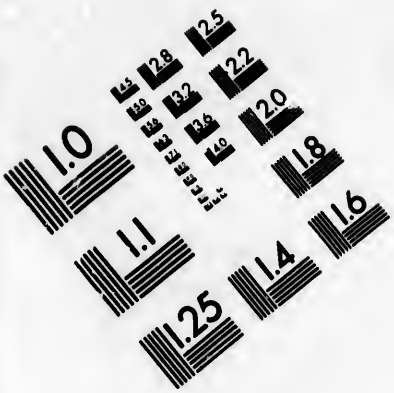


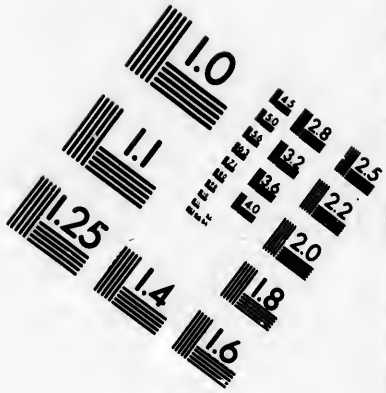
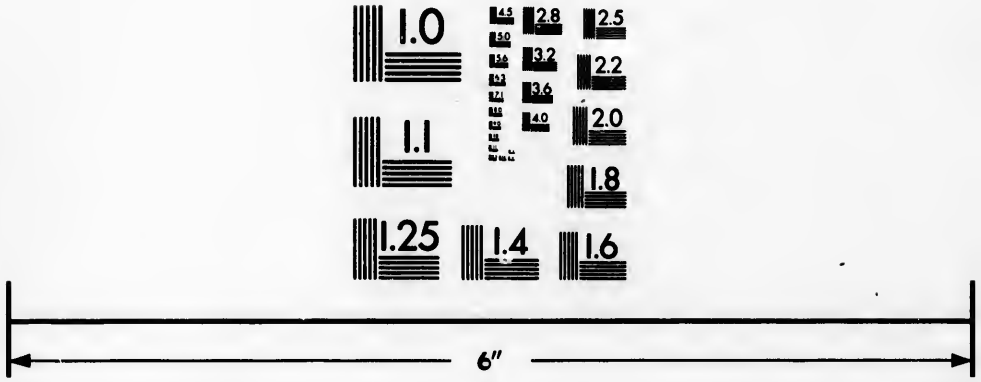
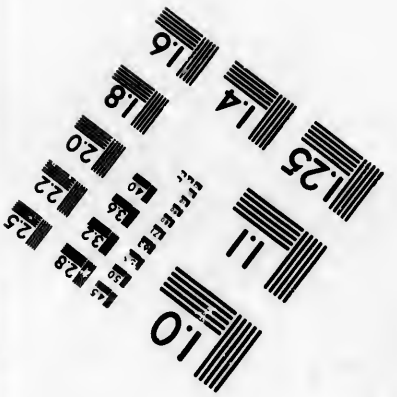
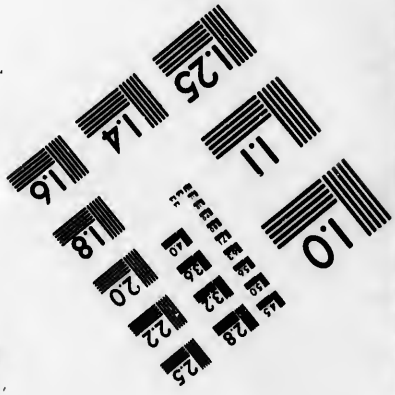


IMAGE EVALUATION
TEST TARGET (MT-3)







Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- [x] Coloured covers/ Couverture de couleur
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [ ] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [ ] Bound with other material/ Relié avec d'autres documents
- [ ] Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distortion le long de la marge intérieure
- [ ] Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [ ] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [ ] Showthrough/ Transparence
- [ ] Quality of print varies/ Qualité inégale de l'impression
- [ ] Includes supplementary material/ Comprend du matériel supplémentaire
- [ ] Only edition available/ Seule édition disponible
- [ ] Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/ Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

- [x] Additional comments:/ Commentaires supplémentaires:

Photocopies of foldouts

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
							X				

The copy filmed here has been reproduced thanks to the generosity of:

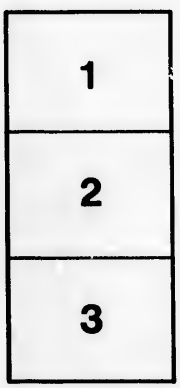
Library of Congress
Photoduplication Service

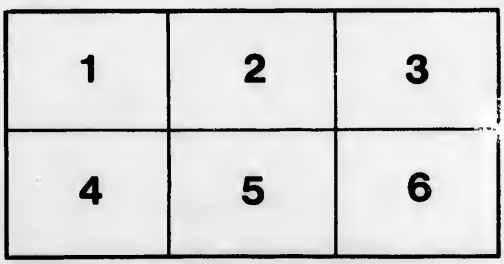
The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol → (meaning "CONTINUED"), or the symbol ▽ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:





L'exemplaire filmé fut reproduit grâce à la générosité de:

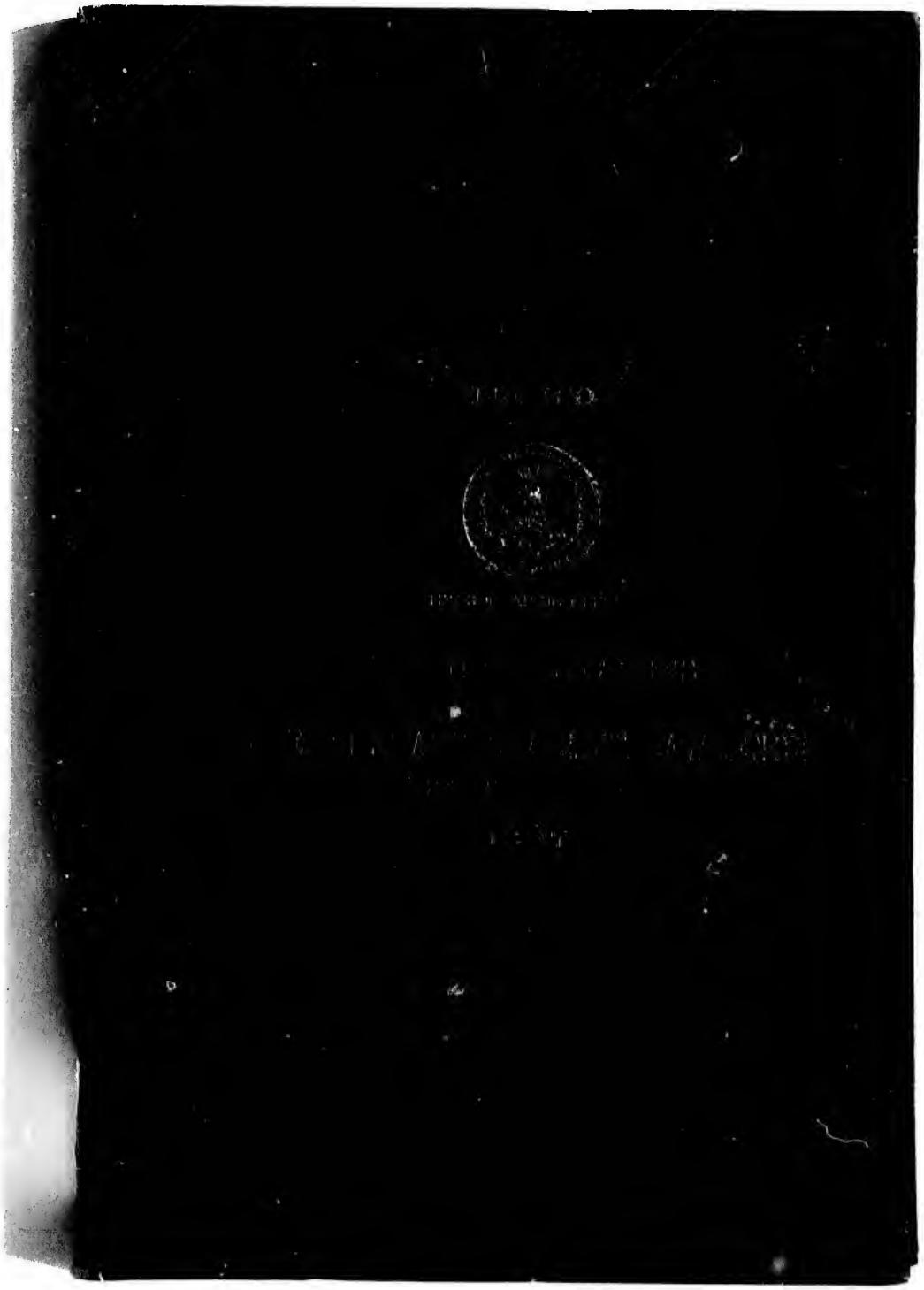
Library of Congress
Photoduplication Service

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole → signifie "A SUIVRE", le symbole ▽ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.



No. 100.

HYDROGRAPHIC OFFICE.

U. S.

SAILING DIRECTIONS

FOR

THE GULF AND RIVER ST. LAWRENCE.

SECOND EDITION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1897.

CONTENTS.

CHAPTER XI.

CHAPTER XII.

CHAPTER XIII.

Page.
309
329
364

PREFACE.

This publication is a revision of the first edition, from the latest information, by Mr. R. C. Ray, U. S. Navy, in the Division of Sailing Directions. The first edition was compiled by Mr. R. H. Orr.

The meteorological remarks in the opening chapter were prepared by Mr. James Page, in the Division of Marine Meteorology.

The description of the southeast and east coasts of Cape Breton Island, found in the first edition, has been omitted, and the description relating to the south shore of the Gulf of St. Lawrence, in the first edition of Hydrographic Office publication No. 99, added.

Since much of the coast described is imperfectly surveyed, mariners are requested to point out to the U. S. Hydrographic Office, either directly or through one of its branch offices, any errors and omissions that they may discover. With a view of making the next edition of this publication more useful and complete, new information is also requested.

J. E. CRAIG,
Commander, U. S. Navy, Hydrographer.

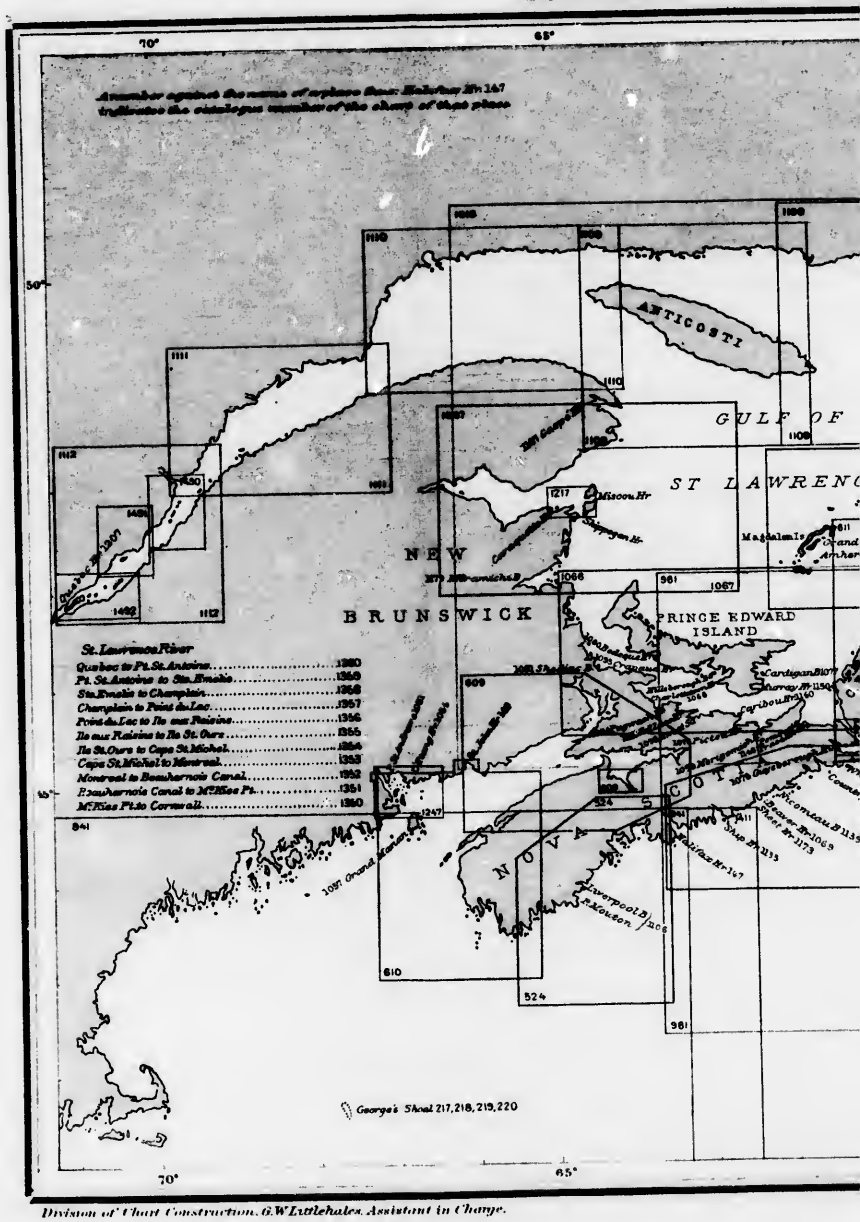
U. S. HYDROGRAPHIC OFFICE,
Washington, D. C., October 1, 1897.

NOTE.

The bearings, courses, and trend of the land are true, but, for convenience, the corresponding magnetic bearings to the nearest degree follow in parentheses (variation in 1897). The directions of the winds are given for the points from which they blow; the directions of the currents for the points toward which they set. Distances are expressed in nautical miles; soundings, unless otherwise stated, are reduced to mean low water.

INDEX TO H

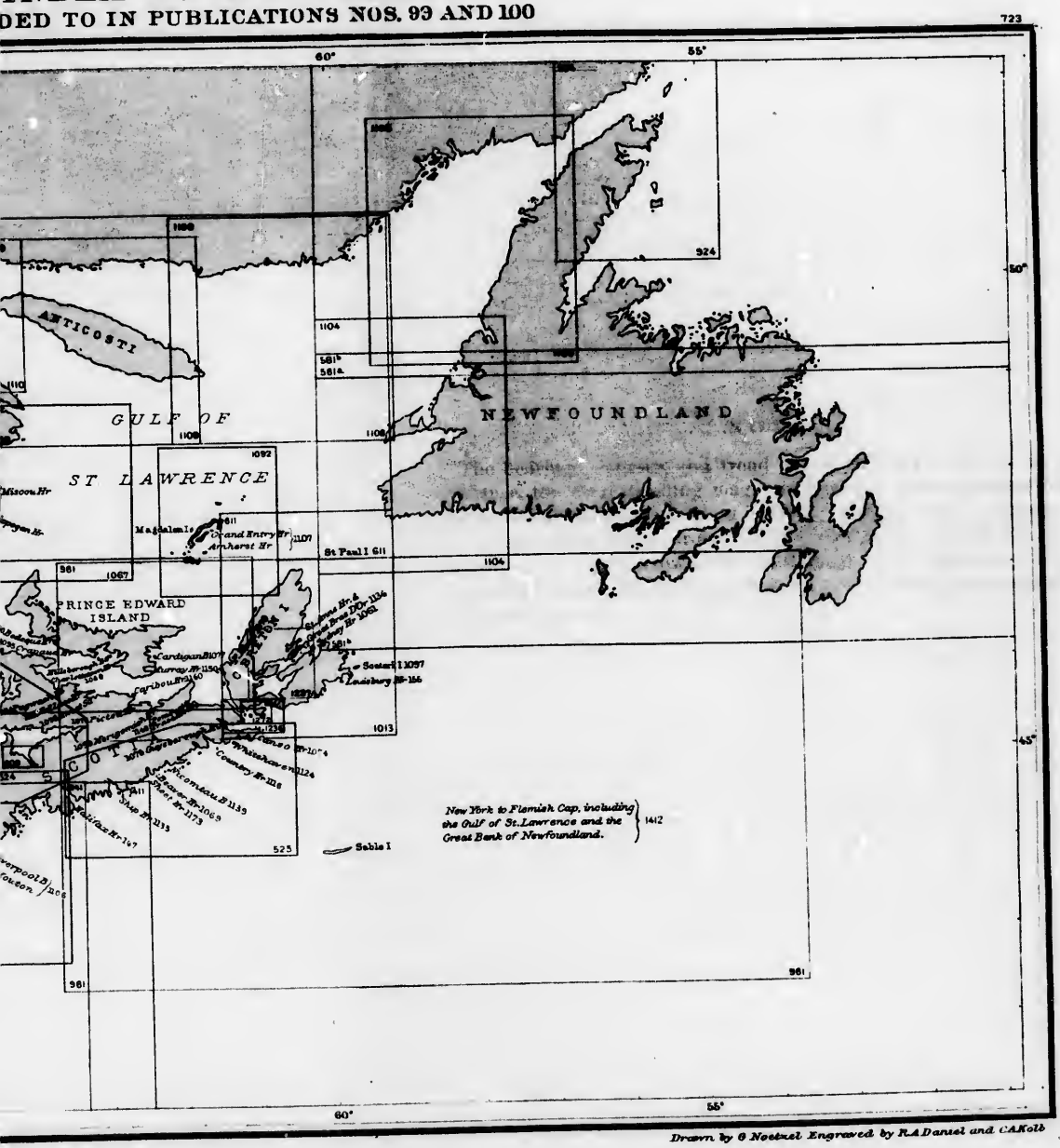
ALLUDED TO IN PUBLIC



Division of Chart Construction, G.W. Littlehales, Assistant in Charge.

INDEX TO H. O. CHARTS

DED TO IN PUBLICATIONS NOS. 99 AND 100



Drawn by G Nostrel Engraved by R.A Daniel and C.A Kolb

CHAPTER I.

GENERAL REMARKS—ICE, FOGS, WINDS AND WEATHER, CURRENTS—GENERAL DIRECTIONS, ST. LAWRENCE GULF AND RIVER.

General Remarks.—The navigation of the gulf and river of St. Lawrence (in the present chapter spoken of as the gulf and the river) requires much careful attention; the irregularity of the tides and currents, the severity of the climate, especially toward the close of the navigable season, and, above all, the frequent fogs, are difficulties which may well cause much anxiety in the mind of the seaman and which call for the exercise of all his vigilance, prudence, and ability.

In thick weather the continuous use of the deep-sea lead in some form so as to obtain accurate depths is necessary for safety, and when near the land the speed should be slow.

The Variation.—The navigator is reminded that the variation of the compass differs nearly two points between the limits of the places described in this work.

The Deviation or local attraction of the compass needle is another source of error, independent of charts altogether. This subject is one of great importance in approaching and navigating the gulf, as from the increase of the magnetic dip and the decrease in the horizontal magnetic force that is found here—two elements affecting the ship's magnetism—the original deviation of the compass will, in all probability, be much increased. In many vessels it has been ascertained by direct observation that their maximum deviation has been increased by one-third.

Magnetic Attraction of the Shores.—An opinion is prevalent that the compasses of vessels are disturbed in the gulf and river, and such disturbance has been attributed to the magnetic ores of iron in the hills, particularly those of the north coast. The magnetic oxide of iron does exist abundantly, and attracts the needle very powerfully at some points, particularly along the coast from the Bay of Seven Islands eastward. Among the Mingan Islands the variation was found to vary from this cause from 19° to 31° W. At Port Neuf and on Manicougan Point the needle was also disturbed. But these effects were only noticed when the instrument was placed on the shore.

When running from place to place, at greater distances than 2 miles from the coast, nothing of the kind was noticed; so that in nine cases out of ten where this source of erroneous reckoning has been alleged as the cause of accidents to vessels, they probably originated either in errors of the chart or in the local attraction on board the vessels themselves.

Lights.—The intrinsic power of a light should always be considered

when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen. The power of a light can be estimated by remarking its order, as given in the Light List, and in some cases by noting how much its visibility, in clear weather, falls short of the range due to the height at which it is placed. Thus, a light placed at 200 feet above the sea, and only recorded as visible 10 miles in clear weather, is manifestly of little brilliancy, as if of any power its height would permit it to be seen over 20 miles.

Under certain atmospheric conditions, and especially with the more powerful lights, the glare is visible considerably beyond the radius given, which is calculated for the actual flame of the light.

In some conditions of the atmosphere white lights may have a reddish hue. The mariner, therefore, should not trust solely to color where there are sectors, but verify the position by taking a bearing of the light. On either side of the line of demarcation between white and red, and also between white and green, there is always a small arc of uncertain color.

In the St. Lawrence River below Quebec the lighthouses, including Point de Monts, Cape Chatte, and Egg island, are lighted on April 1 and extinguished December 10. Those in the Gulf of St. Lawrence, Strait of Belle Isle, Northumberland Strait, Prince Edward Island, and Gut of Canso are extinguished December 20. Bird Rocks light and the lights on St. Paul Island are shown from April 1 to December 31, or even later, if navigation is open. The lightvessels are replaced in position each spring as soon as the state of the ice permits.

Lightbuoys are withdrawn November 10, and are replaced as soon after May 11 as possible. Other buoys are withdrawn on November 14, except those at Beaujeu Bank, Channel Patch, Middle Ground, St. Roch des Aulnets, and South Traverse, which remain in position till the last vessel has passed.

Uniform System of Buoyage.—Throughout the ports and channels of the Dominion of Canada, approaching from seaward, all buoys on the starboard side of the channel are painted red, and, if numbered, marked with even numbers, and must be left on the starboard hand.

