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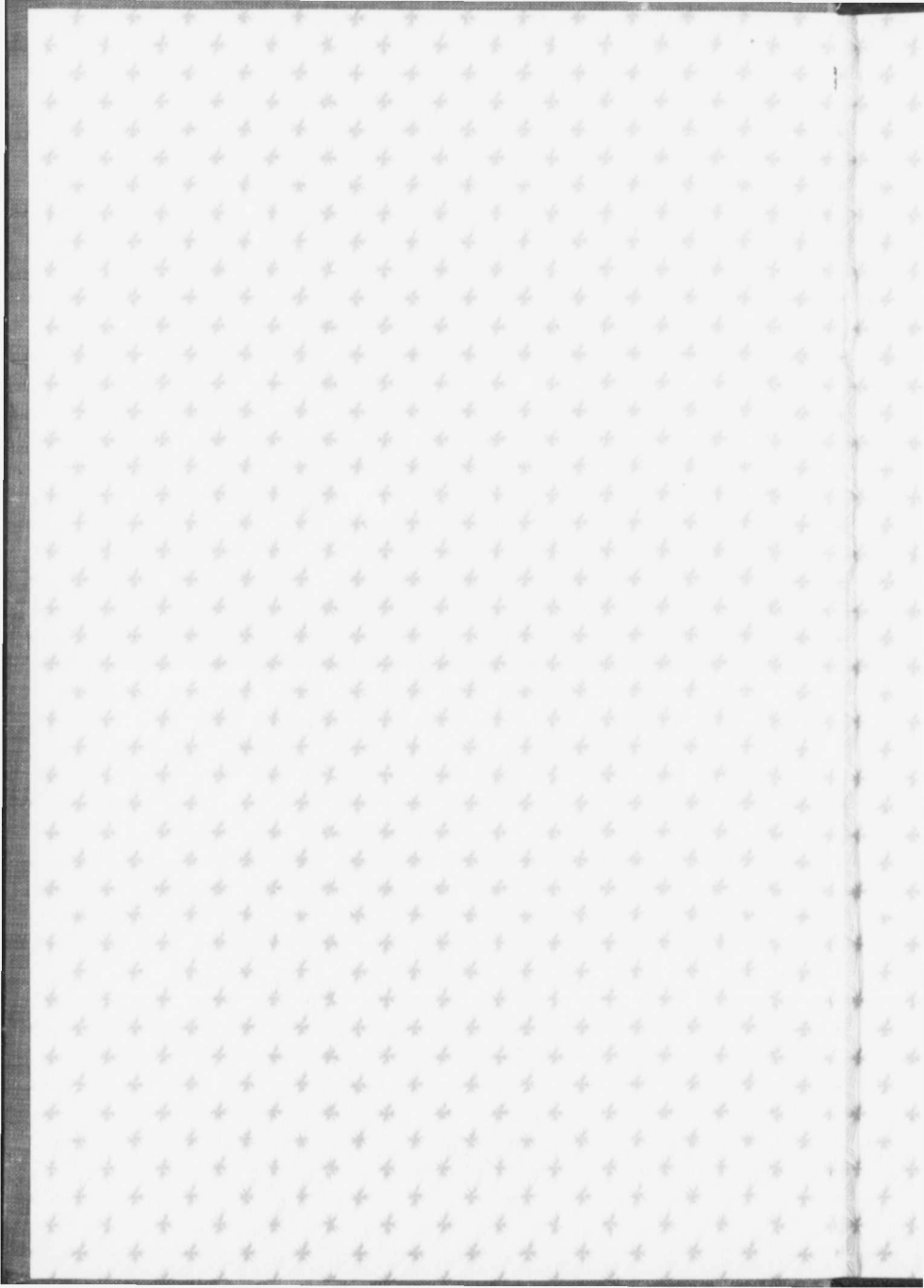
PORT DIRECTORY

OF

PRINCIPAL CANADIAN PORTS
AND HARBOURS

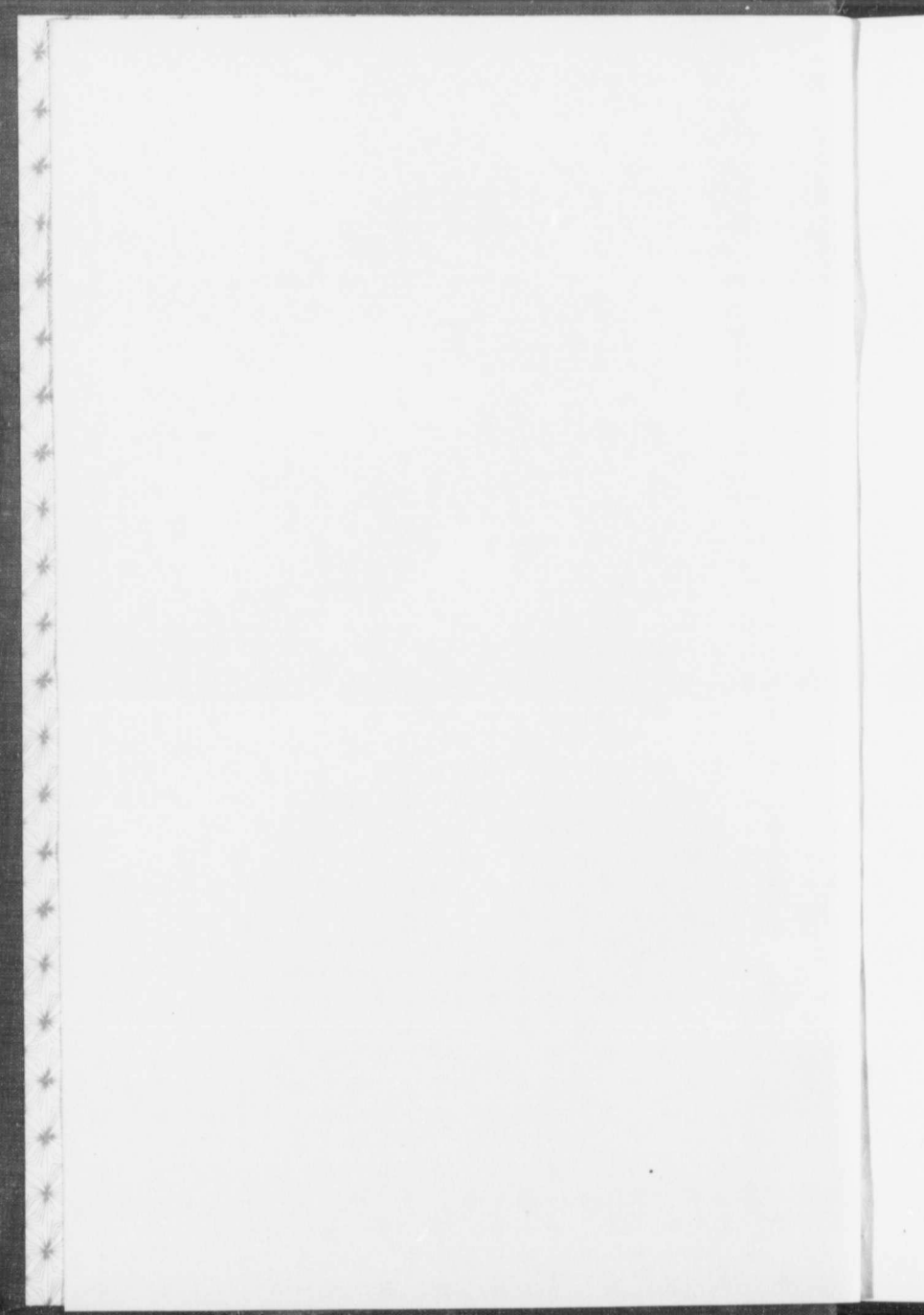
DEPARTMENT OF MARINE AND FISHERIES

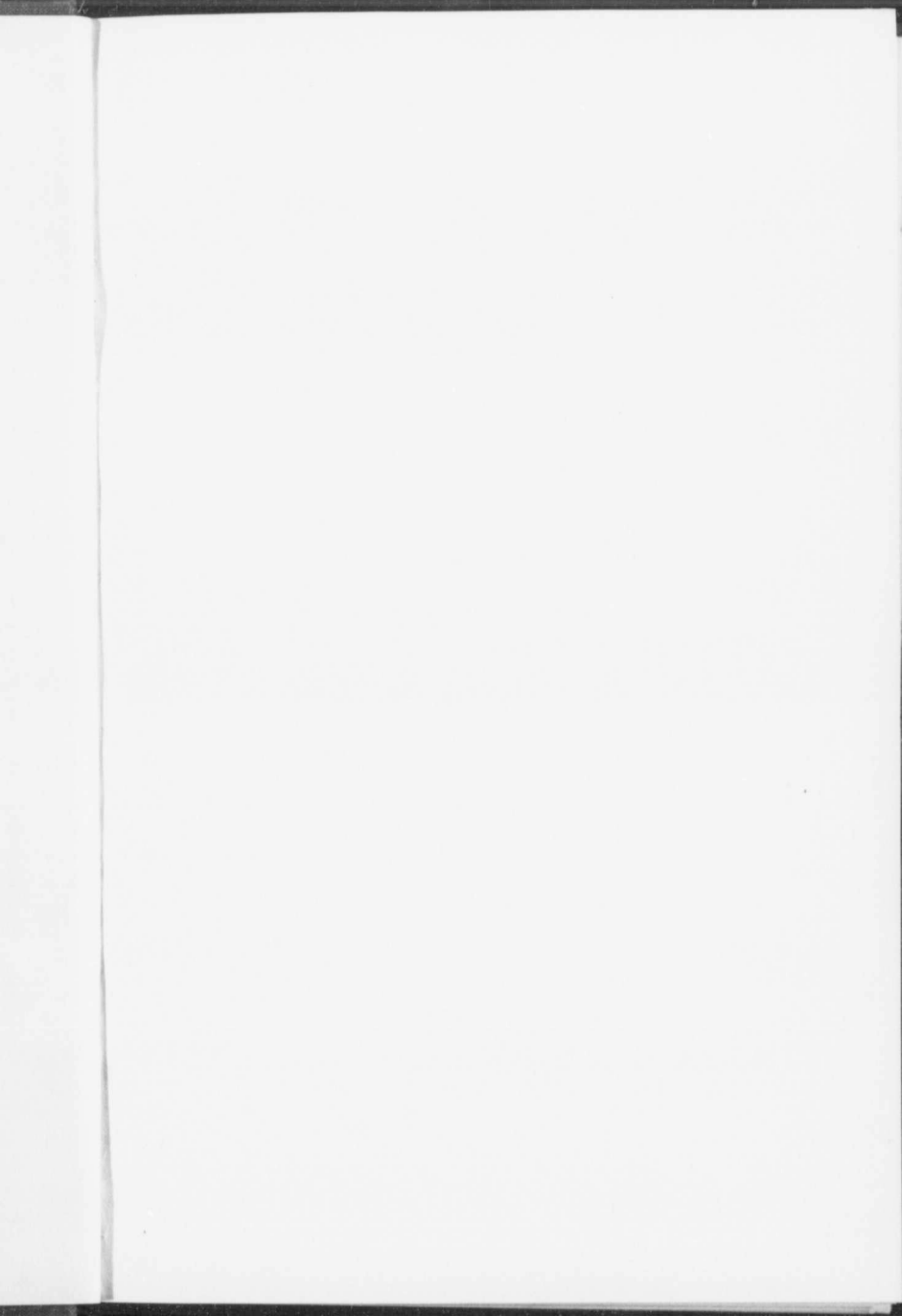
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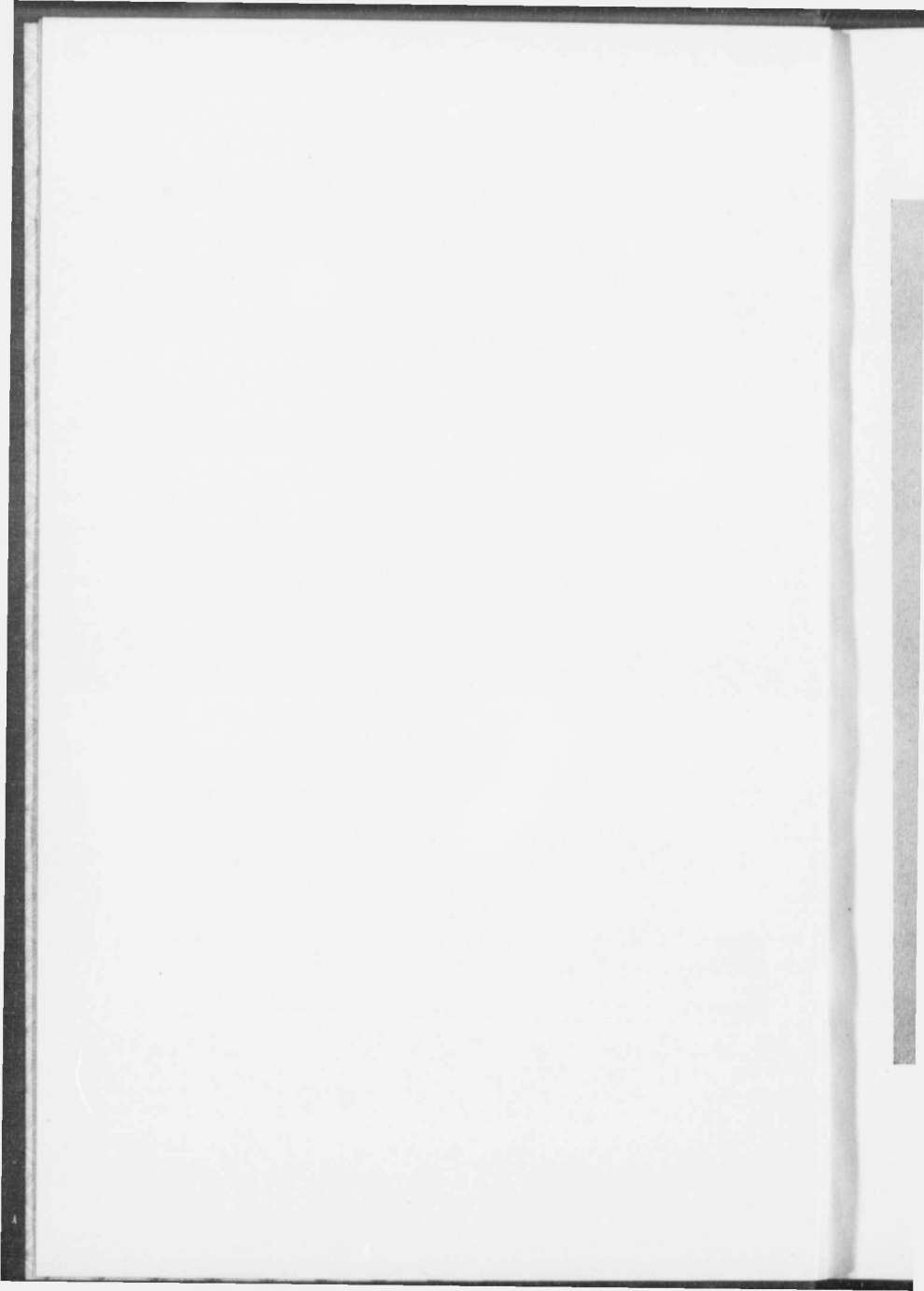


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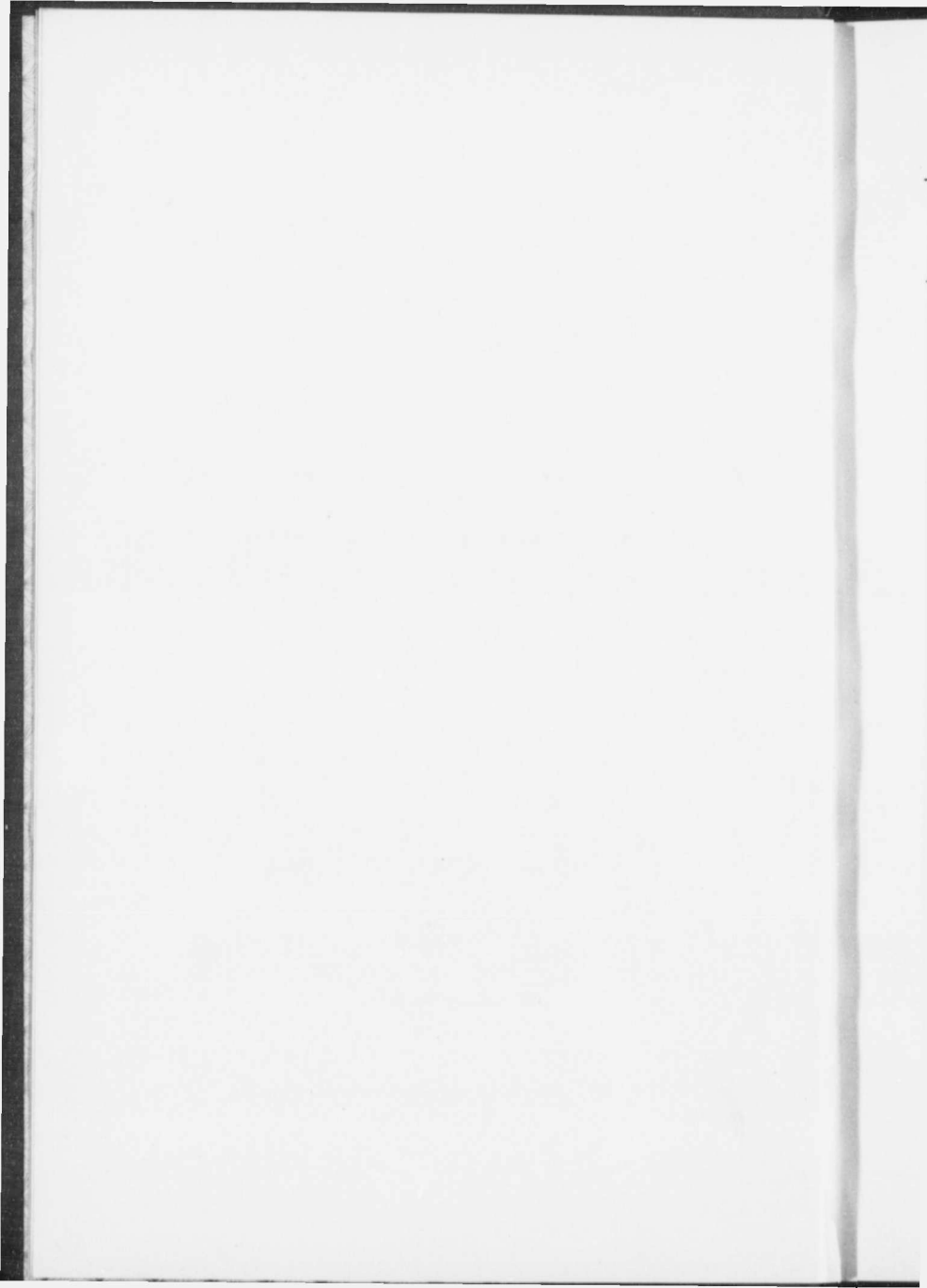








The Hon. J. D. HAZEN, Minister of Marine and Fisheries.



PORT DIRECTORY

of

*Principal Canadian Ports and Harbours and a
Large Number of Minor Ports, Wharves,
Depth of Water, Facilities for
Loading, Etc.*

also

*Descriptions of Types of Aids to Navigation in Canadian
Coastal and Inland Waterways, Navigable Distances
of many Rivers in the North West of Canada
and some General Information to
Mariners, Etc., with a Number
of Illustrations of
Harbours.*

DEPARTMENT OF MARINE AND FISHERIES,
1913 and 1914.

OTTAWA,
GOVERNMENT PRINTING BUREAU.

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To The Hon. J. D. Hazen,
Minister of Marine and Fisheries.

Sir,

I have the honour to submit the new Port Directory which contains information about the principal harbours and of a great number of the minor harbours or ports. The Maritime ports on the Atlantic and Pacific coasts have been described as seaports and the "Inland," or non-tidal harbours, as lake and river ports. Some detailed information has been included regarding inland navigation in British Columbia waters, navigable distances of certain rivers and lakes in New Ontario, Manitoba, Saskatchewan, Alberta and the Mackenzie river and Yukon Territory.

Brief descriptions are included of Hudson bay and strait, with approximate length and breadth and depth of these waters, also references indicating the natural harbours affording shelter in the strait and some information regarding Port Nelson and Churchill on the west side of the bay. The approximate length and breadth of bays along the coast of Baffin island have been referred to, names of natural harbours and other navigable waters in the far north are mentioned.

The first Port Directory was confined to descriptions of harbours where not less than 50,000 tons of shipping had entered during the year of publication. The present Directory is not limited to descriptions of the same harbours but embraces a very much greater number of places, as well as additional information regarding the present conditions and accommodation of the most important harbours.

The demand for information of a detailed character of our harbours from shipowners, mariners and underwriters both from abroad and in this country, will be met by the full descriptions furnished in this Directory, particularly of the chief harbours.

The information regarding berthing accommodation and depth of water alongside wharves has been derived from reports of harbour commissioners, special reports of harbour masters and other officials and from records in the Department.

The depth of navigable waters in the vicinity of the harbours and the channels leading into the harbours and in the harbours themselves, has been taken from charts and the lights, gas lighted and warning buoys, with the latitude and longitude of the different light stations and localities of buoys, from the List of Lights.

The different types of buoys and improved kinds, and other aids to navigation introduced by the Department generally and their establishment in different waterways, have been described.

This will afford useful information to mariners in a compact form and supply to others a commercial geography of the ports.

The Port Directory has been compiled by Mr. W. W. Stumbles and staff, of this Department.

A. JOHNSTON,
Deputy Minister of Marine and Fisheries.

Department of Marine and Fisheries,
Ottawa, 2nd October, 1913.

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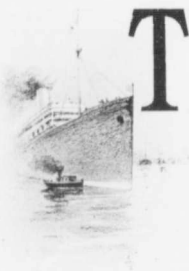
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INTRODUCTION



THIS Port Directory was compiled with a view of giving information in a concise form to shipowners, mariners, importers, exporters, traders, insurance companies, and others interested in the navigation of Canadian waters.

Inquiries have been made at various times, from abroad, respecting port charges in certain Canadian ports, depth of water, extent of harbours, anchorage, pilotage charges and accommodation. The Directory contains information not only of the nature of the inquiries, but some additional facts relating to the facilities for loading and unloading ships, extent of wharves, capacity of sheds, cold stores, railway accommo-

dation to the ship's side, etc., particularly in the largest ports of Canada.

The sailing directions for entering the harbours, where given, are quoted from the coast pilot books published by the Admiralty and the department of Marine and Fisheries.

Improved aids to navigation, introduced and established in Canadian waters, in recent years, and the dredging of important harbours and channels, have greatly reduced the dangers of navigation, enabling much larger ships now to use our important waterways and enter our principal ports than in any period of the history of the country. Deepening of channels and harbours is done by the Public Works Department and information respecting the depth of water at present in a number of harbours where dredging has increased this depth was procured from that Department.

The tonnage of vessels which entered and departed, as shown in the description of each harbour, was obtained from the Trade and Navigation Returns of the Customs Department for 1912.

For the information of owners of vessels, underwriters and mariners, a summary has been made of certain Acts relating to harbour masters, wreck receivers, shipping masters, port wardens, steamboat inspectors, inspectors for seaworthiness of vessels, wharfingers, pilots and pilotage authorities and the fees and tonnage tax for which vessels are liable, and masters and mates, and charges for certificates.

The book is intended to afford captains and mariners, generally, definite knowledge of harbours and aids to navigation leading to the harbours. A few special articles descriptive of the power and order of lights, of fog alarms, of buoys and submarine warnings have been inserted. The summary relating to tides and currents and tide tables and the enumeration of life-saving stations and radio telegraph stations in Canada will be found useful. The directions to be observed on board ship for receiving lines and making signals to life-saving stations have been copied from the International Code of Signals.

Great care has been taken in compiling this Directory but as changes occur in some harbours and channels by shifting sand and filling in by natural causes there may consequently be a difference between the depth of water mentioned in this book and the actual depth existing from time to time. Dredging has been done alongside wharves and in certain parts of harbours since writing the various descriptions. Mariners and others are therefore cautioned to regard this Directory as an aid to acquiring knowledge of Canadian harbours rather than an absolutely correct guide in sailing directions or depth of water in channels or harbours.

NATURE OF TYPES OF IMPROVED AIDS TO NAVIGATION.

The nature of the improved types of aids to navigation will be interesting to mariners, shipowners, insurance companies and others concerned in shipping.

The diaphone has proven in Canadian waters to be superior to the siren or explosive fog signals, though very much smaller in size and weight than the Scotch siren. The experience of the Marine Department with compressed air horns, steam whistles and explosive fog alarms was unsatisfactory. The Scotch siren, which had been in use in Great Britain and considered the most effective sounding instrument at one time, was adopted at two of the most important stations on the Atlantic coast and the St. Lawrence river. The compressed air horn gave surprisingly good results in calm weather, but did not force the sound through external noises on ledges and shoals with any degree of reliability in thick or stormy weather.

In the year 1903, the diaphone was recommended to the department as the best known invention for producing aerial signal warnings and was neither cumbersome nor heavy, compared with the siren and its plant.

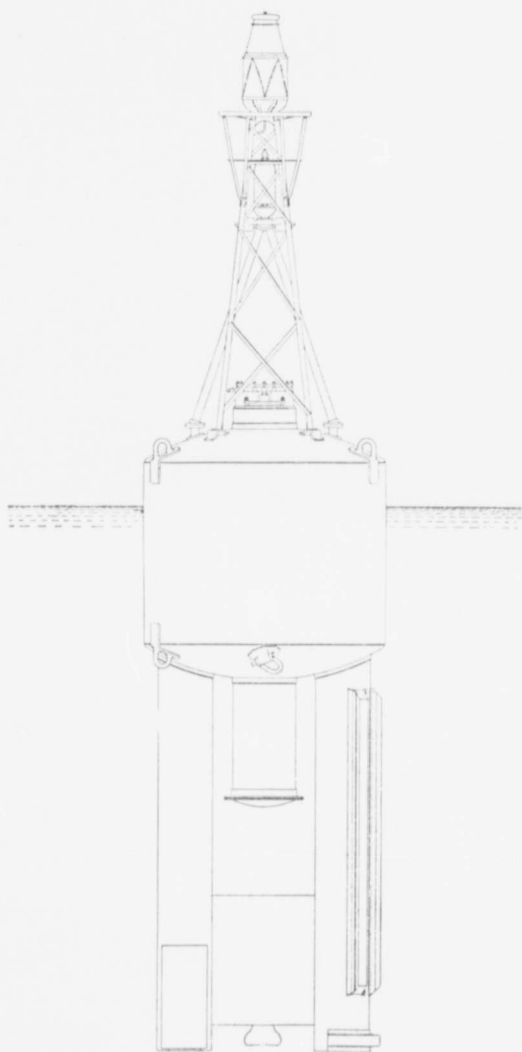
A trial of a small diaphone of 87 pounds weight alongside of a siren which, with its horn, weighed 9,280 pounds, showed that the diaphone could be heard at a greater distance. The siren, operated by $14\frac{1}{2}$ horse-power, was heard $5\frac{3}{4}$ miles from the station, the diaphone was heard $6\frac{1}{4}$ miles, but only required $1\frac{1}{4}$ horse-power to operate it. There are now 90 diaphones in use in Canada.

COMBINED LIGHTED AND WARNING BUOYS.

In addition to improving the fog and thick weather warnings established on land, low pressure acetylene buoys, combination acetylene light and whistling buoys and combination acetylene lighted and bell buoys have been in use for several years. These buoys are known as the Willson buoys and are manufactured by the International Marine Signal Company, Limited, of Ottawa.

The whistling device of the combination buoy is an improvement on the old type on account of the increased area of the compression tube, the increase being from $4\frac{1}{2}$ square feet in the Courtenay whistling buoy to 7 feet and 25 feet in the combination gas and whistling buoy. This combination buoy is equipped for receiving the standard automatic submarine bell apparatus, which conducts the sound of the bell by water to vessels equipped with receivers.

Acetylene from calcium carbide is used in these buoys. The largest size lanterns made for gas buoys, show a light of from 825 to 1,063 candle power and with the sounding power so great, that the combined buoys constitute a floating aid to navigation comparable to a lightship.



Automatic Whistling and Acetylene Buoy.

The largest size combined buoy is 14 feet 6 $\frac{7}{8}$ inches maximum diameter; weight, 38,000 pounds when fully charged; draft, 26 feet 8 inches; total area of whistle tubes, 25 square feet; size of whistle, 18 inches; height of focal plane, 29 feet 7 inches; lantern, 500 m.m.; candle power, 1,063. The light can be seen under favourable conditions twenty miles. With the occulting light, a full charge, say 3,500 pounds of carbide, should show a continuous light for nine months. The smaller combined gas and whistling buoy measures 9 feet 6 $\frac{3}{4}$ inches in diameter with the parts correspondingly smaller excepting the gas generator, which is large enough to contain 3,500 pounds of carbide.

The Aga buoy, illuminant, dissolved acetylene, a more recent type, is being experimented with in Canadian waters.

Acetylene beacons, manufactured by the International Marine Signal Co., have been in use in British Columbia for several years and have each year proved so satisfactory that oil beacons have been replaced by them. The mechanism is similar to the lighting apparatus of the acetylene buoys but the gas is generated from the calcium carbide by water held in the lower part of the beacon, the body corresponding to the shape of the cylindrical buoy. The distance, of course, at which these beacon lights can be seen, varies according to the height at which they are placed above the water level and the sizes of the lanterns; the duration of the carbide also depends upon the size of the lantern.

The beacon lights are kept in operation throughout the year in British Columbia as frost does not interfere with the generation of the gas by the water in the body or tank of the beacon.

SUBMARINE WARNINGS.

The acoustic arrangements of the submarine warnings can only be described here in a general way, as details of the mechanism of the various types of apparatus in use would occupy too much space. Stations are connected on land with light-house stations similar to aerial fog-alarms, or are located separately where necessary. Each submarine station contains an engine, which furnishes power for ringing the bell attached to a tripod placed in water deep enough to allow a deep draught vessel to pass over without contact. An electric bell is used in deep sea generation of sound. The cable, at some stations, is often several miles in length, reaching from the tripod to the shore. This cable is about 1 $\frac{1}{4}$ inches in diameter and contains four copper conductors which are covered with rubber insulation and are held together by a covering of jute and steel armor wire. Two of the conductors supply current for ringing the bell and two are telephone wires.

The power sending apparatus varies in kind, according to the choice made or the importance of a station. Electric, pneumatic, automatic and hand apparatus are now in use.

On lightships anchored many miles from shore, pneumatic mechanism rings a bell hung from a davit over the side of a ship. Rubber twin hose and piping connect the bell with the air supply on board, compressed by steam from the boiler of the lightship. The bell is lowered to a depth of 25 feet and is raised and lowered by a windlass. The bell mechanism and case together weigh about 450 pounds, and measure over all 15 $\frac{1}{2}$ inches in diameter by 39 inches in height.

Coast buoys marking dangers, or channel buoys, are amongst the aids used for attaching bell mechanism. Aerial bell buoys of different types and the larger sized whistling buoys, have long been in use, but the same difficulty in the transmission of sound exists as in aerial fog-alarms. The submarine bell buoy may be either a lighted or an unlighted one, but any ordinary can or conical buoy, of sufficient size and buoyancy to support the actuating mechanism, has been found satisfactory. The bell is rung automatically by the rise and fall of the buoy, caused by the motion of the water. Even in comparatively smooth water, the buoy has enough energy to produce sound.

At land stations and on lightships, a code has been arranged to enable the officers of a ship supplied with the code to ascertain the latitude and longitude of their ship when observations for this purpose have been impossible. An attachment called the code ring forms part of the apparatus and the value of the code, has, in several instances of casualties to liners, been proved by enabling a vessel in distress with wireless telegraphy equipment to communicate to other vessels with wireless apparatus its exact position.

Without the receiving apparatus on board a ship, the submarine warning bell would be of no value. The refraction of sound waves is utilized by means of the receiver which is fastened well forward of a ship and under the water line.

These receivers contain telephone apparatus, dry batteries for supplying an electric current for the telephone, microphones for transmitting the bell sounds to the telephones, tanks to contain the water in which the microphones are immersed, junction boxes and conduits holding electric cables for connecting the indicator box ; also switches for connecting alternately the receivers on the sides of the vessel.

One important feature in connection with the practical use of the receivers is the facility with which an officer, in approaching a station or buoy, can determine upon which side of his vessel, in a fog or thick weather, the warning is located. Louder sounds emanating from the bell are heard upon the side toward the station or buoy, but if no difference of sound is apparent between the two receivers, the officer may conclude that the bell is located directly ahead.

The adoption of submarine warnings was considered by the Marine Department of Canada as early as 1903. The bells and their equipments in Canadian waters are : one at Chebucto Head, Nova Scotia ; one on the Lureher lightship, bay of Fundy ; one on Anticosti lightship in the gulf of St. Lawrence ; one each on the Red island, White island and Prince shoal lightships, in the St. Lawrence river. There are now 13 bells in use including stations, lightships and buoys, in Canadian waters ; one of which is on the Great Lakes and one in British Columbia. It was provided in the original contract with the Submarine Signalling Company of Boston, that receivers and their special attachments would be supplied vessel-owners at reasonable prices. Sound from submarine bells has been picked up from 5 to 18 miles by vessels having receivers.

LIGHTHOUSE IMPROVEMENTS.

The subject of lighthouse illumination has, in recent years, received special and most careful attention. The installation of more powerful lights at many of the most important stations along the Atlantic and Pacific coasts, the gulf and river

St. Lawrence, bay of Fundy and Great Lakes, made it necessary for the department to build more expensive and a better class of towers. The greater weight and size of the new lanterns required more stable structures, where new towers were erected, and the strengthening and raising of old towers. The Department is carrying out improvements yearly to bring the whole system up to the modern standard. Cape Race light, on the southern coast of Newfoundland, belongs to the Canadian system and is the most powerful; it is a hyper-radial light of 1,000,000 (million) candle power and it is claimed to be one of the most powerful in America. It should be seen nineteen miles at sea by vessels approaching it on their transatlantic trips to Canadian ports. Other powerful lights have been established in the strait of Belle Isle and gulf of St. Lawrence, on the south east coast of Nova Scotia and bay of Fundy; lights and fog alarms have greatly diminished the dangers of navigating these coasts, and improvements in erecting new and introducing lights of greater magnitude with distinctive features are constantly being made.

APPROXIMATE candle power of dioptric flashing apparatus used in Canadian lighthouses.

Order.	Character.	Burner used.	Candle power.
Hyper-radial	Single flashing	85 m/m vapour	1,000,000
First	"	85 " "	450,000
"	Double	85 " "	450,000
"	Triple	85 " "	240,000
"	Quadruple	85 " "	160,000
Second	Single	85 " "	270,000
"	Double	85 " "	270,000
"	Triple	85 " "	135,000
"	Quadruple	85 " "	95,000
Third	Single	55 " "	100,000
"	Double	55 " "	100,000
"	Triple	55 " "	55,000
"	Quadruple	55 " "	40,000
"	Single (small)	55 " "	60,000
"	Double	55 " "	60,000
"	Triple	55 " "	35,000
"	Quadruple	55 " "	25,000
Fourth	Single	35 " "	25,000
"	Double	35 " "	25,000
"	Triple	35 " "	15,000
"	Quadruple	35 " "	11,000

Catoptric revolving lights have a power of less than 5,000 c.p. By substituting an oil vapour burner for a circular wick burner of same diameter, the power of an apparatus is increased about three and one-half times.

The light stations of the department now number over one thousand, and about thirteen hundred and fifty separate lights are shown from lighthouses.

TABLE of Distances at which objects can be seen at sea, according to their respective elevations and the elevation of the eye of the observer.

By Alan Stevenson.

Heights in feet.	Distances in Statute or English Miles.	Distances in Geographi- cal or nautical miles.	Heights in feet.	Distances in Statute or English miles.	Distances in Geographi- cal or nautical miles.	Heights in feet.	Distances in Statute or English miles.	Distances in Geographi- cal or nautical miles.
5	2.958	2.565	70	11.067	9.598	250	20.916	18.14
10	4.184	3.628	75	11.456	9.935	300	22.912	19.87
15	5.123	4.443	80	11.832	10.26	350	24.748	21.46
20	5.916	5.130	85	12.196	10.57	400	26.457	22.94
25	6.614	5.736	90	12.549	10.88	450	28.062	24.30
30	7.245	6.283	95	12.893	11.18	500	29.580	25.65
35	7.826	6.787	100	13.228	11.47	550	31.024	26.90
40	8.366	7.255	110	13.874	12.03	600	32.403	28.10
45	8.874	7.696	120	14.490	12.56	650	33.726	29.25
50	9.354	8.112	130	15.083	13.08	700	35.000	30.28
55	9.811	8.509	140	15.652	13.57	800	37.416	32.45
60	10.246	8.886	150	16.201	14.22	900	39.836	34.54
65	10.665	9.249	200	18.708	16.22	1,000	41.833	36.28

EXAMPLE.—A light 100 feet above the water will be visible to an observer whose eye is elevated 15 feet above the water 15.9 nautical miles; thus, from the table:—

15 feet elevation, distance visible, 4.44 nautical miles.

100 " " " " 11.47 "

15.91

TIDAL SURVEYS AND TIDE TABLES.

The investigation into tidal currents in the strait of Belle Isle, gulf and river St. Lawrence and bay of Fundy, has resulted in the discovery of currents previously unknown. The direction in which they flow, under normal conditions, has been ascertained, and a pretty accurate knowledge of the effect of storm disturbances has been acquired. The value of the publications on the tidal currents has been acknowledged frequently by the shipping interests and mariners. The hydrographic office of the British admiralty has made use of the information in publishing the sailing directions for the gulf and river St. Lawrence.

The issuing of accurate tide tables, upon observations obtained by means of self-registering tide gauges, kept in continuous operation by the department, has been the subject of much congratulation from owners of steamboat lines and mariners. The yearly distribution of the published tables has been given prompt attention. The accuracy of the tables is represented by the length of the tidal observations on which they are based.

The tables for Quebec, Father Point, Halifax and St. John, where tide gauges have been maintained for several years, are said to be superior to the tide tables of any harbours on the Atlantic coast. The tide tables for British Columbia have been equally appreciated; the Sands Head tables being the most accurate on the Pacific coast.

The tide of the Pacific coast of Canada can best be described as a declination-tide. Its leading feature is a large diurnal inequality in time and height. There is also a large annual variation with the change in the declination of the sun. When the moon is farthest north or south of the equator, the inequality between the two tides of the day is greatest, and what is termed long and short runs of the current occur.

The tide on this coast is not only of direct interest to navigation, but also to several important industries, notably the lumber industry and coal trade which carry on their business to a large extent by towing. The fishing industry is also deeply interested in the tide, not only on the Fraser and Skeena rivers, where numerous large canneries are located, but also on the long natural channels and sheltered passages.

On the outer coast of Vancouver island the tide has a rise of from ten to twelve feet. Among the islands of the gulf of Georgia and in the strait, the mean rise is twelve to thirteen feet. At Port Essington, on the Skeena river, the rise at spring tides is twenty-one feet, while Port Simpson has nineteen feet, and Prince Rupert, the terminal of the Grand Trunk Pacific, five per cent. more. The range of the tide at the head of the long inlets or channels is only two to twelve per cent. greater than at their mouth, while the time of high and low water is practically the same.

One difficulty met with in navigation on the Pacific coast is the very strong tidal currents in the various passes and narrows; so strong that in some of them navigation is only possible at slack water. The most important of these is the far-famed Seymour narrows, where there is a current of seven to twelve knots. The Yuculta, largely used by tugs in towing logs, has a current almost as strong. In Active and Porlier passes, on the route from Vancouver to Victoria, the current runs from five to seven knots.

As these passes can only be navigated at slack water, except by vessels of high speed, the time of the turn of the current is important. In this connection the Tidal and Current Survey include in their Tide Tables the time of slack water in these passes and narrows, based upon observations obtained at each locality.

Tide gauges are kept in continuous operation at Clayoquot, on the west coast of Vancouver island, Victoria, Vancouver, Prince Rupert and Port Simpson.

HYDROGRAPHIC WORK

Surveys in the St. Lawrence river and in lake Superior and on the Pacific coast are progressing, and during each season of navigation work in this line

has been carried on by separate parties, with a view of issuing charts of accurate soundings.

List of Charts of the Canadian Hydrographic Survey, issued by the Department of the Naval Service of Canada, and obtainable from the Chief Hydrographer, Department of the Naval Service, Ottawa. Price of charts, fifteen cents each.

River St. Lawrence above Quebec.

- Chart No. 1. Montreal to Longue Pointe.
2. Longue Pointe to Varennes.
3. Ile à l'Aigle to ile Marie.
4. Ile Marie to foot of Ile Bouchard.
5. Ile Bouchard to ile St. Ours.
6. Ile St. Ours to ile aux Foins.
7. Ile aux Foins to ile de Grace.
7A. Berthierville to lake St. Peter.
8. Head of lake St. Peter.
9. Lake St. Peter.
10. Foot of lake St. Peter.
11. Three Rivers to Becancour.
12. Becancour to Champlain.
13. Champlain to Pointe Citrouille.
14. Batiscan to Cap Levrard.
15. Cap Levrard to Ste. Emélie.
16. Ste. Emélie to Deschambault.
17. Portneuf to Cap Santé.
18. Ste. Croix to St. Antoine.
19. St. Antoine to St. Augustin.
20. St. Nicholas to Quebec bridge.
21. Quebec harbour.
22. River St. Lawrence, between Montreal and Sorel.
23. River St. Lawrence, between Sorel and Batiscan.
24. River St. Lawrence, between Batiscan and Quebec.

Lake Winnipeg.

- Chart No. 40. Red river to Berens river.
41. Berens river to Nelson river.

River St. Lawrence above Montreal.

- Chart No. 50. Lake St. Louis.
52. Lake St. Francis, Coteau to Lancaster.
53. Lancaster bar to Cornwall.

Ottawa River.

- Chart No. 54. Lake of Two Mountains, eastern portion.
55. Lake of Two Mountains, western portion.

Lake Ontario.

- Chart No. 60. Main Duck island to Presqu'île.
71. Presqu'île bay.

Lake Erie.

- Chart No. 80. Plans of harbours.

Lake Huron, Georgian Bay, and North Channel.

- Chart No. 72. Goderich harbour.
95. Meldrum point to St. Joseph island.
96. Cape Hurd to Gull island.
97. Duck islands to Detour passage.
98. Cove island to Duck islands.
99. Key harbour and its approaches.

Lake Superior

- Chart No. 101. Head of Thunder bay to Pigeon river.
102. Lamb island to Thunder cape.
103. Copper island to Lamb island.

River St. Lawrence below Quebec.

- Chart No. 201. White island to Orignaux point.
202. Razade islands to White island.
203. The approaches to Saguenay river.
204. Bic island to White island.
205. South Traverse.
206. The Traverses.
207. Mal baie to Goose island.

Pacific Coast.

- Chart No. 301. Prince Rupert harbour.
302. Digby island to Kennedy island (Chatham sound).
303. Tree Bluff to Kinahan islands (Chatham sound).
304. Arthur and Telegraph passages.
305. Masset sound and inlet, Q.C.I.
306. Skidegate inlet, Q.C.I.
307. Middle passage Skeena river.
308. Boat harbour (Vancouver island).

Hudson Bay.

- Chart No. 401. Port Churchill.
402. Port Nelson.

The Annual Report of the Department of the Naval Service of Canada, comprising the Naval, Fisheries, Protection, Tidal and Current Survey, Hydrographic Survey, and Wireless Telegraph branches. Price 10 cents.

Radio Telegraph Stations.

- (1). Chart of Radio-Telegraph stations on the East coast of Canada.
- (2). Chart of Radio-Telegraph stations on the Pacific coast of Canada.

BRITISH ADMIRALTY PUBLICATIONS

Admiralty Charts covering the coasts of the whole of Canada, together with the river St. Lawrence and Great Lakes, are for sale by J. D. Potter, Admiralty Chart Agent 145 Minories, London, England. He has appointed the following Sub-Agents in Canada, who usually keep on hand copies of charts in demand in their districts:

Montreal	Harrison & Co.	53 Metcalfe street.
Quebec	T. J. Moore & Co.	118 Mountain hill.
St. John	A. B. Smalley & Son.	91 Prince William street.
Toronto	Chas. Potter.	85 Yonge street.
Vancouver	Thomson Stationery Co.	325 Hastings street.
Victoria	T. N. Hibben & Co.	69 Government street.

Messrs. Creighton & Marshall, Ordnance Square, Halifax, though not Agents, also keep charts in stock.

NOTE.—There is an erroneous impression abroad that the Marine Department keeps on hand Admiralty Charts for free distribution. This is not the case. Any charts required for the use of the Department the Canadian Government purchases from the publishers at the advertised price.

LISTS OF LIGHTS AND FOG SIGNALS

Lists of Lights and Fog Signals in the Dominion are published in three separate sections, viz.:—

ATLANTIC COAST, including the Gulf and River St. Lawrence to head of ocean navigation, Montreal.

INLAND WATERS.

PACIFIC COAST, including British Columbia lakes and rivers.

Any of these Lists will be sent free of charge, upon request, by the Department of Marine and Fisheries, Ottawa.

NOTICES TO MARINERS

Notices to mariners are promptly printed and distributed concerning new aids to navigation established or change of a temporary or permanent character, and of uncharted rocks and shoals discovered, in order that captains and other navigators may be informed. The notices, in order to reach mariners, are sent in Canada to collectors of customs, agents of this department and other outside officers, to consuls of foreign countries, to the British admiralty and to the marine authorities of foreign countries.

STORM WARNINGS.

Storm warning bulletins, and signals considered by all cautious mariners useful aids in determining whether they should proceed to sea when ready, are displayed at all important ports on the Atlantic coast, gulf of St. Lawrence, bay of Fundy, St. Lawrence river, Great Lakes and Pacific coast. Information of weather conditions, forecasts and warnings of dangerous storms, is almost hourly given in addition to the reports published twice daily, by the officers of the meteorological service under the control of the department. Shippers of perishable goods consult these warnings and make it a point to be governed by them. The number of storm signal stations has increased annually.

At Camperdown, Nova Scotia Marconi station, the time signal from land lines from Halifax is automatically repeated at the instant of one o'clock. Navigators find this method useful and practical for checking chronometers at sea.

WIRELESS TELEGRAPHY.

The importance of wireless telegraph stations on the Atlantic and Pacific coasts has been recognized. The Marconi system has been established on the Atlantic coast, but at the Pacific coast stations, the Shoemaker system has been adopted. The latter system permits of inter-communication with vessels and stations having any other system of wireless telegraphy.

The system adopted on the Great Lakes is similar to the Atlantic coast system.

RADIO-TELEGRAPH BRANCH OF THE NAVAL SERVICE DEPARTMENT.

Coast Stations for Communication with Ships.

Name of Station	Normal range in nautical miles	Wave length	Call signal	Hours of service
GULF OF ST. LAWRENCE AND EAST COAST.				
Montreal, P.Q.	350	300 metres	V C A	Permanent
Three Rivers, P.Q.	150	600 "	V C B	"
Quebec, P.Q.	350	600 "	V C C	"
Grosse Ile, P.Q.	100	300 "	V C D	"
Father Point, P.Q.	350	600 "	V C F	"
Clarke City, P.Q.	250	600 "	V C K	"
Fame Point, P.Q. ②	250	600 "	V C G	"
Heath Point, P.Q. ②	250	600 "	V C I	"
Harrington, P.Q. ②	150	600 "	V C J	"
Point Riche, Nfld. ②	250	600 "	V C H	"
Point Amour, Nfld.	150	600 "	V C L	"

① Open from December 1st to May 1st only.

② Open during season of navigation only.

Name of Station	Normal range in nautical miles	Wave length	Call signal	Hours of service
GULF OF ST. LAWRENCE AND EAST COAST—Con.				
Belle Isle, Nfld.	250	600 metres	V C M	Permanent
Cape Ray, Nfld.	350	600 "	V C R	"
Cape Race, Nfld.	400	600 "	V C E	"
North Sydney, C.B.	100	600 "	V C O	"
Grindstone Island, P.Q.	200	600 "	V C N	8 a.m. to 8 p.m.
Cape Bear, P. E. I.	150	600 "	V C P	Permanent
Pictou, N.S. ①	100	600 "	V C Q	"
Camperdown, N.S.	250	600 "	V C S	"
Sable Island, N.S.	300	600 "	V C T	"
Cape Sable, N.S.	250	600 "	V C U	"
Partridge Island, N.B.	250	600 "	V C V	"
Glouce Bay, C.B. (for Transatlantic communication only)	G. B.	Permanent
GREAT LAKES				
Port Arthur, Ont.	350	600 "	V B A	"
Sault Ste. Marie, Ont.	350	600 "	V B B	"
Midland, Ont.	350	600 "	V B C	"
Tobermory, Ont.	350	600 "	V B D	"
Point Edward, Ont.	350	600 "	V B E	"
Port Burwell, Ont.	350	600 "	V B F	"
Toronto, Ont.	350	600 "	V B G	"
Kingston, Ont.	350	600 "	V B H	"
WEST COAST				
Gonzales Hill, B.C.	250	600 "	V A K	"
Point Grey, B.C.	150	600 "	V A B	"
Cape Lazo, B.C.	350	600 "	V A C	"
Pachena Point, B.C.	500	600 "	V A D	"
Estevan Point, B.C.	500	600 "	V A E	"
Triangle Island, B.C.	450	600 "	V A G	"
Ikeda Head, B.C.	250	600 "	V A I	8 a.m. to midnight
Dead Tree Point, B.C.	200	600 "	V A H	8 a.m. to 6 p.m.
Digby Island, B.C., Prince Rupert	250	600 "	V A J	Permanent
Alert Bay, B.C.	350	600 "	V A F	"
HUDSON BAY				
Port Nelson.	750	600 "	V B N	"
Le Pas, Man. (for communication with Port Nelson only)	V B M	Permanent

① Open from December 1st to May 1st only.

② Open during season of navigation only.

LIFE SAVING STATIONS

Station	Crew	Description of Boat	Equipment	Remarks
New Brunswick—				
Little Wood Island.....	8	Beebe-McLellan twin screw motor boat.	Full regulation	
Richilucto.....	8	Race point surf-boat, 24 feet long...!	"	
Point Escuminac.....	7	Beebe-McLellan self-bailing.	"	
Cape Tormentine.....	7	Beebe-McLellan self-bailing.	"	
Nova Scotia—				
Baker Cove.....	7	Dobbin's pattern self-righting, 25 feet long	"	
Blanche.....	7	Beebe-McLellan surf-boat, self-bailing, 25 feet long.	"	
Clark Harbour.....	7	Beebe-McLellan self-bailing, 25 feet long, low ends.	"	
Canso.....	7	Dobbin's pattern surf-boat, self-bailing, 25 feet long.	"	Lyle gun at this station
Devil Island.....	7	Beebe-McLellan surf-boat, self-bailing, 25 feet long.	"	Lyle gun at this station and new boat in 1903.
Duncan Cove.....	7	Beebe-McLellan surf-boat, self-bailing, 25 feet long.	"	
Herring Cove.....	7	Dobbin's pattern, self-righting and bailing, 25 feet long.	"	
Pictou Island.....	7	Dobbin's pattern, self-righting and bailing, 25 feet long.	"	
Port Mouton.....	7	Beebe-McLellan surf-boat, self-bailing, 25 feet long.	"	
Seatarie.....	7	Beebe-McLellan boat on east side.	"	
Seal Island.....	7	Beebe-McLellan boat on west side.	"	
St. Paul Island.....	3	Beebe-McLellan self-bailing, 25 feet long, low ends.	"	Lyle gun here since 1903.
White Head.....	7	Dobbin's pattern, surf-boat, self-bailing, 25 feet long.	"	
Sable Island.....	..	Two Dobbin's pattern, self-righting and bailing, and one Beebe-McLellan self-bailing.	"	Lyle gun and rocket apparatus at this station. Coxswain under control of Supt. of Humane Establishment.
Cheticamp.....	7	Beebe-McLellan twin screw, motor boat.	"	New station with look-out tower and telephone communication has been completed.

Station	Crew	Description of Boat	Equipment	Remarks
Nova Scotia—Con. Bay View (Digby Co.)	7	36 feet, self-bailing, self-righting power boat.	Full regulation.	Station in the course of construction.
Prince Edward Island— Priest Pond	12	Board of Trade apparatus.	"	
Charlottetown	..	Beebe-McLellan self-bailing.	"	
Souris	7	Beebe-McLellan self-bailing.	"	
Alberton	12	Board of Trade Rocket Apparatus	"	Rocket apparatus has been placed and house for the same.
British Columbia— Banfield	11	Doherty's Improved Beebe-McLellan, 25 feet long.	"	Placed at Pachena Bay
Uclulet	9	Self-righting self-bailing power, lifeboat, 36 feet long.	"	New motor boat and Lyle gun in combination with Pachena Bay.
Tassiat	1			Patrolling duty.
Clayoquot	8	Doherty's Improved Beebe-McLellan, 25 feet long.	Full regulation.	
Ontario—Great Lakes— Cobourg	6	Dobbin's pattern, self-righting and bailing.	"	
Collingwood	7	Beebe-McLellan self-bailing surf-boat.	"	
Goderich	7	Surf-boat	"	
Kincardine	7	Beebe-McLellan self-bailing surf-boat	"	
Long Point	9	Surf-boat	"	
Point Pelee	7	Surf-boat	"	Station moved to east end of point. Telephone communication being established.
Port Hope	7	Dobbin's pattern, self-righting and bailing.	"	
Port Stanley	7	Beebe-McLellan surf-boat, self-bailing, 25 feet long.	"	
Toronto Island	11	Dobbin's pattern, self-righting and bailing.	"	Fast motor boat being built. Removed from Poplar point in 1900.
Consecon	7	Dobbin's pattern, self-righting and bailing.	"	Removed from Wellington in 1893.
Southampton	7	Beebe-McLellan surf-boat, self-bailing.	"	

RULES GOVERNING BUOYS AND BEACONS ADOPTED UNIFORMLY THROUGHOUT THE DOMINION OF CANADA

UNIFORM SYSTEM

1. It is expedient in the interests of navigation in the Dominion of Canada, that a uniform system of buoys and beacons should be adopted for the harbours and channels;—the following rules, based upon the system adopted by the Washington Marine Conference of 1889, are therefore to be observed uniformly throughout the Dominion, and no deviations will, under any circumstances, be permitted.

DEFINITION OF STARBOARD AND PORT HAND

2. The term Starboard Hand shall denote that side which would be on the right hand of the mariner going with the main stream of flood, or in entering a river, harbour, or estuary from seaward, or, in tideless rivers, in going against the stream, or, in lakes, in going from the outlet towards the head of the lake. The term Port Hand shall denote the left hand of the mariner under the same circumstances.

SHAPES OF BUOYS

3. Buoys showing the pointed top of a cone above water shall be called Conical and shall always be starboard hand buoys, as above defined. Buoys showing a flat top above the water shall be called Can; those showing a domed top above water shall be called Spherical; and those showing only a mast above water shall be called Spar buoys

SPECIAL SHAPES

4. Buoys having a tall central structure on a broad base shall be called Pillar buoys and, like other special buoys, such as Lighted buoys, Bell buoys, Gas buoys, Whistling buoys, etc., shall be placed to mark special positions, which will be fully described when the buoys are placed. With the exception of Conical buoys, which when used shall always be starboard hand buoys, Conical topmarks, which shall always be starboard hand, or Cylindrical topmarks, which shall always be port hand topmarks, as herein mentioned, the shapes of buoys or beacons shall have no special significance at present in Canada.

COLOURING AND NUMBERING

5. Starboard hand buoys shall be painted red. and, if numbered, shall be marked with even numbers. Port hand buoys shall be painted black with odd numbers if any. Buoys defining middle grounds shall be painted with red and black horizontal bands and may be passed on either hand.

MID-CHANNEL BUOYS RARELY TO BE USED

6. The use of mid-channel or fairway buoys is to be discouraged, as even the most intricate and narrow channels can be properly defined by using Starboard and Port buoys. If used, as is occasionally convenient, particularly in the case of special signal buoys, they are to be painted in white and black vertical stripes and may be passed on either hand.

NUMBERS, LETTERS OR NAMES

7. Numbers, letters or names may be painted on the buoys, but they must never be so large as to interfere with their distinctive colouring. Wherever numbers or letters are used they shall be in consecutive order, commencing from seaward.

TOP MARKS

8. Where topmarks are used on buoys, they shall in no way conflict with the above regulations. Top marks resembling a cone to be used on the Starboard side, and those resembling a cylinder on the Port side of the channel. Any other distinguishing marks of buoys will be used to mark particular spots a detailed description of which will be given when the mark is first established.

WRECK BUOYS OR VESSELS

9. All buoys, and the topsides of vessels, used for the marking of wrecks, shall be painted a green colour, with a suitable white inscription, and shall be moored when possible near the side of the wreck next to mid-channel. Where it is practicable, by day one ball shall be exposed on the side of the vessel next the wreck, and two placed vertically on the other side. Three fixed white lights, similarly arranged, but not the ordinary riding light, should be shown from sunset to sunrise.

BEACONS

10. The above system of colouring and marking buoys is to be applied also to beacons, spindles and other day marks, so far as it may be practicable to carry it out.

ST. LAWRENCE SHIP CHANNEL

The history of deepening the Channel from tide water to Montreal is too lengthy to insert here. It was originally only 10 feet deep in places.

The ship channel of the river St. Lawrence between Montreal and Father Point has a total length of 340 statute miles.

The contracted part of the river, which may properly be called the "Ship Channel," commences at the Traverse, 220 miles distant from Montreal.

The 30 foot project for the channel between Montreal and Quebec had in view a channel of 30 feet depth, at the extreme low water of 1897, from Montreal to tidal water at Batiscan, and from Batiscan to Quebec at extreme low tide. The width contemplated was a minimum of 450 feet in the straight portions, and from 550 to 750 feet at the bends. An anchorage was to be provided at White Buoy Curve, Lake St. Peter, of 800 feet in width.

The 30 foot channel is now completed to the upper end of Cap a la Roche channel, a distance of 107½ miles from Montreal. The anchorage basin in Lake St. Peter has been completed and opened for navigation

The project for further deepening the channel, where dredging is necessary, to 35 feet was adopted and good progress has been made in this work. Part of the north channel below Quebec will be included in the work of deepening the channel so as to give a depth of 35 feet at extreme low tide with a width of 1,000 feet. The total cost of the Ship channel from 1851 to the end of fiscal year, 31st March, 1913, has been \$15,617,893.11, divided into: dredging, \$9,610,559.51; plant, shops, surveys, etc. \$6,007,333.60.

Radio-Telegraph stations for communication with ships approaching or in the St. Lawrence route, have been established between the Atlantic coast, Newfoundland and Montreal. The stations are mentioned in detail in the description of Montreal harbour and the St. Lawrence route, also under "Wireless Telegraphy."

Marine signal service is maintained by the Department of Marine and Fisheries for reporting incoming vessels bound for Montreal and other lower St. Lawrence river ports; these signal stations also furnish information regarding progress of vessels outward bound downstream. This service includes a private telephone service connecting signal stations between Montreal and Quebec. Below Quebec, a station is established at Crane island which has communication by the Bell Telephone Co. with the signal station at Quebec.

**INFORMATION RELATING TO OFFICES OF HARBOUR MASTERS,
WRECK RECEIVERS, SHIPPING MASTERS, PORT WARDENS, STEAM-
BOAT INSPECTORS, INSPECTORS FOR SEAWORTHINESS OF
VESSELS, WHARFINGERS, PILOTS AND PILOTAGE
AUTHORITIES AND THE FEES AND TONNAGE
TAX FOR WHICH VESSELS ARE LIABLE.**

Harbour Masters.—The Governor General in Council may by proclamation declare to be a public harbour any area covered with water within the jurisdiction of the parliament of Canada and appoint a harbour master. The rights, powers and duties of the harbour master or deputy harbour master are defined by a regulation that applies to all harbours alike in the Dominion, with the exception of ports under the control of harbour commissioners or town corporations. The duties of harbour masters consist of superintending the buoy service in the harbour district, assigning vessels to berths, the prevention of discharging ballast or ashes in the harbour except at points assigned for that purpose and prevention of obstructions to navigation.

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The remuneration forms one of the port charges and consists of fees. The fees are paid at the two first ports of entry of a vessel within the calendar year, and are as follows : for vessels discharging or taking in cargo, ballast, stores, wood or water, there shall be paid as fees,—

- (a) for every ship of fifty tons register or under, fifty cents ;
- (b) for every ship over fifty tons and not over one hundred tons register, one dollar ;
- (c) for every ship over one hundred tons and not over two hundred tons register, one dollar and fifty cents ;
- (d) for every ship over two hundred tons and not over three hundred tons, two dollars ;
- (e) for every ship over three hundred tons and not over four hundred tons register, two dollars and fifty cents.
- (f) for every ship over four hundred tons and not over five hundred tons register, three dollars ;
- (g) for every ship over five hundred tons and not over seven hundred tons register, four dollars ;
- (h) for every ship over seven hundred tons register, five dollars.

No tax is imposed, in Canada, on shipping, for the light-house, fog-alarm and buoy service.

Port Wardens.—The Governor General in Council may determine at what ports shall be appointed port wardens or deputy port wardens, whose duties consist of the examination of cargo and the surveying of damaged cargo or wrecked vessels or their hulls, rigging and spars. Vessels, wholly or partly laden with grain, cannot leave any Canadian port for a port not within Canada without the port warden's certificate, as evidence of proper loading.

The maximum rates of fees of port wardens are as follows :—

For every survey of hatches, cargo or hulls or spars and rigging a sum not exceeding \$8.

For valuation of a vessel for average or inspection of a vessel loading, a fee to be graduated according to tonnage but not to exceed \$10.

For hearing and settling disputes between masters and consignee a sum to be graduated according to the question or amount in dispute, but not to exceed \$20.

The port warden of any port may engage inspectors for valuing any parts of vessels, the fee for each inspector not to exceed \$5.

The maximum charge or fee may, however, be increased or altered by the council of a board of trade or chamber of commerce, but all such alterations must be approved by the Governor General in Council.

Port wardens may also approve of the manner in which marks are made for load line and deck line, required by the Act respecting shipping in Canada.

The Shipping Masters : The Governor General in Council may establish a shipping office at each port where a custom house is situated and appoint a shipping master, or, if no shipping master is appointed, the chief officer of the customs shall be a shipping master, under the Shipping Act. Part III of the Act relates to the provinces of Quebec, Nova Scotia, New Brunswick, Prince Edward Island and

British Columbia in respect of shipping and discharging of seamen of Canadian foreign sea-going ships and Canadian home trade ships. Part IV relates to shipping of seamen on the inland waters of Canada. The different forms specified in the Act are from H to P, both included. Agreements or articles are signed by the masters and seamen of vessels on form H, in regard to foreign sea-going and coasting vessels over eighty tons register, before shipping masters or in the presence of a respectable witness. These agreements contain as terms :

- (a) the nature and as far as practicable, the duration of the intended voyage or engagement ;
- (b) the number and description of the crew, specifying how many are engaged as sailors ;
- (c) the times at which each seaman is to be on board or to begin to work ;
- (d) the capacity in which each seaman is to serve ;
- (e) the amount of wages each seaman is to receive ;
- (f) a scale of the provisions which are to be furnished to each seaman ;
- (g) any regulations provided by form M as to conduct on board and as to fines, short allowance of provisions or other lawful punishments for misconduct which the parties agree to adopt.

The duties of a shipping master require him to afford facilities for engaging and discharging seamen, keeping a register of all seamen engaged and discharged and the fees paid by seamen for this service. It is also his duty to procure the presence of seamen engaged, on board, to deal with cases of desertion in port and to prevent improper discharging of seamen by masters. The fees for shipping salt water seamen are 50 cents for each seaman and 30 cents for discharging, excepting in British Columbia, where the fee may be any sum agreed upon, not exceeding \$10, including the fee of 50 cents. The fees on inland waters are 40 cents for shipping and 20 cents for discharging each seaman.

Receivers of Wreck.—The Governor General in Council may appoint any officer of customs or any other person, when more convenient, to be a receiver of wreck. It is the duty of a receiver of wreck, of any district, when a vessel is stranded or in distress in that district, to proceed to the place of stranding and take command for the preservation of the vessel and lives of the shipwrecked persons, but he cannot take command of the ship or cargo if the master, agent or owners object. Certain officers mentioned in the Shipping Act may exercise the powers of a receiver in the absence of a receiver. The receiver or officer may sell wreck or goods in his custody pay the salvage fees and expenses and then shall deliver any remaining portion to the person entitled to receive it. The maximum fees charged by receivers in addition to expenses properly and necessarily incurred, are as follows :—

For every inquiry into a casualty regardless of the number of persons examined a sum not exceeding 88.

For furnishing copy of evidence, 20 cents per 100 words.

For every salvage dispute heard and determined by the receiver in which the claim does not exceed \$100 or the value of the property saved does not exceed \$250, a sum to be charged on the property saved, not exceeding \$5.

For all other cases in which disputes are heard and determined by the receiver to be charged on the property saved, \$10.

For wreck received or taken by the receiver into his custody, a percentage of five per centum upon the value ; but in no case shall the percentage exceed \$80, to be charged on the wreck or derelict.

For every sale of a wreck conducted by a receiver, a sum not exceeding one per cent on the proceeds of sale.

For copies of certificates of valuation when the value is under \$3,000, a sum not exceeding \$4.

In other cases, to be charged on the property valued, \$8.

In cases where services are rendered by a receiver to any vessel in distress but not wrecked or in respect of the cargo, if the vessel with her cargo exceeds \$3,000, the sum of \$8 for the first day and \$4 for every subsequent day during which the receiver is employed on such service. If such vessel and cargo are less than \$3,000 in value, one-half the above mentioned sum.

In no case shall the amount exceed \$100 to be charged on such vessel or articles.

Pilotage.—The Governor in Council may from time to time, make the payment of pilotage compulsory or not compulsory, within the limits of any pilotage district fixed by the Governor in Council. Local pilotage authorities are appointed by the Governor General in Council, with the exception of the districts of Montreal and Quebec, the Minister of Marine and Fisheries being the pilotage authority for the two districts named. By-laws are framed and pilotage charges fixed by the pilotage authorities and approved by the Governor in Council. Pilots are licensed by the pilot authorities after they prove themselves competent by examination. Their boats fly the pilot's flag and pilots are required to offer their services to vessels whether they require them or not. The employment of pilots is not compulsory in any Canadian pilotage district, but the payment of pilotage dues in many districts is compulsory if the services of a pilot have been accepted, or have been offered and refused ; the charge in some districts being full pilotage rates and in others half rates, if spoken and the services refused. Where the by-laws provide, the payment of outward pilotage is compulsory as well as inward pilotage. Unlicensed persons when requested may act as pilots, when a vessel is in distress or no pilot has offered to pilot a ship or make a signal, and the unlicensed person shall be entitled to full pilotage dues for his services.

In waters where pilotage districts exist and it is impossible to board a vessel, a pilot is entitled to pilotage for leading a vessel by his boat to her destination. Masters of steamers running regularly in certain waters are sometimes licensed to pilot their own vessels upon payment of an annual fee.

His Majesty's ships and the Dominion government ships, are exempt from the payment of pilotage dues and also any ship bound inward when no licensed pilot offers his services, also—

Ships making or entering a harbour of refuge.

Ships registered in Canada of not more than 120 tons registered tonnage.

Any ship whose master or mate is licensed to pilot his own vessel within the waters she is then navigating.

Ships not exceeding two hundred and fifty tons that any pilotage authority determines to be exempt within its jurisdiction.

All ships registered in Canada of not more than two hundred and fifty ton registered tonnage, navigating the St. Lawrence river.

Further exemptions are vessels employed in trading between any one or more of the provinces of Quebec, New Brunswick, Nova Scotia or Prince Edward Island, and any other or others of them.

Vessels employed in voyages between any port or ports in the said provinces or any of them, and the port of New York or any port of the United States of America on the Atlantic north of New York

Vessels employed in voyages between any port in any of the provinces above mentioned and any port in Newfoundland.

Wharfingers.—The wharfingers are appointed by the Governor General in Council and are remunerated from tolls collected upon articles landed or shipped at the government wharves and from vessels moored or lying at them. The tariff of tolls is reasonable, and forms part of the regulations under which the wharfingers are authorized to levy tolls and dues. Persons refusing to pay tolls for the use of these wharves, render themselves liable to penalties or imprisonment, and the tolls, dues and penalties are a lien on the goods and on vessels when payment is not made.

For sailing vessels making use of government wharves, the side wharfrage scale of charges is graduated from 10 cents for vessels of 50 tons up to \$1.50 per day for vessels over 1,600 tons.

For steamers : from 20 cents per ton for steamers of 50 tons up to \$3 for steamboats of 1,600 tons, payable once a day if the steamer calls at the same wharf twice in the same day, and steamboats making use of the same wharf three times a week are required to pay twice only. Steamboats landing goods of which the freight amounts to \$10 only or less, are required to pay only half of the usual rate of wharfrage.

STEAMBOAT INSPECTORS AND STEAMBOAT INSPECTION.

The Governor General in Council shall, from time to time, appoint at such places as he deems advisable in Canada, steamboat inspectors whose duties shall be to inspect steamboats and examine applicants for engineers' certificates.

All passenger steamboats over five tons gross tonnage are subject to inspection, of boilers, machinery, hulls and equipment yearly, according to the rules of steamboat inspection.

Every freight steamer of more than one hundred and fifty tons gross is subject to inspection yearly, according to the rules of steamboat inspection for boilers, machinery and hulls.

Freight steamers, tug boats and steamers used for fishing purposes, under one hundred and fifty tons and more than five tons gross tonnage are subject to inspection of boilers and machinery, according to the rules of steamboat inspection.

Steam dredges, floating elevators and vessels of like kind are subject to the annual inspection of steamers and machinery, as required by the rules for the inspection of steamboats.

At present, there is no fee charged for inspection except upon steamers registered elsewhere than in Canada when engaged in carrying passengers between

Canadian ports and not holding a British Board of Trade Certificate. The fee is then in Canada eight cents on the gross tonnage of such foreign steamer.

Engineers' Certificates.—For the first certificate granted to an engineer of any class the fee is five dollars, and for every certificate after an examination for a higher class the fee is also five dollars.

The fee for a temporary certificate is two dollars.

If a certificate is lost or becomes illegible it may be renewed at the cost of one dollar.

First-class engineers are permitted to take charge of any steamboat.

Second-class engineers are permitted to take charge of any freight steamboat or of any other steamboat except a sea-going passenger boat of more than one hundred nominal horse-power.

Third-class engineers are not permitted to take charge of any sea-going steamboat but may take charge of any coasting passenger steamer or passenger steamers on inland waters, of not more than thirty nominal horse-power, single cylinder engines or of forty-five horse-power compound engines, or any freight steamboat of not more than seventy-five nominal horse-power.

Fourth-class engineers may act in the capacity of assistant engineers on any steamboat except sea-going passenger steamers of more than one hundred nominal horse-power, but cannot act as chief engineers on any steamboat.

Temporary certificates, valid for 12 months on a specified steamer, are issued to applicants who have sufficient knowledge and experience of steamboat machinery to act as engineers on passenger steamers, provided the engines are not more than four nominal horse-power if of the single cylinder type or fourteen horse-power if of the compound type and confined to certain limits.

Masters and Mates.—No ship registered in Canada, over one hundred tons registered tonnage, shall go on a sea-going voyage unless the master and first mate or only mate have certificates for sea-going ships.

No sailing ship nor steamship registered in Canada, over one hundred and fifty tons, registered tonnage, is permitted to leave any port or place in Canada on any coasting voyage or ply on any Canadian water, without a master who has a valid certificate.

Every ship registered in Canada of over 400 tons and every passenger steamer, registered in Canada, carrying more than forty passengers on a coasting voyage or on any waters of Canada must have a certificated master and mate.

Pleasure yachts not used for carrying passengers or goods for hire, ships employed solely in fishing and barges not propelled by steam or other vessels without masts, sails and rigging, sailing ships employed in the coast-wise trade of not more than one hundred tons, registered tonnage, propelled by auxiliary power other than steam, employed partly in fishing and partly in the carriage of freight, and steamers five tons gross tonnage and under are not required by law to carry certificated masters and mates.

Scale of fees for Canadian certificates granted to masters and mates :—

For a certificate of competency as master, fifteen dollars.

For a certificate of competency to a sea-going mate, eight dollars.

For a certificate of competency to a mate coasting or sailing on inland waters or minor inland waters of Canada, six dollars.

For a certificate of service as master the fee is eight dollars, and for a certificate of service as mate sea-going, five dollars.

For a certificate of service as mate, coasting or on inland waters, four dollars.

Sea-going certificates of service for vessels of not more than one hundred and fifty tons are granted to masters and mates who can prove service in the respective positions previous to 1884 and can produce satisfactory evidence of good character and can pass the colour test, on payment of the usual fee.

Service certificates for coasting and inland waters are granted to masters and mates who can produce satisfactory evidence of having been masters and mates previous to the year 1883, on payment of the usual fee.

On the loss or deprivation of a master's or mate's certificate, a certified copy can be secured, on application to the Minister, on such terms and conditions as the Minister sees fit.

Sick and Distressed Mariners.—Duty on Ships.—There shall be levied and collected on every ship arriving in any port in the provinces of Quebec, Nova Scotia, New Brunswick, Prince Edward Island and British Columbia a duty of one and one-half cent for every ton which such ship measures registered tonnage to be paid at the custom house of the port.

Ships of the burthen of more than one hundred tons register shall be liable for the payment of the said duty three times in one year but not oftener.

Ships of the burthen of one hundred tons or less, shall be liable to the payment of the said duty once in each year but not oftener.

Ships employed in fishing may by paying the fee once in a year before starting on a fishing voyage, enjoy the benefits of the fund.

INSTRUCTIONS FOR THE GUIDANCE OF MASTERS AND SEAMEN WHEN USING THE ROCKET APPARATUS FOR SAVING LIFE.

PUBLISHED BY LLOYD'S COMMITTEE BY AUTHORITY OF THE BOARD OF TRADE.

In the event of your vessel stranding on the coast of the United Kingdom, and the lives of the crew being placed in danger, assistance will, if possible, be rendered from the shore in the following manner; namely,

1. A rocket with a thin line attached will be fired across your vessel. Get hold of this line as soon as you can; and when you have secured it, let one of the crew be separated from the rest, and, if in the daytime, wave his hat or his hand, or a flag or handkerchief; or, if at night, let a rocket, a blue light, or a gun be fired, or let a light be waved as a signal to those on shore.

2. When you see one of the men on shore, separated from the rest, wave a red flag, or, if at night, wave a red light; you are to haul upon the rocket line until you get a tailed block with an endless fall rove through it.

3. Make the tail of the block fast to the mast well above the deck, or if your masts are gone, then to the best place that can be found, bearing in mind that the lines should be kept clear from chafing the wreck, and that space is left above for the hawser (see paragraph 5). When the tail block is made fast, and the

rocket line unbent from the whip, let one of the crew, separated from the rest, make the signal required by Article 1, above.

4. As soon as the signal is seen on shore a hawser will be bent to the whip line, and will be hauled off to the ship by those on shore.

5. When the hawser is got on board, the crew should at once make it fast to the same part of the ship as the tail block is made fast to, only about 18 inches higher, taking care that there are no turns of the whip line round the hawser. The whip should then be unbent from the hawser.

6. When the hawser has been made fast on board, the signal directed to be made in Article 1, above, is to be repeated.

7. The men on shore will then set the hawser taut, and by means of the whip line will haul off to the ship a sling lifebuoy, into which the person to be hauled ashore is to get. When he is in, and secure, one of the crew must be separated from the rest, and again signal to the shore as directed in Article 1, above. The people on shore will then haul the person in the sling to the shore, and when he has landed will haul back the empty sling to the ship for others. This operation will be repeated until all persons are landed.

8. It may sometimes happen that the state of the weather and the condition of the ship will not admit of a hawser being set up; in such cases a sling lifebuoy will be hauled off by the whip, which will be used without the hawser.

Masters and crews of stranded vessels should bear in mind that SUCCESS in landing them in a great measure DEPENDS UPON THEIR COOLNESS AND ATTENTION TO THE RULES HERE LAID DOWN; and that by attending to them many lives are annually saved by the rocket apparatus on the coasts of the United Kingdom.

The system of signalling must be strictly adhered to; and all women, children, passengers, and helpless persons should be landed before the crew of the ship.

DISTRESS SIGNALS.

When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, viz:

In the daytime:

1. A gun or other explosive signal fired at intervals of about a minute.
2. The International Code signal of distress indicated by NC.
3. The distant signal, consisting of a square flag, having either above it or below it a ball or anything resembling a ball.
4. A continuous sounding with any fog-signal apparatus.

At night:

1. A gun or other explosive signal fired at intervals of about a minute.
2. Flames on the vessel (as from a burning tar-barrel, oil-barrel, etc.)
3. Rockets or shells, throwing stars of any colour or description, fired one at a time at short intervals.
4. A continuous sounding with any fog-signal apparatus.

EXPLANATION OF COMPASS TERMS

Variation of the Compass is the angle between the True North and the Magnetic North. This difference or error arises from the Magnetic Poles not coinciding with the Terrestrial ones, and is due entirely to the influence of the earth on Magnetic Needles, which is the same only at few parts of the world.

Deviation of the Compass is the angle included between the Magnetic North and the Compass North. This error is due to the disturbing influences of the iron of which the ship is built, as rudder posts, masts, chains, funnels, etc., her position when building, her cargo, or other causes within the ship.

Local Attraction is the error caused by some disturbing force outside the ship, and belonging entirely to the locality at which a ship may be—as mooring posts or chains, dock cranes, another iron vessel alongside, volcanic or magnetic influences, etc.

Heeling Error is the effect produced on the Compass by the heeling of an iron or composite ship, the angle increasing with the amount of Heel.

Leeway is the angle between the ship's course by Compass and the direction which she makes through the water, as shown by her wake.

Compass Course is the course steered by ship's Compass.

Magnetic Course is the Compass Course corrected for Deviation and Leeway.

The True Course of a Ship is the Compass Course corrected for Deviation, Leeway, and Variation.

SEAPORTS.

ABBOT HARBOUR, Yarmouth county, Nova Scotia. The harbour is on the south east coast of Nova Scotia, is formed by the narrow channel between Abbot island and the main shore. The entrance is only a cable across and easy of access for small vessels. The harbour is well sheltered and has a depth of water of $3\frac{1}{2}$ fathoms. The light is a fixed white light on a mast on the east side of the harbour, in latitude 43 39 25 N., longitude 65, 49, 36 W. See List of Lights on the Atlantic Coast for 1913.

The port charges are the same as at other Canadian seaports, viz., Harbour Master's dues, 50 cents for vessels of 50 tons register or under, increasing, according to size, up to \$5.00 for vessels over 700 tons, paid twice yearly in the Dominion.

Directions.—Approaching from the southward, the west end of Abbot island in line N. 31° E., with a point on the mainland within Bramble island leads about $1\frac{1}{2}$ cables westward of St. Ann shoal and of the outer shoal off Twin islands; when abreast Stony island, steer by bearings of the lighthouse to avoid the shoal water extending about 2 cables to the southward of Abbot island, until the northern point of the harbour opens out east of Abbot island, thence round, at about half a cable, the south-east point of the island, and anchor in a depth of about $3\frac{1}{2}$ fathoms midway between the island and the main shore. See S.E. coast of Nova Scotia Pilot and charts Nos. 2537, 352, 1651, 2670.

ADVOCATE HARBOUR, Cumberland county, Nova Scotia, is between cape d'Or and cape Chignecto, bay of Fundy, about the middle of the head of Advocate bay. From the middle of Advocate bay, a natural sea wall, 10 feet above high water, extends almost continuously to the western point of cape d'Or, 9 cables from the

shore, thus forming between it and Advocate settlement a deep basin with mud bottom. Near cape d'Or there is an opening at high water and vessels pass through into the basin or harbour inside, where they ground at low water. There is an anchorage near the entrance in which small vessels can lie afloat at low water.

Advocate bay lies between cape d'Or and cape Chignecto, and the distance between the capes is $7\frac{1}{2}$ miles. The water is deep in the bay, varying from 3 fathoms near the shore to 18 fathoms out in the bay, low water. The tide rises and falls at cape Chignecto 37 feet springs and $30\frac{1}{2}$ feet at neaps. See "Nova Scotia (S.E. Coast) and Bay of Fundy Pilot" and chart No. 354.

In the bay, buoys have been placed and are kept in position.

Port Charges are sick mariners' dues of $1\frac{1}{2}$ cents per ton register, paid three times a year and optional with fishing vessels; harbour master's dues, 50 cents for vessels of 50 tons and under, increasing up to \$5.00 for vessels over 700 tons, paid at the two first ports entered yearly. Supplies are readily obtained.

Light.—One red fixed light on the south side of entrance to harbour, lat. 45 19 30 N., long. 64 47 30 W., one fog whistle extreme point of cape d'Or, lat. 45 17 25 N., long. 64 47 30 W. See List of Lights on the Atlantic Coast for 1913.

ALBERNI, British Columbia, is situated at the head of Alberni canal. This canal is a natural inlet running in a northerly direction from Barkley sound. The canal or inlet varies in width from 2 cables to one mile and terminates in a fine capacious anchorage at its head. The inlet is of great depth in its whole length, and at its head there is a depth of from 3 to 9 fathoms. The wharves at the port of Alberni at the head of the inlet are the Esquimalt and Nanaimo railway wharf 1250 feet long and the deep water wharf, a length of 300 feet. Alberni is an outport of Nanaimo for customs purposes and trade and navigation returns.

Light.—One on east side entrance of Somass river, lat. 49 14 35 N., long. 124 49 50 W., white fixed, unwatched, visible from all points of approach. See List of Lights Pacific Coast for 1913.

ALBERT HARBOUR, Albert county, New Brunswick, is a small harbour on the Shepody river. This river empties into Shepody bay an extension of Chignecto bay, an arm in the north eastern part of the bay of Fundy. There are several wharves on Shepody river, one at Albert, from which gypsum is shipped, and others on the river from which general shipments are made and two large wharves from which lumber only is shipped. All these wharves have railway sidings with the exception of one situated on the south side of the river.

Light.—Vessels pass Grindstone island where there is a white occulting light and fog alarm on the W. point of the island, lat. 45, 43, 16 N., long. 64 37 24 W. See List of Lights on the Atlantic Coast for 1913. The island is on the way up the Shepody river. Albert harbour is within the customs port of Riverside.

ALERT BAY, British Columbia, on the south side of Cormorant island. The bay is three quarters of a mile wide and half a mile deep; it affords good anchorage in from 4 to 8 fathoms, low water; sand and mud bottom. Salmon canneries are established at this place and piers accommodate small vessels. The rise and fall of the tide is 16 feet springs, and 9 feet neaps. Tonnage entered and departed for the fiscal year, 1911-12 was 487,922 tons.



A View of Inner Harbour, Alma, N.B.

ALMA HARBOUR, Albert county, New Brunswick, is a small harbour in Chignecto bay, an arm of the bay of Fundy. There is a continuous wharf along shore, 400 feet in length and 50 feet wide, and above the bridge is a wharf 100 feet along shore by 70 feet in width; depth of water at the wharves about 16 feet. There is an outer and an inner harbour, the outer is known as Herring cove, where steamers and vessels load lumber. The anchorage in Herring cove is good, and bottom soft mud; tides rise, springs 37 feet, neaps, 30 feet. Alma is open all the year round.

AMHERST HARBOUR, Cumberland county, Nova Scotia. This harbour is in Cumberland basin at the extreme eastern end of the bay of Fundy. There are two wharves in the harbour; one 200 by 30 and one 150 by 30 feet, railway siding on each wharf; one shed and hoisting engine; depth of water at the wharves 25 feet at high water; no docks for repairs and no anchorage for vessels to lie afloat at low tide, the bottom is soft mud. In the harbour are two buoys, one on the starboard and the other on the port side entering. Vessels enter this harbour only during a rising tide or high tide. When the tide falls vessels lie on mud bottom. Amherst is a port of entry for vessels.

Lights.—Front light near west corner Amherst basin, latitude N. 45 50 4. longitude W. 64 16 40; back light 688 feet 43° 20' from front light, both red fixed. See List of Lights on the Atlantic Coast for 1913.

Port charges are sick mariners' dues and harbour master's dues when not collected in another Canadian port. Tonnage entered and departed, 32,713 tons in fiscal year 1911-12.

Sailing Directions.—Cumberland basin is the eastern termination of Chignecto bay, and receives the waters of numerous rivers. It lies on the eastern side of cape Maringouin, and between Peck and Boss points; the entrance is

1 4-10 miles across; from this position the channel is straight and navigable for a distance of 8 miles to a little beyond Woody point on the northern shore. See Coast Pilot, S.E. Coast, Nova Scotia and bay of Fundy and Chart No. 354.

ANNAPOLIS HARBOUR, Annapolis county, N.S. This harbour is situated on the Annapolis river about 10 miles from Annapolis basin. The entrance to the basin from the bay of Fundy is at Digby strait or gut. The gut is narrow and has a depth of water of about 25 fathoms at its narrowest part, but this depth decreases greatly inside the basin and varies from 12 to 14 fathoms immediately inside the basin to from $3\frac{1}{2}$ fathoms to 6 fathoms low water spring tides in the channel to Annapolis. There is good anchorage for large vessels at several places in the basin and vessels of 1,700 tons can proceed towards Annapolis as far as the King's wharf. From Annapolis basin the Annapolis river has a general E. by N. direction for 10 miles to the town of Annapolis; midway is Goat island which divides the river into two channels, the northern channel being the deeper and having from $4\frac{1}{2}$ to 6 fathoms of water until Annapolis harbour is reached.

A shoal which surrounds Goat island, excepting the south side, dries at low water. Banks that dry on the south side of the river vary from one cable to three quarters of a mile from the shore. Buoys are placed in Annapolis basin leading to Annapolis at the following points: one spar buoy starboard side at Goat island; one spar buoy port side at Marsh point. At Annapolis there is anchorage from 6 to 11 fathoms, but vessels should anchor with a swivel, or head and stern, on account of eddies.

Lights.—One white occulting light on end of Digby pier; latitude 44 37 40 N., longitude 65 45 6 W.; one white fixed light on Shafner point, latitude N. 44 42 40, longitude W. 65 37 12; one red fixed light at water's edge at Annapoli N.E. of Government pier, latitude N. 44 44 51; longitude W. 65 31 6. See List of Lights on the Atlantic Coast for 1913.

Services of pilots can be obtained by applying to the Collector of Customs at Digby at the entrance of Annapolis basin. Tonnage entered and departed 40,942, fiscal year 1911-12.

For further information see Coast Pilot of S. E. coast of Nova Scotia and bay of Fundy and chart No. 2561. The port is open for vessels the whole year.

The port charges are the same as at other Canadian seaports, viz.: harbour master's dues, paid twice in each year, unless paid in other Canadian ports, according to tonnage; sick mariners' dues, paid three times in the year, for vessels of 100 tons burthen and over. Canadian fishing vessels may pay sick mariners' dues for each voyage, but payment is optional.

APPLE RIVER HARBOUR, Cumberland county, N.S. This is a small harbour at the mouth of Apple river which empties into Chignecto bay, an arm of the bay of Fundy. At the entrance, the depth of water is 6 fathoms and from $1\frac{3}{4}$ to $1\frac{1}{2}$ fathoms inside the harbour at low water. In this vicinity at Spicer cove, a small indentation of the coast, the tide rises 37 feet at spring tide and $30\frac{1}{2}$ feet at neap tide, giving an idea of the rise and fall of the tide in the harbour of Apple river.

Light.—The light is situated on cape Capstan N. of the entrance, in latitude N. 45 28 20, longitude W. 64 51 35, and is a fixed white light. A steam fog-alarm is established at the light station, which gives blasts of 14 seconds, with intervals of 46 seconds. See List of Lights on the Atlantic Coast for 1913.

The port charges are similar to those made in other Canadian ports, namely, sick mariner's dues and harbour masters' dues. The harbour opened on the 1st April and closed 22nd December in 1910.



Arichat, N.S.

ARICHAT HARBOUR, Richmond county, N.S., is a capacious harbour and is extensively used for shelter. It has two entrances, of which the northern is the least difficult although narrow; depth of water in this entrance is from 9 to 10 fathoms at low water; rise and fall of the tide, 5 feet spring and 4 feet neap. The southern entrance is three cables wide but lies between shoals. Jerseyman island east and west lies between the northern and southern entrances. The depth of water in the harbour is from 7 to 10 fathoms up to within a cable's length of the shore on both sides. The harbour is about two miles in length and from a half mile to three quarters in width. There are five starboard buoys and two port buoys in the harbour and three can buoys on the outside of Chebucto bay, leading into the harbour; one 3 foot conical buoy off Hautfond shoal; black can off Henley ledges; 5 foot conical off the shoal extending westerly, from Jerseyman's island, southern side of Crab Passage, northern entrance to Arichat. The harbour contains six private wharves, and one Government wharf and shed were recently built, the depth of water at the head of each wharf being 10 feet at high water; a short distance from these wharves the water is 20 feet deep. The bottom in the harbour is mud and affords good anchorage. There are no railway sidings leading to the wharves nor sheds upon the wharves with the exception of the Government wharf.

Drinking water and ship's stores and provisions are easily obtained. The harbour is practically open all the year round.

Lights.—West Arichat, one red fixed light on inner end of beach on north side of harbour, latitude 45 31 24 N., longitude 61 5 17 W., the other on shore of mainland 1,800 feet 62° from front, white fixed, one white fixed light on West Arichat wharf; one red fixed on Jerseyman island on Beach point, Arichat harbour, latitude 45 30 20 N., longitude 61 3 10 W.; one white fixed light on Marache point S. entrance to Arichat harbour, latitude 45 29 0 N., longitude 61 1 50 W. See List of Lights on the Atlantic Coast for 1913. Port charges same as other Canadian ports, viz: harbour master's and sick mariners' dues.

Pilotage charges, when pilots are employed, are according to rates of the Richmond county pilotage authority, as Arichat is in the Richmond pilotage district. Fishing and other vessels find shelter and get water and provisions. The total tonnage of vessels which entered and cleared during the fiscal year 1911-1912 was 233,054.

Sailing Directions. Southern entrance.—When bound to Arichat from the eastward, pass Hautfond shoals by keeping the southern end of Green island in line with cape Hogan, or open of it, until the beacon on Jerseyman island is in line with the cupola of the convent; keep that mark on until the lighthouse on Marache point bears S.E. $3\frac{1}{4}$ S., thence steer E. $1\frac{1}{4}$ N. so as to make a direct course towards Litt'e Barachois at the head of Capodiette bay; and when the Roman Catholic church bears N. 4° E. (the road just westward of the church is then open), run towards it until the southern end of Crichton island opens northward of Beach point. Then haul to the westward, and anchor anywhere northward of the line from Poule islet to Beach point. Southward of that line, in the bight of Jerseyman island, is Cage shoal, with only 7 feet water, and much foul ground.

To go to the eastern part of the harbour, stand well over to the northern shore and run to the eastward along it at a cable from the ends of the wharves, until Marache point is shut in by Kavanagh point, when there is deep water and bold shores to $1\frac{1}{4}$ cables from the entrance of the cove at the head of the harbour.

The foregoing, with the assistance of the buoys, are safe directions, but with local knowledge it might be expedient to pass eastward of Hautfond Shoals with the Roman Catholic church and Marache point in line bearing N. 26° E., until a quarter of a mile from the point; then, after rounding the point and the shoal water off its northern side, proceed as above directed.

Northern entrance.—From the westward, after passing Peninsula shoals keep Bear head open of Peninsula point until the Roman Catholic church at Arichat is open southward of Crib islands, to clear Crichton shoal; this mark also leads clear to Picard reef and of the shoal water off Crichton island; avoid also Cerberus rock.

Having passed Crichton shoal, bring the Roman Catholic church to bear S. 84° E., when it will be in line with the middle of Crib pass. Keep it so until in the pass, then round Beach point at any distance between 60 and 200 yards, and steer into the harbour. See St. Lawrence Coast Pilot and Chart No. 2,727 (1,317).

BADDECK HARBOUR, Victoria county, Cape Breton island, N.S., is located on the western shore of Baddeck bay, between Kidston island and the main. Baddeck bay is on the northern side of Little Bras d'Or lake. Vessels from the gulf and Cabot strait enter at Big Bras d'Or entrance and pass along the channel between Boularderie island and the main. Depth of water in the harbour is from $4\frac{1}{2}$ to 6 fathoms and anchorage is good. Kidston island in front of the harbour affords good shelter in all winds.

The Government wharf is 250 feet long by 40 feet wide, water 21 feet at the head; freight shed 46 by 24; there is also on the wharf a building 30 feet by 22 with waiting room and office. McDonald's wharf is 200 feet by 30 with 18 feet of water at the head; this wharf has also freight shed and office buildings.

No railway sidings are laid on the wharves nor are there cold storage buildings. There is no dry dock nor machinery loading facilities. Port charges are sick mariners' and harbour master's dues similar to other Canadian seaports. The entrance of the harbour is buoyed by two spar buoys on the port hand side entering. Provisions and water are easily obtainable.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 79,069 tons.

Light.—The light is red, fixed, and situated on N.E. point of Kidston island lat. 46 5 58 N., long 60 44 20 W. See List of Lights on the Atlantic Coast for 1913.

Directions. There are two entrances into Baddeck harbour but the eastern entrance is preferable, the western being very narrow.

