

of this is producing an inferior quality of hay and some of it is not producing anything of value. In Nova Scotia much low land that used to be considered worthless has been planted to cranberries and is now yielding equal or better returns than the best of their famous fruit lands. These berries are found growing wild along the St. John in numerous places, but the rank growth of other vegetation prevents them from being a success under natural conditions. Whether or not they can be successfully cultivated on the low lands of the St. John is a question that can easily be settled by trial.

The remaining division of the St. John basin is that drained chiefly by the Belleisle and Kennebecasis rivers. High rocky hills extend to the water's edge and there is very little flood plain. The country is hilly with some broad and very fertile valleys between the hills. The soil is everywhere good and farming is the principal occupation.

### Floods

Every spring the rain and the melting snows increase the flow of the river beyond the net discharge capacity of

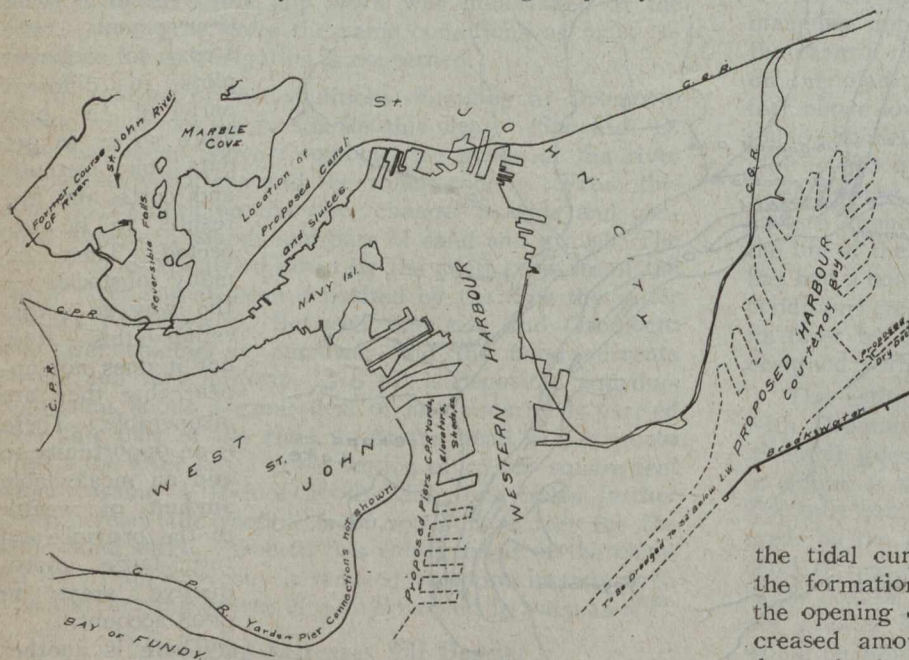


Fig. 2—St. John Harbor

the reversible flow at its mouth. The lower river rises above tide level in the bay and a large non-tidal lake is formed which persists for several weeks. Ordinary spring freshets rise 12 to 16 feet above low water but floods up to 24 feet are on record. Floods of the latter height do much damage, but they are of rare occurrence. The smaller floods inundate only low hay land and are usually a benefit rather than an injury. They may do harm, however, by covering the meadows for too long a period and thus injuring the hay crop. Also during the summer heavy rains sometimes cause the river to rise sufficiently to cover the lower meadows and this is a source of frequent and serious loss. There is another aspect of this matter that calls for attention. When the water powers of the river are developed it will be necessary to regulate its flow as much as possible, and the resultant rise of the low water level will endanger the low lands above referred to. A satisfactory solution of the problem has therefore two objects to attain: First, it must so control the spring freshets as to prevent them from rising to too great a height or remaining on the

meadows for too long, and, second, it must keep the summer water level down as low as possible consistent with navigation and power requirements so that the maximum amount of the low land can be used. The first of these objects can probably be attained by the use of storage reservoirs, but there are as yet no published data on this subject although surveys have been made. It appears, however, that the second object is not likely to be attained by the use of reservoirs. When these are constructed they will doubtless be built above Grand Falls, so that the full benefit may be secured for the power development there. This will leave something more than two-thirds of the basin without flood regulation and consequently considerable rises of the lower river may be expected. This in conjunction with the permanent rise in the low water level caused by the reservoirs, which we are assuming will be built above Grand Falls, will seriously jeopardize the lower parts of the flood plain.

The peculiar formation at the mouth of the river suggests a solution of the problem. It will be recalled that at low tide the water surface in the Bay of Fundy is some

15 feet below that in the river, therefore, the discharge of the water can readily be increased by enlarging the opening it has cut through the natural dam across its mouth. This, however, will increase the tidal variation, reduce the low water level and be generally very objectionable. By cutting short tunnels or regulating sluices from Marble Cove on the river to the harbor (see Fig. 2) and providing these with gates to be operated as needed, the level of the lower river may be controlled as closely as desired and the cost should not be excessive. These sluices could also be used to lengthen the navigation season and even to keep open the lower end of the river during the entire winter. By their use the strength of

the tidal currents could be greatly increased and thus the formation of the ice sheet delayed in autumn and the opening of navigation advanced in spring. The increased amount of salt water that could be admitted from the harbor would have a similar tendency.

In the Kennebecasis basin conditions as regards floods are somewhat different from those obtaining elsewhere on the St. John. Here a larger percentage of the land is under cultivation, the hill sides are steep and being close to the coast the rainfall is heavier than farther inland. The result is frequent floods that inundate the fertile low lands in the valleys and every year do more or less damage to the crops and highways. These streams are constantly eroding their banks, making minor changes in their beds and generally causing the farmers trouble and loss as well as frequently wrecking roads and bridges.

### Flood Prevention

In the absence of complete and careful studies on the ground it is not possible to prescribe a remedy for this state of things, but evidently detention reservoirs will have to be the main feature of any successful improvement. These may be supplemented by straightening and clearing the channels, bank protection, etc. The reservoirs will have two distinct functions to perform: First, to keep the summer floods off the low lands where they very frequently do great damage to the growing