Approaching from seaward, all buoys on the port side are painted black, with odd numbers, if any, and must be left on the port hand.

Buoys painted red and black in horizontal bands mark obstructions or middle grounds, and may be left on either hand.

Buoys painted white and black in vertical stripes mark mid-channel, and must be passed close to to avoid danger.

All other distinguishing marks to buoys are in addition to the foregoing, and indicate particular spots, a detailed description of which is given when the mark is first established.

Perches with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on which hand they are to be left.

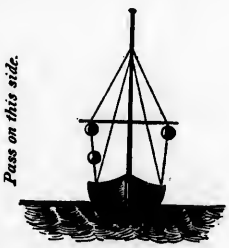
Starboard hand spar buoys, entering channels or harbors, will in some cases be surmounted by a ball; these buoys will be red.

The rule for coloring buoys is equally applicable to beacons and other day marks, so far as it may be practicable to carry it out.

Caution.—Buoys marking outlying dangers, owing to their exposed positions, are always liable to break adrift or to other accident; therefore implicit reliance should not be placed on their being in position.

Buoys Removed during Winter.—All the buoys are removed at the end of navigation in each season in the following areas in the Province of Quebec: Chaleur Bay and Magdalen Islands, in Gaspé Basin, in the Gulf of St. Lawrence from Souris Rock, near Fame Point, to Matane, in the St. Lawrence River from Matane and Bersimis to St. Croix, and in Saguenay and Richelieu Rivers.

Eight spar buoys are moored below Quebec, to assist late vessels leaving that port, after the ordinary buoys have been removed, but these are liable to be displaced by ice in the spring of the year.



In the Province of New Brunswick all the buoys in harbors and rivers that are not navigable during the winter months are taken up about November 20, and some coast buoys about December 15.

With regard to the buoyage of Nova Scotia, all the buoys east of Halifax are withdrawn during the winter.

Prince Edward Island buoys are all withdrawn, with the exception of a spar buoy marking Fitzroy Rock and another marking St. Peters Island Spit, near the mouth of Charlottetown Harbor, and a spar buoy marking Wheeler Bar and Knoll Shoal in Georgetown Harbor.

Wrecks.—Buoys, and the top sides of vessels used for marking wrecks, are painted green with a white inscription, and moored, when possible, near the side of the wreck next to mid-channel.

The following are exhibited from wreck vessels:

By day.—Three balls from a yard, 20 feet above the sea; two placed vertically on the side that shipping may safely pass, and one on the other side.

By night.—Three *fixed* white lights, similarly arranged, but the ordinary riding light will not be shown.

Mariners will therefore know on sighting a wreck-marking vessel that she is thus employed, and they should pass on that side of her on which the two balls or two lights are shown.

Telegraph and Signal Stations.—The Government of the Dominion of Canada has given notice, dated February 20, 1886, that the marine telegraph system, established in the Gulf of St. Lawrence in the interests of navigation and fisheries, is now in operation.

1. Vessels exhibiting their distinctive numbers will have their names transmitted to the local press (for publication only) free of charge.

2. Dispatches to or from vessels within signaling distance, by the international code of all nations, either by flags or semaphores, will be duly delivered as addressed.

3. Dispatches will be charged for at the ordinary telegraph rates between stations; but no charge will be make for signaling between coast stations and vessels at sea.

4. Dispatches may (by special request) be delivered in cipher, otherwise they will be transmitted in ordinary language.

5. Vessels may obtain information as to winds, weather, and ice at any signal station within the Gulf of St. Lawrence *free* of charge.

Stations.

Name of station.	Signals in use.	Situation.
St. Paul Island (S)	Flags	Cabot Strait.
Meat Cove	do	Do.
Grosse Isle (S)	do	Magdalen Islands.
Wolf Islet		Do.
House Harbor		Do.
Amherst Island Lighthouse (S)	Flags	Do.
Amherst Harbor		Do.
Fox Bay		Anticosti Island.
Heath Point Lighthouse (S)	Flags	Do.
South Point Lighthouse (S)	do	Do.
Jupiter River (Shallop Creek)		Do.
Salt Lake Bay		Do.
Southwest Point Lighthouse (S)	Flags	Do.
Becscie River		Do.
West Point Lighthouse (S)	Flags	Do.
Macquereau Point Lighthouse (S)	do	Chaleur Bay, north side of entrance.
Cape Despair Lighthouse (S)	do	Do.
Point St. Peter		Gaspé Bay.
Douglastown		Do.
Gaspé Basin		Do.
Peninsula		Do.
Grand Grève		Do.
Cape Rosier Lighthouse (S)	Flags	St. Lawrence River, south shore.
Griffin Cove		Do.
Fox River		Do.
Fame Point Lighthouse (S)	Flags	Do.
The Great Pond (Grand Étang)		Do.
Cholorydorme (about 10 miles NW. of Fame Point)		Do.
Grand Valley (Grande Vallée)		Do.
Magdalen River		Do.
Cape Magdalen Lighthouse (S)	Flags	Do.
Mount Louis River		Do.
Martin River Lighthouse (S)	Flags	Do.
St. Anne Point (St. Anne des Monts)		Do.
Cape Chatte Village		Do.
Cape Chatte Lighthouse (S)	Flags	Do.
Les Méchins (near Cape Michaux)		Do.
St. Félicité (near Cape Balance)		Do.
Matane Lighthouse (S)	Flags	Do.
Little Metis Lighthouse (S)	do	Do.
Grand Metis		Do.
St. Flavie (about 10 miles SW. of Metis Point)		Do.
Father Point Lighthouse (S)	Flags	Do.
Rimouski (S)	do	Do.
Rivière du Loup (S)	do	Do.
L'Islet (S)	do	Do.
Egg Island Lighthouse	do	St. Lawrence Gulf, north shore.
Point de Monts Lighthouse (S)	do	St. Lawrence River, north shore.
Manicouagan Point (S)	do	Do.
Portneuf Lighthouse (S)	do	Do.

The stations in the above list marked "S" are also signal stations at which the international code of signals is used.

Ice.—Among the difficulties of navigation may be mentioned the ice. In spring, generally in the month of May, the entrance and eastern parts of the gulf are frequently covered with drift ice, and vessels are sometimes beset by it for many days. If unprepared for contending with this danger they often suffer from it and are occasionally lost; but serious accidents from this cause do not frequently occur, because the ice is generally more or less in a melting state from the powerful effect of the sun in spring. In the fall of the year accidents from ice seldom happen, except when the winter commences unusually early, or when vessels have lingered imprudently late from the temptation of obtaining high freights.

Cabot Strait is never frozen over, but vessels built in the ordinary way can not navigate it in safety between January 1 and May 1 on account of the heavy drift ice. Sealing steamers pass through at all times, but are occasionally fast in the ice for days together.

Nearly every year the great rush of ice out of the Gulf of St. Lawrence in the spring causes a stoppage, locally known as the "Bridge," between St. Paul Island and Cape Ray. The "Bridge" sometimes lasts for 2 or 3 weeks, and completely prevents the passage of ships; it is recorded that 300 sail have at one time been detained by this obstacle, and many wrecks have occurred in consequence on the Newfoundland coast. The usual time of the formation of the "Bridge" is between the middle and end of April to the middle of May.

The prevalence of northwesterly and northerly winds drives the ice toward the entrance to the gulf and along the west coast of Cape Breton, and incoming vessels will meet no ice except SW. of St. Paul Island. A SW. gale occasionally brings the ice out from the channel between the Magdalen Islands and Cape Breton, which meets the main body, flowing past Bird Rocks, and closes the strait between St. Paul and Cape Anguilla. The strait often appears to clear rapidly; in 36 hours very little ice may be seen from Cape Ray, but bodies of ice will pass many days after navigation is open, particularly if the winds are northerly. The ice usually passes out of the gulf in the direction of Banquereau, the eastern edge extending halfway between Scatari and St. Pierre. Occasionally it is drifted along the south coast of Newfoundland and reaches St. Pierre, although, according to the report of the Canadian department of marine, no ice has been sighted from that island after the middle of April during the past 7 years (1889–1895). The coast between Cape North and Scatari often holds the ice during easterly winds until late in May.

The early stream of slob made on the Labrador coast and the north usually passes into the gulf during the month of December and mixes with the gulf sheet when it is made early, but it is often open water. The east winds and snow build this thin ice and produce a form of white slob. The northern slob enters the gulf about the 9th of January with variations extending over a month, but it may not be permitted to pass

Blanc Sablon if the wind is NW. The ice can not at present be followed; it may arrive off Bonne Bay during January or February, or it may be driven into the Labrador coast, all depending on the wind.

The gulf sheet makes early and rapidly during the cold season and is often in sheets a mile or two in length, and occasionally it will be fast for a few days from Meccatina to Cow Head in February. Generally speaking, it is loose, with lanes and lakes extending in the direction of the wind and current, and is navigated by small vessels during March and April sailing from Natashquan and Esquimaux Point.

ICE IN THE GULF OF ST. LAWRENCE AND VICINITY.

During December and January the harbors and bays around the Gulf of St. Lawrence begin to freeze, and by January 20 ice will have formed over most of them. In some the ice made there will eventually become thick enough to interfere with navigation, while in others it will completely close the port and prevent the entrance of all vessels. By February 1, the open water in the gulf will be full of ice fields formed there, while other ice will enter through the Strait of Belle Isle and from the St. Lawrence River.

Off the coast the ice is in constant motion, drifting with the winds, tides, and currents, and is slowly working down toward Cabot Strait, through which it passes and finds its way to seaward. Its path broadens when through the strait, and will be governed generally by the prevailing winds. Under the influence of currents alone it will drift to the southward and westward, and in latitude 45° N. may be from 10 to 75 miles wide. Much of this is very heavy, and will prevent the passage through it of all vessels not specially built to go through ice.

Its thickness will be anything from a few inches to several feet. It is only in the Strait of Belle Isle that bergs are encountered, but rarely farther west than Greenly Island, though a few have been known to find their way south through Cabot Strait.

Within the Gulf of St. Lawrence navigation opens during the month of April. Ice is generally found to the north and west of Bird Rocks up to the middle of April, and the last reports of ice within the gulf generally precede May 10. The fleet of sealing schooners leaves Pleasant Bay, Magdalen Islands, between March 20 and April 10, and Esquimaux Point about a week earlier. During the period 1889–1896 the last transatlantic steamship has left the gulf between November 21 and December 5, and the first has arrived between April 20 and April 26. Sailing vessels are from 10 days to 2 weeks earlier in leaving and later in arriving, respectively.

The harbors along the northeast coast of New Brunswick and Nova Scotia are closed by ice for a portion of each year. The records kept at Sydney during several years past show that the harbor is rarely closed before the latter part of January and is generally open after April 15. The Gut of Canso and Northumberland Strait are rarely

t at present be fol-
or February, or it
g on the wind.
he cold season and
nally it will be fast
ruary. Generally
in the direction of
sels during March
Point.

VICINITY.

bays around the
ry 20 ice will have
ere will eventually
while in others it
nce of all vessels.
full of ice fields
Strait of Belle Isle

g with the winds,
ard Cabot Strait,
Its path broad-
generally by the
one it will drift to
nay be from 10 to
event the passage
ugh ice.
everal feet. It is
ntered, but rarely
e been known to

during the month
st of Bird Rocks
e within the gulf
schooners leaves
nd April 10, and
period 1889–1896
tween November
een April 20 and
earlier in leaving

swick and Nova
The records kept
harbor is rarely
erally open after
Strait are rarely

Place.	Harbor frozen over.	Disappearance of harbor ice.	Arrival of field ice.	Disappearance of field ice.	Departu... befor...
Por[illegible]swesbury, Cape Breton	Feb. 3, 1886	Apr. 23, 1886	Feb. 3, 1886	Feb. 23, 1886	Dec. 22, 188...
Lor[illegible]r, Harbor (N.E. arm), Cape Breton	Jan. 15	Breaks up with southerly wind.	About Mar. 17	About Apr. 30	Feb. 20...
Cow B[illegible], Cape Breton	Rarely freezes; 3 times in last 23 years.	None, except in docks	Feb. 15 to 28	Varies; about May 1	About Feb...
Sydney, Cape Breton	Jan. 14, 1886	Apr. 20, 1886	Generally in Jan	With westerly winds	Jan. 5, 188...
Port Hood, Cape Breton	Jan. 15 to Feb. 1	Apr. 15 to May 1	Jan. 15 to Feb. 1	Apr. 15 to May 1	Jan. 1...
Baddeck, Cape Breton	Jan. 22	Apr. 13	None	None	Jan. 6...
Georgetown, Prince Edward Island	Dec. 26	Apr. 21	Jan	End of Apr	
Charlottetown, Prince Edward Island	Dec. 21		None	None	Dec. 20...
Summerside, Prince Edward Island	Dec. 11	Apr. 16	....do	....do	Dec. 11...
Cascumpeque, Prince Edward Island	Jan. 3, 1887	Apr. 6, 1886	Jan. 4, 1887	May 10	Dec. 20 to ...
Richmond Bay, Prince Edward Island	About Dec. 15	About Apr. 1; bay ice often thick and hard on May 1.	Apr. 1; drives back harbor ice.	Apr. 1 to May 1	End of De...
Malpeque, Prince Edward Island	Not until closed by field ice.	May 1	Jan. 15	May 15	Middle of ... ice to pre... ing until
Souris, Prince Edward Island	Jan. 4 to 10	Apr. 1 to 10	About Feb 1	Apr. 1 to May 1	Jan. 2...
Pictou, Nova Scotia	Dec. 26	Apr. 19	But little field ice		Dec. 21...
Shediac, New Brunswick	Dec. 8	Apr. 20	None	None	Dec. 9...
Miramichi Bay, New Brunswick	Dec. 5	Apr. 21	....do	....do	Nov. 26 ...
Shippegan, New Brunswick	Dec. 8	May 4	None since spring of 1876, then May 14.	June 4, 1876	Nov. 13 ...
Caraquette, New Brunswick	Dec. 11	May 8	None	None	Nov. 25 ...
Dalhousie, New Brunswick	Dec. 5	Apr. 15	....do	....do	Nov. 13 ...
Gaspé, New Brunswick	Dec. 10	May 10	....do	....do	Dec. 4 to 6
Cape Magdalen, Quebec	Dec. 15 to Jan. 1	Apr. 10 to 25	....do	....do	Nov. 25 to
Father Point, Quebec	River rarely freezes; only moving ice.		Dec. 9, mean of 4 years	Apr. 2, mean of 4 years	Nov. 28, m...
St. Pierre	Once in 40 years	Feb. to Mar., floating ice from adjacent coves.	Feb. 15; depends upon wind	Rarely remains any length of time.	Open at al...
St. Paula Island			Jan. 12	May 21	Dec. 13...
Amherst, S. Magdalen Island	Jan. 1	May 10	Jan. 15	May 12	Dec. 17...
Anticosti, Southwest Point	Dec. 25	Mar. 31	Jan. 1 to 15	Mar. 31 to Apr. 30	Dec. 5...
Cape Norman, Newfoundland	Dec. 25 to Jan. 16	May 29, 1888	Dec. 24, 1887	June 11, 1888	Nov. 16 ...
Canada Bay, Newfoundland				May 10 to June 25	
White Bay (western arm), Newfoundland	Dec. 20	May 10	Dec. 25 to Jan. 10	May 10 to June 15	Nov. 30 ...
Twillingate Harbor, Newfoundland	Jan. 22	May 6	Feb. 10 to 20	Apr. 24	Dec. 7...
Little Bay (Betts Cove), Newfoundland	Jan. 1 to 20	May 1 to 10	Jan. 10	May 1 to 10	Jan. 1 to 1...
Exploits Burnt Island, Newfoundland	Ja...	....do	Jan. 15 to 20	May 1 to 20	About Jan...
Toulinguet, Newfoundland	Jan. 1 to Feb. 20, averaging about Jan. 20.	Apr. 25 to June 4, averaging about May 10.	Jan. 18	May 25	
Fogo Harbor, Newfoundland	Jan. 9 to 19	Apr. 23	Jan. 14	May 1 to June 1	Jan. 19...
Gander Bay, Newfoundland	Jan. 1	Apr. 20			
Greenspond, Newfoundland	Jan. 19	Mar. 9	Mar. 11	May 11	Jan. 7...
Bonavista Harbor, Newfoundland	Jan. 20	Mar. 20	Feb. 15	May 20	Dec. 20...
Trinity Harbor, Newfoundland	Jan. 21	Mar. 25	Apr. 19	Apr. 29	Jar. 26...
Hants Harbor, Newfoundland	Rarely freezes		Apr. 1	Uncertain	Dec. 26...
Hearts Content, Newfoundland	Jan. 5 to Feb. 20, averaging about Feb. 1.	Mar. 4 to May 23, averaging Apr. 10.	Apr. 15	May 15	
Harbor Grace, Newfoundland	Jan. 10 to Feb. 20	Mar. 1 to Apr. 1	Jan. 20 to Feb. 20	May 1 to 20	Vessels co... round; ... by field
St. Johns Harbor, Newfoundland	Rarely freezes	Mar. 20	Jan. to Feb. 15	Apr. or May	....do ...
Ferryland, Newfoundland			Feb. 10 to Apr. 10, mean of 28 years.	Feb. 25 to Apr. 30, mean of 28 years.	
Cape Race, Newfoundland			Jan. 20 to Mar. 17, mean of 28 years.	Mar. 13 to June 7, mean of 28 years.	
Trepassy Harbor, Newfoundland	Occasionally blocked by field ice.				
Placentia, Newfoundland	About Feb. 1	Apr. 1	Rarely any, only with southerly wind after ice has rounded Cape Race.		
Lamelin Harbor, Newfoundland	Occasionally blocked by field ice 10 days at a time, and frozen over at intervals varying from 5 to 10 years.				
Grand Bank, Newfoundland	Never		About Mar. 1	About Apr. 1	Dec. 24...
Harbor Breton, Newfoundland	Outer anchorage seldom frozen for more than 2 or 3 days. Inner anchorage from Jan. 1 to Apr. 15.		Feb. 26	Mar. 25	Dec. 15...
La Hune Bay, Newfoundland	About Dec. 1, but easily broken up.	Vessels can nearly always enter by April.	Feb. (rare occurrence)	Apr. 1	Open at a...
Burgo, Newfoundland	Never frozen; occasionally blocked by drift ice from adjacent coves.	Moves off with northerly wind, and disappears in April.			Arrive an... sons.
La Poile Harbor, Newfoundland	Feb. 10	Mar. 20	Rarely comes		Navigatio... open in
Channel, Newfoundland	Rarely frozen		For a few days in Feb. and Mar.		Generally ... round.
Bay of Islands (Humber River), Newfoundland	Dec. 26	Apr. 24	Jan. 1	Apr. 15	Jan. 1...
Bonne Bay, Newfoundland	Jan. 15	Apr. 15	Jan. 15	Apr. 15	Jan. 1...
Rich Point, Newfoundland	Dec. 15	May 20	Jan. 15	May 15	Nov. 10 ...
Greenly Island	Dec. 15 to Jan. 21	Mar. 1 to 10	Jan. 1 to 10	June 10 to 30	Nov. 3 to
Belle Isle			Jan. 3 to Feb. 13	June 14	
Battle Harbor, Labrador	Dec. 13. Navigation closes 4 weeks earlier or later, according to season.	May 11	Jan. to Apr. 15	May 18	

VERAGE TIME OF OPENING AND CLOSING OF PORTS.