Pass Red point which is bold to at about 2 cables distance, and steer N. by W. for the church, which, situated close to the shore at about half a mile eastward of the village, is prominent. Continue on this course until the two western churches at Baddeck village are in line N. 73 W.; keep this mark on which leads northward for the $3\frac{1}{2}$ fathoms shoal, and when Kidston island lighthouse bears W. by S., steer for the anchorage and moor in $4\frac{1}{2}$ fathoms, mud bottom, at N. by W. one cable from the lighthouse.

With beating wind, haul close round Red point and work up on the eastern shore of the bay, as it is free from shoals, tacking by the lead. See St. Lawrence pilot and chart No. 2,727.

BAIE VERTE, Westmoreland county, New Brunswick, is 9 miles wide at its entrance from Northumberland strait and $2\frac{1}{2}$ miles at its head. There is no harbour in baie Verte, it is completely open to easterly winds and shallow at its head. The water is from $2\frac{1}{2}$ to 6 fathoms at low water, spring tides. There are several shoals directly in the fairway entering the bay; Aggermore shoal, with 18 feet least water, lies N.E. $\frac{1}{2}$, E. 2.7 miles from Cold Spring head; Laurent shoal, rock and sand, with 16 feet least water, is about $\frac{3}{4}$ miles long and 3 cables wide, its shoalest part is S.E. by S. $2\frac{3}{4}$ miles from cape St. Laurent. The shoal is steep to on its eastern side close to which is a depth of 4 fathoms. Aggermore rock and Laurent shoal are the shallowest parts of an extensive bank which extends southward from capes St. Laurent and Spear so as to leave a deep channel about 2 miles wide between it and Cold Spring head. A depth of $3\frac{1}{2}$ fathoms at low water is left between Aggermore rock and Laurent shoal and also between Laurent shoal and the banks off the northern shore of the bay. Spear shoal is a bank of sand and stones more than a mile long east and west and 3 cables broad with depths of 15 to 18 feet except on a patch near its eastern end where there is a depth of only 10 feet which bears S.S.E. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles from cape Spear. The lead gives little warning from the eastward on which side there is a depth of $3\frac{1}{4}$ to $4\frac{1}{4}$ fathoms close to; but it is avoided by keeping in $4\frac{1}{2}$ fathoms; there are $3\frac{1}{4}$ fathoms between it and cape Spear.

Heart shoal, lying about a mile west north westward from Spear shoal and south-west by south $1\frac{1}{4}$ miles from cape Spear, has 6 feet least water within

the 3 fathom line of soundings. Boss spit extends three-quarters of a mile from the southern shore between Boss and Jackson points, is dry at low water to its edge where it is steep to having 17 feet of water close to its outer point. See St. Lawrence Coast Pilot. *Light* at Fort Monkton near the point in lat. 46 2 38 N., long. 64 3 55 W. white fixed. List of Lights Atlantic Coast including Gulf of St. Lawrence for 1913.

Directions.—In entering baie Verte, keep the Nova Scotia coast aboard, running up to 7 fathoms water, till off Cold Spring head, where, at the distance of about $1\frac{1}{2}$ miles from the shore, the water deepens to 8 and even nearly to 10 fathoms, southward of the banks and shoals extending southward from cape St. Laurent. At about 3 miles northward of Cold Spring head, the depth of water decreases to less than 5 fathoms, and continues to shoal gradually, with mud and sand bottom, to the head of the bay. Do not go into less water than $3\frac{1}{4}$ fathoms until past Boss spit. Farther up the bay is clear, excepting two patches of stone with 3 and 5 feet water, at N.N.E. $\frac{1}{2}$ E., a half and three-quarters of a mile from Tidnish head, and there are several ballast heaps at the entrance of the channel of the river, but all within the 2-fathoms line of soundings.

Port Charges are harbour master's dues, 50 cents for vessels of 50 tons and under and increasing up to \$5.00 for all vessels over 700 tons, paid twice yearly in the two first ports entered, and sick mariners' dues, $1\frac{1}{2}$ cents per ton, paid only three times yearly in Canadian ports.

Tonnage inwards and outwards 9029 for fiscal year 1911-12.

BARRINGTON BAY, Shelburne county, Nova Scotia, is a spacious inlet; its points of entrance are Baccaro point on the east and cape Sable on the west. Near its head is an anchorage accessible by two channels, one east, the other west of Cape Sable island; the island affords partial protection to the anchorage. The western channel is difficult of entrance except to one having local knowledge, owing to its dangers. The anchorage has a depth of 6 fathoms. Rise of tides, $8\frac{1}{2}$ feet springs and $6\frac{1}{2}$ feet neaps. Shotpouch shoal is a rocky shoal 2 cables in extent, the centre being 3 cables westward of Baccaro lighthouse. Bantam rocks, 1 1-10 mile south-west from Baccaro lighthouse, uncover at low water and nearly always break, they are half a cable apart and form the highest part of a dangerous rocky ledge nearly a quarter-of-a-mile in length. White Knoll ledge is a shoal with less than 6 feet on it on the western side of the entrance to Barrington bay. The eastern channel is more easily entered than the western, and can be approached on either side of Bantam rocks, but if passing between them and Baccaro point, vessels will have to do so by bearings of the land as no leading marks are available. There is room to work a vessel in this channel to the anchorage.

There is a gas and whistling buoy anchored off south-west ledge cape Sable, and a lightship moored in 6 fathoms about 4 cables eastward of Wessex point in Barrington bay. There are 36 spar and other buoys in the two channels and vicinity.

Directions, Eastern Channel. After passing clear of Shotpouch shoal, a course can be shaped up the bay to pass Mud channel between the shoals extending from

Clam point and those of the mainland. Lighthouse rock should then be seen near y n line with the light vessel and by steering for it on a N. 30° W. bearing, the shoal will be avoided, and after passing the lightvessel anchorage will be found in 6 fathoms with North East point of Cape Sable island, bearing West. See Nova Scotia (S.E. Coast) and Bay of Fundy Pilot and Admiralty Chart No. 352.

Lights.—One white light Baccaro east side Eastern channel entrance to Barrington bay, lat. 43 26 54 N., long. 65 28 12 W., one white light and fog alarm on cape Sable, lat. 43 23 19 N., long. 65 37 15 W., and Barrington East bay lightship white and red fixed light, lat. 43 31 5 N., long. 65 34 25 W. See List of Lights on the Atlantic Coast for 1913.

The port charges are harbour master's and sick mariners' dues, similar to other Canadian ports.

The total tonnage entered and cleared at this port was 77,786 tons in 1912.

BATHURST HARBOUR, Gloucester county, New Brunswick, is entered from Chaleur bay. The harbour is at the mouth of the Nipisiguit river, is 4½ miles long and 2½ miles wide and is nearly dry at low water, excepting the channels of four rivers which converge and make one main channel to the entrance. Rise and fall of tide 7 feet springs, and 4 feet neap. The harbour is well sheltered for small vessels with from 1¼ to 2 fathoms at low water inside the entrance. There is a bar at the entrance with only 7 feet of water at low tide springs, at its shoalest part. The entrance is about 2 cables wide; there are two starboard and port hand buoys leading to it. Outside the entrance large vessels load in the "Roads"; 4 can buoys are kept in position outside the entrance and 1 ballast ground buoy 3 miles from entrance. Inside the harbour 5 starboard and 7 port buoys lead to the public wharf and from the forks of channels to Nipisiguit bridge 3 starboard and 5 port buoys are maintained.

There is only one public wharf at Bathurst village; length 250 feet with 10 feet of water at low tide; several wharves are owned within the harbour by the Bathurst Lumber Company and the Nipisiguit Lumber Company, having 10 feet water at low tide. There is a railway spur from the Caraquet Railway to the wharf of the Nipisiguit Lumber Co.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 139,435 tons.

The Light is one white, fixed, on Carron point, west side of entrance to harbour, lat. 47 39 20, long. 65 36 40 W.; one red fixed 360 feet N. 28° from other light. See List of Lights on the Atlantic Coast for 1913.

Port charges are harbour master's dues and sick mariners' dues, similar to other Canadian ports.

Directions.—Local knowledge is necessary to enter Bathurst harbour and the bar should not be attempted without a pilot. Good pilots can be obtained for Bathurst harbour.



Partial View of Bear River Harbour, N.S.

BEAR RIVER harbour, Digby county, Nova Scotia. This harbour is at the mouth of Bear river which empties into the Annapolis basin on the southerly side opposite Digby gut, bay of Fundy. Deep water is found in the basin passing the gut, until the mouth of Bear river is reached. The harbour is a tidal harbour, and vessels ground at the village of Bear river at low tide. There are 9 wharves, with an area of 92,000 sq. ft., ten warehouses for general stores; water 17 feet at neap tides, 22 feet at full tides. About two miles below the wharves vessels lie afloat at low water, the anchorage is good and safe. Vessels when loading large cargoes of lumber finish at this anchorage where there is 25 feet of water at low water. There is a set of blocks in the harbour, on which vessels of 800 tons may be repaired, cheaply and quickly. Water and supplies are easily obtained. Lumber and other cargo is loaded at this port. There is a cold store at Victoria bridge.

Light.—The light at Bear river is red fixed, it is on Winchester point, lat. N. 44 37 5., long. W. 65 41 0; visible from all points of approach.

Port charges are harbour master's dues, viz., 50 cents for vessels of 50 tons up to \$5.00 for vessels over 700 tons, paid twice a year. Sick seamen's dues, 1½ cent per ton, paid three times in the year only. Navigation is open all the year round at this port.

BEAVER HARBOUR, in Halifax county, south east coast of Nova Scotia. The coast in the vicinity of this harbour is dangerous, but the harbour itself is easily entered after Beaver island lighthouse has been identified. The entrance channel is straight and deep after passing about half-a-mile eastward of Beaver island. The harbour affords excellent shelter in all winds excepting heavy S.S.E. blows. Vessels visiting this port or entering for refuge may come to anchor in winter as

well as other seasons. Steamers run to Port Dufferin situated on the east side of Beaver harbour. Occasionally the basin and north part of the harbour, for a short duration, may be frozen, but not as a general thing.

The depth of water in the entrance is nowhere less than 10 fathoms but much deeper water is found. In the harbour the water towards the head is 6 fathoms. MacLeod cove affords excellent shelter. Rise and fall of tide 6 feet spring, neap $4\frac{1}{2}$ feet.

Port Charges are harbour master's and sick mariners' dues, similar to charges in other Canadian ports.

Lights.—One white light revolving, on S.E. part of E. Beaver on Beaver island, lat. N. 44 49 34, long W. 62 20 10; a diaphone is located on the S.E. side of lighthouse. A fixed red light on a mast is established on E. end of Beaver point latitude N. 44 52 23, longitude W. 62 23 40. Off the harbour is moored a, black and white striped bell buoy in 30 fathoms, latitude N. 44 48 0, longitude 62 17 42, the bell is sounded by motion of buoy on the waves. From the buoy, Beaver island light bears $312^{\circ} 2\frac{1}{2}$ miles; William shoal $292^{\circ} 30' \frac{1}{2}$ mile. See List of Lights and Fog Signals on the Atlantic coast for 1913.

Sailing Directions.—The entrance to Beaver harbour may be attempted even at night, in clear weather, with a fair wind and careful attention to Beaver island light. Having passed not nearer than half a mile to the eastward of Beaver island, with the red light on Beaver point, open east of Sutherland island, steer to the north-north-westward and approaching Sutherland island pass 1 to 2 cables to the eastward of it. After passing this island keep Beaver island just open east of Sutherland island, and steering with that mark on astern, pass Beaver point and anchor when abreast the cove in 42 feet of water. See Nova Scotia S.E. Coast Pilot and plan No. 2663. There are 8 buoys leading to the harbour.

BEAVER HARBOUR, Charlotte county, New Brunswick, on the bay of Fundy, northern side. The entrance to this harbour lies $2\frac{1}{2}$ miles to the eastward of Deadman head. The intervening coast is rocky and steep close to the shore, excepting to the westward of Little Moose island, where a rocky patch dries $1\frac{1}{2}$ cables from the main shore. The harbour is three-quarters of a mile broad and $1\frac{1}{4}$ miles to its head. It is open to the southward and cannot be deemed safe during strong winds from that quarter. Vessels should pass in and anchor on the western shore, in order to avoid a patch with $2\frac{1}{4}$ fathoms water near the centre of the harbour. Small vessels anchor in a bay on the western side of the harbour opposite the village in $2\frac{1}{2}$ fathoms of water, clay bottom, where they are almost landlocked. There is a small wharf with 24 feet of water alongside at high water. There is anchorage on the east side of the fairway to the harbour in about 8 fathoms.

Light.—is on Drews head on the west side of the harbour, fixed white, latitude N. 45 3 45, longitude W. 66 44 5. At this station is a hand fog horn that answers vessels' signals. An iron, red and white vertical striped whistling buoy is anchored in 22 fathoms, $1\frac{1}{2}$ miles 161° from Beaver harbour lighthouse, latitude N. 45 2 22, longitude W. 66 43 30. The whistle is sounded by motion of the buoy on the waves. See List of Lights and Fog Signals on the Atlantic coast for the year 1913. There are 9 spar buoys within the harbour district.

BEDEQUE HARBOUR, Prince county, Prince Edward Island. See description of Summerside harbour.

BELLIVEAU COVE, Digby county, Nova Scotia, is on the south side of St. Mary bay on the southern side of the bay of Fundy. The depth of water is from 1 to 8 fathoms, low water. There is good anchorage $1\frac{1}{2}$ miles off the cove. Three wharves are located in the cove; one of them is a Government wharf. Ice, occasionally, prevents vessels from reaching the wharves in winter. Rise and fall of the tide is 24 feet spring and 20 feet neap.

Light.—A green fixed light on the outer end of the east pier, latitude N. 44 24 20, longitude W. 66 3 10. See List of Lights on the Atlantic Coast for 1913.

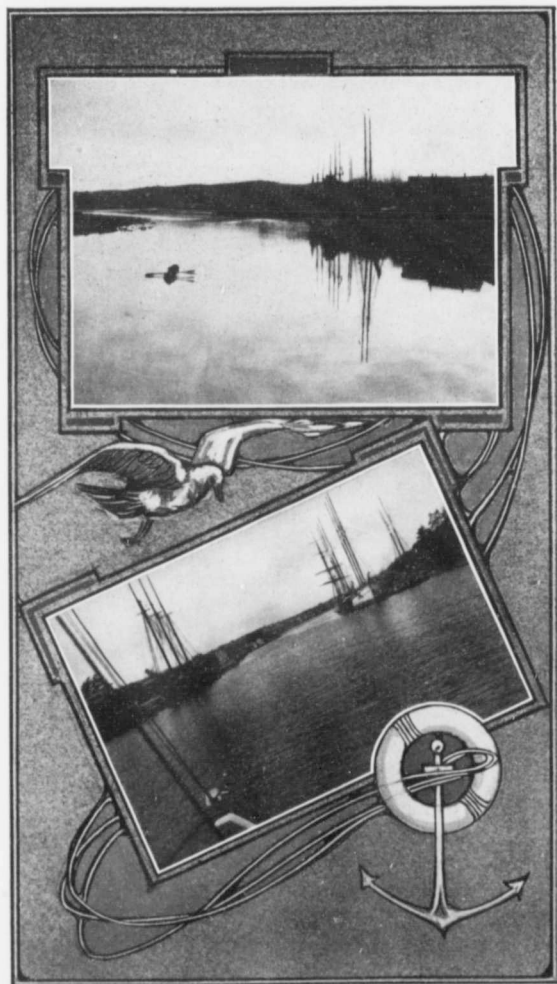
BERSIMIS, Saguenay county, province of Quebec. This is a bar harbour at the mouth of the Bersimis river, emptying into the lower St. Lawrence river. There are two wharves, one 150 x 40, the other is 250 feet long, fitted with an elevator and loader for loading pulp wood. The depth of water at the wharves is from 5 to 7 feet, low water, good bottom. Vessels drawing 15 feet or 16 of water loaded can pass from the wharves and over the bar at high water. Steamers, after entering the harbour, can proceed up the river for 30 to 40 miles with lowest water at 2 fathoms. Lumber and pulpwood is shipped to a considerable extent. The harbour should not be entered without the aid of local pilots.

Lights.—2 fixed white lights, the front on beach on the north shore of Bersimis river, inside mouth, latitude N. 48 56 10, longitude W. 68 38 28, the rear light being 360 feet 296° from front. The range is intended to lead into the river over sand bar, which extends over a mile outside Bersimis point. See List of Lights on the Atlantic Coast for 1913.

BRIDGEWATER HARBOUR, Lunenburg county, S.E. coast of Nova Scotia, on Lahave river, a tidal river. The harbour extends fifteen miles from the Atlantic coast; depth of water from 3 to 8 fathoms at the mouth, at low water, and 2 fathoms at Bridgewater. Tide rises 6 feet at ordinary tide. The wharf on the western side is about an eighth of a mile along shore and is principally used for small vessels discharging coal and merchandise and loading lumber. This wharf will accommodate ten schooners. Dawson's wharf is 700 feet along water front and will accommodate three vessels. Davison Lumber Company's wharf is about a sixteenth of a mile along shore and will accommodate seven vessels of 1,000 tons each. The railroad wharf, main wharf, affords room for two large vessels, and the quay for about three large vessels on each side; this wharf has a railway siding. There are no sheds on the wharves and no docks for repairing vessels, but they can be hauled out on the bank without trouble above low water. Ship carpenters and materials are easily obtained and all kinds of stores and provisions.

The Lahave river is buoyed from the mouth to Bridgewater; the bottom, the whole distance of the harbour, is mud and affords good anchorage.

Lights.—One on West Ironbound island, near mouth of river, latitude 44 13 42 N., longitude 64 16 20 W., white revolving; light on Moser island west side of entrance to river, latitude 44 14 15 N., longitude 64 18 50 W., red fixed; another light, red fixed, on Fort point and a bell and gas buoy, three miles from Moser island. See List of Lights on the Atlantic Coast for 1913 and chart No. 342. Total tonnage entered and departed in 1912, 95,129.



Bridgewater, N.S., Two Views of the Harbour

Vessels can obtain supplies easily at this port. The cost of loading and discharging is, for general cargo, about 20 cents per ton, lumber 40 cents per M.

The harbour charges are, harbour master's fees, 50 cents for vessels of 50 tons, increasing at the same rate up to 700 tons, \$5.00; payable twice a year at the first two Canadian ports entered. Sick seamen's dues are $1\frac{1}{2}$ cents per ton, payable three times a year. Shipping seamen, 50 cents each, discharging 30 cents. The wharfrage is free.

There are no regular pilots, but they can be obtained by signal. General charge, \$15.00 for vessels drawing $20\frac{1}{2}$ feet of water.

BUCTOUCHE HARBOUR, Kent county, New Brunswick. This harbour is located on the shores of the strait of Northumberland at the mouth of the Buctouche river. The harbour is a bar harbour entered by passing over the outer bar excepting North patch; larger vessels approach from the northward in not less than $3\frac{1}{2}$ fathoms and anchor in roadstead in the widest part of the channel within the outer bar. Buctouche river flows south-westward through a shallow bay. The channel becomes narrow off Giddes point with a depth of 7 feet at low water. The village of Buctouche is situated about 4 miles within the river entrance. Vessels ascend about 10 miles above the bar where the tide ends. Rise and fall of the tide, 4 feet spring and 2 feet neap. The channel is buoyed.

Lights.—One fixed white, on S. extremity of sand bar, at entrance to harbour, latitude N. 46 27 53, longitude 64 36 35.

There are two lighthouses on Dixon point to show channel over outer bar and clear of N. bank. The front light on the point, latitude N. 46 27 40, longitude W. 64 38 50, shews a fixed white light; the other, 350 yards 281° from preceding, also is fixed white.

There are two lights for the Inner range, the front one, close to shore road on Indian or Church point, latitude N. 46 29 35, longitude W. 64 40 30; the rear light is situated 660 yards, 313° , from the front, both shew fixed red lights; they lead into harbour through deepest channel clear of all obstructions, from alignment of Dixon point lights to where channel turns abruptly to westward to enter Buctouche river.

Port charges:—Same as at other Canadian ports.

CAMPBELLTON HARBOUR, Restigouche county, New Brunswick. The harbour is at the head of navigation for shipping on the Restigouche river which empties into Chaleur bay. The channel is well buoyed from Maguasha point in bay Chaleur, about 14 miles from Campbellton.

Lights.—There are two range lights at Oak point, the front near W. extremity of point, Restigouche river, latitude N. 48 2 40, longitude W. 66 36 30; the rear light on hill 2231 feet $44^{\circ} 20'$ from front; both are fixed white.

At Campbellton there are two range lights, one on pier beside the railway wharf, Restigouche river, latitude N. 48 0 50, longitude W. 66 39 55, the other on cribwork block on Kilgour Shives wharf, 1238 feet 241° from front, both shew fixed red lights. There are seven gas buoys, at the following locations on the way to Campbellton:—Traverse gas buoy, in 3 fathoms, off Oak bay, Oak point gas buoy in 20 feet, 1-3 mile eastward of the point; Busted occulting gas buoy, in 4 fathoms, off Busted cove; Garde point occulting gas buoy, in 4 fathoms, east

of point; Scaumenac occulting gas buoy, in 26 feet, off the point; Maguacha spit occulting gas buoy, in 7 fathoms, at south western extreme of spit; Lanim point gas buoy, in 4 fathoms, off the point. See List of Lights and Fog Signals on the Atlantic Coast, Gulf St. Lawrence, for 1913.

Vessels drawing 18 feet of water can ascend at any stage of the tide to Oak point and at high tide to Campbellton. The ordinary tide rises 7 feet at Campbellton.

The Government railway wharf has a face of 1550 feet outside and inside. Berthing accommodation for Ocean-going steamers:—three on the outside and two on the inside of this wharf, with 18 to 23 feet of water at low tides, according to berth. There is also a large freight shed on this wharf. Lumber and cargo is taken by rail to the ships' side on two tracks and loaded from cars at the railway wharf. Another wharf, some 400 feet long, is used, by small vessels that lie aground when the tide is out, and a wharf owned by the Shives Lumber Company, with about 10 feet of water, where schooners discharge when the other large wharf is occupied. Campbellton has no docks for repairs. Anchorage is good, with soft bottom in the basin, with from 16 to 20 feet of water, low tide.

This is a large lumber port. Stevedoring charges for lumber is one dollar per Russian standard; scantling and rails, \$1.50 per R. standard. 90 to 100 standards of deals and ends and 65 to 75 standards scantlings and rails can be loaded per weather working day from cars.

Port Charges.—Harbour master's fees, from 50 cents on 50 ton vessels up to \$5.00 for vessels over 700 tons, payable twice a year only, in Canadian ports. Sick mariners' dues, $1\frac{1}{2}$ cent per ton, payable three times a year in Canadian ports.

Wharfage charge on lumber, 10 cents per M. board measure and on lumber exported 10 cents per M. deal measure.

Pilotage is under Restigouche Pilotage Authority and payment is compulsory. Rates for sailing vessels direct from sea, \$2.00 per foot draught; vessels calling at any port in the district on the way to Campbellton, \$1.50 per foot draught and a further charge of 75 cents from any of these places to Campbellton. All vessels propelled by steam charged in addition to above rates 1 cent per registered ton.

Tonnage of vessels entered and departed 149,181 in fiscal year 1911-12.

CAMPOBELLO ISLAND, Charlotte county, New Brunswick, on the northern side of the bay of Fundy, near the boundary line of New Brunswick and Maine, has three harbours, Campobello, sometimes called Welshpool, Head harbour and de Loutre harbour. With the exception of the south-west shore, the salient points of the island are steep to and may be approached to one or two cables. Herring bay, Schooner cove and Mill cove, on the east coast, are good for temporary anchorages. Head harbour is formed by the island of that name and an indentation in the land at the north end of Campobello island, and though small, is safe, easy of access and without detached dangers. De Loutre harbour, on the north-west side of Campobello island, affords well sheltered anchorage in five to six fathoms, but care should be taken to avoid Race rocks, about one cable in extent, covered with $1\frac{1}{2}$ fathoms of water, 2 cables eastward of Man-of-war head. Strangers without a pilot should anchor westward of this rock, observing that the 5 fathom line appears to be steep to. Friar bay, also on the North-west side of Campobello island, is an indentation between the village of Welshpool and Friar head, about a mile distant.

Good anchorage may be obtained here in about 10 fathoms and as near as convenient to Welshpool off which the 5 fathom line is only $\frac{1}{2}$ a cable distant. Vessels of moderate draught may lie alongside Queen wharf. Depth of water from 15 to 18 feet; twenty feet from the wharf, the water is 20 and 22 feet deep. Rise and fall of the tide is, spring $23\frac{1}{2}$, neap 20.

Lights.—Head harbour light, white fixed, on the outermost rock of East Quoddy head, north-east of Campobello island, latitude N. 44 57 30, longitude W. 66 54 10. Fog-alarm, on the North-east extreme end of Campobello island, 983 feet 242° from lighthouse. Fog bell 80 feet northward from the lighthouse. Mulholland point light, fixed white, on the east side of Lubec narrows, Campobello island, latitude N. 44 51 40, longitude W. 66 58 50; Fog bell on Cherry island on southwest point of the island, latitude N. 44 55 6, longitude W. 66 58 2. See List of Lights and Fog Signals on the Atlantic Coast for 1913.

Port Charges at Campobello are harbour master's dues and sick mariners' dues, same as at other Canadian ports.

Tonnage entered and departed at the port of Campobello was 143,996 tons for the fiscal year 1911-12.

CANSO HARBOUR, Guysborough county, Nova Scotia, is at the entrance to Chedabucto bay and near cape Canso at the entrance to the strait or gut of Canso, and is a port of call and shelter. The harbour is formed by Piscatiqui and Grassy islands on the east and by the mainland and Durell island on the west. It is sheltered on the northward by Cutler or Hart island. The ship channel entrance to the harbour is between Grave and Cutler islands. It has a least depth of 21 to 24 feet, and the northern entrance, between Cutler and Piscatiqui islands, a least depth of 20 feet, but the latter is only 80 yards wide. The anchorage is good for vessels of almost any draught; the harbour, however, is limited in size, and often fully occupied by fishing vessels which run there for shelter. The entrances to the harbour are well buoyed, and lights are situated on both sides.

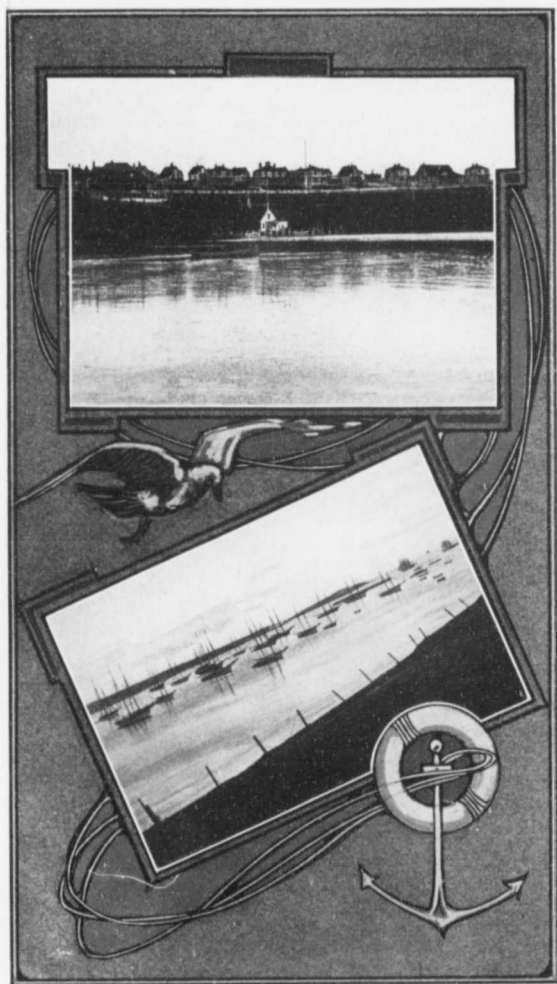
Lights.—Range lights S. of Lanigan beach, near south entrance to harbour, front light, latitude N. 45 20 4, longitude W. 60 58 30, rear light 1256 feet 266° from front, both are fixed red lights; one on Hart or Cutler island, red fixed, latitude N. 45 20 47, longitude W. 60 59 5; one fixed green light on False Passage ledge, north entrance to Canso harbour, 1.5 mile $262^{\circ} 40'$ from Hart island lighthouse, latitude N. 45 20 48, longitude W. 60 59 26.

A bell buoy with black and white vertical stripes, called the Canso Harbour fairway bell buoy, off North entrance in 13 fathoms, $\frac{3}{8}$ mile, 350° from Hart island light, latitude N. 45 21 36, longitude W. 60 59 23. Bell rings by motion of buoy on the waves to guide vessels into harbour through north entrance. See List of Lights and Fog Signals on the Atlantic Coast for 1913.

The wharves are as follows: one 110 feet in width with 14 feet of water at head; one 110 feet with 16 feet at head; one 60 feet wide, water at head, 12 feet; one 150 feet in width, 16 feet of water at head; one 80 feet in width, water at head, 16 feet.

At the mouth of the Tickle river a wharf has recently been built.

There are no docks for repairing vessels, but supplies, materials and workmen are easily obtained. The port charges are the usual harbour and sick mariners'



Canso, N.S. Two Views of the Harbour

dues and wharfage. Pilotage is under the Inverness Pilotage authority and non-compulsory.

The sailing directions for entering the harbour are as follows:—The Lanigan beach range lights in one bearing 266° lead into south entrance of Canso harbour between Frying Pan and Budget rock, and south of the shoals off Petit-pas head and Grassy island. The light on Hart or Cutler island, and the back range light in one bearing, $161^{\circ} 30'$, lead in up to Hart island light, between Net rocks and Whitman rock on the starboard hand and Bald rock on the port hand.

There is a life-saving station on Lanigan beach, about $\frac{1}{4}$ mile north westward of front range light.

Approaching Canso from the south by ship channel, or east of Black ledges and Man of War rock, there are 11 buoys. West of Black ledges and Man of War rock there are 16 buoys.

Approaching the harbour from the north, there are 3 buoys. Coming west of Net rock there are 2 buoys; for vessels of light draught entering by False passage there are 4 buoys.

The total tonnage entered and departed during the year 1912 was 410,590 tons.

CAPE TORMENTINE, Westmoreland county, New Brunswick, is the extreme eastern point of the headland which forms the eastern part of New Brunswick, and it is situated at about $1\frac{1}{2}$ miles northward of Indian point, strait of Northumberland.

The harbour is formed by a breakwater pier which encloses a basin of about four acres. Alongside the end of the pier the depth of water is 19 feet, at high water; the tide rises and falls six feet. Light draught vessels lie at the pier inside the basin.

Cape Tormentine is the terminus of the New Brunswick and Prince Edward Island railway, and there is a railway siding which runs to the end of the pier, and a freight shed is located on the pier or wharf.

The Cape Tormentine lights are:—two range lights, the front one is on the W. side of freight shed on S.E. corner of pier, latitude N. $46^{\circ} 8' 8''$, longitude W. $63^{\circ} 46' 22''$; rear light on shore near inner end of pier 2,620 feet 243° from front light, both fixed white. Jourimain light, on E. end of Jourimain island, latitude N. $46^{\circ} 9' 42''$, longitude W. $63^{\circ} 48' 20''$ is a revolving white light. There is a bell buoy on Tormentine reefs, in 6 fathoms, $\frac{3}{4}$ mile eastward of outer dry part of reefs, latitude N. $46^{\circ} 6' 33''$, longitude $63^{\circ} 40' 58''$.

Port charges are the same as at other Canadian port, and wharfage is collected according to the tariff of tolls of the Department of Marine and Fisheries.

CARAQUET HARBOUR, Gloucester county, New Brunswick, commences immediately within or to the westward of Pokesuedie island and extends westward between the mainland and Caraquet shoal and island on the New Brunswick side of the entrance to Chaleur bay. Caraquet is a excellent harbour for vessels of moderate draught and it is even capable of affording anchorage to large vessels, yet caution is necessary in navigation as its approach is between shoals extending several miles from the shore; the channel is very narrow and steep to, a depth of 23 feet can be carried at low water sufficiently far for vessels to be anchored in safety in that depth. The harbour is 12 miles long and contains three public

wharves and one private one. One of these wharves contains a shed for general freight business, the depth of water at this wharf, called the upper wharf, is 22 feet.

The rise and fall of the tide is 6 feet at spring and 3 feet at neap.

The Caraquet lights are: two range lights, the front light on a point below Stoke point, latitude N. 47 48 47, longitude W. 64 50 3. The rear light is 3,800 feet, 227° 30' from the front; both lights are fixed white. Two gas buoys lead into the harbour, the east gas buoy is 1.45 miles, 131° from Caraquet island lighthouse; the west gas buoy is 1.15 miles, 156°, from Caraquet island lighthouse; both gas buoys are occulting, white. One lighthouse on west side of Caraquet island, latitude N. 47 49 36, longitude W. 64 53 47, white fixed. See List of Lights and Fog Signals on the Atlantic Coast for 1913.

The port charges are the same as at other Canadian ports. Pilotage inwards is \$1.20, outwards \$1.00 per foot draught.

The sailing directions by the Caraquet range lighthouses are as follows:—Back light visible in the line of range. Alignment should be taken at red buoy at junction of Caraquet and Shippigan channels, and kept until black buoy, 1 1-6 miles outside front light is abeam, whence course up the harbour is 227°. For other sailing directions see St. Lawrence Pilot and Chart No. 2,516. The tonnage that entered and departed at this port was 13,949 tons for the fiscal year 1911-12.

CARLETON ROAD, Carleton county, Quebec, an excellent and capacious anchorage on the Quebec side of Chaleur bay, safe in all winds, and with 5 to 6 fathoms at low water. Rise and fall of the tide at Carleton road, spring, 8 feet, neap 5 feet. At Carleton harbour there is a wharf 324 feet long with 17 feet depth of water at low tide. On the wharf is a freight shed and a derrick for handling freight.

Lights.—One fixed red on the wharf near its outer end, latitude N. 48 6 24, longitude W. 66 11 45. One white occulting light on Tracadigash point, latitude N. 48 5 21, longitude W. 66 7 0. See List of Lights and Fog Signals on the Atlantic Coast for 1913. Charts Nos. 2516, 1715. 1286,

Port Charges, same as at other Canadian ports which include harbour master's and sick mariners' dues and wharfage.

CARDIGAN RIVER, Kings county, Prince Edward Island. This is a harbour or port located at the mouth of Cardigan river, on the north-eastern side of Cardigan point, in Cardigan bay, south eastern side of Prince Edward island. The river is navigable for large vessels to the distance of 5 miles above Cardigan point, and small vessels ascend it 2 miles further. The river is somewhat difficult of entrance. Macphie shoal and Maitland flat are very steep and contract in the navigable channel to 2 cables in width, the depth being 7 fathoms. The river empties into Cardigan bay. The bay is entered from the east side of Panmure island. The depth of water in the bay in the direction of Cardigan river is from 26 to 30 feet off Maitland point and much deeper towards the entrance of the bay. There are sand bars, one, a bank with 3 to 5 fathoms, extends 1¼ miles westward of Boughton island and farther westward there are shoals which, together with Boughton spit and Mosquito sands, extend along the north eastern shore of Cardigan bay nearly to Maitland point at the entrance to Cardigan river. Vessels ascend the river to Cardigan bridge where there are four wharves with water of 2 feet at low water, bottom soft.

In the north-eastern side of the bay there are channels narrow and intricate leading into Launching bay. It is not safe to stand into less than 5 fathoms at low water on this side of the bay.

Lights.—Pannure headlight, a fixed white light, on the S.E. extremity of Cardigan bay, latitude N. 46 9 0, longitude W. 62 27 35. At this point is also located diaphone fog-alarm. At Cardigan river, between Ferry wharf and Morrison beach, is a fixed white and green light on W. shore of river, latitude N. 46 12 50, longitude W. 62 31 45. See List of Lights on the Atlantic Coast for 1913.

Port Charges are the harbour master's and sick mariners' dues and wharfage. Pilots can be obtained by signaling.

Sailing Directions for entering river are:—The light at Cardigan river shows green to seaward, white across the river to north eastward; in entering the river vessels should stand northward inside Boughton island until Pannure island light bears 168° and Cardigan river light 292° when they can stand in, keeping light open on port bow. When the white light is opened safe anchorage has been reached. See St. Lawrence Pilot for further information and Chart No. 2029.

The total tonnage entered and departed at this port for 1912 was 5,784 tons.

CASCUMPEQUE HARBOUR, Prince county, Prince Edward Island, is on the north-west part of the island. The harbour is entered from the gulf of St. Lawrence through Cascumpeque bay. The bay is extensive and broken around its shores by small rivers and inlets of the sea which penetrate many miles inland. There are boat channels at high water southward to Malpeque harbour and northward to Kildare river. Cascumpeque narrows, a shallow stretch of water, half a mile to one mile wide, lying between the sand dunes and the sand bars that extend nearly parallel with the coast of the island, connects Malpeque and Cascumpeque bays.

Cascumpeque harbour is of considerable extent, with a good depth of water, and is sheltered from all winds but its approach is obstructed by an outlying and shifting sand bar. It is much used by coasters and fishermen. The entrance to the harbour is $1\frac{3}{4}$ cables wide between two sand bars over which there are 10 feet of water, low water. The outer bar of sand lies $1\frac{1}{4}$ miles out from the entrance and usually has, at its best, 10 feet depth at low water in a very narrow channel. In easterly gales the bar is covered with continuous heavy breakers.

The channel, from the outer to the inner bar, is a cable wide, between sand banks, covered by only a few feet of water, and at its entrance the banks are usually dry at low water. Within the entrance the harbour has plenty of water and a clear channel, which, after running in westward one mile, turns southward within Savage island.

Anchorage.—There is good anchorage off the bar in fine weather in 6 fathoms and fair anchorage in the channel between the outer and inner bars, $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, sand bottom. There is good anchorage in the channel within the entrance in about 3 to 5 fathoms.

The harbour should not be entered by a stranger without a pilot with recent local knowledge as the bar constantly shifts.

Alberton, in Cascumpeque harbour, is an important village with regard to imports and exports, and is one of the principal railway stations on the western

end of Prince Edward Island. There is a railway wharf at Alberton with tracks and warehouse upon it. The outer end of the wharf is 175 feet long; on the western side the berth is 40 feet wide and on the eastern side 60 feet, with 12 feet water at the outer ends and 8 feet at the inner ends, low water spring tides.

Tides rise three feet, spring, in Cascumpeque harbour, but are irregular, rising one foot higher when easterly gales blow.

Lights.—Main light Cascumpeque, on inner face of sand hills on S. side of entrance, latitude N. 46 48 18, longitude W. 64 1 42, white fixed. Alberton, front light on the shore, latitude N. 46 48 37, longitude W. 64 2 43; back, 1072 feet, 278° from front; fixed white lights. Bell buoy, in 4 $\frac{3}{4}$ fathoms, off outer bar, at entrance to Cascumpeque harbour, latitude N. 46 48 32, longitude W. 63 59 14. See List of Lights on the Atlantic Coast for 1913, and Notice to Mariners No. 63, of 1913. The harbour is buoyed with spar buoys.

There is a harbour master at Cascumpeque and the port charges are the same as at other Canadian ports.

CHARLOTTETOWN HARBOUR, Queen's county, is on the south side of Prince Edward island and is entered from the strait of Northumberland through Hillsborough bay. The harbour is in latitude N. 46 13 55, longitude W. 63 7 0. This harbour is in the Hillsborough river, which is practically an estuary or inlet of the sea, and is one of the finest natural harbours in America. It is capacious, well lighted and buoyed. Three tides meet from the North, West and East rivers, about half-a-mile from the entrance of the harbour. Vessels drawing 27 feet of water can enter with safety, smaller vessels can ascend the East river above Charlottetown ten and even eighteen miles. Good sized vessels have been built and launched at the head of the river. Vessels anchor close to the wharves in the harbour, the anchorage being good all over the harbour. The harbour near the Three tides is over one mile wide and carries its depth for four miles from the harbour's mouth. The usual depth of water for anchorage is 30, 40 and nearly 60 feet. There are eleven wharves which are built out to the channel. The railway wharf is spacious, having 24 feet of water at low tide and rails to the ships' side, with sheds for freight. The Marine and Fisheries wharf is also capacious with from 20 to 25 feet of water on each side, at which vessels lie, and a greater depth at the head. There are spacious freight sheds on this wharf that afford ample space for receiving cargo. A railway track is laid on this wharf for conveying freight. The Charlottetown Steam Navigation Company's wharf is used solely by that company and has a spacious freight shed and a railway track to the sheds. Other wharves are owned by private individuals and two by the city corporation.

Some of these wharves are spacious and from 300 to 500 feet long and have freight sheds and hoisting power for loading and discharging cargo. There are ferry wharves for the accommodation of ferry steamers to Southport and Rocky point.

From three to four ocean-going vessels of large size may lie at the heads of three wharves in 25 to 30 feet of water at low tide. The rise and fall of tide is 9 $\frac{1}{2}$ feet spring and eight feet neap. Loading and discharging is done by hoisting engines and ship's tackle; cost of handling freight is about 40 cents per ton. Coaling of steamers at this port is done from schooners alongside with their own tackle or from coal piles with hoisting engines on the wharves or with ship's winches.

There are no regular docks for repairing, but small vessels are hauled out at several wharf properties and vessels can be caulked on the flats at low tide. All kinds of material can be easily procured and workmen obtained; provisions and ship's stores in large quantities are available. Excellent water for drinking is conveyed by pipes to vessels. Extensive repairs to engines and machinery are made in this port. Tugs for towing are also available at reasonable charge.

The lights in the bay leading into Charlottetown harbour are:—a white fixed light on point Prim, latitude N. 46 3 10, longitude W. 63 2 0. One occulting red gas and whistling buoy on Prim reef. One occulting white gas and whistling buoy, Fitzroy rock, in six fathoms, west of the shoalest part. There is also a light, white occulting, and fog alarm on the south side of St. Peter island, on the west side of Hillsborough bay, latitude N. 46 7 20, longitude W. 63 10 35; the fog-alarm is an explosive one.

Two lights, fixed white, on Haszard point, front light 35 feet back from the shore, east side of entrance to Charlottetown harbour, latitude N. 46 12, longitude W. 63 4, 5, rear light, 2,244 feet, 19° from the front. A light, white fixed, on Blockhouse point, west side of entrance to harbour, latitude N. 46 11 36, longitude W. 63 7 28. Two lights, white fixed, on Brighton beach in the harbour, the front one on the N.W. extremity of beach, east side of North river, latitude N. 46 14 5, longitude W. 63 8 20, rear light 1,275 feet, 338° 30' from front. Two lights, red fixed, on Warren farm, inside the mouth of the harbour, front light on the point on W. side of harbour 6 1-3 cables, 322° from Blockhouse point light, the rear light is 1,143 feet 197° from front. One light, red fixed, on outer end of Marine Department's wharf. See List of Lights on the Atlantic Coast for 1913 and General Chart No. 1,651 (1,407).

The total tonnage, which entered and cleared in this port for fiscal year 1912 was 799,018 tons.

Pilotage and Port Charges. Pilotage is non-compulsory and the rate \$1 per foot draught. Tugs are available for towing. The port charges are the usual harbour master's dues, not greater than \$5 and less, according to tonnage, twice a year, and sick mariners' dues, three times a year, if not paid elsewhere.

The Sailing Directions for entering the harbour from the eastward are: steer for a position at N. 80° W. five miles from Prim point lighthouse, and bring the lighthouse on Haszard point, or their lights, in line, N. 42° E. Keep this mark on, which leads, in a depth of not less than five fathoms, westward of Fitzroy rock bell buoy and towards the harbour channel, until Brighton beach lighthouses, or their lights, are in line bearing north.

Then steer through the harbour channel with this mark on until past Canseau spit, and the lunatic asylum is just open south-eastward of the railway wharf N. 59° E. This course leads in the fairway south-eastward of Middle ground to the anchorage off the wharves on the town side.

This is the best anchorage, and in the fall of the year it is advisable to moor with the anchors east-north-east and west-south-west.

Entering the harbour from the westward bring the north-western point of Governor island and Pownell point in line, bearing N. 81° E., and keep this mark on until the thin spire of the Scotch church is in line with Blockhouse point, bearing N. 20° E., when steer N. 56° E., allowing for the flood or ebb stream, until

Haszard point lighthouses are in line, when proceed as before directed. See St. Lawrence Coast Pilot and Chart, No. 1651.

CHATHAM HARBOUR, Northumberland county, New Brunswick, latitude N. $47^{\circ} 2' 0''$, longitude W. $65^{\circ} 28'$, extends from Chatham to the mouth of the Miramichi river, a distance of 30 miles. At the entrance of the river are bars, the inner bar having about $2\frac{3}{4}$ fathoms of water over it at low tide. Tides rise, spring, five and a half feet; neap, three and a half. After the inner bar is crossed, the depth of water in the channel is from 4 to 5 fathoms and in places 8 fathoms. The anchorage is good all the way from the mouth of the river. The river is well lighted and is buoyed by 19 can, conical and spar buoys. About $22\frac{1}{2}$ miles from the mouth of the river, at Loggieville, there is an extensive wharf where lumber and fish are shipped and a railway branch, large salt sheds and storehouses; depth of water at the wharf 16 feet. Five and a half miles farther up the river, on the north side, is a wharf and pulp mill, depth of water 60 feet. About one-half mile farther up, at the eastern end of Chatham port, is Canada wharf; depth of water 17 feet, and a railroad branch. Snowball's wharf at Chatham town is a spacious wharf with 30 feet of water; adjoining is the Miramichi Lumber Company's wharf with a shed, water 20 feet, and used by steamers for loading pulp shipped to foreign markets. Next, the town wharf, with 18 feet of water, used principally as a coal wharf; then adjoining is the ferry wharf and Loggie's wharf, with large warehouses. Depth of water at this wharf is 16 feet; next is the Dominion government wharf used for storing buoys in winter; following is Snowball's store wharf, with 18 feet of water and two large warehouses and a coal shed; the other wharves are Johnson's wharf, 12 feet of water, coal shed and warehouses; Steam Navigation Company's wharf, 16 feet of water, two warehouses and a coal shed; the wharf is used by passenger boats; Welsh's wharf and boom; the Russell and foundry wharves, 16 feet of water, and adjoining is Watt's ballast wharf, then Snowball's deal wharf, and at Clark's cove, at the western extremity of the town, is another wharf used for shipping pulp, depth of water 20 feet. There are 16 berths in the port where ocean-going vessels load lumber.

There is a Marine Slip in this port for small vessels. The Miramichi river to Chatham is a fine harbour, with good anchorage, where vessels are safe from wind and weather. Loading and discharging is done by manual labour.

Port Charges are harbour master's dues, collected twice a year, and sick mariners' dues, paid three times a year, if not paid in some other Canadian port.

Cost of loading lumber is one dollar fifty cents per standard; laths, 4 cents per thousand.

Pilotage is under the control of the Miramichi pilotage authority and payment is compulsory; rates \$2.25 per foot draught inward and \$2 per foot outward. In addition, steamers pay 2 cents per registered ton. Removal in harbour within a mile, \$4; barges in tow of a tug pay inward pilotage only.

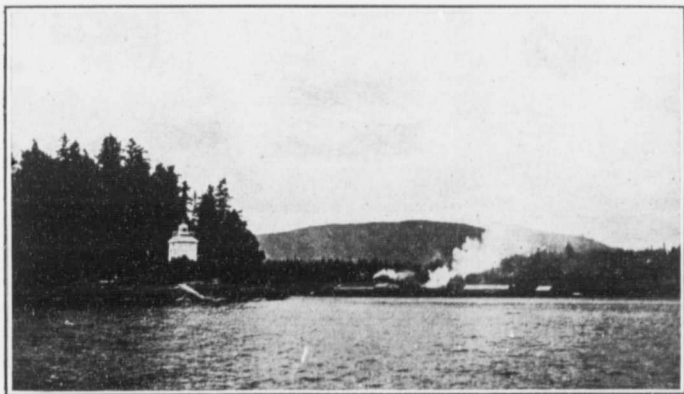
Stores and provisions are easily obtained. See General Chart 2,516 (1,271), and "St. Lawrence Coast Pilot" for sailing directions. Total tonnage entered in fiscal year 1912, 147,776.

Lights.—Entering Miramichi bay, the most important light is on Esecumiac point, lat. N. $47^{\circ} 4' 32''$, long. W. $64^{\circ} 47' 33''$; the light is fixed white, in connection with this light is a diaphone fog-alarm, 240 feet, 315° from the lighthouse. On the

south shore of Miramichi bay, on Preston beach, are two lights, fixed white, latitude N. 47° 44' 47", longitude W. 64° 54' 58". The rear light is 804 feet, 139° 39' from the front. On the east side of Horseshoe bar is an occulting gas buoy in 3½ fathoms 3-5 of a mile, 60° 30' from the Miramichi bay lightship. There is an occulting gas buoy on the west side of Horseshoe bar in 3½ fathoms, 1-5 mile, 56° 30' from the Miramichi bay lightship.

The Miramichi bay lightship on Horseshoe bar, between Fox and Portage islands, in 3½ fathoms, 500 feet west of the bar, latitude N. 47° 8' 14", longitude W. 65° 3' 55".

Two range lights at Oak point north side of river, white fixed. One range light on N.E. edge of Sheldrake island, one on N. side of island, both white fixed. Two lights on Grant beach N. side of river, white fixed, and one on Middle island, white fixed.



Chemainus, B.C., Entrance to Harbour

CHEMAINUS HARBOUR, on the east coast of Vancouver island, British Columbia, is in Chemainus bay, on the western side of Stuart channel.

Stuart channel is entered from the strait of Georgia and is the westernmost of the ship passages which lie on the eastern side of Vancouver island between Victoria and Nanaimo. The general breadth of Stuart channel is about 2 miles; the depth varies in the southern part from 60 to 100 fathoms, in the northern portion from 20 to 40 fathoms.

There are inside channels which are entered from Active pass on the S.E. side of Vancouver island and Porlier pass north of the preceding.

There are two wharves in Chemainus, one is used as a terminus of a logging railway, the other is used for loading lumber. The depth of water alongside the wharves is from 3 to 4 fathoms and the anchorage is from 10 to 20 fathoms. There are several sheds for protecting dry lumber and a large warehouse on the wharf, a portion of which is used for merchandise in bond, from which vessels can get all their supplies and outfitting while lying at the wharf. There is a railway track

which connects with the Esquimalt and Nanaimo railway, a part of the C. P. Railway system.

Bird reef, a rocky ledge, which uncovers at half tide, extends one cable from the shore northwestward from the western point of entrance and lies half a mile west by south from Bare point. A rock with 16 feet over it at lowest water is situated on the western side of the entrance distant $2\frac{3}{4}$ cables from Bare point. The bay extends in a southerly direction two-thirds of a mile and is one-third of a mile in breadth, sheltered from all except N.W. winds.



Lumber Mill, Chemainus, B.C.

Lights.—The lighthouse is at Bare point, on the extremity of a point in Chemainus bay; it is a white fixed light, latitude N. 48 56 00, longitude W. 123 42 10. There is a bell buoy at Porlier pass with black and white vertical stripes, in 17 fathoms, off eastern entrance to the pass, $3\frac{1}{4}$ cables, 132° from south point of Canoe islet, latitude N. 49 11 10, longitude W. 123 34 50. See List of Lights on the Pacific Coast for 1913. There are several lights in Stuart channel between Porlier pass and Chemainus bay, but pilots should be taken by large vessels.

The port charges are the same as at other Canadian ports, viz:—Harbour master's and sick mariners' dues.

Pilotage is under the Nanaimo Pilotage Authority and payment is compulsory.

The rates of pilotage for the time being in force in this district, are one (1c) cent per registered ton, and one (\$1) dollar per foot draught. Pilots can be obtained by notifying the Nanaimo Pilotage Authority from Victoria, pilots also meet vessels from a pilot station near Victoria and a station at Nanaimo.

The total tonnage that entered and cleared this port for the fiscal year, 1911-12, was 105,374 tons



Chester, N.S.

CHESTER HARBOUR, Lunenburg county, Nova Scotia, on the south-east coast, is at the upper end of Mahone bay. The bay in which the harbour is located is about 8 miles in length and 6 miles in width with good anchorage in from 6 to 8 fathoms and mud bottom.

The harbour which is 1 mile wide and $1\frac{1}{2}$ miles long is easy of access and has 2 channels, the southward being more direct than from the eastward which is narrow and somewhat intricate. There are 3 wharves in the harbour, at which the water is 3 fathoms in depth at the head, at low water, and 3 wharves where vessels load at high tide.

Lights, Chester, or East Ironbound island, a little eastward to the centre of the island, in Mahone bay, latitude N. 44 26 24, longitude W. 64 4 50, the light is white fixed.

Quaker island, off Chester, latitude N. 44 30 55, longitude W. 64 13 48, the light is red fixed. At these two light stations are hand fog hours which answer signals from vessels. There is an occulting white gas and whistling buoy on N.E. shoal in Mahone bay.

The Port Charges are the same as at other Canadian ports.

Pilotage is not compulsory.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 20,267 tons.

CHETICAMP, Eastern harbour, on Cheticamp island, Inverness county, Nova Scotia. The harbour lies between the island and the mainland and its entrance is between the shingle spit at cape Gros and Caveau point. It has from 18 to 20 feet of water at flood tide. There are about a dozen wharves, most of them being for the accommodation of fishing vessels, and they have sheds upon them for the purpose of fish curing. The anchorage is safe inside the harbour for the class of vessels that visit it and take shelter.

There is one pier owned and used by the Great Northern Mining and Railway Co. with water at front from ten to twelve feet. The Company has a railway siding running upon this pier.

The port charges are the same as at other Canadian ports.

There is a government wharf at which wharfage is paid according to Tariff of Tolls. There are two other wharves in the harbour and one with about 13 feet of water at mid-tide and about 11 feet of water at the Government wharf.

The total tonnage entered and cleared at this harbour for the fiscal year 1912 was 53,317 tons.

CLARKE HARBOUR, on the S.W. coast of Cape Sable island, in Shelburne county, Nova Scotia. The entrance to the harbour is from the north-west; at the entrance there is a piece of shoal ground and channels on both sides of it leading into the harbour, with a depth of about 30 feet at high water. The channel is quite straight, the depth of water about the same as at the entrance. The shoals and ledges are marked by can and spar buoys numbering 17 in all.

The harbour is divided into what is known as Upper and Lower Clarke harbour, the upper harbour is nearest the entrance. Inside the entrance is a breakwater on the northern side of the harbour, the length is about 800 feet. The first wharf east of the breakwater is the Scotia wharf, length 400 feet, width 38 feet; depth of

water at high tide, 16 feet. There is a freight shed on this wharf, two lobster factories, one boneless fish factory, and a lifeboat shed. About 300 feet east of Scotia wharf is Brannen's wharf, length 400 feet, width 40 feet, depth of water 16 feet at high water. On it is a freight shed, two coal sheds, capacity 500 tons and warehouse. About one-quarter mile east of Brannen's wharf is another called Kenny wharf, 350 feet long, 28 feet wide; depth of water, 13 feet at high tide, with a building for smoking and curing fish and a boneless fish factory. About 300 feet east of this is Central wharf, length 600 feet, width 50 feet, depth of water 13 feet at high tide; on this wharf is a large coal shed, a shed for packing lobsters and making fish barrels, and a warehouse for storing freight.

The bottom of upper Clarke harbour is hard and rocky.

South of upper Clarke harbour, about three-quarters-of-a-mile, is lower Clarke harbour; the channel leading to it is smooth, with a depth of water of from 20 to 30 feet at high water. The most northern wharf is Government wharf, length about 250 feet, width about 40 feet, depth of water, 20 feet at high tide. East of this about 60 feet is Swims wharf, 150 feet long, 28 feet wide; depth of water, 18 feet at high tide. On this wharf are five buildings, used for lobster packing and boneless fish business. About 60 feet east is Duncan's wharf, length 230 feet, width 25 feet, depth of water, 18 feet at high tide, with one building for boneless fish business.

The bottom of lower Clarke harbour is mud and quite level. Rise and fall of tide, springs 11 feet, neaps 9 feet.

There are no railway sidings on wharves. No docks for repairing vessels. The harbour is usually free from ice in winter, but occasionally shipping may be interfered with from this cause.

The lower harbour is well sheltered with good holding ground, and is considered safer than the upper harbour. Steamers make semi-weekly trips from Halifax and St. John and communication is kept up with other ports along the shore.

Light on West head, Cape Sable island, is fixed white, latitude N. 43 27 17, longitude W. 65 39 10. See List of Lights on the Atlantic Coast for 1913.

Port Charges are harbour master's and sick mariners' dues, as at other Canadian ports. Wharfage at the Government wharf is charged according to the Tariff of Tolls of the Marine and Fisheries Department: two cents per barrel bulk of five cubic feet, or ten cents per ton for bulk cargo.

Side wharfage on steamers, twenty cents for fifty tons or under, increasing to \$3.00 for steamers above 1600 tons. Steamers calling more than once a day pay for the first time of using only. Steamers using wharf three times a week pay dues only on the first two days of using. Sailing vessels pay ten cents for vessels of fifty tons and under a day, increasing to \$1.50 for vessels above 1600 tons.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 52,540 tons.

CLEMENTSPORT, Annapolis county, Nova Scotia, on the southern shore of Annapolis basin. There are two wharves at this place with 16 feet of water at high tide. There is a harbour master at this port and the channel is buoyed leading to the wharves. Clementsport has connections by rail over the Dominion Atlantic

Ry.; it also has communication by steamers with St. John and other ports in the bay of Fundy. This place is an outport of Annapolis Royal.

Total tonnage entered and cleared at this port for the fiscal year 1912 was 7,759 tons.

CRAPAUD ROAD, Queen's county, Prince Edward Island, is on the south-western coast of the island and is entered from the strait of Northumberland. It is a small but secure anchorage, between the eastern part of Tryon shoals and the land. The anchorage is from 12 to 15 feet at low water; it is about half-a-mile long and two cables wide, but for small craft, the anchorage is more extensive, continuing nearly a mile westward in a narrow channel or cove with from 7 to 9 feet of water.

The entrance to the road is between the eastern point of Tryon shoals and the shallow water off the shoal to the eastward; it is about 180 yards wide and carries about nine feet at low water, spring tides. There is also a dredged channel, three cables east-south-eastward of Paul's bluff, to a dredged basin, which has a depth of 8 feet and is about 300 yards in extent. Victoria harbour is on the northern side of this basin. It is the most important place of shipment after Summerside on the south-western side of the island, being the outlet of a fertile and well-tilled district. There is a pier 486 feet long with a depth of 9 feet at its end, at low water in Victoria harbour. Steamers ply in the season of navigation to other ports and shallow draught vessels enter for loading agricultural products.

Lights.—Range lights, front one on the south side of Paul's bluff, west of dredged cut from anchorage to wharves, latitude N. 46 12 28, longitude W. 63 49 22; rear light, $3\frac{1}{2}$ cables 294° from the front, both are red fixed lights. Another range of lights is at the head of harbour. The front light is on the west end of bridge at the head of the harbour, latitude N. 46 13 15, longitude W. 63 29 10; the inner range light about half-a-mile, 337° , from outer one; both are fixed white; one on Palmer's wharf, red fixed.

Port Charges are the same as at other Canadian ports. The total tonnage entered and cleared at this port for the fiscal year 1912 was 29,129 tons.

DALHOUSIE HARBOUR, Restigouche county, New Brunswick, is situated at the head of Chaleur bay, on Dalhousie or Douglas island, at the mouth of the Restigouche river. The harbour is easy of access in two directions, one a narrow channel one-and-a-half cables wide, with 6 fathoms of water, and the other over a flat with 3 fathoms at low water. It is well sheltered and the anchorage is good in 6 to 7 fathoms. The area of the harbour is about three miles by one-and-a-half miles and is well buoyed and lighted.

The wharves are the Government wharf, frontage 600 feet; depth of water at low tide, 24 feet, and the south side of this wharf is 300 feet long by 34 feet wide; depth of water, 20 feet at low water. It has a railway siding and vessels can load from cars. The Intercolonial Railway wharf, adjoining the other wharf, has a face on the east side of 350 feet; width of wharf, 100 feet for 200 feet of its length and 60 feet for the remainder of its length; water, 24 feet at low water. Sheds and railway siding are in contemplation. There is also a private wharf with a berth of 450 feet; depth of water, 19 feet, and a ferry wharf available also for light draught vessels for 300 feet on each side and 14 feet wide. There is no dock for repairs nor cold stores.

The best anchorage in Dalhousie harbour is in six-and-a-half to seven fathoms with Dalhousie island and Bon Ami point in line. Tides rise and fall, spring, 9 feet, neap, 6 feet.

A breakwater along the easterly side of the Ferry basin between the mainland and Douglas island has been built, length, 1000 feet; width on top, 27 feet.

Freight handled in this port is principally lumber which is loaded by hand and ship's tackle at a cost of \$1.00 per standard for stevedoring.

The Port Charges are harbour master's and sick mariners' dues, viz.:—fifty cents for vessels of fifty tons and under, increasing to \$5.00 for vessels of over 700 tons, paid twice in each year at the two first ports entered. Sick mariners' dues, one-and-a-half cents per registered ton, paid three times a year; payment of sick mariners' dues is optional by fishing vessels. Shipping of seamen, fifty cents, d'scharging, thirty cents. Wharfage is paid at the Government wharf according to the Tariff of Tolls of the Marine and Fisheries Department:—two cents per barrel of five cubic feet and ten cents per ton for heavy bulk freight; lumber ten cents per thousand B.M. On deal exported, ten cents per thousand, deal measure.

Pilotage is under the control of the Restigouche Pilotage authority and payment is compulsory. The rates are \$1.50 per foot draught for sailing vessels and an additional charge of one cent per registered ton for steamers.

Lights.—One flashing white on the north point Douglas or Dalhousie island, latitude N. 48 4 34, longitude W. 66 21 37; one fixed white light on the south side of entrance of Dalhousie harbour, latitude N. 48 3 45, longitude W. 66 20 50, one on Dalhousie railway wharf, southside 300 feet from its western end, white group occulting with two red sectors. See List of Lights on the Atlantic Coast and Gulf of St. Lawrence for 1913.

Sailing Directions. To enter Restigouche river and Dalhousie harbour from midway between Heron island and Tracadigash point, steer about W. N. W. for Dalhousie hill. When about one-and-a-half miles from Maguacha point, being the highest summit of mount Scaumenac, open south-westward of Dalhousie island, which mark leads south-westward of Maguacha spit. Keep this mark until the south-eastern end of Bon Ami rocks bears about W. by S. $\frac{1}{2}$ S. distant, half-a-mile. Then steer about N. by W. $\frac{1}{2}$ W until the railway wharf opens northward of Dalhousie island when steer west-north-westward into the harbour, by the narrow channel southward of Middle ground. There is a more roomy route northward of Middle ground when the railway wharf opens northward of Dalhousie island. See St. Lawrence Coast Pilot and Charts Nos. 2516 (1271), 1715 (1286) with plan.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 130,592 tons.

DESCOUSSE HARBOUR, Richmond county, Nova Scotia, is in Lennox passage on the north-eastward side of Madame island. Lennox passage is between Madame island and the south-eastward side of Cape Breton island and is entered from the Atlantic ocean. Descousse harbour is formed by a small island named Bernard island, the several parts of which, united by beaches, extend for nearly a mile along the coast of Madame island. The entrance of the harbour from eastward is by a very narrow channel with seven feet of water at low water.

The channel passes close to the flagstaff, stores and wharf, at the northern part of Gabion point. The harbour has from one-and-a-half to three fathoms, low water, and small vessels engaged in fishing enter for shelter and prosecuting the fishing industry. There is a pier 307 feet long, with twelve feet at low water at its outer end.

The tide rises in this section: spring, six feet; neap, four feet.

There is a harbour master and Government wharfinger at this port, and the port charges are the same as at other Canadian ports; the wharfage charged is according to the tariff of the Department of Marine and Fisheries, generally speaking, at the rate of two cents per barrel bulk, of five cubic feet, and from ten cents upwards for general cargo. Side wharfage is also charged at the usual rates already mentioned.

Lights.—There are several lights at the eastern end of Lennox passage, the one at Cape Round is on the eastern end of Madame island entering St. Peter's bay, latitude N. 45 34 45, longitude W. 60 53 0; and a gas buoy off Descousse shoal.

DIGBY HARBOUR, Digby county, Nova Scotia, is entered by Digby gut, a narrow opening, half-a-mile in breadth, with steep acclivities on each side and a deep water channel leading into Annapolis basin. The shore on each side of the gut is rocky and steep to, for several miles, as are also the points of entrance. Digby harbour is open all the year round and well protected, but storms from the northward and westward bring in considerable sea.

There is good anchorage near the town of Digby.

Wharves.—One on Digby pier, 890 feet long, 50 feet wide, 45 feet deep at the head. An arm of this wharf is 350 feet long, 50 feet wide, 40 feet deep; one, 317 feet long, 30 feet wide, 18 feet deep; one, 270 feet long, 30 feet wide, 18 feet deep; one, 270 feet long, 30 feet wide and 18 feet deep.

one, 270 feet long, 30 feet wide and 18 feet deep;

" 33 " " 47 " " " 16 " "

" 220 " " 25 " " " 20 " "

" 222 " " 30 " " " 20 " "

in another part of the harbour are wharves,

one 96 feet long, 21.5 feet wide and 12 feet deep;

" 261 " " 42 " " " 18 " "

" 130 " " 27 " " " 15 " "

" 271 " " 45 " " " 21 " "

" 295 " " 40 " " " 21 " "

" 280 " " 24 " " " 16 " "

" 188 " " 70 " " " 16 " "

in another part of the harbour is a wharf 180 feet long, 23 feet wide, 16 feet deep; one, 90 feet long, 13 feet wide, 10 feet deep and one, 100 feet long, 18 feet wide, 16 feet deep.

The rise and fall of the tide at Digby pier is $27\frac{1}{2}$ feet, spring, and 23 feet deep.

In entering the gut, steer a mid-channel course through the entrance and then keep the eastern point of entrance astern, bearing N. 80° E. This course will lead between the outer shoal tongue of an extensive spit and the western shore, and

when Bear island appears midway between the points of entrance of Bear river, anchor in a depth of from 6 to 8 fathoms.

There is a daily regular steamship service with St. John, N.B., and the town is connected by rail and telegraph with the Dominion systems. Storm signals are hoisted at Digby.

Lights.—The lights are:—Point Prim lighthouse, Digby gut, west point of entrance to Annapolis basin, latitude N. 44 41 30, longitude W. 65 47 10, white revolving light. A diaphone is near edge of cliff, 225 feet northeastwardly from lighthouse tower; one light on Digby pier, at outer end of pier, latitude N. 44 37 40, longitude W. 65 45 6, white occulting.

There is a whistling buoy at point Prim in 23 fathoms off north entrance to Digby gut $1\frac{1}{2}$ miles 25° from point Prim lighthouse.

Port Charges are the same as at other Canadian ports, harbour master's and sick mariners' dues. Wharfage at the Government wharf according to the Tariff of Tolls of the Marine and Fisheries Department.

Local pilots can be obtained who make charges according to agreement.

The total tonnage entered and cleared at this port for the fiscal year of 1911-12 was 483,654 tons.

DORCHESTER HARBOUR, Westmoreland county, New Brunswick, is above the head of Chignecto channel in the bay of Fundy and is situated near the mouth of the Memramcook river. There are two wharves on the harbour; one of them has a depth of water of 27 feet at high tide; another has a depth of water of 20 feet at high tide.

Light.—There is a fixed white light on Fort Folly point at the junction of Petitcodiac and Memramcook rivers in latitude N. 45 52 4, longitude W. 64 33 50. The port charges are the same as at other Canadian ports: Harbour master's dues collected by the harbour master of the port and sick mariners' dues.

EASTERN HARBOUR, Inverness county, Cape Breton island, Nova Scotia. This harbour lies between Cheticamp island and the mainland of Cape Breton island north-west side of the island. The entrance of Eastern harbour is between the shingle spit at cape Gros and Caveau point. There is a depth within the harbour of $3\frac{1}{2}$ fathoms to which a dredged channel of 100 feet width leads with a depth of 16 feet at low water. Spring tides rise $3\frac{1}{2}$ feet, neap 2 feet; the entrance must be made through the dredged channel. Fishing vessels take shelter in this harbour as there is no other safe harbour for 60 miles on each side; the length of the harbour is about $3\frac{1}{2}$ miles and three quarters of a mile wide. The anchorage is good in mud and clay bottom.

There are three good wharves with depth of water at mid-tide of from 10 to 11 feet. Repairs are made to small vessels in this harbour and supplies obtained.

The Port Charges are the same as at other Canadian ports and the harbour is included in the limits of Cheticamp harbour where there is a harbour master.

Lights.—One on Cheticamp island, revolving, white, latitude N. 46 36 20, longitude W. 61 3 10, range lights in Cheticamp harbour, front in Eastern harbour, red fixed, 60 feet back from water, latitude N. 46 38 15, longitude W. 61 0 25, one fixed white 990 feet 175° from front; one fixed white on extremity of Caveau point at entrance to Eastern harbour, latitude N. 46 39 20, longitude W. 60 59 50;

one 740 feet, 104°, from front. See List of Lights on the Atlantic Coast for 1913. Tonnage entered and departed fiscal year 1911-12 in port of Cheticamp, 53,317.

ESQUIMALT HARBOUR, Vancouver island, British Columbia, is entered from the strait of Juan de Fuca and is located at the southern end of the island near Victoria. The immediate entrance is from the Royal roads, a fine sheet of water affording excellent anchorage. The entrance to Esquimalt harbour is between Fisgard island and Duntze head and is 3 cables wide, opening out immediately within, to an extensive harbour having a general depth of 6 fathoms over it and extending 1¼ miles, N.W. On the eastern side are Constance cove and Plumper bay, in the former of which, built on Duntze head, are the Government Naval establishments. At one cable above Dyke point the water shoals to 3 fathoms and from thence to the head of the harbour is a flat with only a few feet on it at low water. The most convenient anchorage is in Constance cove on the eastern side of the harbour, immediately around Duntze head, the general depth being 6 fathoms and the holding good. There is safe anchorage in any part of the harbour in 4½ fathoms as far north as Dyke point. Thetis cove is a sand anchorage ground for small vessels. The tides rise from 7 to 10 feet spring, and 5 to 8 feet neap.

Graving dock; in this harbour is a graving dock 480 feet 10 ins. long by 90 feet wide at coping level and 65 feet wide at entrance, depth of water 26½ feet. There is also a marine slip where vessels 300 feet long may be hauled out and extensive repairs may be made to hulls and machinery. Shafting is forged and cylinder bored, boiler plate is turned and heavy and light work performed. Sheer-legs and cranes for lifting heavy weights are part of the equipment of the Marine slip.

The wrecking plant for the coast of British Columbia subsidized by the Dominion Government has headquarters at Esquimalt. In this harbour is the most important steel shipbuilding plant on Vancouver island and where sea-going vessels of moderate size may be built.

The harbour is connected with Victoria harbour for Customs purposes and is under the supervision of the Victoria and Esquimalt Harbour Master.

Port Charges, are harbour master's and sick mariners' dues similar to other Canadian seaports, viz:—50 cents for vessels of 50 tons and under and \$5.00 for vessels over 700 tons, paid twice in one year. Sick mariners' dues 1½ cents per registered ton, paid three times a year if not paid elsewhere.

Pilotage is under the Victoria and Esquimalt Pilotage Authority. The rates are for regular ocean liners, 50 cents per foot draught of water and ½ cent per net registered ton up to a maximum of 3,500 tons on the inward voyage and 50 per cent of the above outward, subject to a discount of 20 per cent. For irregular ocean steamers \$1.00 per foot draught and ¾ cent per net registered ton. For sailing vessels in tow \$1.50 per foot draught of water and 1 cent per net registered ton. For vessels under sail \$2.00 per foot draught and 1 cent per net registered ton. Higher rates are charged outside of the Pilotage district according to the distance, \$3 from Pillar point, Vancouver island, and from Cape Flattery, Washington State, \$6 per foot draught of water.

Lights.—The lights are:—Race rocks light in strait of Juan de Fuca, white flashing, latitude N. 48 17 36, longitude W. 123 32 15; a diaphone is located 190 feet, 221°, from lighthouse. Fisgard lighthouse, white fixed with red sector, on

rock at western entrance to Esquimalt harbour, latitude N. 48 25 43, longitude W. 123 27 15. See List of Lights and Fog Signals on the Pacific Coast for 1913 and British Columbia Pilot and Supplement and General Chart (2689) 1987.

Directions for Sailing.—After rounding Race island lighthouse, the light on Fisgard island will be seen, a course N. $\frac{1}{2}$ W. direct for it will clear all dangers but attention must be paid to the set of the tidal streams. When the tide is ebbing, Race islands should be given a berth; at Flood tide, Parry bay should be kept aboard if possible.

When entering the harbour under sail with a strong fair wind, take care to shorten sail in time, as the space for rounding to is somewhat limited.

FREEPORT HARBOUR, Digby county, Nova Scotia, is entered from Grand passage, which runs between the northern end of Brier island and the southern end of Long island in the bay of Fundy.

Grand passage is entered from St. Mary bay, an arm of the bay of Fundy, at its south eastern entrance. The passage contains dangers, but the principal one is the velocity of the tide while at ebbing and flowing. The northern entrance is from the bay of Fundy itself. Freeport is on the eastern side of the passage and is entered by a narrow channel, when the tide is rising.

Passenger steamers call at Freeport from St. John and Yarmouth. There is a harbour master at this port.

Lights.—The lights are: one on the north point Brier island, Grand passage, red fixed, latitude N. 44, 17 14, longitude, W. 66 20 36, there is also at this station, operated by machinery, a fog bell; one white fixed light on Peter island, entrance to Grand passage, latitude N. 44 15 17, longitude W. 66 20 21, there is also a whistling buoy about one mile 172° from the lighthouse on Peter island in 22 fathoms of water. See List of Lights on the Atlantic Coast for 1913.

GASPE HARBOUR, Gaspé county, Quebec, is entered from Gaspé bay in the western end of the gulf of St. Lawrence, the harbour is formed by the extension across the bay of a sandy beach in a northerly direction from cape Haldimand. A block, with an occulting white light shews the northern end of the Sandy Beach bank. The passage between the block and the high land, on the northern side of the bay, is about a mile wide, with a depth of eleven fathoms, shoaling gradually towards the land on the north; once around this light vessels are in the harbour of Gaspé. This harbour is about three miles long east and west, and about the same in width north and south; the depth of the water is from four to eleven fathoms. It may be said that the average depth for anchorage is ten fathoms, with mud bottom and completely sheltered; north-west and south-west arms are extensions of the harbour in the directions mentioned. The wharves are:—One on the south side of the harbour is the terminal of the Quebec and Oriental railway. The wharf has a length of 300 feet with a depth of forty feet at the outer end. About a mile to the south-east of the railway wharf, are the wharves of the York Lumber Company, at which the largest vessels load directly from the company's mills. Within the main outer harbour of Gaspé, at the south-western extremity, lies the basin of Gaspé, where the largest vessels may anchor in from seven to nine fathoms. Tides rise, springs, five feet, neaps, three feet. See General Chart 2516 (1271), and St. Lawrence Pilot. In Gaspé basin are seven wharves ranging from 200 to 400 feet, for loading purposes, with an average depth of 24 feet alongside.



Entrance and Harbour Gaspe, Que.

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On the south side of the basin are situated the mills and wharves of the Gaspé Lumber and Trading Company, where vessels load directly from the piles. At the north-eastern extremity of the main harbour of Gaspé, in the cove of Anse-aux-Cousins, are situated the mills and wharves of the Calhoun Lumber Company, where vessels load alongside the mills and piling grounds, the water being bold.

The harbour is open when the gulf is navigable and continues so till the middle of January.

Lights.—The lights are: one on cape Gaspé, a group revolving white light close to south face, latitude N. 48 45 15, longitude W. 64 9 35; bombs are exploded at this station when fogs prevail; one light on Sandy Beach point, on N. extremity of point, latitude N. 48 50 35, longitude W. 64 24 30, white occulting; one on Paddy shoal near southern end of shoal extending off Arnold bluff, Gaspé basin, latitude N. 48 49 57, longitude W. 64 27 59, a red occulting light; one on Janvrin shoal near northern end of spit extending from McConnell point, Gaspé basin, latitude N. 48 49, 44, longitude W. 64 28 16, white occulting. Storm signals are exhibited at Gaspé. See List of Lights on the Atlantic Coast and Gulf of St. Lawrence for 1913.

The Port Charges are the same as at other Canadian ports, harbour master's dues, payable twice a year and sick mariners' dues, one-and-a-half cents per registered ton, payable three times a year.

There is no pilotage authority and vessels depend upon fisherman to pilot them when necessary.

Directions.—The current down the St. Lawrence river runs strongly past cape Gaspé towards Flat island; approach with Sandy Beach spit lighthouse bearing about N.N.W. half W., until about two miles from it, when keep about N. by W., then steer to pass about two cables northward of the lighthouse and enter the harbour, but the water deepens immediately outside the depth of three fathoms eastward of Sandy beach, also off the point, so that it is difficult to beat in or out of the harbour at night, the lead giving little warning.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 197,853 tons.

GEORGETOWN HARBOUR, Kings county, Prince Edward Island, extends north-westward from the south-western part of Cardigan bay; it is a fine harbour and has space and depth sufficient for large vessels.

The channel leading to the entrance of harbour passes between the shoals off Panmure island and Cardigan point, which separates the harbour from Cardigan river.

The entrance to Georgetown harbour, with a greater depth than three fathoms between Cardigan and Panmure shoals, is two-and-a-half cables, while between Thrumcap islet and St. Andrew point, on the south-western shore, it is six-and-a-half cables, but the shoals diminish the breadth of the channel there to two and a quarter cables. Within the Thrumcap the northern shore of the harbour forms a bay three-quarters-of-a-mile wide, the north-western point of which is Gaudin point, and from it a sand spit runs a quarter-of-a-mile.

The wharves are: the railway wharf, 600 feet long, 90 feet wide, with freight sheds; depth of water 24 feet on the east side and 30 feet on the west side. At this

wharf steamers load and discharge by their own steam. Two private wharves and a Government wharf, called King's wharf, with a depth of 18 feet. Tides rise, springs, five feet, neaps, three-and-a-quarter feet.

Communication in the winter is kept up between this port and Pictou by Government steamers which make regular passages daily, except on rare occasions, when the heavy floating ice in the strait of Northumberland interferes.

Excellent accommodation for landing and loading cargo is afforded at the railway wharves. The ice steamer is a high-class and efficient freight and passenger steamer, built specially for keeping up communication between Prince Edward island and the mainland.

The Port Charges at Georgetown are harbour master's and sick mariners' dues, and are similar to the charges in other Canadian seaports. Supplies of all kinds can be procured and repairs to vessels made when necessary.

Services of pilots can be procured by signalling. Strange vessels of large size are recommended to take pilots if beating into the harbour.

Lights.—The lights are: a white fixed light on Panmure head, S.E. extremity of Cardigan bay, latitude N. 46 9 0, longitude W. 62 27 35; there is a diaphone at this station; one light on St. Andrew point, S.W. side of entrance, latitude N. 46 10 0, longitude W. 62 31 30; one on Westaway's farm 2025 feet, 278°, from St. Andrew point light, both are white fixed, the first is the front and the other the rear; one light on the outer end of the railway wharf in Georgetown harbour, red fixed light. See List of Lights and Fog Signals on the Atlantic Coast and Gulf of St. Lawrence for 1913.

Sailing Directions. From the southward pass eastward of Panmure ledge in not less than seven fathoms and then steer north-north-westward until the light-houses on St. Andrew point and Westaway's farm are in line. If this mark is obscured by thick weather the northern edge of Panmure shoal may be followed by the lead in six fathoms to half-a-mile from Panmure shoal buoy, situated N.N.W. $3\frac{1}{8}$ W., $1\frac{1}{4}$ miles from Panmure head lighthouse, where the shoal becomes too steep for the lead to be a safe guide into the harbour. Enter harbour with the Georgetown range lighthouses until Georgetown wharf light opens, then steer direct for it, 321°; this will clear Thrumcap spit and lead to the head of railway wharf. See St. Lawrence Pilot and General Chart, No. 1651 (1407), and List of Lights for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 90,168 tons.

GLACE BAY, Cape Breton island, Nova Scotia, is a bay on the extreme eastern part of the island. The bay is open to the Atlantic and has in places from six to nine fathoms at low water. At the head of the bay is Dyson pond extending two miles inland with a narrow channel through sand-hills and sand-beach, which is usually dry at low water. On the north-western side of this bay, at Glace cove, shallow water extends $\frac{3}{4}$ miles off shore and on the opposite side, at Macrea and Dyson points, reefs run out fully half-a-mile from the cliffs.

Tides rise and fall $3\frac{3}{4}$ feet at springs, 2 1-3 feet at neaps.

Lights.—The lights are: range lights, red fixed, front, on the end of the pier at entrance to Glace cove, latitude N. 46 12 0, longitude W. 59 56 45; rear, on

south side of Glace cove, 1900 feet, $215^{\circ} 40'$, from the front. See List of Lights on the Atlantic Coast for 1913.

Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 30,502 tons.

GRAND HARBOUR is at the south-eastern angle of Grand Manan island. This island is $13\frac{1}{2}$ miles in length with a breadth of nearly six miles and is included in Charlotte county in the province of New Brunswick; the island lies on the north-west side of the entrance to the bay of Fundy. Grand harbour is sheltered by Ross island; it has a least depth of $2\frac{1}{4}$ fathoms in the entrance, but the whole sheltered space of the harbour is dry at low water. Rise of tide in vicinity, springs, 21 feet; neaps, $17\frac{1}{2}$. There is a harbour master at this port and the charges are the same as at other Canadian ports.

GRAND MANAN ISLAND is in the bay of Fundy, and included in Charlotte county, province of New Brunswick.

The island is some $13\frac{1}{2}$ miles in length and nearly six miles at its extreme breadth. The coast is deeply indented and affords a number of good harbours. The best known and settled harbours are:—North Head, Grand harbour, Woodward cove, and Seal cove. The first named appears in the Trade and Navigation returns as an important shipping place where a regular line of steamers calls three times a week.

Old Proprietor shoal, 5-6-10 miles N., 81° E., from Gannet rock lighthouse, is an outer danger south-eastward of Grand Manan island. The anchorages and sheltered localities are included in the following description:—

Grand harbour, south eastern angle of Grand Manan island.

Seal cove lies on the eastern side of Grand Manan island.

Gull cove, a small anchorage on the eastern side of White head.

Big Duck island, anchorage on the eastern side of Grand Manan island.

Long Island bay, two miles northward of Big Duck island.

Flag cove is the northern bight of Long Island bay, where there is anchorage in about $5\frac{1}{2}$ fathoms, protected from all winds except S. by E. and South E.

Whale cove, near the northern end of Grand Manan island; good anchorage in about five fathoms.

Long Eddy point, where there is a diaphone situated on the point.

Dark harbour, on the northwest side of Grand Manan island. A shingle bar at mouth has almost closed this harbour.

Bradford cove, the only anchorage on the western side of this island.

Grand Manan channel is the passage between the island of Grand Manan and the coast of Maine, U.S. It is ten miles wide at its south-eastern entrance and $5\frac{1}{2}$ miles wide at its north-eastern entrance and is entirely free from dangers except shoals in the southern approach to the island at Machias Seal island. The depths of water in the channel are from 45 to 55 fathoms in mid-channel and 30 to 40 fathoms within one mile of the shore on either side. The tidal streams set fairly through with high and low water.

Lights.—The lights are: one white group flashing on Gannet rock, south of Grand Manan, latitude N. $44^{\circ} 30' 38''$, longitude W. $66^{\circ} 46' 57''$; a diaphone is established at this station; one light on edge of cliff S. extremity of South West head, group revolving red and white, latitude N. $44^{\circ} 36' 0''$, longitude W. $66^{\circ} 54' 16''$;

one on Fish Fluke point in Grand harbour, white occulting, latitude N. 44 40 2, longitude W. 66 45 7; one on E. side of Whitehead island in Gull cove, fixed white, latitude N. 44 37 50, longitude W. 66 41 52; one near edge of high cliff, N.E. part of Swallowtail island, white occulting, latitude N. 44 45 46, longitude W. 66 44 2. Fog alarm, diaphone, on Long Eddy point on the beach, extreme N.W. head of island, latitude N. 44 48 0, longitude W. 66 47 15.

There is a gas and whistling buoy in 35 fathoms, $\frac{7}{8}$ mile, $164^{\circ} 30'$, from Old Proprietor shoal, latitude N. 44 32 22, longitude W. 63 39 43, white occulting; at Prangle point, a bell buoy is established at the east end of the point in six fathoms, latitude N. 44 38 33, longitude W. 66 40 49; a bell buoy off Ox head ledges, latitude N. 44 38 22, longitude W. 66 45 7; a bell buoy has been established at Net rock in nine fathoms on the S. extreme off Flag point, latitude N. 44 45 22, longitude W. 66 44 32; a whistling buoy in 52 fathoms, $1\frac{1}{2}$ miles, 139° from S.W. Wolf light, is maintained, in latitude N. 44 55 20, longitude W. 66 42 30. See List of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at North Head for the fiscal year 1911-12 was 63,840 tons.

GUYSBOROUGH HARBOUR, in Guysborough county, Nova Scotia, at the head of Chedabucto bay, and a mile north-north-westward of Digby head, is an extensive inlet, and running into the northward, with sufficient depth of water for vessels of large draught, but with a dangerous bar, a narrow and crooked channel, and rapid tidal streams. This inlet is navigable for ships up to the narrows at four miles from the entrance, where the depth is eight feet at low water; small vessels can proceed three miles still farther. The outer entrance channel into Guysborough harbour, between Peart point and Stony patch, is eighty yards wide, and carries 26 to 40 feet of water; but the outer bar of sand with 16 feet on it at low water is impassable at times on account of the heavy breakers; it stretches across from Toby point to Hadley beach. A bar lies across the inner entrance, which is 230 yards wide, between Eliza point and Hadley beach. The depth that can be carried over it is 13 feet at low water in a channel only 80 yards wide.

The channels into the harbour are buoyed.

There is a safe and spacious anchorage near the town.

The tide rises and falls $6\frac{1}{2}$ feet, springs and $4\frac{1}{2}$ feet, neaps. The rate of the stream in the narrow channels is from four to five knots. In the harbour the water is deep approaching close to its wharves.

Coasting steamers and sailing vessels enter here.

There is a harbour master at this port and the port charges are harbour master's and sick mariners' dues, as at other Canadian ports.

Lights.—The lights are the Chedabucto bay lights and one in Guysborough harbour on W. side of entrance near Peart point, latitude W. 45 22 46, longitude W. 61 29 4, white fixed. See List of Lights and Fog Signals on the Atlantic Coast for 1913, and Gulf of St. Lawrence and General Chart, No. 2727 (1217).

Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 75,449.

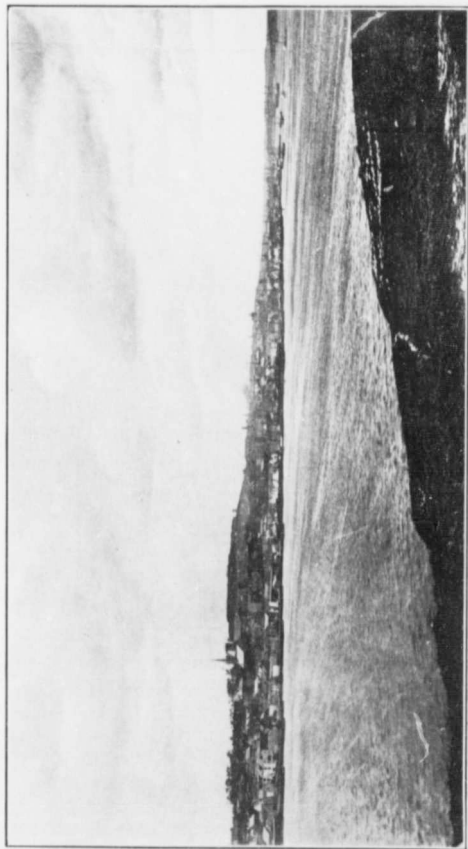
HALIFAX HARBOUR, Halifax county, Nova Scotia, is one of the finest and safest harbours in the world. It is open all the year round and there is direct communication with all parts of the world by sailing vessels and steamers and telegraph



Men-of-War in Halifax Harbour

communication by land lines and cables. The entrance is 5 1-3 miles wide between Devil island, to the north-east and Chebucto head, to the south-west. From mid-position between these points the general trend of the harbour is in a north-westerly direction for a distance of $13\frac{1}{2}$ miles to the head of Bedford basin. In the entrance, north-eastward of Rock Head shoal, there are depths of seven to eight fathoms; between Rock head and Portuguese shoals six fathoms; westward of Portuguese shoal 19 fathoms; eastward of Neverfail shoal seven to eight fathoms. The remaining depths in the channel to the city are over ten fathoms. The rise of the tide is six to six-and-a-half feet.

The wharf accommodation is spacious. There are seventeen wharves, capable of accommodating coasting and freighting vessels, with an area of 125,559 square feet, upon which a number of sheds are built; twenty-two wharves capable of accommodating steamers from 1,600 tons upwards, with an area of 114,986 square feet, the depth of water measuring from 29 to 46 feet. At these wharves vessels can unload into the sheds and load from them. There is one cold store which will contain 1,000 tons.



Halifax from George Island

The Intercolonial Railway wharves have tracks to the ship's side and to the sheds. No. 1 is the immigration wharf and shed; No. 2 wharf is 490 feet in length by 80 feet; shed, 485 feet by 46 feet, two tracks; depth of water, 27 to 40 feet; this pier is being rebuilt to give the following accommodation, 700 feet from bulkhead to end of pier, 235 feet wide with a depth of 45 feet, it will be served by 4 tracks, one on each side and two in the centre, the pier will be covered with one 2 storey shed 700 feet long with a total width of 199 feet. The ground floor of the shed will be 4 feet above the base to facilitate loading and unloading from cars. It is intended for the present to use the upper storey for immigration purposes pending the erection of further projected terminals; No. 3 wharf, length 620 feet by 165; shed 590 by 125 with grain carrier, four tracks; depth of water, 27 to 30 feet; No. 4 length 550 feet by 90; shed, 435 feet by 56, two coal chutes three tracks, water, 27 to 30 feet; No. 5 wharf, 450 feet long by 40 feet, no shed; two tracks; water, 22 to 25 feet; No. 6, deal wharf, 450 feet by 82, no shed, four tracks, water, 20 to 47 feet; No. 7, length, 613 feet by 65, no sheds, four tracks, water, 17 to 24 feet; No. 8, length 755 feet by 123, shed 650 feet by 65, four tracks, water 22 to 35 feet; No. 9 pier is 725 feet long and 110 feet wide with 2 tracks and shed 600 by 54 feet, depth of water 24 to 30 feet. There is berthing accommodation for ocean-going steamers at Government piers Nos. 2, 3, 4, 5, 6, 7, 8 and 9 which will berth two at each wharf.

The Halifax Tramway Company and the Dominion Coal Co. own quays which, together, hold 7,000 tons of coal. The King's wharf has a frontage of 250 feet and depth of water 20 feet. The dockyard, under control of the Department of Marine and Fisheries, is 2,700 lineal feet and depth of water is from $12\frac{1}{2}$ to 36 feet. Cranes in this dockyard will lift from two to fifteen tons.

The graving dock, belonging to the Halifax Graving Dock Company, has a frontage of 825 feet, with three wharves used as quays and three sheds, with an area of 21,552 feet; the depth of water at these quays is from 36 to 51 feet at low tide. The graving dock has a length for docking of 570 feet, breadth 85 feet, with a depth of 30 feet on the sill, at high water, and it is equipped with ample plant of a modern description for executing large repairs to steam vessels.

Sheers belonging to Messrs. Patterson and Company will lift 30 tons.

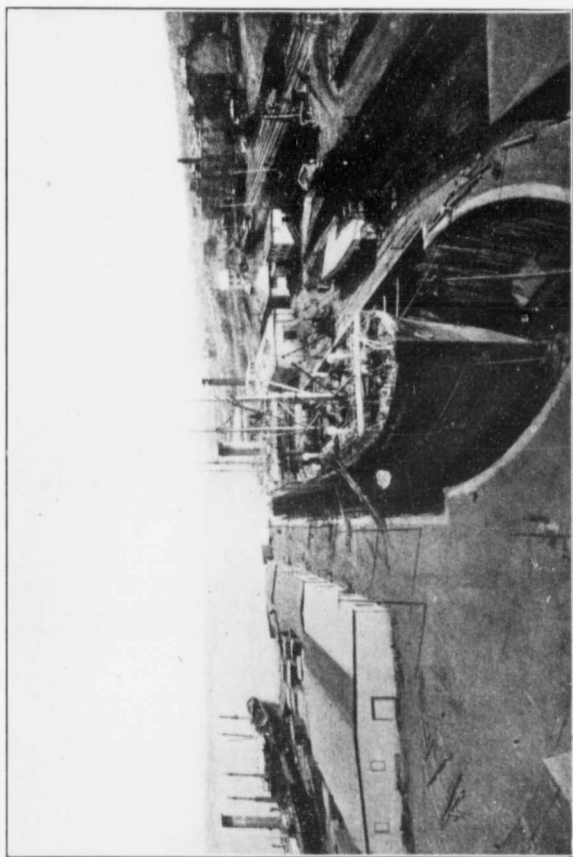
Several marine slips are located at Dartmouth opposite Halifax city in the harbour. No. 1 will take up a ship of 3,000 tons; No. 2, a ship of 1,000 tons; No. 3, a vessel of 400 tons and No. 4, a vessel of 200 tons.

