

inner harbor is 16 to 18 ft. at low water. To give 20 ft. of water at low tide to this harbor and its approach would entail a very large expenditure, and great difficulty and expense in maintaining an entrance channel, on account of the littoral drift.

POINTE DU CHENE, N.B. The bord ice forms for about $1\frac{1}{4}$ miles out from the present pier, and is subject to raft ice under favorable conditions, with a northeast to southeast wind. There are several rock ledge shoals covering the entrance to this harbor, and it is $2\frac{1}{4}$ miles from the pier head before a depth of 20 ft. at low water can be obtained. This would necessitate the dredging of a channel $2\frac{1}{4}$ miles long, a part of which would probably be through solid rock. This channel, when dredged, would be expensive to maintain, on account of its exposed position and the littoral drift, as it is exposed to the northeast sea until under the lee of the breakwater or railway wharf.

CAPE TORMENTINE, N.B. The bord ice at Cape Tormentine forms at a straight line from the outer end of the shoals at Cape Jourimain and Tormentine reefs, upon which the ice piles and grounds, and forms a protection to the bord ice. There is a strong tidal current at this point, and between here and the island shore a curious condition of the tide is found, slack water occurring at both shores first, and the reversal of the tides and slack water working out towards the centre, so that the reversing of the tide in the centre of the straits is from 1 to $1\frac{1}{2}$ hours later than on either shores. This condition of current has a tendency to open up leads in the pan ice when the straits are full. A considerable amount of lolley ice is encountered here during severe cold weather. Rafted ice may form at this point when a large field of pan ice is moving under a northeast gale at the flow of the tide. An extension to the present pier would be required, with slip and apron, and a short breakwater protecting them from the seas from the east, the amount of dredging varying with the length of pier extension. The tide varies from 3 to 6 ft. fall in neap and spring tide, with a 3 knot current in the straits.

PUGWASH, N.B. Bord ice forms for about half a mile outside of Pugwash reef, and it is liable to rafted ice with winds from a northerly direction, ice in the roads forming about 18 ft. in thickness. There is a clay bar across the entrance opposite Fishing point lighthouse. A channel would have to be dredged across this bar and the roads, to the channel side of the middle grounds to deep water in the harbor, this distance being about a mile. There are some rock ledge shoals covering the entrance to this harbor about two miles from the bar. The only position available for the slip and railway connection is just outside of the present wharves at Oxley point. The tide at this point is from 4 ft. neap to 7 ft. spring, and causes a current at the narrow part of the channel of about 3 miles an hour. There would be great difficulty in turning a vessel in the narrow river, with the strong current.

WALLACE HARBOR, N.B. Bord ice forms about a mile out, and is subject to rafting with a northeast wind. Harbor ice makes about 18 ins. thick. There is a sand bar covering the entrance, which would require to be dredged. There is from 25 to 35 ft. of water at low tide inside the bar.

The harbor is exposed to a wind from the northeast to east, but a landing slip could easily be protected by a short breakwater. The Dominion Coal Co. contemplate building a coal pier at this point, which will necessitate dredging a channel through the bar and berth of the pier. The greatest difficulty would be in getting a low line for the railway, with shunting grounds, in proximity to the slip. The shore is bald

and quite high and of sandstone formation. The connecting link to the Intercolonial Ry. would be about 7 miles.

TATAMAGOUCHE HARBOR, N.B., is exposed to the east wind, and is very shallow and would require extensive dredging and is out of the question for the formation of a harbor.

BRULE POINT, N.B., which is on Tatamagouche bay, is exposed to northerly winds, and would require breakwaters to be built and a considerable amount of dredging to get the necessary draught of water. The connecting link to the I. R. C. would be about 7 or 8 miles in length, through bald country.

BRULE HARBOR, N.B., which is a part of Tatamagouche bay, is well protected, but would require a channel to be dredged for about $\frac{7}{8}$ of a mile and a turning basin at landing slip. The railway to connect Brule harbor with the I. R. C. would be about 5 miles long.

SALISBURY POINT, N.B., or John bay, which is part of Tatamagouche bay, has 20 to 25 ft. of water at low tide, at reasonable distance from the shore, and, with the breakwater, good protection could be obtained for a landing slip. The railway connecting link would be about 3 miles.

The ice conditions for Tatamagouche harbor, Brule point, Brule harbor and Salisbury point are all similar, being in Tatamagouche bay. The bord ice forms across the entrance to the bay, from 18 to 24 ins., and raft ice piles on the shoals and at the edge of the bord ice. There is a deep water entrance to Amet sound, less than a mile wide, and flanked by the Amet and Waugh shoals, through which there is a heavy current due to the tides, and it would be a difficult place to enter during thick or foggy weather.