...appearance of field ice.	Departure of last vessel before ice season.	Arrival of first vessel after ice season.	Completely or partially closed.	Interval, if completely closed.	Thickness of ice.	Remarks, and records of previous years.
...b. 23, 1886	Dec. 22, 1885	Apr. 5, 1886	At intervals	Jan 1 to Apr. 25	About 2 feet	
...out Apr. 30	Feb. 20	Mar. 15	At intervals by field ice	Southwest arm open all winter.	Northeast arm 6 to 12 inches	
...ries; about May 1	About Feb. 1	Generally in Mar	At intervals by field ice; never by harbor ice.		Harbor ice about 4 inches	Record 23 years, open generally all the year round.
...th westerly winds	Jan. 5, 1886	Apr. 24, 1886	Average 3 months each year closed.	Jan. to Apr	6 to 10 inches	
...r. 15 to May 1	Jan. 1	May 1	Completely at times	Jan. 15 to Apr. 15	18 inches	
...ne	Jan. 6	Apr. 24	Some years at intervals, other years completely.	Jan. 20 to Apr. 15	...do	Mean of 30 years.
...d of Apr			Completely	Jan. to Apr	...do	
...ne	Dec. 20	Apr. 20	...do	Dec. 20 to Apr	13 to 18 inches	Mean of 13 years' closing; remainder mean of 23 years.
...do	Dec. 11	Apr. 24	...do	Dec. 10 to Apr. 10	12 inches	Mean of 6 years.
...y 10	Dec. 20 to 23	Apr. 20	...do	Jan. 1 to Apr. 10	5 to 12 inches	
...r. 1 to May 1	End of Dec.	May 1 to 10	...do	Dec. 10 to May 1; shipping place open later in fall.	About 3 feet	Mean of 12 years.
...y 15	Middle of Dec.; seldom any ice to prevent vessels leaving until Jan.	May 16	At intervals until Feb. 1	Completely from Feb. 1 to May 1.		
...r. 1 to May 1	Jan. 2	Apr. 28	Completely	Jan. 14 to Apr. 5	1 to 2 feet	Mean of 10 years.
	Dec. 21	Apr. 20	...do	Jan. 9 to Apr. 3	10 to 20 inches	Mean of 5 years, ferry-boat ran in track except from Feb. 5 to 16.
...ne	Dec. 6	Apr. 20	...do	Dec. 8 to Apr. 20	20 to 25 inches	Mean of 5 years.
...do	Nov. 25	May 7	...do	Early in Dec. to Apr. 15	2 to 3 feet	Mean of 26 years.
...ne 4, 1876	Nov. 18	May 21	...do	Early in Dec. to May 10	20 to 26 inches	
...ne	Nov. 26	May 12	...do	Dec. 10 to May 9	2 to 3 feet	Mean of 5 years.
...do	Nov. 18	May 5	...do	Dec. 15 to May 6	4 feet	
...do	Dec. 4 to 9	May 11	...do	Dec. 25 to May 10	3 feet	Mean of 12 years.
...do	Nov. 25 to Dec. 5	Apr. 20 to May 1	Generally in motion all winter.	Jan. 1 to Apr. 25	10 to 20 inches	
...r. 2, mean of 4 years	Nov. 26, mean of 8 years	Apr. 24, mean of 7 years	Completely at intervals	Navigation closed between Dec. 10 and Apr. 10; paths are open about half of the time.	Ordinary field ice	There is rarely any heavy ice until end of Dec. There is always a channel of open water on north or south side of the river, depending upon wind. Wind velocity of 7 miles per hour sufficient to drive ice to mid-channel. Sometimes open water lasts a month at a time.
...rely remains any length of time.	Open at all seasons		Occasionally obstructed by field ice.			
...ay 21	Dec. 13	Apr. 18				Mean of 9 years; heavy ice from about Feb. 15 to Apr. 20.
...ay 13	Dec. 17	May 10	Dec. 17 to May 10			
...ar. 31 to Apr. 30	Dec. 5	Apr. 15 to May 4	Completely	Jan. 1 to Apr. 1	1 to 6 feet	Mean of 36 years.
...ne 11, 1882	Nov. 16	June 6	...do	Dec. to May	18 inches	
...ay 10 to June 25						Mean of 23 years.
...ay 10 to June 15	Nov. 20	May 1	Completely	Dec. to May	2 to 3 feet	Field ice has remained until July 1 and has disappeared by Apr. 10.
...pr. 24	Dec. 7	May 25	...do	Jan. 22 to Apr. 20	...do	
...ay 1 to 10	Jan. 1 to 10	May 1 to 10	...do	Jan. 5 to May 10	2 feet	Mean of 10 years; sealing steamers enter all months; other steamers can occasionally enter.
...ay 1 to 20	About Jan. 1	May 1 to 10	...do	Feb. 1 to Apr. 1	...do	Open at intervals between Apr. 1 and May 20.
...ay 25						
...ay 1 to June 1	Jan. 19	Apr. 7	Completely	Jan. 19 to Apr. 27	2 feet	Occasionally open.
...ay 11	Jan. 7	Apr. 20	Completely	Completely from Feb. 8 to Mar. 9, at intervals from Jan. 16 to Feb. 6.		Mean of 11 years.
...ay 20	Dec. 20	May 1 (at intervals all winter).	At intervals from Jan. 20 to May 15.		1 foot	
...pr. 28	Jar. 26	Mar. 5	At intervals; after 24 hours of southwest wind vessels can enter harbor.		18 inches	
...ncertain	Dec. 26	Apr. 15	At intervals			Dates variable.
...ay 15						Mean of 18 years.
...ay 1 to 20	Vessels come and go all year round; sometimes delayed by field ice.		At intervals from Jan. 20 to Mar. 20.		6 to 15 inches	Mean of 19 years; never closed for more than 6 weeks at a time.
...pr. or May	...do		At intervals by field ice		6 to 18 inches	
...eb. 25 to Apr. 30, mean of 28 years.						
...ar. 13 to June 7, mean of 28 years.						
...bout Apr. 1	Dec. 24	Mar. 3	Completely closed twice in 30 years.			
...ar. 25	Dec. 15	Apr. 30	At intervals by field ice	Feb. 28 to Mar. 25	Harbor ice 1 or 2 inches	Mail steamer unable to enter only 3 times in 30 years.
...pr. 1	Open at all seasons		Only at intervals			
	Arrive and depart at all seasons.					
	Navigation nearly always open in bay.		At intervals from Mar. 1 to 20.		6 inches	Navigation closed only 5 or 6 times in 50 years.
	Generally open all the year round.		At intervals by field ice		4 inches	
...pr. 15	Jan. 1	May 12	Completely	Dec. 25 to Apr. 30	18 inches	
...pr. 15	Jan. 1	May 1	...do	Jan. to Apr	2 feet	Never frozen until arrival of field ice.
...ay 15	Nov. 10	May 15	...do	Dec. 15 to May 20	3 feet	
...ne 10 to 30	Nov. 3 to 11	June 10 to 20	At intervals	Completely at times by field ice.	3 to 5 feet	
...ne 14						
...ay 18						

closed by ice after April 25. The harbor of Picton is frequently open two weeks earlier than this.

West of Cape Canso the ice rarely, if ever, interferes with navigation. Halifax, for example, has only been closed once in 25 years, and then for only a short time, by ice frozen in the harbor, though ice an inch or two in thickness frequently freezes there.

Heavy ice is noticed at the mouth of the St. Lawrence River in the latter part of December and lasts until April 10 or 15, but all during the season leads can be found when the wind drives the ice to either side of the river. The north shore of the river, in the vicinity of the Saguenay, during certain years remains open after the surrounding waters are filled with ice, and a vessel would find no difficulty in making Tadousac Harbor. The river, from Quebec to Montreal, generally opens during the last week in April.

In the Strait of Belle Isle thin sheet ice makes its appearance between December 15 and December 25, and close-packed ice a little later. Bergs do not appear in any great numbers until after April 1, but from that time until the following September they are numerous and sometimes very large. They sometimes make their way through the strait and are seen occasionally as far west as Greenly Island and as far south as Rich Point. Since 1889 the first transatlantic steamer has passed through the strait within a day or two of June 17, although navigation has frequently been open some days earlier. The date of the last passage during the same period has varied from November 6 to December 7.

At the time of the opening and the closing of navigation, full reports as to the condition of the ice at various points of the river and gulf of St. Lawrence are forwarded, for the benefit of commerce, to the Boards of Trade of Montreal, St. John, New Brunswick, and Quebec, and to the Chamber of Commerce, Halifax, Nova Scotia. Full information is also supplied by the Marine Department to their agents at Anticosti, Magdalen Islands, Meat Cove, Cape Breton, Cape Ray, Low Point, North Sydney, and Cape Race as to weather, wind, and movement and condition of the ice in the gulf and river St. Lawrence up to Montreal, for the guidance of any vessel calling for information.

Fogs may occur at any time during the open or navigable season, and they sometimes last several days in succession, but are most frequent in the early part of summer, and seldom fail to accompany an easterly wind of any strength or duration. In the months of October and November the fogs and rain that accompany easterly gales are replaced by thick snow. During westerly winds they are rare, and never of long continuance.

The above general observation is subject, however, to restriction, according to locality or season. Thus winds between the south and west, which are usually clear-weather winds above Anticosti, are frequently accompanied with fog in the eastern parts of the gulf. Winds between

the south and east are almost always accompanied with rain and fog in every part. NE. winds above Point des Monts are often east or more to the southward in the gulf, changed in direction by the high lands of the south coast, and have therefore in general the same foggy character. Winds of considerable strength and duration are here meant, and which probably extend over great distances.

Moderate and partially fine weather winds may occur without fog in any season and in any locality. In the early part of the navigable season, especially in the months of April and May, clear weather NE. winds are of frequent occurrence, and they also sometimes occur at other seasons in every part of the gulf and river.

The fogs which accompany easterly gales extend high above the sea, and can not be seen over from the masthead of a vessel; occasionally they admit the land or other objects to be distinguished at the distance of ½ mile or more in the day time. The fogs that occur in calms, especially after strong winds, are frequently so dense as to conceal a vessel within hail; these fogs are usually not much elevated above the sea, so that when objects are hidden at 50 yards from the deck they can be plainly seen by a person 50 or 60 feet up in the rigging.

When within sight of land in foggy weather the usual effect of fog is that of causing estimations of distance to be erroneously in excess. No great reliance should be placed upon an assumption of position depending upon the distance at which the sound of surf breaking on a rocky shore can be heard, but on many portions of the coast where steep cliffs extend to the shore the proximity of a steamer to them may be detected by the echo of the whistle. There is no safe guide but the constant use of the lead.

Winds.—The prevailing winds during the navigable season are either directly up or directly down the estuary, following the course of the chains of highlands on either side of the great valley of the St. Lawrence. The westerly winds do not appear to be so much guided in direction by the highlands, excepting along the south coast, where a SW. wind at the island of Bic was observed to become a NW. wind at Cape Gaspé. These winds frequently blow strong for 3 or 4 days in succession; the westerly winds being almost always accompanied by fine, dry, clear, and sunny weather; the easterly winds as frequently the contrary—cold, wet, and foggy.

In the spring easterly winds mostly prevail, frequently blowing several weeks in succession. As the summer advances the westerly winds become more frequent, and the SW. wind may be said to be the prevailing wind in summer in all parts of the river and gulf. Light south winds blow occasionally; but north winds are not common in summer, although they sometimes occur. Steady NW. winds do not blow frequently before September, excepting for a few hours at a time, when they generally succeed easterly winds which have died away to a calm, forming the commencement of strong winds and usually veering to the

SW. The NW. wind is dry, with bright clear sky, flying clouds, and showers. After the autumnal equinox, winds to the northward of west become more common, and are then often strong steady winds of considerable duration. In the months of October and November the NW. wind frequently blows with great violence in heavy squalls, with passing showers of hail and snow, and attended with sharp frost.

Thunder-storms are not uncommon in July and August. They seldom last more than an hour or two, but the wind proceeding from them is in general violent and sudden, particularly when near the mountainous part of the coast. Sail should, therefore, be fully and quickly reduced on their approach.

Strong winds seldom veer quickly from one quarter of the compass to the opposite. They generally fall calm, and are succeeded by a wind in the opposite direction. It is not meant, however, by this observation that they may not veer to the amount of several points. The NW. winds seldom or never veer round by north and NE. to east and SE., but they do frequently by degrees to the SW., after becoming moderate. SW. winds seldom veer by the NW. and north to the eastward, but sometimes by the south to SE. and east. Easterly winds generally decrease to a calm, and are succeeded by a wind from the opposite direction.

In the fine westerly winds of summer a fresh breeze will often decrease to a light breeze or calm at night, and spring up again from the same quarter on the following morning. Under these circumstances only may a land breeze off the north coast be looked for. The same has been observed off the south coast also, but not so decidedly or extending so far off shore. The north land wind may occasionally be carried nearly over to the south coast just before daylight, but the south land wind seldom extends more than 5 or 6 miles off, and that very rarely. Under the same circumstances, that is, with a fine weather westerly wind going down with the sun, a SW. land breeze will frequently be found blowing off the north coast of Anticosti at night and during the early part of the morning. If, however, the weather be not settled fair, and the wind does not fall with the sun, it will usually prove worse than useless to run a vessel close inshore at night in the hope of a breeze off the land.

Such is the usual course of the winds in common seasons, in which a very heavy gale of wind will probably not be experienced from May to October, although close-reefed topsail breezes are usually common enough. Occasionally, however, there are years the character of which is decidedly stormy. Gales of wind of considerable strength then follow each other in quick succession and from opposite quarters.

Barometer.—When, after a continuance of westerly winds and fine weather, the barometer has risen nearly to its greatest height, say some tenths above 30 inches, or begins to fall a little, an easterly wind may soon be expected. If to this notice given by the barometer be added

a warm hazy atmosphere during the day, and a heavy precipitation of dew at night, with very bright twiukling stars, or a colored aurora borealis, the approach of a southerly or an easterly wind is almost certain. If land be in sight at such a time, and appears much distorted by terrestrial refraction, or if vessels in sight have the relative proportion of their hull and sails changed by the mirage, or present double or treble images, such appearances will render the before probable indications of the barometer certain. At the commencement, the southerly or easterly wind will probably be light, with fine clear weather; but this will not last above a few hours if the barometer continues to fall. On the contrary, the wind will gradually increase, and as it does so the sky will become overcast by degrees until it is completely clouded. Rain and fog will follow, and continue during the continuance of the southerly or easterly wind, with little intermission until they are dissipated by a fresh breeze from a contrary quarter.

If the fall of the barometer, during the continuance of the southerly or easterly wind, be very slow, the gale will probably continue and not be violent; if rapid, it will probably be of short duration and of greater strength; at any rate, when the mercury falls toward 29 inches, a change is certainly at hand and the gale will, in general, come from the NW. The strength of this succeeding gale will be in proportion to the fall of the barometer and to the strength of the southerly or easterly gale which preceded it. In such a case there is seldom many hours' interval between the one gale and the other. The southerly or easterly wind generally dies away to a calm, and in a very few hours, and sometimes in a much less time, the NW. gale springs up. A heavy cross sea remains for some time from the previous gale.

The barometer sometimes begins to rise in the interval of the calm which precedes the NW. gale, at others, at its commencement; the fog and rain cease, and the weather becomes quite clear, generally in a few hours, and sometimes almost immediately. The strength of the westerly gale is usually greatest soon after its commencement, and diminishes as the barometer rises, veering gradually to the west and SW. It is worthy of remark that the circumstances just mentioned are exactly the reverse of those attending the easterly gale. The latter usually commences with clear weather and a high barometer, light at first from the south or SE. and gradually increasing as it veers to the eastward, with a falling barometer.

To return to the westerly gale. If, after it has veered to the SW. and become moderate, the barometer remains steady at a moderate height, fine weather may be expected. If it remains at a considerable height, but still fluctuating and unsteady, within certain limits, variable, but not heavy, winds and variable weather may be expected. If, on the contrary, it rises quickly to a great height, a repetition of the southerly or easterly gale will not be improbable. Seasons have been experienced in which the barometer may be said to have been no sooner

blown up by one wind than it was blown down by another, and this stormy alternation to have continued for several months, whilst in others there has been scarcely a double-reefed topsail breeze during the whole summer.

There is in fact so great a difference in the phenomena of the weather in different seasons, that it becomes difficult to write anything respecting it that shall not be liable to many exceptions. There are, however, some strongly marked cases of connection between the indications of the barometer and changes of the winds and weather which have been subject to few, or almost no exceptions. The first of these cases is that most common one of a southerly or an easterly gale, with a falling barometer, being always wet and foggy, and succeeded by a strong wind from the opposite quarter, with a rising barometer, and fine weather.

A second case not of so frequent occurrence in common seasons, excepting in spring or early in summer, is the northeasterly wind with a rising barometer; which, although it may not be at first for a few hours, will almost always become fine and clear, and end in fine weather. A third case may be considered certain: If the barometer fall suddenly and greatly at any time, a northerly, and most probably a NW. gale of great strength may be confidently expected. It does not follow that it will be immediate, for it may be preceded by a strong gale from SW. for a few hours, during which the barometer will seldom rise, and even, probably, continue to fall; but when the SW. gale dies away the northerly or NW. will soon succeed, with a rising barometer.

In conclusion it may be remarked that as, on the one hand, a considerable fall of the barometer may occur without being followed by a strong wind, so, on the other, a breeze of considerable strength may come on without any indication from the barometer; but not anything that deserves the name of a gale. There has never, within our experience, occurred a gale so heavy as to be of serious consequence to a good vessel the approach of which has not been indicated by the barometer. But it must be remembered that a high barometer in this climate, and under the circumstances which have been mentioned, is often indicative of a southerly or an easterly gale. It is remarkable that in the gulf and estuary of the St. Lawrence a high barometer may be considered as the forerunner of wet and foggy weather, which usually accompanies its fall; whilst a low barometer renders it equally probable that dry weather will ensue, since it as often accompanies its rise. The marine barometer, therefore, is of the greatest assistance in the navigation of the gulf and river; and by attending constantly to its state and changes, with reference to the winds and weather which preceded them, combined with the indications afforded by the appearance of the sky, etc., those changes of the wind and weather which are about to take place may be anticipated with a degree of certainty sufficient, in most cases, to enable a vessel to avoid being caught on a lee-shore or in an

unsafe anchorage, as well as to regulate her course in anticipation of the coming change.

Currents.—In the main entrance of the gulf, between Newfoundland and Cape Breton Island, a current is very often found setting to the southeastward during westerly winds, or in calm weather; but easterly winds retard it and sometimes cause it to run in the contrary direction. It is frequently deflected to the southward towards Cape Breton Island by northerly winds. But winds, both present and at a distance, act so powerfully and irregularly on the rate and direction of the currents and tides in this entrance of the gulf, as to render it difficult to say anything respecting them that is not subject to exceptions.

Current observations conducted during August and September, 1894 and 1895, showed that between Cape North and St. Paul Island the current varied in direction from NNW. to NNE., and ranged in velocity from $\frac{56}{100}$ knot to 2 knots per hour. East of St. Paul Island the current showed the same variation in direction, but the velocity ranged from $\frac{6}{10}$ knot to $1\frac{6}{10}$ knots. Off Cape North he current is stated to run continuously from a northwesterly direction, except that sometimes it may be checked or reversed for a few days by heavy southeasterly winds. The current is no stronger in the spring than at other times. From the Magdalen Islands toward Cape North, the current has a more tidal character, but it makes to the southeastward. When sealing in the spring, vessels caught in the ice will drift southeastward past Cape North and sometimes as far as St. Pierre Island.

According to information as to 13 trips, dating from June 16 to October 17, 1895, returned by the steamers plying between Montreal and Sydney, Cape Breton, the current between Magdalen Islands and Cape North was found to run 8 times in the outward direction, from NW., west, or SW., with a velocity of $\frac{1}{2}$ to one knot; and twice from SE. or south with a velocity of half a knot. Also three times there was no current appreciable. It is also noted that in the vicinity of Cape North during easterly winds the current appears to divide; and to the westward of that cape a current is found which runs from NNE., as if it were a branch from the main current.

In the region between Gaspé and the Magdalen Islands, the effect of the tide from Chaleur Bay was felt as far as 30 miles out from Miscou Island at the mouth of the bay. This may therefore occasion an apparent cross current in that vicinity at times, and thus account for some of the irregularities there met with.

On the south coast of Newfoundland, between St. Pierre Island and Cape Ray, the current makes to the westward, and passes around Cape Ray into the gulf. This was found to be the case at the stations off Cape Ray where observations were taken during 1894 and 1895, and it is also shown by the movement of icebergs off St. Pierre Island, which make westward even against a NW. wind. The experience of masters of vessels and of fishermen frequenting these waters confirms

the result of the observations, and goes to show that the current is distinctly felt for a width of 8 or 10 miles out, and that it must often extend considerably farther, as it sometimes occupies half the width of Cabot Strait.

The inward current past Cape Ray is, however, not constant. There are instances of sealing schooners in the ice about the month of March, which drifted in the opposite direction past Cape Ray. It appears, however, that while the inward current prevails, the water is usually open and free from drift ice, as it remains open off the south coast of Newfoundland throughout the winter and spring. The evidence goes to show that when there is ice in the offing of St. Georges Bay and off Cape Ray, it comes from the opposite direction, carried by the general current which makes across the gulf from Gaspé toward Cape North, and at times when this current, or a branch of it, is driven farther to the eastward than usual.

The ice is thus brought there under conditions which make it an indication of the disturbance of the current, as otherwise the water would remain open. This disturbed condition is also accompanied by circling movements in the ice. A schooner in the ice off St. George Bay has circled around for several days between Cape St. George and Cape Ray without passing either of these capes. When there is ice in this locality, circling movements of a similar kind occur also in Cabot Strait itself, which indicate an outward current in some part of the strait.

It is not clear what becomes of the current that passes in at Cape Ray. As a rule there is no appreciable current off St. George Bay, and very little from Cape St. George to the Bay of Islands. We can not thus trace this inflowing water as an actual current, but it is probable that it makes to the northeastward, and diffuses itself over the gulf, because we find that the density of the water throughout the northeastern portion of the gulf is the same as in the open Atlantic, and this density could not be so maintained without some inflow of this character.

Through Strait of Belle Isle.—There has been a widespread impression that the current in the Strait of Belle Isle runs constantly inward, the statement being generally made that a branch of the Arctic current flows through the strait into the Gulf of St. Lawrence, and again enters the Atlantic in a southeasterly direction between Cape Breton Island and Newfoundland.

The idea of a constant inward flow appears to be based on the drift of icebergs, and as they are most usually seen drifting inward, it has been inferred that this is the constant direction of the current. The converse of this, however, is much nearer the truth, and it may be stated in general that when icebergs are numerous at the outer end of the Strait of Belle Isle, and are also found within the strait, this indicates that the direction of the current has been predominantly inward from the east during the days previous, while the absence of icebergs indicates a current predominantly out from the west. This, of course,

refers to the presence or absence in the strait of floating bergs, and not to bergs which may be aground near either shore. It may also be noted that only a very small percentage of the bergs of the outer end of the strait ever enter it.

A recent investigation of the currents of this region by the Canadian department of marine, from the report of which the present information has been compiled, has shown that the current in the Strait of Belle Isle is fundamentally tidal. The best comparison of the current with the tide showed a complete correspondence between the two, especially in moderate weather and during the prevalence of moderate westerly winds. On such occasions there were several days during the period of observation when the current ran east and west for an equal length of time in each direction, and turned regularly with the rise and fall of the tide.