Vessels are coaled from schooners or barges alongside, and from coal sheds.

There is a grain elevator with a capacity of 500,000 bushels.

The Port Charges are harbour master's dues, collected under an "Act to provide for the appointment of a harbour master for the Port of Halifax." The fees are similar to the general fees, with the exception that vessels under twenty tons are not charged. Sick mariners' dues are collected three times in the calendar year, provided they are not paid elsewhere. The rate is $1\frac{1}{2}$ cents per registered ton.

The average cost of loading and discharging cargo is, sugar, 25 to 30 cents a ton; iron and steel, 25 to 30 cents a ton; lumber and deals, \$1.15 to \$1.40 a standard. General cargo handled and sorted in sheds, 40 to 50 cents per ton. Ship's stores of all kinds can be procured in any quantity at reasonable prices.



Halifax, N.S. S.S. "Mount Temple" in dry-dock

Lights.—The lights in the approaches are: Chebucto head light, white revolving, latitude N. 44 30 4, longitude W. 63 30 50, fog whistle in front of and below light. Two white fixed lights on Devil island, one on south-east end of the island, latitude N. 44 34 50, longitude W. 63 27 7, the other, 175 yards, 241° from higher light; outer gas and whistling buoy in 36 fathoms outside the entrance 6¼ miles, 104° 30' from Chebucto head lighthouse, latitude N. 44 28 25, longitude W. 63 22 10, white occulting; inner gas and whistling buoy in 20 fathoms, 23°30', 17½ miles from Chebucto head lighthouse, white occulting; one submarine bell, 1-5 mile, 339° 30' minutes from the buoy; one light on Mauger beach, east side of

entrance to Halifax, white flashing, and a diaphone, one white fixed light on Macnab island, 1-5 of a mile, 355° from the south point of Finlay cove, latitude N. 44 37 0, longitude W. 63 31 48; one occulting white light gas buoy in 6 fathoms, 1-10 mile south of centre of middle ground W. of Macnab island; one light on George island, west side of island in Halifax harbour, red group occulting, and a fog bell rings on the west side of dwelling; one light, red fixed, on tower of Dartmouth Exhibition building, latitude N. 44 40 3, longitude W. 63 34 34. See List of Lights on the Atlantic Coast for 1913.

There is a Marconi wireless station at Camperdown, a suburb of Halifax, near Chebucto head, with a range of 250 nautical miles, wave length 600 m.

There is an eastern passage used by small vessels.

Pilotage.—Vessels of 120 tons and under, registered in Canada, are not compelled to pay pilotage charges. Payment of outward pilotage for all vessels, 200 tons and upwards, is compulsory. Rates, 120 to 200 tons, \$9.60 in., \$6 out; 200 to 300 tons, \$13.20 in, \$8.40 out; 300 to 400 tons, \$16.80 in., \$10.80 out; 400 to 500 tons, \$19.20 in, \$12.00 out; 500 to 600 tons, \$21.60 in, \$13.20 out; over 600 tons, an additional 60 cents for every 100 tons or fractional part inwards and 30 cents outward.

Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 4,352,059.

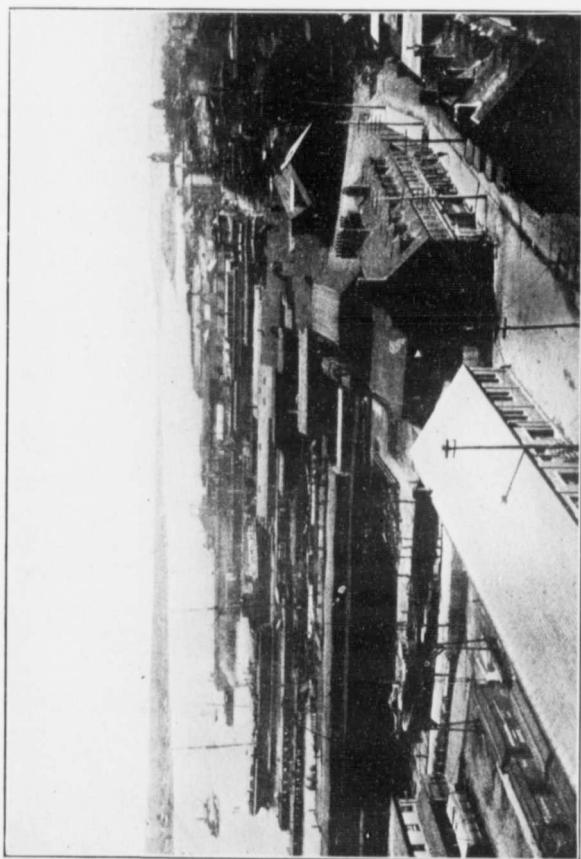
Directions. The harbour is easy of access and the channels leading to it are buoyed with port and starboard hand buoys. In approaching Halifax harbour at night, from the westward, shape course so as to pass at a convenient distance the light and whistle buoy on the outer bank, three miles to the southward of Sambro island light, or keep in not less than thirty fathoms until Sambro island light bears north.

Having crossed Outer bank and when Mauger beach light opens out eastward of Chebucto light, alter course to the northward and pass about half-a-mile from Chebucto head. After passing Chebucto head, steer to bring Mauger beach light in line north 15° east with McNab island light and proceed along this leading line until George island light is in line with Dartmouth Exhibition light and steer on that line for the harbour.

Approaching from the eastward by night and being to the westward of Jeddore ledges, steer along the land in a depth of not less than thirty fathoms for the outer light and whistle buoy, and passing it at a convenient distance steer north-westward for the inner light and whistle buoy, after passing which alter course to pass between Neverfail and Thrumcap light buoys by bearings of Mauger beach light, and from thence bring George island light in line (north) with Dartmouth Exhibition light and steer on that line for the harbour.

The citadel is 270 feet above the sea at high water, and with its flag staff is a leading mark easily recognized from a vessel off the entrance of the harbour. A gun is fired at the citadel at noon, mean time of the 60th meridian, equivalent to 4h. 0m. 0s., Greenwich mean time. See Charts 2,410, 729, 1,651, 2,670 and 2,666 and Nova Scotia (S.E. Coast) and Bay of Fundy pilot.

A great number of overseas and coasting steamship lines make Halifax an important harbour, and as navigation is open all the year round, these lines land passengers and freight during the winter season. Several lines transfer their



Deep water wharves in Halifax, N.S.

steamships to this port after the navigation is closed on the St. Lawrence route. The important lines have communication with all the important maritime provinces and Newfoundland ports, Bermuda in the West Indies, and with South American ports.

It is also a winter port for steamers running between Canada and South Africa, a distance of 7,338 miles to Cape Town. The distance between Halifax and Liverpool is 2,450 miles, a few miles more or less, according to the track taken.

HANTSPORT, Hants county, Nova Scotia, is situated on the Avon river, the lower part of which is practically an arm of Minas basin in the bay of Fundy. Owing to the changeable nature of the channels, caused by the rapid running of the tides, no details regarding the entrance of the mouth of the river are given. The least depth over the bar, according to the present charts 1,651 and 2,670, is $1\frac{1}{2}$ fathoms at low water springs. At Horton bluff, above the mouth of the Avon river, the tides rise 48 feet, springs, and 40 feet, neaps. In ascending the river to Hantsport, local pilots are necessary for strangers. The depth of water according to the chart at low water, ranges from one to three fathoms opposite the entrance to Hantsport. The banks or flats along the estuary are dry at low water. There are repair blocks in this harbour, and steamers call at the wharves on their way to the ports on Avon river.

There is a harbour master at this port. The port charges are harbour master's and sick mariners' dues.

Lights showing on approaching Hantsport are, one on Horton bluff west side of Avon river near its mouth, latitude N. 45 6 30, longitude W. 64 13 20; one on Mitchener point, two miles above Hantsport on the W. side of Avon river, both white fixed; one gas buoy on Cross Bars shoal in $4\frac{1}{2}$ fathoms off mouth Avon river, white occulting.

The tonnage entered and departed for the fiscal year 1911-12 was 30,903.

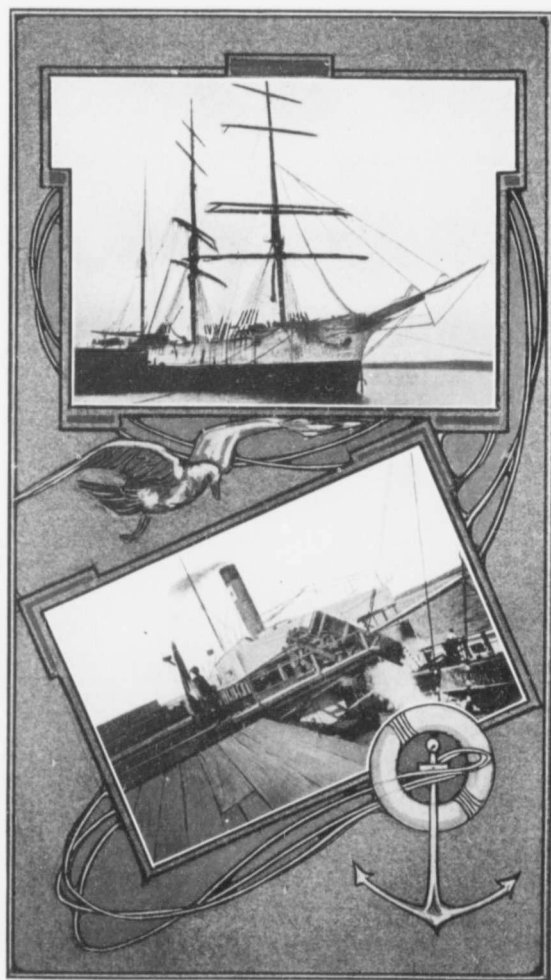
HILLSBOROUGH HARBOUR, Albert county, New Brunswick, is situated on the Petitediac river, five miles from its mouth. The anchorage ground is three miles below the harbour, with five to six fathoms at low water. The tide rises very rapidly in the river, a height of 38 feet at neap tides, and 45 feet at spring tides. The harbour is left dry at low tide with the exception of about a quarter-of-a-fathom in the channel. There are four wharves in the harbour, three owned by the Albert Manufacturing Co., and used by the company for shipping gypsum, each wharf accommodating only one vessel at a time. The remaining wharf, owned by Messrs. Smith & Peek, is used for shipping lumber. There are two railway sidings to the wharves upon which gypsum and lumber are carried. The depth of water at the wharves is 14 feet at high spring tides and eight feet at neap tides; vessels must arrive on the flood tide and load quickly, or wait until the next spring tides to depart. There is no dry dock, but vessels can go on the beach at the end of spring tides and repair until the next high tide.

Light.—The light is on the extreme point of Fort Folly, at the junction of the Petitediac and Memramcook rivers, latitude N. 45 52 4, longitude W. 64 33 50, white fixed. See List of Lights on the Atlantic Coast for 1913. Pilots can be obtained.

The Port Charges are harbour master's dues and sick mariners' dues, paid twice and three times a year, respectively, if not paid elsewhere. See General Chart 354 and S.E. Coast of Nova Scotia Pilot for sailing directions.

Total tonnage entered during fiscal year 1911-12, 54, 274.

ISAAC HARBOUR, Guysborough county, is on the eastern side of the province of Nova Scotia, about 115 miles east of Halifax. The harbour is entered from the Atlantic and is an arm of the sea north-west of Harbour island, being separated



Hillsborough, N.P.—Loading Lumber and Gypsum

from Western or Country harbour by Ragged point. The harbour runs in a north-westerly direction, a distance of three miles, nowhere exceeding four cables in width. The water at the entrance has a depth of four fathoms; there is an anchorage inside the entrance with a depth of 25 feet, mud bottom, the depth continues good and varies from three-and-a-half to four fathoms until the inner anchorage is reached with a depth of fourteen feet.

There are thirteen wharves, with depths varying from $15\frac{1}{2}$ feet, the depth at the head of the Government wharf, and 15, 13, 12 and 10 feet at other wharves. Some of these wharves have sheds where freight is stored. The harbour is well sheltered and, excepting for some distance near the head, is open the year round.

The adjoining arm of the sea is Country harbour which is unequalled by any harbour east of Halifax. It has a breadth of from three to five cables with a depth of from $5\frac{1}{2}$ to 10 fathoms, with an excellent land locked anchorage in from $4\frac{1}{2}$ to 7 fathoms, mud bottom, four miles from the entrance. This harbour continues navigable for large vessels $2\frac{1}{2}$ miles above the anchorage, small vessels proceed farther. The shores of Country Harbour are steep to on both sides. Tide rises in both harbours $6\frac{1}{2}$ feet, springs, $5\frac{1}{2}$ neaps. See Sailing Directions for S. E. Coast of Nova Scotia and Charts Nos. 2,519, 729, 1,651, 2,666.

There is a harbour master at Isaac harbour and the port charges are harbour master's and sick mariners' dues. The rates are as already mentioned in other Canadian harbours.

Lights.—There is a light on Harbour island, on the end of the shingle point, at N.W. end of island, latitude N. 45 8 35, longitude W. 61 36 45, white occulting; one light on the west side of Isaac harbour, about $\frac{1}{2}$ -a-mile, 158° , from Holly point, white group occulting. There is a fog horn at this station.

There is also a gas and whistling buoy in 25 fathoms, $33\frac{1}{4}$ miles, 182° , from Country harbour light, white occulting.

The light in Country harbour is on Green island, latitude N. 45 6 8, longitude W. 61 32 30, white group revolving. See List of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 76,600 tons.

JEDDORE HARBOUR, Halifax county, Nova Scotia, is the first ship harbour east of Halifax, and is entered from the sea. Its entrance is distant $2\frac{1}{4}$ miles east-north-eastward from Jeddore head, is $4\frac{1}{2}$ cables wide from West head to the opposite shore, but Thom shoal, with nine feet of water on it, stretches out from the western shoal just outside and across the entrance.

The channel between this shoal and East head is three cables wide between the three fathoms lines and carries a depth of four fathoms at low water over what may be termed the bar (see view on the charts). Inside of the harbour there is a depth of four fathoms, according to chart No. 1,651.

Jeddore ledges comprise the whole of the scattered off-lying danger to the southward of Jeddore harbour, and in consequence of their distance from the coast and proximity to deep water, require to be approached with extreme caution. (See Pilot for S.E. Coast of Nova Scotia and Bay of Fundy.)

Lights.—One on Jeddore rock, on summit of rock, 22 miles east of Halifax, latitude N. 44 39 45, longitude W. 63 0 22, white group occulting;

one on west side of entrance to harbour between West head and Marsh point, latitude N. 44 42 46, longitude W. 63 0 30, back light 85 feet, 345° 30' from front, both are fixed white lights. See List of Lights on Atlantic Coast for 1913. There is a harbour master at this place.

Port Charges are the same as already mentioned in other Canadian ports. The port is an outpost of Halifax.

LADNER, at the mouth of the Fraser river, British Columbia, at the northern end of Canoe pass, on the south bank of the river, about twelve miles below New Westminster. The water in the pass is from $\frac{3}{4}$ of a fathom to three fathoms at low water, and in the vicinity of Ladner, from three to seven fathoms; between Canoe pass and the main entrance of the river are the Sand heads, which extend for some distance along the coast, and the channels are dry at low tide. Tides rise and fall from seven to ten feet. During the spring and early summer the water is higher in the river and at its mouth. Ladner is a port of entry principally used by small steamers and tugs in connection with the salmon fishing industry. It is quite an important place during the fishing season. Ladner has communication by rail with other places. Provisions can be easily obtained at this point.

Lights.—The lights are: the Fraser river Sand heads lightship in 17 fathoms off the main entrance to the river, latitude N. 49 6 17, longitude W. 123, 18 15, two lights, white fixed, a diaphone fog alarm is installed on boardship and submarine bell, and approaching from the south is a gas and whistling buoy on Roberts bank, in 21 fathoms, off extreme western shoulder of Roberts bank; one light at south curve on south side of main channel, two miles, 219° 10', from North dam light, red fixed; one light at mouth of North dam, west end of dam on north side of main channel, 1 3-5 miles, 276°, from Garry point light, red fixed; one light on platform of tide gauge at Garry point, latitude N. 49 7 18, longitude W. 123 11 12, red fixed. These lights are outside lights which direct vessels to the entrance of the river. See List of Lights on the Pacific Coast for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 25,575 tons.

LADYSMITH, Vancouver island, British Columbia, formerly called Oyster harbour, extends from Yellow point to Reef point, Thetis island, and from Boulder point to Jostling point on Kuper island and includes all the waters west of Thetis island and Kuper island between Reef point and Jostling point. The harbour is nearly one mile wide at the entrance. Rock shoals extend off Coffin islet to a distance of three cables. There are three wharves on the south side where coal is shipped, length 800 feet, 540 feet and 300 feet respectively; depths of water, 33, 29 and 32 feet. Half-a-mile above Twin islands the harbour narrows to a quarter of a mile in width; small vessels may go as far as the west of Long island where there are three fathoms of water. From this point to the entrance the water is from 3 to 36 fathoms at the entrance of the harbour. Good anchorage is found in several places in the harbour for large vessels. Spring tides rise ten feet and neap tides eight feet.

Lights.—One lighthouse is on Coffin islet, latitude 48 59 20 N., longitude 123 44 52 W., on north side of entrance to harbour, red occulting.

When entering from the strait of Georgia by Porlier pass, one front white fixed

light on Race point Galiano island, latitude N. 49 00 32, longitude W. 123 35 5, rear light is on Virago point 1,200 feet 196° 30' from the front, also white fixed.

There are two beacons at entrance to harbour, one, the north, the other, south.

Pilotage is under the Nanaimo Pilotage Authority and payment is compulsory. The rates for the time being in force in this district are one cent per registered ton and \$1.00 per foot draught. Pilots can be obtained by notifying the Pilotage Authority at Nanaimo. Pilots also meet vessels from Pilot station near Victoria and from a station at Nanaimo.

Port Charges are the same as at other Canadian ports.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 1,788,211 tons.

LAHAVE HARBOUR is at the entrance of the Lahave river in Lunenburg county, south-east coast of Nova Scotia. A bay, with several islands is formed by the Atlantic ocean into which the Lahave river flows. The island of W. Ironbound is on the east side of the bay and Mosher's island on the west. Vessels from the east pass the eastern side of W. Ironbound island and vessels from the west or south enter between Mosher island and W. Ironbound island and pass up the Lahave river. There are two entrances to Lahave harbour, the eastern one is west of Oxners ledge; the channel is buoyed and has three fathoms of water entering the harbour. When entering the western channel, pass the black can buoy on S.E. of Big shoal and then pass the conical buoy west of Cockawee shoal and enter the harbour in four fathoms of water, low water. There is a spar buoy on N.E. end of Cockawee shoal in $4\frac{1}{2}$ fathoms and a spar buoy on N.E. end of Big shoal star-board hand in $4\frac{1}{2}$ fathoms and black can buoy in three fathoms on port hand side. See Chart No. 342 for further directions. There are three wharves in the harbour with 14 feet of water at the end where steamers call and deliver and receive freight. There is good anchorage from four to six fathoms in the harbour. The chief business of the port is principally connected with fishing.

Lights.—One on W. Ironbound island, latitude N. 44 13 42, longitude W. 64 16 20, white revolving; one on Mosher island west side of Lahave river; red fixed; one at Lahave, on Fort point, latitude N. 44 17 16, longitude W. 64 20 55, red fixed. See List of Lights on the Atlantic Coast for 1913.

There is a Harbour Master at this port and port charges are similar to other ports mentioned.

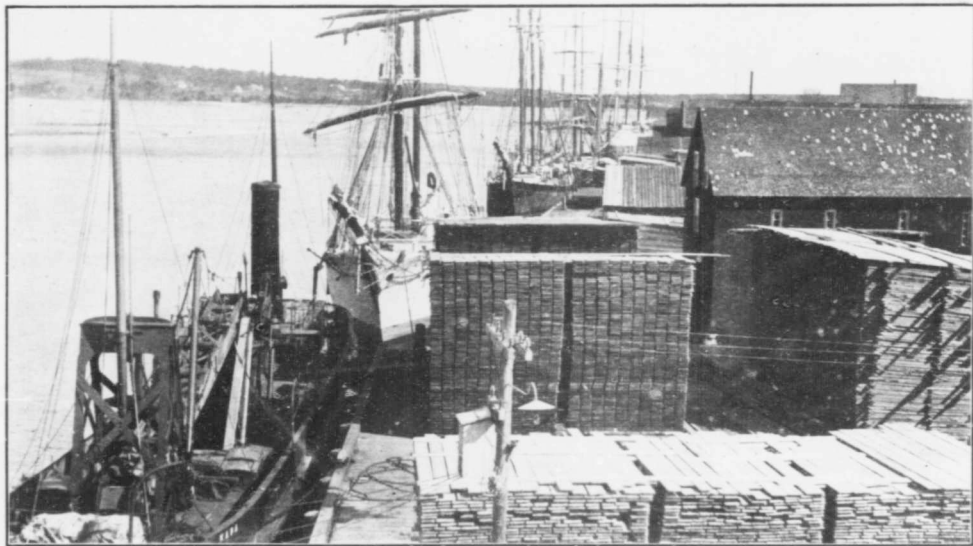
LEVIS, county of Levis, province of Quebec, is on the south shore of the St. Lawrence river opposite Quebec; it contains a dry dock, marine slips, shipyards and wharves and is the terminus of the Grand Trunk and Quebec Central railways and the Intercolonial railway. See Quebec harbour for further description.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 125,441 tons.

LIVERPOOL HARBOUR, Queen's county, Nova Scotia, is in Liverpool bay on the west coast of Nova Scotia. The bay is open all the year round. From the entrance the harbour extends three miles where it forms a basin known as Herring cove on the eastern side, and with the western shore forming the other side anchorage is found for a fleet of vessels. The bottom is mud, and the depth of water



Lahave, N.S.



Liverpool, N.S. Harbour and Water Front

from 4 to 6 fathoms in this anchorage. Tides rise and fall, spring 8 feet, and 5 feet neap.

Approaching the inner harbour is a bar which has been dredged, allowing vessels drawing 18 to 20 feet of water to enter and load at the wharves. There are fifteen wharves, with an area of 168,000 square feet, including the space occupied by buildings on these wharves. There is also a large coal wharf where coal can be loaded or bunkered. The Liverpool and Milton Railway Company have extended their line along the water front and cars are taken to the ships' side with lumber and general cargo. The Liverpool Marine Railway is operated by electricity and vessels of moderate size can be repaired. Labour, stores, provisions and water are readily procured. Stevedores and a large tug can be obtained. Pulpwood is largely shipped from this place and costs from 35 to 40 cents per ton for loading; steamers usually load 2,000 or 3,000 tons and finish balance of cargo in Halifax.

Port Charges are harbour master's dues, paid twice a year, and sick mariners' dues, three times a year, if not paid elsewhere.

Lights.—Liverpool bay fairway gas and bell buoy, white occulting, midway between Eastern head and Black point, latitude N. 44 1 55, longitude W. 64 39 45; Liverpool gas and whistling buoy, white occulting, in 20 fathoms in fairway, off Liverpool; a lighthouse on Fort point, south entrance to Liverpool bay, red fixed, latitude N. 44 2 35; longitude W. 64 42 20; range lights: front on S. W. end of Barrel Rock bar, 660 feet, 275°, from Fort point lighthouse, white fixed, the back light on middle of bridge, 2600 feet, 235° from front, red fixed; there is a green light on Brooklyn pier on inner end of breakwater. See List of Lights on Atlantic Coast for 1913.

Sailing Directions.—In proceeding for Liverpool bay, make the fairway light and whistle buoy and from then steer north-westward for the light and bell buoy which may be passed on either side, a mid-channel course should then be preserved, care being taken to avoid the 3½ fathoms patch off Black point, by keeping Liverpool lighthouse well open of the high water line on the south-west side of the bay, and the 2¾ fathoms patch 7 cables westward of Eastern head. For sailing directions, see S. E. Coast Nova Scotia Pilot, List of Lights and Admiralty Chart No. 341.

Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 127,258 tons.

LOCKEPORT HARBOUR, Shelburne county, Nova Scotia, is entered from the Atlantic ocean and is principally resorted to by fishing vessels. The anchorage is good in about 3½ fathoms at low water; there are several ledges and care should be used in approaching the harbour. Tides rise and fall 7½ feet springs and 6 feet neaps.

Coasting steamers run to this port. There is a Harbour Master and the port charges are the same as at other Canadian ports.

Lights.—One on Gull rock at entrance to harbour, latitude N. 43 39 12, longitude W. 65 5 50, white occulting; one in Lockeport on Carter island, latitude N. 43 42 15, longitude W. 65 6 0; red fixed, Lockeport gas and whistling buoy, white occulting, off the approach to the harbour. There are two bell buoys, one on Laurie rock in 5 fathoms 30 yards S. W. of rock and one in Lockeport fairway

in 12½ fathoms 1 5-16 miles, 77° from Gull rock light and 3 1-16 miles, 153° from Carter island light. See List of Lights on the Atlantic Coast for 1913. Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 31,814 tons.

LOUISBURG HARBOUR, Cape Breton county, Nova Scotia, latitude N. 45° 55', longitude W. 59° 58'. The entrance lies between Lighthouse point and Rocky and Battery islands, and is about 3¾ cables wide, but the navigable channel is 2 cables wide. Within the entrance, southwest arm continues westward over one mile with a general width of 3 or 4 cables; water in this arm, from 25 to 44 fathoms and deep water in all parts of the harbour. This is a coal shipping port and open the year round.

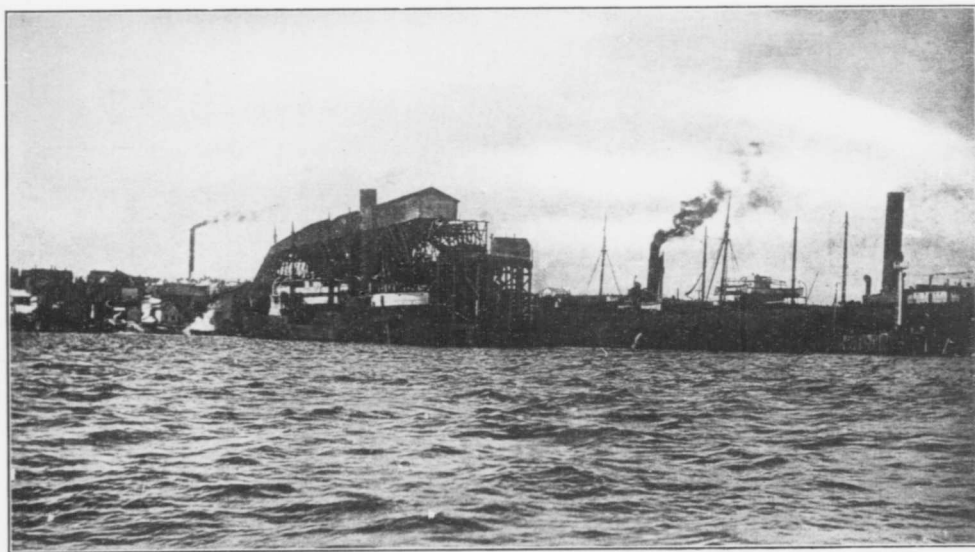
The principal wharves are the Dominion Coal Company's two wharves, both of which are 700 feet long; water from 25 to 35 feet; the freight wharf has a railway siding the full length of the wharf. Vessels unload with aid of donkey engine; a coal pocket is built on the other wharf which holds 6,000 tons and coal is loaded on board vessels by the Robins' Conveyor system. The wharf of W. W. Lewis & Co. is about 300 feet long, with shed and storage capacity of about 8,000 barrels; depth of water, 15 to 25 feet; the wharf of P. O'Toole & Sons is about 250 feet in length, shed and storage capacity of about 3,000 barrels, and near the Sydney and Louisburg Railway sidings; the wharf of Z. W. Townsend & Sons, at lower end of harbour, is about 200 feet long; shed and storage capacity, 2,000 barrels; C. L. Mitchell & Company's wharf and lobster factory is 150 feet long; depth of water on the eastern side, 15 feet; the wharf of James W. Townsend, in the lower part of the harbour, is about 200 feet long; shed and storage capacity about 1,000 barrels; sailing vessels discharge rock ballast at this wharf; depth of water on western side about 15 feet. There are in addition about twenty-five small wharves owned by shore fishermen in different parts of the harbour. There are no dry docks for repairs in the harbour.

Lights.—The harbour is very well protected by lights and buoys; Louisburg light is on the north side of entrance to the harbour in latitude 45° 54' 35" N., longitude 59° 57' 15" W., fixed white light visible 16 miles; a diaphone fog alarm is also operated here; Louisburg range lights are on the west shore of the harbour, red fixed light, visible 7 miles; two coal wharf range lights, red fixed, in harbour lead to the Dominion Coal Company's wharves.

The Louisburg gas and whistling buoy in 36 fathoms, 3 miles, 127° 30' from Louisburg light, white occulting; there is a bell buoy in 13 fathoms, 1½ cables, 65° from centre of Harbour shoal; one submarine bell eastward of Harbour shoal and about 1-10 mile 245° from bell buoy. See List of Lights on Atlantic Coast for 1913.

Port Charges.—Harbour master's dues, twice a year, and sick mariners' dues, three times a year, for vessels 100 tons, and once a year for vessels 100 tons and less if not paid elsewhere.

Pilotage.—Sailing vessels, 80 and under 150 tons, \$5 inward, \$3 outward; 150 and under 250 tons, \$8 inward, \$5 outward; 250 and under 400 tons, \$9 inward, \$7 outward; steamships 80 to 500 tons, \$8 inward, \$5 outward; 500 to 1,000 tons, \$10 inward, \$6 outward; 1,000 to 3,000 tons, \$12 inward, \$8 outward. Winter pilotage is fifty per cent. additional to above rates on sailing ships and steamships.



Louisburg, C.B. Coal Pier

See "St. Lawrence Pilot" for sailing directions and List of Lights and Admiralty Chart, No. 2,692. Total tonnage entered and cleared during fiscal year 1911-12, 469,601 tons.

LUNENBURG HARBOUR, Lunenburg county, is situated at the head of Lunenburg bay on the south-east coast of Nova Scotia. The bay is about five miles in depth by about $2\frac{1}{4}$ miles wide between the entrance points. It is open to the south-east, but the force of gales from that quarter is much lessened by Cross island which acts as a breakwater. Lunenburg harbour is safe in all winds and affords good anchorage at three fathoms. A channel from the entrance of the harbour to the railway wharf, 200 feet wide and 27 feet at low water, has recently been completed. A channel along the heads of all the wharves, 60 feet wide and 17 feet deep, at low water, was recently completed. Lunenburg is connected with the Intercolonial Railway by the Halifax and South Western Railway, and is the terminus of a railway which connects the Annapolis valley with the south coast of Nova Scotia. A railway siding passes along the head of all the wharves' properties. A marine slip of 600 tons capacity is maintained and repairs can be cheaply and quickly made.

The wharves are the railway wharf, 600 feet long, with two railway tracks and a most convenient wharf. Atlantic Fish Company's two wharves, 300 feet long by 35 feet wide, railway siding, five warehouses, bait freezer and cold stores of 1,500 barrels capacity; A. H. Anderson's two wharves, 350 and 300 feet long and 40 and 31 feet, respectively; railway passes the property; five stores for coal and cement; Messrs. Zwicker & Co., two wharves, 300 feet long by 40 feet wide, seven warehouses; James Eisenhauer & Co., two wharves, one 300 feet long, the other 100 feet; Messrs. Adams & Knickle, wharf, 300 feet long by 45 feet wide, large store, 80 by 50; John B. Young, two wharves, each 300 feet long and 35 feet wide, three large houses, a shipyard and railway facilities; W. C. Smith, one wharf, 200 feet long, 35 feet wide, and two warehouses. Supplies of all kinds and water can be easily obtained.

Port Charges are harbour master's dues, twice a year, sick mariners' dues, payable once a year, on vessels of 100 tons and less, and three times a year on vessels over 100 tons, if not paid elsewhere.

The Lights are: One on Battery point, entrance to Lunenburg harbour, red fixed, latitude N. 44 21 45, longitude W. 64 17 35; Lunenburg gas and whistling buoy in 23 fathoms $6\frac{1}{2}$ miles 121° from Battery point light; Lunenburg gas and bell buoy in northern entrance to Lunenburg bay, white occulting; one lighthouse on Cross island, east point of island, Lunenburg bay, latitude N. 44 18 43, longitude W. 64 9 57, white occulting, there is a diaphone fog alarm a short distance south-eastward of lighthouse. See S.E. Coast of Nova Scotia Pilot for sailing directions and List of Lights on the Atlantic Coast for 1913, and Chart No. 342. There is no pilotage authority in the district, but pilots can be obtained by signalling.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 137,749.

MABOU HARBOUR, county of Inverness, on the north-west coast of Cape Breton island, Nova Scotia, is entered from the gulf of St. Lawrence. The harbour is used by fishing vessels and is a coal port from which coal of an excellent quality is shipped.

Lights.—There is a range of lights in this place, the front being on the outer end of the breakwater on S.W. side of dredged channel, latitude N. 46 5 30, longitude W. 61 15 30, white fixed, the rear light on shore at McFayden's wharf, about 2,000 feet from front, red fixed. See List of Lights on the Atlantic Coast and Gulf St. Lawrence for 1913.

There is a harbour master at this port and the charges are the same as at other Canadian ports.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 10,879 tons.

McKINNON HARBOUR, Victoria county, Nova Scotia, is near the southwestern entrance of Barra strait, in Bras d'Or, Cape Breton island. In the bay, between Hector and Malagawatchkt points, there are several shoals. In the head of the bay are also several islands, northward of which is McKinnon harbour, having eleven feet of water in its narrow entrance.

Lights.—One red fixed on western bend of Derby point, Grand narrows; one white fixed on eastern side of Campbell island, west side of entrance of McKinnon harbour, latitude N. 45 54 46, longitude W. 60 55 54. There is a harbour master at this port and the port charges are the same as at other Canadian ports.

See List of Lights on the Atlantic Coast and Gulf of St. Lawrence for 1913.

MAGDALEN ISLANDS, Gaspé county, Quebec, in the gulf of St. Lawrence, contain three harbours: Amherst island, Grand Entry and House harbour; but these harbours do not afford anchorage for large vessels. There is open anchorage eastward of North cape in about nine fathoms, sandy bottom, with good anchorage with southerly winds.

Sailing Directions.—Vessels passing southward of the Magdalen islands make Entry island which, at a distance to the westward, appears like a double peaked hill. South-west cape, Amherst island, is a steep cliff. In foggy weather the soundings afford a good guide to pass southward of the islands.

Tides rise, springs, three feet and neaps, two feet. The tidal streams or currents around Magdalen islands are very variable both in rate and duration.

There is a harbour master at each of the three harbours, viz., Amherst island, Grand Entry and House harbour, where harbour masters dues are collected. House harbour and Grand entry have numerous buoys for the guiding of vessels to fresh water landing places and shelter. Supplies, stores and fresh water can only be obtained in limited quantities.

There are telegraph stations on the islands, one at Wolf island, one at Grosse isle, with a marine signal station and a radio-telegraph station. See Coast St. Lawrence Pilot and Admiralty chart, No. 2,516 (1,271) for further directions.

Lights—One white occulting on Bird rocks off N.E. of Magdalen islands proper, latitude N. 47 50 40, longitude W. 61 8 20, there is also a diaphone at this station; one on Brion island, to the north of Magdalen islands proper, group flashing, white, latitude N. 47 47 10, longitude W. 61 30 10; Grand Entry harbour range lights, front one on east side of entrance on N.W. extremity of Sand spit, red fixed, latitude N. 47 33 57, longitude W. 61 33 25, rear light on shoal inside of entrance to harbour, 742 feet, 38° from the front, also red fixed; Etang du Nord light, white group flashing, W. side of Grindstone island, latitude N. 47 23 20,

longitude W. 61 57 23; Pointe Basse wharf light on outer end of wharf on Alright island, red fixed; one on S. point of Amherst island, red and white alternating, latitude N. 47 13 6, longitude W. 61 58 0; one on outer end of Amherst wharf, red fixed; Entry island light on S.E. end of island, white occulting, latitude N. 47 16 39, longitude W. 61 41 0; there are also automatic buoys. The Alright reef bell buoy eastward of reef, 4 1-3 miles, 87° from cape Alright; Entry island whistling buoy 9-10 of a mile, 87° from eastern extreme of island; Pearl reef bell buoy in 13¼ fathoms half-mile, 177° from reef, latitude N. 47 19 30, longitude W. 61 35 2. See List of Lights on Atlantic Coast for 1913.

Total tonnage entered and cleared from Magdalen islands the fiscal year 1911-12 was 62,377 tons.

MAHONE HARBOUR, Lunenburg county, Nova Scotia, is situated on the west side of Mahone bay. It affords secure and well sheltered anchorage in a depth of about 6 fathoms. It is somewhat difficult of access because of off-lying dangers. The entrance to the channel leading to Mahone harbour and Princes inlet lies between Hobson island, on the south, and Haddock shoal, on the north, the latter being the southern rise of the shoal ground extending from Refuse and Mason islands.

There are several wharves in this harbour, one of which has 16 feet of water at its head, low water.

Tides rise 7¼ feet springs and 6 feet neaps. There are 4 shipyards where small vessels are built for the fishing industry. Coasting steamers engaged in passenger and freight traffic call at this harbour.

The approach to the harbour is buoyed, the first is a bell buoy to the S. E. of Chester or East Ironbound island, the other buoys are spar buoys and a can buoy; there is also a beacon on a shoal just below the wharves.

Lights.—There is a light on Westhaven island at the entrance of Mahone harbour, latitude N. 44 26 15, longitude W. 64 20 2, white fixed; a light also on Hobson island, red fixed, latitude N. 44 24 55, longitude W. 64 13 46. See List of Lights for Atlantic Coast 1913. At this port is a Harbour Master and the port charges are the same as at other Canadian ports namely, Harbour Master's and Sick Mariners' dues.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 19,497 tons.

MAITLAND HARBOUR, in Hants county, Nova Scotia, at the mouth of Shubenacadie river which empties into Minas basin, an arm of the bay of Fundy, is an outpost of Windsor. There are 2 wharves in the harbour. The depth of water at high tide at these wharves is 27 feet. The port is entered on a rising tide but at low tide the harbour has but 1½ to 3 fathoms of water, and the channel leading into the harbour, and should not be navigated unless by a pilot having local knowledge of the shoals and channels.

Lights.—One approaching the mouth of the river on Salter head, shore of Minas basin, red fixed, latitude N. 45 20 10, longitude W. 63 32 10; one on Government wharf, Maitland, white fixed, latitude N. 45 19 11, longitude W. 63 29 58. See List of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 16,255 tons.

MALPEQUE HARBOUR is in Malpeque bay, on the north side of Prince Edward Island towards its western end. The bay is entered from the gulf of St. Lawrence and its principal entrance is between cape Aylesbury and Billhook island and is $1\frac{1}{2}$ miles in width; there is a bar running east by south at the entrance of the ship channel; the narrowest part of the ship channel is about one cable wide and carries 3 to 4 fathoms of water but there is a 13 feet patch between the outer and inner bar. The inner bar has 19 feet at low water; there is temporary anchorage outside the bar in 5 to 7 fathoms, sand bottom and considered tolerably safe. Within Malpeque harbour the bottom is sand and clay at the anchorage in from 3 to 10 fathoms where the deepest water is off Royalty sand.

The rise and fall of the tide in Malpeque harbour averages about 2 feet, but the tide is affected by the direction of the wind.

The harbour is surrounded by a fine settlement and fresh provisions and water can be obtained. Within the bay are located the celebrated Malpeque oyster beds, from which are taken the famous Malpeque oysters, known in all parts of the Dominion and in other countries.

In Malpeque bay there are several small harbours which will not be referred to separately. Grand River and Darnley basin are harbours used for loading agricultural products raised in large quantities in several districts surrounding the bay.

Lights.—One fixed white light at entrance to Malpeque bay on inside of island, the main light is the back light of outer range, latitude N. 46 34 50, longitude W. 63 42 29; one fixed white on Fish island front of outer range and back of inner range; one red fixed light, 1,200 feet, 89° from main light; another red fixed light front of inner range, 350 feet, 219° from back light; range lights in Darnley basin, green fixed, front on west side of Darnley basin, latitude N. 46 33 5, longitude W. 63 41 8; the other 380 feet 168° from front, green fixed; Cascumpeque bell buoy in $4\frac{3}{4}$ fathoms off outer bar at entrance to Cascumpeque harbour, latitude N. 46 48 32; longitude W. 63 59 14.

The main light at the entrance of the bay is a sea light. The outer one in range with the main light shews the channel over the bar. The outer range of white lights should be brought in one outside the bar and kept on to within $\frac{3}{4}$ mile from the front from which point a 247° course will clear the shoals off the east end of Fish island and may be kept until the inner (red) range lights are on astern; these lights kept on 219° will lead into the inner harbour past Horse Shoe shoals. See List of Lights on the Atlantic Coast for 1913.

Malpeque is an outpost of Summerside.

There is a Harbour Master for this port and the charges are the same as at other Canadian ports.

MARGAREE HARBOUR, Inverness county, Cape Breton island, Nova Scotia, at the entrance of Margaree river on N. W. side of island, is entered from the gulf of St. Lawrence and strait of Northumberland.

There is a breakwater on the S. W. side of entrance. The channel is narrow and local knowledge is necessary to navigate. There is a bar at the entrance of the river, of shifting sand; small vessels enter when the sea is smooth but it is not safe to enter in a heavy sea. There is a Harbour Master at this port and the charges

are Harbour Master's and Sick Mariners' dues, according to regulations governing Canadian ports.

Lights.—Margaree light on summit or middle of Sea Wolf island, latitude N. 46 21 30, longitude W. 61 16 30; white fixed; one in Margaree harbour on the west side of the mouth of Margaree river, latitude N. 46 26 25, longitude W. 61 6 40, red fixed, and another red fixed light 215 feet 165° 40' from preceeding. See List of Lights on the Atlantic Coast for 1913.

Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 16,805 tons.

MARGARETVILLE, Annapolis county, Nova Scotia, is on the south coast of the bay of Fundy. There is a shoal that runs parallel with the shore off it. Between the west end of the shoal, with 2 fathoms, and the small pier there is a channel $\frac{1}{4}$ mile broad with 3 fathoms of water. The anchorage is in 5 fathoms, sand bottom inside Margaretville bank.

The tide rises and falls in the vicinity, 32 feet springs and 28 feet neaps. Owing to the constant fall and rise of the tide, not much ice remains in the harbour and it can be entered the year round as a general thing.

There is a Harbour master at this port and the charges are collected under the Dominion regulations for the government of harbours. The place is a railroad terminus and has communication with all parts by rail.

Lights.—Margaretville light on extremity of point south of breakwater, latitude N. 45 3 20, longitude W. 65 4 0; red fixed; one at Port George approaching Margaretville, on outer end of east pier, latitude N. 45 0 25, longitude W. 65 9 25, green fixed.

See List of Lights on Atlantic Coast and Gulf of St. Lawrence for 1913.

Total tonnage entered and cleared at this port for fiscal year 1911-12 was 12,265 tons.

MARIA HARBOUR, county of Bonaventure, province of Quebec, is in Cascadia bay on the north shore of bay Chaleur at its western end. Large vessels sometimes enter this port to load lumber and anchor in from 4 to 7 fathoms, the barges are moored by rope to the wharf and to the sides of the vessels loading. Small vessels moor alongside the wharf which has a depth of water of 14 feet at high water. Rise and fall of the tide, 8 feet springs and 5 feet neaps. The wharf is 980 feet long by 20 feet wide, the harbour is from 1 to $1\frac{1}{2}$ miles wide with from 2 to 5 fathoms of water for anchorage, blue clay bottom. The harbour is well sheltered and free from stones and rocks. The Quebec and Oriental railway passes from $\frac{3}{4}$ to 1 mile from the shore opposite the harbour.

There is a Harbour Master at this port and the charges are the same as at other ports in Canada.

There is a light at Carleton west of Maria on Tracadigash point, latitude N. 44 5' 21'', longitude W. 66° 71' 0'', white occulting, and one on Duthie point, New Richmond, white fixed, latitude N. 48 10 20; longitude W. 65 53 45. See List of Lights for the Atlantic Coast for 1913.

MATANE HARBOUR, Rimouski county, Quebec province, is situated at the mouth of the Matane river on the south shore of the St. Lawrence river, 28 miles east of Rimouski. There is a bar at the entrance of the harbour with 4 feet at low



Matane, P.Q.

water. The bar continually shifts. The tides are irregular, 11 feet springs, 7 feet neaps. Easterly winds raise the water while the westerly lower it. There are 2 Government wharves at Matane; one inside the harbour and one at its entrance; the depth of water at the former is 13 feet at high water and 7 feet at low. Two buoys mark the entrance to the harbour and gas and bell buoy is moored 2 miles from land to indicate the point where vessels should anchor to load in 10 fathoms and down to 5 fathoms within $\frac{1}{2}$ a mile from shore.

There is a Harbour Master at this port; the charges are Harbour Master's and Sick Mariners' dues.

Lights.—One white group flashing light at Matane, latitude N. 48 51 35, longitude W. 67 31 40; one on Matane pier, end of pier, white fixed. See List of Lights on the Atlantic Coast for 1913.

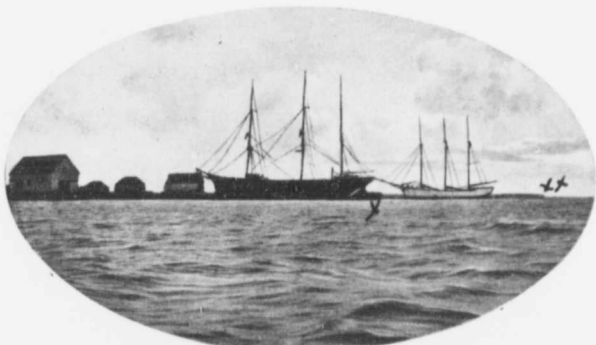
Pilots reside in the village and large vessels can procure their services.

METEGHAN HARBOUR, county of Digby, province of Nova Scotia, near the mouth of St. Mary bay, an arm of the sea, the entrance of which lies between cape St. Mary and Brier island, on the east coast of the bay of Fundy. The anchorage in the harbour is from 4 to 5 fathoms, bottom sand and clay. There is a Government wharf with a depth of water of 20 feet and two other wharves with a depth of 15 feet at spring high tides having 3 sheds used for warehousing general merchandise. There are 2 Marine railways on which vessels of from 600 to 700 tons may be hauled out. There is a Harbour Master at this place who collects port charges under the Marine and Fisheries harbour regulations.

The harbour is practically open the year round and this is due to the rise and fall of the tide.

Lights.—There is a light at cape St. Mary on the course to Meteghan and Meteghan river, east side of bay, red and white alternating, latitude N. 44 5 10, longitude W. 66 12 40; and on at Meteghan river at extreme end of breakwater, latitude N. 44 13 10, longitude W. 66 8 42, green fixed. See List of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 10,844 tons.



Water Front, Meteghan, N.S.

MISCOU HARBOUR, Gloucester county, New Brunswick, is between Miscou island and Shippigan island at the extreme south-eastern end of bay Chaleur. The harbour is at the extreme south-western end of Miscou island. The space of water is 2 cables wide and upwards of a mile in length with water from 4 to 6 fathoms in depth but there is a greater space of from 2 to $2\frac{1}{2}$ fathoms and also a narrow channel extending eastward through the flats to within a mile of Miscou gully. The bottom of the harbour is of soft mud. Inside the Harper point light there is a space about $\frac{1}{2}$ a mile wide and about 2 miles long and the anchorage is good.

There is a Government wharf or pier about 1,800 feet long and 20 feet wide with water about 6 feet at low tide and 12 feet at high water. See St. Lawrence Pilot and Chart No. 2,516 (1,271) for further directions.

The harbour is well buoyed and is principally used by fishing vessels for shelter or to obtain supplies.

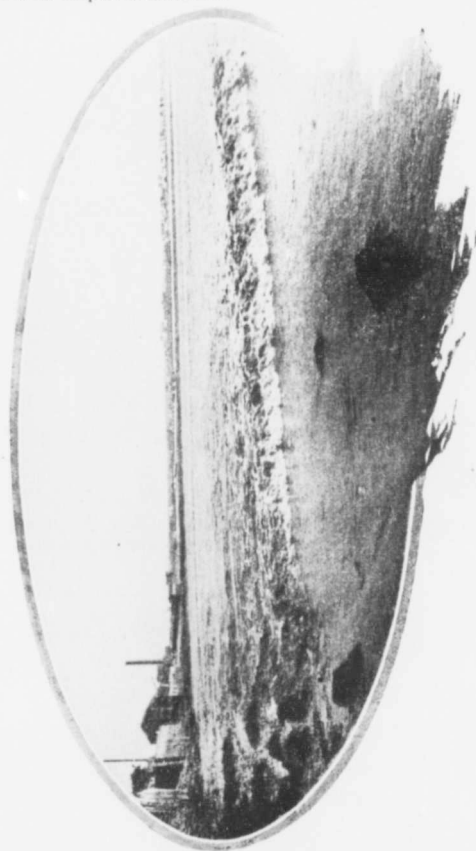
There is a Harbour Master at this port and the charges are the usual fees collected under the Canadian harbour master's regulations.

Lights.—One white group flashing on Birch point, Miscou island, latitude N. 48 1 0, longitude W. 64 29 25, fog whistle 107 yards E. from lighthouse; one light, fixed white, in Miscou gully, on Sandy point, S. E. end of Miscou island, latitude N. 47 55 5, longitude W. 64 29 30; one on Harper point on the port

side entering the harbour, on end of sandy spit, S. W. end of Miscou island, fixed white; one at Goose lake W. side of Miscou island, white revolving, latitude N. 47 55 40, longitude W. 64 35 40.

See List of Lights and Fog Signals for Atlantic Coast and Gulf of St. Lawrence for 1913.

Miscou is an outport of Bathurst.



The Bore, Moncton, N.B.

MONCTON HARBOUR, Westmoreland county, New Brunswick, is on the Petitcodiac river. This river empties into Chignecto bay or channel, an arm of the north-eastern end of the bay of Fundy. Folly point is at the Junction of the Memramcook and the Petitcodiac rivers at the entrance of these rivers into the Chignecto channel.

The Petitcodiac is navigable at or near highwater for vessels of moderate draught for a distance of 25 miles and for a further distance of 12 miles for small craft. Abreast Folly point, the Petitcodiac is about $\frac{3}{4}$ of a mile across and from thence it trends in a general northerly direction for a distance of 15 miles to abreast of the town of Moncton. The depth of water is only $1\frac{1}{4}$ to 2 fathoms at low water in the channel. Vessels lie on the flats in soft mud at Moncton. See Coast Pilot of S. E. Coast of Nova Scotia, Bay of Fundy and charts Nos. 353 and 354 for further information.

There are 6 wharves, including the Government wharf, which has 225 feet front on the river, depth of water 25 feet spring and 18 feet at neap tides; Harris wharf, 100 feet frontage, 23 feet water at spring tide; Stratheona Coal Company wharf, with 25 feet of water at spring tide; Summer's wharf, 120 feet frontage with 23 feet of water at spring tide; Reed Company's wharf, 85 feet frontage, 20 feet of water at spring tide; J. E. Master's Company wharf, 80 feet frontage, 25 feet water at spring tide. There are warehouses on all private wharves used for storage of freight. A railway track runs along the wharves, but there are no sidings.

There are no buoys in the river as there are no ledges or dangers. The bed of the river is dry at low water with the exception of a narrow channel.

Moncton is an important town at which several railways converge; the terminus of the Grand Trunk Pacific and an important station on the Intercolonial railway, at which the principal machine shops and offices of this line are located.

The bore of the Petitcodiac river breaks about three feet in height when the tide rises, and the speed of the bore at spring tide, Moncton, is about $8\frac{1}{2}$ knots an hour.

There is a harbour master at this port and the charges are governed by the regulation of the Marine and Fisheries Department mentioned elsewhere.

Lights.—On the Petitcodiac river are: Fort Folly point, on extreme point, white fixed, latitude N. 45 52 4, longitude W. 64 33 50; one at McFarland point, on edge of marsh E. shore of Petitcodiac river, white fixed, latitude N. 46 0 30, longitude W. 64 41 50; and one on edge of marsh at Outhouse point, south shore of river opposite Moncton, also white fixed, latitude N. 46 5 4, longitude W. 64 45 35.

See List of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 20,960 tons.

MONTAGUE RIVER, Kings county, Prince Edward Island, forms a junction at its mouth with Brudenell river. The river is entered after passing Georgetown harbour and runs in a westerly direction. The entrance of the river is between Brudenell and Aikins points. The depth of water at the mouth of the river is from 21 to 36 feet and carries in depth for about four miles of from 20 to 25 feet. The harbour extends from Georgetown harbour westerly. See St. Lawrence Pilot and Chart No. 2029.

The wharves are:—Poole and Thomson's wharf; John J. Hynes wharf; A. S. Macleod's wharf and the Government wharf. There are two sheds on Hynes' wharf used by shipping. The water at the wharves is 14 feet.



South Side, Montague, P.E.I.

The bottom of the harbour is mud where vessels anchor. Small vessels ascend as far as Montague bridge. The harbour is surrounded by a fine farming section and from which is shipped large quantities of agricultural products.

There is a harbour master at the port and the dues are the same as at other Canadian harbours.

The harbour is entered by passing on the east side of Panmure island from the strait of Northumberland and the lights are the same as for entering Georgetown harbour; one on Panmure head, white fixed, S.E. extremity of Cardigan bay, latitude N. 46 9 0, longitude W. 62 27 35; there is a diaphone fog alarm at this station; one light on St. Andrews point S.W. side of entrance to Georgetown harbour, white fixed; one on Westaways farm, 2025 feet, 278° from the former, white fixed. See List of Lights on the Atlantic Coast for 1913.

The total tonnage for this port during the fiscal year 1911-12 was 33,029 tons.

MONTREAL HARBOUR, province of Quebec, is in latitude N. 45 30 17, longitude W. 73 54 0. The harbour is administered by the Montreal Harbour Commissioners, who report annually to the Minister of Marine and Fisheries.

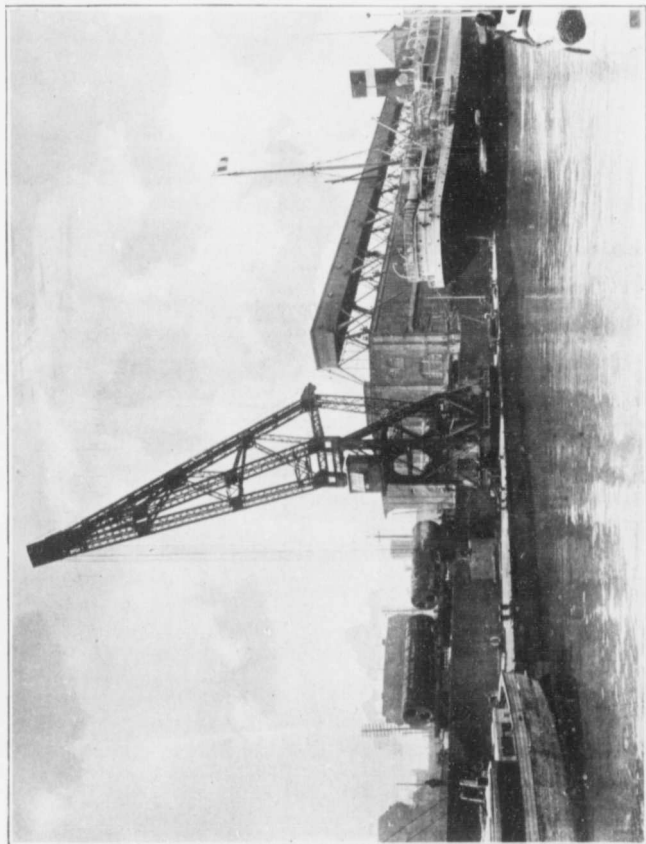
Montreal is the most important port in Canada for shipping during the season of navigation.

It is at the head of the St. Lawrence ship channel and its limits extend from Victoria bridge, on the St. Lawrence river, to the northern point of Montreal island, a distance of about eighteen statute miles downstream. The island is situated on the west bank of the river, but both banks of the river in the harbour are under the control of the Commissioners for harbour purposes. The entire water front on both sides for the whole distance is harbour property.

The width of the harbour in the distance mentioned varies greatly. Opposite the city are ile Verte, ile St. Helene and ile Ronde. The river narrows between these islands and the west bank of the river, and causes what is termed St. Mary's

current, but after passing through this current the river expands above and below the islands. The main or ship channel passes on the west side of the three small islands mentioned, opposite the city.

Deep draught vessels must keep within the ship channel when approaching the wharves located along the city front, but harbour and river boats find ample



Montreal Harbour Commissioners Floating Crane

water to pass over the well known shoals and shallower parts of the harbour by regular channels between the islands. The minimum width of the ship channel is 450 feet. At Longue Pointe, east of the city of Montreal, Longue Pointe shoal begins, and separates the ship channel from deep water that is found along the

west bank of the river. The depth of water close to the bank is from 36 to 40 feet, and is used only by vessels which do not ascend to the Montreal piers or quays. Deep draught vessels passing up to Montreal keep in the ship channel until the wharves are reached. The water over the shoal is from 9 to 22 feet and harbour and river boats only pass over this shoal, but local knowledge is necessary to navigate this part of the harbour.

Vessels navigating the Great Lakes and upper St. Lawrence river enter the harbour at the west end by Lachine canal and locks. At the foot of the locks the water is fourteen feet over the sill. A line of passenger steamers successfully undertakes the navigation of the Lachine rapids, immediately above Montreal, down stream, making the return by the canal.

The harbour of Montreal has three divisions: No. 1, south of the Lachine canal; No. 2, the central harbour and No. 3, the lower division.

Sea-going or large ocean-vessels pass up the river from the Gulf of St. Lawrence, uninterruptedly, day or night, using the dredged ship channel above Quebec, and coasting vessels and steamers from the Maritime provinces and Lower St. Lawrence river either in the ship channel or other portions of the river where the charts indicate water of sufficient depth.

Berthing accommodation for ocean-going vessels is as follows:—

For vessels of 550 feet in length and drawing 28-30 feet water,	20	berths.
For vessels about 400 feet long, with draft of 25-30 feet water,	36	"
For vessels 300 feet long and draft of 20 feet.....	17	"
For vessels 200 feet long and draft of 10 feet and over.....	19	"

Total.....92 "

In addition to the accommodation for ocean-going vessels there is space for small vessels, making a total of berthing space of nearly $7\frac{1}{2}$ miles.

Excellent wharves and basins have been provided for market and passenger steamers and also wharves specially used by ferry-boats.

The main wharfage accommodation for ocean-going and vessels of all kinds is supplied by a costly and substantial line of piers, built out into the river, and quays between these piers, equally substantial, run along the shore front between the inner or shore ends of the piers. Deep draught and other vessels, therefore, berth at the outer ends and along the sides of the piers and at the quays as well. The extension of the line of piers and quays is yearly taking place to afford accommodation to the constantly increasing trade of Montreal harbour.

Wharves.—The principal piers are described as follows, with the depth of water at low water, which includes the depth at the quays along shore as well.

Alexandria pier with from 31 to 33 feet depth; King Edward pier with from 33 to 34 feet; Jacques Cartier pier; water from 32 to 34 feet; Victoria pier, water from 23 to 27 feet; Laurier pier, 28 feet; Tarte pier, 32 to 36 and the Sutherland pier, 31 feet, all at low water.

Steel Sheds.—Upon these piers and quays are fourteen steel two storey sheds and two reinforced concrete sheds; the dimensions are No. 2 shed on quay, sections 12 and 13, length of shed 634 feet 4 inches, width 96 feet; No. 3 and 4 sheds on



Montreal Harbour. View from the Grand Trunk Elevator

Alexandria pier, 507 feet 2 inches each by 69 feet; Nos. 5 and 6 sheds, also on Alexandria pier, 476 feet 6 inches each by 96 feet; Nos. 7 and 8 sheds on King Edward pier, 507 feet 2 inches each by 96 feet; No. 11 on shore quay section 17, 571 feet by 96 feet; No. 12 on Jacques Cartier pier, 443 feet 10 inches by 96 feet; No. 13 on Jacques Cartier pier, 412 feet by 96; Nos. 14 and 15, 381 feet 6 inches and 365 feet 8 inches respectively also on Jacques Cartier pier. Two reinforced concrete one story sheds on the Tarte pier with a floor capacity of 64,000 square feet.

Shed No. 16 is located on Victoria pier and is of structural steel, skeleton type concrete floors. It is 484 feet long by 100 feet wide with freight compartments; the lower floor containing offices of the wharfinger, marine superintendent and staff and the upper floor, with waiting rooms, restaurants, baggage room and all appointments for the convenience of passengers who are landed and embark at the Victoria pier. A grain conveyor gallery running the whole length of the shed connects with Grain Elevators Nos. 1 and 2.

Electric Hoists.—Several of the sheds are equipped with electric hoists for lifting teams and loaded wagons from the ground floors to the upper floors; one at shed No. 11; one on the King Edward pier raises teams with their loads to an overhead bridge which connects with sheds Nos. 7, 8, 9 and 10; the latter is of a new design.

Transporter Cranes operate in sheds Nos. 2 and 9 by which freight is taken from the holds of steamers alongside the pier and delivered either on the floor of the shed or into cars or on wagons on the opposite side of the shed. The cantilever arms are supported by a tower on a turntable and the arms extend 46 feet on the ship's side and 34 feet on the opposite side of the shed. The power used is electric. Chutes for handling freight form part of the conveniences at sheds Nos. 6 and 11.

Coal Wharves.—Coal discharging plants are operated in different parts of the harbour. The Dominion Coal Company's equipment consists of extensive steel and wooden towers at Hochelaga and at Windmill point with large buckets which unload from 200 to 400 tons per hour and storage pockets with large capacity form part of the equipment. The Intercolonial Coal Company, the Inverness Coal Company, the Port Hasting Coal Company, the Nova Scotia Coal and Steel Company and the Acadia Coal Company have each discharging plants of considerable capacity. The coaling and bunkering system is described in paragraph below relating to the coaling systems.

Another wharf is used by the Vulcan Portland Cement Company for unloading material and loading cement.

Grain Conveyor System.—The grain conveyor system is an exceptional feature of the harbour grain-loading system, and said to be the most complete on the continent. These conveyors are steel galleries erected upon different piers and extend from the grain elevators to the ship's side. The grain conveyors from the Harbour Commissioners' two elevators have a length of about 2 1-3 miles, operating some 10½ miles of belting, so that grain from either elevator may be carried on this belting to any of 19 steamships in their berths. Portable trippers are used to deliver the grain into spouts which enter the holds of vessels lying at the piers. A special advantage of this system for vessels carrying general cargo is the despatch given to the large liners by enabling them when cargo space is ready,

to load grain while unloading operations are carried on at the same time. Another special advantage to shipping gained from the conveyor system, is the facility afforded for loading several steamships lying at the different berths simultaneously.

Grain can be delivered at the rate of 16,000 bushels per hour from each spout



Montreal Harbour. One of the basins with sheds.

into vessels, but this quantity is not generally attained owing to the time necessary for trimming on board ship.

The Grand Trunk Railway grain elevator is equipped with conveyors on

one side of their elevator pier at Windmill point in the upper part of the harbour but this will be more fully described under Montreal grain elevators.

Grain Elevators.—The situation of Montreal at the head of ocean navigation affords easy and direct connection with all grain ports on the Great Lakes. Grain transported by vessels from Lake Superior ports and by railroad cars is transhipped for European ports at Montreal. The port is located farther inland than any other sea-port on the North American continent and is at the foot of the canal system which connects the Great Lakes. These lakes being the waterway by which grain grown on the great prairies is borne to the sea, have their various inland ports on both sides of the lakes where grain is loaded into lake carriers of large tonnage and capacity. Montreal has, in order to receive and tranship large quantities of wheat and other grain, developed the most complete system of grain delivery into ocean-going vessels. The elevator system for receiving grain from lake vessels is being put on a more extensive basis in order to give these vessels despatch. The storage capacity and the unloading and elevating equipment has lately been increased.

The elevators are of two classes, the stationary and floating elevators. The latter are placed between the vessel unloading and the vessel receiving cargo. The grain is weighed while passing from one to the other. The principal and more modern system established, includes storage capacity, elevating from cars or loading into cars, unloading lake vessels by use of marine legs and loading by means of conveyors on galleries to the ocean ships lying in their berths some distance from the elevators.

The largest elevator in the harbour is the new No. 2 Elevator, built by the Harbour Commissioners, which, with its annex, has a capacity for storing 2,620,000 bushels. The grain handling capacity is large and convenient, enabling the operators to receive grain from 250 railroad cars in 10 hours. On a special jetty a double marine tower has been constructed for unloading inland grain vessels. Two marine legs with a capacity of 20,000 bushels each per hour have been provided to convey grain to the main elevator where it is distributed into bins and from these conveyed by belting as already described to ocean-going vessels at their berths. It is contemplated to increase the size of No. 2 elevator to double its present capacity for storage and handling grain of all kinds. Electric power is used for operating the appliances and machinery at this elevator.

Harbour Commissioners' elevator No. 1 has a capacity for storing 1,000,000 bushels, also marine legs for unloading from inland vessels and cars and the same process of delivering into vessels by the galleries and conveyors as No. 2. The power for operating this elevator is also electric.

The Grand Trunk Railway elevators built on a pier at Windmill point has a capacity for storing 2,000,000 bushels. Grain is unloaded from cars and vessels and delivered again to vessels loading. In one week, over 1,000,000 bushels can be handled inwards and outwards. Conveyors to the ships' holds are provided for delivery into ocean-going vessels at this elevator pier, but of much less extent than the steel galleries and conveyors system of the Harbour Commission. Steamships engaged in the grain trade are placed in berth opposite the spouts which by the belt system deliver grain at the rate of 10,000 bushels per hour, and two ships may be loaded simultaneously from the spouts which are placed on one side of the pier only. The elevator machinery is operated from electric motors.

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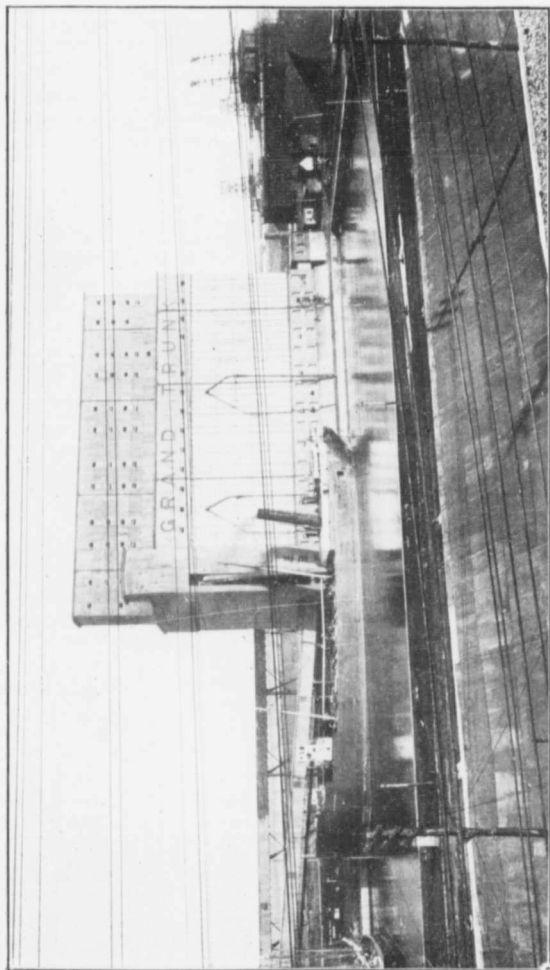
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Montreal Harbour. G. T. Elevator, built 1904.

In addition to these public elevators private elevators and warehouses add to the storage and grain handling conveniences of the port.

In all of these elevators, charges are made as reasonable as possible for storing, cleaning, turning, drying and inspection.

Floating and Dry Docks.—Two small dry docks are located at the foot of the Lachine canal where vessels of 400 feet long and 10 feet draught are repaired.

The new floating dock is one of the largest of its description in Canada, having a length of 600 feet, clear; width, 100 feet; docking draft 30 feet and lifting capacity of 25,000 tons.

The floating dock is now in position in the eastern division of the harbour below St. Mary's current at a point where the gentle current presents no difficulty in handling vessels. The site of the dock is in a natural bay of considerable extent. The dock is the property of the Canadian Vickers, Ltd., and the Harbour Commissioners have appropriated the protected basin, have done the necessary dredging for entering the dock, supplying deep water as well as furnishing 30 acres of made ground for a shipyard and repair plant. The three inner walls of the basin have been built very substantially and are founded 32 feet below extreme low water and improved concrete quay walls erected up to 28 feet above low water.

All the work of quay structure, dredging in the basin or bay filling up of the remaining portion of the 30 acre site is being done and will be maintained by the powerful building and dredging plant of the Harbour Commissioners. The transportation railway tracks of the Commissioners connect the floating dock and shipyard and site with other divisions of the harbour and the various railway terminals of the city.

Railway Transportation or Traffic Tracks.—Under the Harbour Commissioners' and part of the harbour property is a well equipped freight transportation railway. The system includes high and low level tracks, sidings, diamond crossings, convenient switches, cars, locomotives and engine house and shops. The general freight transportation business along the harbour front, as well as coal delivery by railway lines, is conducted upon the harbour railway. The system is connected with every railway that enters or terminates at Montreal. Freight cars belonging to one railway line or another are drawn to the railway yards or points of freight delivery by the Harbour Commissioners' locomotives. The high level and the low level tracks are connected, and tracks have been laid to the different piers and sheds for the purpose of warehousing and loading and unloading vessels. This traffic arrangement is conducted by a separate department of the Harbour Commission and the extension, maintenance and working operations are among the many improvements constantly being introduced. The success of this harbour method is realized by shipping and the many commercial and manufacturing interests concerned in trade with the port of Montreal. For this transportation adjunct to the freight moving facilities of the harbour, over 30 miles of track have been laid. The charges for moving cars are collected under a tariff regulation adopted by the commission and materially add to the revenue of the harbour.

Movable Apparatus.—Included in the movable apparatus for handling freight are scows, floating derricks and a floating crane of 75 ton lifting power. The minimum charge for use of this crane is \$25 and a proportionate rate for lifting different weights from 2 tons, rate \$10 up to full capacity 75 tons, rate \$475.



Montreal Harbour. Harbour Commissioners' Elevators and Sheds, built 1903.

The Department impresses upon every pilot the absolute necessity of waiting above each of the bars mentioned in the Tide Tables for such rise of tide as will carry his vessel safely over.

Officers of vessels will, on application at the Pilotage Office, 223 Commissioner Street, Montreal, be furnished with the By-Laws regulating the harbour, the river and any other special information they may desire. Here may be purchased charts of the Ship Channel from Montreal to Quebec at 15 cents per sheet.

The Pilotage Offices at Montreal and Quebec are open day and night.

The pilotage steamer "Eureka" cruises off Father point for vessels requiring pilots to Quebec, and at Quebec vessels signal for a pilot to proceed to Montréal. By the telegraph system in the St. Lawrence route, masters telegraph ahead to Quebec for a pilot to continue to Montreal.

Lights.—In Montreal harbour on Ile Ronde on N. E. end of island, latitude N. 45 31 29, longitude W. 73 32 4; one on pier in 2 feet of water on shoal on west side of Ile St. Helene 2,158 feet 202° from front, latitude 45 30 27, longitude 73 32 41, both white fixed. See List of Lights on the Atlantic Coast and Gulf of St. Lawrence for 1913.

Gas lighted and other Buoys in the St. Lawrence river ship channel are placed and maintained by the Department of Marine and Fisheries. The whole lighting system is the result of many years of experience and adaptation to the requirements of large ocean-going steam and sailing vessels. Between Montreal and Portneuf, a distance of 108 nautical miles, is termed the Montreal district of lights and buoys system of the Department of Marine and Fisheries. A buoy depot of large dimensions where stores, derricks, yards, landing and shipping piers is established at Sorel, a central point of operation from which lighthouses and buoy tenders constantly give attention during the season of navigation to the demands of the service in connection with aids to navigation. The object of the Department is to make the St. Lawrence route to Montreal safe night and day, and it can be correctly stated that nowhere in a long channel has a greater degree of success been achieved.

The lighthouses in this district number 103 towers; 14 pole lights and 10 lighthouses, under construction, located on carefully selected positions on shore; 78 gas buoys are also maintained to guide the mariner by their lights, both occulting and fixed. In the straight parts of the channel the lights shown by these buoys can be seen for seven miles. Calcium carbide, having water contact in the lower part of the buoy, generates the gas which ascends to a lantern containing burners that show flat flames and a round pilot burner on the buoys, with occulting lights.

In this district are 35 can and conical unlighted buoys, the can painted black are on the port hand side ascending, and the conical painted red on the starboard hand side; in addition, 173 spar buoys are kept in position.

Above Montreal in lake St. Louis, acetylene and other buoys of similar types to those mentioned are kept in position for lake and river vessels entering and leaving Montreal.

From Montreal to Portneuf the lighthouse system includes single tower lights, range lights, a few pole and beacon lights and at Montreal, electric lights; about

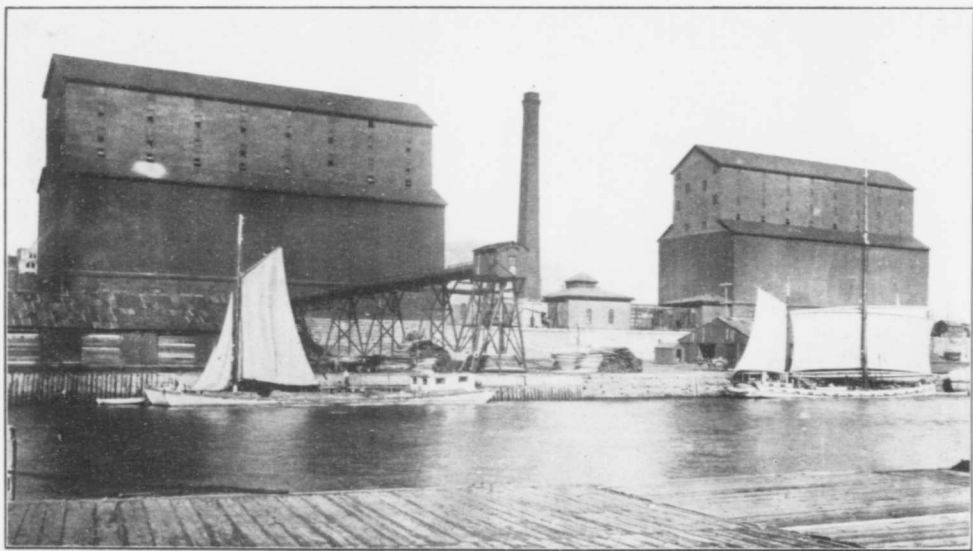
120 single lights are maintained under the direction of the Department of Marine and Fisheries, in which oil, vapour gas and acetylene are the illuminants.

The lighting of the harbour of Montreal is done by the Montreal Light, Heat and Power Co., whose two patrolmen should pass along the wharves at intervals to adjust any lamps not burning properly.

Radio Telegraph Stations for communication with ships approaching and in the St. Lawrence route have been established between the Atlantic, Newfoundland and Montreal, situated as follows:—

Name.	Where Situated.	Owned by	Operated by	Range in Nautical Miles.
Belle-Isle, Nfld.....	Belle Isle Straits	Dominion Government	Marconi Wireless Tel. Co. of Canada.	250
Pt. Amour, Lab.....	" " "	"	"	150
Pt. Riche, Nfld.....	Gulf of St. Lawrence.....	"	"	250
Harrington, P.Q.....	" "	"	"	150
Heath Pt., P.Q.....	" " (Anticosti Island).....	"	"	250
Cape Ray, Nfld.....	Cabot Straits	"	"	350
Cape Race, Nfld.....	North Atlantic.....	"	"	400
Grindstone Island, P.Q.	Gulf of St. Lawrence (Magdalen Islands).....	"	"	200
Fame Pt., P.Q.....	" "	"	"	250
Clarke City, P.Q.....	" "	"	"	250
Father Pt., P.Q.....	River St. Lawrence.....	"	"	250
Grosse Isle, P.Q.....	" "	"	"	100
Quebec, P.Q.....	" "	"	"	100
Three Rivers, P.Q.....	" "	"	"	150
Montreal, P.Q.....	" "	"	"	200

Marine Signal Service.—A marine signal service is maintained by the Department of Marine and Fisheries for reporting incoming vessels bound for Montreal, and furnishing information regarding the progress of vessels outward bound down stream. This service includes a private telephone system connecting signal stations between Montreal and Quebec. Below Quebec a station is established at Crane island which has communication by the Bell Telephone Company's system with the signal station at Quebec. The telephone terminal at Montreal is in the Marine and Fisheries Agency building and the Quebec terminal in the Custom House. Reports are transmitted from any of the signal stations to Montreal or Quebec.



Montreal Harbour. C. P. R. Elevators, built 1835.

Each signal station has a mast, 60 feet in height, with a cross spar 20 feet long, about 20 feet from top of mast. When in operation a "Jack" is run up to the mast head during daylight and a white light at night. Signals displayed at west end of cross spar indicate river or points above station; signals displayed at east end of cross spar indicate river or points below station. For other communications between vessels and stations or *vice versa*, the International Code of Signals is used.

The combined service has been very useful in reporting weather conditions along the river and the whereabouts of vessels. Bulletins are issued at Montreal and Quebec.

The following list shows the names of stations and includes the distances from Montreal in nautical miles.

Name of place.	Locality.	Nautical miles below Montreal.	In operation.
Montreal	In the Agency office, Boyer bldg.	00	Day and night.
Longue Pointe	On the extreme point	5	" "
Verchères	In the windmill near the wharf	19	During daylight.
Sorel	On the Government wharf	39	Day and night.
Three Rivers	On the upper end of Bureau wharf	71	" "
Batiscan	At the wharf	87	During daylight.
Deschailhons	On the hill at the semaphore	93	Day and night.
Grondines point	At old windmill	97	" "
Portneuf	In the front range lighthouse	108	During daylight.
St. Nicholas	At semaphore station on summit of Point Nicholas	127	Day and night.
Bridge	On point above Quebec bridge	133	During daylight.
Quebec	Custom House	139	Day and night.
Crane island	On the wharf	171	" "

Ship Channel.—The St. Lawrence river ship channel has now a depth of not less than 30 feet at low water from Montreal to tidal water at Batiscan and from Batiscan to Quebec, at low tide. The river is very much reduced in width at the Traverse, 220 miles from Montreal, and dredging has principally been done at different places, giving a continuous channel with water nowhere less than 30 feet in depth in it; 450 feet wide in the straight places and 750 feet in the bends. Lake St. Peter, above Three Rivers, is an expansion of the river where a temporary anchorage of 800 feet in width is provided.

The depth of the water in the St. Lawrence river is increased by the greater flow from the Great Lakes above Montreal, and the tributaries below Montreal in the spring and early summer. All times the depth is affected as far up stream as Three Rivers by the tide, although irregular in its rise and fall at Batiscan, above Quebec, the head of tidal navigation. The rise of the tide enables vessels of any draught to pass upwards or downwards in safety in the ship channel at St. Augustine shoal and Cap a la Roche shoal above Quebec city. Semaphores at these points indicate the depth of water by signals. The daily depths of water in the non-tidal parts of the ship channel are indicated by gauges at Montreal and Sorel.

The ship channel work is performed by specially powerful dredges of the best known types, rock cutters and a fleet of tugs and scows employed solely in this navigation improvement, under a Superintending Engineer and trained staff of officers and employees. Sweeping of the channel for the whole distance is performed at regular intervals. Many years' experience in this line has proven that the channel is almost free from the deposit of silt or debris, due to the fact that the lakes above Montreal are natural basins of great depth that receive all sedimentary material from streams, thereby leaving the shallower bed of the river free from silt or gravel. Regulations of the Marine and Fisheries Department prohibit throwing overboard ballast, ashes, hay and straw or rubbish between Montreal and Quebec, in the ship channel, under penalty.

The project of deepening the ship channel includes further deepening to 35 feet, at lowest water, and several miles of dredging has already been done in lake St. Peter and other points. This scheme will cause a further deepening of the present ship channel of five feet, and will increase the lineal measurement of dredging 20 miles, that is from 70 to 90 miles in the dredged portions.

The project of deepening and extending the St. Lawrence river ship channel has been carried out in recent years by the Government of Canada and is now under the special direction of the Minister of Marine and Fisheries.

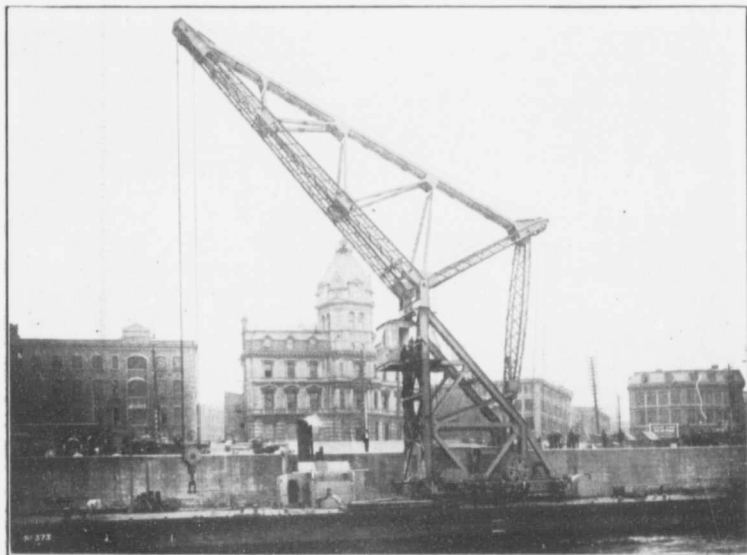
The Annual Report of the department of Marine and Fisheries of 1911-12 contains a profile map, with descriptive tables, prepared by the Superintending Engineer of the ship channel and staff, that exhibits the various features of this great work from its inception to the end of the year 1911.

The brief description of the St. Lawrence river ship channel has been added to the information given respecting Montreal harbour for the reason that Montreal is at the head of this channel. The channel is unique in artificial water ways for its length and depth. To this may be added the important information that the whole St. Lawrence route from the Atlantic coast to Montreal, a distance of 900 miles, possesses exceptional advantages, due to its sheltered character, freedom from heavy seas, excellent lighthouse and buoy system.

Submarine Warnings.—Submarine warning bells and apparatus have been installed on the lightships located near Red island and White island, all in the St. Lawrence route below Quebec. Vessels equipped with receiving apparatus are enabled to pick up the sound emanating from the bells submerged and operated on board each lightship mentioned. This method of warning has proven most effective when lights are obscured by fog or in thick weather.

General Items of Information.—On the tower of the Harbour Commissioners' building, Montreal, is a time ball, which is dropped by electric connection with McGill College observatory every week day at 12 o'clock noon of the 75th meridian or standard time, which is precisely five hours slow of Greenwich meantime.

Tide Tables.—Very accurate tide tables and differences in the St. Lawrence route are published by the Tidal and Current Survey in the department of Naval Service, at Ottawa. These tables have been prepared by the superintendent of the Tidal and Current Survey from tide gauge observations for fifteen complete years continuously.



Montreal Harbour. Floating Crane and Harbour Buildings.

Procuring Charts, etc.—Charts of the St. Lawrence river, charts of the ship channel, by-laws and regulations of the harbour of Montreal, pilotage regulations and any special information may be obtained at the Pilotage Office, 223 Commissioner Street, Montreal. The charts cost 15 cents per sheet.

Opening and Closing of Navigation.—Navigation at Montreal for a great number of years has opened on an average about the 20th of April, and closed about the middle of December. In 1912, navigation opened on the 23rd of April and closed on the 3rd of January, 1913.

Icebreaking steamers of the department of Marine and Fisheries have been employed during recent years in breaking the ice jam at cap Rouge, which has had the effect of leaving the channel in the St. Lawrence river free for descending river ice to pass down and thereby opening navigation about two weeks earlier than the river naturally opens.

Telegraph Signal Stations Along the Shore of the St. Lawrence.—Vessels in the St. Lawrence route, showing their distinctive numbers at any of the following stations, will be reported to Quebec and from Quebec or Crane island by telephone to Montreal.

TELEGRAPH SIGNAL STATIONS

BELOW QUEBEC.

Distances in Nautical Miles.

1.	L'Islet.....	South Shore.....	40
2.	Cape Salmon.....	North Shore.....	81
3.	Riviere du Loup.....	South Shore.....	92
4.	Father Point.....	" "	157
5.	Little Metis.....	" "	176
6.	Matane.....	" "	200
7.	Pointe des Monts.....	North Shore.....	219
8.	Cap Chat.....	South Shore.....	234
9.	Riviere a la Martre....	" "	260
10.	Cape Magdalen.....	" "	294
11.	Fame Point.....	" "	325
12.	Cap Rosier.....	" "	349
13.	Cap d'Espoir.....	Gaspe Coast of the Gulf.....	377
14.	Pointe Maquereau.....	" " "	400
15.	West Point.....	Anticosti.....	332
16.	Southwest Point.....	" "	360
17.	South Point.....	" "	415
18.	Heath Point.....	" "	438
19.	Point Eseuminae.....	Coast of New Brunswick.....	462
20.	Amherst Island.....	Magdalen Islands.....	481
21.	Money Point.....	Cape Breton.....	540
22.	Main Station.....	St. Paul's Island.....	538
23.	Cape Ray.....	Newfoundland.....	553
24.	Flat Point.....	Cape Breton.....	591
25.	Cape Race.....	Newfoundland.....	826
26.	Pointe Amour.....	Labrador.....	673
27.	Belle Isle.....	Newfoundland.....	734



A View of Murray Bay.

MURRAY BAY HARBOUR, Charlevoix county, province of Quebec, is situated on the north shore of the lower St. Lawrence river. It lies between cap-a-l'Aigle and pointe-au-Pic, both being included in the harbour proper. Wharves are located at both places, the pointe-au-Pic wharf having a front of 150 feet, with a depth of water ranging from 11 to 21 feet, and the cap-a-l'Aigle, with the same frontage and with a depth of from 19 to 33 feet at low water.

The depth of water at the anchorage grounds is from 4 to 6 fathoms, the bottom being of sand and clay. The loading and unloading of heavy draught vessels is done by means of boats and scows. During the season of navigation, steamers belonging to the Richelieu and Ontario Navigation Company call daily and moor at the pier. The tides rise and fall 17 feet springs, and 12 feet neaps.

The area of the harbour used by vessels is about one mile square.

There is a harbour master in this port and the charges are the same as at other Canadian ports.

The Lights are.—One at outer end of the Government wharf at cap-a-l'Aigle, latitude N. 47 39 45, longitude W. 70 5 32, fixed white, one at the pointe-au-Pic wharf (Murray bay), at its outer end, latitude N. 47 37 23, longitude W. 70 8 19, fixed white. Some $4\frac{1}{2}$ miles up the river there is a port called St. Irene, which belongs properly speaking to Murray Bay harbour; a Government wharf on which is a light, white fixed, and red sectors, is built at this place, latitude N. 47 34 19, longitude W. 70 11 53.

MURRAY HARBOUR, King's county, Prince Edward Island, is on the S.E. coast of the island; its entrance lies between Murray head and Cody point. There is a dangerous bar of sand, over which 10 feet can be carried at low water, ordinary springs, but strong easterly winds send in so heavy a sea as to render it at times almost impossible to enter, the line of breakers extending between the two points. Within the bar the channel into the harbour between sandy shoals extending from the shore, either side, contracts gradually in breadth to 120 yards and expands again to two cables inside Old Store point, situated about a mile from the outer edge of the bar. The depth inside the bar gradually increases to six fathoms close to the steep sandy beach of Old Store point.

The harbour entrance between Old Store point and the long sandy spit, which runs southwestward from Cody point, is over half a mile wide, but excepting the channel, it is nearly all dry at low water. Within this entrance the harbour is of great extent, and it contains five wooded islands, while several rivers or sea creeks extend from Murray river, the main inlet on either side. There are flourishing settlements on the shores of the rivers, the principal one being at South river, on the southern shore, at 2 miles inside the harbour entrance.

There are two ports within the above mentioned limits named respectively: Murray Harbour and Murray River; there is but one Harbour Master as the two harbours are practically one.

In Murray Harbour, there are 3 wharves, the most important one belonging to Prowse & Sons, which has a large freight shed built on it. Steamers call there twice a week. The other two wharves have no sheds. There is from 15 to 17 feet of water at these wharves.

In Murray River there are 5 wharves: one railway wharf with shed and siding; 3 private wharves, and one owned by the local Government. Sixteen feet is the

average depth of water at these wharves. Slips are available where vessels may be docked for repairs. In Mink river, a tributary, there are 3 wharves, one belonging to the Government; a private wharf with a good freight shed and another without.

Forty buoys shew the different channels leading to anchorages and wharves, making navigation quite safe for moderate draught vessels.

Lights.—There are two lights both white fixed, one on Beach point, south side of harbour, latitude N. 46 1 28, longitude W. 62 28 30; the other on mainland, about 1 mile 234° 30' from front; in one these range lights show the channel to the outer buoy. See List of Lights on the Atlantic Coast for 1913.

The charges are the same as at other Canadian ports.

Storm signals are exhibited at Beach point. At cape Bear a Marconi station has been established.

Tides rise and fall 6¼ feet springs and 3¼ feet neaps.

Local knowledge is required to enter this harbour, and farther inward a pilot should be obtained.

There is but one port of entry and the total tonnage entered and cleared for the fiscal year 1911-12 was 12,815 tons.

MUSQUASH HARBOUR, in the county of St. John, New Brunswick, is situated on the north coast of the bay of Fundy. Its entrance is about half a mile broad and the harbour itself is some 2 miles long. Although there are no wharves, ships load at their anchorage. Vessels of small tonnage sometimes load at the mills at the head of the river.

Vessels of deeper draught, in charge of a pilot, can obtain temporary anchorage in 5 fathoms within the harbour.

The bottom being of mud, ships have been repaired on the flats.

Lights.—On the east side of entrance is a group flashing white light, latitude N. 45 8 35, longitude W. 66 14 30, a bell buoy rung by motion of buoy on the waves is situated in the fairway and from it the lighthouse bears 82°; in 30 fathoms off Split rock, latitude N. 45 7 0, longitude W. 66 14 40, is a whistling buoy sounded by motion of buoy on the waves. See List of Lights on the Atlantic Coast for 1913.

There is a Harbour Master at this place and the charges are the same as at other Canadian ports.

MUSQUODOBOIT HARBOUR, or inlet, is on the south-east coast of Nova Scotia in Halifax county, east of the port of Halifax and west of Jeddore head; it contains many islands and is navigable for small vessels about 7 miles where it receives the waters of the Musquodoboit river.

Within the bar, in a channel 1¼ cables wide, there is a depth of 3 to 4 fathoms between flats of sand, mud and weeds, which uncover at low water. At about 4 miles within the bar the channel becomes narrow and only 7 or 8 feet deep, but small vessels and boats can ascend with the tide to the head of the inlet. The tide rises 4½ feet springs and 3 feet neaps.

There is a Harbour Master at this port and the charges are the same as at other Canadian seaports.

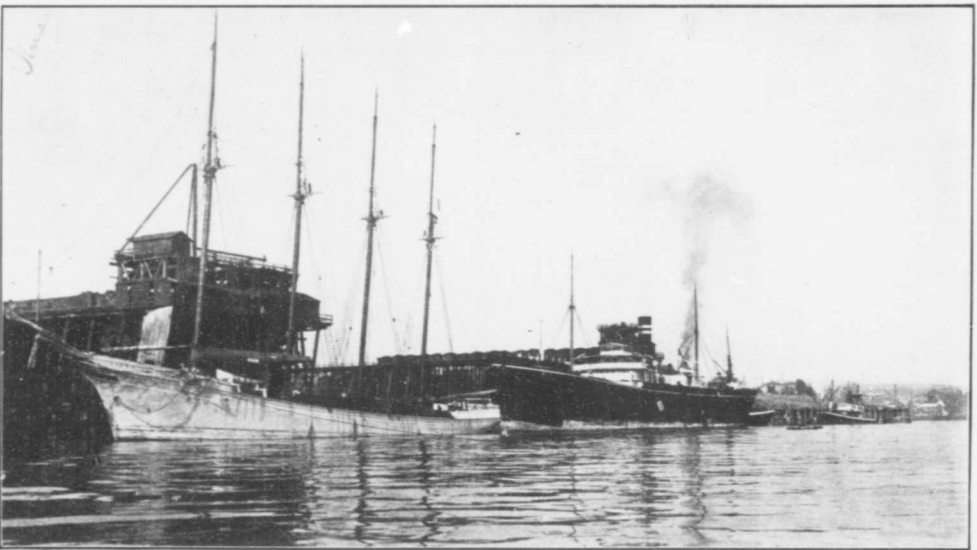
Lights.—There are two lights in the harbour; one on pier on Shag ledge, red fixed, latitude N. 44 41 42, longitude W. 63 4 25; one on French point, Kent

island, about 5-8 mile 10° from front light, also red fixed. Musquodoboit shoal whistling buoy is one mile 226° from the shoal, latitude N. 44 38 20, longitude W. 63 6 15; the buoy is marked with white and black vertical stripes. See List of Lights Atlantic Coast for 1913, S. E. Coast of Nova Scotia Pilot and Charts 729, 1651, 2666 and 2670 for coast directions.

