drawing 9 feet of water, or just one foot less than the unimproved St. Lawrence below Montreal used to have. Vessels drawing 20 feet can pass the falls at the mouth of the river and a very slight amount of work would make the channel navigable for such vessels for 60 miles. Above the falls there is