During the period of greatest regularity, the current ran inward from the east during the rise of the tide, and would either stop at high water or still continue to run inward for some time after. The greatest length of time after high water during which it was observed to run inward was 2 hours and 15 minutes. The current then turned and ran outward from the west during the fall of the tide, and would continue in that direction for a length of time after low water, which varied from 40 minutes to 2 hours and 55 minutes. The greatest velocity of the current in either direction under ordinary conditions of tidal regularity did not exceed 2 knots per hour.

With a heavy and long-continued wind, the current would first run for a longer time with it, and a shorter time against it, and would eventually run continuously in the same direction as the wind, with a fluctuation in velocity corresponding to the tide. The most marked example of a persistent current running out of the strait occurred from Monday, July 16, to Thursday, July 19. During these 3 days the current (as observed 3 miles off the north shore), ran in from the east for only 5 hours, and out from the west for 19 hours, each day. The maximum velocity of the current from the east was $1\frac{88}{100}$ knots per hour; from the west, $2\frac{44}{100}$ knots per hour. The best example of a persistent current running in through the strait from the east occurred from Wednesday, September 5, to Saturday, September 8. All the indications concurred in showing that the current ran continuously in the one direction during these days, although the observations were much interrupted by bad weather. The observed motion of the icebergs seen in the strait at this time agreed with the regular observations in showing that the current ran continuously inward from the east. The current then varied from a minimum of $\frac{54}{100}$ knot per hour to a maximum of $3\frac{15}{100}$ knots, in one direction. The tides themselves were anomalous, as the low water for 5 successive tides scarcely fell below mean sea level, and the whole rise was less than 2 feet, or about half the usual amount.

The general characteristics of the current may be set down as follows:

1. The current is fundamentally tidal in its nature, and under normal conditions it runs east and west with velocities which are nearly equal. It attains at times a velocity of 2 knots per hour in each direction.

2. The conditions are normal in moderate weather and during the prevalence of moderate westerly winds.

3. During heavy winds, especially when easterly or westerly in direction, the current which runs with the wind becomes stronger than the current against it, and eventually the current may come to be continuous in the same direction as the wind.

4. The greatest velocities of the current which were observed during heavy winds (in the months of July and September) were as follows: From the east, $3\frac{15}{100}$ knots; from the west, $2\frac{1}{2}$ knots per hour.

In reply to circulars issued, reports have been received from the captains of transatlantic steamships of the leading lines, which state the direction of the currents met with on each trip through the strait, between Belle Isle and its western end, a distance of about 75 miles. The result is as follows: In 1895, from July 11 to October 18, only 8 trips were reported. Out of this number, a current set outward to the east 3 times, with a velocity of $\frac{1}{4}$ knot to $1\frac{1}{2}$ knots per hour on the average during the whole run through the strait, and twice there was no current, or it was partly in each direction. In 1896 there were twenty-six trips reported, which were made between June 27 and October 30. Out of this number, the current set outward 15 times with a velocity of $\frac{1}{4}$ to 2 knots on the average during the run; it set inward to the west 5 times, with an average velocity of $\frac{3}{4}$ to $1\frac{1}{2}$ knots, and 6 times there was either no current, or it was part of the time in each direction.

Reports have also been received from the captains of transatlantic steamers with regard to the currents encountered on the run between Heath Point and Greenly Island, the result being as follows: In 1895, from July 11 to October 18, eight trips were reported. Of this number there were 6 times when there was no current appreciable; and twice the current set to the westward with the velocity of half a knot. In 1896, there were twenty-four trips reported, which were made between July 5 and October 30. Ten times there was no current appreciable; nine times the current set eastward with a velocity which ranged from $\frac{2}{10}$ to $\frac{75}{100}$ knot per hour on the average during the above run; five times the current set westward with a velocity which ranged from $\frac{3}{10}$ to $\frac{75}{100}$ knot.

On account of the tidal character of the current in the Strait of Belle Isle it is clear that no great volume of water can enter the Gulf of St. Lawrence from that quarter. During the summer season the current flows through the strait in both directions with velocities which are nearly equal, and there is only a difference in favor of inward flow from the east, which on the whole does not probably amount to more than a moderate percentage. There is reason to believe that in the early spring the preponderance of flow from the east may be proportionally

greater than at other seasons. There is some evidence to show that the incoming water may then penetrate the gulf as far as Bonne Bay, on the west coast of Newfoundland. But no reasons have been found for supposing that this water passes completely round the west coast of Newfoundland and finds its way out into the Atlantic through Cabot Strait, between Cape North and Cape Ray, in accordance with the theory which has been more or less accepted up to the present time. The water in the Strait of Belle Isle is exceedingly clear. It is also very cold, having as late as September an average temperature from surface to bottom of less than 45°. Its density is as high as that of any water found within the gulf, being on an average 1.0244 at the surface. The water in Cabot Strait is quite different from this in character. The outflowing current is on the side next to Cape North, or the farther side from Belle Isle. The greater part of the width of the strait is occupied by water having the usual milky-green color of ordinary sea water. The outflowing current has also a distinctly brown tinge. Its surface temperature ranges from 55° to 65°, and its average density to a depth of 10 fathoms from the surface is 1.0230.

There is not only this difference in the character of the water in these two straits, but also a want of connection between them. The few observations obtained along the west coast of Newfoundland show that there is a slight current from the SW. It is also stated by Lieutenant Betty, R. N., navigating lieutenant of H. M. S. *Pelican*, that the current between Cape Gregory and Rich Point runs almost constantly from the SW., and is only intercepted by the ebb and flood tides running in and out of the larger bays on the coast.

The fishermen on this coast anchor their boats as much as 10 or 12 miles off shore, in about 30 fathoms of water. They thus have an excellent opportunity of observing the behavior of the current. It will be understood, however, that their information refers chiefly, if not entirely, to the surface current. They state that its prevalent direction is to the ENE., parallel to the shore; it will run constantly in that direction 3 or 4 days together, and on the whole it has that direction for rather more than two-thirds of the time. For 12 to 20 hours before the arrival of a southwesterly gale it sets more strongly in its usual direction, and before a northeasterly gale arrives it slacks; although this is not so certain an indication of wind, as it may also slack at other times. With long-continued easterly winds it may be reversed in direction. It may also set directly off or on shore for 3 or 4 hours, or even longer.

The current is stronger near the shore and weaker farther out, as it is found that a schooner going westward will make better headway with long tacks; but if going eastward, with short tacks inshore.

GASPÉ CURRENT.

1. *The usual currents.*—While the ordinary weather for the season of the year prevails, the current in the offing of the Gaspé Coast runs

constantly outward from the NNW. and north. It usually occupies a belt about 12 miles in width, lying from 2 to 14 miles off shore, in the vicinity of Fame Point. This belt appears to become narrower and the current stronger toward Cape Rosier, and between it and the shore there is a tidal current in both directions, as shown on the Admiralty Chart, No. 1621. In passing Cape Gaspé it keeps closer to the shore, cutting off the inshore tide, and its direction therefore varies from NNW. to NNE. This current past Cape Gaspé was found to be constant during very varying conditions of the current elsewhere. The velocity of the current generally ranges from one to 2 knots, the highest observed being $2\frac{8}{10}$ knots per hour.

2. *Displacement of the currrent.*—The main current from the NW., consisting of water of the least density was found at times to lie in the middle of the passage between the Gaspé Coast and Anticosti, and to have approximately the position shown by the line along the middle of the passage marked "Constant Current" on Admiralty Charts Nos. 2516 and 1621. When the current is in this position, the area between it and the Gaspé Coast may be occupied by weak and fluctuating currents or even by a reverse current setting inward from the SE. This position of the current in the middle of the passage may therefore be regarded as a displacement of the current, or an alternative route which it may take.

3. *Reversal of the current.*—When the current takes this route along the middle of the passage, there may be a reverse current running inward from the SE., along the Gaspé Coast. Such a current may occupy a belt lying between 2 and 12 miles from shore, and may run constantly from the SE. for as much as 6 days with a velocity which ranges from $\frac{5}{10}$ to $1\frac{4}{10}$ knots per hour. This reverse current may thus occupy the site of the usual outward current along the Gaspé Coast, and it appears to be caused by the current in the middle of the passage circling round and turning back. While this takes place, the current past Cape Gaspé still runs from the north, and its direction will probably be a little east of north. This appears to be a branch which leaves the main current at the bend where it turns back to form the current from the SE.

4. *Off and on shore directions of the current.*—It is possible for the current, while veering in direction, to set directly off or on shore for a few hours at a time.

5. *Tidal influence.*—When the current runs constantly in one direction, whatever position it may take, and whether it runs with its usual outward direction or is reversed, it is always subject to a fluctuation in velocity which corresponds with the tide. When the current has its usual direction from the NW., or outward from the St. Lawrence toward the gulf, it is strongest at low water, but when the current runs inward the reverse is the case.

6. *Return flow.*—It is evident that there must be some return flow to compensate for the outflowing water of the Gaspé Current, as its volume is more than 60 times as great as the average discharge of the St. Lawrence River. The current in the Mingan Channel is a tidal one, in both directions, with only a very slight difference of flow in favor of the inward direction. Also the deep water in the channel between Gaspé and Anticosti was found to be without movement. It would therefore appear probable that the return flow must consist of an inward movement of the water in some part of the width of the main channel, and perhaps, usually on the Anticosti side, and that this movement occurs either at the surface or as an undercurrent at a moderate depth.

7. *Influence of the wind.*—It appears probable that the chief reason the current keeps along the Gaspé Coast is because the prevailing winds on the lower St. Lawrence are toward the SE. side. When the winds are also northwesterly in the Gaspé Region they assist in keeping the current along that shore, and tend to increase its speed. On the other hand, the current appears to be kept away from the coast and to be most disturbed when the winds are from the southward, WSW., on the lower St. Lawrence, and at the same time south or SE. in the Gaspé Region. The winds then blow in upon both ends of the waterway which forms the entrance to the St. Lawrence, and they have an offshore direction along that part of the coast which the Gaspé Current usually follows. The winds can only have the above directions in these regions when a low-pressure area or storm center is traveling along a course which lies to the northward of the St. Lawrence Valley. This northern course for an area of low pressure is less frequent, as the usual path of storms lies to the south of the St. Lawrence Valley, or along the Atlantic seaboard. The conditions above indicated are therefore unusual; and if the displacement and the reversal of the Gaspé Current are dependent upon them, it is clearly correct to consider these conditions of the current itself as exceptional.

It may therefore be said, in general, that vessels may expect to find the usual outgoing current from the NW. along the Gaspé Coast, unless they have reason to infer from the weather they meet with that a low-pressure area or storm center is passing to the northward; accompanied by winds which are southward of WSW. along the lower St. Lawrence, and strong southerly winds with a falling or low barometer at the entrance to the St. Lawrence south of Anticosti. The condition of the current will then be disturbed, and it may lie in the middle of the passage between the Gaspé Coast and Anticosti; while a current which is irregular, or possibly inward from the SE., may be found in the offing of the Gaspé Coast. Vessels making inward, especially if the weather is foggy, must not count too definitely, however, on the absence of the outward current as an assistance in rounding the

Gaspé Coast as under these disturbed conditions there are times when the current may be setting more or less on shore.

(The above information is derived from the report of progress of the "Survey of Tides and Currents in Canadian Waters.)

Pilots.—Pilots for the St. Lawrence cruise in their schooners in the entrance of the river, and during the day these vessels carry a white and red flag (upper half white, lower half red); by night one white light on the middle stay, just before the mainmast, but they fire flash lights at least every quarter of an hour. During fogs a patent bellows horn is sounded. Their cruising ground is comprised in 4 stations, namely, Pilot station No. 1, across the St. Lawrence in a northwesterly direction from the east extreme of Bic Island; Pilot station No. 2, in the same direction from the west extreme of Bic Island; Pilot station No. 3, in the same direction from Port au Pic, about 8 or 9 miles westward of Bic Island; Pilot station No. 4, between Razade Islets and Green Island. A yacht is kept at the entrance to Saguenay River for vessels wishing to ascend that river. In bad weather, with fog and easterly winds, the westernmost schooner anchors off the west end of Green Island, and the yacht from Saguenay River goes to Brandy Pots, where vessels are waited for. In heavy weather, when it is dangerous to board vessels, signals are made to follow the pilot schooners to leeward of Bic Island, where the pilot can be shipped in smooth water.

General Directions.—Full Powered Steamers proceeding to the gulf through Cabot Strait in the spring, should, if the weather be clear, pass near enough to Galantry Head, St. Pierre Island, to obtain information from the signal station as to the state of the ice; or, failing this, seek the same intelligence either from Cape Ray with northerly winds, or from the station on St. Paul Island under other circumstances. After the ice has disappeared, generally about the end of May, they should keep farther off Galantry Head, to avoid the dense fogs that prevail in that neighborhood during the months of June and July, and pay due regard to the strong current that occasionally sets into the bays on the south coast of Newfoundland. Also, during the same period, it is better to be near St. Paul Island than Cape Ray, when passing through Cabot Strait.

Auxiliary Powered Steamers should follow the same directions as those with full power.

Sailing Vessels bound to any of the ports in the Gulf of St. Lawrence should endeavor to make St. Paul Island, which, being of considerable elevation, bold all round, and well lighted, may be safely made at night or in daylight, or with care and good lookout, be steered for even in fogs, unless they are very thick.

Caution.—In approaching St. Paul Island from the SE. with northerly winds the current, mentioned as at times coming from the northward and setting toward the shore of Cape Breton Island, should be

guarded against by attending to the sounding on the bank, which extends about 25 miles off Scatari Island, and off the eastern coast of Cape Breton Island as far northward as Ingonish; beyond which the depth is too great to afford any guidance. The south coast of Newfoundland, eastward of Cape Ray, is broken, rocky, and dangerous. The tidal streams being influenced by the winds are irregular, while southerly and easterly winds bring a thick fog, which is most dense near the lee shore. On these accounts the coast should not be approached, excepting with a decidedly northerly wind and clear weather.

St. Paul to Bird Rocks and Magdalen Islands.—After having passed St. Paul Island, vessels bound across the gulf should endeavor, if the weather be clear, to make Bird Rocks; Great Bird Rock, the largest or southeasternmost, bears from the north point of St. Paul N. 48° W. (N. 21° W. mag.) 55 miles.

In thick weather, which almost always accompanies easterly and southerly winds, the bank surrounding Magdalen Islands is an excellent guide up to Bird Rocks, but under such circumstances if the light can not be seen it will be safer to run along the northern edge of the bank, taking care not to come into less than 40 fathoms, than to attempt to make the rocks. When well past them by the reckoning a course can be shaped up the gulf.

In northerly winds the weather is usually clear; and, if the vessel be far enough to windward, it will be advisable to stand to the westward and endeavor to make Entry Island, taking care to avoid Doyle Reef and the sandy spit off the east end of Magdalen Islands by not approaching the islands in that part nearer than the depth of 20 fathoms. Under the lee of these islands a smooth sea will be found, sufficient guidance by the soundings, and good shelter and excellent anchorage in Pleasant Bay.

Another advantage of following this course arises from the circumstance that the winds generally veer to the SW.; so that, if a vessel has passed to leeward of Magdalen Islands with northerly or NW. winds on the starboard tack, the succeeding SW. wind will enable her to stand on the opposite tack towards Cape Gaspé.

Through the Gut of Canso.—Proceeding to the Gulf of St. Lawrence through the Gut of Canso, vessels when approaching the gulf have to cross the banks which lie off the much exposed and dangerous coast of Nova Scotia. Of these banks, the principal in extent and most important in position, are the Banquereau and Sable Banks, the former being the easternmost of what may be correctly designated the Nova Scotia Banks.

Banquereau Bank, an extensive plateau of sand, gravel, and shell, with 15 to 20 fathoms water, is distinguished from contiguous banks by numerous flat sea eggs without prickles, which are found on the bottom. It extends from about latitude 44° 30′ N., longitude 57° 20′ W., in a westerly direction about 120 miles to the meridian of 60° W. This

bank is separated from St. Pierre Bank by a deep gully, nearly 60 miles wide, having from 200 to 300 fathoms, muddy bottom; and from the east edge of Sable Island by another gully of deep water, 9 miles across its narrowest part.

On referring to the chart it will be seen that the shoalest part of the Banquereau Bank, with 15 fathoms, in latitude 44° 35′ N., and longitude 57° 54′ W., is the apex of a ridge (having less than 30 fathoms' water), about 40 miles in length NE. and SW., and that relatively with the dangers of Sable Island it is not only a safe offing for vessels intending to pass to the northward of the last-named danger, but by keeping, if possible, on the parellel of the bank, this continuous line of comparatively shoal water would enable a vessel, under ordinary circumstances, to feel her way with some degree of confidence, until she has passed to the westward of Sable Island.

Soundings obtained by the French cruiser *Naïade*, in 1894, indicate that Banquereau Bank extends more to the eastward than is indicated on the charts. This vessel obtained a sounding of 40½ fathoms in latitude 44° 43′ N., longitude 57° 18′ 15″ W., half an hour before not having found bottom in 109 fathoms. From the above position the *Naïade* stood west at a speed of 6 to 6½ knots, sounding every half hour, and obtained soundings of 32, 28½, 29, 24½, 16, 20 and 20 fathoms.

Misaine and Canso Banks.—Misaine Bank lies to the northward of Banquereau Bank, between the latter and Scatari Island, and between its NW. edge, with 60 fathoms water, and a similar depth on the outer edge on a bank extending from the shores of Cape Breton Island, there is a deep gully 20 miles wide, with from 70 to 136 fathoms. The least water yet found on this bank is 36 fathoms, the general depth being more than 40 fathoms, with a bottom of stone and broken shell. The outline of the bank is very irregular; its eastern limit is in 45° 28′ N., longitude, 58° 10′ W., and its western extremity is connected with Canso Bank by the 60-fathom line.

The least water found on Canso Bank is 35 fathoms, sandy bottom; the bank is separated from the north end of Middle Ground by a space of deep water with 112 fathoms, and from the bank extending from Cape Canso by a narrow deep-water channel with 84 fathoms.

Artimon Bank, at the east end of the deep-water gully separating Misaine Bank from Banquereau, is of small extent, the least water found being 37 fathoms, over a bottom of stone with starfish and sea eggs.

Bird Rocks to Anticosti Island.—After leaving the bank of soundings, northward of Bird Rocks, the water is deep until near the shores of Anticosti. In making this part of the voyage the southerly current should be considered, and the lead should be frequently hove. By consulting the chart, it will be seen that there are soundings to be obtained nearly all the way upon, and to southward of, a line joining Bird Rocks and Cape Gaspé, while a few miles to the northward of that line the depth is 200 fathoms.

With a fair wind make Southwest Point of Anticosti which is marked by a revolving white light; and, with westerly winds any part of the coast of that island which can be attained. The fixed white light on Heath Point, at the east end of that island, renders it easy to make at night, if the weather be clear; and, if the weather be thick, the bank of soundings, which extends 23 miles southeastward, may serve to determine the vessel's position by the lead.

Approaching Anticosti, especially from the eastward, soundings should be obtained until the vessel's position has been accurately determined, as sometimes, owing to peculiar atmospheric conditions, that island is said to be difficult to distinguish, even when the weather is moderately clear. The loss of the steamers *Titania* and *Brooklyn* was ascribed to these causes.

Passage North of Anticosti Island.—In the event of making East Cape, or the light on Heath Point, with a SW. wind, it will often be preferable to proceed to the northward of the island, where there is a good channel, rather than to tack and stand back to the southward and eastward. Under the lee of Anticosti, a vessel will have a smooth sea and often clear weather, while there is a heavy swell and frequently a thick fog to windward of it. She will, moreover, avoid the current out of the St. Lawrence, which runs constantly with westerly winds between the south coast of the gulf and Anticosti; and thus be able at all times to make way to the westward in moderate weather. At night, or in foggy weather, the bank of soundings off the Labrador Coast, and farther westward the bank off Mingan Islands will safely guide her, even although the land should not be visible, as from Natashquan Point to St. John River westward of Mingan Islands there are banks of sand, gravel, broken shell, and bits of coral extending off the coast many miles. Southward of these banks, and between them and Anticosti, there is a deep channel, in which, with the exception of the part northward of North Point of Anticosti, the bottom is, for the most part, of blue mud. Such a remarkable difference in the nature of the bottom, as well as in the depth of water, renders it comparatively easy to take a vessel through this channel at night, or in foggy weather. But in order to effect this with safety the vessel should be furnished with a patent sounding machine, which must be freely used as she runs along the southern edge of the banks of sand, gravel, and shell, sheering occasionally to the southward into the deep water and muddy bottom, to make sure of not getting too far to the northward.

The dangers of this channel may be said to commence with the reefs off St. Genevieve and Hunting Islands, on approaching which from the eastward, the chart should be carefully consulted, for they are very dangerous, and there are deep soundings, inside the outer banks, which might lead to a mistake if care were not taken to keep on the southern edge of the outer banks.

To pass the narrow part of this channel safely at night or in foggy

weather it is necessary that the lead should be kept constantly going as the vessel runs along the southern edge of the bank off Mingan Islands, and she should not be allowed to go to the northward into less than 30 fathoms of water.

Should westerly winds be experienced, the weather will be clear, and the white cliffs on the north side of Anticosti, which extend from the East Cape westward to opposite St. Genevieve Island, will easily be seen. In clear weather a vessel may stand in toward the north coast of Anticosti to within one or 2 miles, as with the exception of the reefs off Fox Bay it is bold and free from danger. To the westward of West Cliff, the coast is low and shelving and reefs extend farther off. When standing to the northward the soundings on the banks will show when to tack.