NANAIMO HARBOUR, Vancouver island, British Columbia, is in latitude $49^{\circ} 10' N.$, longitude $123^{\circ} 57' W.$, on the eastern side of Vancouver island and is entered between lighthouse and Gabriola island. The immediate entrance to Nanaimo harbour is between Gallows point, Protection island on the north and the mud banks formed by the silt from the Nanaimo river. Two channels lead to the wharves, one called the north channel, north of the middle bank in the centre of the harbour, and the other called the south channel, south of the bank. The depth of water in each channel is from 38 to 40 feet each side of middle bank, gradually decreasing as the shore and wharves are approached. The north channel leads to the anchorage ground off the town, where there are 5 fathoms of water and mud bottom. Vessels also anchor outside Gallows point in 10 to 15 fathoms of water. The harbour affords safe anchorage, being well protected from winds from all quarters. Departure bay is also part of the harbour and is connected by Exit channel, a stretch of water $1\frac{1}{4}$ mile long and about one cable in breadth, with a depth of 14 feet at low water. The entrance from the gulf of Georgia to Departure bay is between Boulder point, a steep cliff on the north end of Newcastle island and Jesse island, a small island to the northward of Newcastle island. Departure bay affords room for a large number of vessels to anchor in from 18 to 25 fathoms of water.

The harbour is well buoyed, having nine platform buoys with distinguishing marks on pyramidal slatwork consisting of drums, balls and diamonds. A beacon with white light marks the north end of the middle bank; a stone beacon with a staff and lattice work is built on Beach rock north of the C. P. Ry. wharf. A black pile beacon surmounted by an acetylene tank showing a white flashing light is placed on the mud flats on the south side of the entrance to the harbour. This beacon stands in about 6 feet of water at low water.

The large wharves in the harbour are used for shipping coal, the main exports of the port. In addition to full cargoes, many steamers call here for bunker coal. Nanaimo wharves, belonging to the Western Fuel Company, are on the west side of the harbour directly opposite the entrance and close to the town. The main wharf is 810 feet long; three loading chutes deliver 700 tons of coal per hour; in close proximity to the loading wharves, coal bunkers are situated with a capacity of 7,000 tons; depth of water alongside, 30 feet at low water, vessels of 10,000 tons load at this wharf. A three-track car ferry slip is located on the south end of the main wharf, to make tidal and railway connection with the main line of the Esquimalt and Nanaimo Railway. This slip accommodates freight cars carried on barges to the mainland of British Columbia. North of the main wharf is a smaller wharf, owned by the same company, for loading scows and bunkering small steamers, with two berths 160 feet long; another wharf, belonging to the same company is situated north of the last wharf and is used for discharging freight for the company and is 285 feet long, depth of water, 20 to 24 feet at low water; to the west of this wharf is a ferry slip used for Protection island ferry; Hirst's



Nanaimo, B.C. Harbour and Coal Wharves.

wharf at foot of Wharf street is 200 feet long by 100 feet, with a depth of 15 feet at low water. The wharf is covered nearly its full length and breadth by sheds. This wharf is used by small coasting steamers for loading and discharging cargo. Adjoining Hirst's wharf is the government wharf and float used as a public boat landing. Next comes the C. P. R. wharf lately rebuilt (dimensions not obtainable); is covered nearly its entire length by sheds for general merchandise and cattle. The wharf is used by passenger steamers plying between ports in British Columbia. Vessels of 2,000 tons can discharge cargo at this wharf at certain stages of tide; the depth of water at low water is 16 feet.

At the Red Fir Company's saw mill a pier is used for loading lumber on scows. In Exit channel, on mainland side, Hogan's wharf is situated; its length is 84 feet, width 72 feet, and it is nearly covered with freight sheds for general merchandise; water, 14 feet at low water. Several small wharves with sheds in Exit channel are used for packing herrings for shipment to the Orient. Vancouver-Nanaimo Coal Company's pier, 500 feet long; T. at end of pier 90 feet long, depth of water alongside, 15 feet at low water. The ship channel in Exit channel is on Newcastle side. On Newcastle and Protection islands are several small wharves with sheds used for landing, salting and packing herrings caught in Nanaimo harbour and Departure bay.

Passing into Departure bay from Exit channel, on the southeast side, is a large wharf connecting with the Brechin and the Western Fuel Company's mining property. The wharf is 410 feet long; water alongside, 35 to 40 feet; an electric chute in the centre of the wharf can deliver into bunkers or pockets, which have a capacity of 3,000 tons when vessels are not loading. Large vessels can be laid alongside these wharves in safety at all times. Wharf of the Canadian Explosive Co., 160 feet long, depth of water alongside, 25 feet. There is no dry dock at this port. Ship stores and water are easily procured and tugs are available.

Port Charges are harbour master's dues, twice a year, sick mariners' dues, three times a year, as in other Canadian ports. Port Warden's fees when surveys are made and wharfage.

Lights.—One on Entrance island, Nanaimo, strait of Georgia, white fixed, red sector, latitude N. 49 12 30, longitude W. 123 48 45, steam fog alarm close to lighthouse eastward. Gallows point fog bell, on the point, latitude N. 49 10 25, longitude W. 123 55 28 and light at harbour entrance; light on beacon on south side of entrance, white occulting. See List of Lights Pacific Coast for year 1913. See general Chart No. 573 for directions along the coast and British Columbia Coast Pilot.

Pilotage is under the Nanaimo Pilotage authority, and the rates are \$1 per foot draught and 1 cent per ton net register when vessels are spoken, payment being compulsory. Special rates for mail steamers and tugs are charged. Total tonnage of vessels which entered and cleared in the fiscal year 1911-12 was 2,259,297 tons.

Tide Tables.—The accuracy of tide tables is represented by the length of the tidal observations on which they are based; those for Victoria, Sand Heads, Vancouver and Port Simpson are now equal or superior to the tide tables for any port on the Pacific ocean, in America, Asia or Australia. The tide tables published

by the Tidal and Current Survey at Ottawa are based upon observations made at Sand Heads. The mean rise of the tide at Nanaimo is 12 feet.

NEIL HARBOUR, in northern part Victoria county, Cape Breton island, province Nova Scotia, is on the north-east coast of the island, some 14 miles from cape North, which is north-eastern extremity of island.

The harbour is at the entrance of a small bay open to the southward and south eastward, and of some half mile in depth. It is much used by the fishing fleet, and for the protection of vessels in south-westerly gales. The harbour is sheltered by Neil head, from the north-eastward wind. A breakwater has been constructed off Neil's head for sheltering vessels in the anchorage in south-easterly gales; the breakwater extends into a depth of 17 feet at low water.

Rise and fall of tides at this place, 4 feet springs; 3 feet neaps.

There is a harbour master and the charges are the same as at other Canadian ports.

Light.—On outer edge of Neil's head on east side of entrance to harbour; red fixed, latitude N. 46 48 44, longitude W. 69 19 12; whistling buoy is anchored 1 mile 57' 30' from above. See List of Lights on the Atlantic Coast for 1913 and Admiralty Charts Nos. 1651 (1407), 2727 (1317) and St. Lawrence Pilot.

NEW CARLISLE, Bonaventure county, province of Quebec, is on the north side of Chaleur bay between New Carlisle point and Paspébiac. The depth of water entering the harbour is 8 fathom; and there is good anchorage in the same depth south-east of the wharf, mud bottom.

The wharf is 700 feet long with two sheds on it for storing freight; depth of water alongside 15 feet at low water. There is a sand bar west of the wharf but bold water east of it.

Lights.—One white occulting on extremity of Bonaventure point, west of New Carlisle, latitude N. 48 0 28, W. longitude 65 26 34; one white fixed with red sector 300 feet N. from S. extremity of Paspébiac spit, latitude N. 48 1 2, longitude W. 65 14 20, and one red fixed light on outer end of wharf in New Carlisle harbour, latitude N. 48 0 41, longitude W. 65 18 9. See List of Lights for the Atlantic coast and gulf of St. Lawrence, for 1913, St. Lawrence Pilot and chart No. 2516 for directions along the coast.

Port Charges.—The port charges are Harbour Master's dues similar to the rates paid at all Canadian ports.

NEWCASTLE HARBOUR, Northumberland county, Miramichi, New Brunswick. This harbour is forty-two miles from the mouth of the Miramichi river, described under the head of Chatham harbour. Newcastle is eight miles above Chatham and the harbour extends to the head of navigation or about fifty miles from the mouth of the river; from that point above, the river is navigable for tugs drawing 9 feet at low water; rise of tide, springs $4\frac{1}{2}$ feet, neaps 3 feet. For sea-going vessels the harbour extends a distance of eight miles up and down. In this distance there are eight large piers or wharves at which sea-going vessels load lumber to their full capacity, and the depth at low water at these piers is not less than 22 feet. Vessels carrying as much as 3,000,000 feet have loaded in the harbour and schooners can sail up or down the river, the channel being

half-a-mile wide at Newcastle. The anchorage gives a depth of 42 feet in the stream with good bottom for holding. Besides the mill piers referred to in this harbour, there are along the water front of Newcastle town : wharf No. 1, known as the Anderson Furniture Co.'s wharf, 300 feet frontage and 300 feet deep; No. 2, deep water terminus of the Intercolonial Railway, frontage 100 feet; No. 3, J. Russell & Co.'s wharf, 500 feet long by 100 feet, with coal shed and warehouse; No. 4, wharf of D. & J. Ritchie, frontage 100 feet, 600 feet deep with three large warehouses for grain and general merchandise; No. 5, N. A. Parker's wharf, 125 feet frontage and 400 feet deep with two large warehouses for grain and merchandise; No. 6, public wharf, 200 feet frontage by 400 feet in depth with warehouses and coal shed; No. 7, M. Bannon's wharf, 100 feet frontage by 700 feet deep and warehouses for coal and merchandise; No. 8, D. & J. Ritchie's wharf or slip for hauling out a vessel for repairs.

Light.—A wooden tower on lime-kiln bank, north side of river, below the town in latitude $47^{\circ} 0' 45''$, longitude $65^{\circ} 33' 40''$, red fixed. See List of Lights on the Atlantic Coast for 1913.

There are seven buoys in the harbour. Supplies and water are easily obtained.

Port charges are Harbour Master's dues, payable twice a year, from 50 cents, for vessels of fifty tons or under, up to \$5, according to tonnage, and Sick Mariners' dues, payable once a year on vessels of 100 tons, and three times a year on vessels over that tonnage, if not paid elsewhere. Port Warden's charges when services required.

Pilotage is under the control of the Miramichi Pilotage Authority and payment is compulsory. The rates are \$2.25 per foot draught inward and \$2 per foot, outward; in addition, two cents per registered ton for steamers. Removal of vessels within one mile, \$4. See Chart 1,712. Total tonnage entered and cleared in fiscal year 1912, 67,034.

NEW MILLS, or HERON CHANNEL, Restigouche county, New Brunswick, is on the south side of Chaleur bay, and is in the channel between Heron island and the mainland. The harbour is two miles long, good anchorage and safe, with from 22 to 28 feet of water at low tide. This place contains no wharves, but vessels load lumber from lighters. There is a wharf at Beaver point, with shed and storehouse where vessels of 600 tons can load; water, 16 feet at the outer end at low water, and a depth of 22 feet off the wharf at low tide. In the harbour buoys are placed to mark the loading berths at New Mills. Heron island bar and Heron island rock are buoyed. Buoys to mark loading berths at river Louison and Jacquet river, near by, are also placed.

Light.—One on Heron island, latitude N. $48^{\circ} 0' 0''$, longitude W. $66^{\circ} 8' 0''$, white fixed. See List of Lights on the Atlantic Coast for 1913, also the Coast Pilot for Atlantic Coast and Gulf of St. Lawrence, and Charts Nos. 2516, (1,271).

At New Mills there is a Harbour Master and the port charges are Harbour Master's and Sick Mariners' dues, similar to other Canadian seaports.

NEW RICHMOND is in Bonaventure county, in the province of Quebec, on the north side of Chaleur bay. The harbour lies between point Duthie and Little river, in Cascapedia bay. Black point, the eastern point of the bay, is bold and rocky, and rises 400 feet above the sea. The channel to New Richmond harbour is

from seven fathoms deep gradually shallowing to fourteen feet, but only small vessels go farther in than this depth. Timber vessels lie at anchor outside and load from barges towed by gasoline launches. The anchorage is from three to five fathoms in depth at low water. The tide rises and falls about $7\frac{1}{2}$ feet springs, and $4\frac{1}{2}$ neaps. There is a wharf and shed used for storing buoys in winter; there is also a little freight placed on the wharf for the use of steamers that call there.

There are three buoys in this district, one red buoy moored $2\frac{3}{4}$ miles from land southwest of the shoal of little Cascapediac; one black iron buoy south of the shoal of great Cascapediac, $1\frac{1}{4}$ miles from point Duthie; one barrel buoy with black and red stripes three-quarters-of-a-mile from point Duthie.

There is a Harbour Master at this harbour and the port charges are similar to charges in other Canadian seaports.

Lights.—There is a light on Duthie point in latitude north 48° 10' 20", longitude W. 65° 53' 45", white fixed, and one on outer end of wharf, latitude N. 48° 9' 55", longitude W. 65° 51' 30", red fixed. See List of Lights for Atlantic Coast and Gulf of St. Lawrence, 1913, also Chart No. 1715 for coast.

NEW WESTMINSTER HARBOUR, British Columbia, is on the Fraser river, about 15 miles above its entrance, in latitude 49° 12' N., longitude 122° 55' W. The Fraser river is navigable for large vessels for about 30 miles from its entrance. At New Westminster there are forty-four wharves having an area of about 185,000 square feet, and in nearly every instance these wharves have sheds or warehouses for storage of freight. Nine of the wharves are for public use, all having sheds and railway sidings to ships' side. For a distance of three miles one railway runs along the inside ends of the wharves, and for two miles there are three railways having separate tracks and each having switches to various wharves.

The facilities for loading are good, a number of movable hoists being available, and the depth of water along the wharves is from 25 to 40 feet. Small vessels are repaired at two docks and large vessels at one dock. Material for repairs and workmen are obtainable and machine shops are located at this place. The average depth for anchorage is 40 feet and the bottom good for holding. The dockage facilities of the port are three sets of ways and one floating dock. No. 1 of the Westminster Marine Company has a capacity of 1,000 tons, length of 350 feet, cradle 120 feet, width of cradle 36 feet, depth of water at foot of ways 15 feet at high water and the motive power is electric. No. 2, one set of ways owned by the Brunette Sawmill Co., is 120 feet long, length of cradle 75 feet, width 30 feet, capacity 200 tons, and the water is 20 feet at high tide. No. 3, owned by Brunet & McDonald is about 100 feet long, with cradle 50 feet long and 20 feet wide, capacity about 150 tons. No. 4, a dry dock owned by Seaton Bros., 130 feet long by 40 feet wide and 4 feet deep.

The Schaafe works owns a wharf and floating pontoon, water frontage 196 feet, depth of water 30 feet. The steam railway trucks pass along this wharf and an electric railway in front of their works close to the wharf. The wharfage frontage of E. J. Fader is 666 feet long, with 200 feet of the wharf built with switch lines on the inner side and one on the outer side by which vessels load from and unload into cars or warehouse. Large warehouses are on this wharf which will accommodate several ship loads of freight. The depth of water at the wharf front is 35 feet at low water. The Fraser River Lumber Company owns a lumber mill



New Westminster, B.C. Part of Water Front.

with large capacity for sawing, planing, etc., and a wharf with 30 feet of water. The Royal City Planing Mills Branch of the B. C. M. T. & T. Co., has a water front of 1,848 feet and a wharf; depth of water, 16 feet. The mills of this company are of large capacity, turning out large quantities of lumber, shingles, doors, windows and mouldings, etc., and the water frontage is largely used by the company.

The city water frontage in use at the present time includes the use of property occupied by the following companies, viz.: Small & Bucklin Lumber Company, water frontage, 500 feet; depth of water, 20 feet. Gilley Bros. 132 feet frontage, with coal bunkers and storehouses; depth of water, 30 feet. Dominion government wharf, frontage, 264 feet, with storehouses; depth of water, 30 feet. Canadian Pacific Railroad wharf, water front 330 feet, with warehouses; depth of water, 25 feet. British Columbia Electric Railway Company, water front 264 feet with freight sheds and tracks; depth of water, 25 feet. St. Mungo Cold Storage fish freezing plant, depth of water, 30 feet. Columbia Cold Storage fish freezing and ice plant, Canadian Pacific Railway Navigation Co., water frontage, 399 feet; storehouse and freight sheds; depth of water, 30 feet. Myers & Preston, water front, 66 feet; coal bunkers; depth of water, 25 feet. Brackman & Ker Milling Co., 198 feet water front, hay and grain sheds; depth of water, 30 feet. V. W. & Y. Railway, frontage 462 feet, with freight sheds; depth of water, 25 feet. New Westminster Fruit Packing Company, 198 frontage; depth of water, 25 feet; Butterfield & Co., fish canning establishment, frontage, 66 feet; water, 25 feet deep; Packers' Association fish canning, depth of water, 30 feet. Swanson & Co., boat sheds, depth of water, 25 feet. Monck & Co., 66 feet frontage, depth of water, 25 feet. V. W. & Y. Railway, frontage, 396 feet; depth of water, 25 feet; railway ferry to Vancouver island. Myers & Preston, water frontage 132 feet, sheds, store-houses, etc.; depth of water, 25 feet. There is dockage at Port Mann of about 700 feet in length. The Canadian Lumber Co. has a mill with about 500 feet of dockage at the east end of the island. Many small Government wharves have been built along the river.

The least depth of water between the mouth of Fraser river and New Westminster is 12 feet at low water at a point $5\frac{1}{2}$ miles within the entrance, and 22 feet at high water springs. Lights have been placed for guiding vessels, on New Westminster bridge, latitude $49^{\circ} 12' 43''$ N., longitude $122^{\circ} 53' 43''$ W. Other lights are located at Garry point, mouth of the river, North dam and South curve, also a lightship at Sands heads and a gas and whistling buoy at Roberts' bank. The Fraser river is well buoyed at the entrance. See List of Lights, British Columbia Pilot and Chart No. 2689. Coal and supplies of all kinds can be obtained readily. *Port charges* are harbour master's dues, paid twice a year, sick mariners' dues, three times a year, if not paid elsewhere. Port warden's charges when surveys are made. *Pilotage* is under the New Westminster Pilotage authority, and the rates for the district are:—

- (a) For vessels under sail, \$2 per foot draught of water and one cent per net registered ton.
- (b) For vessels in tow of a steamer, \$1 per foot draught and one cent per net registered ton.
- (c) For steamers, \$1 per foot draught of water and one cent per net registered ton.



New Westminster, B.C. Part of Water Front on the Fraser River.

NORTH EAST HARBOUR, in the southern part of the county of Shelburne, Nova Scotia. The harbour is situated on the eastern side of an inlet from the Atlantic ocean, on the S. E. Coast of Nova Scotia.

At the entrance of the inlet is Negro island. There are 2 channels to the inlet, one on the eastern side of the island and one on the western. The eastern has from 18 to 14 fathoms depth of water gradually decreasing to 4 fathoms at the northern end of the island; the western from 10 to 4 fathoms. The channel north from the island towards the harbour varies from 4 to 5 fathoms in depth, all at low water. Tides rise 7 feet springs and $5\frac{3}{4}$ feet neaps. In the channel, several rocks make it dangerous for strangers to enter; there is good anchorage in N.E. harbour and it is almost free from rocks and shoals, both North East and Negro harbours are commonly used by fishing vessels. There are two small wharves in North East harbour on the east side, with 15 feet of water.

Supplies and water can be obtained readily and there are railway and steamboat connections with other parts of the province.

Lights.—One on Negro island on the north side, latitude N. 43 30 54; longitude W. 65 20 58; red and white alternate revolving; two in North East harbour, front on E. side of harbour, white fixed, latitude N. 43 32 44, longitude W. 65 23 34; back, 850 feet 296° from front also white fixed; a whistling buoy in the fairway in 21 fathoms off E. entrance to Negro harbour, $1\frac{1}{4}$ miles 111° from Budget rock, latitude N. 43 30 55, longitude W. 65 18 49. See List of Lights on the Atlantic Coast for 1913.

The channel in the harbour is well buoyed having five (5) starboard hand buoys entering and two (2) port hand buoys.

See Chart No. 352 for coast directions.

Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 16,200 tons.

NORTH HEAD, island of Grand Manan, Charlotte county, New Brunswick, is an outport of St. Andrews, N.B. Grand Manan lies on the north-west side of the bay of Fundy, opposite the boundary line of the province of New Brunswick and the state of Maine, U.S. The channel between the island and the mainland is free from dangers. This channel is one of the approaches to the bay of Fundy. The island has several small harbours and sheltered anchorage mostly used by small vessels. The northern part of the island is steep to as is also the whole of the western coast, and can be approached to one cable excepting the part in the vicinity of Dark harbour. North Head comprises Whale cove, Spragg cove and Flag cove, and the water in each of these coves ranges from 4 to 14 fathoms and even deeper in the approach to Whale cove. In Spragg cove the depth is from 6 to 9 fathoms and in Flag cove from 6 to 10 and 11 fathoms. The anchorage in Flag cove is 6 fathoms, all at low water. There is a neck of land between Whale cove and Flag cove. Whale cove is the most northerly cove and is sheltered against southerly winds but exposed to north easterly winds, and Flag cove against north easterly winds. Spragg cove lies between these two coves and is exposed to winds from an easterly direction. Long Eddy point is at the extreme north west point of Grand Manan island and included in North Head harbour district. Shelter is afforded vessels against winds from the east at this point. There are small

wharves in each of these coves and buoys mark dangers and guide vessels into them.

There is a Harbour Master for the district of North Head; the charges are the same as at other Canadian ports.

Lights.—One on Swallowtail near edge of high cliff N. E. part of Grand Manan island, latitude N. 44 45 46, longitude W. 66 44 2; white occulting; fog alarm on the beach at Long Eddy point extreme N.W. head of island, latitude N. 44 48 0; longitude W. 66 47 15, diaphone. There is a bell buoy off Flag point near Flag cove on Net rock ledges, southern extreme of ledges, in 9 fathoms, latitude N. 44 45 22, longitude W. 66 44 32. See List of Lights on the Atlantic Coast for 1913. Tonnage of vessels entered and departed from North Head during fiscal year 1911-12 was 63,840.

NORTHPORT HARBOUR, in the county of Cumberland, Nova Scotia, is situated at the mouth of the Shinemecas river and is entered from the strait of Northumberland. It lies between Cold Spring head, a prominent point of New Brunswick, and Pugwash bay in Nova Scotia.

A narrow channel is marked by nine buoys, while one is placed at the entrance to the river and two mark the loading and ballast grounds respectively.

There is a Harbour Master at this place and the charges are the same as at other Canadian ports.

The harbour is principally used by small craft and partly dries at low tide. The tides rise along the coast from 7 to 8 feet at springs and from 4 to 5 neaps.

Lights.—There are two lights in the harbour; one, the front light on bank about 500 feet W. of railway wharf, latitude N. 46 48 16, longitude W. 64 3 6, red fixed, back light 1,125 feet 250° from front, also red fixed. See List of Lights on the Atlantic Coast for 1913.

NORTH SYDNEY HARBOUR, Cape Breton county, Nova Scotia, is in latitude 46° 13' N., longitude 60° 14' W. It is a safe harbour, easy of access for vessels of all classes, and is a port of call as well as a large coal shipping port. The water area of the harbour is about 12 square miles, with a depth available of 46 feet at high water and 42 feet at low water. The port is the terminus of the Intercolonial Railway, and the railway pier has a depth of 24 feet alongside for two hundred feet in length of the pier at high water, while the inner end of the wharf has a depth varying from 24 to 10 feet. There are sheds for receiving all kinds of merchandise on the pier. The Nova Scotia Steel and Coal Company has two large piers, the first is 900 feet long, with a depth of water of 28 feet at high water. Storage pockets for coal with a capacity of 5,000 tons, the coal at this port is sold F. O. B., the price of the loading being included in the amount charged; the top of the pier is 70 feet above high water; the second pier is 650 feet long, fitted with two gantry cranes with lifting power of ten tons each, and the dock between the two piers has been dredged to a depth of 28 feet; at the head of this dock is a low level wharf, 250 feet in length, available for storage of goods.

There is a breakwater east of these piers about 1,500 feet in length, with depth of water alongside 300 feet of its length of 16 feet at low water.

There are three other good wharves about 400 feet in length, with large storehouses, and a depth of water of 16 feet at low water. There is also a small marine railway at which vessels of 250 tons can be hauled out.

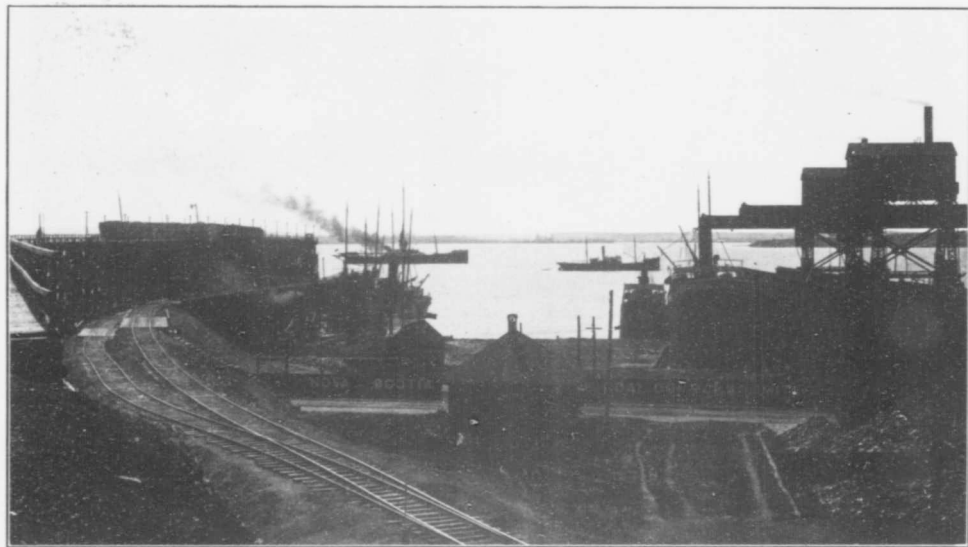
North Sydney roads afford good open anchorage with offshore winds. The roads are much used by vessels seeking freight, and vessels anchoring are exempt



North Sydney, C.B. Ore discharging and coal loading piers.

from port charges (harbour dues), but are subject to payment of North Sydney inward pilotage, but if a pilot is employed inward and outward, full pilotage is charged. See St. Lawrence Pilot, Charts Nos. 2,727 and 2,042.

The harbour is under control of harbour commissioners, who regulate port



North Sydney, C.B. Harbour.

charges and these charges are harbour dues. Supplies of all kinds are readily obtained. Stevedores are paid 20c. an hour at this port.

Pilotage is under the control of the North Sydney Pilotage authority and the inward rates are: for vessels of 120 to 150 tons, \$6.50; vessels 150 to 200 tons, \$7.50; from 200 to 250 tons, \$9.00; from 250 to 300 tons, \$10.00; from 300 to 350 tons, \$11.00; from 350 to 400 tons, \$12.00, and for every additional 50 tons or fraction thereof, 75 cents extra. Outward pilotage is half rates. Payment of pilotage is compulsory, with the exception of vessels belonging to the county of Richmond and fishing vessels not exceeding 250 tons, which are exempt.

Lights.—Flat point, at entrance to Sydney harbour, white group flashing, latitude 46° 16' 12" N., longitude 60° 7' 22" W.; a fog whistle is operated at this station; one light on Sydney bar on W. extremity of S. E. bar, latitude N. 46 12 36, longitude W. 60 12 59, red fixed, a fog bell is also operated here; a gas and whistling buoy anchored in 19 fathoms, 2½ miles, 4° from Flat point, light is white occulting; a gas buoy on the south eastern edge of the N. W. bar, white occulting, latitude N. 46 12 48, longitude W. 60 13 34. See list of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at this port for the year 1912 was 577,121 tons.

PARRSBORO HARBOUR, Cumberland county, Nova Scotia, is at the head of an indentation in the bay of Fundy, three miles east of cape Sharp. The inner harbour is dry at low tide and the average tide is 17 or 18 feet, and at high tide 26 to 27 feet. Large vessels load at West bay, a distance of about four miles. Lumber is carried out to large vessels by schooners. The wharf accommodation at Parrsboro is about 300,000 square feet, all of which is reached by railway. Besides the above area, the Cumberland Railway and Coal Company has a shipping pier for coal which is about 1,000 feet long by 40 feet wide at the head of this wharf, the depth of water at high tide, springs, is 34 feet, neaps, 28 feet. Steamers coal in the inner harbour for ports in the bay of Fundy and elsewhere, at a cost for loading, of seven cents. per ton; sailing vessels at nine cents. Lumber, piles, etc., shipped from the inner harbour cost for loading from 25 to 35 cents per thousand feet. There is one set of good marine blocks at Parrsboro for repairing vessels as large as 1,500 tons. Supplies are readily obtained and coal is easily procured. West bay affords good anchorage in six fathoms, bottom mud, and protected from winds, excepting from E. N. E. to south. Spring tides rise 45 feet, neap, 35 feet in the bay. Steamers and sailing vessels, load lumber for Great Britain and other countries in West bay. Cost of handling lumber 35 to 45 cents per thousand.

Lights.—On the southern extremity of cape Sharp, is a white occulting light, latitude N. 45 21 55, longitude W. 64 23 35, a diaphone fog alarm is installed, 225 feet 317° from above, on Partridge island, at entrance to the harbour, is a white fixed light, latitude N. 45 23 11, longitude W. 64 19 5, at this station a fog bell is operated. See List of Lights on the Atlantic Coast for 1913.

There is a harbour master at this port and the charges are the same as at other Canadian ports.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 284,684 tons.

PASPEBIAC HARBOUR, Bonaventure county, province of Quebec, in Paspebiac bay, between Paspebiac point and Carleton point, and is the principal fishing port in Chaleur bay. The anchorage in the roadstead is good. The wharves in the harbour are No. 1, owned by the Dominion government; No. 2, owned by C. Robin Collas & Co., Ltd., and No. 3, by the LeBoutillier Bros. Co., Ltd. These wharves are of considerable length and are used by fishing vessels and small vessels which load lumber and ties. There are no docks for repairing vessels, but small vessels can be beached by the tide. There is one can buoy in the harbour at the western side of Paspebiac spit.

Light.—One on the end of Paspebiac point, 330 feet N. from S. extremity of spit, latitude N. 48 0 59, longitude W. 65 13 42, white flashing, with red sector. See Notice to Mariners, No. 134 of 1913. A limited quantity of stores can be obtained.

The large fishing establishments of C. Robin Collas & Co., Ltd., are situated in the harbour, also the fishing establishment of the LeBoutillier Bros., Ltd. Both of these firms carry on fishing very extensively and have cold storage for this industry.

Port Charges are the same as generally prevail in Dominion harbours, and are harbour master's dues and sick mariners' dues, when not paid elsewhere. See for sailing directions, St. Lawrence Pilot and Chart 1,633. The total tonnage which entered and cleared during the fiscal year 1911-12 was 63,849 tons.

PERCE HARBOUR, Gaspé county, province of Quebec, is in Percé bay, between White head and Percé rock; the harbour is known as South beach and the first small bay north westward of Percé rock is known as North beach. There are landing piers in both coves, the one in the northern cove being 670 feet long with 13 feet of water at the head. The tide rises 5 feet at spring and 3 feet at neap tides. The water in the southern part of the bay is from 4 to 5 fathoms in depth and at the mouth of the bay, 8 to 9 fathoms. The bottom is mud at the latter depths. Coasting steamers running between Montreal and Pictou call at Percé. It is principally a fishing port. See St. Lawrence Pilot, Canadian edition (below Quebec), Admiralty Chart, No. 1,163.

Lights.—There is a white fixed light on White head, latitude N. 48 30 30, longitude W. 64 12 40, and a red fixed on outer end of Laurier wharf at the north beach. See List of Lights on Atlantic Coast for 1913.

Port Charges.—There is a harbour master at this port and the charges are the same as in other Canadian harbours.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 172,773 tons.

PETITDEGRAT HARBOUR is in Petitdegrat inlet which separates Petitdegrat island from Madame island, Richmond county, the south eastern coast of Cape Breton island, Nova Scotia. The inlet has water enough for vessels of moderate size, but rocks are numerous and local knowledge is required for piloting vessels. There are several coves from which the fisheries are extensively prosecuted. The water in the broad part of the inlet is deep, ranging from 10 to 20 fathoms when entering from the Atlantic ocean, and gradually decreasing until opposite Petitdegrat, where it is from two to three fathoms, low water.

There is a harbour master at this place and the port charges are similar to other Canadian ports.

Lights.—On Mouse island, eastern side of Petitdegrat inlet, latitude N. 45 29 54, longitude W. 60 57 24, red fixed. Petitdegrat gas and bell buoy is anchored in ten fathoms 3-10 of a mile, 240° from Big Arrow rock; white occulting. See List of Lights, Atlantic Coast, 1913.

The harbour is practically open all the year. The fisheries are prosecuted all the year and a coasting steamer plys all winter. See Chart No. 2,342 for coast directions.

PICTOU HARBOUR, Pictou county, Nova Scotia, is on the western coast of the province and is entered from the strait of Northumberland. The entrance of the harbour is situated at the western end of bay, which is $1\frac{3}{4}$ miles wide at its mouth between MacKenzie head and Logan point, and is $1\frac{1}{2}$ miles deep. Shallow water extends nearly six cables northward of MacKenzie head and Bar lighthouse, the whole bay on that side being shoal, with ridges of sand drying out to some distance from the shore at low water. From Logan point on the northern side, reefs extend off Logan point eastward and south-eastward $4\frac{1}{2}$ cables, to the depth of three fathoms. Pictou road outside the bar of the harbour, although open to north-easterly winds, affords good anchorage in five fathoms.

The distance across the harbour's mouth, at the bar, from the end of the sandy spit on the south to London beach on the north, is about $2\frac{1}{2}$ cables, but the channel over the bar is somewhat narrower.

The harbour is a good harbour and very easy of entrance. Vessels drawing 22 feet can enter at low water and vessels drawing 28 feet at high tide. The course is straight. Inside the bar, vessels can anchor in from five to seven fathoms.

Tides rise and fall: springs, 6 feet, neaps 4 feet. Opposite the town, the harbour expands into three large arms, the mouths of East, Middle and West rivers. Large quantities of coal from the mines in the vicinity are shipped, and many steamers bunker at this port. The principal piers are the railway piers, one of which is 500 feet long, where ships load lumber up to 26 feet draught; upon this wharf are large sheds for general merchandise, carried by the Intercolonial Railway and shipped in large quantities via the winter steamers to Prince Edward island; another railway pier is 150 feet long, with 26 feet of water; railway tracks are laid on these piers; one coal pier owned by the Acadia Coal Company and one by the Intercolonial Coal Company, where ships can load to 28 feet from chutes. There are several small wharves where vessels drawing 14 feet can load and discharge.

The marine slip at this port can haul out a vessel of 1,400 tons net tonnage. Foundries and machine shops afford facilities for repairs to steamers and shipyards repair wooden vessels. Provisions, stores of all kinds, coal and water are readily procured.

Port charges are harbour master's dues, paid twice in the year, and sick mariners' dues paid three times in the year if not paid elsewhere. Port warden's dues when surveys are made. Wharfage is charged on cargoes of general merchandise and produce.

New Glasgow, an important town is on the east side of the East river. The New Glasgow Iron Works operates an extensive plant at this place and owns a shipyard.

Pilotage is under the Pietou Pilotage authority and payment is compulsory. Half rates are charged if a vessel is spoken in the district and refuses a pilot. The rates are: vessels of 120 to 140 tons, \$6 inwards, \$4 outwards; 140 to 200 tons, \$10 inwards, \$6 outwards; 200 to 300 tons, \$12 inwards, \$8 outwards; 300 to 400 tons, \$14 inwards, \$9 outwards; 400 to 500 tons, \$15 inwards, \$10 outwards; 500 to 600 tons, \$16 inwards, \$11 outwards; 600 to 700 tons, \$17 inwards, \$12 outwards; 700 to 800 tons, \$18 inwards, \$13 outwards; 800 to 900 tons, \$19 inwards, \$14 outwards; 900 to 1,000 tons, \$20 inwards, \$15 outwards; 1,000 tons and upwards, 2½ cents inwards and 2 cents outwards per ton. All vessels under 120 tons, \$4 inwards and \$2 outwards. Docking and moving vessels from anchorage in harbour, \$4.

Pietou island lies off the bay on the west side. The northern coast should not be approached at night nearer than 8 fathoms depth of water. The southern coast may be approached to 5 fathoms but at East point is a reef a great part of which is dry at low tide and runs out to a depth of 3 fathoms. There are 9 fathoms off this reef northward and eastward. It should, however, be approached at all time with caution. See St. Lawrence Pilot for sailing directions and Admiralty chart, 1,989.

Lights.—There are 3 lights on Pietou island, one on top of bank near West wharf, white fixed, latitude N. 45 48 15, longitude W. 62 34 30; one on S. E. point at east end of island, white flashing N. 45 49 10, longitude W. 62 30 30; and one on W. point of island, white revolving, latitude N. 45 48 27, longitude W. 62 35 43; two lights, white on top and red below, both fixed are exhibited on Pietou bar, latitude N. 45 41 30, longitude W. 62 39 30; range lights in harbour, two in number, red fixed, front on N. side of entrance to Pietou harbour, rear, 468 feet 262° from front; in tower of Custom House, two lights are in operation, red fixed, on east face, white fixed on south face, latitude N. 45 41 0, longitude W. 62 42 0. See List of Lights on the Atlantic Coast and Gulf of St. Lawrence for 1913.

Total tonnage entered and departed at this harbour for the fiscal year of 1911-12 was 340,748.

PORT DANIEL, in Bonaventure county, province of Quebec is near the mouth of bay Chaleur on the north side of the bay. The entrance to the harbour is between West point and Pillar point. The bay entering Port Daniel is a fine bay, open to the eastward and about 1½ mile deep. In the northern corner of the bay at half a mile within White point, locally known as cap a l'Enfer, which lies about N. W. by W. ½ W., 6 cables from Pillar point and is high and of white limestone, a small river enters the bay through a sandy beach.

A shoal extends half a mile from the shore all around the port from West point to White point. On the northern side of West point there is a small cove and good landing for boats.

PORT HASTINGS, Inverness county, Cape Breton island, Nova Scotia, is situated on the eastern shore of the gut of Canso; it is the first safe anchorage after entering the gut from the northward.

The harbour is an inlet from the gut of Canso and affords anchorage of from 6 to 10 fathoms for large vessels. There are two piers at which steamers and

schooners are loaded with coal, an outer and inner; at the outer pier, a railway track of the Inverness R. Road Coal Coy. is laid, and a government wharf, 120 feet in length by 40 in width, at which vessels load and unload; on this wharf is a freight shed for storing freight. Here coasting steamers and schooners receive and land passengers and freight. A railway siding crosses the head of this wharf.

About $\frac{3}{4}$ of a mile of the harbour is used by vessels. There is a rock north of the pier, called Dixon rock. To avoid this keep the cove open so that the whole of the bridge as well as the high cliffs above it are visible. In anchorage large vessels keep Balache point well opened and do not go in to less than 7 fathoms of water, but small vessels anchor in 4 to 5 fathoms. Notice boards warning vessels not to anchor near a line of cables are erected on McMillan (Balache) point and cape Porcupine. The harbour is generally open the year round.

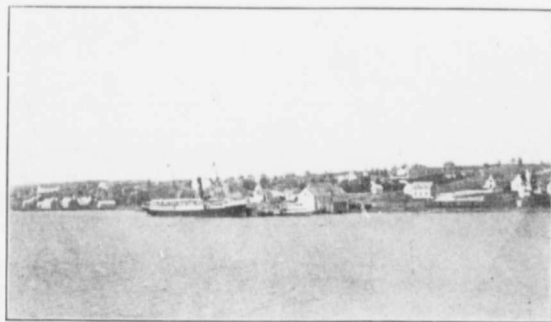
Tides.—Ordinary spring tides rise $4\frac{1}{2}$ feet, neap 3 feet. Extraordinary tides sometimes rise 6 to 7 feet and other times only 2 feet.

See St. Lawrence Coast Pilot, Charts Nos. 2727 (1,317) 2,342 (1431), and plan No. 3,383 (1,506) for further sailing directions.

Port Charges are Harbour Master's and Sick Mariner's dues the same as at other Canadian ports.

Light.—There is a light on the S. W. extremity of McMillan (Balache) point, fixed white, latitude N. 45 38 57, longitude W. 61 24 33, white fixed. See List of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 160,994.



Port Hawkesbury from Point Tupper.

PORT HAWKESBURY, Cape Breton island, Nova Scotia. This harbour is in the gut of Canso and is much used for shipping coal. The trade consists of shipping coal, fishing and shipping general produce. The harbour is a large cove with from 2 to $4\frac{1}{2}$ fathoms inside Premier shoal, one channel is north of the shoal with $4\frac{1}{2}$ fathoms of water at low water, the other channel south of the shoal has a depth of $3\frac{1}{2}$ fathoms at low water. Premier shoal forms a middle ground and the least water over it is reported to be $3\frac{1}{2}$ fathoms; the tide rises 4 feet at spring tides and 2 at neap tides. The anchorage outside Premier shoal is good for large vessels,

the depth of water being from 7 to 9 fathoms with sand, gravel and mud bottom. This anchorage is, however, open to north-north westerly winds, which at times cause a heavy sea. In the harbour there is safe anchorage in $3\frac{1}{2}$ fathoms, low water. See St. Lawrence Pilot and chart No. 2,342 (1,431) and plan No. 3,383. The Intercolonial Railway has its terminus at Point Tupper, where a large group of wharves has been built, extending about 400 feet from shore, with a frontage of about 500 feet; the depth of water at head 22 feet. The railway station and sheds are on this wharf, and a ferry steamer with railway tracks for carrying cars to the mainland of Nova Scotia runs throughout the year. The steamer carries nine railway sleeping cars 80 feet long, weighing 52 tons unloaded.

The other wharves are as follows:—Embrees wharf, 180 feet long 50 feet wide, depth of water 9 feet; the Mackintosh wharf is 180 feet long, 50 feet wide, depth of water at head 16 feet; Paint and Sons wharf, 150 feet long, 20 feet wide, depth of water at head 18 feet; a ferry wharf; Halifax Cold Storage wharf, 115 feet long, 43 feet wide, water 22 feet at head. This wharf extends out from a wharf parallel to the shore 210 feet front and 114 feet deep to the shore, 14 feet of water at head, This wharf has a shed 200 feet by 38 feet wide where fish is handled; there is also on it a modern cold storage plant from which large quantities of fish are shipped.

There are patent slips at Port Hawkesbury which take on vessels of 1,000, 200 and 130 tons respectively. The largest is 200 feet long, 46 feet wide with 20 feet of water over the cradle at high water or during springs. Provisions, coal and all material are readily obtained.

Light.—The lighthouse is at Point Tupper, latitude $45^{\circ} 36' 40''$ N., longitude $61^{\circ} 22' 2''$ W. See List of Lights for the Atlantic coast and Gulf of St. Lawrence for 1913.

Port Charges are harbour master's dues, paid twice in the year, and sick mariners' dues, paid three times in the year, if not paid elsewhere.

Pilotage is under the Inverness Pilotage authority, and the rates are: for vessels from 200 to 500 tons, \$5 inwards, \$2.50 outwards; 500 to 1,000 tons, \$10 inwards, \$5 outwards; 1,001 to 1,500 tons, \$15 inwards, \$6 outwards; 1,501 to 2,500 tons, \$20 inwards, \$8 outwards; 2,501 to 3,500 tons, \$25 inwards, \$10 outwards; 3,501 to 5,000 tons, \$35 inwards, \$15 outwards.

This harbour is also used for shelter in stormy weather and there is anchorage outside of the harbour in from 4 to 20 fathoms for a mile N. of the harbour.

The total tonnage which entered and departed in the fiscal year 1911-12 was 674,491 tons.

PORT HOOD HARBOUR is on the west coast of Cape Breton island, in the county of Inverness, Nova Scotia and northward of the Gut of Canso. Smith island lies off the coast and the entrance from the Gulf of St. Lawrence is made at the south end of this island called also Port Hood island, and has seven fathoms at low water at the entrance. A breakwater is being constructed from the main shore to Port Hood island to protect the harbour from north-easterly and north winds. The northern entrance has but 12 feet of water and is entered only by small crafts. Inside the harbour the water ranges from $2\frac{1}{2}$ fathoms at its northerly end to $4\frac{1}{2}$ and 5 fathoms in other parts where there is good anchorage. The shoals and ledges approaching the main entrance are: Judique shoal, 10 miles south of

the harbour, marked by a red can buoy on the starboard hand; Salley reef, marked by a black iron can buoy on the port hand; Spit head, at the entrance to the harbour, marked by a black iron can buoy on the port hand; Dean shoal on the starboard hand, marked by a red iron can buoy; Smith's spit, in the harbour, marked with a red iron can buoy on the starboard hand side, on the S.E. of Smith's spit, is a red cask buoy.

The wharves are:—Government wharf, 634 feet long, 25 feet wide, with an L, 129 feet long; width from 50 to 75 feet; depth of water alongside S. and W. ends, 11 feet at ordinary low water, used for passenger and freight traffic. The Port Hood and Richmond Coal Co. pier is 2,500 feet long, 60 feet wide; height, above ordinary tide, 45 feet, equipped with pockets and chutes. The depth of water at end of pier is 20 feet at low water.

Tides rise springs, $4\frac{1}{2}$ feet; neaps, $3\frac{1}{2}$ feet.

There is a railway track to the pier and a double track to empty the coal in the pockets, the pier is used entirely for shipping coal.

Wharf on Port Hood island 161 feet long; width, 25 to 40 feet, depth of water at low tide 15 feet; this wharf has a shed, icehouse and fish-curing store; another wharf on Port Hood island, 230 feet long, 25 to 32 feet in width; depth of water at low tide, 13 feet; shed, fish curing bait store, and cold storage building for freezing fish. There is also on the island a canning factory 120 by 30 feet, built on piling; depth of water alongside 10 feet. There is also a lobster canning factory.

Lights.—The lights are: one on S.E. side of entrance to harbour, white occulting, latitude N. 46 00, longitude W. 61 31 25; and one, white group revolving on Henry island, on its summit, at entrance to harbour, latitude N. 45 58 47, longitude W. 61 35 44. See List of Lights on the Atlantic Coast for 1913.

Storm signals are displayed at Port Hood. The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 49,084 tons.

PORT LATOUR HARBOUR, Shelburne county, Nova Scotia. The bight so-called port Latour, is open to the Atlantic ocean from the south-west, and the harbour is on the W. side of this bight.

The anchorage proper in $3\frac{1}{4}$ to $3\frac{1}{2}$ fathoms is, however, further up the inlet, N. of Rain island and E. of Johns island.

The shipping at this port is mostly local, as only light draught vessels carrying not more than 13 feet can enter the harbour at low tide. The harbour is quite extensive and affords good anchorage, the bottom being soft mud or sand and the depth of water fourteen to fifteen feet within the harbour proper.

There are four wharves at this port, and one breakwater or pier, the latter being some 500 feet in length; it protects a portion of the harbour and is also used as a wharf; water, 14 feet alongside at low tide; the Wm. E. Smith & Co. wharf has five buildings erected on it used as a fish factory and general outfitting stores.

There is a Government wharf with one warehouse and coal shed. The Consolidated Trading Co. own another wharf with three warehouses for their business. A wharf owned by E. P. Crowell & Co. has a fish factory and outfitting stores.

At all these wharves six to seven feet of water will be found at low tide. Tide rise ordinarily five to six feet. The bottom is soft.

There are three entrances marked by 16 spar buoys; extreme caution must be used entering this port as there are several dangers.

This harbour is open and has a bi-weekly steamship service the year round.

Light.—The light, white fixed, is established on the E. end of Page island entrance to harbour, latitude N. 43 29 27, longitude W. 65 7 4, and a bell buoy is anchored in the fairway in 22 fathoms, $3\frac{3}{4}$ miles 145° from Page island and is rung by the action of the buoy on the waves. See List of Lights on the Atlantic Coast for 1913.

There is a harbour master at this port and the charges are the same as at other Canadian ports.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 16,523 tons.

PORT LORNE HARBOUR, Annapolis county, Nova Scotia, on the S.E. shore of the bay of Fundy.

The harbour is entered from the bay of Fundy and is distant from Digby gut $26\frac{1}{2}$ miles eastward. There is anchorage off this harbour in 6 to 7 fathoms of water at low tide, at a distance of from $\frac{1}{4}$ to $\frac{1}{2}$ -mile from the shore. The tidal stream runs parallel with the shore with a velocity of from two to three knots an hour.

There is a pier in the harbour. The flats in the harbour are dry at low tide.

There is a harbour master at this place and the charges are the same as at other Canadian ports.

Light.—The light is on the inner end of the pier, white occulting, latitude N. 44 56 53, longitude W. 65 15 56.

See List of Lights on Atlantic Coast for 1913.

PORT MEDWAY, Queen's county, Nova Scotia, twelve miles from Liverpool on the S.E. coast of Nova Scotia. The entrance to the harbour lies six miles westward from Indian island. The channel to the port has a northerly direction for a distance of two miles; it then opens out into a large shallow and irregular basin, in which there are some rocks and shoals. The eastern side to the entrance consists of a series of small islands extending about three miles in a southerly direction from the mainland. There is anchorage in $3\frac{3}{4}$ fathoms, but in the channel leading thereto are several rocks, and strangers should procure the services of a local pilot. The harbour is protected by a breakwater. Lumber and fish form the principal exports.

Lights.—They are Medway head light, fixed white, west side of entrance, latitude N. 44 6 10, longitude W. 64 32 15; one in harbour on east end of breakwater; red fixed, latitude N. 44 7 58, longitude W. 64 34 20. The Medway bell buoy in 14 fathoms $13\frac{1}{4}$ miles 180° from breaker off approach, latitude N. 44 3 15, longitude W. 64 31 25; Medway whistling buoy $\frac{1}{4}$ mile south-west of S. W. breaker. See List of Lights on the Atlantic Coast and Gulf St. Lawrence for 1913. There is a harbour master at this port and the charges are the same as at other Canadian ports.

PORT MORIEN HARBOUR, Cape Breton county, Nova Scotia, is in Port Morien bay, the easternmost end of Cape Breton island. It is entered from the bay and is protected by a breakwater, the bay itself offering no shelter when eastern winds or gales prevail.

The breakwater which forms the harbour has been rebuilt, with exception of the extreme outer end, which is being constructed; the breakwater extends from the

northwestern shore of the bay near Arnold point about 4 miles southwestward from cape Percy. A basin is formed between the breakwater and the pier of the Dominion Coal Coy. Within the harbour there is from 10 to 17 feet of water. Morien (Cow bay) extends westward about $4\frac{3}{4}$ miles from its entrance between cape Morien and cape Percy.

Morien bay rarely freezes over, but drift ice often arrives about the middle of February and partially interferes with navigation. Vessels, however, arrive early in March and continue sailing to the port throughout the year until the first of February; but coal has been shipped at Port Morien every month of the year.

The coal mines are about one mile and one mine is only 100 yards from the wharf.

Cape Morien is a bold headland rising on its southern side, 150 feet above the sea; shoal water extends one and a half miles off it.

Light.—The light is on Flint island off cape Percy, white group flashing, latitude N. 46 11 0, longitude W. 59 45 55 and a diaphone is established at this station 95 feet 99° from lighthouse.

A bell buoy is anchored in 8 fathoms 1.5 mile, $132^{\circ} 30'$ from Cow reef on the northern side of the bay and just within cape Percy, latitude N. 46 9 48, longitude W. 59 48 50.

There are two buoys at the entrance to the harbour to lead vessels in clear of obstructions.

There is a harbour master in this port and the charges are as at other Canadian ports, but vessels which use the breakwater for loading and discharging are charged 6 cents per registered ton, tonnage dues under a special Act.

The total tonnage entered and cleared at this port for the fiscal year 1911-2 was 17,206 tons.

PORT SIMPSON harbour is the most spacious on the northwestern coast of British Columbia in latitude N. 54 34, longitude W. $130^{\circ} 26'$. The approaches to Port Simpson are by Dixon entrance from the north and west and from the south by Chatham sound. The immediate entrance from the northwest is nearly $2\frac{1}{2}$ miles wide and is between One Tree islet and Birnie island, by Inskip pass, 5 cables wide with depth of water from 11 to 15 fathoms. This pass should be invariably used by a stranger.

The harbour runs in an easterly direction for about $3\frac{1}{2}$ miles, contracting gradually as the head is approached, and terminating in a narrow bight, named Stumaun bay, which dries across at low water. Several streams enter this bay where salmon are caught.

The northern shore of the harbour is fringed with a rocky beach compact and backed by rapidly rising high land; the southern shore is not so steep to as the northern shore; there are shallow places between high and low water mark but beyond low water mark the water deepens very rapidly and from One Tree islet, for a distance of about 2 miles eastward, the contour of the shore affords good facilities for wharves or docks. South of One Tree islet, along the S. E. shore of Cunningham passage, the water is shallower and it is rocky in that locality, but this portion of water is large and well sheltered for medium draught vessels.

The main basin of this passage extends westward of Harbour reefs. These reefs are awash at high water and form a natural breakwater to Port Simpson. Dodd passage lies between One Tree islet and Harbour reefs and is 2 cables wide with from 6 to 8 fathoms of water. This is available for steam vessels, but local knowledge is necessary in navigating.

The depth of water in the harbour of Port Simpson, according to the chart corrected in 1908, is from 12 to 30 fathoms, and at one place on the eastern side of the harbour the depth is only 7 fathoms but in the remainder of this side the water is from 12 to 22 fathoms. The harbour embraces 4 square miles of water with muddy bottom, good holding ground and free from rocks and shoals. It is easy of access from the sea, having no strong tidal streams and well sheltered from all winds, except the westward which seldom blow here.

The anchorage in the harbour is opposite Fort Simpson, an old Hudson Bay fort. Depth, 10 fathoms, bottom muddy. There is also good anchorage almost anywhere in the harbour.

For further directions see B. C. Coast Pilot and especially Chart No. 1923 for the latest hydrographic survey.

The Hudson Bay Company owns a wharf and sheds which give accommodation for the steamers which regularly call on their way to more northern ports and on their return southwards. The depth of water at this wharf is 20 feet at lowest stage of the tide. Large steamers of different lines call at Port Simpson, both north and south, bound on regular schedule time several times a month. A great number of small craft enter the port. Provisions can be obtained readily at this port.

No dry dock has been built, but owing to the range of the tide vessels are beached in parts of the harbour with soft mud bottom and readily repaired.

Tide Tables issued by the Department of Naval Service, Ottawa, for Port Simpson are based upon tidal record during six complete years. This is the best port of reference for the tide at all points from Vancouver island northward, as well as for the time of slack water in the northern narrows. The tide rises, springs $19\frac{1}{2}$ feet and neaps $14\frac{1}{2}$ feet.

Light.—One on Birnie island, S. W. end of island, latitude N. 54 35 30, longitude W. 130 28 12, white fixed. See List of Lights Pacific Coast, 1913.

Tonnage of vessel entered and departed for fiscal year 1911-12 was 488,392.

PORT WADE HARBOUR, Annapolis county, Nova Scotia, on the N. shore of Annapolis basin, extends from Digby gut to Little Woods wharf, a distance of about 8 miles. The piers and wharves are:—one big pier situated about $1\frac{1}{2}$ miles E. of Digby gut constructed by the Dominion Government as a terminal of the Halifax & Southwestern Ry; the pier is about 1300 feet long and has a depth at the outer L of 28 feet water at low tide. Tides rise, springs $27\frac{1}{2}$ feet, neaps 23 feet at the head. The railway has a pier station, warehouse and a siding. The Canada Iron Corporation owns a large ore pocket and large Power house with conveyors to the L and chutes to conduct the ore to the holds of steamers which can load 6000 tons in about 3 hours; one pier owned by John W. Snow and one by John D. Apt, used principally by fishing schooners, and Littlewood's wharf, where there is 12 feet of water at high tide. The flats are bare at this section of the harbour at half tide. There are no docks for repairing vessels but several

coves in the harbour are used for repairing small vessels by beaching them. At Port Wade pier, or the larger pier, vessels and steamers load throughout the year. Drift ice rarely interferes with navigation, owing to the rise and fall of the tide. The terminal station of the Port Wade branch of the Halifax and Southwestern Ry. is located near Littlewood's wharf.

Steamers on the route between St. John, N.B., and other ports conveying passengers and freight call at Port Wade.

The port has a Harbour Master and the charges are the same as at other Canadian ports.

Lights.—The lights are:—one on outer end of Government wharf, red fixed, latitude N. 44 40 22, longitude W. 65 42 40; one on Shafner point, on the N. side of Annapolis river, white fixed, latitude N. 44 42 40, longitude W. 65 37 12. See List of Lights on the Atlantic Coast for 1913, and for description of coast charts Nos. 352 and 353.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 13,237 tons.

PRINCE RUPERT HARBOUR, British Columbia, is entered from Chatham sound by vessels from the north, between Kinahan islands and Lima point, the extreme south point of Digby island, and from the south by Grenville channel, Arthur passage and Malacca passage inside channels and by Hecate strait on the outside. The depth of water in the course which vessels from the north take at the entrance, is from 21 to 29 fathoms, and the least depth at low water is 14 fathoms southwest of Georgia rock which is buoyed with a gas buoy. The course from the south to the entrance is from 20 to 25 fathoms. The northern entrance is about $1\frac{1}{2}$ miles wide between Lima point and the Kinahan islands. The width between Digby island and Kaien island about the same distance from the entrance to the north narrows until it reaches Casey point on the west shore of Kaien island, where the width is nearly half a mile. At Parizeau point, on the opposite shore, the entrance widens to half a mile. At Pilsbury point on the same side as Casey point, the entrance expands to about a mile and continues this width for some distance along the front of the town. The water north and east of the town is about 20 fathoms deep and opposite the town from 23 to 17 fathoms in the channel and about 6 fathoms alongside the wharf. See Marine and Fisheries charts 301, 303 and Admiralty chart 1923a.

The wharves at Prince Rupert have 1685 feet frontage at various angles with the water front. First angle 320 feet, second 350 feet, third 475 feet, fourth 360 feet, fifth 180 feet; depth of water at all of these sections 25 feet at low water. Two coal docks are separate with 100 feet and 140 feet frontage respectively. The provincial Government wharf is 600 feet long with 25 feet of water, low water. Freight sheds are located on these wharves. The Department of Marine and Fisheries in 1912, completed a lighthouse depot with wharves, piers, workshops, officers' quarters, storehouses, buoy sheds, etc., from which the lighthouse and buoy service of Northern British Columbia are attended. The anchorage in the harbour is good for vessels of any size and draught.

Lights.—Lawyer islands light on the summit of northernmost island at its N. W. end, latitude N. 54 6 51, longitude W. 130 20 41, white fixed; one on Holland island, latitude N. 54 10 19, longitude W. 130 21 42, white fixed, a diaphone for

alarm is established at this station. Coast island range lights, front on top of Coast island, latitude N. 54 12 43, longitude W. 130 19 53, white fixed, the rear on Ridley island, 4,415 feet 104° from front, white fixed; Georgia rock gas and bell buoy, close south eastward of rock, latitude N. 54 13 7, longitude W. 130 21 42, white occulting; Barrett rock gas and bell buoy, close off Barrett rock, latitude N. 54 14 30, longitude W. 130 20 41, red occulting. Fire ledge gas buoy, in 3½ fathoms off east end of ledge, latitude N. 54 14 39, longitude W. 130 21 17, white occulting; Casey point gas buoy in 7 fathoms, 1-10 mile 256° from the point, latitude N. 54 16 21, longitude W. 130 21 43, red occulting. Fog bell on Charles point, latitude N. 54 16 39, longitude W. 130 22 20.

Prince Rupert is the selected terminus of the Grand Trunk Pacific Railway, now under construction, and the harbour is one of the finest on the Pacific coast, having great depth of water. The tide rises from 17 to 24 feet at alternate spring tides and 16 feet at neap tides. Quite a trade has already sprung up at this port and steamers run between ports to the south and north of Prince Rupert.

Coal from Ladysmith and Nanaimo is conveyed to Prince Rupert for railroad purposes and unloaded by ships' derricks upon the coal wharves. The cost of handling freight is ten to fifteen per cent. higher than at Vancouver. Supplies and stores can be obtained readily. A dry dock for repairing vessels is now under construction. Its length will be 600 feet, width 100 feet, depth 25 feet, lifting capacity 20,000 tons. Wireless telegraph and Quarantine station at Parizeau point.

Pilotage.—Pilots can be secured at Nanaimo.

The total tonnage entered and cleared during the fiscal year 1911-12 was 1,656,489 tons.

PUBNICO HARBOUR, Yarmouth County, Nova Scotia, S. E. of the port of Yarmouth, is entered from the Atlantic ocean between St. Ann and Beach points. The channel has a depth of water of from 7 to 10 fathoms and in the harbour there is from 3 to 6 fathoms. About 2 miles from the entrance the channel is encumbered with shoals. Below these shoals the harbour affords safe anchorage to vessels of large draught and is accessible at all times. The anchorage is in a depth of 9 to 10 fathoms, mud bottom; abreast the wharves, near Meres House, inclining a little to the western side of the harbour. The harbour is in 3 sections divided as follows: Pubnico, Middle Pubnico and Lower East Pubnico.

At lower East Pubnico there are two wharves, one on the east side and one the west, where light draught vessels load and unload. Two wharves at Middle Harbour, one on the east and one on the west side.

On approaching the harbour, after passing St. John island, steer for Beach point lighthouse, bearing N. 47 E., remembering that shoal water (marked by a bell buoy) extends off St. Ann point to the distance of a quarter of a mile; pass one cable from the lighthouse and pass close to the eastern side of the buoy; after passing the buoy, steer by bearings of the church conspicuous on the western shore. Having passed this steer by bearings of the lighthouse astern for anchorage. The channel to the head is buoyed with spar buoys.

Tide rises at Pubnico, 12 feet springs and 10 feet neaps. See Sailing Directions for S. E. Coast of Nova Scotia and Charts Nos. 1352, 1651, 2670.

Lights.—One on Beach point, east side of entrance, 120 yards from low water mark, white occulting, latitude N. 43 35 45, longitude W. 65 46 54, a gas and whistling buoy in Pubnico fairway, white occulting, in 15 fathoms, 6 miles 218 from Pubnico harbour light, latitude N. 43 31 6, longitude W. 65 52 5. See List of Lights on the Atlantic Coast for 1913.

There is a Harbour Master at this port and the charges are the same as at other Canadian ports.

PUGWASH HARBOUR, in Cumberland County, Nova Scotia, is on the S. coast of the strait of Northumberland. The harbour is entered from the bay of the same name into which flow Pugwash and Philip rivers; there are reefs off both of them rendering great caution necessary in the approach. Pugwash road at the entrance of the bay affords excellent anchorage in 16 to 19 feet at low water, sand and clay bottom and well sheltered.

The harbour is situated at the head of the bay and entrance to the river. It is small but secure, has more water inside than on the bar, which carries only 14 feet at low water. The bar is about $\frac{1}{2}$ a mile within the entrance of the bay, and a channel from half to one cable wide leads through flats of sand and weeds for the distance of one mile from it to the harbour's mouth, rendering the employment of a pilot indispensable by strangers, and one can be obtained by making the usual signal.

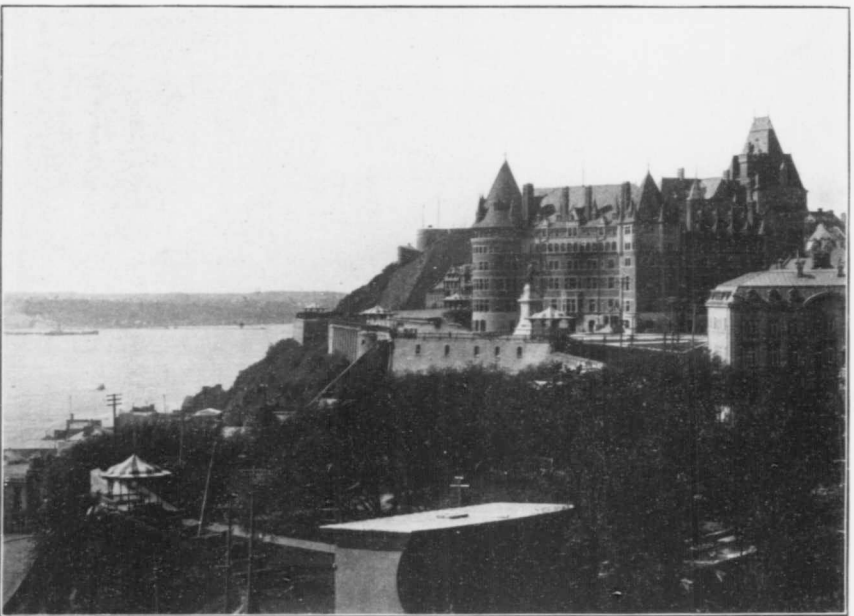
In this harbour is an Intercolonial Railway wharf with 23 feet depth at the head at low water, excepting the north east corner which has 18 feet. On this wharf are three spur tracks running to the head. Near this wharf, to the north of it, is another Government wharf with two railway tracks on it, depth of water 17 feet at the head; another wharf to the south of the I. C. Railway wharf is 360 feet long and about 30 feet wide with an L at the head.

Lights.—Pugwash light in harbour on Fishing point, latitude N. 45 52 30, longitude W. 63 40 20, white occulting; front light on Biglow point, on the point $\frac{1}{2}$ mile eastward of Biglow point, latitude N. 45 51 31, longitude W. 63 40 47, back 1,750 feet 166° 21' from front, white fixed; one on shore $\frac{1}{2}$ mile northward of Steven point, latitude N. 45 52 4, longitude W. 63 39 51, back light 1,750 feet 87° from front, both white fixed. See List of Lights for Atlantic Coast and Gulf of St. Lawrence for 1913.

Tonnage entered and cleared fiscal year 1911-12, 21,984 tons.

QUEBEC HARBOUR, province of Quebec, is in latitude 46° 49' N., longitude 71° 13' W., and is situated on the St. Lawrence river. It comprises the river and its navigable tributaries between St. Patrick hole and Carouge point (Cape Rouge), at about eight miles above the city. The harbour affords excellent anchorage over its greater part, the water between the banks of each shore being deep; anchorage is prohibited between lines drawn from the southeastern corner of Crawford's wharf to the southeastern corner of Barras wharf on the northeast, and from the middle of Champlain market hall to the northwestern corner of Simpson's wharf on the southwest. This space is indicated in day time by sign boards and at night by red lights on both sides of the river.

The harbour affords wharfrage accommodation for twenty-five to thirty ocean-going vessels, water from 24 to 40 feet; in addition wharfrage accommodation can be given to a large number of ordinary size and small vessels.



A View of Quebec Harbour showing the Chateau Frontenac.

Wet Dock.—The wet dock is an inclosed basin of forty acres water surface. Entrance 66 feet wide, depth of water, 28 feet over sill at high tide, general depth 25 feet.

Quay Frontage of the Wet Dock.

Louise Embankment Quay wall	Frontage, 2,085 lin. feet.
	Min. depth of water, 25 feet.
Dominion Coal Co.'s berth	Frontage, 400 lin. feet.
	Min. depth of water, 25 feet.
Cross wall, north of entrance	Frontage, 600 lin. feet.
	Min. depth of water, 25 feet.
Cross wall, south of entrance	Frontage, 230 lin. feet.
	Min. depth of water, 18 feet.

Tidal Harbour.

The tidal harbour is a basin with a water surface of twenty acres; general depth of water, 26 feet at low tide; the entrance to the basin is 200 feet.

Quay Frontage of the Tidal Harbour.

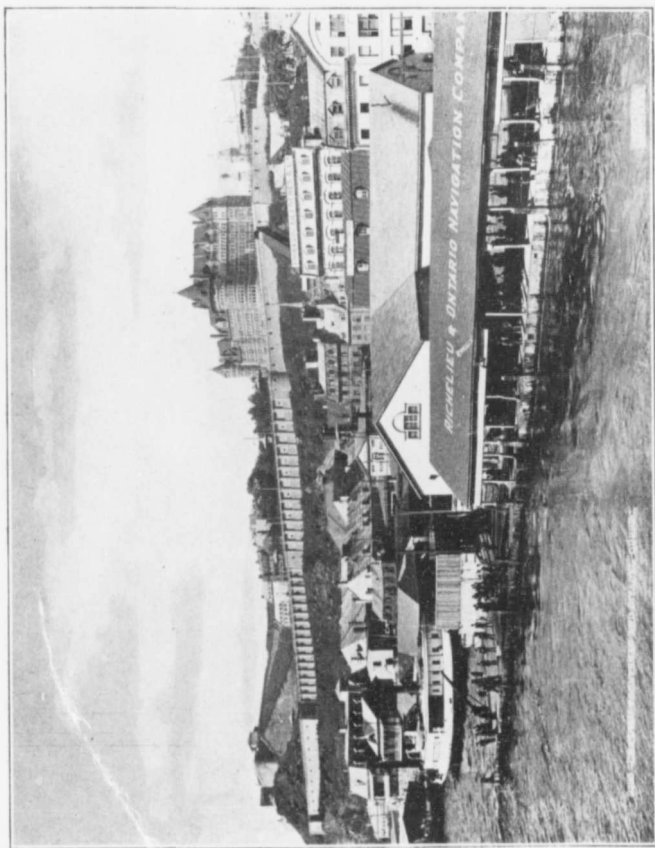
Louise Embankment Quay wall	Frontage, 1,070 lin. feet.
	Depth of water at low tide, 28 feet.
Cross wall, north of entrance	Frontage, 600 lin. feet.
	Depth of water at low tide, 26 feet.
Cross wall, south of entrance	Frontage, 150 lin. feet.
	Depth of water at low tide, 24 feet.
Pointe-a-Carey	Frontage, 600 lin. feet.
	Depth of water at low tide, 29 feet.
Breakwater, Tidal harbour face	Frontage, 680 lin. feet.
	Depth of water at low tide, 24 feet.
Pointe-a-Carey, Pond face	Frontage, 280 lin. feet.
	Depth of water at low tide, over 24 feet.
River face	Frontage, 580 lin. feet.
	Depth of water at low tide, over 40 feet.
Breakwater	Frontage, 880 lin. feet.
	Depth of water at low tide, over 40 feet.
Breakwater extension completed	Frontage, 2,500 lin. feet.
	Depth of water at low tide, over 40 feet.
Breakwater	Frontage, 1,000 lin. feet.
	Depth of water at low tide, over 40 feet.
Bulkhead wall (under construction)	Frontage, 1,800 lin. feet.
	Depth of water at low tide, 40 feet.

Wharf frontage of 3,800 feet, for berthing vessels drawing up to 35 feet.

The cross wall divides the wet dock from the tidal harbour, forms part of the quay frontage in both of the basins, and connects the Louise embankment with the city.

The docks have a surface area of about 56½ acres and are provided with ten landing sheds, with a floor area of 295,000 square feet, with railway connections to all sheds.

A shed, 960 feet by 80 feet, for landing and storing freight has recently been erected with 4,000 feet of railway track running to the shore side. There is within an easy reach of the steamers' docks, a large, newly-erected fire-proof cold store, equipped with modern appliances, five stories, 92 by 92 feet, containing 250,000 cubic feet of refrigerating space, coolers and freezers.



Quebec, P.Q.

IMPROVEMENTS UNDER CONSTRUCTION.

Among the most important improvements under construction is a grain elevator, with a capacity of 1,000,000 bushels, loading and discharging, and provision has been made for an extension for storage. Total capacity will be 2,000,000 bushels.



Quebec. Outer Tidal Harbour, Louise Docks.

The Harbour Commissioners have recently adopted a system of handling railway cars conveying freight from the terminals of railroads to and from the Harbour Commissioners' wharves and sheds. Three heavy locomotives have been secured to be used for switching purposes on the harbour tracks.

Steamers are coaled from barges, wharves, and are bunkered from a coal discharging plant.

The cost of loading general cargo, 45 cents per ton; deals, 85 cents per St. Petersburg standard.

Dry docks are located at Levis, on the opposite side of the river. The Levis dry dock, owned by the Dominion government, sometimes called the Harbour Commissioners' dock, is 600 feet long on blocks; breadth of entrance, 62 feet, and depth of water on the sill is $26\frac{1}{2}$ feet, and $23\frac{1}{4}$ feet on the blocks at high water, spring tides. Geo. Davie & Sons own two floating docks also at Levis. No. 1 is 230 feet long, width of entrance, 41 feet, and will take a vessel drawing 13 feet of water. This dock is sometimes lengthened by a water-tight compartment at the end. The lifting power at the dock is 2,175 tons. The length of No. 2 dock is 180 feet; breadth of entrance, 39 feet; it will take a vessel drawing 13 feet; lifting power is 1,605 tons. Davie's patent slip, close to the floating docks, has a length of 150 feet and can take a vessel drawing 10 feet of water. Russel's floating dock is also situated at Levis, and is 225 feet long over all, $41\frac{1}{2}$ feet broad at entrance, takes a vessel drawing $15\frac{1}{2}$ feet of water, and has a lifting power of 2,500 tons. Close to this dock is Russel's gridiron, 200 feet in length.

There is a twenty-five ton crane and a nine ton steam hammer at Quebec. A fifty ton floating crane has recently been added to the equipment of the harbour. Steel castings of large size are made at Montreal, and large forgings are made at New Glasgow and forwarded to Quebec by rail.

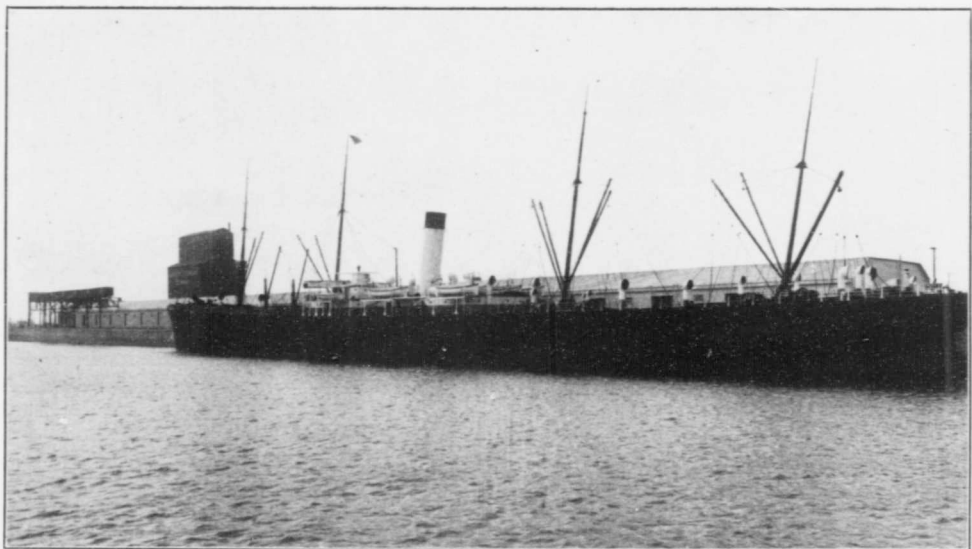
Repairs can be made to large steamers in Quebec, covering hull, machinery and boiler repairs. The tides rise 18 feet at springs and neaps, $12\frac{1}{2}$ feet; neaps ranging 10 feet.

All kinds of supplies, stores and provisions can be procured at very reasonable rates.

Proposed improvements are now being made in the St. Charles river, which will include a dam and basin for barges, and small craft, which will pass through a large manufacturing district, and will afford accommodation for unloading canal barges that descend the St. Lawrence river and enter the port of Quebec.

Ferry steamers cross between Quebec and Levis all the year round, the ferry steamers being specially equipped and strengthened for ice in winter. Pointe-a-Carey wharf, Quebec, is the point from which the ice-breaking steamer "Montcalm", makes her trips, and returns, when engaged during the winter, in ice-breaking above and below Quebec. Breaking of the ice bridge or jam at Cap Rouge permits the ice to move down the river gradually and thus opening navigation to Quebec at an early date.

The harbour is under the control of Harbour Commissioners, who conduct all arrangements for improving their own wharves and docks on the Quebec side, and manage the affairs of the harbour. A number of private wharves are owned as well in Quebec.



Quebec. Outer Tidal Harbour, Louise Docks, S.S. "Michigan."



Quebec. Outer Basin.

The Port Charges are: Harbour masters' dues, paid to the Harbour Commissioners on vessels and cargo using their wharves and docks. Moorage is also charged at Quebec on vessels and wharfage on cargo, a reduction being made in moorage, if a full cargo is not shipped in the port. Sick mariners' dues are paid three times in the year, when not paid elsewhere. Port Warden's charges are made for surveys of cargo and vessels when required. A salvage plant, subsidized by the Department of Marine and Fisheries, is maintained at Quebec.

Pilotage is under the control of the Minister of Marine and Fisheries, and the rates are:

From Father Point to harbour of Quebec per foot draught of water, from May 1 to November 10, \$3.87; from November 10 to 19, \$4.95; from November 19 to March 1, \$6.02; from March 1 to May 1, \$4.41.

From Brandy Pots to Quebec, two-thirds of the amounts from Father Point.

From St. Roch point to Quebec, one-third of the amounts from Father Point.

From Pointe-aux-Pins or Crane island to Quebec, one-quarter the amount from Father Point.

From Quebec to Father Point, from May 1 to November 10, \$3.40; from November 10 to 19, \$4.46; from November 19 to March 1, \$5.54; from March 1 to May 1, \$3.93.

From any place in the harbour of Quebec, not being a wharf, to any other place, not being a wharf, \$5.00.

From any wharf in the harbour between Pointe-à-Carcy below, and the west end of Allan's wharf above, both inclusive, \$2.50.

Lights.—Range lights are situated in Quebec harbour, one on N. E. corner of Princess Louise embankment in latitude N. $46^{\circ} 49' 17''$, longitude W. $71^{\circ} 12' 15''$, red fixed, and one on E. side of ramparts, 2937 feet, $227^{\circ} 44'$, in rear of front light, red fixed. Other lights in the vicinity are the Upper traverse, Lower traverse, one on the extremity of the wharf, island of Orleans, and one at St. Laurent, same island. The river is also well buoyed from Beaujeu bank, below Quebec, to Platon above, with gas buoys, thirty being now in position showing strong lights and a number of steel can and conical buoys.

See St. Lawrence Pilot, Canadian edition (Below Quebec), List of Lights, Admiralty Chart No. 319 and Canadian plan No. 21.

The total tonnage which entered and cleared at Quebec during the fiscal year of 1911-12 was 6,066,226.

RICHIBUCTO HARBOUR, Kent county, New Brunswick, is at the mouth of the Richibucto river, on the eastern side of New Brunswick, strait of Northumberland. This river is among the chief rivers of New Brunswick and next in importance to the Miramichi river on the eastern side of the province. It is navigable a considerable distance from its mouth. The entrance is about $3\frac{1}{2}$ cables wide lying between 2 sand bars called the North and South beaches. Immediately within the entrance there is a wide expanse, nearly dry at low tide, excepting the channel of the river.

At about 3 miles within the entrance and just below Richibucto town, the river is over 4 cables wide but contracts to $1\frac{1}{2}$ cables at $1\frac{3}{4}$ miles up, after which it expands again for a considerable distance and is nowhere less than 160 yards wide.

There is open anchorage off the bar in 9 fathoms; there is a narrow channel over the bar which commences E. S. E. of the river's mouth, but it shifts with gales and the action of ice.

Two breakwaters, each sloping on both sides, have very recently been completed to prevent the channel from filling up and to induce scouring by action of the tide and stream. The channel has been dredged to give a depth of from 13 to 16 feet and is 3,600 feet long and from 170 to 200 feet wide.

There are several small wharves in the harbour; one, a Dominion Government wharf, 200 feet long by 40 feet wide with a railway spur to the head, water 14 feet, low water at the head and 14 feet east side, 18 feet high water; lobster factory wharves, one on north beach and two on south beach. Jardine wharf is above the town of Richibucto.

Lights.—One on Richibucto head, on headland, latitude N. 46 39 40, longitude W. 64 42 30, white fixed, range lights in harbour, bar lights, front on N. side of south beach at entrance, latitude N. 46 42 43, longitude W. 64 47 8; white fixed, back 348 feet 203° from front, also white fixed. North beach lights, front light on south side of beach, back light 300 feet 304° from front, both white fixed. Channel lights, front on W. end of S. beach, latitude N. 46 42 45, longitude W. 64 47 48, back, 367 feet 228° from front, both red fixed. Richibucto bell buoy in 5 fathoms outside bar at entrance to harbour about 1 mile 23° from front light of bar range. See List of Lights on the Atlantic Coast for 1913.

There is a Harbour Master at this port and the dues are sick mariner's and harbour master's dues.

The total tonnage entered and cleared at this port for the fiscal year was 4,466 tons.

RIMOUSKI HARBOUR, Rimouski county, province of Quebec, about 3 miles west of Father point. Lying off Rimouski is Barnaby island. Rimouski is abreast the wharf, off eastern end of Barnaby island, and vessels anchor here in order to load timber during the summer months when light winds prevail. The best anchorage is in 4 and 4½ fathoms, mud bottom, with the E. end of Barnaby island about W. ½ S. and the pier end bearing about S. S. W., to obtain better shelter from strong westerly winds. Smaller vessels anchor just W. of the line along the wharf with the E. end of the island about W. by N. distant half a mile. Barnaby island, the eastern end of which is W. by S., distant 3½ miles from Father point, is 3 miles long and 400 yards at its greatest breadth. Shoal water extends some distance off the N. shore of Barnaby island. Approaching Rimouski from the westward the east end of Barnaby island can be rounded as soon as the head of the wharf is in line with the inner end. Between Barnaby island and Rimouski, the channel is completely dry at low water except for shallow drainage from the river; there is about 12 feet of water at high Springs. See St. Lawrence Pilot, Canadian Edition (Below Quebec).

Rimouski wharf or quay is about 2000 feet long and 50 wide except at the outer end, where there is an L running eastward, and inside the L small vessels are sheltered and load and discharge. The water is 15 feet at extreme low water, west side, and 10 feet on the east side, but dredging is being constantly carried on at the wharf and in a channel at the west end to deep water. The depth in the

channel is now 15 feet extreme low water. A gas buoy is anchored off the end of the channel in 7 fathoms and there is considerable room for anchorage of small vessels, bottom good. Shelter is given by Barnaby island and point Pouliot; vessels come to anchor between the buoy and the end of the wharf. The rise of the tide is 14 feet springs, $8\frac{1}{2}$ neaps. There is accommodation for two ocean-going vessels alongside the wharf. On the Rimouski quay are 2 sheds for storing freight. A branch line of the Intercolonial Railway extends to the head of the quay and mails from Europe for the Maritime provinces from inward bound steamers are landed by the use of a tender, the tender is berthed at the wharf when not employed conveying mails. The Intercolonial Railway runs along the southern shore of the St. Lawrence about a mile inland connecting Quebec with Halifax and other Maritime ports. There is a village at the wharf and the town of Rimouski is $1\frac{1}{2}$ miles from it. Supplies for vessels may be obtained in moderate quantities and fresh water is carted to the vessels alongside the wharf.

There is a Harbour Master at Rimouski and the charges are harbour master's and sick mariners' dues, at the same rate as at other Canadian ports. Coal is landed on the wharf from cars and vessels. The cost of coaling steamers is at the rate of 20 cents per hour for labour.

Lights.—Are on Father point, on the point, latitude N. 48 31 30, longitude W. 68 27 40, white group flashing; diaphone on the beach, 250 feet 71° from lighthouse; one light on Rimouski wharf near its outer end, latitude N. 48 29 26, longitude W. 68 30 50; a gas buoy in fathoms off Father point, $1\frac{1}{2}$ miles 2° from outer end of Rimouski wharf, latitude N. 48 31 0, longitude W. 68 30 50, white occulting. Rimouski road bell buoy marks the point where the mail steamers should meet tenders carrying mail from Rimouski wharf, latitude N. 48 31 0, longitude W. 68 30 47, white occulting.

See List of Lights on the Atlantic Coast and Gulf of St. Lawrence for 1913.

The total tonnage entered and cleared at this port for the year 1911-12 was 288,177 registered tons.

RIVER HEBERT, Cumberland county, Nova Scotia is entered from Cumberland basin at the eastern end of the bay of Fundy. The channel is intricate for strangers but pilots can be obtained at Woody point, Cumberland basin. The depth of water at low water in the channel in River Hebert is from 3 to 4 fathoms. The flats are dry at low tide and small vessels sometimes lie on the flats until the tide returns. Vessels of this class load at times at the banks in favourable locations and repairs are also made on the flats at low water.

The wharves are: one at River Hebert, called the old wharf, about 80 feet front and 50 feet in length shoreward, and the new wharf with a frontage of 150 feet and 40 feet back, with a connection from the old wharf of 35 feet, water, from 10 to 18 feet at high water; the depth is governed by the freshets in the Spring; one wharf at Minudie has a frontage of 80 feet and is 100 feet long; it is used also as a ferry wharf connecting Amherst point. The Minudie Coal Company loads coal at this wharf, and the Company has a railway track running upon the wharf. The average depth of water is 18 feet at Joggins and an anchorage off the wharf. A branch line of railway connects this place with the Intercolonial railway.

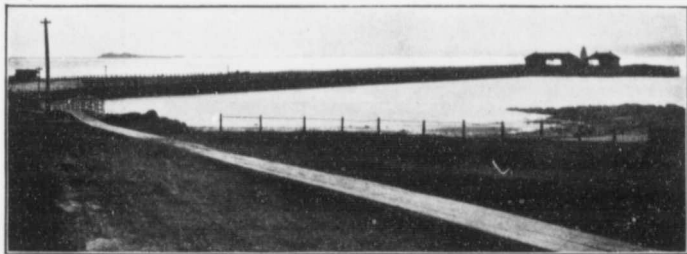
The tides at the head of Cumberland basin rise $45\frac{1}{2}$ feet springs and 38 feet neaps; this range is not given as the rise and fall at River Hebert.

There is a Harbour Master at River Hebert and the fees are the same as at other Canadian ports.

Lights.—One Pole light on Minudie wharf, latitude N. 45 46 23, longitude W. 64 20 11, white fixed. See List of Lights on the Atlantic Coast for 1913.

Tonnage during the fiscal year 1911-12, entered and departed, 37,061.

RIVIERE DU LOUP, county Temiscouata, province of Quebec, is at the mouth of a river of the same name that flows into the St. Lawrence river, south side, opposite Hare island. At Pointe Riviere du Loup is a long wharf, 1,600 feet in length, at the northern entrance of the river. The water at the outer end is 14 feet at low water, and small vessels moor alongside the south western side near the end, but at low water on the northeastern side, it is dry. The tide rises 18 feet springs and 12 feet neaps at the wharf. On this wharf are two sheds and a waiting room for passengers who embark on board river steamers which call at the wharf. The place is a well-known summer resort and landing place for other resorts and the town of Riviere du Loup an important station on the Intercolonial railway.



Riviere-du-Loup Wharf.

In the mouth of the river, small vessels and barges load lumber at a small wharf. Ocean-going vessels load in the anchorage off the western side of the wharf where there is a depth of from 4 to $4\frac{1}{2}$ fathoms at low water. Lumber is conveyed in barges from the lumber wharf to the ships at anchor.

Supplies of various kinds and good water can readily be obtained. Railway connection is made with the Temiscouata railway and with the Intercolonial railway from the wharf where a track is laid to the end.

At this place is a telegraph office and signal station which answers signals from passing vessels.

There is a Harbour Master at this port and the charges are harbour master's and sick mariners' dues.

Light.—On a shed at the end of the long wharf, latitude N. 47 50 59, longitude W. 69 24 1. See List of Lights for the Gulf and River St. Lawrence, 1913.

Tonnage entered and cleared for fiscal year 1911-12, 23,622.

SACKVILLE HARBOUR, Westmoreland county, New Brunswick, is on the Tantramar river, which flows into Cumberland basin at the eastern end of Chignecto bay, bay of Fundy. Sackville anchorage is in the narrow channel, one mile above Woody point, Cumberland basin, in 4 fathoms, low water. Above Sackville anchorage only small vessels can lie afloat at low water, but trading craft lie aground in the mud. Larger vessels sometimes work their way up on flood tide, the current running about 5 miles an hour.

There are two wharves in the harbour, one with 22 feet water, and one with 18 feet, high water. A railway spur, about one quarter mile in length from main line, runs on one wharf. Sackville has railway connection by the Intercolonial railway with all points and telegraph communication.

Tides rise 45½ springs and 38 feet neaps at Sackville.

Light.—One on Pecks point at entrance to Cumberland basin, north side, latitude N. 45 44 25, longitude W. 64 29 1; fixed white, visible in clear weather 10 miles. Diaphone near lighthouse worked by compressed air. See List of Lights on the Atlantic Coast for 1913.

Tonnage entered and departed in 1911-12, 7,574.

ST. ANDREWS HARBOUR, Charlotte county, New Brunswick, in Passamaquoddy bay, an inlet of the bay of Fundy. The harbour lies between the town of St. Andrews and Navy island. It is about one mile broad at high water and about 2 miles long between the E. and W. bars. At low water there is a small area with about 12 feet depth, with good holding ground where small vessels ride out gales at anchor. This port is open all the year. There are two entrances, the eastern and western, both dredged to 12 feet at low water. The eastern entrance is between Tongue shoal and Navy bar lighthouse and is marked by buoys, red starboard hand and black on the port. The western entrance is west of Navy island and 2 beacons marked on the chart. The dangers: one is Niger reef and the other is north east of it with a staff and triangle.

There is an anchorage in 10 fathoms, clay bottom, 3½ cables south-west of Joe point, with Niger reef beacon in line with the north-west point of Navy island S. 50° E. See Coast Pilot for S. E. Coast of Nova Scotia and bay of Fundy and plan of Port St. Andrews 1743 and Chart 352 for coast directions.

The principal wharves in the harbour are the new Canadian Pacific Railway wharf, which is about 350 feet long and 60 feet wide. On this wharf is a warehouse 250 feet long by 30 feet wide for receiving freight. Across the outer end of the wharf the water is 14 feet deep at low water. A railway track is laid to the end of this wharf, alongside the warehouse, and freight is loaded into and from cars. Another wharf, about 200 feet long, is used by local steamers plying between St. John and coast ports, Grand Manan island, Campobello island, St. Stephens, up the St. Croix river and Eastport, Maine, U. S. A. Another wharf is the old Canadian Pacific Railway wharf, 300 feet long and 45 feet wide, track to outer end. There is a wharf near the Customs House used by a fish curing establishment and a wharf for the local coal trade. The public wharf extends from the public square 800 feet into the harbour. The outer part was built a few years ago and is 24 feet wide, with a block or T. which has a slip that is raised or lowered

according to the tides. On the S. E. side of the T. is a floating stage with connections with the wharf, enabling passengers to land and embark. Another wharf, 150 yards N. W., is 250 feet long and with its warehouses is used for storing and handling lumber, building materials, etc. This wharf is dry at low tide.

Lights.—The lights in Passamaquoddy bay are:—One at St. Andrews, north point of entrance, white fixed, latitude N. 45 4 6, longitude W. 67 2 55; one on E. end of eastern bar of Navy island, white fixed; fog bell on S. E. end of pier; one light on sand reef at east entrance Tongue shoal, latitude N. 45 3 46, longitude W. 67 0 48, also white fixed.

The port is a favorite summer resort and one of the terminals of the Canadian Pacific Railway, and it has telegraph and railway communications with all points.

Supplies and water are easily obtained. A large number of fishing vessels and others enter and depart from this port. Sardines and other kinds of preserved fish are shipped in considerable quantities.

There is a Harbour Master at this port and the charges are Harbour Master's and Sick Mariners' dues, as at other Canadian ports.

Services of pilots can be obtained by the strangers before entering port, at Machias Seal island or Passamaquoddy bay.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 191,924 tons.

ST. ANN HARBOUR, Victoria county, Cape Breton island, Nova Scotia, is at the western end of St. Ann bay, which is entered from Cabot strait. The entrance of the harbour is between Beach point and Weed point, the width between the 2 points being only 130 yards. The depth of water is from 11 to 13 fathoms, ordinary low tide; there is a bar at about $\frac{3}{4}$ of a mile north-eastward of the entrance over which there is a narrow channel with a least depth of 20 feet low water, springs, but for a width of 3 cables there is a depth of 12 feet, in strong north-easterly winds, and, especially with the ebb-stream, the bar is covered with heavy breakers.