PICTOU HARBOR, N.S., has good water inside of bar. Channel crooked over bar, but well lighted with range lights; $2\frac{1}{2}$ to 3 knot current over bar. Bord ice sometimes forms from Lagan point to McKenzie head, and is liable to rafting, with a northeast wind. Heavy drift ice is liable to choke up in the bay formed between Pictou island and the mainland. Tides, spring rise 6 ft. and neap 4 ft. Ice forms in the harbor from 12 to 18 ins. thick.

GEORGETOWN HARBOR, P.E.I. There is good water in this harbor, but it is exposed to a southeast blow. The bord ice forms from 12 to 24 ins. thick, about a mile out, and is subject to rafting with a southeast wind. The bord ice, for a considerable distance in from its edge, is liable to move out several times during the winter, if tide and wind are favorable. Heavy field ice is liable to jam into the harbor, with northeast or southeast winds. A landing slip could be protected by making the easterly leg long enough to provide shelter behind it. There is no current to speak of in this harbor. Tides, spring rise 5 ft., neap $3\frac{1}{4}$ ft.

MURRAY HARBOR, P.E.I. Bord ice forms across the entrance of this harbor, and is liable to raft heavily. The entrance is exposed to the east winds and is narrow and flanked by shoals. There is a bar across the entrance, through which a channel would have to be dredged. There would be great difficulty in maintaining this channel on account of the littoral drift. When once inside there is good protection, but considerable dredging would be required to deepen and straighten the channel and give a turning basin. There is a branch of the P.E.I. Ry. to this point.

CHARLOTTETOWN, P.E.I. There is good water inside this harbor and land locked when inside the narrows. Ice forms from 18 to 24 ins. thick. Current $2\frac{1}{2}$ knots at spring tide ebb, through Battery point to quarantine hospital. Bord ice forms

from Point Prim to St. Peter's island, and is subject to rafting. Under favorable conditions the first ice may raft in one or more windrows inside of the final edge of bord ice to the depth of from 4 to 8 ft. There is a good site for landing slip east of the railway wharf, with plenty of room for turning basin. Tide, spring rise 9 ft. and neap 8 ft.

CAPE TRAVERSE, P.E.I. There is too much littoral drift at this point, and too far to go to obtain deep water.

CARLETON HEAD, P.E.I. The bord ice forms from 18 to 30 ins. thick from the outer end of the piled ice on the reef at Carleton head, to a corresponding point out from Cape Traverse. The early ice is liable to raft in one or more windrows inside of this line. In 1903 the most severe conditions were reported, when it is claimed that the rafted ice grounded in 25 ft. of water in some places. The conditions of the tidal currents and ice in the straits are the same here as at Cape Tormentine. Good water is to be had for a landing slip about 2,000 ft. east of Carleton head, under protection of the point and at a short distance from the shore. This would necessitate the building of a connecting link with the P.E.I. Ry., Cape Traverse branch, of about 2 miles. Tide, spring rise 5 ft. and neap 3 ft.

SUMMERSIDE OR BEDEQUE HARBOR, P.E.I. Bord ice forms from Sea Cow head to the Muscouche banks, with a probable rafting of earlier ice in one or more windrows inside of this line. Under favorable conditions the rafted ice at the edge of the bord ice may be quite heavy. The harbor is well protected when inside of the breakwater. There is considerable littoral drift from the west. The channel would require straightening and deepening inside of the breakwater, part of which work the Public Works Department contemplates doing during 1912. A suitable site can be obtained for a landing slip, with railway connection.

WEST POINT, P.E.I. The bord ice forms in a long, easy sweep from the shoal off West point to Cape Egmont, and is subject to heavy rafting and piling under favorable conditions, when the piled ice will ground in four fathoms of water and is from 20 to 50 ft. wide. This point is exposed to winds from the south and west and with a gale from north to northeast the heavy seas swing round the point and cause a heavy undertow. Two breakwaters would have to be constructed enclosing a large enough area for turning basin. About 10 miles of line would have to be built to connect with the P.E.I. Ry. There is considerable littoral drift to the south and east. The drifting ice is seldom very heavy, and nearly always some open water may be seen, the position of the ice depending on the wind and tide. The current varies from 3 to 4 knots, the heaviest being during the June tides.

TRAFFIC. The summer and fall trade with Cape Breton and the Nova Scotia mainland, especially from the east end of P. E. Island, will not be affected by the car ferry service no matter where the ferry is established, as the water rates will be less than the rail rates. It is the summer shipments to points south and west, and the winter shipments to all points that will be benefitted by the ferry service. With the opening up of continuous winter communication the produce now rushed out in the fall or held over until spring will find an outlet during the winter at better prices, and will very likely affect the direction of the traffic, the bulk of it passing through Moncton on its way to Boston, Montreal, Ottawa and the Cobalt district, Ont. The heaviest passenger travel will also be through Moncton, so that the most