Currents.—It has been remarked already that in westerly winds there is a weak easterly current, but it is not constant and its rate seldom exceeds half a knot. Sometimes it is imperceptible during the westerly stream and runs even westerly the other way, on the approach of easterly winds. On arriving off North Point of Anticosti with a west or SW. wind, this current will almost always be found setting to the NE., being turned in that direction by the west end of the island. Confined within a comparatively narrow channel, it is here stronger than elsewhere, running during the easterly stream about one knot, and during the westerly stream half a knot, in the offing.

Passage South of Anticosti.—Vessels experiencing westerly winds in the south channel should stand over toward Anticosti and make boards, off and on, of 9 to 12 miles, to avoid the current out of the St. Lawrence. In beating between Cormorant Point and South Point, off which, at the distance of one mile from the shore, there is a rock with 16 feet water, keep the lighthouse on Heath Point open of Cormorant Point. In standing inshore at night in the neighborhood of Southwest Point, do not bring the light on this point to bear westward of N. 50° W. (N. 23° W. mag.), or when standing inshore to the westward of it, southward of S. 56° E. (S. 29° W. mag.).

Caution.—In moderate weather a vessel will generally gain ground to windward all along the south coast of Anticosti, but care should be taken to avoid being becalmed near the shore between Southwest and West Points, where both the swell and current set inshore, and where, the bottom being of clean flat limestone, an anchor will not hold. It is by no means uncommon off this part of the coast for the fine-weather westerly breeze of summer to die away suddenly to a calm, so that a vessel should stand off shore on the first appearance of a decrease of wind to avoid being driven into danger.

Having made Southwest Point, and being 4 or 5 miles off it, with a fair wind, a course should be steered along the coast, so as to pass 8 or 10 miles southward and westward of Cape Henry and West Point. In thick weather the lead should be hove constantly, and a depth

of 40 fathoms or upward maintained. With this precaution, there is no danger of being too near the coast, even when the lights can not be seen, since there are depths of less than 40 fathoms at a distance varying from 5 to 3 miles off shore all the way from Southwest Point to the west end of the island.

Anticosti to Point de Monts.—An inspection of the chart will show that there are depths of from 50 to 100 fathoms from the western end of Anticosti to nearly opposite Seven Islands, whilst to the southward the depths are much greater. This is useful in ascertaining the position of a vessel when light winds and fogs prevail for several days in succession, and the land in consequence has not been seen. When the vessel has arrived off the West Point of Anticosti, with a fair wind still continuing, a course should be steered well to the northward, especially with northerly winds, say for about Egg Island. She will thus avoid the strength of the current and the possibility of being set over too near the south shore by its acting on her starboard bow. When she has run about half way across she should haul more to the southward so as to insure clearing Point de Monts.

Caution.—If the weather be thick, as it commonly is, with a fair wind for running up, great caution is necessary. In such circumstances, after having run within about 15 miles of Point de Monts by the reckoning, sail should be reduced, so as to have the vessel under complete command, and soundings obtained so as to insure that she is not to the northeastward of the point, and this should be repeated frequently until the light be seen, the fog gun heard, or until it is certain that it is passed.

If the vessel be to the northeastward of Trinity Bay, soundings will be obtained in less than 60 fathoms, from 4 to 6 miles off shore. Directly off Trinity Bay, there is the same depth 3 miles off shore; while at the same distance off Point de Monts, there is no bottom at 100 fathoms. If the distance to Point de Monts has been run by the reckoning without finding bottom at 70 fathoms, it will be almost certain that the vessel is not to the northward; but still, as the effects of currents can not be exactly calculated and reckonings are liable to error, it will be prudent to shape a course well to the southward of the point, till there remains no doubt of its having been passed.

In making the light on Point de Monts, remember that it is not on the extremity of the point, but has been placed 1¼ miles to the northeastward, along the coast toward Trinity Bay.

Point de Monts may be approached to ¾ mile with safety, but not nearer in a large vessel, to avoid the dangers off that point.

The foregoing remarks apply where the object is to make the lighthouse, or light, on Point de Monts, but this is no longer absolutely necessary, as there are numerous lighthouses from which to obtain the vessel's position.

Working to Windward.—Vessels beating up against westerly

winds should stand over to the northward, as soon as they can weather Anticosti, unless the barometer or other indications render it probable that the wind will veer to the southward. During the flood tides, make short boards off and on the north coast, to take advantage of it, for it runs strongest inshore. During the ebb, keep farther off the land, for that tide also runs strongest near the shore. The streams, in general, are weak along this coast, and a vessel will always make way to windward in moderate weather.

From Seven Islands to Point de Monts is, in general, the easiest part of the passage, for the westerly wind, which, in this part, is the most common, is off the land, so that a vessel can frequently fetch up to Point de Monts in smooth water, particularly at night, when the wind in fine weather generally veers a point or two to the northward. She will also have the benefit of the flood tide, whilst the ebb, being turned off by Point de Monts, is scarcely felt.

If it blows fresh, and the flood be nearly done on arriving near Point de Monts, there will be no use attempting to beat round it till next tide, and then only in fine weather. In this case, Trinity Bay, with westerly winds, is a good anchorage with moderate depth of water, good ground, and plenty of room to get under way.

Point de Monts to Bicquette Island.—In the comparatively narrow estuary, where the tides and currents are much stronger, and more various in their direction, than in the wider parts previously treated of, and where there are shoals extending on the north side several miles off the shore, a good look out and constant attention to the soundings become indispensably necessary at night, or during the fogs, which are so prevalent and embarrassing in this locality.

Tidal Streams.—After taking a departure from the Point de Monts, the course to be steered must vary under different circumstances of wind and tide. The downward stream is not only turned off to the southward by Point de Monts, but Manicouagan and Bersimis Points also produce the same effect, although in a less degree, during the ebb stream; to which must be added the streams out of the large Manicouagan, Outarde, and Bersimis Rivers. During the flood tide the streams out of these rivers cease, the general stream is checked in the offing, whilst inshore, within a few miles of the north coast, a stream of flood will be found.

A vessel taking her departure from Point de Monts, with a whole ebb tide before her, is therefore very differently circumstanced from one which does the same at the commencement of the flood, and must reckon upon being set over toward the south coast much faster in the former than in the latter case.

Directions will first be given for a fair wind, and afterwards for beating winds.

Directions up the Estuary.—Having made the light on Point de Monts, and being 3 or 4 miles off it to the southward, with the usual

easterly winds, nearly or right up the estuary, steer S. 53° W. (S. 76° W. mag.) until nearly abreast the Manicouagan Peninsula, then keep half a point more to the southward, S. 47° W. (S. 70° W. mag.). These are safe courses with either ebb or flood, and if the vessel has left Point de Monts at or near the commencement of the ebb tide, will usually bring her into soundings off Metis, where 30 fathoms over sandy bottom will be found 3 miles off shore, and 50 fathoms 5 miles off shore, and on the edge of the bank.

If, on the contrary, the vessel has left Point de Monts early on the flood, she will probably be farther to the northward; we say probably, because the strength of the current is too uncertain to allow of saying that she positively will be so. However, the degree of uncertainty which the irregular rate of current gives rise to must be met by the use of the lead. If, therefore, the weather be thick, and the land not seen, round-to in time, particularly if the vessel has had the ebb tide against her, and get a cast of the lead, to make sure that she has not been set too near the south coast.

If no bottom be found at 60 fathoms, the S. 47°. W. (S. 70° W. mag.) course may be continued until the vessel is up as high as Metis by the reckoning, then let soundings again be tried for, and if still without finding bottom, haul in gradually to the southward, under easy sail, and with the deep-sea lead going, so as to endeavor to strike soundings on the bank off Father Point, which may be accomplished safely, since the bank in that part extends several miles off shore.

To Pass Bicquette Island.—The revolving light on Bicquette Island will now be distant about 15 miles to the SW., and visible in clear weather; but if it be foggy, and the light not seen, proceed as follows, attending to the fog whistle: Run along the northern edge of the bank of soundings, with the lead going, taking particular care not to go to the southward into less than 30 fathoms. When it is judged that the vessel is approaching near Bicquette, having passed Barnabe Island, haul out a little to the northward until she is out of soundings, and then steer S. 54° W. (S. 75° W. mag.), still heaving the lead, and having the vessel under moderate sail for the purpose of getting bottom, still certain that she is well above the Northwest reef of Bicquette. If soundings less than 30 fathoms are struck, whilst running past this dangerous island, on which many vessels have been wrecked, the vessel must be hauled off immediately to the northward out of soundings, and then steer as before. Two miles north of Bicquette there are 30 fathoms, and only 1¼ miles north of Northwest Reef there is the same depth, with sandy bottom. Farther off no bottom will be found at 50 or 60 fathoms. Both the island and reef are bold to the northward, having 12 fathoms close to them.

When it is quite certain the vessel is past Bicquette and its reefs, haul in to the southward by degrees, till the edge of the bank is gained again, and keep it up to Green Island Reef.

It would not be prudent for vessels without a pilot to attempt running inside of Bic Island in foggy weather, unless well acquainted. If, however, it be necessary to do so, for the purpose of anchoring, the directions for that locality should be followed.

From Point de Monts with Southerly Winds.—We have hitherto been speaking of the case when vessels are running up with easterly winds and thick weather; but a second case is when the wind is from the southward; then a direct course S. 50° W. (S. 73° W. mag.) may be steered if the vessel be, as before, close off Point de Monts, or S. 56° W. (S. 79° W. mag.) if she be nearer the south coast; allowing still for the set of the current to the southward, according to the tide, and sounding in time if the land be not in sight. Whenever the weather is foggy, and the land can not be seen, the object should always be to strike the bank of soundings along the south coast about Metis, or Father Point at farthest, and then follow it as a guide to the westward.

With Northerly Winds.—A third case, of frequent occurrence in the autumn, is when there is a fresh northerly wind. The weather is then invariably clear, and, as the land can be seen, there is no danger of getting on shore with a good look out; but the strength of the current to the southward is increased by this wind, and therefore the vessel must be kept well to the northward, to prevent being set over to the lee shore, being in consequence obliged to tack (upon the wind veering a point or two to the westward) and stand all the way back again.

Supposing the vessel to be in the same position as before, 3 or 4 miles to the southward of Point de Monts, she may steer S. 65° W. (S. 88° W. mag.) for the first 20 miles, or as long as the light is seen. Take the bearing of the light frequently, and lay it down on the chart, in order that the effect of the current may be seen; take care not to bring the light to bear to the eastward of N. 53° E. (N. 76° E. mag.), as in that case the vessel would be set too near Manicouagan Shoals. Abreast Manicouagan, get a cast of the lead, for although these shoals are steep-to on their east side, and also to the westward of Manicouagan Point, yet there are soundings off their south point.

When past these dangerous and extensive shoals, the south point of which extends 2½ miles off a low point of the same name, which can seldom be clearly distinguished at night in consequence of the higher land behind it, a vessel may haul up well under the north shore, coming no nearer than 3 miles, and taking care to avoid the shoal off Bersimis point, which extends nearly 1½ miles off a low point, also difficult to be seen at night.

Working from Point de Monts to Green Island, against westerly winds, which are almost always accompanied with clear weather, there is little difficulty, with the assistance of the charts, other than that which arises from the set of the tides and currents.

It requires a tolerably smart sailing vessel and a flood tide to beat

past Point de Monts against a foul wind, but short boards round the point and along the north coast up to Cape St. Nicholas will most readily succeed. It is not, however, advisable to keep this shore close aboard much farther to the westward, lest the wind should fall to a calm, for there is a strong indraught toward the mouth of Manicouagan River during the flood tide; and if an easterly wind should chance to spring up, after the vessel had been drifted in near the mouth of English Bay, it might be difficult to beat out, or to weather the eastern side of the Manicouagan Shoals. The light on Point de Monts can not be seen on any bearing to the southward of N. 70° E. (S. 87° E. mag.), being intercepted by the high land to the westward of it; and when it appears, a vessel off Godbout River will be only one mile from the bar, or off Cape St. Nicholas little more than 2 miles off shore; so that it is a safe rule, in standing in toward the coast at night, to tack as soon as the light bears N. 60° E. (N. 83° E. mag.).

When the ebb makes, stretch over to the southward into the middle of the estuary, where that tide is less strong than near either shore, but do not go farther to the southward, and be back again at the north coast at the return of flood.

The best time to get past Point de Monts, when fine weather and westerly winds prevail, is at night, or in the first hours of the morning, for then vessels are often assisted by a northerly land wind. If it has blown fresh from the westward during the preceding day a heavy head sea may be expected off the pitch of the point; the flood from along the land in the direction of the Seven Islands meeting the downward current off the point assists in causing this.

If, after passing Point de Monts in the morning, with a northerly land wind, there are signs of its dying away, or veering to the westward as the day advances, continue the board to the southward and westward, instead of tacking to keep the north land on board, as directed when the wind is settled right down; for the land wind of the night will probably be succeeded by the fine-weather day wind, which usually becomes a steady breeze about 9 a. m., after commencing at SW., and thus affords an advantageous board toward the north coast.

In the fine weather of the summer the wind will probably veer by degrees during the day back to west, thus offering another good board to the southwestward. Pilots and others who are experienced in reading the indications of the winds and weather frequently gain more ground to the westward by calculating upon these probable changes of the wind than by keeping on the north shore out of the current.

With the exception of the low points of Manicouagan, Bersimis, and Mille Vaches, the land can in general be plainly seen at night during the continuance of westerly winds; and where its features are sufficiently remarkable, there will be little difficulty in making it out. Mount Camille especially, being an isolated mountain 2,036 feet above high-water mark, can easily be distinguished, as well as the summit of

the high land of Bic, 1,236 feet high. Their bearings will often be of great service to vessels on clear nights, and will show when they are high enough up to fetch Father Point.

On arriving off Father Point, or anywhere between it and Bic, if the flood be done and the wind be light it will be better to anchor on the bank of soundings, weighing again, if there be a breeze, in sufficient time to stand over and meet the first of the flood on the north shore. By this mode of proceeding vessels will gain much more ground to the westward than by remaining on the south shore, for although there be a weak stream of flood upon the bank of soundings from Father Point to Bic Island, yet there is little above that island, and none after the first quarter flood, excepting so close inshore as to be useless to large vessels.

From Mille Vaches Bay to within 3 miles of the entrance of the Saguenay River, with the exception of a shoal extending a short distance off shore from the bay next westward of Cape Bondesir, the coast is moderately high and very bold, the flood strong, and the ebb comparatively weak. Vessels should, therefore, make short boards along this shore until up to Bergeron Coves, and then stretch over to the anchorage under Green Island Reef, to wait for the next flood; for it will require a whole tide, even with a good working breeze and a fair sailing vessel, to beat through between Green Island and Red Islet, and reach good anchorage above before the ebb makes.

Red Islet Bank is, however, very dangerous, and the first of the flood sets strongly over it in a direction from Bergeron Coves toward Green Island. The ebb out of the Saguenay also sets upon it, so that a stranger should not make too free with it. If a vessel can not fetch the anchorage under Green Island Reef she may anchor anywhere, in fine weather, along the south bank between Bic and Green Islands, and will have good ground in 12 fathoms at low water and plenty of room to get under way.

In coming up with a NW. wind, the north shore should be kept close aboard until up to Bergeron, and if it be flood tide the vessel may pass either northward or southward of Red Islet, as may be preferred, but the former passage should not be attempted with this wind during the ebb, nor yet the other, except by those who are well acquainted with the set of the tides.

Although the passage to the nothward of Red Islet is the quickest, there being a much stronger stream of flood in that channel, yet it can not by any means be recommended; on the contrary, it should never be attempted unless the breeze appears certain to continue, for if it fell calm the vessel would run great risk of being drawn in by the stream of flood among the dangerous shoals off the mouth of the Saguenay, or being set down upon Red Islet Bank when the rapid ebb made out of that river, which is so strong and the water so deep that no anchor would hold.

To pass to the southward of Red Islet with the same wind, haul round the east end of the reef, and as close to the southward of it as is prudent, coming no nearer than a depth of 20 fathoms until past the islet. To those who are well acquainted both with the soundings and set of the tides it may be desirable to keep closer in attempting the passage with an ebb tide, but it can not be recommended to strangers.

Directions down the Estuary and Gulf.—For the return voyage down the estuary and gulf little or no instruction seems necessary as long as the wind remains fair and the weather clear, beyond what may be gathered from the charts and the preceding remarks. But where vessels are met by easterly winds and thick weather anywhere above Point de Monts, great caution, attention to the soundings, and set of the tides and currents become necessary to insure safety, particularly during the long nights and wild weather in the fall of the year.

Vessels proceeding down the St. Lawrence, after they have passed Green Island, finding that the fair wind fails and they are met with an easterly wind before they have arrived near Bic Island, should, in that case, run up to Brandy Pots, especially if late, or very early in the navigable season. But if they have reached far enough down at the commencement of the adverse wind, Bic Island affords good shelter and anchorage, which should be sought in time, before the fog commences.

There is no other anchorage which can be recommended lower down nearer than Seven Islands, and after that Gaspé.

In a vessel beating down, the south bank should be the guide in thick weather or at night. She should tack from it, after striking soundings on its edge, and should not stand to the northward more than half-channel over in any part, to keep in the strength of the downward stream, and avoid the possibility of accident from the shoals of the north coast.

Effects of Tides.—It will be almost always seen, when the vessel comes upon the south bank of soundings, by there being so much less sea there than in the deep water, and strength of the weather current, outside; a strong ripple will be observed at the edge of the bank during the flood tide.

In the board from near Bicquette, during the flood tide, the vessel will go to the northward rather faster than to the southward back again, whilst in the ebb the contrary will be the case. But above Razade Islets she will go much faster to the southward than to the northward in both tides. Lower down the estuary, and as far down as Cape St. Anne, she will generally go faster to the southward than to the northward during the ebb tide; whilst in the flood an indraught into the rivers will be felt on approaching near the north coast from Bersimis Point nearly down to Cape St. Nicholas. The least reflection upon what has been previously said of the set of the tides and currents will account for these effects.

Caution.—In a vessel beating down in a dark night or thick weather

there is no safety unless the lead be kept constantly going; when she is approaching the south coast, in the board to the southward, sail should be sufficiently reduced for soundings to be easily obtained and everything in readiness to tack or veer at the shortest notice. These precautions become the more necessary as the vessel descends the estuary and the bank of soundings becomes narrower. Off Matane there are 30 fathoms, sandy bottom, 1½ miles off shore, and 60 fathoms at 3 miles off, whilst at the distance of 5 miles from the land no bottom will be found at 100 fathoms. The south bank becomes narrower still to the eastward of Matane, and ceases, in consequence, to be of use to vessels. Off Cape Chatte there are 30 fathoms water little more than ½ mile from the shore; a short distance farther off there are no soundings at 70 fathoms; and between it and the Point de Monts, from 150 to 170 fathoms, blue-mud bottom.

Below Point de Monts there is plenty of sea room, and although the lead will there be of little use, yet the south coast is so high and bold that it may generally be seen, if the fog be no thicker than is usual with a regular easterly wind up the St. Lawrence.

Lower down still, with a beating wind and thick weather, soundings may be struck off the west end of Anticosti, or between the West and Southwest Points of that island, if it be wished to ascertain how far the vessel is over to the northward before night. Eastward of Southwest Point to Pavillon River the bank of soundings off the south side of the island is very narrow; but from the latter to the East Point there is plenty of warning by the deep-sea lead, as will be seen by the soundings in the chart.

The channel northward of Anticosti can not be recommended in the voyage down the St. Lawrence, because there is not only less room but also less current in favor; neither the route by the Strait of Belle Isle, on account of the straggling icebergs, which are in general to be met with there through all the navigable season. Toward the fall of the year, however, vessels occasionally pass through it, in anticipation of the northerly winds which prevail at that season in the Atlantic.

The foregoing general directions have purposely not been interrupted by particular descriptions of the coasts, or places, alluded to; the latter, together with directions for the harbors, anchorages, and dangers, will be found in the following chapters.

CHAPTER II.

ISLANDS IN THE GULF OF ST. LAWRENCE.

(H. O. Chart No. 611.)

St. Paul Island, lying in Cabot Strait, the main entrance to the Gulf of St. Lawrence, between the SW. extreme of Newfoundland and the north extreme of Cape Breton Island, is composed of primary rocks, principally mica slate, dipping at an angle of not less than 45 degrees to the southward. It is nearly 3 miles long, by one mile broad. Its NE. point is a small detached islet (although it does not appear as such from the sea), separated by a very narrow channel from a peninsula, between 300 and 400 feet high, which, together with the isthmus, is so precipitous as to be nearly inaccessible. The remaining greater part of the island, which is also steep and precipitous toward the sea, has two parallel ranges of hills, that on the eastern coast being the higher and attaining an elevation of 500 feet.

A valley runs through between these hills, having two small lakes or ponds 200 or 300 feet above the sea. These supply the principal stream on the island, which is about 2 yards wide, of yellowish brown water, well-tasted and wholesome, and descending into the sea in the southern part of Trinity Cove. There are several other, but much smaller, runs of water, one of which is into Atlantic Cove. These two coves are nearly one mile from the SW. extremity of the island, the first being on the gulf side and the other on that which is toward the Atlantic, as its name implies. They afford the only shelter for boats, and the only good landing on the island which is easier of ascent from them than at any other part.

The island is partially wooded with dwarf and scrubby spruce trees, useless, excepting for fuel.