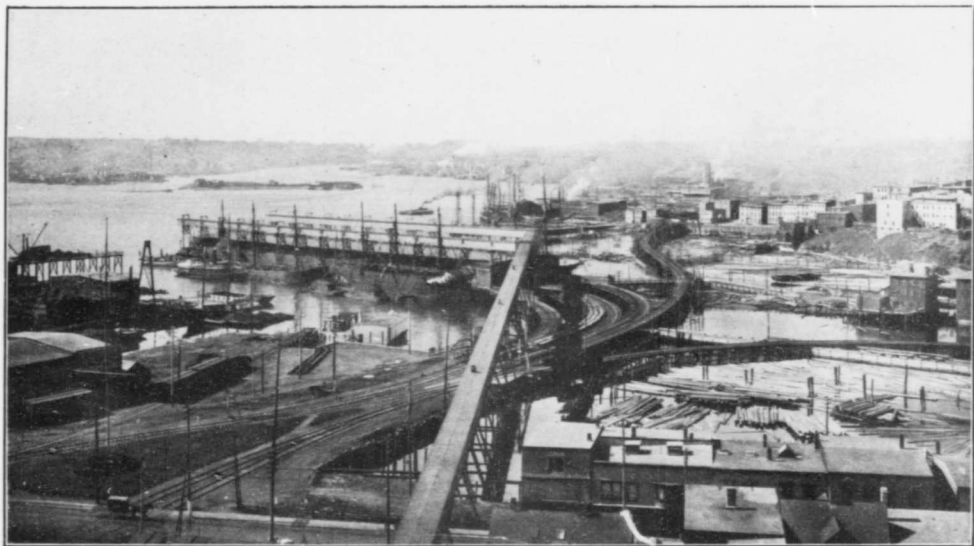
Port shoal, with a least depth of 8 feet, mud, is on the northern side of the entrance in the harbour and it extends to half a mile west-south-westward from Beach point.

There is a wharf at the head of North arm with about 9 feet of water at its outer end, and one in south arm, 198 feet in length and extending into 8 feet depth at low water; this wharf is made use of by steamers running to Sydney and elsewhere. See St. Lawrence Pilot and Charts Nos. 1,651 (1,407), 2,033, (1,320).

Lights.—The lights are: one leading to the harbour on Ciboux island, $\frac{1}{2}$ mile from north end, latitude N. 46 23 10, longitude W. 60 22 30, red revolving; one in St. Ann harbour on S. point of beach, latitude N. 46 17 45, longitude W. 60 32 25, white fixed; one on Munro point, on S. E. extremity of point, St. Ann harbour, latitude N. 46 15 22, longitude W. 60 35 22, red fixed. See List of Lights on Atlantic Coast for 1913.

There is a Harbour Master at this port and the charges are Harbour Master's and Sick Mariners' dues, as at other Canadian ports.

Weed Pond beach and Bar point in line lead close southward of the shoal. The rate of the tidal stream at the entrance is 4 knots. The mountains of St. Ann,



St. John, N.B. Harbour from C.P.R. Elevator, looking West.

which rise precipitously, form the northern shore of the harbour from the northern end of the beach to North arm.

The harbour extends about $4\frac{1}{2}$ miles south-westward within St. Ann beach; it has a general width of $1\frac{1}{4}$ miles, a depth of 7 to 9 fathoms and is completely sheltered.

Tides rise 6 feet springs, $4\frac{1}{2}$ feet neaps.

ST. JOHN HARBOUR, St. John county, New Brunswick, lies at the head of the bay into which the St. John river flows, some 55 nautical miles from the entrance of the bay of Fundy, on the north side of the bay. The harbour is safe, commodious and always accessible. It is rapidly becoming one of the chief north Atlantic ports in winter traffic for ocean-going freight, passenger and mail steamers and immigrant ships. Owing to its favorable location and extensive railway communication with all parts of the Dominion of Canada and United States, a number of ocean-going liners and ocean-going steamers enter and depart from this port during the winter especially.

The increase of trade and traffic has made it necessary to enlarge the berthing and loading accommodation for the large steamers, and extensive improvements have been undertaken and are proceeding on this scale. Grain, lumber, pulp and paper and agricultural products from the maritime provinces and western Canada form the chief part of the articles of exports; while merchandise, iron and steel manufactures form the chief articles of import.

Numerous passenger lines of steamboats keep up communication with ports in the Maritime provinces, bay of Fundy, the United States, Montreal and on the St. Lawrence route. The passenger traffic with these ports is especially large in the summer season. Trade with the West Indies forms an important item in the operations of this port.

Partridge island protects the harbour on the south side, and from Partridge island to the head of the harbour the distance is $2\frac{1}{2}$ miles. A quarantine station for St. John is located at Partridge island. There are 2 channels known as the east and west, one on each side of the island; the one on west side is used by vessels of shallow draught only. The one on the east is the main channel and has been dredged at the entrance to the harbour and carries a depth of not less than 30 feet at low water for a distance of 6,000 feet, with a general width of about 650 feet. After this channel is passed, the depth towards the head of the harbour and width increase greatly, being from 50 to 70 feet in depth, and even greater in parts, and about 2,000 feet wide. Beacon bar, formerly on the west side of the main channel, has been removed and the depth of water at that point is now 32 feet at low water. The depth of water along the piers at West St. John is from 26 to 30 feet and in Sand point slip 32 feet.

The channel leading into Courtenay bay on the east side of the harbour is 32 feet in depth at low tide.

The deepest and best sheltered anchorage is off the wharves at Sand point.

There are at present in use twenty-three deep-water berths for ocean steamers, with capacious warehouses, seven berths for steamers drawing not more than 10 feet of water, and one mile and a half of frontage, including slip-faces, at which vessels can be moored and receive cargoes, although grounded at low tide, without inconvenience or damage.



St. John, N.B. Water Front.

Repair Docks.—The facilities for repairing consist of sets of blocks owned by the city and private concerns for vessels up to 800 tons. The construction of a dry dock in Courtenay bay, 900 feet in length, 100 feet in width at entrance and 37 feet on the sill, is being proceeded with.

The anchorage grounds in and adjacent to the harbour extend over a wide area. For large vessels there is ample anchorage accommodation; the bottom is composed of soft mud with gravel in places.

There are forty wharves ranging in length from 200 to 1,540 feet. There are fifteen large sheds, besides coal sheds and pockets. There are about eighteen railway sidings belonging to the Canadian Pacific Railway Company, the Intercolonial Railway and the New Brunswick Southern Railway adjacent to the wharf sheds. At twenty-two wharves the depth of water ranges from 18 to 31 feet at low water. At eighteen wharves it is 20 feet at high tide.

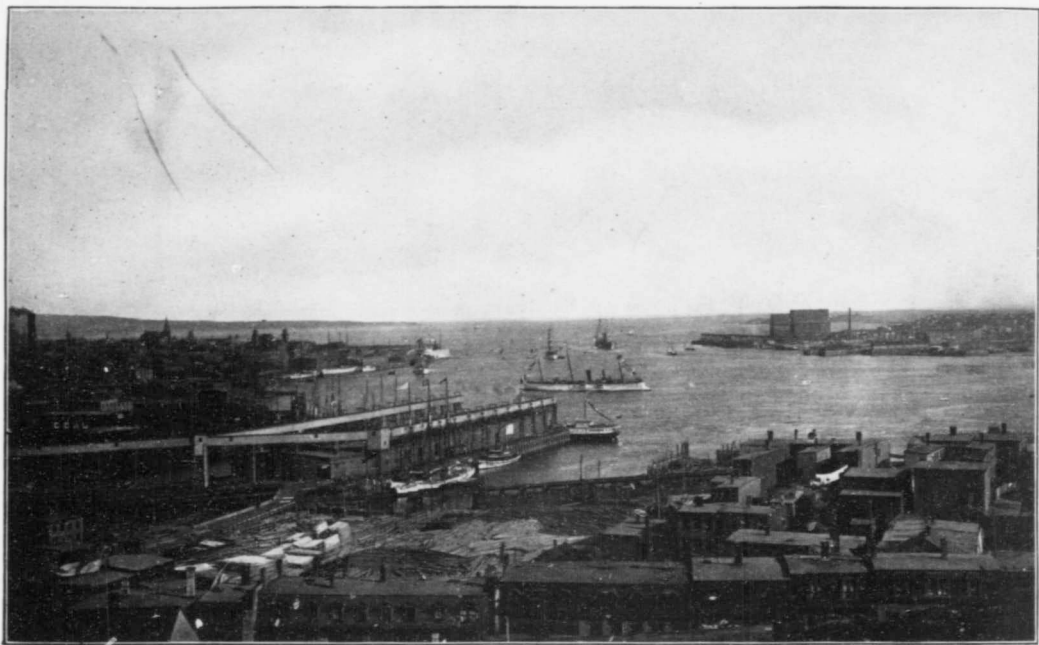
At St. John West, the Canadian Pacific Railway extends its tracks to the Canadian Pacific Railway wharf, Union wharves 1, 2, 3 and 4 and New South Rodney 5 and 6, upon which wharves are sheds; the New Brunswick Southern Railway to North Rodney wharf and Nelson wharf, upon which is a coal shed. At St. John east the Intercolonial Railway extends its tracks to the Intercolonial Railway ballast wharf slip and to the same slip west and north and to the public pier to Pettingell wharf and McLeod wharf, also to the Intercolonial Railway pier east and west.

The Canadian Pacific Railway has a grain elevator at St. John West from which grain is conveyed to vessels lying at the company's wharf and at the Union wharves. The conveyor is 1,800 feet along the front of the wharves and a conveyor is now being constructed to another wharf. The capacity of the elevator is 1,032,000 bushels and is in constant use during the winter season by transatlantic steamers. The Canadian Pacific Railway are erecting an additional elevator of 1,000,000 bushel capacity. Excellent cattle sheds are connected with the Canadian Pacific Railway wharves, so arranged that cattle are taken into them from the cars at one side and driven aboard the vessels from the other side.

The Intercolonial Railway has connected with its terminal wharf at York point an elevator with a capacity of 500,000 bushels, equipped with all the facilities for handling grain. The wharf is a crib wharf, tight faced, 535 feet long and 156 feet wide, two tracks, a shed 510 feet long by 118 feet wide, with doors on both sides for handling freight and two tracks in the centre holding thirteen cars. Depth of water at this track 30 feet at low spring tide on each side of the wharf and the same on the harbour front. The Intercolonial Railway has also a crib wharf with large shed for the flour shipped to bay of Fundy ports. A number of private wharves are located in the harbour.

The Department of Marine and Fisheries has now under construction a wharf and depot at West St. John, on a site at the end of Nelson street above Navy island.

A cold storage plant is owned by the New Brunswick Cold Storage Company, and is located beside and facing the Intercolonial pier. Any large or small vessel running into the port may easily dock there at any time. There is siding accommodation for sixteen cars at one time, operated either by the Intercolonial or Canadian Pacific railways when required. The cold store, in addition to large space for general storage, has accommodation of 80,000 cubic feet for fresh fish.



St. John, N.B. City and Harbour from Fort Howe.

A signal staff on Partridge island signals vessels bound for St. John harbour.

The Meteorological Office at St. John exhibits a daily signal by which ships' chronometers may be checked. Storm warnings are posted on the approach of storms.

A wireless telegraph station of the Marconi system is established at this port and communication with vessels at sea, 250 nautical miles from St. John, can be maintained. The harbour regulations are administered by the City Corporation, but the Dominion Government has spent large sums of money in improvements and is continuing the work.

Port Charges.—The port charges are dues according to the regulations of the harbour authorities, consisting of harbour master's fees and anchorage fees, specially arranged for this port, and the Dominion Government charge for sick mariners' dues of $1\frac{1}{2}$ cents per ton, collected three times in one year. Wharfage is charged at the rate of \$2.00 per day for vessels of 380 tons and 25 cents for every additional 50 tons. Anchorage dues are:—vessels of 550 tons and under 600 tons \$3.50 and 25 cents additional for every 50 tons above 550.

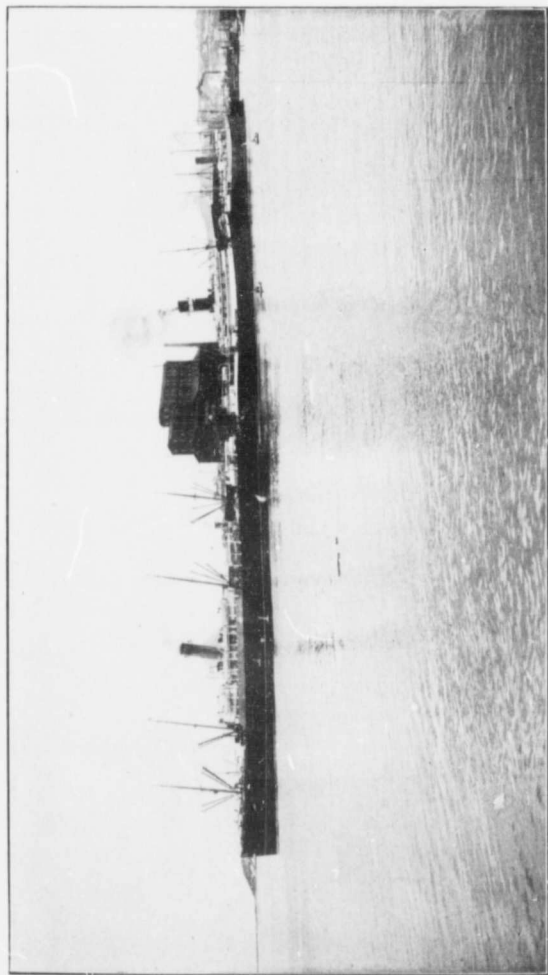
Loading and discharging cargo costs an average of 30 cents per ton on general cargo and \$1.00 per standard for loading lumber.

Coaling large steamers is done by two barges fitted with proper machinery, each capable of handling 150 tons per hour. There are two coal towers, one on each side of the harbour for discharging coal.

Supplies of all kinds are readily obtainable at St. John and cheap.

Tides.—The tides rise and fall in St. John harbour $25\frac{1}{2}$ feet springs and $21\frac{1}{2}$ feet neaps. Tide tables are published by the Tidal and Survey branch of the Naval Department at Ottawa. The flow of the St. John river during April and May increases the depth of water in the harbour and causes the ebb stream to be stronger than the flood stream. See Coast Pilot for S.E. coast of Nova Scotia and Bay of Fundy, 1911, for sailing directions in bay of Fundy and chart No. 352 and plan No. 1551.

Lights.—*The Lights in approaches and St. John Harbour:* Tiner point fog-alarm on the point, latitude N. 45 9 22, longitude W. 66 11 22; submarine bell off Negro head 1 1-8 mile, 146° , from south end of Manawagonish island, latitude N. 45 11 0, longitude W. 66 6 51; Negro head bell buoy in 12 fathoms off Negro head; Black point gas and whistling buoy in 15 fathoms outside entrance of St. John harbour, white occulting; Partridge island light, highest point of island, St. John harbour, latitude N. 45 13 54, longitude W. 66 3 10; diaphone on south-west end of island; Partridge island light and bell boat in 26 feet near east side of Partridge island, latitude N. 45 14 7, longitude W. 66 2 45, white fixed; one light on Negro point, Government breakwater, west entrance to port, 50 feet from outer end, latitude N. 45 14 13, longitude W. 66 3 19; white fixed; St. John harbour gas buoy in $5\frac{1}{2}$ fathoms, about 4 cables eastward of Negro point, white occulting; light on pier on point of bar, west side of channel, white occulting; a fog bell is operated at this station; one on Intercolonial Railway wharf, St. John city on the outermost corner of wharf, latitude 45 15 27, longitude W. 66 3 13, red fixed; one on Reeds point, foot of St. James street, St. John city, red and white fixed. See List of Lights on the Atlantic Coast for year 1913.



St. John, N.B.

Pilotage is under the control of the St. John Pilotage authority and the rates are for vessels not under steam :

INWARD.

First District, from Partridge Island to Musquash Head, bearing N.W., per foot draught of water.....	\$1 50
Second District, from Musquash Head to Point Lepreaux, N.W., per foot draught of water.....	1 75
Third District shall be from the outside limit of the Second District to a bound ranging from the North head of Grand Manan to Liberty point, bearing N.W. by W., North Channel, and from Machias Seal island to cape Sable, Seal island, bearing S.S.E., South Channel, per foot draught of water.....	2 25

OUTWARD.

From the harbour of the port of St. John, N.B., to outside of Partridge island, per foot draught of water.....	1 25
Down the bay of Fundy, when required, shall be two dollars per foot (\$2) draught of water, over and above the one dollar and twenty-five cents (\$1 25) harbour pilotage outwards.....	



St. John Harbour.

For vessels under steam :

INWARD.

From Partridge island to Musquash head, bearing N.W., per foot draught of water.....	2 00
From Musquash head to point Lepreaux, N.W., per foot draught of water..	2 50
From point Lepreaux to Sable island.....	3 00

OUTWARD.

	From the harbour of the port of St. John, N.B., to the outside of Partridge island, per foot draught of water.....	1 75
	Down the bay of Fundy, when required, two dollars and seventy-five cents per foot draught of water (\$2.75) over and above the one dollar and seventy-five cents (\$1.75) harbour charge outwards.	
1 50	For all steamers not exceeding 120 tons.....	2 00
1 75	Over 120 tons and not exceeding 200 tons.....	2 50
	Over 200 tons and not exceeding 300 tons.....	3 75
	Over 300 tons and not exceeding 400 tons.....	5 00
	And thirty cents additional of every 50 tons over 400 tons.	

The total tonnage which entered and departed at St. John in the fiscal year 1911-12 was 3,258,805 tons.

ST. GEORGE HARBOUR, Charlotte county, New Brunswick, on the Magadavic river, entered from Passamaquoddy bay. There is a Government wharf in this harbour with 14 feet water at low tide. There is another wharf about 2 miles from the town of St. George. The anchorage is about one mile from the town, with 15 feet at low water. Tides rise and fall 27 feet at springs and 18 feet at neaps.

There is a Harbour Master in this place and the charges are the same as at other Canadian ports.

ST. MARTIN HARBOUR (Quaco), in St. John county, New Brunswick, is an artificial harbour formed by a breakwater. It is situated on the north coast of the bay of Fundy and is 30 miles east of St. John. In the bay there is good anchorage in 10 fathoms. Quaco shoal, in this bay, is about 1 mile in length, N.E. and S.W., and occupies a considerable portion of the bay. The least depth of water on the shoal is $1\frac{1}{2}$ fathoms, but there is deep water all around it. The breakwater which forms the shelter for vessels seeking this harbour is 259 feet long on the outside, with 20 feet depth at high water, outer end. The west pier opposite the breakwater is 300 feet. Inside the harbour is cribwork with 17 feet of water at one end and 12 to 14 feet at high water at the other end. At the head of the harbour is a block at which small vessels are repaired, and there is a shipyard also at the head of the harbour. The E. pier connecting with the breakwater is 315 feet long with water 18 to 20 feet, high tide.

Salmon river empties into the harbour. There are several lumber mills in the harbour and the place is also the terminus of the Hampton and St. Martin's R.R. In Quaco bay the tide rises 30 feet springs and 25 feet neaps and sweeps around the bay eastward inside Quaco shoals. The anchorage off Quaco head, east of Quaco head lighthouse, is in 5 to 6 fathoms, mud bottom, and is not considered safe with winds from N.E. through E. to S. See Pilot S. E. coast of Nova Scotia and bay of Fundy and charts Nos. 352, 1,651 and 2,670.

Lights.—The lights are one on Quaco W. head on point of cape St. Martin, latitude N. 45 19 30, longitude W. 65 32 10, white revolving; steam fog horn 70 feet from lighthouse; one light at St. Martin on outer end of E. breakwater

pier, red fixed; one called Great Salmon River light, on western breakwater, latitude N. 45 24 50, longitude W. 65 24 0; white fixed; on Quaco ledge is a gas and whistling buoy in 10 fathoms, 1-8 of a mile, 295°, from ledge, latitude N. 45 14 35, longitude W. 65 22 40. See List of Lights on the Atlantic Coast for 1913.

There is a Harbour Master at this port and the charges are the same as at other Canadian ports.

St. Martin is a port of entry and the tonnage entered and cleared was 63,473 tons in 1911-12.

ST. MARGARET BAY, Lunenburg county, Nova Scotia, is on the S. E. coast of Nova Scotia, and is an arm of the sea east of Mahone bay. St. Margaret bay is about 25 miles in circumference, 9 miles in length and upwards of 2 miles in width at the entrance; is unusually clear of dangers, but there are several rocky banks with irregular soundings over them about 2 miles from the head of the bay.

There are several small harbours in the bay used by vessels engaged in the fisheries. The bay is open for navigation all the year as a general thing.

Lights.—One in Hubbard cove, on Great point W. side of entrance, latitude N. 44 37 14, longitude W. 64 3 10, red fixed; one on Croucher island, latitude N. 44 38 24, longitude W. 63 57 20, white fixed; one at Indian harbour on S.E. extremity of Paddy Head island, latitude N. 44 31 20, longitude W. 63 56 37, white fixed.

There is a Harbour Master for St. Margaret bay, and the dues are the same in the different small harbours as in other harbours of the Dominion.

ST. PETER BAY, on the south east coast of Cape Breton island, Nova Scotia, runs in about 2 and 2-10 miles northeastward of Samson rock. Its entrance is 1 1-10 miles wide. The bay may be approached either east or west of Horse Heads shoal and Samson rocks. It has excellent anchorage, specially at Grande Greve on its eastern shore; but numerous rocky shoals are scattered over the bay. Vessels entering the bay must use the plan as a guide except the officers have local knowledge. The channel principally used is that westward of the middle ground.

St. Peter canal connects Bras d'Or lake with St. Peter bay. It is 2,400 feet in length, 55 feet wide at the water level and has a depth of 19 feet at lowest water. There is one tidal lock, 48 feet wide and 200 feet long from gate to gate, with a depth over the sill of 18 feet at lowest water.

Vessels drawing over 12 feet should not use the canal as there is little more than that depth between the northern canal entrance and Campbell island in St. Peter inlet and the turn there is very short and sharp.

There are several small harbours in the bay and communication is kept up with Sydney and other ports.

Tides rise in the bay 6 feet springs and 4 feet neaps.

Lights.—One on cape la Ronde west side of entrance to St. Peter bay, latitude N. 45 34 45, longitude W. 60 53; white flashing; Jerome Point, St. Peter bay, near entrance to canal, red fixed; latitude N. 45 39 5, longitude W. 60 52 0, red fixed.

There is a Harbour Master for St. Peter bay and the dues are the same as other Canadian ports.



St. Peter's, C.B., Canal Locks.

ST. STEPHEN HARBOUR, Charlotte county, New Brunswick, is situated at the head of the tidal waters of Ste. Croix river, on its northern bank of the river which flows into Passamaquoddy bay, latitude $45^{\circ} 11' 30''$ N., longitude $67^{\circ} 15' W.$ Vessels of 600 tons and under load alongside the wharves and lie aground at low water in soft mud. Spring tides rise 26 feet, neap tides 21 feet. The Ledge, an outport of St. Stephen, has ample water for large ships to load afloat, is capable of accommodating 500 vessels and is well sheltered. Vessels of $18\frac{1}{2}$ feet draught can load alongside the principal wharf; the bottom is of soft mud. There are ten wharves at St. Stephen with sheds on five of them.

St. Stephen is a terminus of the Canadian Pacific Railway. The Company has built for railway and shipping extensive wharves on which there are railway tracks. A Government dredge has been at work deepening the channel to the wharf and the work is proceeding but not yet completed. Dredging in the river Ste. Croix has also been done by the United States Government for improving navigation to Calais. The port has railway communication with railways in the United States as well as telegraphic connection.

Lights.—The lights are: one at St. Mark point, latitude N. $45 10 10$, longitude W. $67 12 30$, and one at Spruce point, latitude N. $45 10 0$, longitude W. $67 10 25$, both white fixed, on the Ste. Croix river, north side. Ships' stores can be readily procured at reasonable prices.

Port charges are Harbour Master's dues, payable twice a year, and Sick Mariners' dues, payable three times a year, if not collected elsewhere.

Pilotage is under control of the Charlotte County Pilotage authority, and the rates are:

(1) From Seal island, Cross island, Little river, Southwest ledges of Grand Manan, Kents island, Long Island bay, Moose river and Bailey's Mistake, to Saint Andrews, Saint Stephen, or any harbour or loading place in the county of Charlotte (except Campobello or the lines), pilotage inwards and outwards, \$2.25 per foot.

(2) From North head of Grand Manan, Beaver harbour and West Quoddy lighthouse to any port or harbour in the county of Charlotte (except Campobello or the lines), pilotage inwards or outwards, \$1.60 per foot.

(3) From Head Harbour lighthouse, Letite passage or Clam Cove head to any port or harbour in the county of Charlotte (except Campobello or the lines), pilotage inwards and outwards, \$1.50 per foot.

(4) From or to Campobello or the lines the pilotage inwards or outwards to be 20 cents per foot less than the above rates.

See S. E. Coast of Nova Scotia and Bay of Fundy Pilot, List of Lights for 1913, and Charts 464 and 1,743. The total tonnage entered and cleared for fiscal year of 1911-12 was 62,816 tons.

SANDY COVE on Long island, Digby county, Nova Scotia, on the S.E. side of the bay of Fundy. The anchorage off the harbour is well sheltered from all winds between E.N.E. through S. to W.S.W. The water in this part of the bay of Fundy is steep to within 2 cables of the shore as far as Sandy cove. There is a rock with 6 feet water lying 3 cables N.E. of the western point of Sandy cove with a deep channel between it and the shore.

There are two wharves in the harbour with 12 feet of water at ordinary low tides.

Sandy cove is the customs port for Little river, 4 miles S.W. St. Mary bay on the east side of Long island. The anchorage off Little river in St. Mary bay is 8 fathoms, and there are several wharves in the harbour with from 10 to 20 feet at ordinary low tides. Five miles north from Sandy cove, on the bay of Fundy, is a breakwater with 25 feet of water at its end, and it is used by fishing vessels for mooring purposes.

Lights.—Point Prim light at Digby gut is about 20 miles, S.W. from Sandy cove in latitude N. 44 41 30, longitude W. 65 47 10, white revolving; diaphome near edge of cliff, 225 feet north eastwardly from light.

The tides rise 23 feet, springs and 19 neaps. See Sailing directions in Coast Pilot for the south east Coast of Nova Scotia and bay of Fundy and chart, No. 2,656.

Total tonnage entered and cleared at this port for the fiscal year 1911-12 was 6,168.

SHEDIAC HARBOUR, Westmoreland county, New Brunswick, is entered from the strait of Northumberland through Shediac bay. The bay is $6\frac{1}{2}$ miles wide from Bouleaux point to Shediac point and about 5 miles deep. The shore of the bay from Bouleaux point trends west-north-westward $4\frac{1}{2}$ miles to Pointe-du-Chene and from Shediac point, south-westward 2 miles to Grandigue point. There are several shoals in the bay and less than 3 fathoms of water in its greater part.

The wharves are: the railway wharf at Pointe-du-Chene, 2 miles from the town of Shediac; one wharf at Shediac; the Pointe-du-Chene wharf is 1972 feet long, the south end is 100 feet wide. At the entrance is a dock 163 feet wide at

the outer part and 50 feet at the inner end; this dock is 620 feet long. The wharf extends N.E. 500 feet, connecting with the breakwater, forming a ballast wharf. There is available for berthing about 620 feet on the south side. The harbour has been dredged near the wharf to about 17 feet, low water, and at a distance of about 600 feet at the west and south ends. On the railway wharf at Pointe-du-Chene is a spur from the Intercolonial railway, which makes connections with the steamboat line running to Prince Edward Island and a shed on the wharf, 420 feet long, 32 feet wide, with 3 railway sidings on the south side and 2 sidings on the north side. Derricks are used on the wharf to load and unload from cars. There are 3 fish sheds on the north side of the dock.

The anchorage extends some 900 feet west from the wharf and half a mile to the N.E. where vessels of over 17 feet draught finish loading. The holding ground is good. The harbour is buoyed with spar and can buoys and one gas buoy.

In the harbour are 2 rocks, Medea rock situated E. by N. $\frac{1}{2}$ N. 2 miles from the northern part of Pointe-du-Chene with 7 feet least water on it and several patches between it and the shore with 12 feet of water, and another rock named Zephyr rock, N.E. $14\frac{1}{2}$ cables from the north part of Pointe-du-Chene and N.W. by W. $\frac{3}{4}$ W. $10\frac{1}{2}$ cables from Medea rock with 9 feet least water.

There are from 14 to 22 feet of water between Medea and Zephyr rocks but the best channel is north-westward of them. The deep part of the harbour is unsafe during the north-easterly gales of the autumn. See St. Lawrence Coast Pilot and general chart No. 1651 (1407).

Lights.—One on northern part of Pointe-du-Chene, red fixed, latitude N. 46 14 43, longitude W. 64 30 48; one 602 feet, $190^{\circ} 30'$, from front; range lights on Shediac island, front on east shore near south end of island, white fixed, latitude 46 15 32, longitude W. 64 31 27, back light 619 feet, 262° from front, also white fixed; harbour lights, one on north-west corner of Pointe-du-Chene breakwater, latitude N. 46 14 39, longitude W. 64 31 41, white fixed; one near extremity of south railway wharf 621 feet, $195^{\circ} 30'$, from front, white fixed; one gas buoy, white occulting, in 19 feet 2 cables north of Zephyr rock off Pointe-du-Chene. See List of Lights on Atlantic Coast and gulf of St. Lawrence for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 272,914 tons.

SHELBURNE HARBOUR, Shelburne county, Nova Scotia, is situated in the eastern arm of an inlet and is entered from the Atlantic ocean. The entrance of the port is between Government point on the mainland and cape Roseway, McNutt island. The harbour is safe, commodious and easy of access. The depth of water ranges from 7 fathoms in the inlet to 2 fathoms near the wharves. There is safe and convenient anchorage for vessels seeking temporary shelter about half a mile north of Sand point. Adamant shoal, about two-thirds of a mile in extent, lies nearly in the middle of Shelburne harbour, but two channels exist, each of which can be safely taken.

The wharves beginning at the southeast part of the town are: one belonging to N. W. White, length 100 feet from the shore and 80 feet at the outer end where there is $15\frac{1}{2}$ feet of water at low tide; the steamer wharf owned by G. A. Cox, which consists of a double wharf, one wing being 120 feet long by 40 feet wide, with a freight shed upon it; between this and the other wing is a space of 40



Shelburne, N.S. Harbour,

feet, the shortest wing is 100 feet long by 40 wide, the water at the outer end of each is 12 feet deep. The shore end of this wharf has a space of 160 feet in width, and upon this is a sail loft and salt fish warehouse; Hipson's wharves, one 140 feet long from shore by 40 feet wide, depth of water 12 feet, the other 110 feet long by 30 feet wide, depth of water 12 feet, with a water space of 90 feet between the two wharves, depth of water at the outer end 13 feet; Jos. McGill's wharf, 120 feet long on one side and a diagonal front of 80 feet at the outer end with 12 feet of water. On this wharf is a crane which lifts five tons. Government wharf recently built, length 666 feet, width 40 feet with a T 100 x 70 feet, depth of water at the T, 25 feet at low water.

Anchorage is obtained almost anywhere in the harbour northward of Adamantine rock, with soft mud; depth of water from 6 to 7 fathoms.

The town has railway and telegraph communication with other parts of the province. Navigation is generally open all the year round.

Lights.—Two lights, white fixed, in one tower, fifty-five feet, apart vertically, are located on cape Roseway, near S.E. point of McNutt island, latitude N. 43 37 15, longitude W. 65 15 45, with a trumpet fog alarm and one on Sand point on the east side of the entrance of the harbour in latitude N. 43 41 25, longitude W. 65 19 28. A fairway whistling buoy is moored off the entrance of Shelburne harbour in 18 fathoms of water, latitude N. 43 37 5, longitude W. 65 11 44, white occulting; and one light on McGowan's wharf, red fixed, latitude N. 43 45 19, longitude W. 65 19 19. See S.E. Coast of Nova Scotia Pilot, the List of Lights on the Atlantic Coast for 1913, and Admiralty Chart, Nos. 340 and 3,842. Provisions, ships' stores and water are readily obtained.

The Port Charges are harbour master's dues, paid twice a year, and sick mariners' dues, three times, when not collected elsewhere. The total tonnage which entered and departed during the fiscal year 1911-12 was 36,276 tons.

Sailing Directions.—When approaching the entrance to Shelburne harbour from seaward, shape course for Shelburne light or with cape Roseway lighthouse in sight, steer for it between N. 16° E. and N. 73° W., the former will lead just eastward of Jig rock and the latter southward of Bull rock.

On nearing McNutt island steer to pass mid-channel between the island and the mainland. After passing the north end of the island proceed to the southward of Middle rock by bringing N.E. bluff astern bearing S. 27° E., until abreast Surf point, thence to pass in mid-channel between Sand point and the land on the western shore. From abreast Sand point to pass east of Adamant shoal, steer to the northward, keeping Grey's island (chart 340) open off Surf point boulder, S. 10° W., until past the danger; then select an anchorage as most convenient on the eastern side of the harbour. There is also a passage westward of Adamant shoal.

SHERBROOKE HARBOUR, Guysborough county, Nova Scotia, is on St. Mary river, 12 miles from the Atlantic, on the S.E. coast of Nova Scotia. The estuary is entered from the Atlantic ocean between cape St. Mary and Barachois point. The bar of the river shows numerous breakers, and caution is required when making the entrance at any time of the tide in strong S.W. winds. About 13 feet of water may be carried from the entrance to the mill below Sherbrooke.

Local knowledge is necessary in navigating the estuary. A large number of spar buoys indicate the channel to Sherbrooke which is at the head of navigation.

There are two wharves at Sherbrooke and two at Goldville opposite Sherbrooke. The depth of water at all of these wharves is about 14 feet at low water.

Down the river towards the entrance are several lumber wharves with 18 feet of water, low tide, and on the bar at the middle ground there is a depth of 16 feet in the bay, low water, inside of Wedge island, where there is good anchorage, bottom mud and gravel. Good fresh water may be obtained at several of the wharves conveyed by hose.

Lights.—The lights are :—One on Wedge island, mouth of St. Mary river, red revolving, latitude N. 45 0 35, longitude W. 61 52 23 ; one on extremity of Shoal, Budget, St. Mary river, red fixed ; latitude N. 45 3 12, longitude W. 61 53 38. See List of Lights on the Atlantic Coast for 1913.

There is a Harbour Master for St. Mary river district and the charges are same as at other Canadian ports.

Total tonnage entered and cleared for the fiscal year 1911-12 was 16,129 tons.

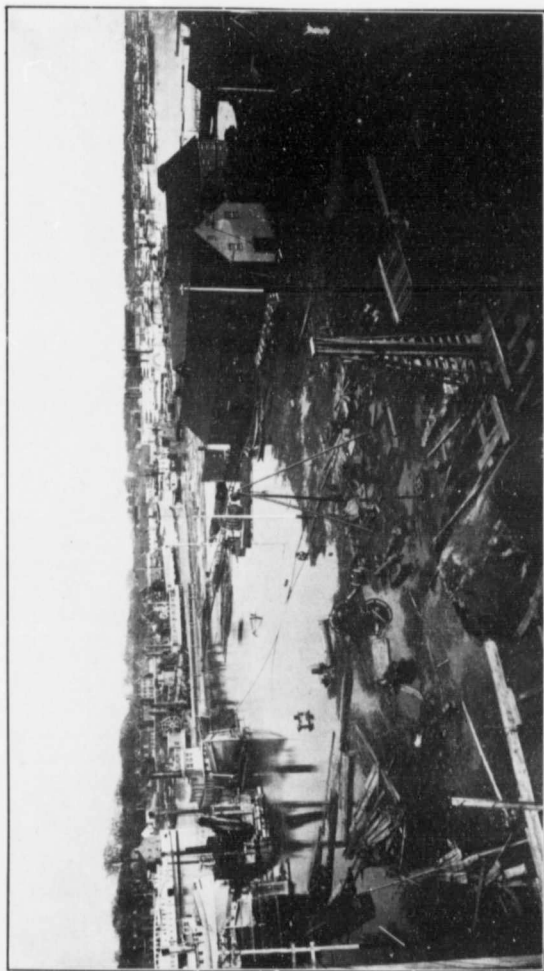
SHIPPIGAN HARBOUR, Gloucester county, New Brunswick, is west of Miscou island at the mouth of the bay Chaleurs. The harbour is entered by Shippigan gully from the gulf of St. Lawrence or from bay Chaleurs from the northward through Shippigan channel and Shippigan sound. The channel leading into the harbour from the sound is narrow with from 2 to 4 fathoms of water between shoals of mud and eel-grass ; nearly dry at low tide. The channel terminates at Shippigan gully. At the southern entrance to Shippigan harbour a bar of sand at the entrance of the gully dries in part at low water and shifts in heavy gales. Shippigan harbour is quite secure in all winds and the depth of water is $1\frac{1}{2}$ to 3 fathoms. The channel from the north or south has a depth of water of from 2 to 4 fathoms, except approaching the harbour, where it is at places $1\frac{1}{2}$ fathoms, all at low water. The tides rise, springs $5\frac{1}{2}$ feet, neaps 3 feet. The channel is buoyed, red marks being on the starboard hand side and black on the port hand, entering from the northward as far south as the Government wharf. See St. Lawrence Pilot and charts Nos. 1,633 and 2,516.

The pilots for Shippigan are under the Caraqueet Pilotage Authority and the rates are \$1.20 per foot draught inwards and \$1.00 outwards.

Port Charges. :—There is a Harbour Master at Shippigan and the port charges are Harbour Master's and Sick Mariners' dues, similar to other Canadian sea ports.

Lights.—One at the north entrance of Pokesudie, N.E. point of island, white fixed, latitude N. 47 49 10, longitude W. 64 44 40 ; at the south entrance, the Shippigan gully range lights, the front on W. breakwater near its outer end, southern entrance to Shippigan gully, latitude N. 47 43 21, longitude W. 64 39 15, the rear light is near eastern end of W. beach 1960 feet, $342^{\circ} 20'$, from front, also white fixed ; one at Big Shippigan, white flashing, on the sand bar, E. side of S. entrance to Shippigan gully, latitude N. 47 43 35, longitude W. 64 38 56, white flashing. See List of Lights on the Atlantic Coast for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 8,971 tons.



Port of Sorel, Que.

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SOREL, Richelieu county, Quebec, is situated at the mouth of the Richelieu river, which empties into the St. Lawrence river. Within the mouth of the river, for a distance of two miles, the depth of water is from 4 to 5 fathoms and good anchorage is found. Here steamers escape the heavy ice which moves down the St. Lawrence river in the spring and many steamers, tugs, barges and small vessels find winter quarters.

Anchorage can be had off Sorel, north or south of the ship's tracks in $5\frac{1}{2}$ to 8 fathoms, from a little east of the line of the beacons to half a mile westward of the entrance of the Richelieu river, or anywhere between Sorel and Lanoraie.

See St. Lawrence Pilot (Canadian edition) Above Quebec and Canadian chart of river St. Lawrence No. 7.

The place presents a busy scene during the winter and spring, while a large number of steamers and tugs are undergoing repairs, many of them having been hauled out on the west bank of the Richelieu river. There are four shipyards at Sorel, the principal one is the Government shipyard, where Government steamers, tugs, dredges and barges are constructed each year. Extensive repairs are made at this yard of vessels owned by the Government, but under the control of several departments. The plant used in deepening and widening the St. Lawrence ship channel is put in winter quarters at this shipyard, overhauled every season and put in good working order for the summer operations. Repairs to the plant are also made when required, at any time. Marine slips with sufficient power to haul out vessels of 1,200 tons are located in the shipyard. The yard is equipped with machine shops, foundry, stores, saw mill, moulding loft, paint shops and sheds, in which about 650 men on an average, are constantly employed. A railway track is laid from the station in the town to the shipyard and constantly used for conveying materials. The yard is under the control of a director who is an officer of the Marine and Fisheries department.

The Richelieu and Ontario Navigation Company place their fine river boats at Sorel in the autumn, and during the winter overhaul and refit them for the summer's traffic on the St. Lawrence river and elsewhere. The company has a well equipped shipyard at Sorel, where steamers are built and repaired. Other shipyards are the Manseau and Poupore yards, at which repairs are made and small steamers and tugs built.

There are six wharves along the river front on the town side, including the Government wharves, having a total frontage of 6,350 feet, with three sheds used for receiving general freight. Coal is also landed in considerable quantities. (A railway siding from the Sorel station is used for transshipping and forwarding freight to and from vessels.)

At the mouth of the river, on the east side, a spacious block of crib work has been built and is used by the Department of Marine and Fisheries for storing buoys, anchors and chains during the winter, of the St. Lawrence river buoys and where repairs are made to them.

The depth of water alongside this pier or quay is 30 feet. The system of navigation between lake Champlain and the St. Lawrence river begins at Sorel and is continued from Whitehall, at the southern end of Lake Champlain, to the Hudson river and New York, a total distance of 411 miles. The navigable depth of water in the Richelieu river at the locks is 7 feet.

The port charges are harbour master's dues, paid twice a year, and sick mariners' dues, payable three times a year if not paid elsewhere.

Pilotage is under the Montreal Pilotage district and the rates will be found in the information given under the port of Montreal.

A signal mast with a yard is erected on the Government wharf. Communication by wireless telegraph day and night can be made with passing vessels to and from Montreal.

A special rule of the road for Sorel harbour requires all vessels entering or leaving the harbour to keep to the port side unless otherwise signalled.

Lights.—Two range lights, one on the Richelieu company's wharf on east side of mouth of Richelieu river, latitude N. 46 2 50, longitude W. 73 7 7, one on S.W. point of wharf, 30 feet, 171° 10' from front, both red fixed. See List of Lights on the Atlantic Coast and Gulf St. Lawrence 1913. Between Montreal and Sorel the distance is 38 miles.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 295,404 tons.

SOURIS HARBOUR, Kings county, Prince Edward Island, is in Colville bay, south east coast of the Island. Colville bay has from 4 to 9 fathoms of water and $2\frac{1}{4}$ fathoms at its head. The bay affords good anchorage in off-shore winds. It is, however, open to easterly winds. It is entered from the gulf of St. Lawrence and Northumberland strait. Between Souris head and Swanton point is Colville river, an inlet of the sea, and in its entrance is Souris harbour. The bay near the harbour is one mile broad and half a mile deep, with no dangers. The harbour is protected by a breakwater, 1,500 feet long by 40 feet wide. There is a dredged channel, 800 feet long by 80 feet wide leading to the end of the Railway wharf. Northward for 150 yards the dredged channel from the breakwater is 15 feet deep, low water. The railway wharf is 700 feet long and 80 feet wide, 200 feet inside of the breakwater. In the dredged part alongside of wharf the water is 15 feet in depth, the length of the wharf, at low water. On the inside of the wharf the dredged part from the end to the shore is 20 feet wide. Tides at Souris rise $4\frac{1}{2}$ feet springs and 3 feet neaps. A warehouse, 100 feet long by 40 feet in width, is located on the wharf with railway tracks on each side. One track is laid to the end of the wharf and the other to loading ports on the inner side of the wharf opposite the warehouse.

Another wharf, 400 feet long by 40 feet wide, is owned by Mathews and McLean, dredged alongside to 13 feet at low water. There are five warehouses on the wharf and a basin near it with 10 feet depth of water, low tide.

Between the railway wharf and Mathews and McLean's wharf is a large warehouse owned by J. J. Hughes for storage of grain and other articles of shipment.

Storm signals are erected at Souris.

Lights.—The lights are, one on Knight's point; Souris east, 300 feet, S.E. of breakwater, latitude N. 46 20 50, longitude W. 62 14 30, white flashing; one on outer end of breakwater, red fixed. See List of Lights for Atlantic Coast and gulf St. Lawrence for 1913.

There is a harbour master at Souris and the port charges are the same as at other Canadian ports.

Souris is the eastern terminus of the Prince Edward Island railway. Stores, provisions and fresh water can easily be obtained.

SUMMERSIDE HARBOUR, Prince county, Prince Edward Island, is in Bedeque bay on the south-west side of the island. The harbour is also known as Bedeque harbour. The bay is extensive and its entrance from Sea Cow head, on the southern side to Sunbury point on the north side, is about 10 miles in width. The bay gradually narrows until Indian head is reached, on the south side. The anchorage in the bay is from $3\frac{1}{2}$ to 4 fathoms in depth, and in the roadstead between Indian head and Miscouche bank is 22 feet in depth and safe in summer but open to south-westerly winds.

There is a breakwater at Indian head 3,200 feet long running northerly. The channels inside the breakwater are buoyed and the depth of channel leading to the wharves at Summerside is 19 feet in depth at the shallowest part. There is good anchorage near the wharves especially east of the railway wharf.

The tides rise 7 feet springs.

The wharves are:—No. 1, called the town wharf, has a depth of water on the west side, of 20 feet for 300 feet from the end, and 16 feet for 600 feet shorewards, low water; on the east side of wharf the depth is 20 feet for 600 feet, decreasing to 16 feet. The wharf is used by gulf port and other steamers. There is a shed upon it for receiving freight; No. 2, is a private wharf owned by R. T. Holman, Ltd. The depth of water at this wharf, on the west side, for 400 feet from end, is 16 feet, low water; on the east side, the depth from 300 feet from end is 17 feet, low water. The end of this wharf is also used by gulf port steamers and it has upon it a freight shed and coal shed, with hoisting derrick; No. 3 is the railway or government wharf. The depth of water for 600 feet is from 20 feet decreasing to 17 feet, at low water, on the east side, and on the west side the water is 12 feet decreasing to 6 feet, low water. At the end is a coal shed. There is a freight shed near the end of this wharf and a coal shed, and another coal shed half way up the wharf. This wharf is used by the Charlottetown Steam Navigation Company's steamers which keep up daily passenger and freight communication with Pointe-du-Chene, New Brunswick. There are 3 railway tracks on this wharf connecting with the main line of the Prince Edward Island Railway; No. 4 wharf is a private wharf owned by Joseph Reid and Co., used by schooners of light draught, and has upon it a coal shed into which coal is discharged from vessels.

Vessels can be repaired at Summerside where supplies, material and good workmen can be procured. Supplies and stores of all kinds can be readily and reasonably obtained at the port. Summerside is a port of entry and under the control of the Customs at this port are several outposts.

Summerside is an important town, with regard to imports and exports, and has steamboat freight and passenger communication with all Maritime ports and the St. Lawrence route. It has also telegraph communication and railway communication with all parts of the Prince Edward Island railway system, and steamboat communication with the Intercolonial railway at Pointe-du-Chene. The traffic during the season of navigation is extensive, and large exports of agricultural products, horses and other live stock and shell fish, are made from this port.

In Bedeque bay are several wharves from which exports of agricultural products are shipped. The surrounding country is an exceptionally fine agricultural section.

Light.—One on Sea Cow head, on the extremity of the low flat point, latitude N. 46 19 10, longitude W. 63 48 25, white fixed; one on Indian point east edge of shoal on south side of channel in Bedeque bay, latitude N. 46 22 50, longitude W. 63 48 45; one on railway wharf Summerside, latitude N. 46 23 30, longitude W. 63 47 13, red and white sectors fixed; one $\frac{3}{4}$ mile, $69^{\circ} 15'$, from front latitude N. 46 23 45, longitude W. 63 46 13.

Port Charges.—There is a harbour master at Summerside and the port charges are similar to dues collected at other Canadian seaports, viz: harbour master's and sick mariners' dues.

Pilotage.—The services of a pilot may be procured by signaling but there is no pilotage authority at Summerside nor Bedeque.

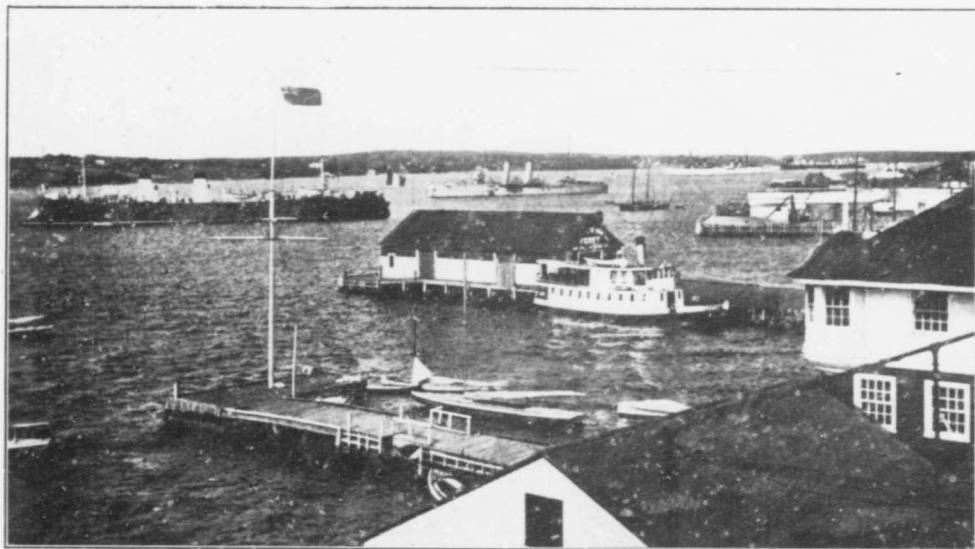
The tonnage entered and departed including out ports at the port of Summerside for the fiscal year 1911-12 was 410,107 tons.

SIDNEY HARBOUR is at the eastern end of Cape Breton island, in Cape Breton county, N.S. The harbour is entered from Cabot strait through Spanish bay. The depth of water in the bay is from 8 to 20 fathoms at low water. Sydney harbour is on the shore of an inlet and the depth of the water at the entrance of the inlet between Cranberry Head and Flat point is 8 fathoms at low water. The inlet extends south-westward five miles from its entrance, with a general width of 1 4-10 miles; it then divides into West arm, which runs west-south-westward for $3\frac{3}{4}$ miles to Ball creek, with a general width of three-quarters of a mile, and South arm which runs southward and south-westward for five miles, with a width decreasing from nearly a mile to $1\frac{1}{2}$ cables. The harbour is entirely land locked, with a depth of water of from 6 to 10 fathoms and no obstructions. The area of water from 5 to 7 fathoms is approximately 2 8-10 square miles in the harbour of Sydney. The depth of water along some parts of the frontage of the town is over 8 fathoms within a few feet of the shore.

Anchorage.—There is anchorage in about 5 fathoms, mud bottom at $1\frac{1}{2}$ to 2 cables at North Sydney under the shelter of N. W. bar, but there is some sea with easterly winds. Anchorage may be obtained in Fishery cove in 6 to 7 fathoms, mud bottom, well sheltered by S.E. bar.

The port of Sydney is completely sheltered by S.E. bar, which affords safe anchorage in every part. The anchorage is good, with deep water close off the wharves of the town northward of the line of Shingle point, bearing west. Within that line there are shoals. The depth of this anchorage is 5 to $8\frac{1}{2}$ fathoms. There is sufficient depth for large naval and merchant marine vessels to the head of the harbour between which and the town is the most secure part. When anchoring in North Sydney roads avoid the telegraph cables shown on plan 2,042 (1,322), latitude 46 13' N., longitude 60 14 W.

Piers.—The Dominion Coal Company has two piers known as the International piers No. 1 and No. 2. No. 1 pier is 1,120 feet long by 40 feet in width. It has two high level tracks for the full cars and two return tracks which carry empty cars to the low level yard. The pier is equipped with two Ludlow towers and cranes, by which coal is hoisted in buckets and deposited in bunkers and holds of vessels. The loading berth has 26 feet of water at low water. The rise of the tides is 6 feet at springs and 4 feet at neaps. Pier No. 2 is 1,150 feet long, with double tracks laid, equipped with steel chutes and a Denton hoist. From this



Sydney, C.B. Harbour.

pier can be loaded 1,800 tons per hour on one side and 15,000 tons in 24 hours. Four steamers can be berthed, loaded or bunkered at one time. Berths for schooners are also provided. The piers are electric lighted and are equipped with stand pipes, and hose fed by a large fire pump which has direct connection with the sea as well as with the city water main. This company has another large pier and low level wharf in good condition.

The Dominion Steel Company also has two piers, and from No. 1 pier is shipped steel rails, billets, etc. It has four towers with a capacity of four tons each, and has ample length and water to accommodate a steamer of 10,000 tons; No. 2 pier has six Hoover and Mason grabs which lift five tons each. At this pier a vessel of 7,000 tons can be discharged in ten to eleven hours, and can discharge from ten to eleven thousand tons in one day. There are several small piers with considerable warehouse accommodation.

The water front for anchoring and berthing for ocean-going shipping in Sydney harbour, with good approach, is about seven miles.

Naval vessels are coaled from barges and lighters, towed to their anchorage. Steamers in large numbers bound for or leaving other Canadian ports call at Sydney and North Sydney for bunker coal.

The average cost per ton for handling general cargo for ocean-going shipping runs from 40 to 70 cents per ton which includes warehousing; lumber from 40 to 60 cents per thousand feet; piling from 15 to 17 cents.

There is a marine slip at North Sydney where vessels up to 250 tons are repaired.

Stores, provisions and supplies of all kinds in any quantity and fresh water can be readily obtained.

At this port there is a signal station, quarantine hospital and storm signals are raised.

Sydney has railway communication with Louisburg and with all parts of Canada by the Intercolonial railway and steam communication directly with Port aux Basques, Newfoundland, 101 miles distant, connecting with the Newfoundland railway and a line of steamers to St. John's, Newfoundland, 400 miles distant. Regular lines of steamers keep up communication with Halifax, Montreal, Quebec and ports of the Maritime provinces and with Boston, U. S.

Lights.—One on Flat point, east side of entrance to Sydney harbour, latitude N. 46 16 12, longitude W. 60 22 2, white group flashing, fog whistle, westward of lighthouse; Flat point gas and whistling buoy in 19 fathoms, $2\frac{1}{2}$ miles, 4°, from Flat point, white occulting; lighthouse on west extremity of S.E. bar, latitude N. 46 12 36, longitude W. 60 12 59, red fixed, with fog bell; Sydney N.W. bar gas buoy, on the south-eastern edge of N.W. bar, latitude N. 46 12 48, longitude W. 60 13 34, white occulting; Sydney front light on point south side of west arm of Sydney harbour 1 mile west of Edward point, latitude N. 46 11 3, longitude W. 60 14 51, white revolving, rear light $\frac{1}{2}$ mile, 214°, from front, white fixed. Battery point, front on Intercolonial Railway pier at point, latitude N. 46 9 17, longitude W. 60 12 5, back, on shore, 1,130 feet 167° from front. Both are red fixed. See List of Lights for Atlantic coast and gulf of St. Lawrence for 1913.

Port Charges are harbour master's and sick mariners' dues, the same as at other Canadian seaports mentioned herein. Port warden's charges according to schedule herein when surveys are made.

Pilotage is under the North Sydney Pilotage authority, and payment is compulsory and half pilotage when spoken, and the inward rates are:—for vessels of 120 to 150 tons, \$6.50; vessels 150 to 200 tons, \$7.50; from 200 to 250 tons, \$9; from 250 to 300 tons, \$10, from 300 to 350 tons, \$11; from 350 to 400 tons, \$12; and for every additional 50 tons or fraction thereof 75 cents extra. Outward pilotage at half rates. Payment of pilotage is compulsory, with the exception of vessels belonging to the county of Richmond and fishing vessels not exceeding 250 tons, which are exempt.

The tonnage of vessels entered and departed for the fiscal year of 1911-12 was 2,720,724.

TADOUSSAC HARBOUR, county of Saguenay, province of Quebec, is situated at the east side, a little beyond entrance of the Saguenay river, about 5 miles above its confluence with the St. Lawrence. Its entrance lies between points Rouge and Ilot. The bay has a sandy beach at its head, and is 5 cables wide and $2\frac{1}{2}$ cables deep to the drying line. The anchorage is in 7 to 18 fathoms, clay bottom. The harbour is completely sheltered by either land or reefs, excepting from between S.E. by S. and S.S.E., but no sea of any consequence to a boat ever arises in the harbour.

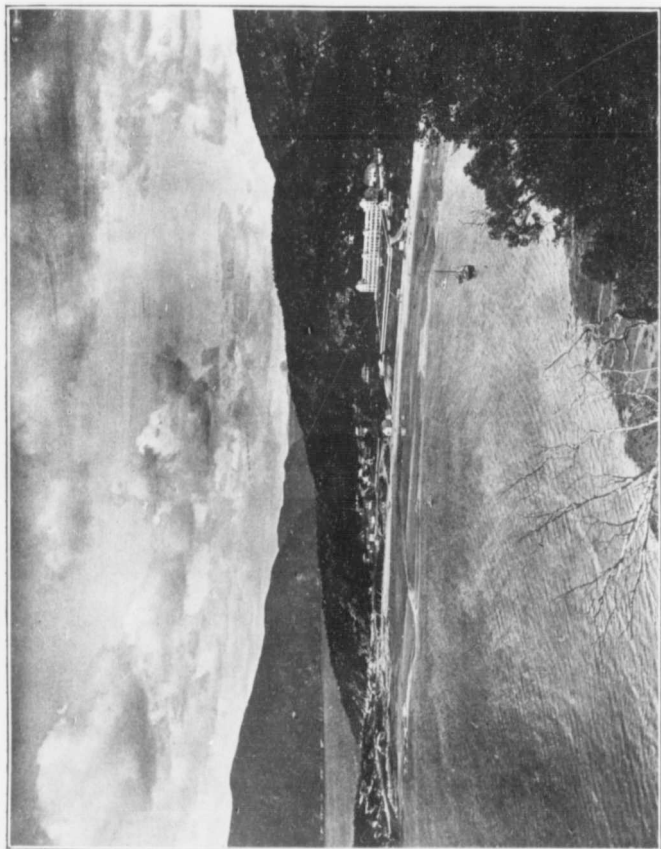
There are 2 wharves, one at Anse-a-l'eau, 215 feet long, with a shed, 50 by 24 feet; there is a shelter shed, 60 by 30 feet, an oil house 12 by 15 feet. The depth of water at this wharf is from 10 to 19 feet. One wharf at St. Catherine, on the opposite side of the river, where Richelieu & Ontario Nav. Co. steamers call, 300 feet long, with 10 to 19 feet, both depths at low water. In approaching Tadoussac from the east give Vaches patch and Pt. Vaches a berth and pass up in 7 to 9 fathoms opposite point Vaches where the water is much deeper. In coming from the west, Prince shoal is rounded. After passing the shoal the water is very deep in the center of the river. On the Tadoussac side the anchorage for deep draught ships is in 16 to 18 fathoms, hard clay bottom.

Directions for entering. Deep draught vessels coming to anchor in Tadoussac bay should approach from S.S.E., keeping a conspicuous red brick house, which will be seen close to the yellow belfry of the English church. Immediately on picking up soundings of 16 or 18 fathoms at low water the anchor should be let go. A second anchor may be dropped close to shore on the same line. Comfortable anchorage for small vessels is to the northward of this position in 7 to 8 fathoms.

Beacons.—A white triangular beacon has been erected upon the hill, 294 feet high, behind the Roman Catholic church. It is used in conjunction with one on point Rouge to lead small craft south of Bar reef, west of Prince shoal; a white triangular beacon is erected on the western slope of the rocky promontory (point Ilot) on the west side of Tadoussac bay. This is only used for placing buoys in the district. See Canadian edition of St. Lawrence Pilot below Quebec for 1912 and Admiralty charts Nos. 1370 and 2,516 (1,271).

Lights.—Prince shoal lightship, anchored in 4 fathoms on south edge of shoal, latitude N. 48 6 18, longitude W. 69 36 32, white, red, and white fixed and fog

whistle; range lights, front on pointe Noire on the point near its eastern extremity, latitude N. 48 7 41, longitude W. 69 42 48, white fixed; the rear light is 1,558 feet, $278^{\circ} 45'$, from front, also white fixed; one light on outer end of l'Anse-a-l'Eau wharf Tadoussac, latitude N. 48 8 38, longitude W. 69 43 30, white fixed; there



A View of Tadoussac Harbour.

is a bell buoy on Bar reef. See List of Lights on the Atlantic Coast and gulf of St. Lawrence for 1913.

Tadoussac is a summer resort. The Richelieu & Ontario Nav. Co. steamers make regular trips there in ascending or descending the Saguenay river during

the summer months. The Company owns a large hotel, situated at this place. Daily communication is kept up between Quebec and Chicoutimi at the head of the Saguenay river and intermediate ports. Provisions, in limited quantities, may be obtained at Tadoussac and fresh water is easily procured.

Pilotage is under the St. Lawrence river pilotage system.

There is a harbour master at this port and the port charges are similar to other Canadian seaports.

TATAMAGOUCHE BAY lies between Cumberland and Colchester counties, Nova Scotia. It is situated on the south shore of Northumberland strait. The mouth of the bay is between Malagash point in Cumberland county and Peninsula point in Colchester county. The bay runs in 7 miles westward from between these points. Good anchorage is everywhere afforded over soft mud bottom but with insufficient depth of water for large ships far up the bay. From 5 fathoms at its entrance the depth decreases to 3 fathoms at $1\frac{1}{2}$ miles up the bay, and to 2 fathoms at 4 miles, the remainder being all shallow and in part dry at low water, with the exception of both channels. The only detached shoal in the bay is a rock with 7 feet least water, lying $3\frac{1}{2}$ cables off the northern shore and 2 miles in from Malagash point; the northern end of Amet island and Malagash point in line, bearing N. 70° E., leads a cable southward of it. In the outer part of the bay the shore may be approached to the low water depth of 3 fathoms, and farther in to $2\frac{1}{2}$ fathoms. In entering keep well over to the northward to avoid Brule shoal.

The anchorage is good all over Tatamagouche bay, regard having been had to the draught of the vessel, but towards Malagash shoal is better sheltered from north easterly winds. A good position is in 4 fathoms with Amet island, N. 54° E., Malagash point N. 25° W.

Tides rise, springs 8 feet, neaps 5 feet.

Tatamagouche river in the south-western corner of the bay is approached by a very narrow channel through the flats.

Light.—There is a light on Amet island outside the mouth of the bay, latitude N. $45^{\circ} 50' 15''$, longitude W. $63^{\circ} 10' 20''$, white fixed.

There is a Harbour Master for Tatamagouche bay who collects harbour master's dues and furnishes information.

THREE RIVERS HARBOUR, St. Maurice county, province of Quebec, is on the north shore of the St. Lawrence at the confluence of St. Maurice and St. Lawrence rivers, $67\frac{1}{2}$ miles above the city of Quebec and $70\frac{3}{4}$ miles from the Guard pier at Montreal. The harbour has constant communication with these two cities and various small towns by steamer and rail. The port has excellent facilities for ocean-going vessels. It has a channel right along the wharves of from 30 to 50 feet in depth and a roadstead of from 1,200 to 1,500 feet in width, and in the narrowest part of about 900 feet, with little tide and no excessive current. For further information see St. Lawrence Pilot, above Quebec (Canadian edition), and the Marine and Fisheries chart No. 11.



Three Rivers Harbour. Western Section.

The wharves, as shown upon a plan of the harbour from the mouth of the river St. Maurice going up the St. Lawrence, are as follows:—

Wharves.	Length.	Depth.
St. Maurice Lumber Coy's.....	700 feet	25 to 30 feet at front.
Harbour Commissioner's.....	1314 "	25 to 30 do
do do	400 "	24 do
Richelieu & Ontario Nav. Coy's.....	300 "	30 do
Harbour Commissioner's.....	275 "	22 do
Zephirin Marchand, fils.....	100 "	10 do
Harbour Commissioner's Bureau.....	2000 "	33 do
Government wharf (to be completed this year).	600 "	

The latter is now being constructed for a coal dock to be used by the Dominion Coal Coy.

A railway line runs along the whole water front and branches connect the port with manufacturing centres.

The port of Three-Rivers is also directly connected with the most important trunk lines of the country, and facilities for loading freight from cars to the vessels and from vessels to the cars have been provided. In the southern part of the harbour, however, there are no railway sidings.

The harbour is under the control of harbour commissioners who charge wharfage on articles passing over their wharves.

Coaling Docks.—About 100,000 tons of coal are landed annually for the use of vessels. Hoisting engines and ships' winches are used for loading and bunkering. The cost per ton for loading is 50 cents.

Coast of loading lumber per standard of 1980 feet is \$1.70; discharging pig iron, 53 cents per ton; discharging sulphur, 64 cents per ton; discharging china clay, 75 cents per ton. These prices include harbour and customs brokerage dues.

Wharfage Charges.—Vessels of 60 tons register pay 30 cents per day, increasing up to \$7 for a vessel of 2,000 tons and 35 cents for every 100 tons additional, side wharfage. Minerals, heavy articles, grain and general merchandise, 10 cents per ton; coal, 7½ cents; pulpwood, 5 cents per cord; telegraph poles, 50 cents per 100; railway sleepers, 25 cents per 100.

Tonnage dues, a special charge, viz:—Passenger steamers pay \$2.50 every time a vessel uses the harbour; other river steamers or tow boats, \$1 per trip. Schooners and barges, 2 cents per registered ton for the first trip; each succeeding trip, half rate. These rates increase according to tonnage. Ocean steamers, 3 cents per ton on the cargo and ¾ cents of the registered tons on vessel per day. Sick Mariners' dues, 1½ cents per registered ton, 3 times a year, if not paid elsewhere.

Harbour dues on goods imported and exported from places outside of the province of Quebec; pulpwood, 3 cents per cord; lumber and timber, 3 cents per 1,000 feet; railway sleepers, 15 cents per 100; telegraph poles, 25 cents per 100.

Lights.—Range, front 7–8 mile above W. side of mouth of St. Maurice river, latitude N. 46 20 11, longitude W. 72 32 40, white fixed; the other is 1,800 feet, 235° 45', from front, white fixed. On the upper end of Three Rivers shoal is a gas buoy, white occulting, latitude N. 46 20 15, longitude W. 72 32 17. See List of Lights on the Atlantic Coast for 1913.

Pilotage rates are fixed by the by-laws of the Montreal district and are:
Quebec to Three Rivers. Vessels in tow of steamers per foot

draught.....	\$1.50 upward.
Three Rivers to Quebec. Vessels in tow of steamers per foot	
draught.....	1.50 downward.
Quebec to Three Rivers. Sea-going steamers.....	1.75 upward.
Three Rivers to Quebec. Sea-going steamers.....	1.75 downward.

The port of Three Rivers has communication with the United States by steam barges, steamboats and canal boats and also with Canadian ports above this port on the St. Lawrence, Montreal and the Great Lakes, and with Canadian ports below, including Quebec and the Maritime provinces, and communication by ocean-going vessels with Great Britain and foreign ports.

The total tonnage for the fiscal year 1911-12 was 2,102,314 tons.

Ocean-going vessels use the ship channels elsewhere described in this directory.

TIGNISH HARBOUR, Prince county, in the N. W. part of Prince Edward Island, is entered from the gulf of St. Lawrence. The harbour is at the mouth of Tignish river which flows into the sea, $4\frac{1}{2}$ miles northward of cape Kildare and 8 miles S. of North point. The harbour is entered between two breakwaters, the one on the N. side being 1,500 feet and the one on the S. side 1,700 feet long; there are also beach protection works extending from the inner ends of the breakwaters. The depth of water between the breakwaters, is never less than 6 feet at low tide and the tide rises 6 feet. This harbour is used for small craft engaged in fishing and carrying agricultural products shipped from Tignish.

Tignish is the terminus of the P. E. I. Ry. and is an important station in connection with freight and passenger traffic. The fishery industry is carried on extensively at this place. Storm signals are exhibited at Tignish.

Lights.—There are range lights here, the front on outer end of N. breakwater pier 620 feet, 106° , from main light, red fixed; main light back on beach at inner end of breakwater pier, latitude N. $46^{\circ} 57' 35''$, longitude W. $63^{\circ} 59' 20''$, white fixed.

TRACADIE HARBOUR, P.E.I., or Bedford bay, Queen's county, Prince Edward Island, on the N. shore of the island, is entered from the gulf of St. Lawrence. The entrance of the harbour is the western end of a remarkable range of sand hills, 50 to 60 feet high. A bar of sand, which shifts occasionally in heavy gales, extends $\frac{3}{4}$ mile from the entrance. The harbour is suitable only for small vessels. It is 3 miles wide within the sand bar and carries $2\frac{1}{2}$ fathoms water. It runs in 4 miles to the southward. The channel and harbour are buoyed.

The tides rise, springs, $3\frac{1}{2}$ feet, neaps, 2 feet.

A breakwater has been built, 1,000 feet long, extending from the E. side of the entrance.

It is difficult to beat in to this harbour when the wind is off shore and blowing heavily.

Tracadie has a railway station and has communication with all parts of Prince Edward Island Railway.

Lights.—Range lights, one on beach, west side of entrance 1,100 feet back from the shore line, latitude N. $46^{\circ} 25' 35''$, longitude W. $63^{\circ} 2' 30''$, red fixed; rear

light 403 feet, $186^{\circ} 45'$, from front, also red fixed. See List of Lights on the Atlantic Coast and Gulf of St. Lawrence for 1913.

There is a Harbour Master at this port who furnishes any information required.

TRACADIE HARBOUR, N.B., or Lagoon, Gloucester county, New Brunswick, is on the eastern coast of the province, and is entered from the gulf of St. Lawrence or from Northumberland strait. It is 23 miles north of Miramichi bay and 17 miles south of Shippigan gully. It is entered by narrow channels, termed gullies. It is quite shallow and almost dry at low water. A sand beach with $7\frac{1}{2}$ feet of water at extreme high tides, about 4 miles long, divides Tracadie harbour from the gulf of St. Lawrence. The north gully is the entrance now used. The channel to the Government wharf is long and crooked. The wharf is 1,430 feet long. To raise low parts of the beach and prevent other openings, the construction of an extension to the breastworks has been in progress since 1908. The harbour is buoyed by spar buoys and bushes. Depth of water in the harbour at low water in the lagoon is from $1\frac{1}{2}$ to 3 fathoms. Tides rise, springs, 5 feet; neaps, 3 feet.

Lights.—One on north side of South Tracadie gully, latitude N. $47^{\circ} 29' 50''$, longitude W. $64^{\circ} 52' 10''$, red fixed. North Tracadie range lights are:—front on sands 161 feet, 108° , from back, white fixed, the other on sand flat north side of gully, latitude N. $47^{\circ} 33' 17''$, longitude W. $64^{\circ} 51' 25''$, white fixed.

There is a harbour master here who furnishes information on request.

TRACADIE HARBOUR, N.S., Antigonish county, Nova Scotia, is in the southern end of George bay. It is entered from the strait of Northumberland and strait of Canso through the bay. It is separated from the bay by a number of islands and connecting beaches of sand and gravel. There is a breakwater at the eastern side of entrance to the harbour and a retaining wall inside the breakwater.

The harbour is principally used by fishing craft. The depth of water in George bay outside the islands is from 8 to 9 fathoms. The harbour itself is extensive and has 14 feet of water in some parts. There are many coves, islets and small streams. Tracadie river is the principal of these streams, at the head of the eastern arm, $2\frac{1}{2}$ miles in from the sea.

Tides rise, 4 feet, springs; 2 feet, neaps, but tides may be increased by northerly winds.

There is a station of the Intercolonial railway here, giving communication with all parts.

TUSKET RIVER and **TUSKET WEDGE** are in Yarmouth county, Nova Scotia. The river is entered from the Atlantic coast and is about 9 or 10 miles from the port of Yarmouth.

At the mouth of the river there are islands and outlying dangers. Many of the islands afford shelter in from $3\frac{1}{2}$ to 7 fathoms. Admiralty chart, No. 352, shews a depth of water in the channel east of Tusket wedge of $3\frac{1}{4}$ fathoms up to 4 and 5 fathoms, and in the river above the depth ranges from 4 to 7 fathoms for some 10 miles. Tides at Tusket wedge rise, springs, 13 feet; neaps, 10 feet.

Lumber is exported from different points on the river and Tusket wedge, and vessels carrying coal, agricultural products and some general cargo enter.

There is a Government wharf at Tusket wedge. Tusket wedge is now called Wedgeport.



Tusket River, Yarmouth County, N.S.

The mud flats are bare at low tide as far out as the channel. There are also mooring places along the river and buoys to mark the dangers and indicate the channel.

There is a harbour master for Tusket wedge or Wedgeport and Tusket river. The port charges are similar to those charged in other Canadian seaports.

Lights.—The lights entering are called Peases island lights, one of the Tusket islands, latitude N. 43 37 35, longitude W. 66 1 40, red and white, alternating, one in window, 16 feet below the main light, red fixed; Seal island light, group flashing, S. point 1-8 mile inland, latitude N. 43 23 34, longitude W. 66 0 52; fog whistle, 585 feet, 188°, from lighthouse; Tusket river light, white group occulting, on Big Fish island, S.W. point, latitude N. 43 42 10, longitude W. 65 57 10. There is also a bell buoy on Peases ledge in $9\frac{1}{2}$ fathoms, 106°, 2 miles from Peases island light, also a gas and whistling buoy, 2 miles, 199°, from Blond rock, white occulting.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 3,360 tons.

UNION HARBOUR, Vancouver Island, British Columbia, is on the western side of Bayne's Sound, and the shipping point for coal brought from Cumberland. The Union Collieries Company has a coal wharf with pockets and chutes for loading coal into ships' holds and bunkers. This wharf is about 700 feet long, and the depth of water at low water mark is 27 feet and 44 feet at high tide, showing that vessels can load at any stage of the tide. A small wharf, with a warehouse 81 by 31 feet, is used by passenger and freight steamers. There is also an apron or slip for running cars loaded with coal into barges. There is also a gridiron on which repairs to small vessels can be made. Anchorage is found in the bay for

vessels of deep draught, the water being 8 fathoms and more, at low water, half a mile from the beach. A shoal bank extends 2 to 3 cables from the shore around the bay. There is a stream of fresh water in the S.E. corner of the bay. See British Columbia Pilot and Supplement and Admiralty Charts, Nos. 2,840 (1,988) and 333.

Lights.—Back light on Yellow island near eastern extremity of island, latitude N. 49 28 16, longitude W. 124 42 10, white fixed, front light 290 feet, 278°, from back, white fixed; fog alarm on the eastern extremity of Yellow island; one light on Denman island on reef west side of island, 1 1-5 miles southward of Village point, latitude N. 49 32 15, longitude W. 124 49 12, white fixed with 2 red sectors; one on western extreme of Goose Spit, Port Augusta, latitude N. 49 39 40, longitude W. 124 54 58, white occulting, with red sector; one gas and bell buoy in 8 fathoms eastern entrance to crossing over Kelp bar, latitude N. 49 39 31, longitude W. 124 51 5, white occulting. See List of Lights on the Pacific Coast, 1913.

Pilotage is under the control of Nanaimo Pilotage, and the rates for the time being in force in this district, including the amounts and description of all charges made in the respect of pilotage, are:—

Regular pilotage rates are one cent per registered ton, and one dollar (\$1) per foot draught.

Tow boats, fishing boats and small trading vessels are charged a flat rate of from ten dollars (\$10) to twenty dollars (20), according to size.

Barges carrying two thousand tons and over are charged twenty dollars (\$20); under two thousand tons and over one thousand (1,000) tons, fifteen dollars (\$15); under one thousand (1,000) tons, ten dollars (\$10).

Port Charges are harbour master's dues, payable twice a year, and sick mariners' dues, collected three times a year, if not paid elsewhere.

The tonnage entered and cleared at this port for the fiscal year 1911-12 was 1,009,985 tons.

VANCOUVER HARBOUR, British Columbia, is on the easterly side of the strait of Georgia, north of the 49th parallel, a few miles north-east of the mouth of Fraser river. The harbour limits are from Atkinson point on the north to Grey point on the south and continue easterly through Burrard inlet from the First narrows to Port Moody at the head of the inlet.

English bay, at the entrance to the harbour is more than 3 miles in breadth between Atkinson and Grey points which bear from each other N.N.W. and S.S.E., and has the same breadth for nearly its entire length, or almost 4 miles. The depth of water in the bay is from 60 fathoms, at its entrance, to 5 and 6 fathoms near the shore of Stanley park, which is the western coast line of Vancouver city. In the bay is good anchorage in 6 fathoms, stiff mud bottom, at about $\frac{1}{2}$ a mile from the south shore of the bay, with west extreme of Prospect point, bearing N. by E. $\frac{1}{2}$ E. and lighthouse on Atkinson point, W. by N. $\frac{3}{4}$ N. This anchorage is well protected from westerly winds by Spanish bank. The bay is easy of access to vessels of any size or class, and convenient depth of water for anchorage is found in almost every part of it.

The First narrows is between Prospect bluff, on the south side of the narrows, and the mouth of Capilano creek on the north. The breadth of the channel is



North Vancouver. Marine Railway.

about one cable and depth of water from 6 to 12 fathoms. A flat composed of shingle and boulder stones, covering with the early flood, extends from one to three cables off the north shore, so that Prospect point must be kept close aboard, rather less than one cable. The entrance to the First narrows is not easily made out by strangers until close in. Pilots are, however, easily picked up before entering the narrows.

Continuing through the First narrows, after passing the narrow part of the channel, $\frac{1}{2}$ a mile in length, it opens out from 2 cables to $\frac{1}{2}$ a mile in width abreast of Brockton point on the south side of these narrows. The harbour increases in width after passing Brockton point and is well sheltered from all winds. Off Brockton point to the north-westward of it, was Parthia shoal, within the 5 fathom line; the shoal has been dredged, giving at present a depth of 26 feet; also off Brockton point, to the south-east, lies Burnaby shoal with from $1\frac{1}{2}$ to 3 fathoms of water. The depth rapidly increases in all around that small shoal, and any depth of water from 9 to 30 fathoms is found after passing the shoal.

The harbour continues beyond the city wharves to the Second narrows, where the water is from 9 to 10 fathoms in the channel, after passing which the harbour again enlarges in width and the depth of water increases. There is another narrow channel at the entrance to Port Moody with a depth of water of from 9 to 11 fathoms. The north arm of the inlet also contains very deep water, and affords good anchorage. Soundings are at low water.

Tides at Vancouver rise 13 feet springs and 11 feet neaps. The strength of the tidal streams at the narrowest part of the channel at the First narrows is from 4 to 8 knots; eddies form in the First narrows when tidal streams are running with any strength; it is necessary, therefore, to exercise caution, especially for heavy draught vessels when going through.

See British Columbia Pilot, also tide tables issued by the Marine Department at Ottawa and chart No. 992 (1910), containing latest correction.

The wharves in Vancouver harbour along the city front are: the Canadian Pacific Railway main wharf, having 2,800 feet berthing accommodation and 270,100 square feet area. For a distance of 1,160 feet the depth of water is 27 feet at low tide and 40 at high tide; for a distance of 1,640 feet the depth of water is 23 at low tide and 36 feet at high tide. The company owns five freight sheds, with an area of 136,510 square feet. They have also a transfer slip, at present handling barges of 12 cars capacity each. The business can be increased by employing more barges.

The means of loading and unloading employed are generally by ship tackle and trucking, and one derrick of 30 tons capacity, for loading direct from cars to ships. Railway tracks are adjacent to all sheds.

The Canadian Pacific new wharf with 1,500 lineal feet of berthing, 126,000 square feet of area and shed of 33,000 square feet. The depth of water alongside the wharf is 30 feet of water at low tide and 40 feet at high tide. Wharves running parallel to this wharf are under construction.

The Johnson wharf, to the eastward of the Canadian Pacific wharf, is 550 feet long and has a storage capacity of 4,200 tons.

The Evans-Coleman wharf has a surface area of 169,540 square feet. Depth of water at high tide, from 36 to 57 feet, at low tide from 20 to 41 feet. The



Wallace Shipyards, North Vancouver, B.C.

number of sheds on the wharf is thirteen, and the area of floors is about 150,000 feet. A railroad siding runs to the end of the westerly arm of the wharf and cargo can be loaded into and out of steamers directly from the cars.

The Vancouver Ice and Cold Storage Company have two public cold storage buildings, one for butter, cheese and eggs, the other for freezing and storage of fresh fish. These buildings are on the water front and have a railway siding. The present storage capacity is 350,000 cubic feet, and the ice-making capacity, 50 tons per day.

The MacDonald Marpole Company, Limited, own bunkers, capacity about 600 tons, and two coal sheds of 2,000 tons capacity.

The Union S.S. Company leases a wharf from the Canadian Pacific which has a surface of 59,500 square feet. Depth of water alongside is from 36 to 12½ feet at low tide. On the wharf are 4 sheds, area of floors, 24,450 feet. There is a railway siding to one shed.

Messrs Brown & Howey have a large warehouse for feed, hay and grain, and the outer end of the wharf is occupied by the New England Fish Company, operating steamers in the halibut fishery.

To the eastward of Messrs. Evans, Coleman & Evans wharf is the Grand Trunk Pacific Railway wharf, length 550 feet, width 100 feet; shed 500 x 70 feet, capacity 25,000 square feet, also oil fuel storage of 32,000 pounds and tank measurement of 10,000 barrels, built with reinforced concrete wharves. Delivering capacity, 1,000 barrels per hour.

At Hastings saw mills, large piers accommodate vessels loading lumber, the largest having a depth of water alongside of 25 feet.

One quarter of a mile east of the Hastings saw mills are the Great Northern Railway wharves of large size, built of concrete to accommodate the largest class of ocean liners. These wharves are now under construction.

The B. C. Sugar Refinery Company has wharves for the accommodation of their trade and are building new wharves eastward of the existing ones.

At Barnet the chemical works own wharves for large vessels.

At Port Moody is the oil refinery wharf used by the largest class of tank steamers, and wharves are under construction for the lumber trade at this place. Several wharves are being built along the water front at different places in the inlet.

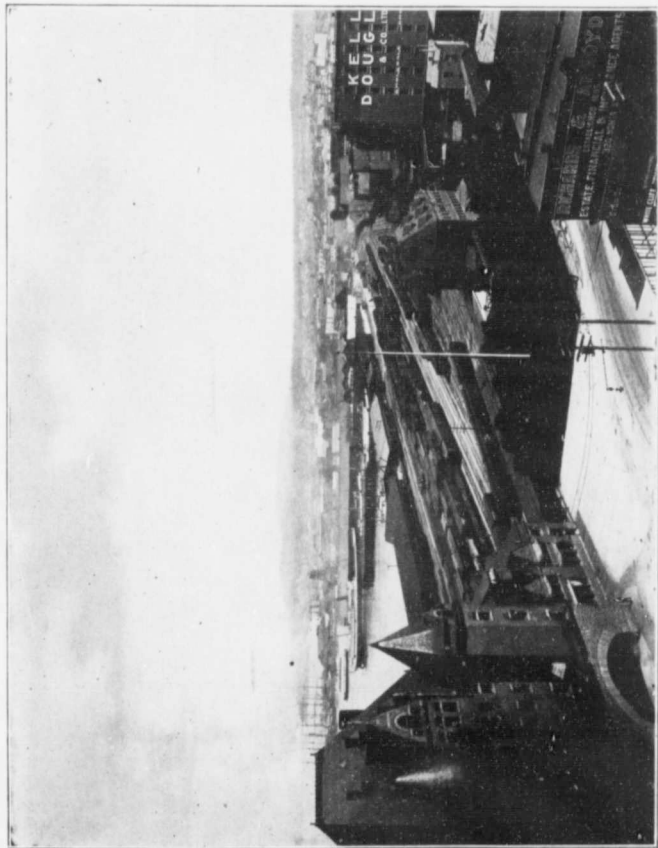
At Coal harbour, inside the First narrows, at the western part of the city, the C. P. R. Coy. has built large tanks for the storage of oil fuel for their own use. These tanks have a capacity of 50,000 barrels each. Dredging operations are being conducted on a large scale. A fairway has been established, 400 feet wide, used by yachts and towing craft. The Vancouver Shipyards have an establishment for yacht building, where vessels of 200 tons can be hauled out.

At the eastern end of the city the British Columbia Salvage Company has a marine railway where vessels are hauled out and all kinds of repairs made.

At North Vancouver, on the opposite side of the harbour from the city, are the Wallace shipyards where vessels are built and repaired. The slips at this yard are capable of hauling out vessels of 2,000 tons, dead weight, and are fitted

with all the most modern appliances for effecting repairs. The water along the shore of North Vancouver is from $5\frac{1}{2}$ to 9 fathoms in depth at low water, excepting the flats which extend out for a short distance.

There is a ferry wharf at North Vancouver and constant communication is kept up by ferry boats between this wharf and the ferry wharf on the Vancouver city side.



A View showing the east end of Vancouver Harbour.

Moodyville is on the same side of the harbour as North Vancouver, where lumbering operations are carried on on a large scale.

In False Creek there are wharves for coal, gravel and building material, occupying nearly the whole of water frontage.

False Creek is an inlet from the southern part of English bay and runs into the heart of the city. It is being rapidly improved by dredging and the building of wharves.

The Canadian Northern Railway occupies the property at the eastern end of False Creek from Westminster avenue bridge to the eastern end of the creek. There is a large and rapidly increasing traffic done by towing craft.

The tidal stream in False creek is of considerable strength, and towing craft with tows wait for the flood tide in English bay.

At Vancouver there is a time signal and compass beacons have been established.

Coaling in the harbour is done by barges, but large vessels to and from Vancouver bunker at Nanaimo, Vancouver island, some 30 miles from Vancouver.

Vessels are loaded and unloaded in the harbour by steam cranes, derricks and ships' tackle. The cost of loading and discharging general cargo is about 80 cents a ton, including wharfage. Stevedoring charges for lumber are from \$1.00 to \$1.35 per thousand feet, board measure.

The port charges are: sick mariners' dues, $1\frac{1}{2}$ cents per ton, registered, paid 3 times a year, if not paid in some other Canadian port; harbour master's dues, 50 cents for vessels of 50 tons, increasing according to size to maximum charge of 5 dollars for vessels over 700 tons, paid twice in one year only if not paid in other Canadian ports.

Harbour Commissioners have recently been appointed and will administer the harbour and fix the port charges in the near future.

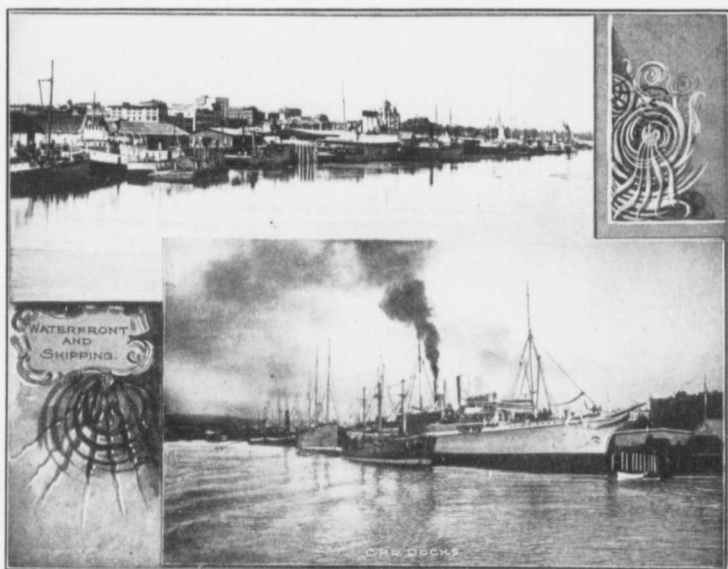
The shipping and discharging of seamen in British Columbia ports range higher than the fixed rates for other Canadian ports.

All kinds of ship's stores and good water and bunker coal can be easily procured in the port.

Vancouver is the western terminus of the Canadian Pacific Railway which at this port makes connection with its liners and coast steamers on the Pacific. The Great Northern Railway line from Washington State runs into Vancouver. The Canadian Northern Railway is constructing its line eastward to connect with the portion of this line that is being built in British Columbia. The Grand Trunk Pacific Railway has steamboat connections with Prince Rupert its terminus on the Pacific coast.

The city has communication by water with all the ports on the Pacific coast and with China, Japan, Australia, Mexico and other South American ports, and with the east by rail, and telegraphic communication with all parts of Canada and the United States, and by cable with Australia.

Lights.—The lights are: one on Atkinson point, north point of entrance to English bay, latitude N. 49 19 32, longitude W. 123 15 30, white group flashing; fog alarm on extreme of point in front of lighthouse; one on Prospect point, white occulting and red sector, under bluff at the point, south side of First narrows, latitude N., 49 18 34, longitude W. 123 8 00, with a fog bell; one on Brockton point inside First narrows, red fixed, white sector, latitude N. 49 17 44, longitude W. 123 6 54, a fog bell, 120 feet, 33°, from Burnaby shoal light and bell buoy on northern edge of shoal, red fixed with fog bell; beacon light, First narrows; Grey point fairway, gas, and bell buoy about $1\frac{1}{4}$ miles, 357°, from



Vancouver, B.C. Water Front.

Grey point, north shore of W. entrance white occulting; fog bell on concrete base of beacon; False creek beacon at S. end of Nicola street north side of entrance to the creek, red fixed, latitude N. 49 16 41, longitude W. 123 8 28. See List of Lights Pacific Coast for 1913.

Pilotage is under the Vancouver Pilotage authority and payment is compulsory. The rates are :

For vessels under sail, \$2 per foot draught of water and 1 cent per net registered ton.

For vessels in tow of a steamer, \$1 per foot draught of water and 1 cent per net registered ton.

For steamers, \$1 per foot draught of water and 1 cent per net registered ton.

Any portion of a foot, not exceeding six inches, shall be paid for as half a foot ; any fraction exceeding six inches shall be paid for as one foot.

The pilotage from Cape Flattery or Royal Roads to a line drawn from Point Atkinson to the buoy on Spanish bank, or to the limits of Howe sound, and vice versa, is not compulsory, but if the services of a pilot are required he shall be paid the following rates for vessels under sail, viz. :—

From Cape Flattery.....	\$6.00
“ Callum bay.....	5.00
“ Beechy head.....	4.00
“ Race rocks or roads.....	3.00

For vessels under steam or in tow of a steamer the following rates shall be paid :—

From	Cape Flattery.....	\$3.00
"	Callum bay.....	2.50
"	Beechy head.....	2.00
"	Race rocks or Royal roads, vessels under steam..	1.00
"	Race rocks or Royal roads vessels in tow of a steamer.....	1.50

Vessels from foreign ports must call at the quarantine stations at William head.

Tonnage that entered and departed at this port for fiscal year 1911-12 was 7,326,514.

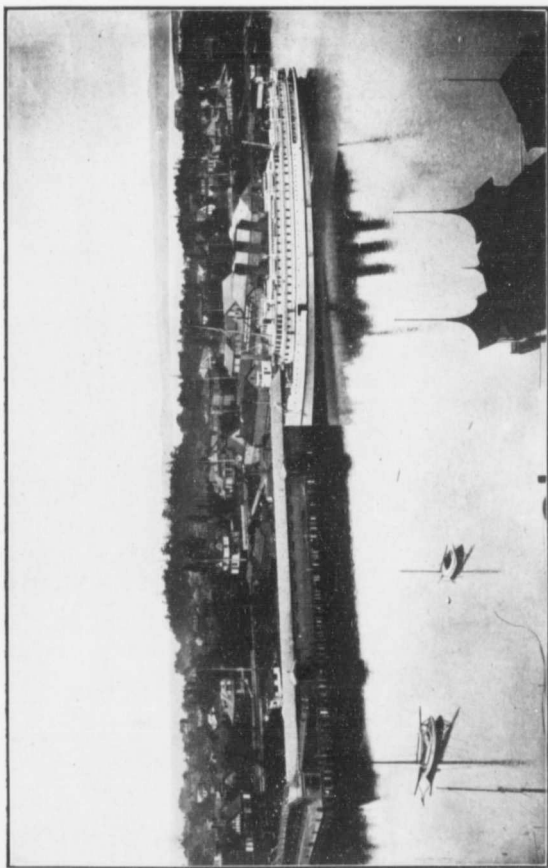
VICTORIA HARBOUR lies at the southern end of Vancouver island, British Columbia, and at the eastern end of the Juan de Fuca strait. Vessels inward bound from sea pass through the Juan De Fuca strait and outward by the same strait. Vessels bound from Victoria for ports on the easterly side of Vancouver island and ports on the mainland of British Columbia pass into the strait of Georgia by Haro strait but inner channels between Vancouver island and Trial, Discovery and Chatham islands, through Baynes channel, Swanson channel and Active pass, with deep water, are usually taken by ordinary steamers which enter the strait of Georgia. Trincomalie and Stuart channels and Porlier pass are also used going north. Haro strait is the westernmost of the three channels leading from Juan De Fuca strait into Georgia strait. It trends in a N.W. by N. direction for 18 miles, then turns sharply to the N.E. round Turn point, Stuart island, for a further distance of 12 miles leaving Saturna island to the westward when it enters Georgia strait. The average depth of water is over 50 fathoms, and for its whole extent is for the most part a broad and deep navigable ship channel. Reefs, however, exist in certain parts; care is therefore necessary in navigating it.

Victoria is approached from the south by Puget sound which is a branch of the strait of Juan De Fuca.

The strait of Juan De Fuca which is entered from the Pacific ocean has a breadth of 13 miles between cape Flattery, state of Washington, the southern point of entrance and Bonilla point on Vancouver island; the width of the strait for 60 miles easterly averages 12 miles. It is a deep navigable ship channel with several anchorages on both sides of the strait. On the British Columbia side are port San Juan, Sooke inlet and Beecher bay, good anchorage places. See British Columbia Coast Pilot and Admiralty Charts Nos. 576, 1897b, 1911, 1917, 2689 and 2840. All vessels proceeding to ports in the southern part of British Columbia enter and pass through this strait.

The quarantine station for Victoria is at Williams head in Parry bay, part of Royal bay or roads, where vessels are required to report. This station has a wharf, 480 feet long, with depth of from 25 to 30 feet alongside. In the Royal roads, a fine sheet of water, 3 miles in extent, vessels may anchor anywhere within $\frac{3}{4}$ of a mile from the western shore, in good holding ground and well sheltered. Two miles from Victoria is the excellent harbour of Esquimalt. (See description of Esquimalt herein.)