Provision Depot.—The men in charge of a depot of provisions for the relief of shipwrecked persons, and furnished by the Government of the Dominion of Canada, reside on the north point of Trinity Cove, where there is a dwelling-house and store. Fish are plentiful around the island.

Anchorage.—Off Trinity and Atlantic Coves small fishing schooners anchor, with the wind off shore, in 10 or 12 fathoms, sand and gravel bottom, and at the distance of 400 yards from the rocks. In very fine weather large vessels might venture to ride in from 25 to 30 fathoms, about ½ mile off shore, but should be in constant readiness to weigh at the first sign of a change in the wind or weather. There is little or no

warning by the lead in approaching this island in foggy weather. On this account, although so bold and high, it is extremely dangerous, and many shipwrecks, attended with sacrifice of human life, have taken place upon its shores.

The irregularity of the tidal streams and currents add much to the danger arising from the fogs, which prevail in southerly, easterly, and often also with SW. winds. During the whole of a fine calm day at the end of June, the current set to the SE. at the rate of one knot past the north point of the island.

Lights.—Two lighthouses stand on St. Paul Island—one on the detached rock at the north point and the other on the extreme SW. point.

The northern lighthouse is 40 feet high, of an octagonal shape, and painted white. It exhibits a fixed white light, which can be seen from seaward on any bearing, excepting between N. 11° W. (N. 15° E. mag.), and N. 40° E. (N. 66° E. mag.), when it is hidden by the island.

The southern lighthouse is also an octagonal white building, 40 feet high, and exhibits a revolving white light every minute, which is visible from seaward on all bearings, except between S. 51° E. (S. 25° E. mag.) and S. 68° W. (N. 86° W. mag.), when it is obscured by the intervening land. Both lights are elevated 140 feet above the level of the sea, and when the weather is clear they may be seen 20 miles. These lights are exhibited only from April 1 to December 31, or afterwards if navigation is open.

Fog Signal.—During thick weather or in snowstorms a steam fog whistle, in Atlantic Cove, on the south side of the island, is sounded five seconds in every minute.

Ice Report.—There is a telegraph and signal station at the main establishment on St. Paul Island, from which information respecting ice, weather, and the state of navigation may be obtained. The cable extends from the island to Meat Cove, at the north extreme of Cape Breton Island.

There are two surf-boats on St. Paul Island to aid seamen in distress.

Beacons.—A tidal-gauge house, painted white, erected about 40 feet above high-water mark in the bight of Atlantic Cove, now forms a conspicuous landmark on the coast of the island.

A circular white beacon has been placed on the side of the hill, above the gauge. These two marks, in line bearing N. 70° W. (N. 44° W. mag.), lead clear to the southward of Big Dick, a dangerous detached rock, on which the sea breaks very heavily, off the NE. horn of the cove.

The above allgnment affords a good guide to vessels anchoring off the cove in 15 fathoms.

(H. O. Chart No. 1092.)

Bird Rocks.—Lying about NW., 55 miles from St. Paul Island, are two rocks of coarse red sandstone, dipping very slightly to the SW., which are constantly diminishing in size from the action of the sea.

They present perpendicular cliffs on every side; yet it is possible to ascend them with great difficulty in one or two places, but there is no landing upon them except in the calmest sea. Every ledge and fissure of the cliffs is occupied by gannets, and the summits of both rocks are literally covered with them. The white plumage of these birds gives these rocks the appearance of being capped with snow, and renders them visible through a night glass in a clear and moonlight night from the distance of 7 or 8 miles.

The two rocks are about ¾ mile apart. Sunken rocks leave only a boat passage between them. The southeasternmost is the larger and higher, though scarcely 400 yards long, and not more than 140 feet high above the sea. The other is divided into two precipitous mounds joined together by a low ledge. The lesser of these mounds resembles a tower. A reef extends about ¾ mile to the eastward from North Bird Rock, and there is a patch of breakers nearly midway between the two, and rather to the SW. of the line drawn from one to the other. Great Bird Rock is quite bold, excepting in the direction of the other rock.

Light.—On Great Bird Rock stands an hexagonal tower, 39 feet high, and painted white, from which, at an elevation of 140 feet, is exhibited a fixed white light visible 17 miles. This light is shown from April 1 to December 31 each year, or afterwards if navigation is open. The tower is on the summit of the rock; the keeper's dwelling, painted white, is near the lighthouse.

Fog Signal.—During thick and foggy weather, and in snowstorms, a cotton powder cartridge is fired every twenty minutes.

Soundings.—The soundings eastward of Bird Rocks afford ample warning and assistance to vessels at night, or in foggy weather, as will be seen in the chart. Between them and East Point of Magdalen Islands the depth nowhere exceeds 16 or 17 fathoms, over a bottom of reddish sand, and sea eggs are very frequently brought up by the lead.

Caution.—Between Bird Rocks and Bryon Island there is a ridge of rocky and foul ground, on some parts of which it has been said there is as little as 4 fathoms water, because bottom has been seen in calm weather. Nothing, however, less than 7 fathoms could be found; but it may nevertheless exist, so that a vessel of large draft had better not cross this ridge when there is much sea running. The two cliffy points on the north side of Bryon Island, in line, mark the northern limits of this rocky ground.

Bryon Island is rather more than 4 miles long, W. by S. and E. by N., with the extreme breadth of rather more than one mile. Its eastern end bears from East Point of Magdalen Islands, N. 4° W. (N. 22° E. mag.) 10½ miles, but its SW. point approaches to within 8¾ miles of North Cape of Grosse Isle. There was no opportunity of measuring the height of Bryon Island, but it nowhere exceeds 200 feet above the sea. The cliffs on the north side are much higher than those on the south, where there are several small coves in which boats may land easily with the wind off shore.

This island is formed of alternating and nearly horizontal strata of red sandstone, red ocherous clay, and shaly gray sandstone. These rocks are soft and friable, forming perpendicular or overhanging cliffs nearly all around the island, which are broken in holes and caverns, showing how fast they are giving way to the action of the waves. A great part of the island is wooded with dwarf spruce trees, and there is a large upland tract covered with good native grass. There are a few inhabitants on this island who raise good crops, besides cattle and sheep.

Water.—Water is neither plentiful nor easy to be obtained, but it may be had in small quantities by digging, and there is a spring on the north side of the narrow isthmus which joins the eastern peninsula to the remainder of the land.

Reefs.—There are three reefs off Bryon Island. One off its east end extends nearly ¾ mile to the northeastward; another off the west end extends 1½ miles to the westward, and the third, off the sandy SW. point, 1¼ miles to the southward. No marks can be given for clearing these reefs, but the bearings of the land will afford sufficient guidance to the seamen. The reef off the SW. point obstructs the channel so much that it may be useful to add that from the southern ridge of this reef, Bryon Island subtends an angle of 97 degrees, so that with the island subtending any less angle the reef may be passed. The south reef assists greatly in turning off the sea from the roadstead to the eastward of it, where vessels may safely anchor in 6 fathoms water and a sandy bottom, at the distance of a mile or more from the shore, and with all winds from the northward. Small vessels during NW. gales lie at anchor close under the reef.

Shoal.—There is an extensive patch of foul and rocky ground lying SW. from the west end of Bryon Island, and having a clear channel on either side of it. Not less than 5 fathoms could be found here, and although the fishermen see bottom upon it in calm weather, there is every reason to think that there is no less water. Nevertheless, vessels of large draft had better not run over it when there is a heavy sea running, for a small point of rock, with a few feet less water, might escape the most rigorous examination.

Fishing Grounds.—The rocky places are called fishing grounds by the inhabitants of Magdalen Islands because codfish abound upon them. There is one having 11 fathoms water 2½ miles north of Bryon Island, and which extends a considerable distance parallel to the island. There is sandy bottom and a great depth of water within this ridge, and vessels may anchor in fine weather and southerly winds off the bay on the north side of the island. The soundings extend so far off Bryon Island to seaward in every direction that there is no possibility of a vessel on a voyage being endangered by it if the lead be used. Great caution is requisite in approaching the reefs, for they are very steep, especially that which extends to the southward.

Magdalen Islands.—This chain of islands assume an irregular curved direction, the greatest length of which, from Southwest Cape of Amherst Island to East Point, is 35 miles.

The central parts of these islands rise into hills, with rounded and frequently dome-shaped summits, and which are in general of igneous or trap rocks. No rock salt has been found upon the islands, but the water of many springs and small streams is sufficiently saline to be nearly unfit for use. Gypsum forms an article of commerce, and some valuable ocherous pigments are also found upon the islands, but the principal dependence of the inhabitants is upon the codfishery. The herring and seal fisheries are also prosecuted to a limited extent. The islands are partially wooded, but the trees are small, and mostly spruce, juniper, birch, and Canadian poplar. The unwooded parts produce good grass, and afford pasturage for cattle and sheep.

The climate is severe; not quite so cold as at Quebec in winter, but less warm in summer. Rains, and especially fogs, are extremely frequent, and without this humid atmosphere the islands would be deprived of the little fertility which they possess, the dry and meager soil requiring continual supplies of moisture.

When first sighted from sea, Magdalen Islands appear like several hilly islands, with channels between, but on a nearer approach they are seen to be all connected together, with the exception of Entry Island, by a double line of sand bars and beaches, inclosing extensive lagoons, having very narrow entrances, by which the tide finds access and egress. These sand bars are in some parts only a few feet above the sea, while in others they rise into hills of blown sand of considerable elevation. They appear to be increasing, since they are generally ridges of sand with from 9 to 12 feet of water parallel to, and from 50 to 100 fathoms outside, the beach. There are 3 and 4 fathoms water between these ridges and the shore, a circumstance which has often proved fatal to the crews of vessels wrecked upon these shores. In stormy weather it is dangerous to attempt making the islands, for in approaching the lower parts the breakers would probably be the first thing seen from a vessel.

Population.—According to a census taken in 1891, there were upon Magdalen Islands 4,942 inhabitants. These are distributed on Amherst, Grindstone, and Alright Islands, with the exception of a few families divided between Entry Island, Grosse Isle, and East Island, near the NE. extremity of the chain.

Seals.—During the spring of the year the fishermen leave the islands for seal hunting on the ice of the gulf. Many seals which are driven on the ice to the shores of the islands by winds are killed by the inhabitants. Seals are also taken by means of nets in Pleasant Bay.

Supplies.—Vessels may obtain limited supplies of fresh provisions, especially at Entry Island, and water most readily from Amherst Harbor, either from a spring which issues from under Demoiselle Hill, or

from a small stream which falls into Cabane Bay, near Southwest Cape. Wood for fuel is becoming scarce near the settlements. Small spars of spruce and juniper may be obtained. The latter, of which the inhabitants build their fishing boats and shallops or small schooners, somewhat resembles larch wood. It is said to be extremely strong and durable.

Harbors.—Magdalen Islands possess no harbor for large but three for small vessels, named Amherst, House, and Grand Entry Harbors.

East Point, forming the NE. extreme of Magdalen Islands, is of low sand, inclosing several shallow ponds, and having several sand hills, some of which are near its extremity, while others, of greater elevation and farther westward, extend in a chain nearly to Northeast Cape. These last-mentioned sand hills are inland, and on the margin of the northeastern part of Great Lagoon. Northeast Cape is a hill on East Island, at the head of Grand Entry Harbor. It is a remarkable cape, and its isolated cliffs, being 230 feet high, can be seen over all the sand hills and sand bars, so that, when these last are below the horizon, the cape appears to be the eastern extremity of the chain.

Long Spit.—A ridge of sand, with 2 to 3 fathoms water, extends ESE. rather more than 1½ miles off East Point, and for 1¼ miles farther in the same direction the depth is from 4 to 6 fathoms. To clear this spit, observe that the southern part of Coffin Island is a peninsula, forming the southern shore of Oyster Pond, and connected to the remainder of the island by a low neck or isthmus at the west end of the pond. The mark for the 3-fathom extremity of the spit is the north side of this peninsula in line with Old Harry Head. And the south side of the northern part of Coffin Island (where the narrow neck joins it, as above mentioned), in line with Old Harry Head, will lead over the spit in 4 fathoms.

The mariner with the chart before him will have little difficulty in making out these leading marks, but may, if he pleases, pass round the spit, by the lead, in 5 or 6 fathoms, taking care not to bring Old Harry Head to bear southward of S. 64° W. (west mag.). To know when a vessel from the eastward has passed it, observe that the summit of North Cape in line with the east side of Northeast Cape leads nearly ½ mile to the SW., which mark will be useful to a vessel approaching it from the westward. The tides set rapidly over this spit, and, together with the shoal water, cause a heavy breaking sea. It is extremely dangerous, and vessels should take care not to get becalmed near it without an anchor clear.

Doyle Reef lies S. 76° E. (S. 50° E. mag.) 6¾ miles from East Point, and consists of pointed rocks. It is very small, being only 600 yards long and 100 yards wide from the depth of 6 fathoms to 6 fathoms on either side of it. The least water is 3 fathoms on one spot nearly in the center, and there are 12 and 13 fathoms all around it. The only mark for this reef is North Cape, open two-thirds of its breadth NE. of

Northeast Cape. On the reef the angle between these marks and the western point of Coffin Island is 24° 27′.

Lying directly in the way of vessels, and very seldom showing, the sea breaking upon it only in heavy gales, Doyle Reef may justly be considered as one of the worst dangers off Magdalen Islands.

Old Harry Head, the SE. point of Coffin Island, is formed of red sandstone cliffs of moderate height, with a reef off it ⅓ mile to the SE. It is the first headland southwestward of East Point, from which it is distant 4½ miles. Between them is a sandy bay, in which vessels may anchor, with good shelter, in all winds from WSW., round by north, to NNE.; but it is not a place to be recommended, because a vessel would be there very much embayed by the shoals on either side, and might find it difficult to get out on the occurrence of a sudden shift of wind either at night or during a fog.

Columbine Shoals.—The outermost of these shoals is a patch of rocks with 3 fathoms over it, from which Old Harry Head bears N. 2° E. (N. 28° E. mag.) 2½ miles. Within this, and toward Coffin Island, are numerous small shoal patches and pointed rocks, on some of which there are not more than 3 feet at low water.

These shoals are extremely dangerous, and much in the way of vessels hauling round East Point with northerly winds. To clear their NE. side, the whole of the high Northeast Cape must be kept well open eastward of Old Harry Head. There are no good marks for clearing the west side, or for leading clear outside of them, so that the only guide for the latter purpose is not to bring East Point to bear eastward of N. 19° E. (N. 45° E. mag.). But although there are no good marks, an angle with a sextant will answer the purpose as well and as easily. On the outer edge of these shoals, the angle between Old Harry Head and the left or west extremity of Coffin Island is 77 degrees; consequently, with these points subtending any less angle, the vessel will pass outside of the shoals.

Coffin Island extends 4 miles southwestward of Old Harry Head, having on its SE. side a lagoon with a very narrow outlet, named Oyster Pond, which boats can only enter in fine weather. Off the coast of the island there are several rocks, besides Columbine Shoals, but as these are inshore, and out of the way of vessels, it is sufficient to refer to them, and to remark that this is a very dangerous part of the islands, which should never be approached at night or in foggy weather.

Grand Entry Harbor has its entrance between the SW. end of Coffin Island and the sand bars westward of it, and has water enough within for large vessels; but this entrance is extremely narrow, not exceeding 100 yards in breadth, and the narrow channel leading to it, between sandy shoals which are said to shift, extends 1⅛ miles westward. A native pilot should be employed, or the channel buoyed or staked, and even then the entrance should not be attempted excepting with a leading wind, flowing tide, and fine weather. The greatest

depth that can be carried in, at low water, is 10 feet; at high water, neap tides, 12 feet, and in spring tides, 13 feet. There are 28 feet water at, and immediately within, the entrance. The ebb tide runs out with great rapidity, and the flood in is also strong. There are no settlements at the harbor, but there are a few families in the vicinity of Northeast Cape who breed cattle.

Within this harbor there is a large expanse of water, from one to 3 fathoms deep, extending northeastward to the southern shores of Grosse Isle, and communicating by a narrow channel with a large shallow pond, which washes the base of Northeast Cape, and extends to within about 2 miles of the eastern extremity of the chain. This great lagoon also extends southwestward, between a double line of sand bars, to the northeastern shores of Grindstone Island, and is, in all, 23 miles long and from ½ mile to 3 miles wide. Throughout its whole extent there is a communication for boats at high water, quite sheltered from the sea. There are at present three entrances into this lagoon from the sea, namely, Grand Entry Harbor; another 3½ miles westward, which is very shallow, and House Harbor, near its SW. extremity, between Alright and Grindstone Islands.

Shag Island is small and low, and of sandstone, lying off the east coast of Magdalen Islands, about ½ mile from the sand bars, nearly midway between Coffin and Alright Islands, and out of the way of vessels.

Cape Alright, 16½ miles SW. of Old Harry Head, is the SE. point of Alright Island. The cliffs, of a grayish-white color, with occasional brick-red low down, are 400 feet high at the highest part, which is about a mile to the eastward of the cape, and those to the westward of the cape, toward House Harbor, are also very high and of the same color. Nearly a mile inland is the summit of Alright Island, 420 feet high. Between this summit and the cape there is a hill named Butte Ronde. The south extremity of the cape is low, with a small rock close off it.

Alright Reef, the outer edge of which lies N. 72° E. (S. 83° E. mag.), 3¼ miles from Cape Alright, is 800 yards long by 600 yards wide, and is composed of white and pointed rocks, with 6 feet least water. When on this reef Butte Ronde is in one with the summit of Grindstone Island, the west side of Cape Alright is in line with the west side of Cape Meule, and the whole of the woody Wolf Island is just open to westward of Shag Island. The well-marked summit of Grindstone Island, open to the southwestward of Cape Alright, will lead to the SW., and the east side of the woods of Wolf Island (seen over the sand bars), open to the eastward of Shag Island, will lead to the SE.

Pearl Reef, small and dangerous, is of white pointed rocks, like most of the reefs around these islands. It is round and about 400 yards in diameter, with 9 feet least water; and even with a moderate swell the sea breaks heavily upon it. From the reef Cape Alright bears N. 63° W.

(N. 38° W. mag.) 8¼ miles; the NE. point of Entry Island S. 57° W. (S. 82° W. mag.) 4½ miles. Demoiselle Hill, shut in behind the north side of Entry Island, S. 66° W. (N. 89° W. mag.), will lead to the southward, and the Demoiselle, kept more than half a point open to the northward of Entry Island, will lead to the northward.

House Harbor lies 2¾ miles from Cape Alright. Its entrance is a narrow and crooked channel, with a depth of only 6 feet at low water and 9 feet at high water.

Cape Meule, formed of gray sandstone, is about 1½ miles southward of the entrance to House Harbor. Meule Rocks, extending ¾ mile seaward of Cape Meule, are marked on their outer extremity by a black buoy moored in 14 feet water 100 yards east from a 6-foot patch.

Vessels entering House Harbor should pass SE. of the buoy, and those intending to anchor in Leslie Cove should, after passing southward and westward of the buoy, steer to the NW.

Red Cape, SW. by W. 5¼ miles from Cape Alright, is the southeastern point of Grindstone Island and the north point of Pleasant Bay. The opposite point of the bay, Sandy Hook, is the east point of Amherst Island, and bears from Red Cape S. 40° E. (S. 15° E. mag.) 6 miles. From this line to the shore of Amherst Island at the head of the bay the distance is 4¼ miles.

Grindstone Island is the second largest of the chain, being, in this respect, intermediate between Amherst and Alright Islands. Its summit is elevated 550 feet above the sea at high water.

Light.—On the west side of Grindstone Island, about ¾ mile northward of the entrance to Etang du Nord, is a square lighthouse, 42 feet high, and painted white, which exhibits at an elevation of 200 feet a revolving white light every minute and a half. The light should be visible 20 miles.

Amherst Island, the largest and southwesternmost of Magdalen Islands, is connected with Grindstone Island by a double line of sand bars, inclosing an extensive lagoon, 7¼ miles long and from one to 3 miles wide, the southern part of which is named Basque Harbor. This lagoon is full of sands, which are dry at low water, and has three outlets into Pleasant Bay, the southernmost being the deepest, but having only 3 feet water over its bar at low water. The others, including three through the sand bars of the NW. coast, will only admit boats at high water, and when the surf is not too high.

The hills in the interior of Amherst Island rise to a height of 550 feet above the sea. Toward the SE. part of the island, and about one mile WNW. of Amherst Harbor, is the very remarkable conical hill named Demoiselle Hill, of trap rock, and 280 feet high. The perpendicular and dark red cliffs of this hill are washed by the waters of Pleasant Bay.

Amherst Harbor is formed by a peninsula, presenting cliffs of gray sandstone to seaward, in the SE. corner of Pleasant Bay. Its entrance,

between this peninsula and the sands southward, is 2½ miles within or southwestward of the extremity of Sandy Hook, which is a long and narrow sandy point with sand hills. The harbor is the easiest of access and egress of any in the Magdalen Islands, and has, moreover, the advantage of an excellent roadstead outside, where vessels may wait their opportunity of running in. Nevertheless, its entrance is extremely narrow and rather crooked, so that, without a pilot, it would be necessary to buoy or stake the channel.

The depth over the bar, which is rocky, is 8 feet at low and 11 feet at high water springs. Within the harbor there are from 10 to 18 feet, over a bottom of soft, black, and fetid mud, well sheltered from every wind. It is proposed to construct a breakwater on the north side of the entrance to the harbor.

Ice.—The harbor is usually frozen over about January 1, and clear of ice about May 10, being completely closed between January 1 and May 1. Field ice generally drifts in toward the shores of the island about January 15, and disappears about May 12. The first vessel arrives from sea about May 10, and the last one leaves about December 17.