Victoria harbour has its entrance between McLaughlin and Ogden points. From Ogden point in a westerly direction, a long breakwater is being constructed, and inside the breakwater large piers or wharves are contemplated for ocean-going vessels. In the outer harbour of Victoria the water is from $3\frac{1}{2}$ to 7 fathoms



Victoria B.C. C. P. R. Wharf, Inner Harbour.

and deep water in the channel leading to the 2 wharves now used by ocean-going vessels.

The entrance to the inner harbour is between Berens island and Shoal point where the channel is 400 feet wide with a depth of from 17 to 22 feet at low water.

The mean rise of the tide is 8 feet.

The wharves are divided into 3 groups : the outer wharves or ocean docks in the outer harbour ; the inner harbour wharves or that part between the entrance of the inner harbour and the E. & N. Ry. bridge, and the upper inner harbour, which is above the railway bridge. The ocean docks, principally used by ocean-going ships, are situated on the E. side near the entrance to the inner harbour and consist of 2 wharves called the " Old " and the " New " wharves. The old wharf provides 754 feet of berthing room on one side and 595 on the other and 145 at the end, the general width is 100 feet. The freight shed on this wharf is 524 feet long by 60 feet wide. At what is called the new wharf, ships use the N. side and end only ; the berthing space is 1,020 feet long on the side and 140 on the end ; the freight shed on this wharf is 800 feet long giving 54,300 feet of floor space.

The general depth of water at these wharves is 33 feet at low tide except one place where it is 26 feet only.

The wharves of the inner harbour have a frontage of 5,486 feet and shed area of about 120,000 superficial feet. These wharves lie along the city front and the depth of water at low tide ranges from 12 to 20 feet. Around some of these wharves the depth has been dredged to a uniform depth of 20 feet and to the same depth in James bay, low water.

Around the upper inner harbour there are 12 wharves, owned by industrial concerns. These have a frontage of some 1,500 to 1,600 feet ; depth of water from 6 to 22 feet. Sheds on these wharves have a floor space of about 20,000 feet.

There are no railway connections at Victoria wharves. The city has two cold storage plants and sheds of 135,000 cubic feet capacity.

Port Charges are Harbour Master's dues, paid twice in one year only, as in other Canadian ports, referred to elsewhere herein ; Sick Mariner's dues, $1\frac{1}{2}$ cents per registered ton, paid 3 times a year, if not paid elsewhere in Canada.

Steamers use their own winches for loading and discharging but freight in coasting steamers is handled by small trucks. Sailing vessels are loaded by means of movable hoisting engines.

Cost of loading, from 45 to 50 cents per ton ; lumber, \$1.10 to \$1.25 per 1,000 lumber feet ; ballast, loading \$1.20 per ton ; 35 cents per ton discharging.

Cooling : bunker coal is obtained by large vessels at the coal ports, Nanaimo, Ladysmith and Union bay. Coal is also supplied at Victoria to ordinary steamers and tugs and ships calling in for orders, carried from the coal ports to Victoria in barges.

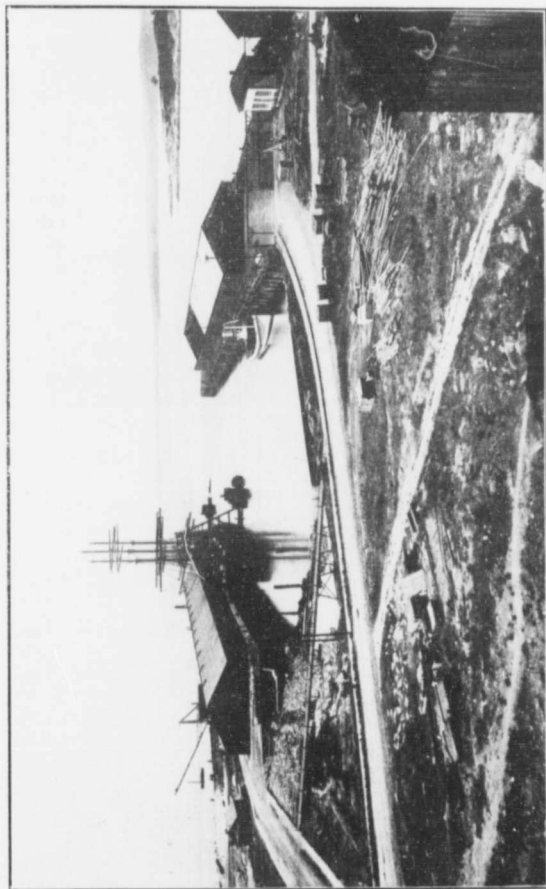
There are three marine railways in the harbour, one of which has a capacity for a vessel of 3,000 tons displacement.

There is a wireless telegraph station at Victoria, under the name of Gonzales Hill, which can communicate with vessels 250 nautical miles distant. The large dry dock and marine railway are situated at Esquimalt.

Victoria is a port of call for ocean-going ships, where provisions, stores and water may be readily obtained, and to receive orders for other ports.

This port has communication by steamship lines with all the southern and northern ports of British Columbia and with Alaska, with United States ports on

the Pacific, with South American ports on the Pacific, with Australia, New Zealand, Honolulu, Figi islands, China, Japan and the Malay straits, also by telegraph and cable with the mainland of British Columbia, the United States and Australia.



Victoria, B.C. Outer Wharves.

Lights approaching Victoria harbour from the west are : Race rocks lighthouse in the strait of Juan de Fuca in latitude N. 48 17 36, longitude W. 123 32 15, white flashing, diaphone fog alarm 190 feet, 221°, from lighthouse ; lights at William head, quarantine station, on extreme of William head. 90 feet from high

water mark, latitude N. 48 20 23, longitude W. 123 31 45, rear light 30 feet, 220° from front, both red fixed; Fingar light, on a rock at western entrance to Esquimalt harbour, latitude N. 48 25 43, longitude W. 123 27 15, white fixed, red sector; Brothie ledge beacon light, N.E. side off the entrance to Victoria harbour, latitude N. 48 24 33, longitude W. 123 23 7; white occulting, with electric fog bell; fog-alarm on McLaughlin point on the W. side, entrance of harbour on the point, latitude N. 48 25 5, longitude W. 123 24 13; light on Berens island, W. entrance to inner harbour, latitude N. 48 25 22, longitude W. 123 24 00; white occulting, red sector, fog bell on seaward side; light on shoal point beacon on outer end of spit, off the point in the harbour, latitude N. 48 25 24, longitude W. 123 23 40, red fixed; light on middle rock beacon in the harbour, latitude N. 48 25 22, longitude W. 123 23 20, white fixed; light on Laurel point, in harbour, at the N.W. extremity of point, latitude N. 48 25 23, longitude W. 123 23 2, red fixed. Approaching from the east, light on Trial islands, on southernmost island, latitude N. 48 23 36, longitude W. 123 18 45, white group flashing, fog alarm near W. edge of island 185 feet 147° from lighthouse. See List of Lights and Fog Signals on the Pacific Coast, 1913, and Notice to Mariners, No. 73, of 1913 which refers to a temporary light consisting of 2 fixed red lights set 6 feet apart, vertically, on a dolphin, about 1,000 yards from Ogden point westwardly and moved farther out from time to time as the construction of the breakwater progresses.

Pilotage is under the control of the Victoria and Esquimalt Pilotage authority and payment of pilotage is compulsory. The rates are:

Vessels bound to other ports and coming to anchor in 'Royal Roads,' the pilotage shall be free, except the services of a pilot are employed, when pilotage according to the following graduated scale shall be payable:—

From inside, or north of "Race Rock," to Royal bay, or vice versa, 50 per cent of the prescribed rates under clause (b), section 18. From Beechy head to "Royal Roads" or vice versa, \$1 per foot.

From Pillar point to "Royal Roads," or vice versa, \$3 per foot draught of water.

From Cape Flattery to "Royal Roads," or vice versa, \$6 per foot draught of water.

(b) For vessels entering into or clearing from all ports of Victoria and Esquimalt, the rates of pilotage shall be as follows:—

(1) For regular ocean steamers, 50 cents per foot draught of water and $\frac{1}{2}$ cent per net registered ton up to a maximum of 3,500 tons, on the inward voyage, and 50 per cent of the above on the outward voyage subject to a discount of 20 per cent.

(2) For irregular ocean steamers, \$1 per foot draught of water and $\frac{3}{4}$ cent per net registered ton.

(3) For regular steamers in the coasting trade between San Francisco and Lynn canal inclusive, the rates shall be the same as for regular steamers as rated in clause 1.

(4) For vessels under sail, \$2 per foot draught of water and 1 cent per net registered ton.

(5) For sailing vessels in tow, \$1.50 per foot draught of water and 1 cent per net registered ton.

(6) For all vessels entering into or clearing from Williams Head Quarantine Station, the rates shall be 50 per cent of the prescribed rates of any class of vessel for Victoria and Esquimalt, subject to exemption in section 17, clause 7; provided, however, that all coasters between San Francisco and Lynn canal inclusive, when compelled by special instructions from the Dominion government to call at Williams Head Quarantine Station, shall be exempt from pilotage dues unless the services of a pilot are requested.

(7) For all vessels of 500 tons and under, 75 cents per foot draught of water.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 7,317,324.

WALLACE HARBOUR, Cumberland County, Nova Scotia. The harbour is entered from the strait of Northumberland and is at the mouth of Wallace river. It has 16 feet over its bar at low water, ordinary springs, which rise 8 feet so that the harbour is capable of admitting vessels of large size. Its entrance, W. by S. $21\frac{1}{2}$ miles from the south eastern point of Oak island and between two sandy points named Palmer and Caulfield points, is nearly 2 cables wide and carries $3\frac{1}{2}$ to $6\frac{1}{2}$ fathoms water, but the approach to this entrance and over the bar and through the bay, for a distance of 3 miles, is difficult. Within the harbour, flats of stiff clay extend to the shore and dry at low water. At 6 cables within the entrance a middle ground begins and diminishes the breadth of the channel to half a cable.

Opposite Wallace the harbour or river is half a mile wide, whilst the channel between the flats is only 60 yards wide, with 5 fathoms of water. About 2 miles above Wallace the river divides and both the north and south branches are navigable for a few miles above the village. See Atlantic and Gulf of St. Lawrence Coast Pilot for further directions and Chart, No. 2,034 and plan 2,003.

There are wharves in this harbour and a ferry between North and South Wallace.

There is a Harbour Master at this port and the charges are the same as at other Canadian ports.

Provisions and supplies of all kinds can easily be procured at reasonable prices. Pilots can be obtained by signaling.

Lights.—One on Mullins point, N. side entrance to Wallace harbour, latitude N. 45 49 45, longitude W. 63 25 5, white fixed; one, 1,473 feet, 284° , from front, red fixed, these lights lead over the bar; range lights in Wallace harbour, front light on N.E. extremity of Macfarlane point, latitude N. 45 49 0, longitude W. 63 27 25, back light, 1,860 feet, $257^{\circ} 30'$, from front, both red fixed. See List of Lights Atlantic Coast and Gulf St. Lawrence for 1913.

Tonnage entered and departed for fiscal year 1911-12 was 1702.

WESTPORT HARBOUR, Brier island, Digby county, Nova Scotia, is in the southwestern end of the bay of Fundy, less than 40 miles from Yarmouth. It is entered from Grand Passage. There is good anchorage off the town of Westport in 5 to 7 fathoms, mud bottom, only exposed to wind from N.E. by N. to N.E. by E., but the water is generally smooth. See S.E. Coast of Nova Scotia and Bay of Fundy Coast Pilot.

There are several wharves in the harbour but none of them extend below low water mark, one is the E. C. Bowers Co. wharf; the Payson wharf is used by

the Insular S.S. Company; there are several smaller wharves and all have fish houses on them, used in the fishing industry, the principal business of the port. The Government pier affords good landing with 15 feet at low water.

Grand Passage has a northern and southern entrance. The southern entrance is indicated by a whistling buoy, about one mile S. of Peters island, and a can buoy on Dartmouth point on the starboard hand entering the Passage, and a buoy on Passage shoal left on the port side until rounding into the bight or harbour. The northern entrance is indicated by a can buoy on Cow ledge on the Freeport shore which is left on the port hand going into the harbour.

The harbour is open the year round.

Tide rises $20\frac{3}{4}$ feet, springs, and 17 feet, neaps. Caution is necessary in entering Westport without local knowledge as the tide runs with a velocity of from 5 to 6 knots an hour forming eddies.

There is a harbour master at Westport and the port charges are the same as at other Canadian ports.

Lights.—One in Grand passage N. point of Brier island, latitude N. 44 17 14, longitude W. 66 20 36, red fixed, and a fog bell; one light on W. point of Brier island, latitude N. 44 14 57, longitude W. 66 23 38, white group revolving and a diaphone fog alarm south of tower; one gas and whistling buoy on South W. ledge (Brier island) $17\frac{1}{4}$ miles 226° from ledge, latitude N. 44 10 0, longitude W. 66 27 8, red occulting; the Westport light on Peter island entrance to Grand passage, latitude N. 44 15 17, longitude W. 66 20 21, white fixed. See List of Lights on the Atlantic Coast for year 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 20 320 tons.

WEYMOUTH HARBOUR, Digby county, Nova Scotia, is on the Sissiboo river which empties into St. Mary bay on the east side. St. Mary bay is an arm of the sea at the S.E. entrance of the bay of Fundy. There is anchorage off the mouth of the Sissiboo river, $5\frac{1}{2}$ fathoms low water, mud bottom, $\frac{1}{2}$ mile from shore. See S.E. Coast of Nova Scotia and bay of Fundy Coast Pilot. Weymouth harbour being a bar harbour vessels enter a short time before high water. The depth of water in the river varies considerably and is very shoal at low tide. Tugs are available to tow vessels into the wharves and services of pilots can be obtained. Vessels loaded can pass over the bar with a draught of 15 feet ordinary high tides and 18 feet spring tides, but if drawing more than 18 feet load from lighters in the bay. The river is buoyed. The tides in the vicinity of Weymouth in the bay rise 24 feet, springs and 20 feet, neaps. There is a ballast ground in the bay where ballast is unloaded.

There are 6 wharves in the harbour owned by private individuals, and one pier at lower Weymouth, on which is a shed which contains machinery for manufacturing lumber. Upon wharf 6 is a large shed used for storing pulp and another wharf has a shed for coal. The depth of water at the wharves ranges from 10 to 14 feet at low water and 20 to 24 feet at high water. Vessels load and unload within reach of ship's tackle.

Weymouth has communication by rail and telegraph with the Dominion systems.

There is a harbour master at this port and the charges are the same as at other Canadian ports.

Light.—Sissiboo light, south side of entrance to river in St. Mary bay, latitude N. 44 26 25, longitude W. 66 1 0, white fixed. See List of Lights for Atlantic Coast and Gulf of St. Lawrence for 1913.

Tonnage entered and cleared at this port for the fiscal year 1911-12 was 11,401 tons.

WINDSOR HARBOUR, Hants county, Nova Scotia, is at the confluence of the Avon and St. Croix rivers, the Avon empties into Minas basin. This basin is an arm on south coast of the bay of Fundy. The entrance of Minas basin is between Fox point on the north and cape Split. The distance between these points is 3 4-10 miles and the water in this bay is deep at its entrance and from $2\frac{1}{2}$ to 6 fathoms in the channel at the mouth of the Avon river at low water. The depth, however, varies in the river. The approaches to the river are difficult on account of extensive flats. The least depth over the bar is $1\frac{1}{2}$ fathoms at low water but at Horton bluff up the river there is anchorage in 7 fathoms. The tides rise and fall at Horton bluff, springs, 48; neaps, 40 feet. See S.E. Coast Nova Scotia and Bay of Fundy Pilot and Chart No. 353.

The wharves at Windsor number twelve, extending along the river front 2,300 feet, and railway sidings at the Government wharf at Mosher's wharf, and sheds are convenient for handling freight by rail to and from vessels; the depth of water at the wharves is 16 feet high water. There are also freight sheds on Dimock's wharf but no railway siding; depth of water at other wharves about 14 feet. There are no docks for repairs at Windsor, but at Hantsport, seven miles from Windsor, there are good marine blocks on which to repair vessels, and also at Summerville, eight miles from Windsor.

Windsor has railway and telegraph communication with the Dominion system.

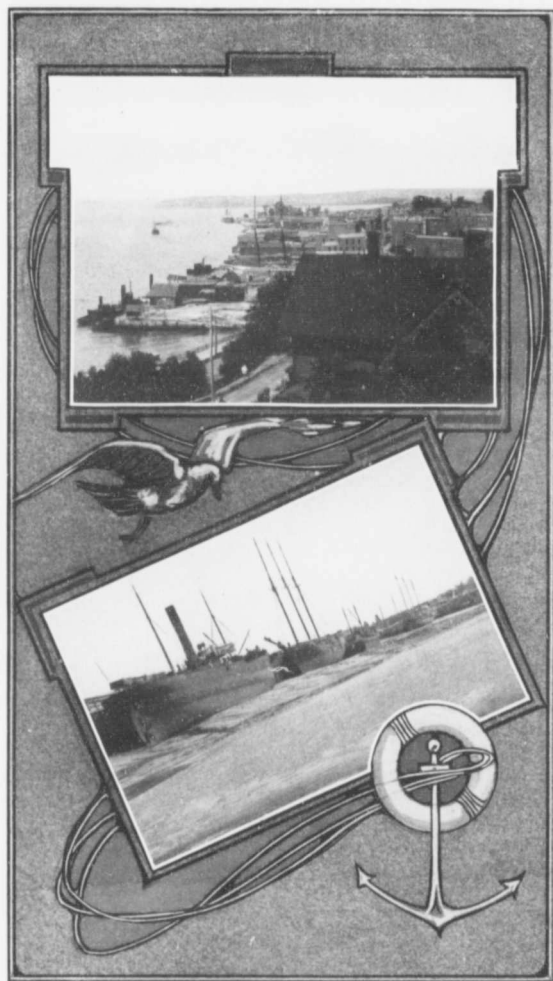
Lights.—Cross Bars shoal gas buoy in $4\frac{1}{2}$ fathoms 1-5 mile off shoal at mouth of Avon river, latitude N. 45 13 0, longitude W. 64 15 0, white occulting; one light on Horton bluff west side of Avon river, latitude N. 45 6 30, longitude W. 64 13 20, white fixed; one on Dimock point; near Windsor, junction of Avon and St. Croix rivers, latitude N. 44 59 50, longitude W. 64 8 15, red fixed; electric lights Nos. 1 and 2 on bridges crossing the Avon river, red fixed. See List of Lights on the Atlantic Coast for year 1913.

Tonnage of vessels entered and departed year 1911-12 was 375,448 tons.

There is a harbour master at this port and the port charges are similar to that of other Canadian ports.

WOLFVILLE, Kings county, Nova Scotia, at the mouth of Cornwallis river, on the south shore of Minas basin, an inlet of the bay of Fundy. The best anchorage off Cornwallis river is in a depth of 5 to 6 fathoms. This anchorage is considered good with all but north-easterly or easterly winds. See S.E. Coast of Nova Scotia and Bay of Fundy Coast Pilot.

There are 4 wharves and a Government pier. This pier is about 100 feet long and 40 feet wide with a depth of water of 30 feet at highest tides, and at



Windsor, N.S. Water Front.
" " Low Tide.

the other 4 wharves the depth is 20 feet at highest tides. On these wharves are freight sheds and two railway sidings leading to the latter wharves. The water is 45 feet deep at high tides in Cornwallis river at its mouth, sand bottom.

Port Charges are harbour master's and sick mariners' dues, as in other Canadian ports.

Light.—Red fixed in marsh near inner end of Government wharf, latitude N. 45 6 6, longitude W. 64 21 34.

Total tonnage entered and cleared at this port for the fiscal year 1912 was 14,425 tons.

YARMOUTH HARBOUR, in Yarmouth county, S.W. end of Nova Scotia, is situated in Yarmouth sound. The sound is entered from the Atlantic ocean and bay of Fundy. This entrance is at the eastern cape of cape Fourchu where there is a depth of 6 fathoms running to 3½ fathoms opposite the town of Yarmouth.

There is anchorage in the sound at 20 feet over sandy bottom, about a quarter of a mile east south-eastward of east cape lighthouse. The shore inside the lighthouse should not be approached within a cable as several detached rocks lie off it. There is an inner anchorage within Bunker island, farther in, latitude N. 43 49 0, longitude W. 66 8 0; this anchorage is safe from all winds but the channel leading to it is dangerous and studded with dangers, therefore, the services of a pilot can be obtained by ordinary signals.

There are fairway buoys leading into the sound; one marked "Y'm't'h S.W. F'y" in white, on the deck, painted black and white in vertical stripes, gas and whistle, in 34 fathoms, 10 miles, 224°, from cape Fourchu light; one marked "Y'm't'h N. W. F'y" in white, on deck, in 22 fathoms, 5 miles, 286°, from cape Fourchu light.

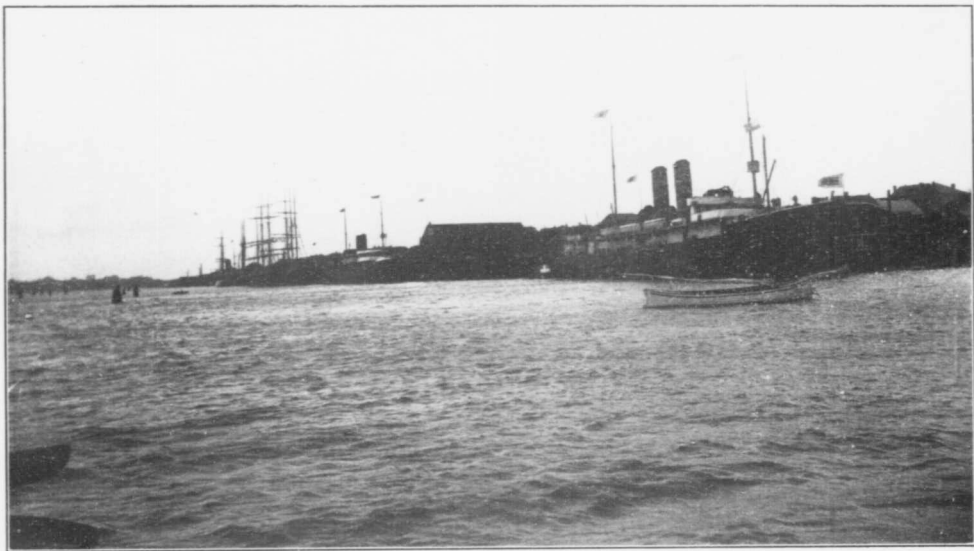
Directions for entering the harbour:—from the south steer to the north-east passing westward of the gas and bell buoy marking the Hen and Chickens until the north end of ship's stern bears north and passing on the western side of Bunker island lighthouse. After passing the lighthouse steer to pass about 2 cables from Bunker island shore through the buoyed channel and about 1¼ cables northward of Battery point. Good anchorage will be found in 5½ fathoms.

The channel inside the entrance of Yarmouth harbour is marked by port and starboard buoys and with 42 dolphins made of piles driven in the flats. About half way to the town the channel turns and at this turn is a light on one of the dolphins.

See Coast Pilot for S.E. Coast of Nova Scotia and Bay of Fundy and charts, Nos. 352, 1651 and 2,670.

There are nineteen wharves in the harbour of Yarmouth, all on the eastern side of the harbour, and all of these wharves have sheds for receiving freight; the depth of water alongside the wharves is 19 feet at low water. At three of them, where lumber is loaded, cars run to the ship's side. At Baker's wharf passenger steamers from Boston, daily in the summer, land passengers from the boat directly into cars. On the south side of Baker's wharf a berth has been made for unloading coal, 250 feet long, 90 feet wide with 20 feet of water at low tide.

Tides.—The tide rises in Yarmouth harbour 16 feet at spring and 13 feet at neap tides.



Yarmouth, N.S. Harbour looking North.

There is a marine slip for hauling vessels out, up to 1,000 tons register for repairs, and a shipyard belonging to the new Burrill-Johnson Iron Company, where steel vessels are built or repaired. The yard is covered from the weather and work can be carried on night and day.

There is one cold store at Yarmouth. Vessels load and unload by manual labour, in which hand trucks and gangways are used by steamers, and in the case of lumber when loaded in steamers, it is hoisted and lowered by the vessel's own winch into the hold.

Yarmouth has long been known as a shipbuilding and owning port and has had communication with all ports where North American vessels have sailed, consequently all kinds of ships' stores are kept in stock and can be easily procured. On an average from 3,000 to 5,000 tons of coal is kept on hand by dealers. Yarmouth has railway communication east by the Dominion Atlantic Railway running to Halifax and with St. John by rail and ferry steamer from Digby. It has telegraphic communication with all parts of the province of Nova Scotia and other parts of Canada.

The harbour is open all the year around and daily lines of steamers in summer run from Boston and bay of Fundy ports and these lines also connect in winter, but not daily, as the traffic is not so great during winter.

Lights and Buoys.—The lights leading into sound and harbour are: Lurcher shoal lightship in the bay of Fundy, in about 36 fathoms, off Lurcher shoal, 2 miles, 252°, from 1½ fathoms spot, latitude N. 43 49 32, longitude W. 66 32 0, white occulting; there is also a diaphone fog alarm and submarine fog-bell attached to this lightship; Lurcher shoal whistling buoy in 13 fathoms, 1-3 mile west of shoal, latitude N. 43 50 2, longitude W. 66 30 0; cape Fourchu gas and whistling buoy in 22 fathoms, 286°, from cape Fourchu light, latitude N. 43 48 50, longitude W. 66 16 1, white occulting; Cat rock bell buoy in 9 fathoms, 4 cables, 184°, from Cat rock, latitude N. 43 46 46, longitude W. 66 9 20; Cape Fourchu light, on S. cape, S. point Yarmouth sound, latitude N. 43 47 30, longitude W. 66 9 25, white flashing, fog whistle on W. side of cape submarine bell, 2 miles, 232°, from light-house, latitude N. 43 46 16, longitude W. 66 11 33; light on Bunker island on end of reef off S. W. point of island E. side of entrance to Yarmouth harbour, latitude N. 43 48 36, longitude W. 66 8 42, there is also a fog bell at this station, light on Bunker island N. end on N.W. extremity of island, latitude N. 43 48 58, longitude W. 66 8 10, red fixed; Yarmouth harbour corner beacon light, 1-5 mile south-westward of the long wharf, Yarmouth, red fixed; Hen and Chickens gas and bell buoy referred to above; there is also a bell buoy in 10 fathoms off Yarmouth sound, latitude N. 43 44, longitude W. 66 10 47; and Yarmouth gas and whistling buoy referred to above, red occulting. See List of Lights on the Atlantic Coast for 1913.

Port Charges.—They are the same as other Canadian ports.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 429,025 tons.

INLAND WATERS.

HARBOURS ON THE UPPER ST. LAWRENCE RIVER, GREAT LAKES
AND GEORGIAN BAY.

The Port Charges are Harbour Master's dues, where Harbour Masters are appointed, and wharfage. Piloting is done by Officers on board vessels.

ALGOMA HARBOUR, district of Algoma, Ontario, is in the north channel of lake Huron. The town is situated on the shore of a bay and the depth of water between Sandford island and the bay is from 3 to $3\frac{3}{4}$ fathoms. In East bay, vessels can anchor in 15 feet of water, but at the wharf and channel leading to it, the depth is $14\frac{1}{2}$ feet. Algoma is principally a harbour from which lumber is shipped. There is one wharf only and on it is a shed 30 to 40 feet for general freight. The Northern Transportation Company's steamers call at this port, and there is communication daily by water with Collingwood and Owen Sound in Georgian bay and Sault Ste. Marie, at the head of the St. Mary's river or foot of lake Superior. The place is an important Canadian Pacific Railway station and has communication by this railroad and by telegraph east and west. Supplies, to a limited extent, may be procured, but there are very few facilities for repairing vessels of any considerable size.

There are no port charges. The total tonnage which entered and cleared at this port during the fiscal year of 1912 was 200,514 tons.

Lights.—Blind River, front light on outer end of Government wharf at Harriette point, latitude N. 46 10 42, longitude W. 82 57 43, one on shore west side of mouth of river 1,550 feet, 31° , from front light both red fixed. See List of Lights on the Inland Waters for 1913, Admiralty chart, No. 908, and American charts, Nos. 1,475 and 1,476.

AMHERSTBURG HARBOUR, Essex county, Ontario, is near the mouth of Detroit River. Bois Blanc island in Detroit river is about one quarter mile from the main shore and parallel thereto. This island is about one and one quarter miles long, and one third mile wide, and many buildings have been erected and other improvements made to render it attractive as a pleasure resort and picnic ground. During the summer season excursion steamers make regular trips between Detroit, Bois Blanc island and Amherstburg.

The through channel between Bois Blanc island and Amherstburg has been improved to 600 feet width and 21 feet depth, and to the West of Bois Blanc island the Livingstone channel has been improved to 300 feet minimum width and 22 feet depth. Freight steamers passing through the Detroit river are required to use the Amherstburg channel upbound and Livingstone channel downbound. Between the improved channel and the docks at Amherstburg a depth of 21 feet has been secured by dredging for a length of about 800 feet along the face of the docks. There is an anchorage opposite the Southern end of Bois Blanc island on the Amherstburg side of the channel, with $19\frac{1}{2}$ feet depth of water, and well sheltered. The depths herein given are referred to a low water datum, and they are about two feet less than those during the midsummer season.

This port is mainly a coaling station, and cargoes are handled by steam derricks and cranes. The docks are continuous for about 1,500 feet, with coal sheds, ferry boat landing, boat houses and lumber dock. For about 300 feet at the southern end the dock is of concrete construction; this dock is owned and maintained by the Dominion Government, and on it, is the depot and supply station of the Marine Department in connection with buoy service.

Lights.—Main light on Bois Blanc island, latitude N. 42 5 11, longitude W. 83 7 10, white fixed; float light 1,350 feet, 99° from Bois Blanc lighthouse, another float light, 1,575 feet, 76° from Bois Blanc lighthouse; another float light, 1,800 feet, 63° from Bois Blanc lighthouse, all red fixed; Amherstburg range lights, front on E. bank of Detroit river, 80 feet from water's edge, latitude N. 42 5 48, longitude W. 83 6 45, back 558 feet 14° 55' from front, both red fixed; range lights in Amherstburg channel, front 1880 feet, 130° 40' from Bois Blanc lighthouse; back 1,060, feet 175° 45' from front, both red fixed. A number of float lights are maintained in the channel and range lights at Lime Kiln crossing, front 300 feet out from shore of Bois Blanc island, 1-5 mile southward of N. end, white fixed; back 703 feet 182° 56' from front, red fixed and a number of float lights and gas-buoys in Lime Kiln Crossing channel.

Amherstburg has communication by water with all lake ports, and by steam and electric railroads with the main lines in Canada and the United States.

The total tonnage which entered and departed from Amherstburg during the fiscal year 1912 was 360,144 tons. See List of Lights and Admiralty Chart No. 330.

The Port is in charge of a Harbour Master, who is paid a regular salary, no dues being charged.

BATH HARBOUR, county of Lennox and Addington, Ontario, is in the north channel of bay of Quinte, opposite Amherst island, in the eastern end of lake Ontario. The depth of water in the harbour is from 15 feet alongside the wharves to 40 feet off the town, where there is good anchorage. The wharves are: one 140 feet front and 140 feet long with 17 feet of water, with coal shed, grain warehouse, ice-house and general freight shed; one 140 feet long and 85 feet front with 12 feet of water, with a flour mill upon it, coal shed and grain warehouse and wharf with similar buildings. Lights are maintained on these wharves by the owners and steamboat companies.

Lights.—One on the northernmost point of Centre Brother island, east of Bath, latitude N. 44 12 26, longitude W. 76 37 49, white fixed; one on point Pleasant, entrance to bay of Quinte, west of Bath, latitude N. 44 6 36, longitude W. 76 50 37, white fixed. See List of Lights on the Inland Waters for 1913, also Admiralty chart, No. 2,961.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 87,994 tons.

BELLEVILLE HARBOUR, Hastings county, Ontario, is on the north shore of the bay of Quinte and at the mouth of the Moira river. The water is very shallow opposite the town, but east of it there is a depth of 15 feet. A channel has been dredged in the mouth of the river, about 1,000 feet, with a width of 450 feet at its outer end and 200 feet at the shore end. At the pier along the channel the depth of water is 14 feet. On the pier are warehouses for general merchandise and fruit storage.

Lights.—The lights are one on a crib southeast edge of shoal at entrance of harbour in latitude 44 9 9, longitude 77 22 43, red fixed; there are 6 lights on bay of Quinte bridge immediately west of Belleville, 2 white, 2 red and 2 green, all fixed. See List of Lights on the Inland Waters for 1913 and Admiralty charts Nos. 1,152, 3,117.

The total tonnage of vessels entered and cleared at this port for the fiscal year 1912 was 231,766 tons.

BLIND RIVER HARBOUR, district of Algoma, Ontario, is on the north shore of North channel, lake Huron, the depth of water is 15 feet. There is a large Government wharf at this place with a shed upon it, 100 by 40 feet. Located at this place are the wharves of the Eddy Lumber Company. The port is principally a lumbering centre and lumber mills are located on the shores of North Channel, lake Huron. The Northern Transportation steamers call at Blind River, both ways, when sailing between Collingwood and Sault Ste. Marie. Lumber is shipped by rail as well as by water.

Lights.—Front on outer end of Government wharf at Harriette point, latitude N. 46 10 42, longitude W. 82 57 43, one on shore west side of mouth of river, 1,550 feet, 31°, from front light, both red fixed, another range, front on elevated way, west of Eddy west wharf, latitude N. 46 10 42, longitude W. 82 57 54; one 295 feet, 3°, from front, both red fixed. See List of Lights on the Inland Waters for 1913, Admiralty chart, No. 908 and American charts, Nos. 1,475 and 1,476.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 200,514 tons. The only port charge is wharfrage at the Government wharf.

BOWMANVILLE HARBOUR or **PORT DARLINGTON**, county of Durham, Ontario, is on the north shore of lake Ontario in the western part of the lake. This place is the harbour for Bowmanville, some 2½ miles inland. The harbour is entered between a pier and a breakwater, the distance between the two is 150 feet with the deepest water on the pier side; 800 feet of the pier is planked on top, 800 feet is unplanked. The depth of water at the landing pier is 16 feet at low water. The water between the pier and along the inside of the breakwater is everywhere 14 feet.

There is a coal shed 150 feet long by 56 feet wide and 2 grain elevators where grain is delivered at the elevators by loaded waggons and from the elevators on board vessels.

Light.—Port Darlington light on the pier head, latitude N. 43 52 40, longitude W. 78 38 0, white fixed with red sector. See List of Lights on the Inland Waters for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 40,311 tons.

BROCKVILLE HARBOUR, Leeds county, Ontario, is on the Upper St. Lawrence river. The depth of water for anchorage is from 16 to 40 feet. The wharves belong to companies and private individuals. The wharves are continuous along the water front, with warehouses and sheds. The frontage of the water works wharf is 240 feet; of Jas. Bresnan's wharf, 70 feet; R. Bowie & Co.'s wharf, 160 feet; Ault & Reynold's, 218 feet; Canadian Pacific Railway Co., 650 feet,

recently rebuilt; J. Smart Mfg. Co., 400 feet; C. C. Coal Co., 100 feet; and Electric Light works, 110 feet. The depth of water alongside these wharves ranges from 12 to 16 feet. There is a railway siding on the Canadian Pacific Railway wharf and one on the wharf of the Jas. Smart Mfg. Co. The extent of the harbour used by vessels is along the river front inside the main channel.

Lights.—One Cole shoal light on pier five miles west of Brockville, 350 yards from north shore, latitude N. 44 32 0., longitude W. 75 45 21; a gas buoy off eastern end of Brockville narrows, another in 18 feet of water, 250 feet from north shore in narrows, west of Brock group and a third one on the south side of 15 foot Patch 1-5 mile south-eastward of Cole shoal. See List of Lights on the Inland Waters for 1913 and Admiralty Chart No. 2,789 (G). The total tonnage entered and cleared at Brockville during the fiscal year of 1912 was 1,281,840.

BRONTE HARBOUR, Halton county, Ontario, at the entrance to Twelve Mile creek, on the west shore of lake Ontario, has its entrance between two piers or breakwaters. The entrance is 93 feet in width. The length dredged alongside the north pier to a depth of 14 feet is 600 feet and the width of the dredged portion is 50 feet. The total length of the north pier is some 900 feet, with 9 feet depth of water at its shallowest point. The length of the south pier is 730 feet with depths varying from 4 to 10 feet.

Light.—The light which is a fixed white one is on the N. pier near its outer end, latitude N. 43 25 17, longitude W. 79 41 43. See List of Lights on the Inland Waters for 1913.

There is a harbour master at this port and his charges are as at other Canadian ports.

BRUCE MINES HARBOUR, district of Algoma, Ontario, is on the north shore of North Channel of lake Huron. It is a port of entry. The water is not deep, but a channel, 15 feet deep, has been dredged to the ends of the 2 wharves. One wharf is the property of the Bruce Mines Copper Coy. and is in the middle of the bay; it is the eastern wharf. The western wharf is close alongside at the outer end and trending N.W. by N. 1,200 feet to the western side of the village. This wharf is the property of the Dominion. McKay island on the western side of the mouth of the harbour affords shelter from gales. The anchorage is good under the island, east side, 3 fathoms depth of water, clay bottom.

Bruce Mines is a station on the Sault Ste. Marie line of the Canadian Pacific railway and is also the terminus of a short railroad running 14 miles inland called the Bruce Mines and Algoma railway.

Lights.—One on McKay island on the eastern end of the island, latitude N. 46 16 54, longitude W. 83 46 53, white fixed; one on outer end of Government wharf at Bruce Mines, latitude N. 46 17 47, longitude W. 83 47 24, white fixed. See List of Lights on the Inland Waters for 1913 and Canadian chart, No. 95.

The tonnage entered and cleared at this port for the year 1912 was 139,829 tons.

BYNG INLET, district of Parry Sound, Ontario, in the N.E. part of Georgian bay. The inlet runs $6\frac{1}{2}$ miles to the place of discharge of the Maganatawan river.

The wharves are:—one owned by the C. P. Ry. and is 500 feet long by 500 feet wide; depth of water 20 feet at low water; on this wharf are 2 steel oval towers for unloading coal and at each of which 250 tons can be unloaded per hour; wharf owned by Holland and Graves Lumber Coy., at which their saw-mill is located. These docks are used for piling and shipping lumber. There is also a small dock on the north side of the inlet owned by C. E. Begin.

There is a harbour master at Byng Inlet and the harbour extends the distance of one mile in length. The depth of water is 22 feet; the bottom is mud affording good anchorage.

The port charges are Harbour master's dues, according to tonnage, and are collected at the 2 first ports at which a vessel enters in the year.

Lights.—On Gereaux island, south side of entrance to Byng Inlet, latitude N. 45 44 31, longitude W. 80 39 52, fixed white; gas buoy in 9 fathoms 1 1-3 miles westward of Maganatawan ledges, white occulting.

Range lights in Byng inlet, front close to south side of channel, $\frac{3}{4}$ mile, 53°, from Gereaux island light, back light, 1,520 feet, 75°, from front, both red fixed. See List of Lights on the Inland Waters for 1913. There is a turning buoy in line with the range and other buoys to mark the channel.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 168,184 tons.

CARDINAL, Grenville county, Ontario, is situated on the upper St. Lawrence river about one mile below the Galops rapids. The harbour is artificially formed by a cut in the old canal bank. At one dock there is a depth of 18 feet on one side and 6 feet on the other. Another dock opposite has a depth of from 10 to 12 feet. An elevator is located near the latter dock. Vessels use the canal bank above the harbour for landing. There is deep water at the piers. In the harbour there is also an unused dock with 6 feet depth of water alongside.

Light.—One at the head of Galops canal, about 2 miles from Cardinal, on western end of pier on south side of upper entrance to canal, latitude N. 44 46 38, longitude W. 75 25 7., red fixed. See List of Lights on the Inland Waters for 1913.

The tonnage which entered and departed during the fiscal year 1912 was 48,052.

CHATHAM HARBOUR, Kent county, Ontario, is on the Thames river which empties into lake St. Clair. The harbour is about 18 miles east from the lake. The river has been dredged to about 13 feet.

There are ten wharves in all, including the City wharf, which has a shed available for freight, and one wharf has a railway siding.

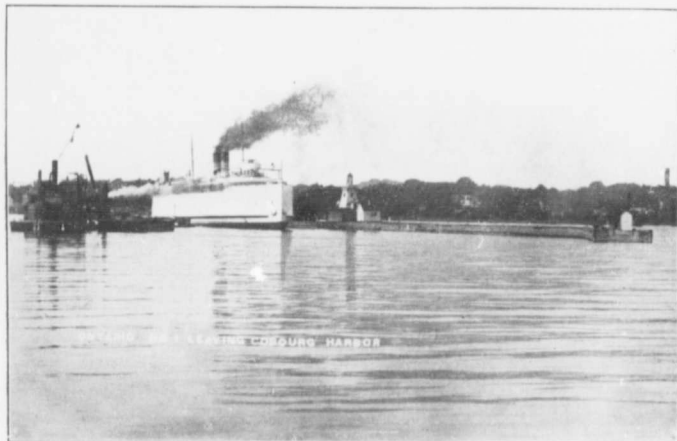
Chatham has communication with all parts of Ontario and United States by Grand Trunk, Canadian Pacific and Pere Marquette railways, as well as by steamboat lines to Windsor and Detroit.

Lights.—Thames river back light, called the main light, at the mouth of the river, south shore, latitude N. 42 19 0, longitude W. 82 26 50, and front light 300 feet, 320°, from main light, both white fixed; gas buoy in 14 feet of water in

lake St. Clair, $1\frac{1}{2}$ miles, $320^{\circ} 30'$, from Thames river main light, white occulting. See List of Lights on the Inland Waters for 1913.

The tonnage which entered and cleared during the fiscal year 1912 was 56,162 tons.

COBOURG HARBOUR, county of Northumberland, Ontario, is on the north shore of lake Ontario, about 68 miles east of Toronto. The harbour is formed by the construction of long piers, 3 in number, called the East pier, Central pier and Western pier. From the East pier, a short pier runs 305 feet westward towards Central pier, and within this pier and Central pier is the inner harbour where there is 13 to 19 feet of water. The West pier or breakwater is 2,000 feet long, running in a southerly line from the shore; there is an angle at the end of this pier running in an easterly direction. The East pier is 2,015 feet long



Cobourg, Ont. Car Ferry.

from the shore. Between the ends of these piers is the entrance to the harbour running also in a southerly direction with an average depth of water of 20 feet. The Central pier is about 1,200 feet in length, and the distance between the outer end of this pier and the East pier is 160 feet. At the inner end of the pier the distance is 780 feet between it and the East pier. The harbour front between these piers is 800 feet long built of cribwork.

Between Cobourg and Charlotte, in the state of New York, the large ferry boat "Ontario, No. 1" plies the year round, conveying cars of coal for the Grand Trunk railway and also a number of passengers.

Cobourg is also a place of call for the regular passenger boats plying between Toronto and Montreal. The place is also an important railway station of the Grand Trunk railway running along the shore of lake Ontario.

Lights.—One on E. pier, latitude N. 43 57 10, longitude W. 78 8 35, white fixed, immediately outside of this lighthouse is a diaphone fog-alarm; light on outer end of W. pier, latitude N. 43 56 57, longitude W. 78 8 58, white occulting; Cobourg range lights, front on W. edge of E. pier, 166 feet inside the Customs warehouse, back, E. of the east pier, 376 feet, 8°, 20', from front, both red fixed. See List of Lights on the Inland Waters for 1913, and Admiralty chart, No. 1,152.

The total tonnage entered and cleared at this port in 1912 was 2,093,004 tons.

COCKBURN ISLAND, district of Algoma, Ontario, is a small island on the S. side of the North channel of lake Huron and on the west side of Mississauga strait. On the north side of the island is Tolsmaville where there are wharves. In the vicinity the depth of water is from 2 to 3 fathoms. West of this place, in Tolsma bay, there is an anchorage in from 5 to 8 fathoms.

See Admiralty Chart No. 909 or Canadian Naval Service Department Chart No. 95.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 45,478 tons.

COLLINGWOOD HARBOUR, county Simcoe, Ontario, is on the south side of Georgian bay, and is an artificial harbour, having good wharf accommodation and 22 feet of water in the ship channel at the approach to the harbour and inside the harbour. The harbour is formed by 2 breakwaters, one the "East" and the other the "West", making a water area of about 300 acres within the enclosure. A large part of the harbour is shallow with rocky bottom. The East breakwater is 1,815 feet long and the West breakwater is stone mound and cribwork of about 1,400 feet in length. The cribwork is 700 feet long from the entrance to the harbour to the angle adjoining the stone mound. The distance between the ends of the 2 breakwaters is 1250 feet. The dredged ship channel from the bay into the harbour runs in a southerly direction and turns at the middle range light in the harbour in a south-easterly direction to the different wharves in the E. side of the harbour. The large vessels entering the harbour find accommodation at these wharves. Shallow draft vessels only make use of the western side of the harbour.

There is a turning basin connected with the ship channel approaching the wharves. At the outer end of the channel entering from the bay, the width is 300 feet, gradually diminishing to a width of 220 feet at a point 1,000 feet from the Grand Trunk railway freight sheds. Nearer the G. T. R. freight wharf the width of the channel is 450 feet. Along the face of the Government wharf the minimum width is 220 feet and the maximum is 300 feet. It will be seen by this that the widest part of the channel is east of the Grand Trunk Elevator wharf leading to the Grand Trunk general freight wharf and dry docks of the Collingwood Ship Building Co'y.

There are seven wharves for loading and discharging cargo, grain, coal and lumber: No. 1 wharf is the Grand Trunk Railway Company's lumber wharf, 500 feet long and 80 feet wide with railway siding and switches, depth of water 16 feet alongside wharf; No. 2, Grand Trunk Railway elevator wharf, 1,100 feet long, with elevator, railway siding and switches; No. 3, Grand Trunk Railway freight

wharf, 1, 200 feet long, with freight shed, 200 by 80 feet, and railway track running through the centre of the shed; No. 4, Collingwood Shipbuilding Co.'s wharf, 400 feet long; No. 5, Government wharf, 650 feet long, with freight shed, 100 by 50 feet; water in the channel leading to all these wharves except No. 1 is 22 feet deep; No. 6, Collingwood Meat Company's wharf, west side of harbour, 800 feet long and No. 7, Charlton Sawmill Company's lumber wharf on the west side of harbour, 2,500 feet long. The water at Nos. 6 and 7 is only 16 feet deep.

The capacity of the grain elevator is 200,000 bushels. Grain can be unloaded from vessels at the rate of 4,250 bushels per hour. Cars can be loaded at the rate of 5,000 bushels per hour and the largest sized vessels can be unloaded by loading grain directly into cars.

The accommodation for docking vessels for repairs is extensive and the port has one of the most complete ship-building plants anywhere on the Great Lakes for construction and repairs. One dry-dock is 570 feet long, 90 feet wide, depth of water on the sill 20 feet; another is 515 feet long, 54 feet wide; a third dry dock is contemplated and a landing slip, 1,000 feet long, for further mooring accommodation of vessels while undergoing repairs. Some of the finest and largest boats in the passenger and freight service on the Great Lakes have been built in Collingwood. Large boats for carrying bulk cargo of grain and merchandise have also been built.

The present equipment enables the Collingwood Ship Building Coy. to build ships of 600 feet in length and vessels of from 800 to 900 feet long, should future requirements call for them. The capacity of the Company with regard to time enables them to build a 500 or 600 foot ship every 6 months on one building berth. A 400 foot ship can be built on another berth in one year. Several tugs and small barges can also be built at the same time as these. One berth is large enough to build two 500 foot vessels in one year. The Company build their own engines and boilers and much of the auxiliary machinery.

Lights.—The lights are: Collingwood breakwater light, outer end of west breakwater in latitude N. 44° 31', longitude W. 80° 13' 50'', white fixed; one on cribwork pier at the turn of the dredged channel, which is a range light common to the shore range on the mainland 2,644 feet, 178° 30' from front light, red fixed; one light on a cribwork pier, 1,530 feet, 304° 30'; from front, white fixed, which is a range to the wharf from the light on the turn; one light on Nottawasaga island, two miles northwest of Collingwood harbour, latitude N. 44 32 20, longitude W. 80 15 50, white revolving. There is a gas buoy moored in 4 fathoms of water 400 feet west of Lockerbie rock.

The port charges are harbour master's dues, collected twice a year, if not paid elsewhere, and wharfage on cargo. At the Government wharf moorage is charged according to registered tonnage. See List of Lights on the Inland Waters for 1913. Chart No. 327, and the Georgian Bay Pilot for sailing directions. The total tonnage which entered and cleared from the port in the fiscal year 1912, was 345,869 tons.

CORNWALL HARBOUR, Stormont county, Ontario, on the upper St. Lawrence river, is at the eastern end of the Cornwall canal. The Cornwall canal is 11 miles long and is operated with six locks. The entire canal is lighted by the arc light system to facilitate night navigation. The dimensions of the locks are 270 feet by 45 feet. The depth of water on the sills 14 feet. From the head

of the Soulanges canal to the foot of the Cornwall canal, there is a stretch through lake St. Francis of 32 miles, which is navigable for vessels drawing 14 feet of water. From the head of the Cornwall canal to the foot of the Farran canal the distance on the river St. Lawrence is 5 miles. The wharf on the north side of the canal immediately south of the town is 1170 feet long, depth of water 14 feet; the wharf at the lower end of the canal on the river St. Lawrence is 500 feet long with a depth of water of from 9 to 12 feet, according to stage of water in the river, there is also a river wharf, 200 feet long, directly opposite the town of Cornwall.

There is also a dry dock which will accommodate vessels drawing 12 feet. The dock is 300 feet long and 250 feet wide and is situated opposite the south-east corner of the town of Cornwall. Its location is convenient for repairing vessels. Material and labour can be easily procured. The dry dock is used in the winter for laying up vessels after the close of navigation.

The channels are good and clearly distinguishable.

Lights.—Are lights along the canal; one range on St. Regis dyke, front one on cribwork pier on western end of dyke, latitude N. 45 1 3, longitude W. 74 39 44; one on cribwork pier on eastern end of dyke, 500 feet, 95° 30', from front, both white fixed; St. Regis dyke gas buoy, No. 96F., opposite east end of Cornwall island, white occulting. See List of Lights on the Island Waters for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 102,993 tons.

COURTRIGHT HARBOUR, Lambton county, Ontario, on the eastern shore of St. Clair river. The dock at this place is 1,000 feet in length with a depth of water of 16 feet alongside, there are 3 railway sidings on the wharf affording the best of facilities for loading and unloading freight.

The harbour is kept open the year round by ferry boats running with passenger and freight cars between Courtright and St. Clair. From 10 to 20 freight cars are loaded daily.

Lights.—On Stag Island shoal south end of shoal, latitude N. 42 52, longitude W. 82 27 50, white fixed, this light is situated about 4 miles north of Courtright; gas buoy on St. Clair Middle ground on the most northerly 18 foot spot east of St. Clair Middle ground, latitude N. 42 49 44, longitude W. 82 28 18, white fixed. See List of Lights on the Inland Waters for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1912 was 391,721 tons.

CUTLER HARBOUR, district of Algoma, on the north shore of North channel of lake Huron, is 18 miles east of Algoma harbour. The harbour is in Aird bay and anchorage is found in the bay with a depth of 20 to 25 feet. There are several lumber wharves with water from 18 to 24 feet alongside. Two of these wharves are on Aird island and are lumber docks. One wharf, called "Steamboat dock," is about one mile further east and it is necessary to pass through Little Detroit channel to reach this wharf. The port extends over quite an area but Cutler village is the main place of business, being a station on the Sault Ste. Marie branch of the Canadian Pacific Ry.

Directions for Sailing.—Through Whaleback channel to Cutler, after passing Nicholas island, on the westward, steer E. $\frac{3}{4}$ N. for Papineau island, 4 miles, until the highest part of mount Victoria is open eastward of the mill stack. Keep

it thus for about a mile to pass Curran rock (which generally shows) when haul to pass about 200 yards east of Casgrain rock, thus avoiding the rock off Lister island and the shoal water north of it; when abreast of Rykert point haul over for the wharves.

Lights.—Front on outer end of wharf, latitude N. 46 11 50, longitude W. 82 27 50, back light, 435 feet, 19° 30', from front, both red fixed. See List of Lights on the Inland Waters for 1913.

Total tonnage entered and cleared at this port for the fiscal year 1912 was 161,996 tons.

DEPOT HARBOUR, district of Parry Sound, Ontario, is situated on the north shore of Parry island, in Parry sound, Georgian bay, $5\frac{1}{2}$ or 6 miles distant from Parry Sound harbour. The approximate extent of the harbour used by vessels is one and a half miles by one quarter mile, and the depth of water for anchorage is 5 fathoms with good holding clay bottom. The harbour is well sheltered from heavy seas and its approach well marked by acetylene buoys, port and starboard spar buoys and compression gas lighthouses and beacons for a distance of twenty miles out into the open Georgian bay.

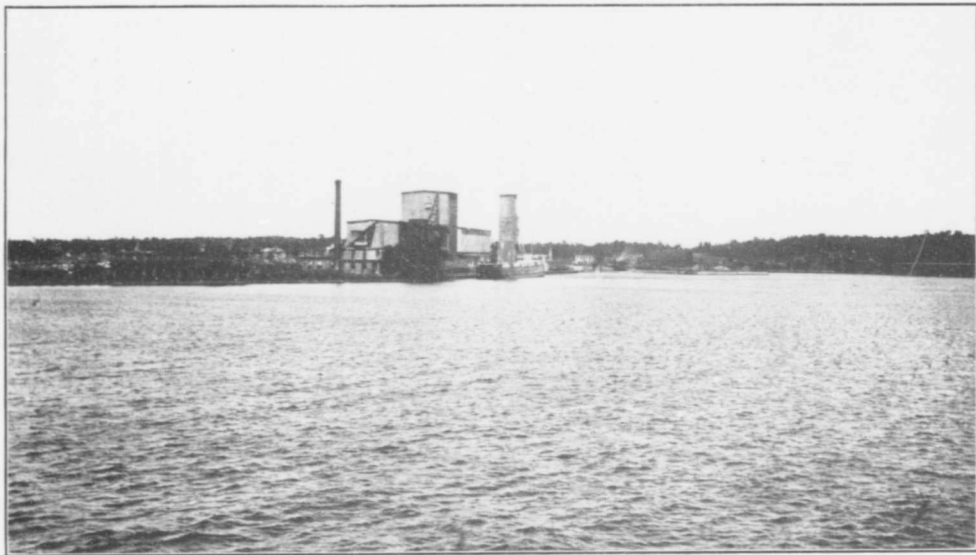
The elevator and coal wharf is 1,200 feet long by 81 wide, situated on the north side of the harbour, and owing to its length forms a breakwater against heavy seas from the north. The elevator which stands on the wharf has a capacity of two million bushels and has one marine leg. The amount of grain handled in the harbour averages 15,000,000 bushels, received principally from Fort William and Chicago during the season of navigation up to November 1, and then is transhipped in cars to Montreal, St. John, N.B., and Portland, Me. The wharf is also fitted with coal bins where from 80,000 to 85,000 tons of coal are handled in one season. For loading and unloading coal a steam derrick with buckets is used, principally by the Grand Trunk Railway vessels. Six railway sidings have been placed on this wharf, two of which run into the elevator, two along the north side and two run to the coal bin and end of breakwater on the south side. The depth of water alongside this wharf is from 18 to 30 feet.

The cement dock is situated in the centre of the harbour and consists of cribwork with concrete top; it is also 800 feet long by 150 feet wide. Two railway sidings run upon this wharf and the depth of water on both sides and across the face is from 18 to 20 feet. The wharf is used mostly for handling lumber and steel rails.

The package freight wharf is situated on the south side of the harbour and is 1,200 feet in length by 100 feet in width, with depth of water alongside from 21 to 35 feet. There are two extensive freight sheds, No. 1 being 600 feet by 80 and No. 2 is 650 feet by 80. Two railway sidings run alongside the sheds and the ships' side, with facilities for unloading freight by steam conveyors.

Lights.—The immediate light is Depot island light on the beach at the western extremity of the island in latitude N. 45° 19' 6", longitude W. 80° 30' 5", and one on Killbear point latitude N. 45° 20' 1", longitude W. 80° 10' 25", white fixed. See List of Lights on Inland Waters for 1913 and Admiralty Chart No. 1731.

The tonnage entered and cleared in 1912 was 468,828. See List of Lights on the Inland Waters and Admiralty Chart 1,731.



Depot Harbour, Ont.

DESERONTO HARBOUR, Hastings county, Ontario, on the north shore of bay of Quinte, is a commodious harbour for lake vessels. Good water is found up to the wharves for an extent of one mile east and west, and the harbour extends north and south about two miles. The depth of water at the eastern end is about 13 feet at low water, in the bay and about 11 feet at the western end. There are four wharves at which vessels drawing 14 feet can tie up at the highest stage of the water. The water in the channel from Deseronto to lake Ontario going east, is from 30 to 100 feet and safe for navigation, but vessels passing up to Murray canal draw less than 14 feet; the bay affords excellent shelter in storms, the bottom being of clay and mud and good holding ground.

The port has about a dozen wharves, nearly all connected by sidings with the railway track which runs along the shore end of the wharves, and loading with lumber is easily and quickly effected. There is a large cold storage building on the railway wharf with separate compartments for storing cheese, butter, meat, fruit, etc. The wharf has also a large shed where cheese and fruit are loaded directly into refrigerator cars, and articles can be taken from the cold store and also placed in refrigerator cars.

A large coal hoist has been constructed on the west end of "Long Dock" for unloading coal from boats drawing 12 feet of water.

Extensive repairs to wooden steamers and sailing vessels can be made at Deseronto, in a well situated shipyard with a complete equipment for hauling out and repairing. Several large steamers have been built at this port. It has convenient water communication with all lake ports and railway and telegraph communication with all points. The *port charges* are harbour master's dues paid twice a year if not paid elsewhere and wharfage.

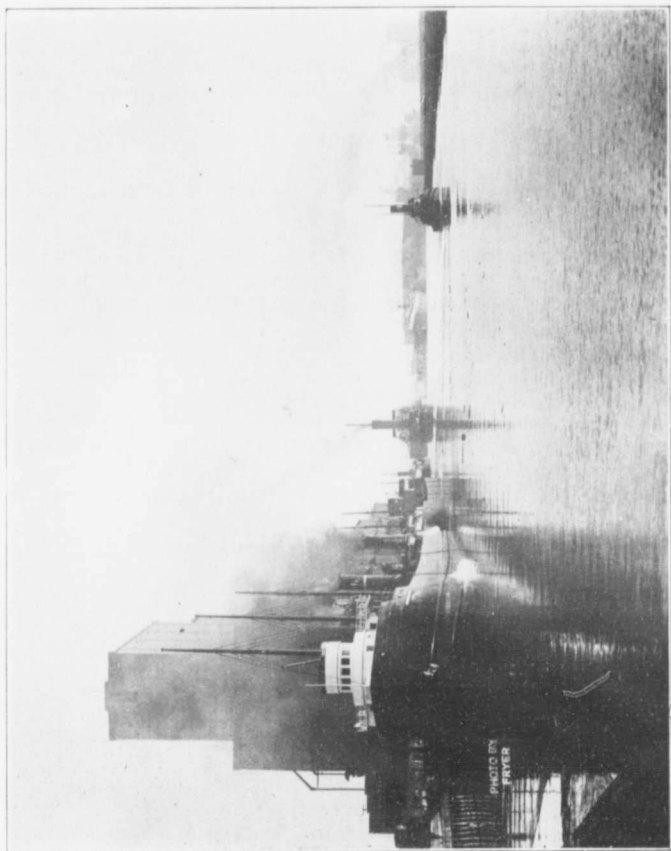
Lights.—The lights are one on the railway wharf in latitude N. $44^{\circ} 11' 27''$, longitude W. $77^{\circ} 2' 55''$, white fixed, and one on Telegraph island, about four miles westward. See List of Lights on the Inland Waters for 1913 and Admiralty Chart No. 2,961.

The total tonnage which entered and cleared from Deseronto during the fiscal year 1912 was 213,306.

FORT WILLIAM HARBOUR, District of Thunder bay, Ontario, is on the west side of Thunder Bay, north shore of lake Superior. The bay is a fine sheet of water, having a depth of $3\frac{1}{2}$ fathoms around the shores at the mouth of Kaministiquia River and 30 feet in the channel. The water increases in depth to the 10 fathom line, and beyond this line the water is deep everywhere, reaching to 40 fathoms well out in this bay south and east of Fort William. Approaching the harbour are the Welcome Islands, situated about $4\frac{1}{2}$ miles S.E. from the harbour. The Kaministiquia river has three channels emptying into the bay at three distinct points, viz.: Kaministiquia channel, McKellers channel and Mission channel.

There are docks at the mouth of each channel, and at the junction of the Mission channel with the main river is a turning basin and farther up the main river is another turning basin, $6\frac{1}{2}$ miles from mouth of the Kaministiquia or main river, with docks on one side of this basin. The natural channels have been dredged to a depth of 30 feet; the Kaministiquia was widened to 600 feet, the Mission channel to 500 feet and the McKeller channel to 400 feet. The depth of water at the landings or docks is 25 feet. Taking the water front on both sides of the river and

channels the harbour has a total water frontage of about 26 miles of land locked harbour, part of this frontage is on the mainland and part on the islands formed by the different channels mentioned, which run from the main river and empty into the bay.



Fort William, Ont.

The wharves, docks and elevators are as follows in rotation: beginning on the Kaministiquia river, a few hundred yards from the mouth of the Kaministiquia river, is the Dominion Government new Terminal elevator, with a storage capacity of 3,500,000 bushels. Proceeding up stream the next in order is the Empire elevator on the mainland side, with a storage capacity of 1,750,000 bushels; the next is the

Imperial Oil Coy.'s docks and tanks; on the opposite or island side in rotation, next to the Imperial Oil Coy.'s docks, are the C. P. Ry. Coy.'s hard and soft coal docks; then the flour sheds and docks of the C. P. Ry. Coy.; then come freight sheds and elevator C, with a capacity of 1,195,000 bushels; the C. P. R. docks and elevator A., with a capacity of 482,000 bushels; next in order is the C. P. R. dock and elevator E., with a capacity of 1,976,000 bushels; next is the C. P. Ry. dock and elevator B. with a capacity of 1,039,000 bushels, then the City wharf subway dock, Tug "Phone" dock, in a group; then follow the C. P. Ry. Coy.'s freight sheds and passenger steamer landing.

Next in order is the Grand Trunk Pacific Ry. docks at the junction of the McKeller channel with the main river, then the Ogilvie Flour Mills' docks and elevator, this elevator has a capacity of 1,250,000 bushels; then follows the C. P. Ry. freight docks. The C. P. Ry. bridge crosses the river at this point to island No. 2. The line proceeds to a bridge across the McKeller channel and continues to the new freight sheds on island No. 1 previously mentioned. Following above the bridge are the Murphy coal docks and sheds; then the International Harvester Coy.'s dock and warehouse, opposite the turning basin at the junction of Mission channel with the main river; following is another shed and dock of the C. P. Ry.; then comes the C. P. Ry. elevator D., capacity 7,800,000 bushels; next in order is the Power House and landing, then another of the Imperial Oil Coy.'s tanks, on the opposite side of the river on island No. 1; and following on the main land is the Consolidated Elevator Coy.'s elevator, with a capacity of 1,700,000 bushels, to be increased to a capacity of 2,700,000 bushels, then the C. P. Ry. cleaning elevator; next the Western Elevator with a capacity of 1,000,000 bushels, being increased by an additional unit of 1,000,000 bushels; then the G. T. P. Ry. freight sheds and dock. Above these freight sheds is the traffic swing bridge of the G. T. P. Ry. leading to its terminals at the mouth of the Mission channel; the next dock is the C. N. Ry. coal dock; next the Canada Iron Corporation docks; then the Canadian Car and Foundry dock and then the National Tube Coy.'s dock and plant; then the Black & Muirhead elevator, with a capacity of 50,000 bushels; then the turning basin, $6\frac{1}{2}$ miles from the mouth of the river previously mentioned.

At the mouth of the McKeller channel, where it empties into the bay, are coal docks of the C. P. Ry. Coy., capacity 2,000,000 tons.

At the mouth of the Mission channel the G. T. P. Ry. has in view the construction of the huge grain elevators, and plans show their location and capacity. The Grand Trunk Pacific Railway elevator now in use at mouth of Mission channel has a capacity of 6,500,000 bushels. The ore docks of the G. T. P. are also located near the mouth of the Mission channel and freight sheds of the same company. On the same side, ascending the channel, are the Fort William coal docks, the Seamen Kent Coy.'s plant and docks and on the north side of the channel farther up the Nanton Starch Factory docks.

Port Charges, are harbourmasters' dues, 50 cents for vessels of 50 tons up to \$5.00 for vessels of 700 tons or over, twice in the one year.

Lights.—One on Thunder cape entrance to Thunder Bay, latitude N. $48^{\circ} 18'$ $23''$, longitude W. $88^{\circ} 56' 40''$, white flashing, diaphone at this lighthouse. Hare island reef gas and bell buoy, about $1\frac{1}{2}$ miles, $294^{\circ} 15'$ from Thunder cape lighthouse, latitude N. $48^{\circ} 18' 43''$, longitude W. $88^{\circ} 58' 18''$, white occulting. Welcome

islands light on the N.E. extremity of the eastern Welcome island, latitude N. $48^{\circ} 22' 14''$, longitude W. $89^{\circ} 7' 13''$, white fixed, diaphone 50 feet northeastward of lighthouse. Fort William North gas buoy on outer end of northern edge of dredged channel of mouth of Kaministiquia river, latitude N. $48^{\circ} 23' 59''$, longitude W. $89^{\circ} 11' 33''$, white occulting. Fort William South gas and bell buoy on outer end of southern edge of dredged channel of Kaministiquia river, opposite N. gas buoy, latitude N. $48^{\circ} 23' 55''$, longitude W. $89^{\circ} 11' 33''$, white fixed. Kaministiquia light on Empire Elevator wharf, N. side of channel, latitude N. $48^{\circ} 23' 41''$, longitude W. $89^{\circ} 12' 48''$, red fixed.

The total tonnage entered and departed at this port for the fiscal year 1911-12 was 4,401,247 tons.

FRENCH RIVER HARBOUR, district of Parry Sound, Ontario.

French River is on the northeast side of Georgian bay. The river has five mouths which are called channels. Several islands and groups of islands separate the mouths from one another. The shore line is somewhat dangerous owing to ledges and rocks. Bustard islands and rocks are situated about one and a half miles southward of the entrance to French river proper. The harbour is principally a lumbering place, and several wharves afford accommodation for loading and unloading vessels. About half a mile of dock is used only for loading lumber and timber. There are three wharves with warehouses. The first wharf is known as the Ontario dock and is 275 feet long, with warehouse 50 by 20 feet for storing freight of every description; depth of water from 10 to 16 feet. The second wharf is known as the Boom Co. dock. It is 120 feet long with warehouse 30 by 18 feet. This wharf is sometimes used as a coal dock; water 18 to 22 feet in depth. The third wharf is known as Wabbs dock. This wharf is 120 feet long with from 6 to 12 feet of water alongside.

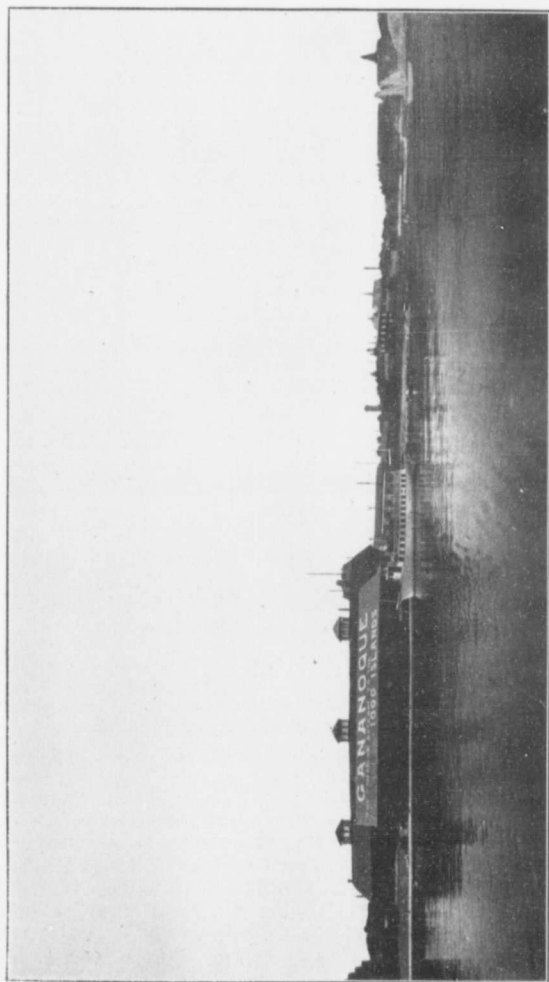
In addition to the shipping of lumber, pulpwood is shipped. Large lake tugs for towing purposes are used at this port. There is good anchorage inside the harbour with from 12 to 30 feet of water, mud bottom; anchorage is also found outside the harbour behind Bustard islands where there is from 12 to 30 feet of water. There is a buoy on the southern point of a shoal and this buoy is left on the port side going into the harbour and should be given a good berth. A flat shoal is situated on the northern point of the island. Vessels entering keep well to starboard to clear the shoal.

Lights.—Bustard rocks range lights: Back on a rocky islet, $2\frac{1}{2}$ miles S.W. of entrance to French river, latitude N. $45^{\circ} 53' 25''$, longitude W. $80^{\circ} 57' 18''$, white fixed; front inner, $229^{\circ} 43'$ from back; front outer, $193^{\circ} 254'$ from back, both white fixed.

French river inner range lights: Front on Lefroy island, W. side of mouth of river, latitude N. $45^{\circ} 46' 8''$, longitude W. $80^{\circ} 54' 40''$; back, in mill yard on E. side of river, 5178 feet 27° from Lefroy island light, and 348' $50'$ from head of creek, both red fixed. See List of Lights on Inland Waters for 1913.

French river is a sub-port of Parry Sound the local tonnage entered and cleared is not therefore obtainable

GANANOQUE HARBOUR, Leeds county, Ontario, is on the north side of the St. Lawrence river, at the mouth of the Gananoque river. Opposite Gananoque are situated a number of the Thousand islands. A channel has been dredged to a



Gananoque, Ont.

depth of 12 feet below the low water of lake Ontario level; the channel is in 2 tangents, the easterly one 100 feet wide, bearing $270^{\circ} 30'$, leading from deep water to the public wharf; the westerly one 150 feet wide, bearing $238^{\circ} 30'$, leading from the wharf to deep water above the mouth of Gananoque river. The south edge of this cut is marked by 3 spar buoys viz., one at the east end, one at the turn, and one at the west end. There is good anchorage off the town in from 15 to 50 feet of water.

The wharves are:

- No. 1. The Town Waterworks dock, 144 feet frontage. No shed. No facilities for handling freight. Depth of water 9 feet.
- No. 2. Taylor & Green Co's. dock, 375 feet front. One coal shed, 60 by 80 feet; one do., 70 by 90 feet; one freight shed 24 by 30 feet, with facilities for unloading coal only. Depth of water, 11 feet.
- No. 3. T. I. Railway Cement dock, 240 feet front; general freight shed, 30 by 85 feet; railway siding in rear of shed. Depth of water, 13 feet.
- No. 4. T. I. Railway coal and lumber dock, 134 feet front; railway siding on dock. No shed. Depth of water, 9 feet.
- No. 5. Town public dock, 60 feet front. No sheds. Water, 10 feet.
- No. 6. Gibson's Coal Dock, 100 feet front. No sheds. Water, 10 feet.
- No. 7. Britton's Coal and Freight Dock, 200 feet front; freight shed, 30 by 60 feet. Depth of water, 12 feet.

Lights.—One at Gananoque narrows, N.E. end of Prince Regent island, S. side of channel, 5 miles below Gananoque, latitude N. $44^{\circ} 19' 32''$, longitude W. $76^{\circ} 4' 58''$, white fixed; Jack Straw shoal light N. side of channel, 2 miles below Gananoque, red fixed; Spectacle shoal light, N. side of channel, quarter of a mile W. of Gananoque, latitude N. $44^{\circ} 18' 40''$, longitude W. $76^{\circ} 11' 9''$ white fixed; Red Horse rock light, S.E. side of channel, one mile above Spectacle shoal, white fixed; Gananoque narrows gas buoy, abreast of Gananoque narrows lighthouse, white occulting. See List of Lights on Inland Waters for 1913.

The total tonnage entered and departed during fiscal year 1911-12 was 273, 228 tons.

GODERICH HARBOUR, Huron county, Ontario, is on the southeastern part of lake Huron. There are two breakwaters protecting the entrance to the harbour basin, one called the Northwestern breakwater running towards the mouth of the Maitland river, having a light on the outer end, and the other breakwater running in a south-easterly direction from its outer end. The distance between these two breakwaters at their outer ends is about 600 feet. Previous to their construction the sea broke heavily against the ends of the north and south piers at the entrance to the harbour basin, and in gales or strong breezes made it difficult to enter. This difficulty has been largely overcome by the construction of the breakwaters. A breakwater on the north side of the harbour, built along the Maitland river, runs eastwardly and protects the cribwork of the northern side of the harbour basin from damage by ice during Spring freshets.

Two long piers, one the north and the other the south pier, 200 feet apart, form the entrance to the basin. At the inner end of the south pier is a checkwater, and the commercial docks or chief landing part of the harbour, begins at the checkwater, but steamers sometimes land passengers on the south pier west of the checkwater.

The harbour inside the piers is a basin entirely surrounded by crib-work, faced with timber and decked with plank with mooring hooks and posts. The landing or dock on the south side is 1,400 feet long, on the east side 650 feet long and on the north side 800 feet long; the circuit of the harbour basin is completed by sheet piling along the west side between the north pier and the northern side of wharf. West of this sheet piling is the sand beach, an accretion between the north pier and north breakwater.

The depth of water between the two outer breakwaters is from 20 to 24 feet excepting a shoal marked by a black spar buoy where the depth is $16\frac{1}{2}$ feet. Between this shoal and the southwest breakwater the depth is $23\frac{1}{2}$ feet. Range lights lead



Goderich, Ont.

into the heads of the piers from the lake outside the breakwaters. The depth of water between the north and south piers is 22 feet, and in the turning basin inside, opposite the south or commercial dock, 19 and 20 feet low water level. The water on the north side of the harbour basin is $17\frac{1}{2}$ feet along the central part of the wharf, 8 feet on the west and less at the east end; this dock has upon it a railway spur used principally for transporting lumber. The water is shallow along the cross dock at the east side of the harbour basin, and near it is an islet upon which small craft are built or repaired.

On the south side of the harbour two grain elevators are located, and vessels unload and load grain at them. One elevator, with a capacity of 1,000,000 bushels,

is owned by the Goderich Elevator and Transit Co., and the other, with a capacity of 800,000 bushels, is owned by the Western Canada Flour Mills Co. Facilities for handling grain by cars have been provided. The flour mills of the Western Canada Flour Company is one of the largest in Ontario, having a capacity of 1200 barrels per day. The carriage of grain to Goderich from Fort William and Port Arthur has amounted to about 10,000,000 bushels in the season of navigation in late years and the trade is increasing.

Goderich is a large distributing point of merchandise and grain, being the terminus of the Goderich branch of the Grand Trunk railway and of the Guelph and Goderich Railway (C. P. R.). Three regular lines of steamboats connect Goderich with other ports, and grain carrying steamers make Goderich their winter port.

The safety of the port for lake vessels has greatly increased in late years and deepening the harbour is constantly going on. The wharves are kept in a good state of repair by the Public Works Department.

Lights.—Goderich main light on high bank above the S. entrance to the harbour, latitude N. $43^{\circ} 44' 33''$, longitude W. $81^{\circ} 43' 34''$, white fixed, fog alarm on town water works building on the beach; light on the southern end of the Northwestern breakwater, fixed white. Temporary front light on northern pier and back light on the inner edge of the sand beach at the west side of the harbour, 1035 feet, $84^{\circ} 45'$ from temporary front light. Both these temporary lights are red fixed.

Buoys mark the channel from the outer breakwaters to the north and south piers. See List of Lights on the Inland Waters for 1913. There is a life boat station at the inner end of the south pier in the harbour.

The total tonnage entered and departed for the fiscal year 1912 was 327,492 tons.

GORE BAY HARBOUR, in the district of Algoma, Ontario, is on the northern side of Manitoulin island, North Channel, lake Huron, and is the provincial county seat of the island. The bay is two by one and a quarter miles at its entrance, and narrows towards its head, giving good anchorage in from 4 to 10 fathoms, mud bottom, the former 400 yards inside Town point and the latter half a mile outside. The harbour is completely sheltered from all winds.

There are four wharves, the largest or Merchants has 15 feet of water alongside, while the second or Public wharf has 14 feet, the last two, respectively called the Farmers and Fish wharves, have 12 feet each.

Lights.—Leading from Main passage, north point of Clapperton island, latitude N. $46^{\circ} 3' 22''$, longitude W. $82^{\circ} 14' 23''$, white fixed; leading from Mississagi strait, Mississagi island light on S. end, latitude N. $46^{\circ} 6' 23''$, longitude W. $83^{\circ} 0' 31''$, revolving white; cape Robert on N. extremity of cape, latitude N. $45^{\circ} 59' 45''$, longitude W. $82^{\circ} 48' 40''$, white fixed; the Gore bay light situated on Janet head, latitude N. $45^{\circ} 56' 40''$, longitude W. $82^{\circ} 28' 58''$, white fixed. See List of Lights on Inland Waters for 1913.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 188,451 tons.

GRAVENHURST HARBOUR, district of Muskoka, Ontario, is situated at the S. end of lake Muskoka. It is the chief centre of the tourist traffic in the

district on account of its connection with the Grand Trunk Railway. The steamboats of the Muskoka Lake Navigation Company connect with the railway and carry passengers and freight to all points on the lakes. There are wharves and landings for the accommodation of steamers. The company have two, one 330 feet long with a front of 36 feet, and one 340 feet long with a front of 40 feet. The Government's public wharf, lately repaired, is 330 feet long with a front of 26 feet.

Lights.—Gravenhurst narrows, one S.E. point of Denison island, lake Muskoka, latitude N. $44^{\circ} 58' 20''$, longitude W. $79^{\circ} 22' 25''$, white fixed lights, at junction of Muskoka river and lake; the Cut outer light at outer end of dredged channel outside cut, red fixed; the Cut middle light, midway between outer light and shore, red fixed; the Cut inner light, at inner end of dredged channel near shore, red fixed; main channel N. side, on outer end of reef on N. side of channel, white fixed; main channel, S. side, on edge of reef S. side of channel; Rosseau light, on Ditchburn shoal, near head of Lake Rosseau, about one mile southerly from wharf, white fixed; Peacabe light, on shoal about one mile above Maganatawan river, white fixed. See List of Lights on Inland Waters for 1913.

HAMILTON HARBOUR, Wentworth County, Ontario, is practically the whole of Burlington bay in the extreme west end of lake Ontario. The harbour is approximately six miles long by one mile wide. It is land-locked, and anchorage is good in 50 feet of water with mud bottom. Burlington beach, a narrow neck of sand, varying in width from 250 to 1,000 feet, separates the bay from the lake through which the entrance from the lake to the harbour has been cut and piers built on each side, the north pier being about 2,305 feet and the south pier 2,721 feet long, the width between varying from 174 feet at the outer to 103 feet at the inner end. There is a shoal in the harbour off the wharves, but it is marked by buoys.

The wharves beginning on the western side are some unused wharves, then Brown's wharf, 173 feet long on the west side, 173 feet frontage and 205 feet on the east side with one shed 160 feet by 40 feet, and another 160 feet by 53 feet, the depth of water at this wharf is from 16 to 18 feet; McIlwraith's wharf with several sides and angles, at the shore end 132 feet long, one side 80 feet at right angles, another side 135 feet, one 116 feet and the front face 234 feet, and the eastern side 178 feet in length; two sheds are upon this wharf, one 87 feet by 40 feet and one 100 feet by 30 feet; the depth of water is 14 feet; McKay's wharf, 294 feet on the west side, 148 feet frontage, the east side adjoining a slip, 63 feet wide, with 14 feet depth of water in it. There is a large warehouse upon McKay's wharf covering nearly the whole area; the depth of water is 14 feet. Adjoining the slip is the Hamilton Steamboat Company's wharf, length 110 feet at the head; a passenger shed and a freight shed are upon this wharf, 147 feet by 40 feet; some distance further east is the Hamilton Ferry Company's wharf; the Turbinia Steamship Company's wharf adjoins the city warehouse property. The depth of water in the harbour opposite the western wharves referred to ranges from 13 to 18 feet and opposite the Hamilton Steamboat Company's wharves the water is from 17 to 21 feet.

The water opposite the ferry wharf ranges from 13 to 16 feet. The water opposite the Turbinia wharf from 13 to 18 feet, low water level. East of the revetment wall the Intercolonial Harvester Company of Canada has a dock, 600 feet long

by 75 feet, with two sheds measuring 300 feet by 150 feet, and two railway sidings; the depth of water is from 16 to 18 feet at this dock. A new wharf has been built at the west end of the revetment wall with water on the west side 16 feet to 19 feet in depth and on the east side from 5 feet, near the revetment wall, to 14 feet at the head of the wharf, and at a distance beyond the head, it is 16 feet. Outside the 17 feet contour line which runs east and west the water ranges from 17 to 19 feet and in some places the depth is over 20 feet. At the east end of the revetment wall some filling in will be done, and it is proposed to build a wharf along the side of the filled in portion. Near the Oliver Plough works dredging has been done to 20 feet. The Hamilton Steel and Iron Company's dock is 200 feet long by 60 feet wide, with one railway siding; depth of water, 16 feet. A channel has been dredged to the outer end of this dock 18 feet in depth.

Lights.—Main light near middle of S. pier at entrance is 1467 feet 236° 46' from front light, latitude N. 43° 18' 20", longitude W. 79° 48' 25", white fixed. Front light on outer end of S. pier, red fixed. Diaphone attached to this Light-house. Inner light on end of S. pier 1300 feet 241° 45' from main tower.

The harbour it is expected will be placed under a Harbour Commission which will administer the affairs of the Harbour.

IROQUOIS HARBOUR, in the county of Dundas, province of Ontario, is situated at the foot of Galops canal on the St. Lawrence river. From the head of Rapide Plat canal to Iroquois, at the foot of Galop canal, the St. Lawrence river is navigable for 4½ miles.

The canal enables vessels to overcome the rapids at Pointe-aux-Iroquois, Pointe Cardinal and Galops.

Lights.—The nearest light is the gas buoy, number 138-U, at the upper entrance of the canal at Iroquois, latitude N. 44° 46' 43", longitude W. 75° 25' 17", white occulting. At the head of Galop canal, on the west end of the pier, on south side of upper entrance to canal, is a red fixed light.

KASLO HARBOUR, West Kootenay district, British Columbia, is on the north end of the main Kootenay lake. The port has communication by steamboat with Ainsworth, Lardo, Nelson, Proctor, and Kootenay landing, and other places.

Light.—On end of spit, Kootenay lake, latitude N. 49° 55' 0", longitude W. 117° 0' 0", white fixed.

Total tonnage entered and cleared at this port for the fiscal year, 1911-12, was 234,216 tons.

KENORA HARBOUR, Rainy river district, Ontario, formerly called Rat Portage, is on the north side of lake of the Woods. The harbour extends from Bunnell's point, on the east, to Reduction Works, on the west, and is approximately 1 mile long by ½ mile wide. The entire harbour is land-locked and is available for small vessels. The water is about 10 feet deep and the bottom is sand, gravel and mud. There are 2 entrances, one on the east side from Rainy river direction and the other on the west side from Keewatin channel. Owing to the number of islands on the northern part of lake of the Woods there are a great many channels and they are generally shallow. A number of these channels are buoyed.

Kenora is on the Canadian Pacific Railway's main line between Winnipeg and Fort William and Port Arthur. It has communication by water with Fort Francis at the head of the Rainy river where Rainy lake empties into the river over Fort Francis Falls. The southern part of lake of the Woods is of considerable width, being about 40 miles of clear water from the islands to the mouth of the Rainy river on the south east side of the lake.

The Wharves, beginning on the west side, are as follows: a short dock, 48 feet by 60 feet, 10 feet of water; Town dock, 160 feet by 100 feet, 10 feet of water; Rainy River Navigation Company's wharf, 480 feet by 20 feet, 10 feet of water; Kendall's dock with an 'L', 200 feet by 100 feet, 10 feet of water; Town dock, 66 feet by 20 feet with 10 feet of water; Rat Portage Lumber Company's dock, 66 feet by 128 feet with 10 feet of water. South of the latter dock is the Rat Portage Lumber Company's repair slip which will accommodate the largest vessel on lakes, say 335 tons registered tonnage.

A new wharf has recently been built by the Government of pile construction, total length 399 feet 3 in., width 16 feet, with an approach of 35 feet of earth and rock. This wharf has been sheet piled for motor boats, depth of water 20 feet.

Coney Island pleasure resort has a wharf at the entrance of the Keewatin channel with 6 feet of water alongside.

There is a spur track to the Rat Portage Company's mill.

Lights.—Lights on lake of the Woods are: two in Bishop's bay, front light on small island about 200 feet north of northwest extremity of Royal island, latitude N. 49° 27' 53", longitude W. 94° 45' 35", white fixed; one on north shore of Royal island also white fixed; one on Squaw island west of South point of island, 37B, latitude N. 49° 17' 48", longitude W. 94° 49' 10"; one on Ferris island off Hopper point, extreme west of Bigsby island; one on Tomahawk island an island off McAuley bay, altitude N. 49° 1' 38", longitude W. 94° 30' 35", white fixed. There is a bell buoy at the mouth of Rainy river, Rainy river lights, one off south-west extreme of Sable island, latitude N. 48° 53' 7", longitude W. 94° 40' 38", and another 1494 feet, 164° from front light, red fixed.

KEY HARBOUR is in Parry Sound district, Ontario, midway between French river and Byng inlet on the north shore of Georgian bay. From the bay of Key inlet by channels running between islands the distance is about 7 miles. A deep water course is indicated on the plan of Key harbour published in 1909 by the Department of Marine and Fisheries.

The first wharf is connected with the main line of the Canadian Northern Ontario railway by a spur line seven miles long from Key junction. Iron ore is conveyed to a building on the wharf. Vessels can convey freight to this wharf and discharge. The depth of water at the wharf is 16 feet.

The second wharf is 500 feet long and 28 feet wide; the water is 24 feet deep. On the wharf is an elevator and pockets for the storage of iron ore which is carried by spouts to steamers loading. This wharf was rebuilt in 1911 and extended. The principal shipment from Key harbour is iron ore. Vessels carry cargoes of 8000 or 9000 tons from this harbour to Toledo and Indiana harbours. Good anchorage is found in the harbour and vessels can enter in all winds.

The outside entrance to Key harbour, clear of all dangers, is on Dead range S. 41° W. 1½ miles from Southeast rock in latitude N. 45° 51' 9", longitude W. 80° 52'

46". A red gas buoy No. 2 is placed at this point; the next gas buoy is at Murray Bend, red buoy No. 8, close to a 2 foot spot; the next in line is a red gas buoy at Keefer Bend at the junction of Keefer and Wedge ranges in 7 fathoms of water, 150 feet south of Keefer range and on Wedge range; the next gas buoy is No. 20, 75 feet S.E. of range, marking a spot with 14 feet of water, 2000 feet west of Bigsby island; the next gas buoy, red, is at Dokis middle ground marking south extremity 50 feet N.W. of range; the next gas buoy is No. 24, marking north extremity of Mann reef 100 feet south of range; the next gas buoy is No. 26 "Inside" on north end of a shoal patch 50 feet south of Dokis range. Then the range leads to the wharf in Key harbour.

Day beacons were placed in 1908 on the following ranges: Dead, Keefer, Wedge and Dokis ranges. The Dead range in one leads from the open bay to intersection with Keefer range at No. 8 gas buoy, depth of water on Dead range from 30 to 70 feet. Keefer range in one leads from the intersection with Dead range at No. 8 gas buoy to the intersection with Wedge range at No. 14 gas buoy, depth of water on Keefer range from 22 to 39 feet. Wedge range in one leads from the intersection with Keefer range at No. 14 gas buoy to the intersection with Dokis range near No. 23, black spar, depth of water on Wedge range from 27 feet to 60 feet. Dokis range in one leads from the intersection with Wedge range near No. 23, black spar buoy, to the railway wharf; depth of water from 21 feet at the gas buoy to 27 feet near the railway wharf. See Admiralty charts 1213 and plan of Key harbour, No. 99, published by the Department of Marine and Fisheries in 1908 and 1909.

The total tonnage entered and cleared at this port for the fiscal year 1912-13 was 50,714 tons.

KINCARDINE HARBOUR, county of Bruce, Ontario, is situated on the east coast of lake Huron, at the mouth of Penetangore river. The harbour was formed by dredging, building cribwork. Two piers were built into the lake at right angles to the beach forming the entrance. The piers, named North and South piers respectively, are about 750 feet long and 125 feet apart. The outer entrance to the harbour, just outside the piers is dredged to 16 feet; the channel between the piers is dredged 725 feet long, 50 feet wide, to a depth of 15 feet, while the turning basin 350 feet long, 275 feet wide, has 11.2 feet of water, all below low water level. The normal water level for July 1913 was 2 feet 6 inches above low water level.

The harbour is used as a refuge for vessels not drawing over the depth in the basin. It is a regular port of trade for a line of steamers running between lake Huron ports and Sault Ste. Marie.

A breakwater is contemplated N.W. of the North pier, to break the sea at the entrance; at present with a heavy sea running, it is difficult to make the entrance.

The docks in the basin accommodate vessels drawing eleven feet and at the dock on the western side of the basin the water is fourteen feet. There is a life-saving station located in the harbour equipped with a surf boat and apparatus.

Some 5 miles from Kincardine, or midway between Point Clark (locally called Pine Point) light and Kincardine, are Tolmie reefs, composed of five reefs, with from 12 to 13 feet of water, Clark reef, one mile outside the point of that name is another danger. See Pilot for lake Huron and Admiralty chart No. 3319.

Lights.—Range lights in Kincardine leading into the harbour, front on N. pier, 230 feet from W. end, 1200 feet 285° from main light, red fixed; back or main light in town on hill side, latitude N. $44^{\circ} 10' 38''$, longitude W. $81^{\circ} 38' 22''$, white flashing; the fog alarm is situated 1375 feet N. of harbour entrance, at town water works building and is a steam siren maintained by corporation. See List of Lights on Inland Waters for 1913.

The total tonnage entered and cleared at this port for the fiscal year, 1911–12 was 20,816 tons.

KINGSTON HARBOUR, Frontenac county, Ontario, is situated on the St. Lawrence river, at the north-eastern extremity of lake Ontario. The Cataraqui river empties into the St. Lawrence river at Kingston, and the mouth of it forms part of the harbour above the bridge. The extent of the harbour, from Portsmouth, on the west, to Bell island, on the eastern side, is about $3\frac{3}{4}$ miles, and the depth of water varies from about 12 to 20 feet at the outer ends of the wharves to 40 feet in places opposite the city in the St. Lawrence river.

The wharves from the west to the east are Portsmouth pier, about 610 feet long by 20 feet wide; depth of water from 4 to 17 feet; Penitentiary wharf, frontage 1,040 feet, with an angle from the west side 230 feet by 30 feet; Clark's malt house wharf, 180 feet on the west side by 35 feet, the front side of the angle is 140 feet; depth of water, 21 to 22 feet along the front side; Rathbun's wharf, length along the front, 275 feet by 30 feet in width with sheds, water from 11 to 17 feet; Maitland street wharf, 120 feet long by 20 wide, water, 17 feet; Waterworks wharf, front side of angle, 155 feet long by 20 feet wide, depth of water from 14 to 18 feet; another waterworks wharf, 220 feet from shore to outer end by 25 feet wide, water 27 to 29 feet at outer end; Moder's elevator wharf with 20 feet of water at the outer end; Kingston Locomotive Works wharf, 410 feet long by 265 wide on the front, water along the front side, 18 feet; Craig's wharf, frontage, 145 feet, depth of water, 10 to 11 feet; Grand Trunk freight shed, 272 feet frontage, with from 12 to 14 feet of water alongside; Swift's wharf, west side, 400 feet long by 82 feet wide, with freight sheds, depth of water along the front, 12 feet; Ferry dock, 214 feet long by 36 feet wide, depth of water, 9 feet at outer end; Richardson's elevator wharf, 394 feet long by 65 feet wide, water at outer end, 10 feet 6 inches; Mrs. Harty's wharf, 200 feet long by 104 wide, depth of water at outer end, 8 feet; Crawford's wharf, 196 feet long by 64 feet wide, depth of water, 8 feet at the head of the wharf.

Montreal Transportation Company's wharf, 810 feet long, width varying from 66 feet to 20 feet, with two projections on the east side 80 feet long each, water alongside projection, 17 feet, at the outer end, 13 feet 6 inches; Montreal Transportation Company's elevator wharf, 645 feet long by 92 feet wide, depth of water along the west side, 10 feet, at the outer end 16 feet. Above the bridge over the Cataraqui river is the coal wharf of the Kingston and Pembroke Railway Company, 400 feet long, and another wharf of the same company 925 feet long by 66 feet, and one 760 feet long by 68 feet wide, upon which are railway tracks on all of the three wharves.

There are two docks for repairing vessels, one belonging to the government, 290 feet long by 79 feet wide at coping level, 47 feet at floor level, with 16 to 18 feet

over the sill. This dock can be lengthened to 323 feet; the other, Davis' dock, for light draft vessels, is situated above the bridge; it is 182 feet long by 31 feet at the entrance, and depth of water 4 feet 6 inches over the sill.

Kingston has three grain elevators with a capacity of 1,800,000 bushels, and considerable quantities of wheat are transhipped to ocean ports from the port. Extensive repairs are sometimes made to vessels, and material can be easily procured. Kingston has water communication east and west and railroad communication with all parts of Canada and with the United States. The harbour is under the control of the city corporation.

Lights.—Range lights on Barriefield Common, front, 370 feet E. from end of Bridge to Kingston, latitude N. $44^{\circ} 14' 4''$, longitude W. $76^{\circ} 28' 24''$, back, 1500 feet 37° from front, both white fixed. Portsmouth range, front on E. extremity of Carruthers point, west side Little Cataraqui bay, latitude N. $44^{\circ} 12' 38''$, longitude W. $76^{\circ} 32' 46''$, back on N. shore of bay, 3550 feet 21° from front, both white fixed. On Penitentiary shoal is a gas buoy showing a white fixed light. See List of Lights on the Inland Waters for 1913.

Total tonnage entered and departed for the fiscal year 1911-12 was 2,564,588 tons.

KINGSVILLE HARBOUR, county of Essex, Ontario, on the north shore of lake Erie, about 25 miles east of the mouth of the Detroit river, is an artificial harbour formed by 2 piers making an entrance 180 feet wide. The outer entrance to the channel, 300 feet long, 275 feet wide, was dredged to a depth of 17.5 feet below low water level. The channel between piers from a point opposite the outer end of East pier is 180 feet wide, 16 feet deep below low water level and for a length of 650 feet adjacent to the East pier the channel is approximately 200 feet wide and 16 feet deep, further inside the harbour the depth in channel and turning basin is 15 feet at low water level. The West pier, or breakwater, is some 1,500 feet in length, while the East pier, used as a wharf, with freight shed, 14 by 15 feet, and waiting room, 14 by 14 feet, is 800 feet long.

Kingsville is the centre of a rich farming district, with a line of steamers from other ports calling regularly, and has communication with Pelee island in the lake, and is a harbour of refuge.

Lights.—Range, front on outer end of East breakwater pier, 10 feet from W. edge, latitude N. $42^{\circ} 1' 37''$, longitude W. $82^{\circ} 43' 50''$; back, on top of bank at head of East pier 349° 1,060 feet from front, both red fixed. See List of Lights on Inland Waters for 1913.

The total tonnage entered and cleared at this port for the fiscal year, 1911-12 was 100,028 tons.

KOOTENAY LANDING HARBOUR, East Kootenay district, British Columbia, situated at the south end of the lake, is the terminus of the Crows Nest Pass railway. There are suitable wharves at Kootenay Landing for the C. P. Ry. steamboats that ply between Nelson and other ports on the lake. A car ferry, consisting of barges towed by powerful tugs, exists between the Landing and Proctor, the terminal of a branch of the Canadian Pacific Railway.

Lights.—One on west side of mouth of Upper Kootenay river, latitude N. $45^{\circ} 15' 49''$, longitude W. $116^{\circ} 41' 36''$, white fixed. See List of Lights for Pacific Coast, 1913.

LEAMINGTON HARBOUR, county of Essex, Ontario, is situated on the north shore of lake Erie, $6\frac{1}{2}$ miles east of Kingsville and 10 miles west of point Pelee. The harbour is an artificial one formed by two piers. The new or east pier, used as a dock, is 1,050 feet long with an L 70 feet long at outer end, affording shelter for small vessels. The old or western pier is used as a breakwater and is 400 feet west of the one just described. Although 14 feet is to be found at outer end of East pier the maximum draught of vessels utilizing the harbour is 11 feet. A line of steamers plying between Windsor and Pelee island calls regularly at this port, also deep draught tugs carry considerable freight to Pelee island and other places.

Light.—On shore on old pier, Latitude N. $42^{\circ} 1' 50''$, longitude W. $82^{\circ} 35' 38''$, white fixed.

The total tonnage entered and departed at this port for fiscal year 1911-12 was 85,618 tons.

LION'S HEAD HARBOUR, county of Bruce, Ontario, is situated on the west shore of Georgian bay, 22 miles north of Wiarton. Its area comprises a quarter of a mile square, and is partially sheltered from northerly gales by a breakwater extending 120 feet beyond the N. W. narrow point. Vessels of light draught find refuge under the breakwater with the wind in. The bay affords some shelter with the winds from east and west.

The main industry in the village is a very large sawmill, the output of which is considerable, all sent out by vessels.

From the village the east shore runs N. E. straight for $1\frac{3}{4}$ miles to a headland 168 feet high, called by the same name as the village. From the eastern part of Lion's head a reef makes out 400 yards, and as the bottom is very rough, care should be taken to avoid it. See Pilot for Georgian Bay and Admiralty chart No. 1214.

Light.—On breakwater at N. entrance, latitude N. $44^{\circ} 59' 31''$, longitude W. $81^{\circ} 14' 55''$. See List of Lights on the Inland Waters for 1913.

LITTLE CURRENT HARBOUR, district of Algoma, Ontario, is on the north shore of Manitoulin island and in the narrow channel between the island and Goat island. A channel, 100 feet wide, carrying 22 feet of water at low water has been cut through the rock bar between Spider island and Goat island, north of the town of Little Current. The place is a lumber shipping port, and a series of boom piers have been built to facilitate the towing of logs.

The harbour is well sheltered and has wharves with ample water alongside of them. The place has communication by water with all Georgian Bay ports and with Sault Ste. Marie, and at a short distance by steamer with the Canadian Pacific Railroad, east and west. See Georgian Bay Pilot and Admiralty chart No. 907.

Lights.—On E. extremity of Spider island, latitude N. $45^{\circ} 59' 4''$, longitude W. $81^{\circ} 55' 50''$, white fixed; Little Current range lights, front, near shore in village, latitude N. $45^{\circ} 58' 52''$, longitude W. $81^{\circ} 55' 41''$; back, on high ground, 176° from front, both are red fixed. See List of Lights on the Inland Waters for 1913.

The total tonnage entered and departed at this port for the fiscal year 1911-12 was 263,635 tons.

MEAFORD HARBOUR, county of Grey, Ontario, is on the southern shore of Georgian bay, east of Owen Sound, at the mouth of the Big Haad river. There are two wharves, one on the east side and the other on the west. On the east side is

the grain elevator, with a capacity of about 750,000 bushels. It is located about 1,000 feet from the entrance. The water on the west side, near the freight shed, is from 17 to 18 feet in depth. Considerable dredging has been done within the last two years to remove the material which was brought down by the freshets into the harbour. There is about 1,500 feet of dockage in the harbour ranging from 250 to 400 feet in width and in places the water is 19 feet deep. The depth of water alongside the dock at the elevator is about 19 feet.

The port charges are Harbour Master's Dues, paid twice a year, and according to tonnage, not exceeding \$5, on the largest vessels.

Light.—On west end of breakwater on N. side of entrance, latitude N. $44^{\circ} 36' 55''$, longitude W. $80^{\circ} 35' 10''$, white occulting. See List of Lights on Inland Waters for 1913.

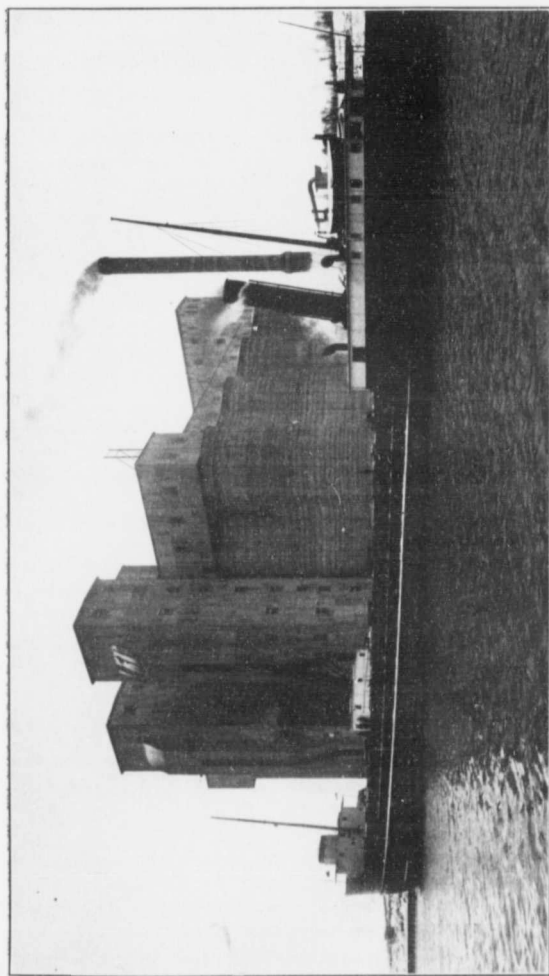
The total tonnage entered and departed during the fiscal year 1911-12 was 245,551 tons.

MICHIPICOTEN HARBOUR, district of Algoma, Ontario, is situated on the eastern shore of lake Superior and the northern shore of Michipicoten bay and is one of the lake terminals of the Algoma Central Railway. A river of the same name empties into the bay. The ore dock and commercial pier are situated in the northernmost cove of the harbour, and the bottom has been dredged to 20 feet alongside. The basin between the wharves from 175 to 300 feet has been deepened to 20 feet, but the slip off the east side of the commercial pier is only 150 feet wide. The dock in this harbour runs north and south. It is 600 feet in length by 50 feet wide. There is a freight shed on it, 189 feet long, with 18 feet of water on both sides of the dock. The railway track runs the whole length of the dock through the freight shed. A wharf has lately been constructed, 137 feet long, 22 feet wide, with a depth alongside of 20 feet. There is a moving derrick for loading and unloading heavy articles. There is also an ore dock about 300 feet west of the other dock, running also north and south.

Light.—On S. E. extremity of Little Groscep, latitude N. $47^{\circ} 56' 54''$, longitude W. $84^{\circ} 54' 10''$. See List of Lights on the Inland Waters for 1913.

The total tonnage entered and departed for fiscal year 1911-12 was 251,885 tons.

MIDLAND HARBOUR, Simcoe county, Ontario, is in Midland bay, on the southeast side of Georgian bay. The entrance is between Midland point and Elimere point, a distance of $2\frac{1}{2}$ to 3 miles. Midland bay runs a distance of four miles from the turning point at which vessels come in line with the electric range lights, situated on a hill in the southwest part of the town. The harbour is spacious, with a depth of 25 to 100 feet of water for anchorage of large vessels, with the exception of Middle shoal, which has a depth of 12 feet only. This shoal is in the middle of the harbour or direct course from Midland point to the wharves situated on the southeast side of the harbour, but there is ample depth of water on each side of the shoal. The east side of the shoal in the harbour has a depth of from 50 to 100 feet with ample room, the west side of the shoal has a channel 24 feet deep, narrow but without obstructions. Vessels are well sheltered at the wharves, no storm interferes with loading or discharging and many large steamers are put in winter quarters in this harbour.



Midland, Ont. G. T. P. Elevator.

Grand Trunk Elevator.—This elevator has a full capacity of 2,400,000 bushels and facilities to unload vessels at the rate of about twenty-five thousand bushels per hour. There are two sidings running into it, on which cars can be loaded nearly as fast as can be elevated from vessels. This is a very fine iron and cement structure, with all the most modern appliances for work; water, 25 feet.

Aberdeen Elevator.—This elevator has a capacity of one million bushels, with facilities to unload vessels at about the rate of ten thousand bushels per hour. It is an iron structure and has one siding on which cars can be loaded; water, 25 feet.

The Midland Elevator Company.—This elevator has a capacity of 1,200,000 bushels and facilities to unload vessels at the rate of about ten thousand bushels per hour. It is a wooden structure, iron sheeted, with a railway siding into it on which cars can be loaded; water, 22 feet.

Manly Chew's Mill.—This mill has a capacity of about eighteen to twenty million feet of lumber per season, with large dock frontage to load vessels from; water from 15 to 20 feet.

Georgian Bay Shook Mills Co.—This factory is large and manufactures boxes, doors, sash and all kinds of mouldings and house-building material; water along frontage from 16 to 18 feet in depth.

N. L. Playfair Mill.—A most modern mill with a capacity of about twenty million feet of lumber per season. A fine dock front at which vessels can be loaded; water from 12 to 16 feet.

Jas. Playfair & Coy's Mill.—This mill's capacity is about eighteen to twenty million feet of lumber per season; with large dock frontage at which vessels can be loaded; water from 12 to 22 feet. Two railway sidings lead to the dock.

Midland Towing and Wrecking Coy's Dock.—The water at this dock is about 22 feet. Wrecking sheds are located here, and appliances used at wreckages stored.

Midland Coal Dock Coy's Dock.—This dock handles yearly about 75,000 tons of coal, and has a storage capacity of 25,000 tons, and facilities to unload boats at the rate of 1,800 tons every twenty-four hours. Railway siding leading to this dock. The largest size lake vessels can coal here. The water is from 22 to 24 feet.

Government Dock.—This dock has a good frontage, and water 14 to 22 feet in depth.

Shipway and Shipbuilding Yard.—Vessels 100 tons capacity can be hauled out here, and vessels of 150 tons can be built in the yard. A large business is done.

Government Dock at end of Grand Trunk Railway Dock.—This dock has a good frontage, and water from 10 to 22 feet. Railway on side of it.

Grand Trunk Railway Dock.—This dock has two railway sidings leading over it, and has a large shed 36 by 150 feet; water, 10 to 22 feet.

Chew Bros. Mill.—This mill has a capacity of eighteen to twenty million feet of lumber per season; with large dock frontage; water, 22 feet.

Steel Works and Canada Iron Furnace Co.—These works are of a very substantial character and with the steel works does a large business. Long dock, most solidly built, with water from 14 to 22 feet. Railway siding leading along the dock front.

Provisions and other ship's stores can be procured at Midland at reasonable prices, and coal can be easily obtained for bunkers. The port has communication

with all Georgian bay and lake ports, including Fort William and Port Arthur. From the latter ports large quantities of grain are received. The port has railway communication with all parts of Ontario and with the United States. See Georgian Bay Coast Pilot and Admiralty chart No. 2102.

Lights.—Midland point, approaching from the west, 2,500 feet northward from Midland point, latitude N. $44^{\circ} 47' 10''$, longitude W. $79^{\circ} 51' 54''$, the other light west of it is 225 feet 283° from first, both white fixed; Tiffin lights, front, 10 feet back from the N. W. extremity of quay wharves, latitude N. $44^{\circ} 44' 46''$, longitude W. $79^{\circ} 51' 20''$, back, 151 feet, 142° from front, both red fixed; Midland town lights, leading directly into the harbour, front on hill side, S.W. part of the town, latitude N. $44^{\circ} 44' 58''$, longitude W. $79^{\circ} 53' 56''$, back, 1320 feet 230° from front, both red fixed. See List of Lights on the Inland Waters for 1913. Port charges are Harbour Master's Dues, paid twice a year if not collected in other ports, and wharfage.

The total tonnage entered and departed at Midland for the fiscal year of 1912 was 823,277 tons.

MORRISBURG HARBOUR, county of Dundas, Ontario, is situated at the foot of Rapide Plat canal on the St. Lawrence river. In ascending the river the canal is entered at Morrisburg. There are two wharves in the harbour. The old wharf, which is 400 feet by 20 and is available for loading and unloading freight. Depth of water between the old wharf and new wharf in the slip entrance to the old canal is 12 feet, width about 100 feet. The new wharf is 600 feet by 25.

The total tonnage entered and departed at this port for the fiscal year 1911-12 was 116,478 tons.

NAPANEE HARBOUR, county of Lennox and Addington, is situated on the Napanee river, six miles from where the river empties into the bay of Quinte. A cut has been made in the river to form a channel of eleven feet in depth for craft going to the town. It has 11 wharves, 8 on the north side and 3 on the south, with grain sheds and coal sheds, and a cold storage shed for apples is located at Napanee.

The total tonnage entered and departed at this port for the fiscal year 1911-12 was 12,618 tons.

NELSON HARBOUR, B.C., is on the south western arm of Kootenay lake, about 16 miles from the main body of the lake. Nelson is the centre of steamboat traffic and has communication with Kootenay landing, the western terminal of the Crow's Nest Pass railway, also with Kaslo, Ainsworth, Proctor and other places on the Kootenay lake. Nelson also is the centre of railway communication in this part of British Columbia; it also has communication by steamboat with Arrow Head on the northern Arrow lake. The steamboats connect with the main line of the Canadian Pacific Railway from Revelstoke by a branch line to Arrow Head and then by steamer on the Arrow lakes to Nelson and from there to Kootenay landing. Nelson has communication with American ports on the Columbia river of which the Kootenay lakes form a part. Nelson is in the centre also of a large mining district and the traffic in all directions is considerable.

Lights.—Proctor middle ground light buoy, entrance to West arm of Kootenay lake, latitude N. $49^{\circ} 37' 43''$, longitude W. $116^{\circ} 56' 30''$, white fixed. Proctor range, front, S. side of entrance to W. arm of Kootenay lake, latitude N. $49^{\circ} 37' 24''$,

longitude W. $116^{\circ} 56' 40''$, 500 feet 215° from front, white fixed; Proctor, entrance to W. arm of Kootenay lake, latitude N. $49^{\circ} 35' 00''$, longitude W. $117^{\circ} 00' 00''$, white fixed with red sector; Pilot Bay, near N. end of Pilot point, latitude N. $49^{\circ} 38' 29''$, longitude W. $116^{\circ} 53' 9''$, white fixed; Kootenay landing, on W. side of mouth of Upper Kootenay river, S. end of Kootenay lake, latitude N. $49^{\circ} 15' 49''$, longitude W. $116^{\circ} 41' 36''$, white fixed.

The total tonnage entered and departed at the port of Nelson during the fiscal year 1911-12 was 3,718,330 tons.

NEWCASTLE HARBOUR, Durham county, Ontario, is situated on the north shore of Lake Ontario, 47 miles E. of Toronto. The harbour is a small bay with an entrance channel formed by a pier 900 feet long on the east side and a breakwater 600 feet long and pile revetment 730 feet long on the west side. The channel between the pier and the breakwater is 14 feet deep and continues along the east pier but at the inner end is only $9\frac{1}{2}$ feet in depth. The depth in the approaches and between the piers is 14 feet, recently dredged.

Light.—The light is on the outer end of East breakwater pier, latitude N. $43^{\circ} 53' 35''$, longitude W. $78^{\circ} 34' 0''$, white fixed.

NIAGARA-ON-THE-LAKE HARBOUR, Lincoln county, Ontario, is at the mouth of the Niagara river, Lake Ontario. The harbour is not much used for anchorage. There are two wharves. The main one is 600 feet long by 45 feet wide, and depth of water 15 feet. In 1911 four cuts were made in the approach to the harbour, each 42 feet wide. No. 1 is 1,200 feet long; No. 2, 949 feet long; No. 3, 555 feet long; No. 4, 325 feet long. Adjoining this wharf are railway tracks, station and freight shed. Another wharf in the port is 100 feet long by 35 feet wide, upon which stands a small freight shed. Between the two wharves is a slip where small vessels may be repaired. Though the harbour is not much used for anchorage, there is room with good shelter for a large number of vessels.

Lights.—Niagara gas and bell buoy $2\frac{1}{2}$ miles, 350° from Fort Niagara lighthouse. Fort Niagara is on the American side of the river, latitude N. $43^{\circ} 18' 9''$, longitude W. $79^{\circ} 4' 23''$, white occulting. Diaphone on edge of river 300 yards below front lighthouse of Niagara-on-the-Lake; front light near South East corner of Niagara Navigation Company's wharf, Niagara-on-the-Lake, latitude N. $43^{\circ} 15' 22''$, longitude W. $79^{\circ} 3' 54''$, red fixed; light on shore 690 feet $152^{\circ} 30'$ from front light, also red fixed. There is a bell buoy at the north west extremity of the shoal making out from the east side of the mouth of Niagara river, 5,200 feet 317° from Fort Niagara lighthouse, latitude N. $43^{\circ} 16' 22''$, longitude W. $79^{\circ} 4' 36''$. See List of Lights and Fog Signals on Inland Waters for 1913.

The total tonnage entered and departed at Niagara-on-the-Lake during the fiscal year of 1911-12 was 2,032,038 tons. Niagara has daily communication with Toronto.

NORTH BAY HARBOUR, Nipissing district, Ontario, situated at the eastern end of Lake Nipissing. The town is a divisional point on the main line of the Canadian Pacific Railway and a terminus of the Temiskaming and Northern Ontario Railway and the Grand Trunk Railway and will be a divisional point on the Canadian Northern Railway. There is a Government wharf at this place and

a breakwater recently completed. The depth of water near the Government wharf is about 14 feet in different cuts and about 30 feet wide.

Light.—On outer end of Government wharf at its South East end, latitude N. $46^{\circ} 18' 35''$, longitude W. $74^{\circ} 28' 37''$, white occulting.

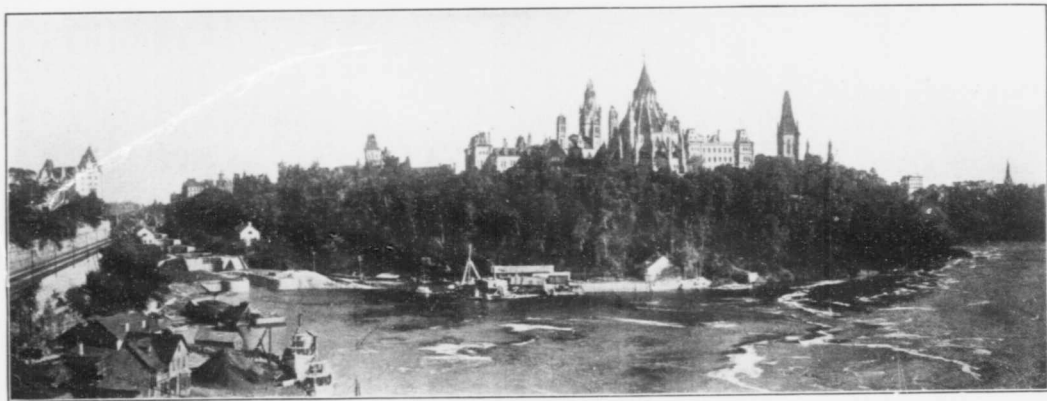
ORILLIA HARBOUR, Simcoe county, Ontario, is situated on the west shore of Lake Couchiching about 23 miles northeast of Barrie, on Lake Simcoe. Lake Couchiching connects with Lake Simcoe to the south, and steamboats and yachts ply on Lake Simcoe from Orillia. There are wharves at this place, one of which is a new Government wharf. The channel between Lakes Couchiching and Simcoe is buoyed, and steamers drawing from 9 to 10 feet of water leave Orillia for various points on Lake Simcoe, a favourite summer resort. Communication by small craft is maintained to the head of lake Couchiching to the north of Orillia.

Orillia has several large factories and is a lumber centre, having also good railway connections by the Grand Trunk Railway with the northern and midland counties of Ontario.

OSHAWA HARBOUR, Ontario county, Ontario, is situated on the north side of Lake Ontario, and is about 34 miles north east of Toronto. The harbour is not used to any great extent by shipping owing to the fact that there is no shelter. The bottom is sand. There is a wharf at Oshawa on Warrant's Creek about 4 miles inland from the lake. The landing consists of a pier which has a depth of about 12 feet at its end. Boats approach either side of the end of this pier, but the water shallows somewhat quickly to the shore line. There is communication by steamboat with Toronto and other lake ports and Bay of Quinte. At the shore end of the wharf is a grain elevator formerly used for storing grain purchased from farmers and shipped from Oshawa. Coal is also landed at the wharf and coal sheds of considerable size are conveniently placed. The wharf is under the control of the Department of Marine and Fisheries and a wharfinger is stationed at this place.

Light.—Oshawa light on pier head, latitude N. $43^{\circ} 52' 0''$, longitude W. $78^{\circ} 47' 0''$, red fixed.

OTTAWA HARBOUR, Carleton county, Ontario, is situated on the south-east side of the Ottawa river in latitude $45^{\circ} 25' N.$, longitude $75^{\circ} 45' W.$ The shipping trade is done by small river steamers and barges which also ply on the Rideau canal, having the termini at Ottawa and at Kingston at the eastern end of Lake Ontario. Passenger and freight steamers ply between Ottawa and wharves along the Ottawa river, some of them communicating daily with Montreal. The canal basin is situated a short distance above the locks by which steamers and barges ascend from the Ottawa river. The basin has a wharf frontage where a number of freight steamers load and unload, and passengers are taken aboard on their way up the canal. The depth of water in the basin is about 6 feet. At Chaudiere docks, Ottawa river, lumber is loaded in large quantities on both sides of the river for shipment via the Rideau canal going westward and by the lower Ottawa river going eastward. These docks extend along the shore of the river on the Ottawa side and around a basin at the foot of the cliff up to the Suspension bridge and along the shore from the Suspension bridge on the Hull side of the river eastward below the Alexandra bridge. The Chaudiere Falls and rapids immediately above the Suspension bridge prevent navigation for several miles.



Rideau Locks, Parliament Hill, from Nepean Point, Ottawa.

The river below the falls is called the lower Ottawa. The Queen's wharf below Nepean point is the principal passenger and package freight wharf, and upon it is a freight shed; depth of water at low water at the wharf is from 8 to 10 feet. At the foot of the Rideau canal locks the water varies from 15 feet in depth, low water, to 25 feet, during the spring freshets, but there is only 5 feet of water over the



Grand Trunk Ry. System, portion of the City of Ottawa, showing the new \$2,000,000 Grand Trunk Hotel, the "Chateau Laurier," Railway Station, and part of Rideau Canal basin.

sills of the locks. East of the Queen's wharf several small lumber docks are used for loading lumber into barges. Ottawa has railway communication by the Canadian Pacific Railway in six directions, including two transcontinental lines, by the Grand Trunk in three directions, and by the New York Central to New York and by the Canadian Northern railroads east and west.

The total tonnage that entered and departed at the customs during the fiscal year 1911-12 was 163,314 tons.

OWEN SOUND HARBOUR, Grey county, Ontario, is situated at the bottom of Owen Sound bay. The bay is eight miles wide at the entrance, gradually narrowing until the town is reached twelve miles from the entrance. The bay is well sheltered and its shores can be approached with safety to within one quarter of a mile from shore, except at Vails and Squaw points on the east side of the bay or sound. The anchorage is good in the bay in 6 to 7 fathoms of water at certain points with mud bottom.

The wharves in the harbour on the east side are: No. 1, town dock, 450 feet long by 20 feet wide; No. 2, owned by Davis Son & Malone, 200 feet by 20 feet; No. 3, Northern Navigation Company, 400 feet by 20 feet; No. 4, owned by the Canadian Pacific Railway Company, 1,900 feet long by 70 feet; No. 5, Canadian Pacific Railway Company's slip, 1,200 feet by 70 feet; No. 6, Keenan Bros.' Wharf, leased from the Canadian Pacific Railway, 400 feet by 30; No. 7, McQuay Tanning Company, 100 feet long by 20 feet; No. 8, Maitland & Rixon, 200 feet by 30 feet; No. 9, Imperial Cement Company's slip, 600 feet long by 40 feet; No. 10, Carney Lumber Company, 1,000 feet by 40; No. 11, Keenan Bros. Sawmill Wharf, 100 feet by 30. Wharves on the west side: No. 1, town dock, 625 feet by 30; No. 2, J. R. McLauchlan, 383 feet by 30; No. 3, Grand Trunk Railway wharf, 1,000 feet by 30; No. 4, N. A. Bent Chair Company, 316 feet by 30; No. 5, John Harrison & Sons, 400 feet by 30; No. 6, Sun Cement Company, 235 feet by 30; No. 7, Owen Sound Cement Company, 290 feet by 30 feet; No. 8, John Harrison & Co., 806 feet by 30; No. 9, Grey and Bruce Cement Company, 370 feet by 150 feet. The depth of water along the wharves is 22 feet. A revetment wall on both sides of the harbour has been built and the harbour has recently been dredged at the mouth of the Sydenham river and elsewhere in the harbour.

The freight sheds are, the Canadian Pacific Railway cattle sheds, 50 feet by 30 feet; Canadian Pacific Railway freight sheds, one 350 feet by 40 feet; one 300 feet by 60 feet; one 650 by 70 and another 200 by 50 feet. The Apple Company own one cold store. The Grand Trunk sheds are, cattle shed 75 feet long by 50 feet and a freight shed 300 feet long by 60 feet wide.

Railway tracks run both sides of the river adjacent to the sheds, and freight is moved to and from vessels directly into the cars by hand trucks. Grain is shipped from Fort William and Port Arthur to Owen Sound by steamers and transferred to cars. The port has daily communication by water with many Georgian bay, lake Huron, North channel, and some Lake Superior ports, and railway communication with all parts of Canada. Provisions and ships' stores are easily procured at reasonable prices.

Lights.—The lights are two range lights, the front light on the east side of the Sydenham river in the town, latitude N. 44° 34' 43", longitude W. 80° 56' 19", and the back light 1,060 feet S. 21° W. from the front tower; Presqu'île light on a wharf in the sound. See List of Lights, Georgian Bay Pilot and Admiralty Chart No. 1214.

The total tonnage entered and departed at Owen Sound for the fiscal year 1911-12 was 673,715 tons.



Parry Sound Harbour, Ont.

PARRY SOUND HARBOUR, district of Parry Sound, Ontario, is situated on the east side of Georgian bay. The entrance to this harbour is between Deepwater and Bobs' points. It has a width of 250 yards and a depth of four fathoms on Deepwater point side of the channel. Opposite Bobs' point a bank runs out upon which the water is only 11 feet deep, but the edge is marked by a buoy. Inside the harbour there is a good anchorage in about 5 fathoms of water, with clay bottom. The extent of the harbour is about $1\frac{1}{2}$ mile square with good water all over, except off Silbow rock, also off Galnas dock, Parry island; off Conger Lumber Company's wharf and off 9-foot spot near Parry harbour dock. These dangers are marked by buoys and can easily be avoided. The harbour is well protected on all sides and the channel leading to it well buoyed.

There are five wharves in the harbour of Parry Sound. The Parry Sound wharf is 901 feet in length and 30 feet in width; the depth of water, starting 50 feet from the shore line and running to the southern extremity, is from 15 to 18 feet and 17 feet across the end. Adjoining the wharf are two storehouses, one, belonging to the Parry Sound Lumber Company, measures 64 by 26 feet, and the other to the William Beatty Company, is 86 by 38 feet. The wharf is also fitted with coal bins which hold from 2,500 to 3,000 tons. The Canadian Northern Ontario Railway wharf measures 465 feet in length by 75 feet in width, and has a depth of water, from 18 to 23 feet along both sides. There is a freight shed on the wharf, 100 by 30 feet, and a railway siding which runs to the extremity of the dock. Freight is loaded and unloaded from the cars. The Parry Sound shore wharf is a crib wharf, running along the shore front about 83 feet, with a depth of water of about 11 feet; a storehouse, partly on the wharf, measures 103 by 24 feet. Rose point wharf is used for passengers from the Grand Trunk; it measures 73 by 20 feet; depth of water, 18 to 20 feet along the front. The Department of Marine and Fisheries has a buoy depot at this harbour with a wharf for landing buoys. A new Government wharf has been built consisting of pile substructure and concrete superstructure, which is 300 feet long by 26 feet wide. The approach is 115 feet wide by 220 feet long. A channel has been dredged alongside this wharf to a depth of 18 feet below low water mark.

There is one small repairing dock fitted with lifting gear and ways on Parry island, used for repairing small steamers and scows. There are extensive lumber docks along the shore front, covering an area of about two miles where the water averages from 15 to 20 feet except at two points.

Water and supplies of all kinds can be easily obtained at Parry Sound and repairs to vessels not requiring to be docked are reasonably made. Shipbuilding of small vessels is carried on.

Lights.—The lights, beginning from Red rock light at the entrance of Parry Sound are: Snug harbour range, Jones island range, Spruce shoal beacon, Carling rock light, Killbear point, Depot island light, Three Mile point light, and one on Rose point swing bridge in the harbour, in latitude N. $45^{\circ} 18' 57''$, longitude W. $80^{\circ} 2' 49''$, green and red fixed, green when opened and red when closed. Gas buoys also mark the dangers in the approaches to the harbour.

See List of Lights on the Inland Waters for 1913 and Admiralty Chart No. 1731. The tonnage entered and departed at this harbour during the fiscal year 1911-12 was 160,547 tons.

PEMBROKE HARBOUR is in Renfrew county, Ontario, and situated on the upper Ottawa river, 104 miles west of Ottawa, a distance between Ottawa and Pembroke is navigable only in sections owing to falls and rapids on the river. The river is navigable above Pembroke to Joachin, a distance of 50 miles. Steamboats carry passengers and freight from Pembroke to Joachin and intermediate landings.

There are several wharves at Pembroke, one of which is a Government wharf of great length. There are several lumber wharves at which vessels load. There are railway connections by the Canadian Pacific Railway and Grand Trunk and Canadian Northern Railways.

Pembroke is a place of much importance owing to the large quantity of lumber that is made at the different saw-mills. Large numbers of logs are floated down the river to Pembroke from the limits above and tug-boats are used for towing rafts. The channel above Pembroke is well buoyed for passenger boats and yachts that pass up and down.

Lights.—Allumette island light about two miles below Pembroke, on boom pier about 200 feet from shore of island, latitude N. $45^{\circ} 48' 12''$, longitude W. $77^{\circ} 2' 37''$; one on Lower narrows on pier north side of channel, latitude N. $45^{\circ} 50' 0''$, longitude W. $77^{\circ} 10' 0''$. Both are white fixed. See List of Lights on the Inland Waters for 1913. Pembroke is an outpost of Ottawa.

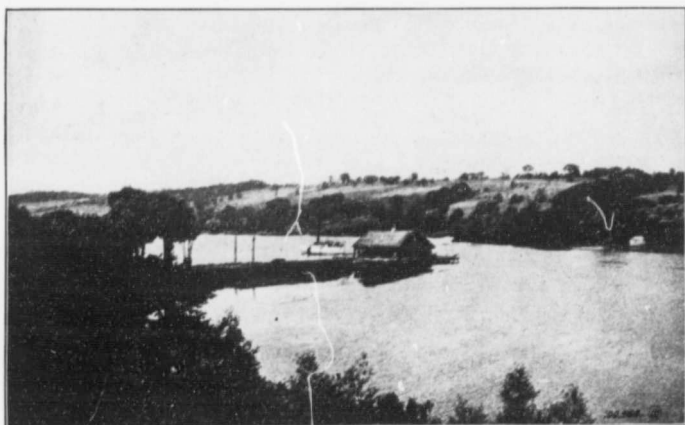
PENETANGUISHENE HARBOUR, county of Simcoe, Ontario, is on an arm of Georgian bay on the southeastern side of the bay. Whiskey island is passed on the way to this harbour. The island is a small one with shoal water extending off the south point 225 yards and off all other sides 100 yards. On entering to pass between Whiskey island and Sloane point keep the northernmost of the Indian huts on the west shore of the harbour in line with the lighthouse on the Reformatory point pier, S. W. $\frac{1}{2}$ W. This mark also clears the sand spit off Pinery point. North West point at the entrance of the harbour has very shoal water off it in all directions for about 275 yards. A good entrance, however, 100 yards wide, has been dredged in not less than 25 feet of water and this channel may be safely navigated, keeping the two lighthouses in line N.E. by E. Reformatory point is marked by a pier built across the shallow water. The end of the pier bears E. 500 yards from North west point and between them is the entrance to Penetanguishene harbour. From these two points the harbour runs in $2\frac{1}{2}$ miles in a nearly S. by W. direction. It is an excellent harbour. The water is good and anchorage may be had anywhere in from 4 to 8 fathoms with mud bottom with perfect shelter from both wind and sea. The southern part of the harbour shallows very quickly. Opposite the town is a large bay that gradually shoals from the centre to the shore but it has 7 feet of water in mid channel.

The wharves are:—Tannery wharf north east of town, 173 feet long on north side 39 feet wide and along the breastwork the wharf is 186 feet long. Water 15 feet deep at the end, 10 feet in the centre and 9 feet on the south side; Penetanguishene dock government wharf, east side depth of water 13, $10\frac{1}{2}$ and 7 feet, front 13 feet and 9 feet at the N. E. corner. There is a dock running along shore 1250 feet in length with a railway track upon it. The depth of water is about 9 feet in the centre and 13 feet at the N.E. corner; McGibbon's wharf is 110 feet long, with $7\frac{1}{2}$ feet of water; First Brook wharf is 500 feet long and 53 feet wide

at N. E. corner, depth of water about $7\frac{1}{2}$ feet. On the west side of the harbour are the Charles Beck wharves, Nos. 1, 2, 3, 4 and 5. They are of large size, depth of water $10\frac{1}{2}$ feet at No. 1, 12 feet at No. 2, 7 feet at No. 5.

Lights.—The lights are; one on Whiskey island, entrance to Penetanguishene harbour, latitude N. $44^{\circ} 48' 53''$, longitude W. $79^{\circ} 55' 12''$, white fixed; one on outer end of Reformatory pier, also white fixed and one at the bottom of the harbour, 1,600 feet $117^{\circ} 30'$ from the mouth of Copeland creek in Penetanguishene harbour, and another 500 feet 186° from the front, both red fixed. See List of Lights on the Inland Waters 1913.

The port charges are Harbour Masters' dues collected twice in the year, if not collected elsewhere, according to tonnage, not exceeding \$5 for any vessel.



Entrance to Picton Harbour, Ont.

PICTON HARBOUR, county of Prince Edward, Ontario, is at the end of the southern arm of the bay of Quinte, called the Adolphus reach. It is between Deseronto, on the north side of the bay of Quinte and the mouth of the Napanee river. The arm referred to continues in a southerly direction into Picton bay. The harbour has been dredged to a depth of 12 feet. At the entrance of the harbour is a freight wharf and at some distance from this are several wharves with freight sheds, cold store, and coal shed. Steamers call at this port to load fruit, unload merchandise and land passengers. The Richelieu and Ontario Navigation Company owns a line of boats running between lake Ontario and the St. Lawrence river and connect with Charlotte, state of New York across lake Ontario and through the bay of Quinte.

The total tonnage entered and cleared at this port for the fiscal year 1911-12 was 348,748 tons.

POINT EDWARD HARBOUR, county of Lambton, Ontario, is situated on the St. Clair river, at the southern end of lake Huron, at the point where the waters of the lake enter the river. The town is adjoining Sarnia. The wharves are continuous along the river for about 3,000 feet and divided as follows:—The dock at which fish tugs and other small boats lie, 600 feet in length; iron ore dock, 300 feet; shed docks, 1,500 feet, where general merchandise and cargo is handled, length of shed, 800 feet; elevator docks, 600 feet long, one elevator, capacity 500,000 bushels. The average depth of water along the docks is 22 feet. At this place the Hamilton Steel and Iron Company has established a large plant. Two railway sidings are laid on the ore docks, two leading to the freight sheds, two to the grain elevator and one siding along the remainder of the docks. The shipping to and from this port conveys general merchandise, grain, flour, iron ore, gravel, fish, lumber and small shipments of other articles. The machinery and appliances for loading and unloading are considered excellent. The port has railway communication with all parts of Ontario and with the United States with excellent appliances for shipment of goods.

Lights.—Front, on beach 500 feet, east, from head of St. Clair river, latitude N. $43^{\circ} 0' 11''$, longitude W. $82^{\circ} 24' 49''$, back on beach 579 feet 180° from front, both red fixed. Lights in one lead in to head of St. Clair river from lake Huron and should be kept in one ahead until their alignment of Fort Gratiot range on the United States side. See List of Lights on the Inland Waters for 1913.

PORT ARTHUR HAREOUR, district of Thunder Bay, Ontario, is situated on the northwest shore of lake Superior. The inner harbour has been formed by the construction of a breakwater, with an entrance at each end and the middle entrance between the two breakwaters is 366 feet wide, 22 feet deep. The entrance at the end of the southerly part of the breakwater is about 600 feet wide and dredged to a depth of 25 feet. The middle entrance is about 366 feet wide and dredged to a depth of 22 feet. The northern entrance is 250 feet wide and 22 feet deep. The western side is 25 feet deep in front of the docks. In the centre of the harbour inside the breakwater the water is 22 feet deep. The breakwater at Bare point runs in a southerly direction for 1,200 feet to an angle and from this angle it runs westerly for a distance of 2,500 feet. North of this breakwater is a channel leading to the dry dock of the Western Dry Dock Company with a depth of 20 feet. Inside the breakwater the harbour has been dredged for a turning basin with a depth of 22 feet of water and outside the entrance of the middle channel is a depth of 25 feet.

There are a number of wharves of different lengths; the Canadian Pacific Railway wharf 990 feet long, 75 feet wide, shed upon it 400 feet long; the Canadian Northern Railway wharves have been recently extended in length and size, 5 railway tracks alongside; the Fisher's wharf, 700 feet long by 40 feet wide, with icehouse and packing house upon it; Clewat's wharf, 770 feet long by 55 feet wide, with two store-houses and shed. The coal wharf is 930 feet long; the Canadian Northern Railway wharf, 800 feet long, with freight shed upon it and railway track alongside. The Canadian Northern Railway Company has a coal dock with a storage capacity of 650,000 tons and at which a large quantity of coal can be discharged in 10 hours by the plant.

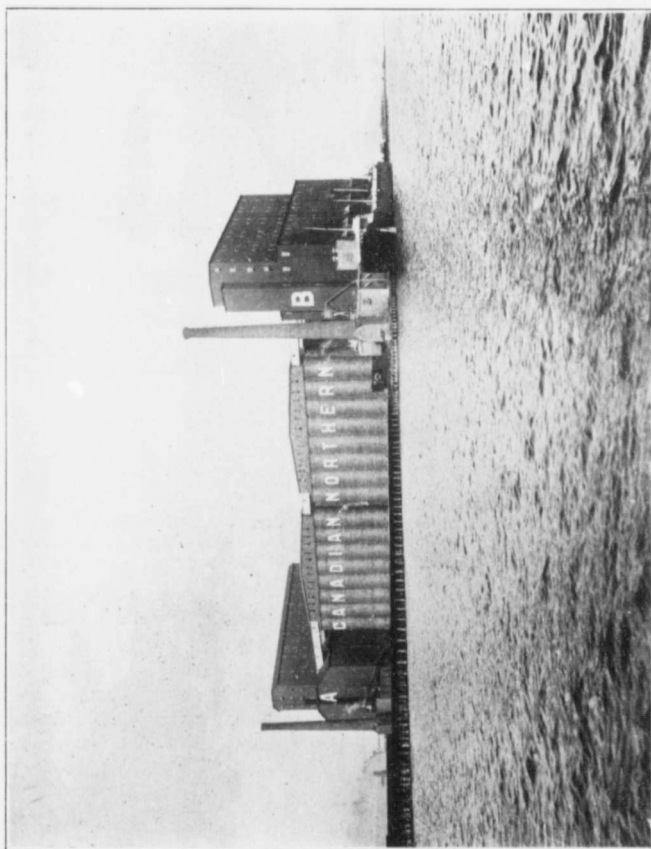
The grain elevators are:—Horne's elevator, capacity for storage 750,000 bushels; Port Arthur elevator (C. N. R.) 9,500,000 bushels; Thunder Bay elevator 1,750,000 bushels; Government elevator 2,250,000 bushels; Davidson and Smith's elevator 750,000 bushels; National elevator 100,000 bushels; total 16,100,000



A Big Freighter Loading at Port Arthur, Ont.

bushels. These elevators have an unloading capacity of approximately 1000 cars per twenty-four hours and a shipping capacity of approximately 4,000,000 bushels per twenty-four hours. The channel to all the elevators and coal dock is 25 feet in depth.

It is proposed to duplicate the plant of the Canadian Northern Railway Coal dock. The dry dock in the north eastern part of the harbour is 700 feet long, width at top 108 feet with 16 feet of water over the sill at gates. The channel leading to it is 20 feet in depth.



Canadian Northern Railway Elevator, Port Arthur, one of the largest in the world. Capacity 9,500,000 bushels.

The shipyard at Port Arthur is very well equipped for the construction of lake vessels of the largest size and also for the building of passenger and freight boats. The "Noronic," length 385 feet by 59 feet, with passenger capacity of over 600 cabin passengers, tonnage 6,000, was built in the shipyard at Port Arthur. The

shipyard, it is stated, has a capacity for building lake vessels of 14,000 tons burthen and 625 feet long. Tugs for icebreaking purposes have also been built in the shipyard and a stern wheel steamer built in sections and shipped to the Kootenay lakes. The yard has every facility for handling large or small boats and a floating dock for tugs and small steamers.



Coal Docks at Port Arthur, Ont.

A large number of lake boats make Port Arthur their winter quarters and have repairs done in the dry dock. The ice in the harbour is broken by ice tugs to enable steamers to get to the elevators by which they are made use of in storing grain for their spring trips when the elevators are full.

The Lights are.—Port Arthur gas buoy, north side of entrance of widest channel to Thunder Bay elevator, latitude N. $48^{\circ} 24' 45''$, longitude W. $89^{\circ} 12' 27''$, white occulting; Thunder Bay Elevator wharf light on outer end of elevator wharf, red fixed; Port Arthur gas and bell buoy in 5 fathoms, latitude N. $48^{\circ} 25' 30''$, longitude W. $89^{\circ} 12' 13''$; Port Arthur light on crib work block 31ft. from south end of northerly breakwater, white occulting. There is also a fog bell at this station. See List of Lights on Inland Waters for 1913.

PORT BURWELL HARBOUR, county of Elgin, Ontario, is situated at the mouth of Otter creek on the north shore of lake Erie. An extensive breakwater makes the harbour one of refuge and there is considerable traffic with Ashtabula, an American port 51 miles across the lake, in coal. Car ferries call regularly. The harbour is continually being dredged to a least depth of 20 feet, to remove sand and silt swept in both by creek and lake. There are two piers, more properly speaking, breakwaters, 150 feet apart, eastern and western, the former with a length of 1,350 feet, the latter some 1,800 feet, both 30 feet wide with heads 50 feet wide. Inside the harbour is a car ferry slip, 75 feet wide at the head; up to this point, in the channel and turning point there is no less depth than 20 feet depth in turning basin. There are wharves further in the harbour where depths of from 16 feet and less can be found.

Port Burwell is a branch terminal of the Canadian Pacific Railway or rather is the point where cars are sent or brought from the American side. During the season of 1912, 10,722 cars were ferried across.

There is a small fishing trade carried on at this port.

Lights.—Main light is on east side of harbour 770 feet N. of shore line and 1,984 feet 6° from front range light, latitude N. $42^{\circ} 39' 0''$, longitude W. $80^{\circ} 48' 15''$, white fixed; outer range front on S. W. corner of E. pier, white fixed, back on E. pier 530 feet 356° from front, red fixed; inner range, front on E. side of harbour, north of car ferry slip and 315 feet 266° from main lighthouse, back, 625 feet 357° from front, both white fixed. See List of Lights on Inland Waters for 1913.

The total tonnage entered and departed for this port for 1912 was 447,007 tons.

PORT COLBORNE HARBOUR, county of Welland, Ontario, is situated near the eastern end of lake Erie at the entrance to the Welland canal. The harbour is formed by two piers or breakwaters, the west breakwater is 4,424 feet long, running north of west to the shore of the lake, the east pier or breakwater is 2,400 feet long running north of east to the lake shore. The entrance is about 675 feet wide, but vessels are cautioned in the List of Lights to keep 100 feet from the end of the east pier, leaving a clear entrance of about 575 feet between the piers. The area protected by the breakwaters is about 70 acres, with a depth of 22 feet between the buoys placed to show the limits of the deepened part. In this area on the western side is the government grain elevator built on a dock 700 feet long, which, with a loading berth in the centre of 200 feet width, is 600 feet wide, giving a width on each side of the loading berth of 200 feet. On the westerly side of the elevator is the unloading berth, with a depth of 22 feet to the limit of the deepened part. On the easterly side of the elevator dock a continuous dock extends up to the Welland canal basin, with a depth of water alongside of 22 feet and 75 feet in width, but

increasing in width to 100 feet, which is the width of the entrance to the canal basin. Outside of the deep cut of 22 feet the water is 16 feet deep in the approach to the canal basin between a line of isolated cribs or blocks opposite the continuous dock.

The Department of Railways and Canals has a siding on the west side of the canal running to the elevator, open to any railway which chooses to connect with it. The Grand Trunk Railway has a siding along the east side of the canal basin and a grain elevator of small capacity for lighterage purposes. The government elevator belonging to the Railways and Canals Department, has four marine legs



Port Colborne, Ont.

and a capacity of 70,000 bushels per hour, and a storage capacity of 1,000,000 bushels. On the east dock of the canal basin are coal chutes for unloading and bunkering steamers.

The harbour was originally made by a corporate company and is not among the harbours controlled by the Department of Marine and Fisheries. At Port Colborne provisions and supplies of all kinds can be easily obtained.

Lights.—Main or back light on eastern side of canal 4,620 feet 16° 30' from front, white occulting, front light on outer end of western breakwater, latitude N. 42° 52' 2'', longitude W. 79° 15' 13'', white occulting, diaphone on west side of

front light; on outer end of Port Colborne east breakwater, latitude N. $42^{\circ} 52' 0''$, longitude W. $79^{\circ} 15' 5''$, is a white fixed unwatched light. See List of Lights on Inland Waters for 1913 and Admiralty chart No. 1605.

The total tonnage entered and departed for the fiscal year 1911-12 was 935,872 tons.

PORT DALHOUSIE HARBOUR, Elgin county, Ontario, is situated on the southern side of lake Ontario at the northern entrance of Welland canal, the entrance is between two piers, one 2,400 feet long and 200 feet wide running due north, the other 1,800 feet long by an average width of 500 feet, depth of water in the harbour is from 16 to 17 feet with soft clay bottom. There are two wharves in the harbour with railway sidings, one belonging to the Grand Trunk Railway and the other to the Canadian Northern Railway, with small freight sheds upon them. There is a coal dock, and coal is landed there for the use of steamers calling at the port. There is room in the harbour for the accommodation of a number of small craft.

In a basin above lock No. 1 is a dry dock where 3 vessels can be docked at one time, one 255 feet long, one 185 and the other 100 feet long. The depth of water at these docks is $10\frac{1}{2}$ feet.

Lights.—One on beach E. of the line of E. breakwater lake Ontario entrance to Welland canal, latitude N. $43^{\circ} 12' 10''$, longitude W. $79^{\circ} 15' 50''$, white occulting; one near outer end of E. pier and 1,500 feet 357° from main light, red fixed; there is also a diaphone at this light. See List of Lights on the Inland Waters for 1913.

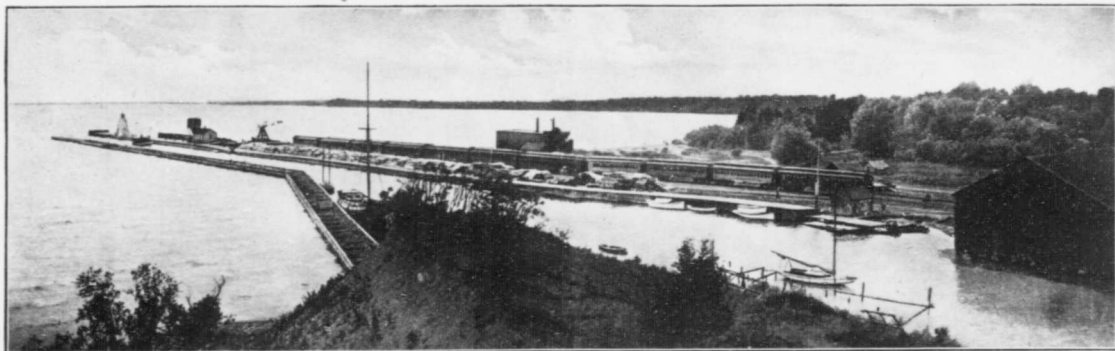
Total tonnage entered and departed at this port for the fiscal year 1911-12 was 511,737 tons.

PORT DOVER HARBOUR, Norfolk county, Ontario, is on the northern side of lake Erie between Port Rowan and Port Colborne at the easterly end of the lake. The entrance of the harbour is between two piers. The west pier is about 1,200 feet long and 16 feet wide near the shore end and 32 feet approaching the other end. These piers are about 1,100 feet long. The depth of water between the piers is from 11 to 12 feet. The width between the piers is about 70 feet. There is good anchorage about one-half mile out from the piers in 16 feet of water. The Grand Trunk Railway has a siding parallel with the harbour about 11 feet from the west pier. There are several freight sheds on the wharf for storing freight landed from steamboats and there is also a slip with a protection pier near the West pier and about 150 feet from it. The slip is about 400 feet long from the outer end with a depth of water of 14 feet.

Lights.—One 110 feet from outer end of West pier, latitude N. $42^{\circ} 46' 52''$, longitude W. $80^{\circ} 12' 10''$, white fixed, back, 1668 feet $22^{\circ} 30'$ from front, red fixed. See List of Lights on Inland Waters for 1913.

PORT ELGIN HARBOUR, in the county of Bruce, Ontario, is situated on the eastern side of lake Huron, it is an artificial harbour not difficult of access but the harbour is limited. There is a landing dock for passenger and freight steamers and recently a groyne was constructed on the southerly side of the harbour. Dredging has been carried on to a depth of 14 feet.

Lights.—South range, front on shore, 1,200 feet 167° from south end of Government wharf, latitude N. $44^{\circ} 26' 25''$, longitude W. $81^{\circ} 24' 15''$, white fixed,



Harbour of Port Dover, Ont.



Port Hope, Ont., Harbour.

back, 150 feet 104° from front, red fixed. North range, front on North extremity of Government wharf, white fixed, back on shore east side of harbour, 660 feet $38^{\circ} 40'$ from front, both red fixed. See List of Lights on Inland Waters for 1913.

PORT HOPE HARBOUR, county of Durham, Ontario, is situated on the north shore of lake Ontario, about 63 miles east of Toronto. There is an inner and an outer harbour, with room for quite a number of vessels. The harbour is formed by two piers running out into the lake. The west pier is 1,641 feet long and the east pier 1,471 and a breakwater 500 feet long. The piers are 120 feet apart, with a depth of 14 feet or sufficient to admit all vessels which use the canals. The harbour is open practically all the year round and is a good harbour of refuge from all winds. The town has daily communication by water, with lake Ontario ports and one or two United States ports. There are over one and a half miles of wharf accommodation; the water from the mouth of the harbour to Queen's wharf, some 1,600 feet, is over 16 feet deep.

Port Hope has railway communication with the Midland district on Georgian bay, and with all other points. There are three grain elevators with railway tracks leading to them which are frequently in use. Shipments of lumber and ore are made from this port.

The harbour is under the control of the Port Hope Harbour Board, and port charges are regulated by that board.

Light.—The light is 110 feet from extremity of east breakwater, latitude N. $43^{\circ} 56' 20''$, longitude W. $78^{\circ} 14' 30''$. See List of Lights on Inland Waters for 1913.

The total tonnage entered and departed at this port for the fiscal year 1911-12 was 187,240 tons.

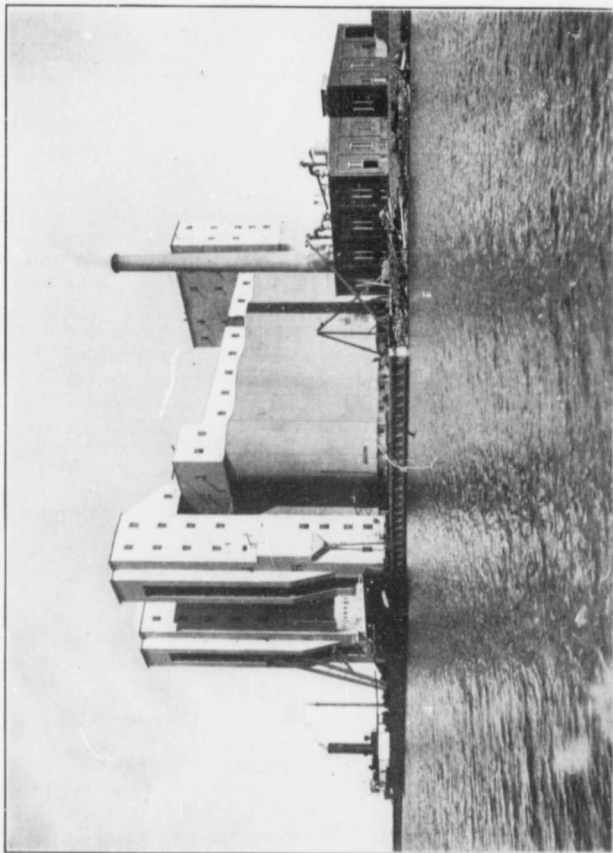
PORT McNICOLL HARBOUR is in Simcoe county on the eastern side of Georgian bay. The harbour was formerly called Victoria harbour and is a short distance from Midland harbour. The harbour is itself a Canadian Pacific Railway project. Extensive work has been done in dredging basins and channels leading into these basins. One basin has at present a width of 600 feet, length 900 feet, and one side of this basin is a grain elevator with dock. On the other side of the basin is a large freight shed 800 feet long, and a freight shed 500 feet long. The grain elevator at this place has a storage capacity of 4,000,000 bushels. The depth of water is 25 feet along the dock leading to the elevator. Other basins are being dredged for accommodation of the large Canadian Pacific steamboats which run to Sault Ste. Marie and Port Arthur and Fort William and around each side of these basins concrete wharves have been built.

Port McNicoll is an important Canadian Pacific Railway station and the line runs from Toronto to Port McNicoll and connects with the steamers going to Fort William and Port Arthur.

Lights.—Victoria harbour range, front on Bergie point, latitude N. $44^{\circ} 45' 20''$, longitude W. $79^{\circ} 47' 0''$, back on hill behind village, 4,200 feet 149° from front, both red fixed. The Port McNicoll gas buoy is anchored on west side of channel

leading to Canadian Pacific Railway dock, latitude N. $44^{\circ} 45' 30''$, longitude W. $79^{\circ} 47' 25''$, white occulting.

The total tonnage entered and departed at this port for the fiscal year 1912-13 was 928,506 tons.



New Wharf and Grain Elevator, Port McNicoll, Ont.

PORT ROWAN HARBOUR, Norfolk county, Ontario, is on the north side of lake Erie and what is called the inner bay between Pottowhawk point and Turkey point. Port Rowan is on the western shore of the bay about twenty-one miles from the eastern end of Long Point island. The harbour is shallow and is frequented by light draft craft. There is a landing pier at Port Rowan. A number of launches and tugs make use of this landing pier. The water is from 5 to 6 feet in depth.

PORT STANLEY HARBOUR, county of Elgin, Ontario, is on the north shore of lake Erie about the centre of the shore line, between the east and west ends. Kettle creek empties into the lake at that point, and the harbour is formed at its mouth by two piers extending out into the lake. The west pier runs out a distance of 2,456 feet from the shore end and the east pier is 1,263 feet long; the width of the entrance at the end of the east pier is 86 feet and the depth of water is over 20 feet along the west pier until the water gauge is reached at an angle in the pier. At the outer entrance a cut has been made 300 feet long 30 feet wide to a depth of 22 feet. The basin opposite the angle has a depth of $17\frac{1}{2}$ feet. The Pere Marquette Railway pier is west of the west pier of the harbour, its length being 783 feet, and a ferry slip with from 17 to 19 feet of water in depth in the centre exists between the two piers. At the end of the railway pier a breakwater is connected with it running in a southwesterly direction for 200 feet, and this breakwater continues in a southeasterly angle a distance of 800 feet more, forming a protection against storm winds from the lake which come from the southwest. The harbour is thus made a harbour of refuge. The Pere Marquette Railway has a freight shed and icehouse on the inner side of the west pier, and the London and Port Stanley Railway has a terminal track running to the shed, while the Pere Marquette Railway has several tracks and switches leading to the railway slip. A grain elevator stands upon the western pier within the basin with a capacity of 25,000 bushels. There is a coal ferry between Port Stanley and Conneaut, Ohio, and a considerable quantity of coal is landed at Port Stanley. The place is also an important fishing depot. A number of tourists visit Port Stanley during the summer months.

Lights.—The front light on the outer end of the breakwater, latitude N. $42^{\circ} 39' 25''$, longitude W. $81^{\circ} 12' 38''$, white occulting, and the back light on the outer end of the west pier in latitude N. $42^{\circ} 39' 55''$, longitude W. $81^{\circ} 12' 40''$, white fixed. See List of Lights on Inland Waters for 1913, and Admiralty Chart No. 1605.

The total tonnage entered and departed at Port Stanley during the fiscal year of 1912 was 1,127,641 tons.

There is a life-saving station on the west pier of this harbour. The port charges are Harbour Masters' dues, paid twice a year, if not paid elsewhere, according to tonnage, not exceeding \$5 for the largest vessel.

PRESCOTT HARBOUR, Grenville county, Ontario, is on the upper St. Lawrence river. The harbour is an open roadstead but not exposed to storms owing to the limited width of the water between the river banks. Anchorage can be found in 50 feet of water opposite the town. The wharves number eleven, having a frontage of three-fourths of a mile. Beginning at the west end, the first wharf is the Prescott waterworks and electric plant wharf, and the wharf of J. P. Wiser & Sons, which is a continuation of the other wharf, having a depth of 20 feet along these two wharves; next the Dominion Lighthouse Depot wharves, water 20 feet at head of one and 18 feet at head of the other; I. W. Plumb's coal wharf and M. J. Buckley's coal wharf, with 20 feet of water at the head; then I. Purkis' coal and ferry wharf; next the grain elevator wharf, and then follows the Canadian Pacific Railway wharf with 24 feet of water; on this wharf stands a large freight shed; at the extreme east is the coal derrick of the George Hall Coal Company, with 24 feet of water alongside.

The Dominion Depot, under the control of the Department of Marine and Fisheries, is located at Prescott lighthouse; lanterns, lenses, oil and other light-house supplies are kept at the depot and repair shops are maintained. Tests are also made of gas vapour burners and other kinds of burners and lenses and of illuminants. Acetylene buoys and beacons are stored and sent to various points where aids to navigation are established. The Depot wharf is the headquarters of small steam tenders, employed in light and buoy service on the upper St. Lawrence river and part of lake Ontario.

Lights.—One on outer end of east pier of Dominion Depot in latitude N. $44^{\circ} 42' 21''$, longitude W. $75^{\circ} 31' 10''$, red fixed, another at Windmill point about $1\frac{1}{2}$ miles below Prescott, white fixed. See List of Lights on Inland Waters for 1913 and Admiralty Chart No. 2789 F.

The total tonnage entered and departed at Prescott during the fiscal year 1912 was 1,477,033 tons.

RONDEAU HARBOUR, Kent County, Ontario, is situated on the north shore of lake Erie, a short distance from pointe aux Pins. The bay of Rondeau is about six miles long and two miles wide, water shallow in the bay except in the dredged cut. The harbour in the bay is formed by two piers, the west pier 900 feet long and the east pier 750 feet long, width between these piers is 250 feet and the water 23 feet deep, but the water leading to coal slip is at places 26 feet deep. A breakwater runs at right angles to the east pier for 300 feet and a basin is formed 600 feet long by 400; the water in this basin varies in depth from 8 to 20 feet, except in the channel already mentioned. Rondeau is used as a harbour of refuge and a depot for coal for the Pere Marquette Railroad. There is a coal slip with two hoists in one corner of the harbour and a railway track alongside of it.

Lights.—One on the outer end of the eastern pier, white fixed, and a back light 780 feet 14° from the front light, latitude N. $42^{\circ} 15' 32''$ longitude W. $81^{\circ} 54' 18''$ red and white alternating. One on outer end of west breakwater pier, white occulting. See List of Lights on Inland Waters for 1913 and Admiralty Chart No. 332.

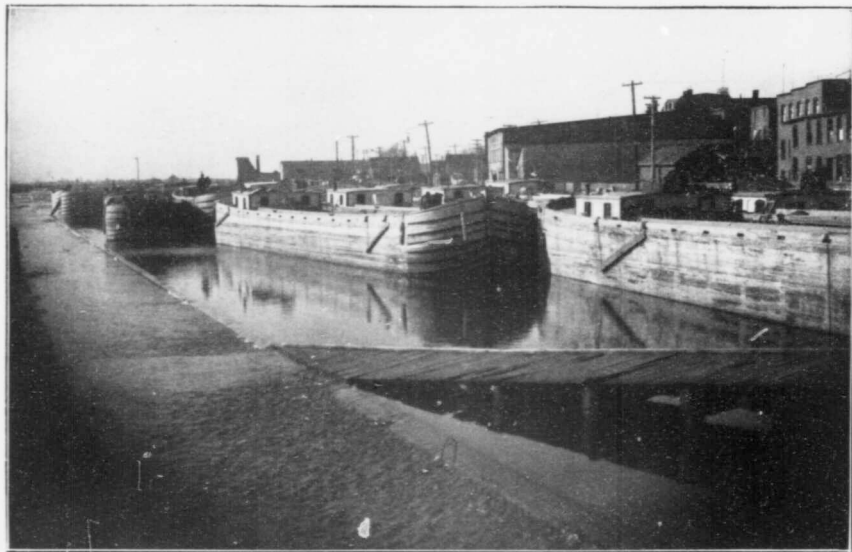
The total tonnage entered and departed at Rondeau for the fiscal year 1912 was 288,177 tons.

ST. JOHNS HARBOUR is situated in St. Johns county, province of Quebec, on the Richelieu river. This river is navigable for canal boats from Sorel at the mouth of the river, to lake Champlain. St. Johns is quite an important place of business for canal boats, and has wharf accommodation running continuously along the river at which barges tie up. The approach to the canal basin and the the basin itself, is being dredged to a depth of 8 feet. Passenger steamers run on the river and have communication with Rouse's Point, in the state of New York. The *port charges* are harbour master's dues collected twice a year if not paid elsewhere. The River is buoyed for steamers from St. Johns to Rouses Point and from Chambly to St. Johns.

The total tonnage entered and departed at the port for the fiscal year 1912 was 199,334 tons. St. Johns has frequent railway communication with Montreal.



Port of St. Johns, P.Q.



Port of St. Johns, P.Q.

SARNIA HARBOUR, Lambton county, Ontario. This harbour lies on the east bank of the river St. Clair, at the head of the river, where the waters of lake Huron enter that river. The limits of the harbour include all the waters of the St. Clair river between the Canadian shore and the International boundary in the middle of the stream, and extending from the head of the river at the outlet of lake Huron to the foot of the river, at the entrance of St. Clair flats, a distance of about two miles. These waters include the inlet known as Sarnia bay, where vessels make their winter quarters and rafts of timber are handled.

The Grand Trunk Company wharves are at Point Edward, one 450 feet long by 40 wide, is used by the Hamilton Steel and Iron Company for unloading cargoes of ore which is shipped to Hamilton. There are three steam power ore-hoisting machines of the total capacity of one thousand tons per hour on this wharf. South of the ore wharf is an open wharf 340 feet by 85 feet, equipped with a platform operated by steam for the unloading of flour, and a shed 650 feet by 85 feet used for the storage of flour and package freight. South of the general freight wharf of the Northern Navigation Company is also a coal wharf 110 feet by 85 feet, having a storage capacity of 2,500 tons and equipped with a coal-handling plant of modern construction, consisting of hoisting apparatus and pockets for fuelling the steamers. The unloading capacity is 800 tons per day, and the loading capacity 300 tons per hour.

South of the Northern Navigation coal wharf is the wharf of the Point Edward Elevator Company, 500 feet by 25 feet. The Point Edward elevator has a capacity of half a million bushels, and is equipped with grain-cleansing apparatus. The grain is loaded into cars on the Grand Trunk Railway.

South of the Point Edward elevator on Sand Point, is an open wharf 1,400 feet by 150 feet, operated by the Ontario Lumber Company, of Toronto, for unloading cargoes of lumber.

On the east shore of Sarnia bay is a double deck tramway owned by the Cleveland Sarnia Sawmills Company, with a wharf at the outer end for the loading of lumber vessels. The tramway is 2,770 feet by 14 feet in width and the wharf at the outer end is 100 feet from north to south, by 70 feet wide. The depth of water is from 8 to 14 feet. A large pool has been inclosed in the bay and the water kept warm by exhaust steam from the mills, to enable them to operate during the winter.

South of the Cleveland-Sarnia mill property is a wharf 400 by 150 feet and owned by W. A. Brown, with three houses for the storage of ice, having a total area of 15,000 square feet; depth of water at this wharf 8 feet.

Next is the coal wharf of John Garroch, coal dealer; length of wharf, 262 feet by 120 feet; area of coal shed, 4,000 square feet, equipped with coal plant operated by steam, capable of unloading 300 tons per day; depth of water, 13 feet.

South is the property of the Sutherland Wire Fence Company, comprising a wharf 128 feet by 90 feet, with a warehouse 40 by 80 feet, used for storing goods manufactured by the company; depth of water, 13 feet.

Further south is the wharf of the Loughhead Hub and Spoke and Bent Goods Manufacturing Company; length of wharf, 200 by 125 feet; shed, 40 by 50 feet; another shed, 100 feet by 40 feet; depth of water, 16 feet.

Next in order, are the headquarters of the Reid Wrecking and Towing Company who own the most extensive plant on the Great Lakes. The Reid Company's

wharf is 360 feet by 150 feet, with machine shop 100 feet by 40 feet for repairing and rebuilding hulls and machinery. The company's outfit includes eight powerful tug steamers with lighters, wooden pontoons, twenty one hundred ton hydraulic jacks, four large air compressors and other appliances.

Further south are the waterworks wharves, 225 feet by 50, with one coal shed, area 2,000 square feet.

King's Milling Company's Wharf, 200 feet by 60 feet, with two warehouses, area 2,200 square feet.

Gardner's wharf, 65 feet by 60 feet, one warehouse, area 2,600 square feet.

Lochiel street wharf, owned by the municipality, 60 feet by 40 feet.

Clark's wharf, 235 feet by 60, with four warehouses, area 5,800 square feet; another wharf belonging to the Reid Wrecking Company, 200 feet by 100 feet, with warehouse, area 60 feet by 100 feet, used for fuelling and storage; another wharf owned by the town, 60 feet by 100, used as a ferry landing. South of this wharf is the Grand Trunk Railway Company's wharf, 1,100 feet by 25 feet, with freight sheds, 300 by 30 feet, used as a joint passenger terminal by the Grand Trunk and Northern Navigation Company. Another wharf is the Grand Trunk and Northern Navigation joint terminal wharf. It is 180 feet by 30. The Grand Trunk elevator wharf is 180 feet by 25 feet. The elevator itself is 180 feet by 25 feet, capacity 100,000 bushels, used for the transfer of western grain from vessels for shipment into cars.

South of the elevator wharf is the last of the Grand Trunk Company's wharf properties, the lumber wharves, 1,300 feet by 25 feet, operated by F. McGibbon & Sons, E. A. LeBel and W. F. Lawrence & Sons.

Further south the Sarnia Salt Company has a wharf 400 feet by 25 feet, warehouse 100 feet by 50 feet.

Below Devine street are the extensive properties of the Imperial Oil Company, with a wharf frontage 400 feet, where bulk oil products and packages are unloaded on this wharf. It is equipped with coal unloading machinery with a capacity of 400 tons per day. The average depth of water is 16 feet along the northern part and from 20 to 25 feet along the southern part.

Below the Imperial Company's wharf is the Sarnia terminal of the Pere Marquette Railway Company, including a wharf 350 feet by 25 feet, with a warehouse 120 feet by 14 feet; depth of water, 20 feet.

Last in order, near the southern boundary of the town, are the premises of the Standard Chain Manufacturing Company. The wharf is 152 by 80 feet, and is used for coal and iron for the company's purposes and the shipment of chain manufactured; depth of water, 18 feet.

The depth of water at the wharves, except in the cases mentioned, averages about 20 feet. There are railway tracks running upon and alongside of the wharves, with the exception of two or three; the depth of water for anchorage varies from 30 feet in the channel to 9 feet or less.

The holding ground for anchorage is everywhere good.

The harbour is of great value as a harbour of refuge; it is easy of access and can be entered from lake Huron by vessels under sail with the wind in any quarter but from the south.

The water in the river runs rapidly, but in Sarnia bay it is slack and vessels are not exposed to any ice movement in the winter.

A gas buoy is in position on the shoal off Point Edward near the Point Edward elevator.

The United States Government has a gas buoy on the middle ground of lake St. Clair, and a lightship at the foot of lake Huron, two miles above Point Edward. See List of Lights on Inland Waters for 1913. Admiralty Chart No. 330.

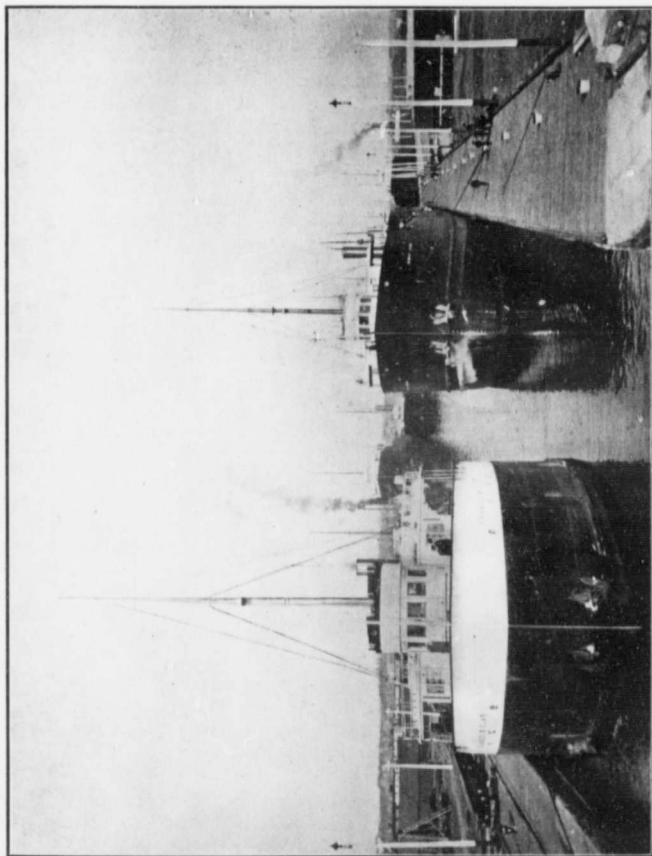


Sault Ste. Marie, Ont. The Gateway of the Great Lakes.

The tonnage of vessels, which entered and departed at Sarnia during the fiscal year of 1912 was 2,281,497 tons.

The Grand Trunk Railway Company has communication at Sarnia with Port Huron by means of a tunnel under the St. Clair River.

SAULT STE. MARIE HARBOUR, Algoma district, Ontario, is on the St. Marys river, about five miles east of the extreme easterly end of lake Superior. The harbour of Sault Ste. Marie embraces the dredged approaches to the Sault Ste. Marie Canal, and approaches to the different docks therefrom which have been deepened. Safe anchorage can be found within the areas mentioned, and towards



Sault Ste. Marie—A blockade near the lower approach—Nine vessels in view.

the centre of the river outside the canal ranges, from a depth of 21 feet to 40 feet. The nature of the bottom of the river is sand and boulders overlying Potsdam sandstone.

The wharves along the townsite of Sault Ste. Marie comprise, one owned by the

Dominion government which is used principally for passenger steamer service and package freight, and upon it stands a commodious warehouse for receiving the freight; this wharf was extended in 1912 by the addition of a block 100 feet by 50 of concrete superstructure and five slips added to the Government wharf. The Plummer wharf which forms the approach to the Government wharf was improved by tearing down the upper part to 30 inches below low water level and building up a concrete superstructure.

The Algoma Coal and Metal Company's dock is used principally for unloading coal and wood cargoes, and tugs are there supplied with fuel; the New Ontario Dock and Coal Company's dock is used for package freight and passenger service, and upon it is a large area for coal chutes for fuelling steamboats of all classes; a slip 520 feet long by 75 feet wide was dredged alongside this wharf in 1912 and 13. Seven docks of the Lake Superior Corporation, comprise, (a) ferry dock used exclusively for the ferry service between the Canadian town of Sault Ste. Marie and the United States town of the same name, a slip 300 feet by 60 feet has been dredged at the ferry wharf; (b) International dock, a commercial wharf which provides accommodation for boats of light draught engaged in passenger and freight service; (c) the north wharf and south wharf along the tail races provide facilities for handling machinery, and repair work can be done to advantage at the company's shops, situated a short distance from the wharf; (d) the company's commercial wharf is used principally in connection with its own industries but is available with its rail connections for general service, this wharf is on the lake Superior level; (e) the ore wharves are used exclusively by the Algoma Steel Company in connection with the steel industry, and are situated to the west of the commercial wharf forming an extension of it; (f) the sawmill wharves at which lumber cut at the company's mills is shipped, is on the Lake Superior level.

At Sault Ste. Marie, the canals cut by the Canadian and United States governments are very extensively used by shipping, passing up and down between lakes Huron and Superior. The Canadian canal on the north side of St. Mary's river is 7100 feet, equal to about 1 1-3 miles long from end to end of the upper and lower piers, and its width is 150 feet at the water surface and 141 feet 8 inches at the bottom. The approaches to the canal are channels cut through boulder shoals; the upper approach is at least 250 feet wide, with 17 to 19 feet depths and the lower approach at least 500 feet wide with 21 feet depth. The canal has one lock 900 feet long by 60 feet wide, built of masonry; at the lower end of the canal, depth of water on the sills at the lowest water level, is 20 feet 3 inches, and the total rise of this lock is 18 feet; the gates and culvert valves are operated by electricity. The construction of the canal was begun in 1888 and opened for traffic in 1895. It was built to overcome the rapids of St. Mary's river and has been improved and the piers extended since the date of its opening. The traffic through the Canadian canal in 1913 was 42,699,324 tons of freight.

Sault Ste. Marie has water communication with ports on lake Superior on the west and with lake ports on the east, more particularly with Georgian Bay ports, and lines of steamers running daily, convey passengers and freight to and from the port. At this port large steel smelting works have been established by the Algoma Steel Company, large quantities of ore are received at the docks of the Company.

The approaches to the canal are well and carefully buoyed. Wharfage is charged at the different wharves.

The total tonnage entered and departed at this port during the fiscal year of 1912 was 2,797,107 tons.

The wireless telegraph station is situated on high land to the east of the town.

Lights.—The first light approaching lower or eastern entrance to Canadian canal is a gas buoy, anchored on south side of channel 950 feet, 142° from outer end of pier, white fixed. The lower entrance range lights, front on shore of bay, N. of entrance to canal, latitude N. 46, 30 54, longitude W. 84, 20, 8, back, 1,356 feet $321^{\circ} 30'$ from front, both are red fixed, these 2 lights in one lead from the American channel, up the middle of the dredged approach between the red and black buoys to the piers at the East end of canal. Upper entrance range lights, front, on pier, 1246 feet, 231° from back, latitude N. 46, 30, 39, longitude W. 84, 21, 43, back on east extremity of Davignon point, both are red fixed, these two lights in one lead in from the American channel past Vidal shoal, between the red and black buoys,



Lake Winnipeg Steamboats at Selkirk, Man.

to the turn at the Upper turning black gas buoy. The Upper turning gas buoy, on southern edge of dredged curve, 1350 feet westward of W. end of S. entrance pier, white fixed. Vidal shoal, E. gas buoy, on northern edge of Canadian channel, at lower end of shoal, white occulting. Vidal shoal, S.E. gas buoy, on southern end of Canadian channel, at lower end of shoal, white fixed. Vidal shoal, W. gas buoy, western end of Vidal shoal on northern edge of Canadian channel, white occulting. Vidal shoal, S.W. gas buoy, western end of shoal, on southern edge of Canadian channel, white fixed. See List of Lights on the Inland Waters for 1913.

SELKIRK HARBOUR, Selkirk county, in the province of Manitoba, is situated on the W. shore of Red river, some 24 miles north of Winnipeg. Besides being the most important port on the Red river, excepting Winnipeg, it is also the home port for all the Government steamers, dredges, etc., used on lake

Winnipeg and Red river, as well as for a considerable number of privately owned craft. There is at present under construction by the Government, a Marine railway that will be able to raise the largest vessel that can pass the St. Andrews locks. The Dominion Fish Company have a smaller one in operation. There is a Government wharf as well as several other privately owned ones. A slough running into the City park is used as winter quarters for the fleet sailing out of Selkirk. The shipyard, belonging to the Department of Public Works, is situated on it. A great deal of dredging was done to a depth of 9 feet to accommodate the dredges, tugs, scows, pontoons, etc.

Lights :—Seven poles are located on the inner side of the wharf, at equal distances apart, fixed white, see Notice to Mariners No. 64 of 1913.

SMITHS FALLS, Lanark county, Ontario, is situated on the Rideau river, and at this place is a lock of the Rideau canal. The town is situated about 46 miles north of Ottawa and the traffic is conducted on steamboats and canal barges towed by tugs. There is a canal lock at Smiths Falls used in the traffic to the St. Lawrence river. There are three combined locks and one detached lock. The water in the canal between Smiths Falls and Ottawa comes from the St. Lawrence river to the Rideau river and canal and then from Rideau lakes. A number of locks between Ottawa and Smiths Falls enable vessels to pass up. The official depth of water over the sills of these locks is 5 feet at Ottawa, but during the freshets in the spring it is deeper all along the river and at the locks.

SOUTHAMPTON, Bruce county, Ontario, is on the northeastern side of lake Huron, about 54 miles north of Goderich and 28 miles from Kincardine. The water in the vicinity of Southampton is shallow and the shore much exposed to north, west and south west winds. The harbour is an artificial one made by a pier and breakwater running from the shore of the town to Chantry island which lies off the shore. The Grand Trunk pier wharf is 1100 feet in length and well-built with cement walls. This pier has upon it rails upon which cars run to the steamboat landing. There is also a Government wharf used for landing lumber, cordwood and for shipping articles of commerce. On the north side the harbour is entered between the Grand Trunk pier and the breakwater, and on the southern side, it is more open and vessels get shelter within this artificial harbour when the wind is from the west and north but are more or less exposed to south west winds. On the north side of the pier, the depth of water is about 13 feet and small craft may load when the wind is from the south west on this side. In the basin after the harbour is entered there is about 12 feet of water. The Saugeen river empties about a mile north of the harbour. A breakwater has been built on the northern side of the Saugeen river, and piers have been built on the southern side and the channel between the two has been dredged, admitting tugs and fishing vessels for about a distance of 300 yards. There is a life-boat station at Southampton between the mouth of the Saugeen river and the artificial harbour. Southampton has factories and saw-mills and has railway connection with different parts of Ontario by the Grand Trunk Railway. It is a favorite summer resort and passenger steamers call frequently at Southampton on their way up and down lake Huron.

Lights.—The lights are:—Main light on Chantry island, about $2\frac{1}{2}$ miles west from Saugeen, latitude N. 44, 29, 23, longitude W. 81, 24, 9, white fixed. The Southampton harbour range lights, front, on the East end of West breakwater, 2,799 feet 50° from Chantry island light, red fixed, back, on the south shore of

landing pier 7.914 feet, 178° , 30' from front, white fixed. There is a steam fog whistle on the town waterworks building on lake shore. Saugeen range lights, front on the cribwork block on breakwater North side of mouth of river, latitude N. 44, 30 6, longitude W. 81, 22, 34, back on hill, 2350 feet 95° , 15' from pier light, both red fixed. In 22 feet off north end of Chantry Island bank, is anchored a white occulting gas buoy.

THESSALON HARBOUR, district of Algoma, Ontario, is situated on the north shore of the north channel of lake Huron, it is formed by an indentation in the land immediately west of the Thessalon river, near its mouth, and is protected from south easterly winds by a breakwater. Good anchorage is to be found in 5 to 6 fathoms, east of Thessalon point.

In making Thessalon in thick weather, caution must be observed, the 10 fathom line approaches the extremity of the point to within a quarter of a mile, the water should not be shoaled to less than this depth until the land is recognized or the mill whistle heard. A hand fog horn also answers ships' signals. See Georgian Bay and North Channel Pilot and Naval Service Chart No. 95.

Accommodation can be found at the wharves (2) in from 18 to 25 feet. Freight and passenger steamers call regularly at this port during season of navigation with package freight, lumber and a considerable quantity of pulp wood are shipped from this port.

Light.—60 feet from extremity of Thessalon point, latitude N. 46, 14, 12, longitude W. 83, 34 4, white fixed. See List of Lights on the Inland Waters for 1913.

The total tonnage entered and departed for the fiscal year 1911-12 was 326,581. tons.

TOBERMORY HARBOUR, Bruce county, Ontario, is situated at the north west extremity of Saugeen peninsula and is perfectly sheltered from all winds, on an inlet of lake Huron and near the entrance of Georgian bay from lake Huron. Cove island and Russell island lie to the north-westward of Tobermory. The harbour may be entered from Georgian bay or lake Huron. The harbour consists of eastern and south-west arms. The S. W. arm is narrow but the water is bold in all parts of the arm with the exception of the extreme end of the arm where a muddy flat extends 120 yards to a depth of 18 feet. This arm is narrow and difficult for sailing vessels to enter if the wind prevails from the west. In entering the Eastern arm shoal water extends 70 yards south westward from North point and thence to Rixon rock in shoal bight, vessels proceeding to Eastern arm should therefore give this shoal water and Rixon rock a berth. Middle point is the name given to the point dividing the two arms, and on the eastern side of it is an indentation known as Fisherman cove. From this cove, shoal water extends half way across Eastern arm but may be avoided by keeping close to the eastern shore of the arm. There are no other dangers in the approach to Tobermory harbour; it may, when the light is visible, be approached with confidence at night as well as day. There is a storm drum used for storm signals displayed from a mast erected on the high ground about midway between eastern and south-west arms.

Vessels make fast to the shore in the south-west arm, in 7 or 8 fathoms, and are protected from chafing by glance booms.

There are two wharves in the eastern arm.

The harbour affords excellent shelter for vessels that make this harbour for refuge.

Light.—On water's edge, W. side of entrance, latitude N. 45 15 25 longitude W. 81 40 25 red fixed.

TORONTO HARBOUR, York county, Ontario, is situated on the north side of lake Ontario, about 35 miles from its western end. The harbour is formed by a low sandy island on the southern side. The 10 foot lake contour from the centre of the island is about a $\frac{1}{2}$ mile distant from the beach. The 20 foot contour is about 9-10 of a mile. The water increases in depth from 40 to 50 feet about $1\frac{1}{2}$ miles in the lake opposite the centre of the island. On the western side of the island and part of the lakeshore is Humber bay, also on the western side of the island and on the lakeshore is Scarboro beach. There are two entrances to the harbour, the one called the eastern channel and the other the western channel. The eastern channel is between two parallel concrete piers. The approach to this entrance has been dredged to 23 feet in depth with a splayed width of about 1,000 feet. The distance between the piers is 375 feet and the depth of water 20 feet at low water. The eastern pier of this channel has a boat-landing near the centre. The new western entrance, also between concrete piers, is 400 feet between the piers and the depth of water 18 feet. The piers of this channel are, one, 2,535 feet long on the south side, and one, 2,235 feet on the north side. There is also the old western channel north of the new channel close to the city front, which has practically been abandoned and is now too shallow for use. The shore of the harbour is curved along the south or island side, and straight on the northern side or city front. The area of the harbour is $6\frac{1}{4}$ square miles and the depth of water varies from 14 feet to 25 feet.

A channel has been dredged to the wharves at Hanlan's point for ferry boats and small passenger boats ply between the city wharves, Centre island, Ward's island and Hanlan's point. A channel has been dredged 1,750 feet in length by 100 feet in width, depth of water 10 feet and approaching the wharves at Hanlan's point the width is 250 feet for a distance of 500 feet. This channel is used by steamers plying between the city wharves and Hanlan's point.

The harbour is under the control of Harbour Commissioners who administer the affairs of the harbour and report to the Minister of Marine and Fisheries. A new and extensive scheme of improving the harbour is now being carried out, and therefore, information that may be given of the present state of the harbour will be obsolete in a year or so. One of the projects is the construction of docks in the district formerly known as Ashbridge bay but now as the Toronto Harbour Industrial district. The docks will be extensive and substantially built, with a large turning basin and a channel from the main harbour leading to the turning basin and the docks. It is proposed to make the channel 400 feet wide. One permanent concrete dock, 600 feet long by 176 feet wide, has already been constructed. The policy of the Harbour Commissioners is to acquire the whole harbour frontage, and a number of properties have already been secured.

The wharves at present used by shipping are located on the city side of the harbour. The face frontage of the wharves measures about one mile and the wharves are separated by slips of various widths.

Along the inner end of these wharves are 25 railway tracks with sidings leading to coal docks and to the lumber wharves. The depth of water at the wharves varies

from 14 feet to 20 feet. There is berthing room at some of the wharves for vessels from 300 to 400 feet in length. There are 4 wharves where coal is discharged and stored in large sheds, but the principal supply of coal for Toronto is delivered by rail.

A track has also been laid by the Canadian Pacific Railway Company on the Queen's wharf. These sidings connect with various industrial concerns in the city of Toronto.

The storehouses on the wharves of Toronto are the Merchants Mutual Line store, with a capacity of 4,000 tons; the two sheds on the Harbour Commissioners' Harbour Square dock, with a capacity of 4,500 tons each; the three sheds on the Harbour Commissioners' Yonge Street dock, with a capacity of 3,000 tons and the Canada Steamship line shed, with a capacity of 2,000 tons. There are cold stores having a capacity of about 500,000 cubic feet.

The shipbuilding industry is carried on by the Polson Iron Works, Limited, and the Thor Iron Works Shipyards, in which are built steel and wooden vessels. The facilities for building in the Polson Iron Works shipyard include space for laying down four canal-size steamers at one time. The Company possess sheer legs alongside a slip of a capacity of 60 tons and a gantry crane running the full length of the slip, of a capacity of 10 tons. In this yard the equipment includes machine and boiler making shops, and engines and boilers are constructed for the vessels that are built in the yard. Repairs are also made of an extensive and minor nature to vessels of all classes. The Company intends constructing a floating dock of steel, dimensions, 330 feet over all in length, 100 feet outside in width, lifting capacity 5,400 tons, pumping capacity 42,000 imperial gallons per minute. The dock will be of sufficient width to permit of lengthening it to take in some of the largest lake steamers when the Welland canal is completed.

The Thor Iron Works have equipment for smaller vessels and for constructing boilers and engines.

Toronto harbour is an exceedingly well-protected harbour from all winds, with good anchorage in the deepest part. Toronto, on account of being the largest city in Ontario, has water communication by steamboat lines in every direction on lake Ontario and with ports on the St. Lawrence river. Steamboat lines run daily from Toronto across the lake to Niagara-on-the-lake, and a great number of passengers take advantage of the large and well-equipped steamers that carry passengers to and from Niagara river. The Niagara Navigation Company's steamers ply between Toronto and Niagara-on-the-lake and Queenston, on the Niagara river, and Lewiston, on the American side of the same river. These ports are connected by short lines of electric road with Niagara Falls and Buffalo, N.Y. Fine steamers belonging to the same company run between Toronto and Hamilton, Toronto and Olcott, on the American shore, and Toronto and Grimsby. Fine passenger boats owned by the Richelieu & Ontario Navigation Company p'y between Toronto and Charlotte, in the state of New York, to Kingston and via Thousand Islands to Prescott on lake Ontario, and connect with a daily passenger boat between Prescott and Montreal, which shoots all the rapids on the St. Lawrence river to Montreal. Boats daily leave Toronto for ports on the bay of Quinte calling at Port Hope and Cobourg on the east and with Hamilton and other places on the west. Excursion steamers from various ports on the lakes run to Toronto. The Niagara,

St. Catharines and Toronto Navigation Company's boats run daily to Port Dalhousie, and freight boats from Montreal call at Toronto on the way to Fort William and Port Arthur at the head of navigation on the lakes. Toronto, being so favourably situated, a large portion of the traffic is carried on by water during the season of navigation.

The extensive improvements now being made by the Harbour Commissioners in the Harbour, in establishing and building an industrial district, will make this port the finest on lake Ontario and will place it in the first rank of Canadian harbours for handling commodities. The co-operation of the City Corporation with the Harbour Commissioners, in the last two years, has already affected great improvements in the interests of navigation to and from the port. The Public Works Department of the Dominion has vastly improved the eastern and western entrances to the harbour by the construction of concrete piers, revetment walls and dredging the approaches to the entrances and by giving a greater depth of water in the channels.

The harbour is administered directly by the Harbour Commissioners who receive authority for their operations through the Minister of Marine and Fisheries. Parliament has voted large sums of money to aid in improving and equipping the harbour with the best modern facilities. A contract has been made for the construction of breakwaters and other improvements at a cost of \$5,371,000, the contract to be completed within four years.

Lights:—The lights and fog alarms under control of the Department of Marine and Fisheries on Toronto island on the lake shore are as follows:—one on Gibraltar point, S.E. side of point $1\frac{3}{4}$ miles south of Toronto, latitude N. 43 37 0, longitude W. 79 22 55, white revolving; one at east entrance, outer tower, 100 feet from outer end of east pier, latitude N. 43 37 48, longitude W. 79 20 20, red occulting; inner tower on inner end of east pier 2,400 feet, 320° from outer light, diaphone fog alarm on beach just east of east pier, 1,630 feet inside of outer light; fog bell on platform on north side of inner lighthouse. Lights on the western entrance are:—one on S. pier near its outer end, latitude N. 43 37 46, longitude W. 79 23 50, red fixed; one on S. pier near its inner end, 2,423 feet 55° 30' from front; fog bell on roof of front lighthouse. See List of Lights on Inland Waters for 1913.