Pleasant Bay is the best roadstead in the Magdalen Islands, and the only one where vessels can venture to lie with all winds during the three finest months of summer—June, July, and August. In those months a gale of wind from the eastward so heavy as to endanger a vessel with good anchors and cables does not occur above once in 3 or 4 years. The riding, however, is often heavy enough in NE. gales, and a vessel should be well moored and all snug aloft.

Anchorage.—The best and most sheltered anchorage is in 4 fathoms, with the rocky point of entrance of Amherst Harbor bearing S. 27° W. (S. 52° W. mag.) ⅔ mile, and a little more than ½ mile from high-water mark on the sandy beach to the southward. A vessel of large draft should anchor farther off. The bottom is everywhere excellent for holding, and of red sandy clay. Even when the wind comes right in the sea is much lessened by passing over so much of shoal water; nevertheless, the attempt to ride out a heavy easterly gale, either before June or after August, will be attended with great danger.

Sandy Hook Channel, between Amherst and Entry Islands, has a navigable breadth of little more than ½ mile between Sandy Hook Flat and the rocky shoals off the west side of Entry Island. There are several rocky patches of 2½ fathoms off the SW. point of Entry Island, reaching to fully ¾ mile from the shore. The ebb tide sets strongly through this channel and over Sandy Hook Flat, so that vessels of large draft should go round to the eastward of Entry Island.

Directions.—Four fathoms is the most that can be carried through Sandy Hook Channel by a good pilot, but 3½ fathoms is the utmost that can be safely reckoned on by a stranger. Off the NE. end of Sandy Hook Shoal, which is steep-to, a red buoy is moored in 5 fathoms. Vessels must pass eastward of this buoy.

To run through Sandy Hook Channel from the southward, keep the east side of Alright Island just open to the westward of Northwest Spit until abreast of the SW. point of Entry Island, then haul up for the summit of Grindstone Island.

Entry Island is the highest of Magdalen Islands, its summit being 580 feet above the sea, the red cliffs rising at the NE. point to a height of 350 feet, and at the south point to 400 feet. Off the NE. point there is High Rock, about 100 yards from the cliffs, and on its north side the remarkable Tower Rock, of red sandstone, joined to the island, and which can be seen from the SW. over the low NW. point, as well as from the NE.

Light.—On the SW. side of Entry Island is a square lighthouse, 42 feet high, and painted white, which exhibits at an elevation of 93 feet a fixed white light. The light should be visible 12 miles from S. 87° W. (N. 68° W. mag.), through north and east, to S. 26° E. (S. 1° E. mag.).

Supplies.—The inhabitants of Entry Island raise cattle and sheep, depending more upon the sale of fresh provisions than the fisheries. Vessels may, therefore, almost always obtain supplies.

Anchorage.—Vessels generally anchor under Entry Island in northerly and easterly winds, but it is rough riding, by reason of the sea which rolls round the island. The best anchorage in easterly winds is in Sandy Hook Channel under Northwest Spit, in 5 fathoms sand.

Besides the rocky patches in Sandy Hook Channel, and off the SW. point of Entry Island, there are others off the south and SE. sides, extending ¼ mile off shore.

Andromache Rocks are several mere points of rock with deep water between them, lying off the NE. point of Entry Island. The two nearest the shore, with 11 feet water, do not extend beyond 260 yards from High Rock. Two others, with 17 feet water, are distant 400 yards and 460 yards, respectively, from High Rock on the same line of bearing; and lastly, there is a patch, with 3½ fathoms water, fully ⅓ mile out in the same direction. There is a clear channel between these rocks and Pearl Reef, which lies NE., 4 miles farther off, and vessels passing eastward of Entry Island will therefore be in no danger, if they do not haul round High Rock at a less distance than ½ mile.

Amherst Island.—The south coast of Amherst Island, consisting of sand hills and beaches, with shoal water ½ mile off, curves round westward, for 6 or 7 miles, to the entrance of the Basin, which extends nearly across the island to within less than ½ mile of Pleasant Bay. The Basin is now so nearly closed with sand, that boats can only enter at high water, and in the finest weather. There is good anchorage off the entrance, in from 6 to 9 fathoms, sandy bottom, and with winds from WNW., round by north to ENE.

Westward 1½ miles from the entrance to the Basin, cliffs commence and continue, except in Cabane Bay, to West Cape, which is the highest cliff of Amherst Island, its summit being 300 feet above the sea. There

is a remarkable rock above water close to the shore, and about ¼ mile southward of it.

Light.—On South Cape of Amherst Island is an hexagonal-shaped building, 54 feet high and painted white, which exhibits an alternating light, showing red for thirty seconds and white for thirty seconds in each minute, at an elevation of 107 feet, that should be visible 20 miles. This light is obscured to the westward by the high land of Southwest Cape or from S. 81° W. (N. 74° W. mag.) to S. 81° E. (S. 56° E. mag.).

Ice Report.—There is a telegraph and signal station at this lighthouse which receives and transmits special reports on the ice and the state of navigation in the gulf during the month of April and May.

Cabane Bay is a small bight, between South and Southwest capes of Amherst Island, where vessels may safely anchor with northerly and easterly winds, and where good water may easily be obtained. The best berth is in 8 or 9 fathoms, sandy bottom, off the center of the bay, with South Cape and Cape Percé in line, ¾ mile off shore.

Deadman Islet, W. by N., 7¾ miles nearly from West Cape of Magdalen Islands, is small, being not more than 600 yards long, and less than half that in breadth. It is about 170 feet high, with steeply sloping sides, meeting at the summit like a prism, so that when seen end on it resembles a pyramid. When seen from a distance, with its longest sides presented to view, its outline very much resembles that of a body laid out for burial, from which circumstance its name is derived. The islet is composed principally of trap rocks, and when seen close to, on a bright sunny day, with the white surf dashing against its variously colored sides, is a very beautiful object. It is so bold on the west side that a vessel may pass at the distance of 400 yards with safety, but a reef extends ⅛ mile toward Amherst Island.

About one mile northward of this islet there is a rocky fishing ground with 8 fathoms least water, and 6 miles south of it there is another with 11 fathoms. There is no danger nearer than White Horse, and vessels may safely pass between it and Amherst Island. It is, however, much in the way of those passing round the west end of Magdalen Islands, and they should beware of it at night, or in foggy weather, for the lead will give little warning, since there is nearly as much water within ½ mile of it as at the distance of several miles.

Gull Island.—From West Cape of Amherst Island the remainder of the seacoast of Amherst Island consists of red cliffs, without beach, all the way to West Lake, a small pond at the SW. end of the sand bars which join Amherst and Grindstone Islands. At the north extremity of these sand bars is Gull Island, which is small, rocky, and close to the western point of Grindstone Island, and has shoal water off its west point to the distance of ⅛ mile. About 1½ miles to the SW. of it, and with the west side of Gull Island and Gros Cap in line, lies a rocky shoal with 3 fathoms at low water, and leaving no good passage between it and the shore. Close to the NE. of Gull Island is the Etang du Nord, a small inlet, affording good shelter to boats.

Hospital Rock.—The northern shore of Grindstone Island is of red sandstone cliffs, less high than those of Amherst Island. Near their NE. extreme lies Hospital Rock, close to the shore, and also some rocky 3-fathom patches, more than ½ mile from the shore.

White Horse is the name of a dangerous reef lying N. 36° E. (N. 61° E. mag.) 7 miles from Deadman Islet, and west 5⅛ miles from Gull Island. It is scarcely more than 200 yards in diameter, and has 9 feet least water over pointed rocks, on which the sea often breaks. On this reef the summit of Entry Island is seen over a low part of the sand bars, at the NE. outlet of Basque Harbor, but this mark can not be easily discerned by a stranger.

When on the reef the western extremity of Amherst Island and Hospital Cape (the northeastern extremity of the cliffs of Grindstone Island) subtend an angle of 91° 30′; consequently, with these points subtending a less angle by 3 or 4 degrees, the vessel will pass outside of the reef. With a greater angle, 94 or 95 degrees, she will pass inside of it, or between it and the shore.

There are irregular soundings and foul ground between this reef and the shore, but nothing less than 5 fathoms, excepting what has been already mentioned.

Pierre de Gros Cap, another dangerous reef of rocks, nearly of the same size as White Horse, and having 18 feet least water, is seldom seen, as the sea breaks upon it only in very heavy weather. It lies N. 58° W. (N. 33° W. mag.) 3⅜ miles off Cape le Trou, the nearest point of Grindstone Island.

When on the reef, the summit of Alright Island is seen over the NE. point of Grindstone Island, which is in the lagoon, and very nearly in line with Hospital Cape, and Butte de Portage, a hill of Amherst Island about 1½ miles WNW. of Demoiselle Hill, is midway or in the center of the narrow passage between Gull Island and the west point of Etang du Nord. These marks kept open will lead NE. and SW. of the reef, and a vessel will pass well clear outside of it, and also of White Horse, if Deadman Islet be not brought to bear westward of S. 25° W. (S. 50° W. mag.).

Wolf Island.—From Hospital Cape to Wolf Island, off which there is a rocky 3-fathom shoal nearly ½ mile from the shore, the northern coast of Magdalen Islands consists merely of sand beaches and sand hills for a distance of 10 miles. The low sandstone cliffs of Wolf Island, which is about ¾ mile long, interrupt the continuance of the sandy shore; the sand beaches then recommence, and continue, with high sand hills, occasionally, 9 miles farther to North Cape. In this part the sand bars may be safely approached by the lead as near as 10 or 9 fathoms depth of water.

North Cape of Magdalen Islands is the northern point of Grosse Isle, and a precipice of considerable height, but not so high as the west point of the same island, which is in the Great Lagoon, and 300 feet above the sea.

The north coast of Magdalen Islands continues from North Cape, in a curved line of sand beaches and sand hills, for about 6 miles, to East Point.

North Cape Rocks, some of which always show, lie westward of North Cape, the outermost being 1,200 yards off shore. The west end of these rocks bears N. 48° W. (N. 22° W. mag.) from the high SW. side of Grosse Isle, and their extent to the eastward is marked by the NE. sides of North and Northeast Capes in line. Therefore, in running down from the westward to anchor under North Cape, do not come nearer the shore than one mile until the above-named marks are open.

Ice Report.—There is a telegraph and signal station at Grosse Isle, which receives and transmits special reports on ice, etc., during the months of April and May.

Water may be had in small quantities near the houses on the east side of North Cape, but there are no good watering places excepting those already mentioned.

Anchorage.—In the anchorage, eastward of North Cape, vessels may ride in 8 or 9 fathoms, over sandy bottom, with all southerly winds, and will find good holding ground, and plenty of room to get under way.

Directions.—Entry Island, when first made from the eastward, will appear like a double-peaked hill, sloping somewhat abruptly down to perpendicular and high cliffs on either side. Southwest Cape of Amherst Island is also a steep cliff, but of less height, and as there is no land southward and westward of it, it can not be mistaken. The land rises from it in undulations to the higher parts of the island. Should the weather be foggy, the soundings will safely guide vessels passing southeastward of the islands.

The general soundings around Magdalen Islands, which extend off them so many miles in every direction, will afford an invaluable assistance to vessels at night or in foggy weather, and will be better understood from the charts than by any written directions.

Tides.—At Amherst Harbor it is high water, full and change, at 8h. 20m.; ordinary springs rise 3 feet, and neaps 2 feet.

The tidal streams or currents around Magdalen Islands are so irregular that the most experienced and intelligent pilots for the islands, who are also fishermen, and have passed their lives in fishing craft around them, can give no certain account of their rate and direction, but all agree in stating that they vary in both respects, either from the effects of winds, or other and unknown causes. Nevertheless, the following observations will hold good as a general rule, and although subject to occasional interruption, the set of the tidal streams about to be described will be found to recur with considerable constancy in fine weather:

A few miles outside Bryon Island and Bird Rocks there appears to be usually a current setting to the southeastward, out of the Gulf of St. Lawrence; but the stream of flood tide flows between them and

Magdalen Islands. The stream of flood comes from the SE., and is divided by the east point of Magdalen Islands. One branch of the stream sets strongly over the Long Spit, which, with Old Harry Head and the shoals off it, turn it off to the southwestward toward Entry Island, leaving nearly slack water in the bay between Coffin Island and Cape Alright, and also in Pleasant Bay. The other branch, to the northward of the islands, follows the shore from East Point round to Southwest Cape of Amherst Island, whence the greater part of the stream continues its course to the SW.; whilst the remainder, following the shore, runs round and along the southern coast of Amherst Island, until it meets the before-mentioned other branch of the stream from the East Point, setting off the east side of Entry Island. It is overcome by this other branch, and turned gradually round to join the general weak stream of flood to the westward in the offing.

On the SE. side of the islands the stream of the ebb tide sets strongly out of the lagoons and out of Pleasant Bay, between the Sandy Hook and Entry Island. It is also often found running to the westward along the southern shores of Amherst Island, and right round it in like manner, but contrary in direction, to the course of the flood already described. In the offing, at the same time, the stream of ebb is from the SW., and sets over the Long Spit off the East Point, where it meets the stream from the NW., which has followed the north shore of the islands, round from Amherst Island to the East Point. The meeting of these two streams of the ebb tide, together with the shoalness of the water, causes so heavy a breaking sea in strong easterly winds that the fishing shallops dare not venture at times to pass the point.

The rate of either stream seldom amounts to a knot, excepting close inshore, or round the points. The ebb, however, is generally the strongest stream, and its rate is increased by westerly winds, as is that of the flood by winds from the eastward.

(H. O. Charts Nos. 1108 and 1109.)

Anticosti Island is 122 miles long and 30 miles in extreme breadth. Its shores are everywhere of rock, affording in some parts excellent building stone, of which the two lighthouses have been constructed. On and near the coasts the limestone is covered with a thick and often impenetrable forest of dwarf spruce, which, in some exposed situations, is only a few feet in height, with gnarled branches, so twisted and matted together that a man may walk for a considerable distance on their summits. Extensive banks of limestone shingle, bush swamps, morasses, and also beds of peat are of common occurrence.

Anticosti is nowhere higher than 700 feet above the sea. Its south coast is low and shelving, with reefs of flat limestone which dry at low water. There is, however, a range of highlands in rear of Southwest Point, and extending for some miles both to the northwestward and southeastward of it. The north coast for 70 or 80 miles to the west-

ward of East Cape is bold, precipitous, and of considerable elevation. The headlands end in magnificent cliffs of limestone, which are externally so nearly white from the effects of the weather as to resemble chalk. The remainder of the north coast is low, with reefs of flat limestone, like the southern shores.

Harbors.—It is unusual to find an island so large as Anticosti without a good harbor; the best are only suitable for vessels drawing 10 to 15 feet.

The reefs of flat limestone, extending in some parts to 1¼ miles from the shore, the want of anchorage off most parts of the coast, and, above all, the frequent fogs, render great caution necessary in approaching the coast of this island.

Productions.—The interior of Anticosti is probably less sterile, for white spruce spars have been seen large enough for the masts of a schooner of 60 tons, and others of juniper (a species of larch), of excellent quality, and of sufficient size to form the keel of a vessel of the same dimensions. Black and white birch, and ash, the latter of bad quality, complete the list of trees which attain to any size upon the island.

Fisheries and Exports.—Many of the streams abound with trout, and are periodically visited by numbers of salmon. Seals frequent the reefs and are killed annually in great numbers. Codfish and halibut are taken off several parts of the coast, which is occasionally resorted to by fishing vessels from the maritime provinces of the Dominion of Canada. Black bears are numerous in the interior of the island. Their skins, salted fish, seal skins, and oil, with the furs of smaller animals, form the greater portion of the exports.

Wild geese, outardes, and ducks of various species are abundant.

Population.—The inhabitants of Anticosti, including the lighthouse keepers and their families, numbered 253 in 1891, and resided principally at Jupiter, Pavillon, and Becscie rivers, and at Salt Lake and Fox Bays.

Climate.—The climate of Anticosti, from its proximity to an open sea, is probably not more severe in winter than that of Quebec, although farther to the north, but the summers are cold, wet, and stormy, with frequent fogs. Frosts are common in August, and in some severe seasons they occur in every month of the year. It is probable that no other grain but barley would ripen here, unless it might be oats occasionally in sheltered situations. Potatoes are frequently prevented by early frosts from coming to perfection, although planted in the most favorable situations.

Communication.—The Dominion steamer, carrying supplies to the lighthouses, visits Anticosti twice annually, and *La Canadienne*, another Dominion steamer, calls officially from Gaspé five or six times during each summer.

Rivers.—Streams of excellent water descend to the sea on every part

of the coasts of Anticosti. They are generally too small to admit boats, becoming rapid immediately within their entrances, and even the largest of them, Observation River, northward of Southwest Point, is barred with sand, excepting for short intervals of time after the spring freshets or heavy rains.

Lights.—Four lighthouses are erected on Anticosti—one on Heath Point, at the east end of the island; one on Bagot Bluff, ¾ mile from South Point; another on Southwest Point, and the fourth on West Point. These lights will be described in their places hereafter.

Ice Report.—At each of the lighthouses on Anticosti there is a telegraph and signal station, which receives and transmits special reports on ice, etc., during the months of April and May.

Telegraph Signal Stations.—In addition to the lighthouses there are marine telegraph and signal stations at Bescie River, Jupiter River, and Shallop Creek, all of which are connected together and to the mainland at Great Fox River by telegraph lines.

There are direction boards erected on the shore, or nailed to trees from which the branches have been cut off, near the beach, and on various parts of the coast. These boards are intended to point out to shipwrecked persons the way to the provision posts, and were placed on the following parts of the shore: At 30 miles westward of Shallop Creek and at 21 miles eastward of Shallop Creek.

East Cape is a long, rounded projection, the southeastern termination of one of the numerous densely wooded ridges in this portion of the island, the seaward extremity being a limestone cliff 49 feet high. The northern side of the cape is steep-to, but from the SE. extreme a ledge, dry at low water, extends ⅛ mile. Two of the boilers of S. S. *Circe*, lost in 1891, are prominent objects on this ledge.

A conspicuous patch of sand in the face of a steep slope lies close south of this ledge, and southward of it the cliff rises to a height of 90 feet, falling again to 45 feet in a projection that forms the north side of Wreck Bay.

Wreck Bay is a shallow bight, and the shores are foul to the distance of nearly ½ mile, while near the north side is an isolated rock with 10 feet on it at low water. The holding ground is of rock, and the bay affords indifferent anchorage, but it is frequented by fishing vessels during NW. winds. With southerly or easterly winds the bay should not be approached, as a heavy sea rolls in. Landing may generally be effected, except in bad weather, in the western corner of the bay near a small storehouse, where a projection of the shore reef gives some shelter to boats; but if there is much swell, the shore must be approached with great caution. There is a lake of fresh water close inshore of the landing place.

Heath Point is of limestone, about 10 feet high, with a superstratum of peat, in which there are several ponds of dark bog water. Being so low, this point disappears below the horizon at a distance of a few

miles; the lighthouse then appears like a sail off the island, and is extremely useful in marking the extent of the low land to vessels, either from the eastward or westward, as well as in showing its position from the southward, from which direction the low point can not be made out at night, being obscured by the high land behind or to the northward.

Light.—The lighthouse on Heath Point is a circular tower, 95 feet high, and painted white, with one red horizontal band that exhibits between the bearings of S. 27° W. (S. 55° W. mag.) and N. 61° E. (N. 89° E. mag.), at an elevation of 110 feet, a fixed white light which should be visible 15 miles.

Fog Signal.—During thick weather, fogs, or snowstorms, a cotton powder cartridge will be fired every twenty minutes.

Heath Point Reef extends with foul ground 1¼ miles southeastward from the lighthouse to the depth of 5 fathoms. A rock, with 3 fathoms water over it, lies east (S. 62° E. mag.) 1½ miles from the lighthouse, with depths of 6 to 7 fathoms between it and the shore reef, but with any swell there are breakers over both reef and shoal. A bank, with 10 fathoms water on it, lies S. 84° E. (S. 56° E. mag.) 4 miles from the lighthouse, and ⅞ mile farthur southward is another bank with 11 fathoms water over it. Over all these shoals there are strong tide rips during spring tides, and in bad weather overfalls resembling breakers.

Caution.—The attention of mariners is directed to the great change of variation between Belle Isle Strait and the SE. end of Anticosti Island, as there is a difference of over 7 degrees between Belle Isle and Heath Point. This, if not allowed for, has the tendency of setting vessels toward Anticosti when bound southward through the strait.

Ample warning of approach to the land can be obtained by the lead.

Soundings.—The deep water eastward of Anticosti approaches nearer the island than hitherto charted. The lines of 20 and 30 fathoms, which off East Cape are, respectively, ½ mile and 1¼ miles distant from the shore, turn abruptly southeastward, forming a projecting ledge off Heath Point, from which the 20 fathoms line is 7¾ miles and the 30 fathoms line is 13 miles distant, respectively. The line of 50 fathoms, which off Table Head is only 4 miles from the land, extends to 23 miles E. by S. from Heath Point. Southward of this point the line of 50 fathoms again approaches the shore, being only 8 miles distant south from Heath Point, 5⅞ miles from Goose Point, and 3½ miles from South Point, while the line of 10 fathoms is only 1¼ miles from South Point, with no danger southward of it.