Steamboats of the different lines are piloted by the officers on board each steamer.

The total tonnage entered and departed during the fiscal year 1912 was 3,881,217 tons.

The Harbour Commissioners operate a public dock at the foot of Yonge Street at which any vessel may dock, the only charge being for the handling of freight through the freight sheds on the dock.

All vessels entering the harbour are subject to the harbour dues and goods landed. These dues are very light, the schedule being as follows:—

TORONTO HARBOUR DUES.

Merchandise, etc., Government stores and all unenumerated articles, as per Bill of Lading	3 cents per ton of 2,000 lbs.
Coal.....	3 cents per ton of 2,000 lbs.
Wood	3 cents per cord.

Stone.....	5 cents per toise.
Unwrought building stone.....	1 cent per ton.
Ice.....	1 cent per ton
Moulding sand.....	1 cent per ton.
Fruit and vegetables, baskets 15 lbs. and under.....	1-16 cent each.
Fruit and vegetables up to 30 lbs.....	1-8 cent each.
Fruit Crates and Boxes, over 30 lbs. and up to 55 lbs.....	$\frac{1}{4}$ cent each.
Fruit and vegetables, over 55 lbs.....	$\frac{1}{2}$ cent each.
Fruit Bags, all sizes.....	$\frac{1}{2}$ cent each.
Fruit Barrels, all sizes.....	$\frac{1}{2}$ cent each.
Fire and Scoria Bricks.....	5 cents per 1,000.



Overlooking Trenton Harbour and Bay of Quinte

Common Bricks.....	3 cents per 1,000.
Shingles, in bundles.....	1 cent per 1,000.
Laths and Hoops.....	1 cent per 1,000.
Lumber, sawed or square.....	3 cents per 1,000 feet Board Measure.
All Grain and Pulse.....	5 cents per 100 bushels.
Sheep, Pigs or Calves.....	2 cents each in carcass.
Sheep, Pigs or Calves, alive.....	1 cent each.
Carriages, Carts or Sleighs, Horses and Horned Cattle	10 cents each.

TRENTON HARBOUR, county of Hastings, Ontario, is situated on the north shore of the bay of Quinte at the mouth of the Trent river. The channel into the

harbour has been dredged to 14 feet, ordinary water, and alongside wharves a similar depth. There are 5 wharves, viz: two coal wharves, railway siding to one of them, one wharf with bonded warehouse, one wharf used by steamers calling regularly during the season and one belonging to a firm of contractors.

There is one cold storage plant with a capacity of 45,000 barrels. There are "ways" for repairing vessels up to 125 feet in length. The channel is well buoyed.

The entrances are:—From the west through the bay of Quinte, from the east through Murray canal into Presqu'île harbour on lake Ontario.

Lights.—Front on W. side of harbour, latitude N. 44 5 47, longitude W. 77 34 30, back, 520 feet 280° 40' from front, both red fixed. A gas buoy is anchored in 13 feet at E. end of easterly dredged channel, latitude N. 44 5 35, longitude W. 77 32 27, white occulting.

The total tonnage entered and departed for the fiscal year 1911-12 was 149,605 tons.

WALLACEBURG HARBOUR, Kent county, Ontario, is situated on the Sydenham river, a stream navigable from its mouth to a point several miles above the town. The river empties into lake St. Clair and is navigable for vessels drawing not over 19 feet of water; it has a clay or mud bottom, free from rocks or boulders, and from Wallaceburg to its mouth is not subject to any decided variations from freshets, ice jams or other causes. Vessels can be safely moored at any point, either to the various wharves or to the banks along the river.

The wharves are built parallel to the river shore and are from 10 to 30 feet in width, and are as follows: Sydenham Glass Company wharf, about 600 feet long; McMairnie Bros.' wharf, about 150 feet long; Premier Electric Light Company, 50 feet long; Wallaceburg Cooperage Company, 100 feet long; public wharf at foot of Nelson Street, about 50 feet long. Railway sidings have been laid to the wharves of the Wallaceburg Sugar Company and the wharf of the Sydenham Glass Company; the former is equipped with a McMyler clam operated by steam for unloading coal and sugar beets. These wharves have sheds on them and in the immediate vicinity, for the storage of goods of the two companies. The depth of water alongside these wharves is 18 feet. A slip for vessels drawing 19 feet has been dredged at the Sugar Company's plant. Vessels can be laid up here in safety at any point in the river and repairs made. The repair yard of W. J. MacDonnell has a plant equipped with a marine railway on which vessels 150 feet in length, drawing not more than 12 feet of water, can be hauled out.

The total tonnage of vessels which entered and departed during the fiscal year 1912 was 350,460 tons.

WALKERVILLE HARBOUR is in the county of Essex, Ontario, on the Detroit river, one mile east of Windsor. The water is from 33 to 36 feet off Walkerville, and 26 feet at the end of the Distillery dock. The wharf is over 800 feet long on which stands a store 50 feet by 40 feet; a switch track runs the whole length of the wharf and goods are loaded and unloaded from cars to vessels and from vessels to cars. The water at the wharf is 26 feet deep, with clay bottom.

The total tonnage entered and departed at this port for 1912 was 363,219 tons.

WELLAND HARBOUR, Welland county, Ontario, on the Welland river and Welland canal. Vessels going to Welland leave the canal either up or down.



Harbour of Whitby, Ont.

The total tonnage entered and departed at this port during the fiscal year 1912 was 27,215 tons.

WEST DOCK HARBOUR is on Pelee island, in lake Erie, in the most southerly part of Ontario. The dock is $3\frac{1}{2}$ miles S. of Sheridan point on Pelee island.

The total tonnage entered and departed during the fiscal year 1912 was 380,539 tons. See description of Pelee island herein.

WHITBY HARBOUR, county of Ontario, Ontario, is situated on the north shore of lake Ontario, 30 miles E. of Toronto. This harbour was formerly owned by a company, but was purchased by the Dominion Government on the 9th of April, 1912. Plans and specifications for improvement of the harbour have been made and are being considered.

The harbour is formed by two piers extending into the lake. These piers are parallel, about 650 feet long and 300 feet apart. There is deep water near the approach but the entrance to the channel has only a depth of about 11 feet. Dredging has been done between these piers along the north pier. The east pier extends north-westerly on a curve and the west pier extends at right angles to the channel to the shore of the lake. The basin is thereby protected and makes a harbour of shelter for vessels drawing 10 to 11 feet, and other small craft.

Light:—The light at Whitby harbour is on the West pier, latitude N. 43 50 45, longitude W. 78 56 0, white fixed. See List of Lights on Inland Waters for 1913.

The total tonnage entered and departed at this port during the fiscal year 1912 was 10,454 tons.

WHITEHORSE HARBOUR, in the Yukon territory, is situated on the Lewes river, between lake Laberge and lake Marsh. The Lewes river empties into the Yukon and navigation continues to Dawson. There is one wharf at Whitehorse which is used by steamers on the Yukon route. The depth of water is from 10 feet to greater depths. The steamers which ply between Whitehorse and other places draw, when loaded, about 5 feet. Steamers run from Whitehorse to the Pelly and Hootalinqua and other small rivers, and to lake Teslin, and carry freight and passengers.

The total tonnage which entered and departed at Whitehorse, during the fiscal year of 1912, was 74,393 tons.

WIARTON HARBOUR, Bruce county, Ontario, is situated at the bottom of Colpoys bay, an inlet on the west side of Georgian bay. Colpoys bay runs in $7\frac{3}{4}$ miles from the south-west extremity of White Cloud island, which, together with Hay island, shelters it from the heavy seas on the Georgian bay. The breadth of the mouth of the bay is $2\frac{1}{2}$ miles and at the town of Wiarton $\frac{2}{3}$ of a mile. It is a fine sheet of water, and with the exception of a sandy flat, extending 800 yards from the bottom of the bay and a bank near the village of Oxenden making out 300 yards, its shore may be approached anywhere within a distance of 200 yards, and in some places closer.

Anchorage:—There is excellent anchorage in any depth under 10 fathoms from abreast the village of Colpoys to the bottom of the bay, a space of $1\frac{1}{2}$ miles in length by a mile in breadth on an average. See Georgian bay and North Channel Pilot.

There are two town docks and a Government breakwater. There is a shed for storage of freight on one of the town docks. The Grand Trunk Railway Extension passes the dock with the shed on it and the end of the breakwater. Dredging has been done alongside the Crown Portland Cement Company wharf, 350 feet in width, giving a depth of 16 feet below ordinary water level. A channel has also been dredged between the Government breakwater and the town wharf 100 feet in width, with a minimum length on the north west side of 580 feet, and on the south east side of 1,100 feet to a depth of 16 feet below bench mark.

Light:—The light is near the outer end of the breakwater at the head of Colpoys bay, latitude N. 44 45 0, longitude W. 81 8 10, red fixed. Cape Croker light, north east of Colpoys bay, latitude N. 44 57 27, longitude W. 80 57 35, white group flashing. There is a diaphone 150 feet 38° from the lighthouse at Cape Croker.

See List of Lights on Inland Waters for 1913.



Warton, Ont.

WINDSOR HARBOUR, county of Essex, Ontario, is situated on the south side of the Detroit river, near the outlet of lake St. Clair. The wharves at Windsor afford good accommodation for vessels, the water being from 4 to 4½ fathoms along the frontage. The Grand Trunk Railway wharf is over 600 feet long, with a railway track running the full length of the wharf, on which articles of all kinds are loaded or unloaded from cars to vessels and vice versa. The depth of water at this wharf is 25 feet, with clay bottom. The Canadian Pacific Railway wharf is 700 feet long, with a shed 500 feet in length by 46 feet wide; two railway tracks run the full length upon which merchandise is loaded and unloaded from the cars to vessels or from vessels to cars; depth of water, 25 feet, with clay bottom. The Michigan Central Railway wharf is 500 feet long, with a railway track running the full length of the wharf, and goods are loaded and unloaded from vessels to cars and vice versa. The wharf of J. T. Hurley & Co. is 250 feet long, upon which is erected a shed 22 feet by

30 feet; depth of water, 19 feet, with clay bottom. The Detroit, Belle Isle and Windsor Ferry Company's wharf is 300 feet long, and depth of water 20 feet, with clay bottom. This wharf is used by the Company's ferry boats which ply every few minutes between Windsor and Detroit on the United States side of the river. The wharf is also used as a coal wharf. The Dominion Government has recently built a landing dock, 484 feet along shore, 20 feet wide; depth of water $17\frac{1}{2}$ feet low water level.

Four railway companies have transfer boats running between Windsor and Detroit, and there are two passenger lines, one plying between Windsor and Detroit and the other between Walkerville and Detroit. The Michigan Central Railway has completed a tunnel under the river by which communication is maintained with Canada and the United States at that port. Windsor has communication with several lake and Detroit river ports by water and with all parts of Canada and the United States by rail. Owing to its situation it is mainly a railway centre, but an immense tonnage from the upper lakes passes up and down the channel of the Detroit river close to the water front of the city.

At Windsor all kinds of stores for vessels can be purchased and repairs made at the wharves, but the port has no marine slip or dry dock.

Lights:—The Detroit river is well lighted by floating lights, gas buoys and the city lights on both sides of the river.

The total tonnage which entered and departed at Windsor during the fiscal year of 1912 was 1,204,848 tons.

WINNIPEG LANDING AND LAKE WINNIPEG. Winnipeg, is in Provencher county, Manitoba, situated on the Red river. The Red river passes from the United States into Manitoba and empties into lake Winnipeg, about 46 miles from Winnipeg. Steamboats drawing 9 feet of water can pass from Winnipeg to lake Winnipeg. The river is narrow but all along its course shows a depth of water in the channel of over 9 feet when it is low water. Selkirk is about 26 miles from Winnipeg and at this point tugs, dredges and barges used in dredging the river and working on lake Winnipeg are put in winter quarters. At St. Andrew's rapids, about 19 miles from Winnipeg, a lock enables vessels to pass the rapids. The lock chamber is 215 feet in length by 46 feet in width and there is a dam above the lock and the change of level of water in the lock is affected in 6 minutes without any surge in the chamber. This lock is exceedingly well-equipped. The main valves are of cast-iron and bronze, circular in form, having a diameter of 77 inches over all and a circular opening or well 63 inches in diameter. It is stated that these valves are among the largest of this type in the world. The power for operating the gates is electrical. The water over the sill of the lock is 9 feet in depth when the lock is filled, but just below the lock the water is 10 feet in depth at low water level.

Steamers navigate the Red river from lake Winnipeg to Winnipeg. Stern wheel light draft steamers navigate Red river to Grand Forks, North Dakota.

A survey of the Red river, from Winnipeg to its mouth, has been made by the Public Works Department and some information has been furnished by the Department of Marine and Fisheries. A plan of the river, from Winnipeg to lake Winnipeg has been published by the Department of Marine and Fisheries showing the depth

of water from Winnipeg to St. Andrews rapids, and from St. Andrews rapids to Selkirk, and from Selkirk to Netley bay at the southern end of lake Winnipeg.

Lights at Selkirk:—Seven poles are located on the inner side of the wharf, at equal distances apart, fixed white. See Notice to Mariners No. 64 of 1913.

Lake Winnipeg is a large body of water; it is properly included in the Great Lakes of Canada. It is navigable from the mouth of Red river at the south end to Nelson river at the north end, a distance of 300 miles, by steamers of a draught of 10 feet. Since the completion of the locks at St. Andrews, 40 miles of navigation have been added, enabling steamboats to pass up the Red river to Winnipeg. The traffic on the lake is considerable, due to the extensive following of fishing operations. The Dominion Government has established two fish hatcheries near the lake. Dredging is now progressing for improvements at Red river and other points. Twenty-two steamers navigate the lake in different directions.

Lights on lake Winnipeg:—Red river mouth range lights, situated on the new channel cut through the N.E. extreme of the delta between the middle and east mouths; front on west side of new channel, at the point where the dredged cut meets the lake shore, latitude N. 50 23 44, longitude W. 96 48 13, white fixed, back, 1,896 feet 163° from front, white fixed. See notice to Mariners, No. 20, of 1914. Gimli on the W. side of the lake, on outer end of Government wharf, white fixed; Gull harbour, N.E. end of Big island, east end of S. entrance point of harbour, latitude N. 51 11 18, longitude W. 96 35 48, white occulting; Black bear island, on its east end, latitude N. 51 46 54, longitude W. 96 53 20, white fixed; Cox reef, latitude N. 52 19 26, longitude W. 97 14 15, George island, on its E. extremity, latitude N. 52 49 4, longitude W. 97 37 54, white fixed; Warren landing at the head of Nelson river has two ranges: lower, front on S.W. end of island opposite landing, latitude N. 53 42 48, longitude W. 97 52 15, back, 1-3 mile 32° 40' from front, both white fixed; upper, front at W. side of entrance to Nelson river, latitude N. 53 42 33, longitude W. 97 53 26, back 1,050 feet 3° 40' from front, both white fixed. In addition to the lights above enumerated there are 12 unlighted buoys placed where required at Warren landing.

DAWSON HARBOUR, Yukon Territory is on the Yukon river, about 1500 miles from St. Michaels on Behring strait. Steamers make the trip from the sea to Dawson in about 16 days and from Dawson to the sea down stream in about 6 or 7 days.

There are two wharves at Dawson and some storehouses; depth of water is about 6 feet.

Dawson has water communication by light draft boats with places on the Yukon, White, Pelly and Lewes rivers and with lake Teslin. Also with ports in Alaska.

The tonnage in 1912 which entered and departed was 241,928 tons.

MARITIME WATERS—ATLANTIC COAST.

Canada has a sea coast line of 5,000 miles on the Atlantic coast and 7,000 miles on the Pacific coast. This does not include any portion of Hudson strait Hudson bay nor the northern waters within the Arctic regions; nor is the whole

of the St. Lawrence route included in the sea coast of the country. On the Atlantic side, the seashores of Quebec, Nova Scotia, New Brunswick and Prince Edward Island comprise the sea coast line of eastern Canada.

The St. Lawrence route is first in importance, with regard to the volume of trade and passage of vessels in interoceanic navigation. Montreal is an ocean port although tidal waters do not reach within 82 miles of the port, nor does the rise and fall of the tide affect navigation for large vessels nearer than 87 nautical miles from this sea-port. The artificial shipchannel, between Montreal and Quebec, is of sufficient depth for large ocean steamers of 18,000 tons to navigate to Montreal. The route is well sheltered and the sea comparatively smooth after entering the Gulf of St. Lawrence from the Atlantic Ocean, for a distance of 900 miles.

The shipchannel has been described in this work under the port of Montreal, but a few general outlines are given under Maritime Navigation. The channel, technically speaking, extends from Montreal to the Lower Traverse, a distance of 220 miles from Montreal. The shallow sections have been dredged from the former depth of 10 feet to 30 feet in depth at the lowest stage of the water in the river. In spring, owing to the vast discharge of water from the Great Lakes or basins above, the water reaches a greater height in the narrow stretches of the river. The depth varies from 36 to 37 feet at the highest stage of water in Montreal harbour. The width of the dredged channel is 450 feet in the straight parts, and from 500 to 800 feet in the bends.

The distance in the channel from Montreal to Quebec is 160 miles and ocean-going, deep draught vessels have always been able to navigate to Quebec, consequently this port is the principal seaport on the lower St. Lawrence.

The waters of the St. Lawrence may be termed an estuary as far up as Batiscan, a few miles above Quebec. From Quebec downwards deep water is found, with the exception of the Beaujeu, St. Thomas and St. Roch channels, which have been dredged.

From these channels downwards, not less than 8 fathoms is obtained in the channel, and, in the course of ocean vessels, any depth from 8 to 150 fathoms are found before the mouth or dividing line of the river and gulf is reached. The river gradually expands below the mouth of the Saguenay river, which empties into it, until it is over 30 nautical miles wide, but at its mouth or the dividing line, at pointe des Monts, it contracts to a width of 23 nautical miles. The northern shore of the river is very irregular, forming many bays of considerable width.

The Gulf of St. Lawrence is an inland sea, enclosed by Canadian territory on the north and south, and by Newfoundland on the east. Three straits form the entrances from the Atlantic ocean including the strait of Canso; two on the eastern side of the gulf, namely, the strait of Belle Isle on the North side of Newfoundland and Cabot strait on the south side of the same island. The narrowest part of the strait of Belle Isle is 10 nautical miles; the width of Cabot strait, between Cape Breton island, Nova Scotia, and pointe aux Basques, Newfoundland, is 56 nautical miles. Vessels may enter both straits on the way to Montreal, but the Belle Isle route is not open for navigation in the Spring as early as the other route, owing to Belle Isle strait being blocked by ice which descends from northern waters.

The depth of water in the gulf varies in the track of ocean vessels north of Bird rocks and St. Paul's island, and south of Anticosti island, from 150 fathoms in the western end of the gulf to over 280 fathoms in Cabot strait. The soundings in the strait of Belle isle, show a depth varying from 22 fathoms to 100 at low water. North of Anticosti island the water is also deep, but ocean vessels do not take this course.

The area of the gulf is 101,562 square miles and its coast is very irregular. Extensive fishing operations have always been carried on in the gulf by the fishermen of Quebec, Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland and United States fishermen as well.

Gaspé bay is in the western part of the gulf. The bay extends 17 miles in a north north-westerly direction from cape Gaspé, and contains an excellent outer roadstead and Gaspé harbour at its head, capable of holding a numerous fleet, and a basin where large ships can be outfitted.

Chaleur bay is a wide and deep indentation south of Gaspé bay, and is the largest bay in the gulf, being 25 miles wide across its entrance. The northern shore is part of the coast of the province of Quebec, and the southern shore is on the New Brunswick side. There are numerous settlements along the shores, and several harbours and rivers entered by vessels engaged in the lumber and fishery trade. The Restigouche river, empties into the bay at its head. Campbellton, an important sea-port, is at the mouth of the Restigouche river.

Anticosti island is in the north western part of the gulf, and is 122 miles long by about 30 miles wide. There is no good harbour for large vessels on the coast, but bays, afford anchorage for light draught vessels and a breakwater pier, 3,476 feet long, has been built in Ellis bay. Vessels drawing 12 feet of water moor at this pier at any stage of the tide.

Magdalen islands are in extent about 35 miles long and of irregular shape. The principal harbours are Grand Entry harbour and House harbour. Pleasant bay, at the eastern end of Amherst island, affords shelter to fishing vessels in all winds, in June, July and August.

Atlantic coast and bay of Fundy—Next in importance to the St. Lawrence route is navigation along the Atlantic coast and bay of Fundy. Cape Breton Island, Nova Scotia, is of an irregular triangular form. It is indented with bays on three sides but only one good harbour may be said to exist on the western side. At its eastern end, there are fine harbours, namely Louisburg and Sydney. The inlet of Bras d'Or enters the northeastern side of the island, and forms a lake about 45 miles in length, which is continued by a cut named St. Peter's canal. This inlet is navigable from the northeastern side of the island to the entrance of the strait of Canso, on the southwestern end. The inlet or Bras d'Or lake affords excellent facilities for commerce and for fishing operations. Several harbours or ports in the inlet are centres of trade and commerce and mining operations.

The extreme eastern point of Cape Breton island is cape Breton, east of Louisburg, and north of the cape is Mira bay; Gabarus bay is west of Louisburg harbour. These two bays are the principal indentations of the coast of Cape Breton island on the southeast coast. The contour line of soundings averages 40 fathoms of water along the coast until the strait of Canso is reached. This coast is indented by numerous small bays and harbours.

An important headland is cape Canso at the entrance of the strait, and north west of this headland is Chedabucto bay. From cape Canso to Halifax the coast contains a number of coves and small harbours.

The bay of Fundy lies between the provinces of Nova Scotia and New Brunswick and the state of Maine. It is noted for the range of tides all along its shores. At cape Sable the rise is 11 feet but at Noel bay in Minas basin the tides rise and fall $50\frac{1}{2}$ feet. At low tide the flats are dry in many harbours and bays, and vessels are left high and dry until the tide rises again.

Between Yarmouth, on what is called the southeast coast of Nova Scotia, to the coast of New Brunswick on the bay, are the Annapolis basin, Minas basin, Chignecto bay and Cumberland basin. Amherst in Nova Scotia is at the head of navigation.

The Petitecodiac river is an arm or estuary of Chignecto bay and is navigable for a distance of 25 miles by vessels of ordinary draught at high water and for a distance of 12 miles farther by light draught vessels. On this river is Moncton in New Brunswick, a converging point for several railroads, and will be the eastern terminus of the Grand Trunk Pacific Transcontinental Railway.

The bay of Fundy is deep and anchorage at high water is difficult. The bay is never frozen over owing to the great rise and fall of the tide. Winter navigation is, therefore, kept up. St. John, on the northern side of the bay is the main winter port for ocean liners which carry passengers and freight to and from Canada and European ports.

In the bay of Fundy are several islands at which fog alarm stations have been established, viz: Brier island near the Nova Scotia coast, Grand Manan, Machias Seal island within the coast line of New Brunswick.

The Bay from the western part of Nova Scotia to the head is about 100 miles in length and has an average breadth of 30 miles.

Strait of Canso has its entrance between Chedabucto bay, on the coast of the mainland of Nova Scotia, and St. Peter's inlet, on the coast of Cape Breton island. The strait of Canso continues in a northerly direction to George bay. The depth of water in the strait is from 10 to 20 fathoms, and the rise and fall of the tide 4 feet springs, and 2 feet neaps. George bay is a wide bay and is an inlet from the gulf of St. Lawrence on the southern side of the gulf. The depth of water in the bay is from 17 to 18 fathoms in the centre, but immediately around the shores the water shallows.

The Strait of Northumberland trends in a north westerly direction between the province of Prince Edward Island and the northern coasts of Nova Scotia and New Brunswick. The depth of water of the strait varies greatly in depth, ranging from 6 to 22 fathoms. The rise and fall of the tide is irregular being $3\frac{1}{2}$ feet spring tide and 2 feet neap at East point and $9\frac{1}{2}$ feet springs and 8 feet neaps in Charlottetown harbour. Prince Edward Island has two fine harbours, one at Georgetown, open all the year round, and one at Charlottetown. The narrowest part of the strait is between cape Traverse, P.E.I., and cape Tormentine, N.B.

The harbours on the north side of Prince Edward Island are open to the gulf of St. Lawrence, are shallow and sand bar harbours, visited principally by fish-

ing vessels. Fishing operations are carried on extensively in several of the harbours, where small schooners and numerous boats are employed and outfitted.

The general improvements of navigation in eastern maritime waters include the construction of breakwaters and deepening of harbours, channels and removal of obstructions by the Federal Government.

In the waters within the coast line and harbours, bays and coves in Nova Scotia, dredging has been done, during a period of 39 years, in 112 localities. In New Brunswick, the same kind of work has been done in the same period in 111 localities and along the coast and in harbours in Prince Edward Island, dredging has been done in 57 localities.

TIDES AND CURRENTS—ATLANTIC COAST.

The tides of the eastern coasts of Canada are very varied in character, and exemplify several different types. They vary in range from the largest tides of the world, in the bay of Fundy, to a tide which is almost inappreciable in the middle of the gulf of St. Lawrence. They contrast with the tides of the Atlantic coast of the United States, which have a remarkable uniform character from cape Cod to Florida.

The tide of the open Gulf after entering the St. Lawrence, takes some $4\frac{1}{2}$ hours to run up the estuary from Father point to Quebec where it has a range of 18 feet at the springs. Beyond this it gradually decreases until at Three Rivers, or the head of tide water, it is scarcely appreciable.

On the outer coast of Nova Scotia the rise is small and the time of the tide is nearly simultaneous throughout its whole extent.

In the bay of Fundy the tide rises from 11 feet at cape Sable to $50\frac{1}{2}$ feet at Noel bay in Minas basin. At Yarmouth, the rise at the springs is 16 feet, while in St. John harbour it reaches 27 feet.

One remarkable feature of the tide in this region is the "Bore," at Moncton, on the Petiteodiac river. At high tide the river at this point forms a sheet of water half a mile in width; while at low water it consists of mud banks and flats, with a stream about 500 feet wide. The average rate of travel of the incoming "Bore" is about $8\frac{1}{2}$ miles per hour and the wall of water is often 5 feet in height. After it passes, the water continues to rise at the rate of a foot in 4 or 5 minutes.

The currents in eastern Canada and around Newfoundland: (1) constant currents, which run more or less continuously in accordance with the general circulation of the water; and (2) tidal currents, which are produced or chiefly influenced by the tide.

In Belle Isle strait the current is of a tidal character. The average velocity is 1.5 knots per hour in each direction. Along the Gaspe coast the current sets downward and has a width of about 12 miles. Its greatest strength is at an offing of 4 or 5 miles where it attains a speed of $3\frac{1}{2}$ knots.

The irregular current in the gut of Canso is the result of the difference in the character of the tide at the two ends of that strait.

In the bay of Fundy the currents are tidal in their character, running strongly during flood and ebb. The current is as strong down to a depth of 30 fathoms as

it is on the surface, and generally turns in direction on the surface and below at the same time. The velocity of the current in this bay reaches 4 knots an hour in places.

The Tidal and Current Survey, a branch of the Naval Service, has made investigations of these currents; and also maintains tide gauges in continuous operation throughout the year at Quebec, Father Point, Forteau Bay in Belle Isle strait, St. Paul island at the entrance to the gulf, Charlottetown, Halifax and St. John, N.B.

RIVERS IN THE PROVINCE OF QUEBEC.

The Saguenay river is navigable by large river steamers from Tadoussac, on the north shore of the St. Lawrence river, to Chicoutimi, the head of navigation, a distance of $71\frac{1}{2}$ miles, and by ocean-going vessels to St. Alphonse. It flows from lake St. John by two discharges from the lake.

Lake St. John is a body of water 30 miles long by 18 miles at its minimum width. Eight rivers flow into this lake, which in spring cause the overflowing of its banks.

The Richelieu river is navigable from the St. Lawrence river to lake Champlain, including canals, a distance of about 60 miles. Numerous rivers discharging into the St. Lawrence are navigable for a short distance from the main river.

NEW BRUNSWICK RIVERS.

The St. John river is 500 miles in length from its source, in the state of Maine to St. John, where it discharges into the harbour of St. John on the bay of Fundy. It is navigable in three sections. The first section is from the mouth of the St. Francis river, where it first touches Canadian territory, to Grand Falls, a distance of 75 miles; the second section is from Grand Falls to Fredericton, 140 miles, and the third to St. John, a distance of 80 miles. The influence of the tide is felt as far as Chapel bar, 90 miles from the mouth of the river.

Several lakes and rivers empty into the St. John river. Grand lake is about 30 miles long and is from three to six miles in breadth. Its outlet is about 30 miles below Fredericton at what is called the Jemseg, a narrow deep channel. Salmon river, which falls into the head of the lake, is a good sized stream, rising in the same highlands as the Richibucto river that flows into the gulf of St. Lawrence.

The Washademoak flows into the St. John river about 36 miles below Fredericton. This river has a course of between 60 and 70 miles.

Extensive improvements have been made on the St. John river by the Government of New Brunswick and by the Federal Government, covering a period of many years. An International Commission is now engaged in an hydraulic investigation of the river, its tributaries, lakes and watersheds to determine the possibilities and effect of creating storage by dams, and otherwise improving the river.

The St. John river is famed for its beauty, and on this account offers exceptional attractions to tourists, who find steamers plying between St. John and Fredericton, with excellent accommodation.

The Miramichi river is the second river in importance in New Brunswick. Its branches are numerous and drain a large extent of country. This river empties into the gulf of St. Lawrence. It is navigable for a distance of 42 miles from its mouth by large vessels and still farther, for several miles, by light draft vessels, but the river is greatly influenced by tidal waters. Chatham and Newcastle, located on its banks, are important lumber ports; the first is about 30 miles from the mouth or bay, and the latter 42 miles. Extensive lumbering operations and shipment of lumber have been carried on for a century or more. The northwest arm and southwest arm unite about 15 miles from the mouth of the river, while three of the northwest branches spring from a chain of lakes not far from the Tobique and Nipisiguit rivers.

MARITIME WATERS OF BRITISH COLUMBIA PACIFIC COAST.

Juan De Fuca strait is between the south coast of Vancouver island and the mainland of the state of Washington.

The breadth of the strait between cape Flattery, its southern point of entrance, and Bonilla point, on Vancouver island, is 13 miles. The breadth of the strait for sixty miles easterly averages 12 miles.

At its eastern part are channels leading in or outwards between Vancouver island and the mainland of British Columbia and among the Haro archipelago, and southward to the coast of the United States, by Admiralty inlet and Puget sound.

The strait, along the southern part of Vancouver island, contains several inlets in which harbours are located. The most important of these harbours are Victoria and Esquimalt.

Strait of Georgia.—The route generally taken from Victoria to Vancouver is south of Trial and Discovery islands through the main channel of Haro strait, and northward of Stuart and Waldron islands into the strait of Georgia. The Fraser river empties into this strait, and in its freedom from risk of life and shipwreck it possesses advantages over any other river on the coast. A sheltered strait, scarcely 15 miles across, receives its waters; the island of Vancouver serves as a natural breakwater, preventing the possibility of any sea arising which would prove dangerous to vessels even of the smallest class.

The strait of Georgia may throughout be said to measure some 60 miles in length, and on both the southern and northern shores of Vancouver island and mainland shores shelter can be found everywhere. On the south shore lies Nanaimo, Ladysmith, Departure bay and Oyster harbour.

Chemainus bay is a well sheltered bay, two-thirds of a mile in length by one in breadth.

Queen Charlotte sound.—From the strait of Georgia to Queen Charlotte sound there is deep water everywhere. Seymour narrows in Discovery passage is but three quarters of a mile in width, and steamers have sometimes to wait for tides, but for the one hundred and fifty odd miles from Vancouver to Queen Charlotte sound the route is not only well sheltered but is perfectly safe in every other way.

It will here be of interest to give a little data about the most important inlets from Burrard inlet to Prince Rupert.

Howe sound, immediately adjoining the former, is an extensive sheet of water, the general depth being very great, while there are but few anchorages. The entrance, nearly 12 miles in width, is between point Atkinson, the north point of Burrard inlet and Gower point.

Jervis inlet.—In Malaspina strait, well protected by Texada island, is the entrance to Jervis inlet, one of the most remarkable arms of the sea which indents the continent of America from the parallel of Juan de Fuca strait as far as latitude 60° N. It extends by winding reaches in a northerly direction for more than 40 miles, while its width rarely exceeds 1½ miles, and in most places is even less.

Bute inlet is the next extensive area of the sea to be found northward. It penetrates the mainland for nearly 40 miles in a winding course inland, and presents many similar features to Jervis inlet, the general breadth varying from one to two miles, as in Jervis inlet. On both shores are mountains rising abruptly to some 5,000 or 8,000 feet covered with snow all the year round. There are neither as many anchorages nor harbours as in the former, but the depths are greater.

The main entrance, though rarely used on account of rocks, to Knight inlet, which is one of the most extensive of sea canals of British Columbia, lies northward of Swanson, Lewis and Village islands. From thence Fitzhugh sound, Millbank sound and Laredo sound are important inlets navigable with very deep water. Grenville channel still further north leads to Prince Rupert in Chatham sound.

North of Prince Rupert is Port Simpson, one of the best harbours on the coast protected from all winds except west winds which seldom blow. The harbour embraces an area of 4 square miles of water from 4 to 20 fathoms deep. The British Columbia coast continues some distance farther north in Chatham sound and includes the Dundas islands, Zayas and other islands.

Dixon entrance between Queen Charlotte islands and Prince of Wales island, is a broad entrance from the Pacific ocean and merges into Brown passage between Stephens and Melville islands. Very deep water is found in Dixon entrance until the contour line of the coast is reached. In Brown passage it is not so deep but ranges from 16 to 126 fathoms in the passage to Chatham sound.

West of the inner channels described on the course between Vancouver and Prince Rupert, a number of large islands lie on the east coast of Hecate strait.

Hecate strait is a broad sheet of water between the Queen Charlotte islands and the mainland. Between the north end of Vancouver island and the southern of the Queen Charlotte islands, the waters of the Pacific ocean pass until they reach the coast of the mainland.

Vancouver island and the Queen Charlotte islands are indented by many bays and inlets on their eastern sides. The same can be said of the western coast from the most northern part of Graham island, of the Queen Charlotte islands, to the southern end of Vancouver island or Juan de Fuca strait where the description began.

An important Sound 30 miles west of the entrance of the strait is Barkley sound. It is 14 miles wide and practically retains this width, including islands, for a distance inland of 12 miles. The Sound then breaks into numerous channels or canals, the principal one being Alberni canal that extends inland 23 miles. This canal so deeply indents Vancouver island that only 13 miles of land remains between the head of the canal and the east coast of the island.

TIDES OF THE PACIFIC COAST.

The tide of the Pacific coast of Canada can best be described as a declination-tide. Its leading feature is a large diurnal inequality in time and height. There is also a large annual variation with the change in the declination of the sun. When the moon is farthest south or north of the equator the inequality between the two tides of the day is the greatest, and what is termed long and short runs of the current occur.

The tide on this coast is not only of direct interest to navigation, but also to several important industries, notably the lumber industry and coal trade which are carried on to a large extent by towing. The fishing industry is also deeply interested in the tide, not only on the Fraser and Skeena rivers, where numerous large canneries are located, but also on the long natural channels and sheltered passages.

On the outer coast of Vancouver island the tide has a rise of from 10 to 12 feet. Among the islands of the gulf of Georgia and in the strait the mean rise is 12 to 13 feet. At Port Essington on the Skeena river the rise at the springs is 21 feet while Port Simpson has 19 feet, and Prince Rupert, the terminal of the Grand Trunk Pacific, 5% more. The range of the tide at the head of the long inlets or channels is only 2 to 12 per cent. greater than at their mouth, while the time of high and low water is practically the same.

One of the difficulties met with in navigation on the Pacific coast is the very strong tidal current in the various passes and narrows, so strong that in some of them navigation is only possible at slack water. The most important of these is the far-famed Seymour narrows, where there is a current of 7 to 12 knots. The Yuculta, largely used by tugs in towing logs, has a current almost as strong. In Active and Porlier passes, on the route from Vancouver to Victoria, the current runs from 5 to 7 knots.

As these passes can only be navigated at slack water, except by vessels of high speed, the time of the turn of the current is important. In this connection the Tidal and Current Survey include in their Tide Tables the time of slack water in these passes and narrows, based upon observations obtained at each locality.

Tide gauges are kept in continuous operation at Clayoquot, on the west coast of Vancouver island, Victoria, Vancouver, Prince Rupert and Port Simpson.

The Tide Tables issued by this Survey are published in two sets, one including the harbours of Eastern Canada and the other those on the Pacific coast; and besides giving the time of the tide at the principal harbours, these tables give a series of "differences" by which the time of high and low water at intermediate ports can be readily and accurately determined.

GREAT LAKES.

The bodies of water termed "Great Lakes" include lakes Superior, Huron, Erie and Ontario. These great inland seas or waterways are connected by a system of canals and locks which permit vessels to proceed from Montreal, on the St. Lawrence river and head of ocean navigation, to Thunder bay, north-west side of lake Superior. Vessels drawing 19 to 20 feet navigate the Great

Lakes on the Canadian side of the boundary from Port Colborne at the eastern end of lake Erie to Port Arthur and Fort William on the northwest shore of lake Superior. Deep draught vessels also trade and carry passengers between Canadian and American ports situated on opposite sides of the lakes. Water traffic is also maintained by vessels drawing more than 14 feet by one Canadian port with another.

The Sault Ste. Marie canal and lock connects lake Superior at its eastern end with lake Huron and Georgian bay. The canal is over one mile long and 150 feet wide at the water surface. It contains one lock chamber 900 feet long and 60 feet wide, with 18 feet 3 inches depth of water at its extreme low water, but of a greater depth at other stages. The distance from Sault Ste. Marie west of Port Arthur is 274 miles, affording deep water navigation all the way across. The depth of the lake in places reaches over 600 feet.

The course from Sault Ste. Marie to Fort William and Port Arthur is in a northwesterly direction, and the Canadian lighthouse and buoy system includes a number of lights and gas buoys, placed as aids to navigation where they are deemed necessary.

Lake Huron, connected by Sault Ste. Marie canal with lake Superior, is also navigated very extensively, and Georgian bay, part of lake Huron, is connected with the canal by what is termed the North Channel or St. Mary's river. Lake Huron has a number of ports along the coast, and Georgian bay, a greater number of safe harbours and well-known ports termed, "Bay Ports."

Lake Huron is connected on the great waterway with lake Erie by the St. Croix and Detroit rivers. The lighthouse and buoy systems on these waterways embrace a most complete chain of aids to navigation.

Lake Erie, the shallowest of the Great Lakes, includes a small number of well-known ports and is connected with lake Ontario by the Welland canal. This canal is $26\frac{3}{4}$ miles long and has its western entrance at Port Colborne on lake Erie and the eastern entrance, at Port Dalhousie on lake Ontario. There are 25 lift lock chambers and one guard lock, by which vessels are transferred from one lake to the other; the length of the locks is 270 feet, width 45 feet and water over the sills 14 feet. The total lockage lift from lake Ontario to lake Erie is $326\frac{3}{4}$ feet. The mean height of lake Erie above mean tide at New York on the Atlantic, is 572.6 feet. The new Welland canal, being constructed, will vary from the older one by the introduction of all the modern improvements for operation, and will be built large enough to permit the largest and the deepest draft vessels navigating the Great Lakes to pass from one lake to another. Niagara falls, on the Niagara river, flow over its declivity between the two lakes.

Lake Ontario, a deeper body of water than lake Erie, is the most easterly of the chain of Great Lakes and from it the great St. Lawrence river flows to the gulf of St. Lawrence, nearly its whole length in Canadian territory. The bay of Quinte, a large sheet of water, is part of lake Ontario. The navigating connection between lake Ontario and Montreal is made by a series of canals of different lengths, containing locks for overcoming the several rapids on the Upper St. Lawrence river. The lake coast affords good harbour accommodation for shipping and a number of important ports are situated on its shores. Communication between Montreal, at the head of ocean navigation, and lake ports is continuous to the head of lake Superior. The great waterway has steadily increased in importance notwith-

standing the addition of railways connecting the eastern provinces with the great west. Merchandise and manufactures of various kinds of heavy articles and machinery are shipped west or from one port to another, and raw material, iron ore, lumber, and grain shipped east. The passenger traffic on all these lakes, especially in summer, is enormous, maintained by large and well-equipped steamboat lines. The tourist traffic is a special feature in which luxuriously fitted steamers are engaged, starting and arriving at numerous points on scheduled time. Excursion boats of all sizes daily make the scenes along the shores and crossing the lakes one of constant movement and activity. International rules of the road, specially adapted for the Great Lakes and waters contiguous to Canada and the United States, govern the movements of steamers in the course of navigation. The constant stream of vessels passing upwards and downwards by the Detroit river, between lakes Erie and Huron, exceeds the tonnage and number of any other connecting waterway in the world.

LENGTH, BREADTH, AREA AND ELEVATION OF THE GREAT LAKES.

The greatest length of lake Superior is 354 miles, breadth 162 miles, area 31,800 square miles, mean depth, 688 feet, greatest depth 1,008 feet, elevation above tidal waters at New York 602 feet. Lake Michigan, U.S., greatest length 316 miles, breadth 118 miles, area 22,400 square miles, depth 690 feet, greatest depth 870 feet, elevation 581 feet above tide water. Lake Huron, greatest length 207 miles, greatest breadth 101 miles, area 23,200 square miles, mean depth 700 feet, its greatest depth 750, elevation 581 feet above tidal waters. Lake Erie, greatest length 239 miles, greatest breadth 59 miles, area 10,000 square miles, mean depth 84 feet, greatest depth 210 feet, elevation 572 feet above tidal water at New York. Lake Ontario, greatest length 193 miles, breadth 53 miles, mean depth 500 feet, greatest depth 738 feet, area 7,260 square miles, elevation 246 feet above tidal water at New York.

The Canadian or north shore coast lines of these lakes vary in contour. Lake Erie has but few indentations, the harbours are principally artificial and were costly and difficult of construction. The other lakes contain bays and indentations and numerous rivers discharge into them. Harbours have been formed at the mouths of some of these rivers which afford accommodation for loading and shelter in storms and gales.

CANADIAN COAST LINE OF GREAT LAKES.

The Canadian coast line of lake Ontario extends, approximately, a distance of 250 miles from end to end; of lake Erie 290 miles; of lake Huron including Georgian bay 620 miles; and of lake Superior 400 miles.

DISTANCE FROM PORT ARTHUR AND FORT WILLIAM TO LIVERPOOL, G.B.

Some features of the route from the head of lake navigation to Liverpool, Great Britain, are of great interest to shippers of grain by water. From Fort William and Port Arthur, the two principal ports at the head of lake Superior and the gateway of the Northwest provinces, to Montreal, the head of ocean naviga-

tion, the distance is 1,500 miles, from Montreal to Quebec 160 miles. From Quebec to the strait of Belle Isle the distance is 573 miles. By this it will be seen that the distance from the head of lake navigation by lakes, canals and the St. Clair, Detroit and St. Lawrence rivers to the entrance of the strait of Belle Isle, where vessels enter the Atlantic ocean, is 2,233 miles. The total distance, therefore, from Fort William and Port Arthur to Liverpool, by Canadian waters, is 3,835 miles. This might have been stated in one line, but the other facts included are of sufficient importance to mention them.

CANALS AND LOCKS CONNECTING LAKES AND UPPER ST. LAWRENCE RIVER.

Beginning at Montreal, the first is Lachine canal, overcoming the Lachine rapids, length $8\frac{1}{2}$ miles, locks 5, length of each lock 270 feet and 45 feet wide, total rise of lockage 45 feet, depth of water on sills at two locks 18 feet, three locks 14 feet. The next canal is Soulanges, a distance of 16 miles from Lachine canal. Soulanges canal extends from Cascade point to Coteau Landing, overcoming Cascades, Cedar and Coteau rapids. It is 14 miles long, 100 feet wide at the bottom and 164 at the water surface; there are 4 lift locks and guard lock 280 by 45 feet, depth of water on sills 15 feet, total rise of lockage 84 feet. Between Soulanges and Cornwall canals the distance is 31 miles; length of Cornwall canal is 11 miles, width 90 feet at bottom, 154 feet at water surface; there are 6 locks, 270 by 75 feet, depth of water on sills 14 feet, total rise of lockage 48 feet. Five miles is the distance from the head of Cornwall canals to the foot of Williamsburg canals which include Farrans point, Rapide Plat and the Galops canals, $12\frac{3}{4}$ miles in length, with short stretches of water in between. There are 6 locks ranging in size from 270 by 45 feet to 800 by 50 feet, total rise of lockage is $30\frac{1}{2}$ feet. From the head of Williamsburg canals to Welland canal the distance is 228 miles over the St. Lawrence river and lake Ontario. The Welland canal in use at present is $26\frac{3}{4}$ miles in length, 25 lift locks, 1 guard lock, dimensions 270 by 145, rise of lockage $326\frac{3}{4}$ feet from lakes Ontario to Erie, depth of water on sills 14 feet. Canal under construction: seventeen miles of present canal to be deepened to 25 feet and widened to 200 feet, 8 miles of new canal at the lake Ontario end will follow. Ten Mile creek, in which 7 new locks will be constructed, to be termed the Ship canal. The new locks will be 800 feet long, 80 feet wide and 30 feet deep on the sills; the canal will be for 25 foot navigation, but the locks are being constructed for a possible 30 foot navigation. The 7 locks will have a lift of $46\frac{1}{2}$ feet each; 3 locks will be twin locks providing for navigation both ways. The distance between Welland and Sault Ste. Marie canals is 574 miles. The Sault Ste Marie canal is $1\frac{1}{4}$ miles in length with one lock, 900 by 60 feet, with a depth of water on sills of $18\frac{1}{4}$ feet at low water, rise of lockage 18 feet from St. Mary's river to lake Superior.

UNITED STATES LAKE PORTS.

Brief descriptions of United States harbours on the Great Lakes are here inserted for the use of mariners trading between Canadian and United States lake ports.

DULUTH-SUPERIOR HARBOUR. Duluth is in Minnesota and Superior in Wisconsin, but the two harbours form one harbour under the Federal Government Harbour Act.

The harbour is situated at the inner end of an arm of lake Superior and at its head. The distance from Port Arthur and Fort William is about 196 miles in a south-westerly direction from Thunder cape. The entrances are Duluth canal and Superior Entry. In Duluth canal entrance the channel is between two piers 300 feet apart for a distance of 1,250 feet, but at the inner or harbour end the distance between piers is 540 feet. The approach to the outer end of the piers originally had a width of 330 feet with a depth of 30 feet, but the soundings in 1913 showed a width only of 240 feet of 30 foot depth. The narrowing of the approach has been caused by shoaling on the south side of the entrance. The depth of water between the piers varies from 20 feet to 27 feet for a width of 250 feet from the outer end of the piers.

One anchorage basin, called the Duluth harbour basin, is from 20 to 24 feet in depth with an area of 409 acres; the east gate basin is 20 feet or more in depth and an area of 62 acres. Duluth is one of the principal harbours on the Great Lakes, owing to its commerce, particularly in grain shipments.

Superior harbour entrance from the lake is 30 feet in depth, 600 feet wide between the breakwaters and decreases to 20 feet in depth near the inner pier heads. The revetment channel is 24 feet in depth, width 500 feet. Superior harbour basin has 20 feet or more of water for a length of 3,600 feet with a width varying from 1500 to 600 feet. In Duluth-Superior harbour there are two dry docks; the largest is 620 feet long, width at entrance 66.5, depth of water over the sill 19 feet. There is one more dry dock and two floating docks with extensions that will admit vessels drawing 12 feet.

Lights:—Duluth canal lights, front range light, fixed red, is located on the outer end of the south pier; a steam fog whistle is located here; rear light shows a red flash light and is located near the inner end of the south pier 1,200 feet S.W. by W. $\frac{3}{4}$ W. from front light.

GRAND MARAIS HARBOUR, Michigan, on the south shore of lake Superior, half-way between Whitefish bay and Grand island, and the only harbour in this stretch of 90 miles of dangerous coast where numerous wrecks have occurred. It is therefore of value as a harbour of refuge and will increase by improving the entrance which at the last datum from the corps of Engineers of the U. S. Government gives the least depth as 22 feet.

The lights leading into the harbour are two red fixed lights, front is about 40 feet from the west pier, while the rear light is on the inner end of the pier, 1,770 feet S. $\frac{1}{4}$ E. from front.

MARQUETTE HARBOUR, Michigan, on lake Superior, is situated at the north end of Marquette bay. A breakwater some 450 feet in length protects wholly or in part an area of about 200 acres. Twenty to 30 feet of water is to be found with good anchorage in this area. Vessels are not allowed to make fast to breakwater and care is taken that they do not swing round against it.

The harbour contains a number of wharves. The Marquette light, white flashing, is situated on the N. point of Marquette harbour; the Marquette breakwater light, fixed red, and a fog bell are located at the S. end of breakwater. There is a life-saving station and storm signals are displayed day and night.

CHICAGO HARBOUR, state of Illinois, is situated near the southern extremity of lake Michigan on its western shore. The length of the Chicago river in the city is 16 miles, but along the river channels there are 22 miles of docks and wharves and 7 miles in slips, the river and branches constitute the inner harbour, the easterly

and southerly breakwaters are the boundaries of the outer harbour, with the return to the north and the Grand Park bulkhead and the Illinois Central Railway wharves to the west, making an area of 270 acres, of which 71 acres have been dredged to a depth of 22.7 feet, while the remainder will carry steamers of from 9 to 20 feet draught.

The entrance channel from the lake to Rush street on the Chicago river has been dredged to a depth of 22.7 feet.

Chicago is well supplied with dry docks and shipbuilding yards.

Lights.—Chicago harbour light, red and white flashing, is situated near the S.E. end of the exterior breakwater; a fixed red light marks the inshore end of the exterior breakwater. Range lights for entering the harbour are: front, fixed red, on the Chicago pier head on the outer end of the north pier; back, fixed white, 108 feet W. 1-8 N. from front; a fog bell is struck here. The Chicago breakwater N. light is white flashing, is on the N.E. angle of the easterly breakwater of the outer basin at the south side of the river entrance and is a guide into the river entrance. The Chicago breakwater S. light is on the S. end of the easterly breakwater of the outer basin, at the N. side of the southern entrance into the basin.

MILWAUKEE HARBOUR, Wisconsin, on the western shore of lake Michigan, at the mouth of Milwaukee river, 89 miles north of Chicago.

The harbour is formed by a breakwater which starts from a point on the N. shore of the bay and extends 155° for 2,450 feet; the main arm then runs 191° for 6,180 feet; 1,000 feet south from the angle there is an opening 400 feet wide for a fair weather entrance and exit, making the total length of breakwater structure 8,230 feet. The distance of the southerly end from the mouth of Milwaukee river is 3,500 feet.

The protected area available for the use of vessels is about 270 acres and over 18 feet deep; maximum depth 34. The anchorage is good.

In the outer harbour above described are two piers, 1,653 and 1,604 feet long respectively. The 21 foot channel between the piers is stable in character and is easily and safely navigated.

The inner harbour is formed of the Milwaukee, Menomonee and the Kinnickinnic rivers. A depth of 21 feet is maintained in all three within the area described as Inner harbour. The channels are narrow, tortuous and not provided with turning basins; several of the bridge openings are also too narrow and navigation is difficult.

Fixed red range lights on the north pier guide mariners into the piers. A fog alarm signal is in operation on the pier between the two lights; a red flash light is shown on the end of the south pier; the Milwaukee breakwater light on the southerly end of the breakwater is also red flashing.

A life-saving station has been established on the south side of the harbour entrance.

Storm warnings are displayed day and night from a steel tower at the life-saving station as well as from a flagstaff in town.

CLEVELAND HARBOUR, Ohio, on the southern shore of lake Erie, consists of two harbours, an inner, and outer which have been much improved of late years, the former is under the control of the municipal authorities, while the latter is under the control of the federal Government. This harbour is formed by breakwaters and has an area of approximately 375 acres. A new breakwater is under con-

struction which will extend the harbour three miles to the eastward. There is an available depth of 21 feet to the slips, elsewhere the depth varies from 16 to 25 feet.

The entrance channel is 30 feet deep between the pier heads at the outer entrance, decreasing to a least depth of 22 feet in the Inner basin.

The Cleveland east breakwater pier head light at the outer entrance shows a white flashing light; the west breakwater pier head light shows a red and white flashing light. Other lights show the mariner the way in to the docks all along the channel.

The life-saving station is situated on the west pier. Day and night storm signals are displayed from a flagstaff on a public building and also from a steel tower at the life-saving station.

TOLEDO HARBOUR, Ohio, on lake Erie, is situated on the Maumee river at the S.W. corner of Maumee bay, has many miles of dockage and warehousing. It is in direct communication with the interior by the Miami and Erie canal. The harbour includes Maumee bay and lower reaches of the river. The channel through the bay and river has been dredged to a least depth of 21 feet, the total distance dredged being some 15 miles. The Toledo harbour light, $\frac{1}{2}$ mile in from the outer end of the straight channel and 400 feet north-westerly from its axis, in 21 feet of water, shows a red and white flash, visible 16 miles. Range lights and gas buoys lead the mariner to the river.

Three dry docks varying in lengths from 674 to 235 feet and with depths of water over sill from 15.3 to 9.5 feet.

OSWEGO HARBOUR, N.Y., is the most easterly harbour on the south coast of lake Ontario. The harbour comprises an outer harbour, an inner harbour and Oswego river up to the lower end of Oswego canal. The outer harbour is artificial, and is made up by a breakwater. There is one entrance to the outer harbour, it is 384 feet in width; the harbour itself has poor holding ground for anchorage, but vessels moor to the breakwater from which they are sometimes driven on account of seas breaking over it. The depths in the harbour range from $11\frac{1}{2}$ feet to 15 feet. The Inner harbour has $14\frac{1}{2}$ feet at the wharves, Oswego river has the same depth at the wharves. Light at the entrance is fixed red, while the main Oswego light is fixed white. The Life-saving station is situated on the Fort Ontario reservation, and day and night signal storm warnings are displayed at this station.

CHARLOTTE HARBOUR, N.Y., on the S. shore of lake Ontario at the mouth of Genesee river; the harbour is the port of Rochester 2 miles above the navigable part of the river and 7 miles from its mouth; the channel from deep water in the river to deep water in the lake is 200 feet wide outside the piers and 150 between, was reported dredged to a depth of 20 feet in October of 1913. The piers are nearly parallel and about 450 feet apart.

Charlotte light, red fixed, is located near the outer end of the west pier, another red fixed, is situated near the outer end of the east pier. A fog alarm, life-saving station, and storm warnings, displayed night and day, form further aids to navigation.

OGDENSBURG HARBOUR, N.Y., on the St. Lawrence river, 62 miles from lake Ontario, on the opposite side of the river from Prescott, Ontario, described elsewhere in this issue, is an artificial channel $1\frac{1}{2}$ miles in length close in front of Ogdensburg on above named river, and the Oswegatchie river empties at the upper limit of the harbour. The different channels connecting the main

St. Lawrence river channel to the harbour channel have been deepened to 19 feet at low water; this depth is carried to the elevators and freight sheds of the Rutland Railroad terminus. This dredging was completed in 1913, but these channels require periodical dredging. Lights, gas buoys and red and black spar buoys mark the channels to the harbour. Day and night storm warning signals are displayed at this port from a steel tower.

MINOR NAVIGABLE WATERS IN ONTARIO.

The Ottawa river, from its source, which is almost directly north of the city of Ottawa, at the height of land which marks the commencement of the slope to Hudson bay, to its junction with the St. Lawrence river, is a distance of 750 miles. The Ottawa river drains a basin of 56,043 square miles. From a report of the Public Works Department, the navigable length of the river has been obtained. The Upper Ottawa, that is above Ottawa city, can be navigated on various parts to the mouth of the Mattawan river, a total distance of 192 miles. From Ottawa to the Joachim rapids, a distance of 120 miles, steamers of 6 feet draught can navigate the various sections. From Joachim rapids to the mouth of the Mattawan river, a distance of 50 miles may be navigated by steamers of $3\frac{1}{2}$ feet draught at low water. It should, however, be pointed out that owing to rapids and falls a clear run cannot be made from Ottawa to the Mattawan river.

The Lower Ottawa is 120 miles in length, and many steamers are employed carrying freight and passengers from Ottawa to Montreal and intermediate points. The Grenville canal and Lachine canal enable freight and passenger steamers to reach Montreal.

Three large bodies of water, that are enlargements of this river, are lake Temiscaming, lake Deschenes and lake of Two Mountains. These expanses are beautiful lakes much used as pleasure resorts and for general navigation.

Lake Nipigon is north of Fort William and lies between the shores of lake Superior and the Grand Trunk Pacific Railway. The lake is navigable from the north end, where it connects with the railway, for a distance of 70 miles for vessels of 10 feet draught. At present, the lake and surroundings are preserved by the Ontario Government as a forest, fishing and game preserve. It is justly famed for the variety and quantity of fish within its waters and streams discharging into it. Sportsmen visit the lake for hunting and fishing at the proper seasons. Three steamers are engaged in carrying passengers and freight from one point to another, situated on its banks.

Lake Helen is still further east and is navigable from Nipigon, a station on the Grand Trunk Pacific, in a northerly direction for 15 miles for vessels of a draught of 6 feet and for 6 miles up the Nipigon river. One steamer plys on the river, carrying passengers and freight.

Lake Sturgeon is 300 miles east of Winnipeg, in western Ontario. It is navigable, from where it connects with the railway, in a south-easterly direction for a distance of 40 miles for steamers of 6 feet draught; there are four steamers plying on the lake. Minerals are abundant in the vicinity.

Lake or Lac Seul is also connected with the Grand Trunk Pacific Railway at a point about 300 miles east of Winnipeg. It is navigable in an easterly and westerly direction for 180 miles by steamers of a draught of 8 feet. One steamer

is at present engaged in carrying passengers and freight on its waters. The surrounding country is heavily wooded with a fine growth of timber forest.

Lake Wabigoon lies near a section of the Canadian Pacific Railway, 250 miles east of Winnipeg. It is navigable from Dryden in a southerly direction for 50 miles by vessels of a draught of 7 feet. Connection is made with lake Manitou by portage. Five steamers are engaged on lake Wabigoon in the freight, lumber and fishing industries. The lake is an important stretch of navigation and the centre of a rich mineral district.

Lake Manitou—This lake is seven miles south of lake Wabigoon. The two lakes are connected by a seven mile portage. Manitou lake is navigable for 40 miles in an easterly direction, by steamers of 6 feet draught. The navigation of the lake is important as it is in a mining district. Two small steamers carry freight and passengers from one point to another.

Eagle lake is connected with the main line of the Canadian Pacific Railway, 188 miles east of Winnipeg. It is navigable from Vermillion bay in a southerly direction, for a distance of 60 miles by steamers of a draught of 7 feet. The lake has connection with a number of small water stretches and navigation is important. Three steamboats navigate the lake, engaged in the lumber and fishing industry. The surrounding country is heavily timbered.

Lake of the Woods is connected with the Canadian Pacific Railway at Kenora, in Ontario, and the Canadian Northern Railway on the south side at Warroad, Minnesota. The Rainy river discharges into this lake. The lake is navigable for a distance of 80 miles from Kenora to the mouth of Rainy river by vessels drawing 9 feet of water. Twenty-two steamers are employed on this lake, the largest at present being 472 tons. The lake is famed for the thousands of islands within its bounds, and for its mineral deposits and mines in operation. It has become the greatest summer resort in western Canada. The Winnipeg river is one of its tributaries.

Lake Nipissing is in the northeast part of Ontario. Of irregular shape and bold shores. The overflow discharges into French river which in turn flows into Georgian bay.

The lake is some 50 miles long, its greatest breadth being 35 miles, and is 642 feet above sea level.

At North Bay the most important port on the lake, dredging has been carried on to give a depth of 14 feet at the wharves.

Lake Nipissing is a link in the proposed Georgian Bay canal uniting the Ottawa river with French river.

Rainy lake is another sheet of water fast becoming a favourite summer resort. The Canadian Northern Railway runs along its banks for some distance, and part of the roadbed has been formed by connecting some of the islands by fillings. It is navigable from Fort Francis, Ontario, in a south-easterly direction for 75 miles for steamboats of 7 feet draught. Eight steamboats are engaged in traffic on this lake.

The lakes above described are within the boundary lines of the province of Ontario, and complete the comparatively new waters opened to navigation within recent years.

LAKES IN MANITOBA.



View on Lake Winnipeg.

Lake Winnipeg is a large body of water; it is properly included in the Great Lakes of Canada. It is navigable from the mouth of Red river, at the south end, to Nelson river at the north end, a distance of 300 miles, by steamers of a draught of 10 feet. Since the completion of the locks at St. Andrews, 40 miles of navigation have been added, enabling steamboats to pass up the Red river to Winnipeg. The traffic on the lake is considerable, due to the extensive following of fishing operations. The Dominion Government has established two fish hatcheries near the lake. Dredging is now progressing for improvements at Red river and other points. Twenty-two steamers navigate the lake in different directions.

Lake Manitoba is connected at its southern end with the Canadian Pacific and Canadian Northern Railways at Oak Point and Totogan. It is navigable from these points northward to Gypsumville, a distance of 125 miles, by steamers drawing $5\frac{1}{2}$ feet. Dredging is being carried on to improve small harbours to a depth that will accomodate vessels drawing $4\frac{1}{2}$ feet. There are now five steamers navigating the lake, engaged in carrying lumber and gypsum.

The surrounding country is agricultural, and when settled the navigation on this lake will be of considerable importance.

Lake Winnipegosis is connected at the southern end with the Canadian Northern Railway at Winnipegosis; it is navigable from this point in a northerly direction for 120 miles for vessels with a draught of 7 feet. There are six steamboats on this lake engaged in fishing and the lumber trade. This lake is surrounded by a timber country and some good agricultural land. The white fish, trout and pickerel caught in its waters are superior in quality. Artificial propagation is carried on by means of a fish hatchery.

LAKES OF SASKATCHEWAN.

Last Mountain lake is connected with the Canadian Northern and Canadian Pacific Railways at the southern end of the lake at Craven. It is navigable from this point for 70 miles in a northerly direction by vessels of a draught of 7 feet. The Public Works Department of Canada has a dredge at work improving harbours on the lake. The lake is surrounded by a rich prairie country. When this country is settled navigation is more than likely to become important. The locality is fast becoming a summer resort of the inhabitants of Saskatchewan, who find fish abundant in its waters.

Lake Athabaska is connected at the south-west corner with Athabaska river, and at the northwest corner with the Peace river and the Slave river, at Fort Chipewyan. This is a deep water lake, and is now navigated from Fort Chipewyan



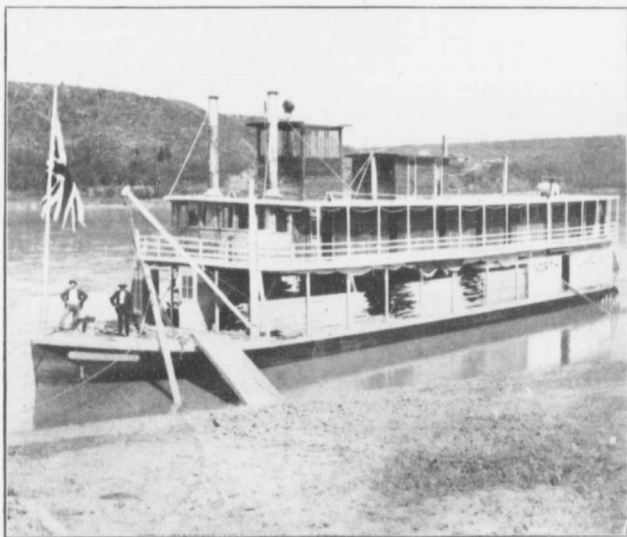
Last Mountain Lake.

to Fond du Lac, a distance of 130 miles, by steamboats drawing 7 feet of water, but much larger and deeper draught boats might be successfully used. This lake is on the route to the Mackenzie river country and forms an important section for navigation to the northern country. Its tributaries are the Athabaska, Peace and Slave rivers. Light draught river boats can run from Fort Chipewyan to Fort McMurray on the Athabaska river, 187 miles, to the Chutes, on the Peace river, 173 miles, and to Fort Smith, on the Slave river, 188 miles. Trout, white fish and pickerel, abound in the waters of lake Athabaska. This lake is partly in Alberta.

LAKES OF ALBERTA.

Lesser Slave lake is 250 miles north of Edmonton, and forms part of the route to the Peace river. Railway connection has not yet been established with the lake, but it is probable that it will be at no distant time, as the country

surrounding it is being rapidly settled in sections of good farming land found there. The lake is navigable for a distance of 70 miles, its full length. One freight and passenger steamboat plys on its waters and runs 110 miles down the Lesser Slave river.



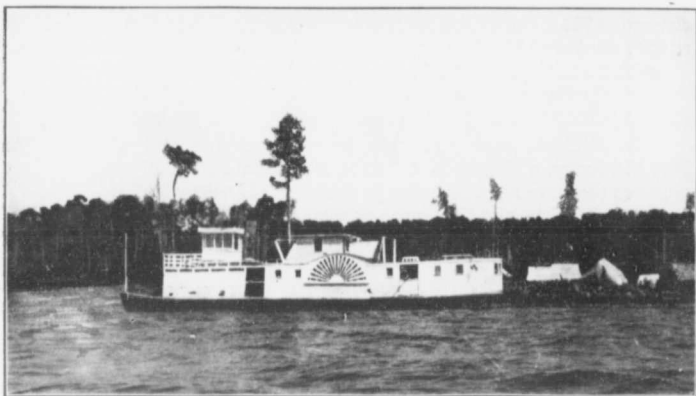
Athabaska Landing, Alberta

LAKE IN MACKENZIE TERRITORY.

Great Slave lake is connected on the south side with the Slave river, and at the northwest part with the Mackenzie river. The lake is deep, with only a few known indentations or natural harbours. River steamboats, drawing six feet of water, run from the Slave river to the Mackenzie river, a distance of 100 miles and to Fort Ray, a distance of 130 miles. Boats also run from Fort Resolution on the lake to Fort Smith on the Slave river, and to the mouth of the Mackenzie river, a distance of 1,105 miles. Larger and deeper draught steamers might successfully operate on these waters. Great Slave lake, like the other northern lakes, contains white fish, trout and pickerel in immense numbers.

NAVIGABLE RIVERS IN WESTERN ONTARIO, MANITOBA, SASKATCHEWAN, ALBERTA, AND MACKENZIE TERRITORY.

Many shallow rivers and streams are found in Western Ontario that discharge into Georgian bay and lake Superior and smaller lakes north of the Great Lakes, but in a country where large rivers are numerous these shallow rivers and streams are important only as lumber streams, but are not included in a publication in-



Steamer "Northland Light" on Lesser Slave Lake

tended to describe the main waterways only. The smaller streams are principally used for floating logs, intended for the manufacture of lumber at sawmills located on the shores and banks of larger bodies of water.

Rainy river, in western Ontario, forms a stretch of navigation for light draught river boats from Lake of the Woods to Fort Francis, for a distance of 90 miles. This river forms a very important link of navigation on the route between Kenora and Fort Francis. Three steamers are engaged on it in regular traffic.

Red river, in Manitoba, is navigable from its mouth in lake Winnipeg to Winnipeg city, a distance of 45 miles, by steamers of 10 feet draught. It is also navigable from Winnipeg by stern wheel steamers of 2 feet draught, to Grand



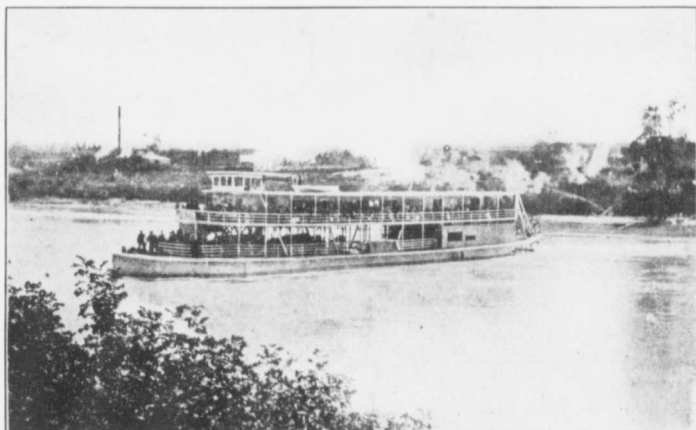
Saskatchewan River

Forks in the state of North Dakota. Three passenger steamers ply from Winnipeg, the largest being a steamer of 883 tons.

The *Saskatchewan river* is navigable from its mouth, at the north end of lake Winnipeg, to Prince Albert, by steamers of a draught of three feet, a

distance of 700 miles. There are nine steamers engaged in general traffic on this stretch, the largest of which is a vessel of 250 tons. The Saskatchewan is also navigable from Prince Albert to Brazeau river, a distance of 800 miles, by steamboats drawing 22 inches of water. There are three steamers on this part of the river, engaged in freighting, towing and passenger traffic, the largest being 300 tons.

The *Athabaska river* is navigable from its mouth, at lake Athabaska to Fort McMurray, a distance of 187 miles, also from Fort McMurray to Fort Smith on the Slave river, 303 miles, by steamboats of a draught of three feet, and from Fort McMurray to the Chutes on the Peace river, a distance of 458 miles. Four steamers ply on this part of the river, carrying passengers and freight. The largest is 360 tons.



On the Saskatchewan River.

The Athabaska river is also navigable from Grand Rapids to the Lesser Slave river for 250 miles by steamboats of 23 inches draught. Three steamboats are engaged on this part of the river in passenger and freight traffic; the largest being 148 tons.

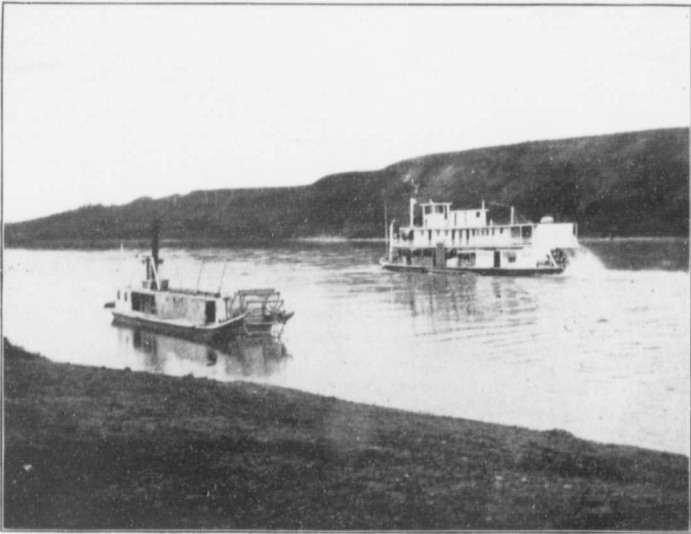
Lesser Slave river runs from Lesser Slave lake to the Athabaska river, a distance of 75 miles, but is navigable only for a distance of 40 miles from the lake, with a draught of 5 feet. One steamer is now employed on this stretch. The Department of Public Works of Canada is improving the river for navigation from the Athabaska river to Lesser Slave lake. The Lesser Slave lake is important as it is part of the only route now taken to the Peace river country.

Peace river is navigable from its mouth to the Chutes for 272 miles, by steamboats of three feet draught. All vessels plying on the Lower Athabaska river, Athabaska lake and the Upper Slave river run up this portion of the Peace river. It is also navigable from the Chutes, excepting for a two-mile portage at the Chutes,

to Hudson's Hope, by steamers drawing three feet, a distance of 660 miles. Three steamboats are now navigating it.

Peace river, rising in the Rocky Mountains, has cut its way deep into the prairie soil towards lake Athabaska, its banks, therefore, although high are singularly free from rocky cliffs. Peace river district is very extensive and its settlement is exciting much attention. The river will no doubt become a great waterway to the far north.

Slave river is navigable from its head, at lake Athabaska, to Smith landing, a distance of 118 miles, by steamboats of a draught of 5 feet. All vessels running on lake Athabaska, the lower Athabaska river, and Peace river, include in their trips Slave river. At Smith Landing a portage intervenes of 16 miles to Fort Smith. From this point, Slave river is navigable for 194 miles by steamers drawing



Steamers "Northland Call" and "Northland Sun" on Athabaska River.

six feet, for a distance of 194 miles. Six steamboats are engaged in freight and passenger traffic; they all traverse Great Slave lake and run down the Mackenzie river.

Mackenzie river.—This magnificent river is navigable from its head at Great Slave lake to its mouth, in the Arctic ocean, a distance of 1,025 miles, by steamers having a draught of six feet.

Steamboats now plying on the Mackenzie river, including the waterways already mentioned, have a free run of 1,309 miles. No doubt is entertained regarding the navigation of vessels with cargo drawing six feet of water, from Fort Smith, on the Slave river, and making connections with ships on the Arctic ocean.

In addition to the rivers now navigated are certain large but well known rivers that have been used by surveyors, trappers and explorers for many years.

Yellow Knife river, in Mackenzie territory, takes its rise in Upper Carp lake and runs into Great Slave lake. Its length is approximately 105 miles, but falls and rapids form obstructions to navigation in its course.

Coppermine river, also in Mackenzie territory, rises in Point lake, is fed by many small streams and has a length between the lake and its mouth, in Coronation gulf, approximately of 500 miles. Two rapids and one fall prevent a free run from its source.

Nelson river is in the territory lately added to Manitoba. It rises in a chain of small lakes which are part of the northern end of lake Winnipeg. The river is approximately 285 miles in length and empties into Hudson bay at Port Nelson. Norway House, a well known Hudson Bay station, is located near the northern end of lake Winnipeg, in the vicinity of the head of the river, and York Factory, another well known Hudson Bay station, is located near the mouth of the river on Hudson bay. The river is fed by numerous streams and is navigable nearly its whole length by steamers similar to those employed on other rivers. An artificial harbour is now being made at Port Nelson.

Churchill river rises in the northern part of Saskatchewan, about 150 miles north of Prince Albert. The river flows in an easterly direction, and discharges at Port Churchill in Hudson bay. Including the lakes the river is about 700 miles in length. It is navigable in sections similar to other Canadian large rivers. There is a good harbour at Churchill in Hudson bay.

Albany river rises in lake St. Joseph, in the northern part of the province of Ontario, and discharges into James bay, the southern part of Hudson bay. The river is approximately 600 miles in length.

Backs river rises in Artillery lake and runs to Franklin lake in the northern regions or Franklin territory, a distance of over 600 miles.

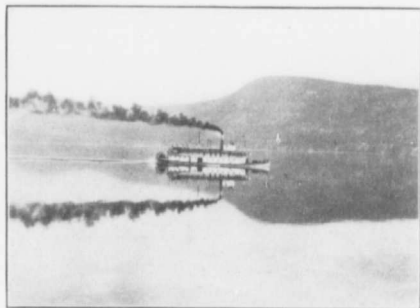
The above condensed description of fresh water navigation from Thunder bay, lake Superior westward and northward to the Arctic ocean was published for the first time in "Canada, her Natural Resources, etc., by this Department in 1912. In it is embodied the length of navigable water stretches, the draught of steamboats now employed for the traffic, and will serve to show the means for transportation during settlement of the country along the rivers and surrounding the lakes. The immense possibilities of developing trade and commerce in the products of the western provinces and northwest territories, are brought to the attention of all interested in Canada or in inland navigation itself, its improvement and development. Exception, however, is made in Coppermine, Churchill, Nelson, Albany and Back rivers, where navigable portions are not referred to owing to lack of definite information as to the distances navigable.

No attempt has been made to describe the natural scenery nor the characteristic physical features, nor has mention been made of the resources of the country known to be very great along the rivers or surrounding the lakes. Navigation is the one main subject, while the purpose has been to afford correct information.

INLAND NAVIGATION IN BRITISH COLUMBIA.

Of the rivers and navigable waters of British Columbia, the following brief description is from the report of the late Steamboat Inspector, J. A. Thompson, who had twenty years' service in inspection on the inland waters of the province.

Kootenay lake is 1,730 feet above sea level; it is formed by an expansion of the Kootenay river, which rises in the Rocky Mountains, about 20 miles south of Leanehoil on the Canadian Pacific Railway, in British Columbia. It flows southward into the state of Montana, turns gradually northward back into British Columbia; about 22 miles north of the boundary between British Columbia and Idaho, it suddenly expands and forms Kootenay lake. This lake trends practically north and south with an arm on the west side, which is the continuation of the Kootenay river that joins the Columbia river at Robson. The main lake is about 56 miles in length, with no obstruction of any kind to navigation, the west arm being about the middle of the main lake. It becomes shallow towards the north end. At the south end the Kootenay river is navigable to Bonner's Ferry, in the state of Idaho, a distance of about 48 miles, the arm of the west side of the lake, going westward, trends southward before it ends, at the town of Nelson, a distance of 16 miles from the main lake.



On the Okanagan Lake

The centre of traffic is from Nelson, where all the railways converge, to a number of landings on the west arm to Proctor, the terminus of the Canadian Pacific Railway, at the east end of the arm, thence to Ainsworth, Kaslo and Lardo at the north end of the main lake. The traffic line continues from Nelson to Proctor, Pilot Bay, Crawford Bay and Kootenay Landing, at the south end of the lake the terminus of the Crow's Nest Railway. From Kootenay Landing there is a large traffic with car barges carrying 18 cars, to Proctor. These cars are towed by powerful tugs. The passenger traffic between Nelson and the points mentioned is carried on by stern-wheel steamers, the "*Kuska-Nook*," 1008.19 tons gross, the "*Moyie*," 835 tons gross, the "*Kaslo*," 765 tons gross, the "*Kokanee*," 348 tons gross, and others; draught, 4.6 to 5 ft. The draught of the steamers from Nelson is limited by the narrows near Proctor, where, in the season of low water, there is only about 8 feet depth of water, with the bottom covered with boulders. On the main lake there is a depth sufficient for any sized vessel.

The Kootenay river is also navigable from Canal flats, at the source of the Columbia river, in East Kootenay district, to Jennings, Montana. Before the construction of the Crow's Nest Railway, steamers plied from Fort Steel, East Kootenay, to Jennings, Montana, about 60 miles.

Shuswap lake, Kamloops lake, Thompson and Spillimacheen rivers are so much part of each other, that they may be taken together. Shuswap is, properly speaking, the name of the district that extends from Sicamous to Kamloops, on the Canadian Pacific Railway. The Spillimacheen river, which rises in Mabel lake, northeast of Okanagan lake, flows north, and is navigable from Enderby to Sicamous, 23 miles, where it joins Shuswap lake. This body of water is formed by several arms called Salmon arm east to west, Seymour arm north to south, Shuswap lake proper, easterly to westerly. It is altogether a large body of water, and flowing westerly it contracts and becomes what it known as the South Thompson river, again expands and becomes Kamloops lake.



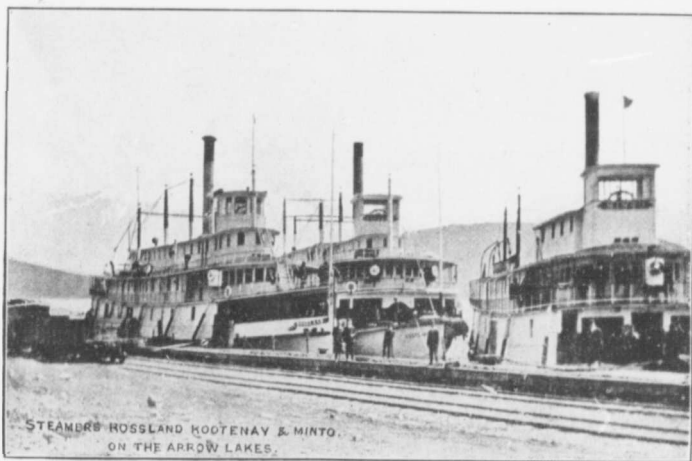
Slokan Lake, B. C.

The navigable distance from Enderby, on the Spillimacheen, to Savona, the westerly end of Kamloops lake, is 150 miles, but there is much more navigable water than this up the various arms. There was, during construction of the Canadian Pacific railway, much traffic on this lake and the rivers. Now, there are two passenger steamers of 192 tons gross and several tugs that are engaged in log towing. The passenger steamers ply between Sicamous and Kamloops, distance 100 miles, calling at the logging camps and several Indian villages.

The North Thompson, which debouches into the South Thompson at Kamloops coming from the north, has its rise up in the Cariboo country. It is a very swift river, shallow in places, but has been navigated for nearly 100 miles by good-sized steamers. The Canadian Northern Railway construction begins in that section and will increase the traffic.

About 25 miles east of Kamloops, the Adams river flows into Little Shuswap lake. Adams lake is 9 miles up this river. It is 40 miles long. On it plies a steamer, 331 tons gross, engaged in towing logs from the north end to the head of the river at the south end, where the logs are driven down to the Shuswap lake to the saw-mill at Chase, on the opposite side of the lake.

Trout lake is a small lake in the mountains, lying in a north-westerly direction between the north end of Kootenay lake, distance 36 miles, and the north end of Arrow lake, distance 14 miles. The lake is 17 miles long, and like all mountain lakes very deep. A small passenger steamer, 43 tons gross, plies between Gerrard, the end of the railway from Kootenay lake and Trout Lake city, at the north end of the lake, where there is extensive mining carried on. She also, between times, tows a barge with concentrates from the mines to the railway at Gerrard.



C. P. R. Fleet on the Arrow Lakes.

Okanagan lake is a fine sheet of water, absolutely free from any obstruction to navigation, is of good depth throughout, and about 88 miles long. There is a large traffic, both freight and passenger, on the lake. The Canadian Pacific Railway Company has several fine steamers, of from 1078 to 554 gross tons, that ply between Okanagan Landing, the end of the railway, Okanagan ranch, and Kelowna, Peachland, Summerland and Penticton, the towns at the south end of the lake; also a powerful tug is used as there is much bulky agricultural produce that is carried on a barge. There are several smaller tugs belonging to the saw-mills at the towns on the lake.

Slocan lake, altitude, 1,850 feet above sea level, is formed by a hollow in the mountains, midway between the valleys fronting Kootenay and Arrow lakes, north-west of Nelson on the west arm of Kootenay, about 26 miles in a straight line. This lake is over 1,700 feet deep, has warm springs and never freezes. The length of the lake is about 20 miles. There are several busy towns on it as the

mining is quite an industry. The passenger steamer is 605 tons gross. It plies between Slocan city at the south end and Roseberry at the north end of the lake. There is another steamer of 86 tons gross, also fitted as a passenger steamer, to relieve the larger boat, as occasion may require. She is used as a tug to tow the car barge, carrying 15 cars, from the railway at each end of the lake to make connection between the railway from Nelson to the short line that connects with Arrow lakes.

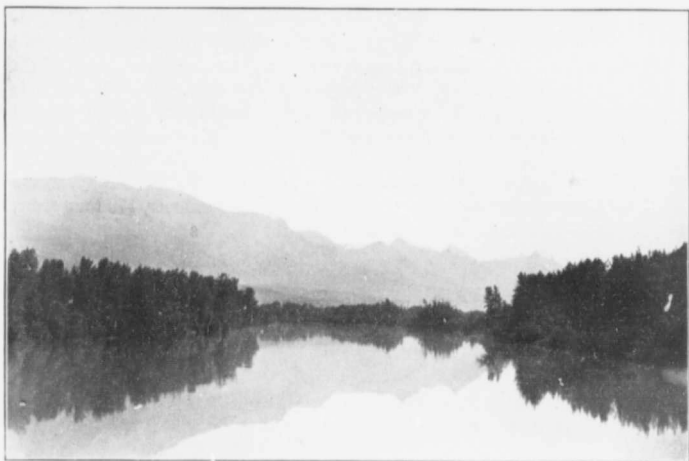
The *Arrow lakes* are the most extensive area of navigation in the interior of British Columbia. They are formed by an expansion of the Columbia river from Arrowhead (to which there is a branch line from Revelstoke, on the Canadian Pacific Railway, distance 28 miles) to Robson, where there is railway connection to Nelson on Kootenay lake, 28 miles, Rossland, 20 miles, and Greenwood, 100 miles. Arrow lakes, upper and lower, are about 125 miles long between



Arrowhead, Arrow Lake, B. C.

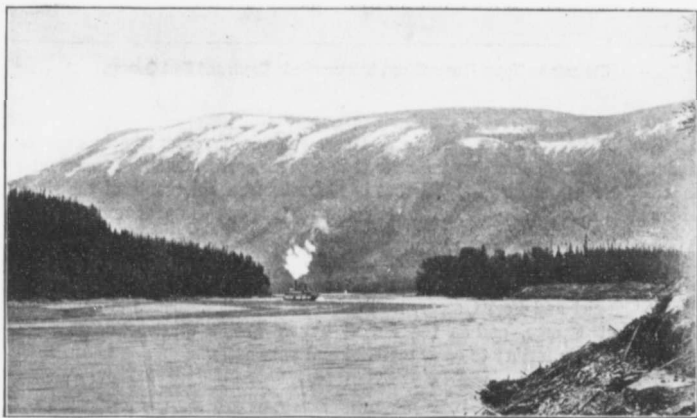
Arrowhead and Robson. These are the points between which the steamers now ply. The waters are navigable right up to Revelstoke. Before railway connections were made they used to go right up to Revelstoke on the north and to what was then known as Little Dalles, now Northport, in the state of Washington, on the Columbia river; on the south, that is about 40 miles below West Robson, B.C., the present terminus.

The class of vessels that ply on the Arrow lakes in the passenger service are of the best of their class: one 1,117, one 884, one 829 tons. A new steel boat has been added named the "*Bonnington*," 2,000 tons, with several smaller passenger boats, besides powerful tugs to tow the 18-car barges between Nakusp and Arrowhead. The large passenger steamers are all sternwheel boats, as the narrows between the upper and lower lakes get very shallow and crooked during the season of low water. The ice forms in the winter in the narrows, but they



Upper Columbia River above Golden, B. C., at the base of the Rockies.

are kept open by an ice-breaker barge heavily armoured, which the up-going steamer shoves before her, leaving the barge above the narrows where it is picked up by the down-going steamer which also shoves it ahead of her and leaves it below the narrows. A channel is thus kept open all the winter, and there is no interruption to navigation.



Climbing the Swift Water on the Columbia River, near Burton, B.C.

The Columbia river, above Arrowhead, at the north end of Arrow lakes, is navigable to La Porte, which is 40 miles above Revelstoke, where navigation is stopped by the Death rapids. There is a passenger steamer, 309 gross tons, plying from Revelstoke to La Porte in the summer season. She is a stern-wheel boat. It is very swift water. At one part the rise is 9 feet in three lengths of the boat, and requires good power to ascend; it is a most interesting trip. From La Porte navigation stops, the Columbia flowing round what is known as the "Big Bend," 190 miles between Revelstoke and Golden on the Canadian Pacific Railway, where navigation commences again. From Golden a passenger steamer, 178 tons gross, plies on the Upper Columbia to Windermere, about 90 miles



Steamer on Upper Fraser River, between Soda Creek and Fort George.

Fraser river, the lower part from New Westminster, properly belongs to the coast district. Going up the river it is navigable from New Westminster to Yale on the Canadian Pacific, that is 100 miles from the mouth of the river. There are a number of steamers 545 to 300 gross tons on this upper route, though they seldom go now beyond Chilliwack, 40 miles. The navigation stops at Yale, owing to rocks and canyons, for 240 miles, till Soda Creek is reached in the Cariboo district. From there steamers of 513 to 129 gross tons, ply between Soda Creek, Quesnel and Fort George, a distance of 154 miles. There is navigation beyond Fort George, and as the Grand Trunk Pacific construction goes on, steamers will ply further to carry material and passengers.

SOME NAVIGABLE WATERS IN UNSETTLED PARTS OF THE DOMINION, AND APPROXIMATE LENGTHS.

ONTARIO.

	Statute Miles.
<i>Lake Nipigon</i> , shore line, at present navigated only by contractors' supply steamers.....	200
<i>Winisk river</i> from its mouth in Hudson bay to the forks of the Upper branches.....	150
<i>Ekwan river</i> from its mouth in James bay to First falls.....	80
<i>Attawapiskat river</i> from its mouth in James bay to Rapids.....	120

MANITOBA.

<i>Carrot river</i> from Pas to Indian reserve.....	60
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SASKATCHEWAN.

<i>Reindeer lake</i> , shore line.....	360
<i>Wollaston lake</i> ,.....	150
<i>Athabaska lake</i> , shore line.....	560

N. W. TERRITORIES AND YUKON.

<i>Liard river</i> , which empties into Mackenzie river, has a rapid 16 miles from its mouth, but is navigable for stern wheelers.....	400
<i>Bear river</i> , from Great Bear lake, site of Fort Franklin, to Fort Norman, at its mouth on the Mackenzie river.....	90
<i>Peel river</i> , from Two Hundred and Fifty Miles falls to its mouth on the Mackenzie river.....	250
<i>Great Bear lake</i> , connected with Mackenzie river by Bear river, is a deep water lake with a shore line of.....	1,360
<i>Great Slave lake</i> , shore line.....	1,440

NAVIGABLE RIVERS IN THE YUKON TERRITORY.

Yukon river is formed by the confluence of the Lewes and Pelly at Fort Selkirk, and flows in a northwesterly direction until it enters the United States territory of Alaska, at a point about 70 miles northwest of Dawson. It might be said, in a general way, that the Yukon has a width of from $\frac{1}{2}$ to 1 mile. The current is swift and uniform, at a medium state of the water, running at the rate of 5 miles an hour.

The river is navigable from Whitehorse, on the Lewes river, to St. Michael's, on the Pacific ocean, a distance of over 2,000 miles.

Steamers heavily laden and towing barges give good service between Dawson and St. Michaels. This stretch is generally known as the Lower river.

On the Upper, namely from Dawson to Whitehorse, there is an almost daily service.

Lewes river is formed by two branches, one from lake Marsh, the other from lake Lindeman. From the "landing" at the latter to Fort Selkirk, which is the better and more used route, the distance is 357 miles, while from Tagish, at the head of lake Marsh, the distance is 294 miles.

Pelly river takes its rise in the height of land between the Campbell mountains and the Selwyn range, and flows southwest to some distance north of Hoole canon where it makes a wide curve and flows northwest and west to its confluence with the Lewes at Selkirk. At present a line of steamboats runs from Hoole canon to Selkirk, a distance of about 300 miles, middle depth 7 feet.

Stewart river has its source at the northern extremity of the Selwyn range, it only becomes navigable past the Fraser falls, 187 miles from its mouth at the Yukon river, some 80 miles south of Dawson. During the summer months small steamers ply between Dawson and the falls.

Teslin river finds its outlet in the Lewes river at Hootalinqua, and drains the lake of that name. From the head of the lake to its mouth it is navigable for stern wheel steamers. The distance is about 150 miles.

White river is a tributary of the Yukon into which it flows some 80 miles south of Dawson; it rises in the Nutzotin mountains and flows north and east. The current is estimated at 8 miles an hour, and the river navigable to Canyon city, a distance of 217 miles. White river is also the connecting link with Donjek river and Kluane river and lake.

Donjek river, fed by the Misling river and its tributary streams, flows into White river. It is navigable at present for 144 miles.

McMillan river, from the junction of its north and south branches, is navigable to its confluence with the Lewes river, 155 miles.

Kluane river and lake, from the head of the lake to the mouth of the river, is 67 miles.

AREAS OF THE LAKES IN THE YUKON.

Kluane, 184 sq. miles.

Laberge, 86 sq. miles.

Tagish, 139 sq. miles.

Teslin, 245 sq. miles.

PRINCIPAL NORTHERN WATERS.

Hudson bay, not including James bay, has a length of 500 miles and a width of 500 miles. Hudson strait, from Button islands to the west coast of Mansfield island, is 480 miles long. Roughly speaking, from the Atlantic ocean, through the strait, and across the bay to Churchill, the distance is 1,000 miles. The width of the strait is from 30 to 40 miles at the entrance between Button islands and Resolution island, farther west the width is 84 miles, and at the western end of the strait, 70 miles.

Frobisher bay, on the east side of Baffin island, is 150 miles deep; with an average width of 30 miles.

Lancaster sound is about 1,000 miles long from east to west, with an average width of 40 miles, and is the only northwest passage for deep draught vessels.

Jones sound, north of North Devon island, is about 300 miles long by about 30 miles wide.

The construction of the Hudson Bay railroad, from Le Pas in Manitoba to Nelson, has made it necessary to consider port accommodation in Hudson bay. The principal terminus of the road will apparently be Nelson where work is proceeding in the direction of making an artificial harbour. Hydrographic surveys were begun in 1913 for the purpose of charting the waters along the coast and out in the bay approaching Nelson. For three seasons, vessels have been making voyages from Maritime province ports, principally Halifax, with supplies for railroad and harbour construction at Nelson.

Surveys have also been made in James bay. A good harbour is found at Rupert bay.

Course taken by Hudson bay vessels, from Hudson bay into James bay, passes to the westward of Bear and Twin islands. A few miles south of the Twin islands they shape their course for the beacon at the mouth of the Moose river, thence they make for Charlton island, then another course is taken by the Revillon Freres Trading Company by the same route as far south as the Twin islands, then alter the course to passing a few miles westward of Trodley island or south of Tide island and thence bear up for the main Strutton island, passing halfway between Charlton island and Trodley island. This latter track is the better and more practical for reaching Rupert bay, being shorter and deeper.