Cormorant Point is a conspicuous steep slope of red clay 20 feet high, backed by wooded ridges, which here approach close to the shore. Near it is a shallow bight in which is a lobster factory, abreast which there is a break in the limestone reef that elsewhere fronts the coast for distances varying from 100 to 800 yards. Foul ground extends ¾ mile from Cormorant Point, and is generally shown by breakers.

The Coast from Cormorant Point trends westward in a series of small bights separated by low points. Goose Point, the next westward, may be distinguished by a remarkable clump of trees ¾ mile northeastward of it. A lobster factory is situated 2¼ miles eastward of Goose Point. The shore reef extends from Goose Point 1¾ miles to the depth of 3 fathoms.

From this point westward the shore rises to a height of 300 feet at 4 miles inland, with occasional patches of swampy land and numerous ponds. Otter River, a small stream that boats can enter at high water, lies westward of Goose Point, and at 4 miles from this point is La Croix Point. Two other small streams that boats can enter at high water, the western known as Bell River, lie between this and South Point.

South Point is low and flat, with some small ponds just inshore of it, and no trees within a distance of ½ mile from the shore.

Beacon.—A wooden beacon, 40 feet high, is erected on the extreme of the point.

Bagot Bluff is a slight rise in the coast ¾ mile northwestward of South Point. A break in the shore reef occurs at 800 yards westward of the lighthouse, where boats can land in moderate weather.

A Rock with 16 feet water on it lies west (N. 62° W. mag.) 2¼ miles from the lighthouse on Bagot Bluff.

Light.—On Bagot Bluff is an hexagonal tower, 54 feet high, painted white, with one red vertical stripe, which exhibits, at an elevation of 75 feet, a flashing white light showing a flash every twenty seconds. The light should be visible 14 miles.

Fog Signal.—During snowstorms and in thick or foggy weather a steam horn, 100 yards east of the lighthouse, will be sounded for a period of ten seconds in every minute, with an interval of fifty seconds between blasts. If the horn is out of order a whistle will sound at the same intervals. Neither horn nor whistle are reliable.

Aspect of Coast.—From South Point to the lighthouse on Southwest Point, a distance of 56 miles, there is such a sameness in the character of the coast that it is very difficult to make out one part from another. Fox River, a small stream, lies 6 miles westward of Bagot Bluff.

Mariners are reminded that it is most undesirable to close this shore without due cause, as the survey is very incomplete.

In this distance the coast is very low, but it begins to rise at Pavillon River, there being a high ridge close in rear of the coast all the way to Southwest Point, and beyond it for some miles.

Beacon.—At the entrance of Pavillon River, where there is a limestone cliff, is a white beacon, 40 feet high.

A large white beacon, 40 feet high, is placed 4 miles SE. of Salt Lake Bay.

Salt Lake Bay, 11 miles southeastward of Southwest Point, has fine sandy beaches, inclosing lagoons or ponds, into which the tide

flows. Off the center of this bay, and with its NW. point bearing N. 12° W. (N. 15° E. mag.), distant 1¾ miles, there is very indifferent anchorage, in 7 fathoms, over sandy bottom. Vessels should be careful not to anchor farther southward and eastward, since there is some foul and rocky ground about one mile in that direction from the position which has just been recommended. There are 7 fathoms rocky bottom marked in the chart on the spot alluded to, and there is probably less water between it and the southeastern point of the bay, so that no one should attempt to pass between it and the shore.

Caution.—Between South and Southwest Points of Anticosti the reefs extend one mile from shore, and are so steep that there is little warning by the lead. This part of the south coast of the island should therefore be approached very cautiously at night or in foggy weather. When far enough westward to see the revolving light on Southwest Point, care should be taken not to bring it to bear to the westward of N. 49° W. (N. 22° W. mag.).

Telegraph.—There is a telegraph station at Salt Lake Bay.

Southwest Point is a low projecting mound of limestone, having a small cove on its north side, which forms it into a peninsula. The land rises gradually in the rear of this to the summit of the ridge already mentioned. On the south side of the point there is a beach of limestone gravel on which boats may land, as well as in the cove on the north side, when the wind is off shore and the sea smooth. On the north side of the point, and for several miles along the coast to Observation River, the cliffs are perpendicular, and washed by the sea. A reef extends west and SW. from the point not more than ½ mile; and 2 miles off, in the same direction, there are 30 fathoms, over rocky bottom, deepening rapidly to 65 fathoms, with sand and shell at the distance of 3 miles.

Light.—Southwest Point Lighthouse stands on the western extremity of the point, and forms a conspicuous landmark by day. The tower is circular, 90 feet high, and painted white, with two red horizontal bands, and exhibits at an elevation of 94 feet a revolving white light every minute; the light should be visible 15 miles.

Anchorage.—Vessels may anchor in the bay on the north side of the point in 12 or 13 fathoms, over a bottom of sand, gravel, and broken shell, with the extremity of the point bearing south (S. 27° W. mag.) ¾ mile, when the cliffs eastward will be at the same distance. The shelter is from N. by W., round easterly, to S. by E., and small vessels may lie closer under the point, but it is a dangerous place to be caught in by westerly winds, which are preceded by a heavy swell. The ground is not to be trusted, and no vessel can be recommended to anchor here unless in case of necessity. The telegraph cable from Great Fox River is landed on the outer part of the western cove of this bay. Vessels should anchor nearer the eastern shore to avoid fouling it.

There is no anchorage from Southwest Point to Ellis Bay. The reefs of flat limestone extend from it, in most parts, fully one mile, and often

have 10 or 12 fathoms of water close outside of them; but vessels with the lead going may safely stand in as near as 2 miles or, which will be safer than an estimated distance, had better tack in 17 fathoms.

Observation River, 5½ miles northward of Southwest Point, is the largest stream on the island, having 5 or 6 feet water in its entrance, after the melting of the snows in the spring of the year, but soon becomes barred with sand by the SW. gales. Its source does not appear to be known to the people of the island. Immediately northward of this river there are conspicuous and high sandy cliffs.

St. Mary Cliffs, 21 miles from Southwest Point, are also of sand, less high, and less remarkable, but yet not difficult to distinguish.

Beacon.—On St. Mary Cliffs is a beacon 40 feet high, painted white.

Becscie River, at 7 miles northwestward of St. Mary Cliffs and 12 miles southeastward of Ellis Bay, is a small stream at the head of a cove affording shelter to boats, where there is one resident family.

Ellis Bay affords the only tolerably sheltered anchorage in Anticosti. Vessels, if their draft is not too great for a depth of 3 fathoms, may safely lie there during the three finest months of summer, namely, June, July, and August, but they should moor with an open hawse to the southward. If of larger draft, and only wishing to remain for a few hours, they may anchor farther out, in 3½ and 4 fathoms, but neither the ground nor the shelter will be found so good as farther up the bay.

Anchorage.—The best berth in Ellis Bay is in a line between Cape Henry and White Cliff, Captain Setter's (formerly Gamache) house, N. 15° W. (N. 12° E. mag.), and Cape Eagle, S. 51° E. (S. 24° E. mag.), nearly. The vessel will then be in 3 fathoms over muddy bottom, distant about 600 yards from the flats on either side, and about ½ mile from those at the head of the bay. Southerly winds are of rare occurrence, and never last long. Moreover, when they do occur the sea is much less at the anchorage than might be expected, although very heavy in the entrance between the reefs.

Reefs.—These reefs are of flat limestone, and dry at low water; and as the tides only rise from 4 to 7 feet, the sea always breaks upon them when there is the least swell. The reef off Cape Henry extends nearly one mile southeastward, and that off Cape Eagle nearly ¾ mile southwestward. The entrance between them is ½ mile wide, between the depth of 3 fathoms on either side. Extensive flats proceed from these reefs quite around the bay, and do not entirely dry at low water, except in very low spring tides, but there are immense bowlders upon them which always show. These flats occasion the landing to be very bad, except at high water, which is the only time that supplies of good water can be obtained from Gamache River.

Directions.—Ellis Bay can be easily made out from the sea, for Cape Henry is a bluff point, and the land being very low at the head of the bay, occasions the opening to show distinctly. On a nearer approach, Cape Eagle and White Cliff on the east side, and the houses near the head of the bay, will be easily recognized, whilst two ridges or hills

will be seen far back in the country, and to the northward and eastward. The long line of breakers on either side, and the numerous large stones so far from the shore ahead, will present anything but an agreeable appearance to those who may approach this bay for the first time, but there will be no danger if the following directions are attended to:

In approaching Ellis Bay from the westward, with westerly winds, run down along the outside of the reefs off Cape Henry by the lead, and in 10 fathoms, until the west side of White Cliff is in line with the east side of the western of two hills far back in the country, and bearing N. 7° E. (N. 34° E. mag.); then haul up with these marks on, and they will lead into smooth water close under Cape Henry Reef, in 3½ fathoms. Continue running in with these marks on till Setter house bears N. 15° W. (N. 12° E. mag.); then haul up for it, and anchor in the line between Cape Henry and White Cliff, as previously recommended. The lead should be kept going, and the reefs on either side should not be approached nearer than a depth of 3 fathoms water in any part until the vessel arrives at the anchorage.

In running for the bay from the southeastward, with an easterly wind, come no nearer to the west point of Cape Eagle Reef than the depth of 7 fathoms, until the east side of White Cliff comes in line with the east side of the same hill as before; then haul up with this mark on until Setter house bears N. 15° W. (N. 12° E. mag.), and proceed as above directed. Take notice that the west side of White Cliff is used for the leading mark in westerly winds and the east side in easterly winds, the intention being to keep the vessel in either case from going too near the lee side of the channel.

Boats can only land near high water.

Tides.—It is high water, full and change, in Ellis Bay at 1h. 45m.; ordinary springs rise 6 feet, and neaps 4 feet.

Aspect of Coast.—On the outside of Cape Henry, and continuing to West Point, reefs extend 1¼ miles from the shore, and vessels approaching it should keep the lead going, and attend to the soundings in the charts.

West Point is low and wooded, with reefs which do not extend beyond one mile from the shore, and vessels may pass it in 15 fathoms water at the distance of 1¾ miles.

Light.—The lighthouse on West Point is a circular tower, 106 feet high, painted white, with two red vertical stripes, and exhibits at an elevation of 112 feet above the sea a fixed white light, which should be visible in clear weather from a distance of 15 miles. The keeper's dwelling is attached to the lighthouse.

Fog Signal.—A cotton powder cartridge is fired every twenty minutes during foggy weather and snowstorms.

North Coast.—The north coast of Anticosti, between West and North Points, is low, with reefs of flat limestone, extending one mile from the shore. There are soundings, in moderate depths, for more than one mile out from the reefs. Vessels should not go nearer than a

depth of 25 fathoms water. In the rear of the coast, and about midway between West and North Points, are the two hills or ridges mentioned as forming one of the leading marks for Ellis Bay.

North Point is wooded, of moderate height, and without any cliff. It is so little remarkable as to be only distinguished by the change which takes place at it in the direction of the coast. High Cliff Point, distant 13 miles from North Point, is easily recognized, being the only cliff on the island that has a talus in front of it, or that has not its base washed by the sea at high water.

Beacon.—On North Point is a whitewashed beacon, 30 feet high.

Coast.—From High Cliff Point to West Cliff, a distance of 26 miles, the coast is low in front, with ridges of considerable elevation a few miles back in the country. This is the most dangerous part of the north coast, for the reefs extend nearly 2 miles out from high-water mark, beginning at some low cliffs 7 miles eastward of High Cliff Point, and continue to do so for 4 or 5 miles eastward, after which they gradually diminish in breadth, till at West Cliff they are not more than one mile from the shore. There is more or less warning by the deep-sea lead all along this part of the coast until West Cliff is approached, off which there are 70 fathoms at the distance of 1½ miles from the surf.

Beacon.—On West Cliff is a whitewashed beacon, 30 feet high.

West Cliff is very remarkable, for there is no other high cliff near it. It appears like a white patch on the land, and can be seen from a distance of 20 miles. Low cliffs commence 4 miles southeastward of West Cliff, and continue to Charleton Point, under which vessels may anchor in fine weather with westerly winds, and obtain wood and water.

Cape Observation, 10 miles farther southeastward, is a bold, high, and remarkable headland. On its west side there is a magnificent range of grayish-white cliffs several hundred feet high. At the extremity of the cape these cliffs become suddenly much lower, and then rise again to their former elevation for a short distance on the east side. Vessels may anchor under the lee of Cape Observation with westerly winds and fine weather, and obtain supplies of wood and water very conveniently.

Bear Head lies 12½ miles farther southeastward, it is composed of grayish-white cliffs 400 feet high, and in some degree resembles Cape Observation. The intervening coast has the same character, is bold, and has small bays between the cliffs. Cape Observation has no equally high cliffy headlands westward of it, whilst Bear Head has, a difference which will, independently of the beacon on Bear Head, prevent the one from being mistaken for the other.

From West Cliff to Bear Head the coast is bold, there being in most parts a depth of 100 fathoms within 3 miles of the shore.

Beacon.—On Bear Head Cliff is a beacon, 30 feet high, with diamond-shaped top and whitewashed.

Bear Bay, between Bear Head and Cape Robert, which are distant nearly 6 miles from each other NW. and SE., is by far the best roadstead

on the north coast of Anticosti, and, indeed, the only one in which a vessel of large draft would like to anchor, unless she had some particular object in view. It is sufficiently roomy, the bottom is excellent for holding, the depth of water moderate, and the shelter extends from NW., round by west and south, to SE. by E.

Cape Robert consists of cliffs of the same color and elevation as those of Bear Head. There are two other points of cliffs 300 feet high within the bay, the southeasternmost of which is named Tower Point. The best anchorage is between Tower Point and Cape Robert, at a distance of one mile from the former, as well as from the western shore, and in 13 fathoms water over a bottom of brown mud.

Bear Bay is divided into three smaller bays by the two high points of cliff already mentioned. In each of these bays there are fine bold beaches of sand and limestone shingle, and streams where water may be easily obtained. But the principal stream is Bear River, which enters the southernmost of the three bays close to the SE. side of Tower Point. It is too shallow and rapid to admit boats, but the water is clear and good. The cliffs in Bear Bay are of grayish-white limestone, in thin strata, dipping very slightly to the southward, and are perpendicular or overhanging. At the extremities of the points the cliffs are rounded by the action of the waves and atmosphere so as to resemble towers, which resemblance is rendered stronger by the masonry-like appearance of the rock. The trees are of diminutive growth.

Deep Bay, immediately northwestward of Table Head, has excellent shelter at the head in 5 to 9 fathoms water, with a bottom of clay or mud, from all winds between NNW. round by west to ESE.

Water may be easily obtained from a stream which flows into the SE. corner of the bay.

Table Head rises to a height of 260 feet in a densely wooded summit, but the form of a table, which apparently suggested the name, is difficult of recognition. A limestone ledge extends ¼ mile, and the line of 5 fathoms is 800 yards, respectively, distant from the head.

The coast southward trends 3¼ miles to Fox Point and has a flat reef extending nearly ½ mile from it. Nearly midway between these points is a break in the reef where boats can obtain sheltered landing at low water in moderate weather. Thickly wooded ridges, rising to a height of 220 feet, extend southeastward at a distance of 2 miles from the coast, the intervening space alternating in swamps and patches of dense wood.

Fox Bay, 1½ miles southward of Fox Point, is about one mile wide and deep, with a sandy beach at its head, where there is a stream draining the ponds and swamps mentioned before. The north shore is foul for a distance of 600 yards and the south shore for 400 yards. In the center there are depths of 2¼ to 2¾ fathoms, the latter over a muddy bottom, and it affords anchorage to the small vessels which resort here in the summer for fishing, and is fairly well sheltered from the sea by the shoals fronting the bay.

The telegraph station and the houses of about 10 resident families are on the southern shore.

Reef Point, the south entrance point of Fox Bay, is low and flat, and behind it are several lagoons and swamps. Shoal water extends north ¾ mile to the depth of 3 fathoms, and close beyond it is a detached shoal with 9 feet on it at low water, and occupying a space ½ mile long and 400 yards broad. The whole of the summit of the ridge on Table Head open east of Fox Point leads close eastward of this shoal.

Wreck Point is 3 miles southward of Reef Point, the intermediate coast forming a small bight. The shore reef extends more than 200 yards from this point, and foul ground extends southward one mile.

The ridge rises to a conspicuous wooded summit 316 feet above high water, at 1¾ miles inland, with a bluff at the north extreme, and a little southward of it are two remarkable detached summits on the ridge extending toward East Cape. This is the most conspicuous land in the southeastern part of the island.

Cape Sandtop is a remarkable headland rising steeply to a height of 120 feet, and is composed of marl and gravel that from seaward resembles white sand. There is no secure anchorage in the bight between this and Wreck Point. Southward of Cape Sandtop the limestone cliffs continue to a conspicuous perpendicular bluff 116 feet high, and from this they fall gradually toward East Cape, forming a small bight, in which there is sheltered anchorage with westerly winds in 10 to 12 fathoms over sand and rock.

Tides.—It is high water, full and change, at Heath Point at 11h. 20m.; springs rise 4½ feet and neaps rise 2 feet. The tidal streams run strongly round the point at spring tides to a distance of 5 or 6 miles from the shore. The flood stream runs generally northeastward and the ebb southwestward, but at a distance of 5 miles from the land the streams turn at 1½ hours before high and low water by the shore. During neap tides these streams are much modified both in force and direction by the wind. Between East Cape and Table Head there is an almost constant stream to the southward, with an occasional weak eddy northeastward close to the shore. This stream sometimes sets sharply round East Cape into Wreck Bay, and necessitates caution in this locality. Westward of Cormorant Point the flood stream runs westward and the ebb eastward, but the rates and directions are much affected by the wind, and occasionally the stream has been noticed to run in one or the other direction for a whole day without change, and generally the tidal streams are very irregular. Between West Cliff and Table Head there is generally very little stream in any direction. Occasionally winds from the westward converge from both sides of the island toward Heath Point. Between the junction of the winds and the shore there is generally a space of light and variable airs from 5 to 8 miles eastward of the island. Sailing vessels should be careful under these circumstances not to approach the island within this space.

CHAPTER III.

CAPE BRETON ISLAND, WEST COAST, AND ST. GEORGE BAY.

CAPE BRETON ISLAND.

H. O. Chart No. 611.

West Coast.—The west coast of Cape Breton Island is dangerous of access and possesses no harbor but Port Hood.

Caution.—It is a dangerous coast to be near in autumn or early winter, when the prevailing NW. winds send in a heavy sea, and the set of the current is often in the same direction. The swell frequently precedes the wind by many hours, and as there is no good holding ground, it becomes dangerous to vessels caught close inshore.

The Fisheries are valuable. Salmon are taken in all the principal streams, and the Margaree is so celebrated for its salmon fishery that it has sometimes been called the Salmon River. Herring, mackerel, cod, etc., abound in their seasons, and are frequently taken in large quantities. The seal fishery is also attempted occasionally, but is a precarious pursuit.

Currents.—Even with a smooth sea and in fine summer weather, vessels are set in toward this coast, an effect which seems to be due sometimes to the general current from the NW. coming from between the Magdalen Islands and Prince Edward Island, and at other times to the direction of the ebb stream from Northumberland Strait, inclining toward these shores. These streams, being inconstant and irregular both in strength and direction, are therefore the more dangerous, and require the more to be guarded against. In the summer months, however, the rate of the current or tides will not be found to exceed one knot even close inshore, excepting round Cape St. Lawrence and Cape North, where it sometimes runs at the rate of 2 or 3 knots, causing a heavy breaking sea. Its direction for three-fourths the time is from the westward. This appears to be due to the combined action of the current and ebb tide predominating over the flood stream from the NE., so as to render it nearly imperceptible, excepting at or near the spring tides. There is no doubt that winds, present or at a distance, also influence these streams, as they have been observed to do in all parts of the gulf.

Cape North, the north extremity of Cape Breton Island, is a bold and rocky headland, of slate in nearly vertical strata, rising abruptly from the sea to the height of 1,000 feet. There is no shallow water off

it, only some rocks above water, which at Money Point, a mile to the SE. of the cape, run off a short distance. The passage between this headland and St. Paul Island is 13 miles wide, with deep water, and no other danger than that which arises from the frequent and heavy squalls which prevail off this great promontory.

Light.—North Cape lighthouse, a square building with a white tower erected on it, 26 feet high, stands one mile SE. of Money Point. The light is exhibited 74 feet above the sea level and is a revolving red and white light every forty-five seconds. It should be visible 15 miles.

Tides.—It is high water, full and change, at Cape North at 8h.; springs rise 4 feet.

St. Lawrence Bay, between Cape North and Black Point, is 4½ miles wide and 1¾ miles deep, with bold shores, and a depth of water not too great for anchoring; but the bottom is not to be trusted, being either of rock or loose sand. Vessels requiring supplies may anchor there in the summer months, when strong northerly winds are of rare occurrence, and will find 9 or 10 fathoms water at the distance of ½ mile off shore in the bottom of the bay, but they should be ready to weigh immediately on the approach of a wind from the sea. At Deadman Pond and Wreck Cove there are settlements and good landing, the principal fishing establishment being at the first-named place.

Cape St. Lawrence, which forms the NW. termination of the west coast of Cape Breton Island, is of slate rock, affording no landing except on the west side, where there is a brook, and a steep stony beach, on which a boat can be hauled up with difficulty. Round this headland to the SE. is the remarkable Bear Hill, a sugarloaf 750 feet high, and close to the shore. This is distant less than a mile from the cape; and at an equal distance farther is Black Rock, always above water, and about 360 yards off shore.

Meat Cove, where there is a settlement and good landing for boats, lies 600 yards farther in the same direction, and about a mile westward from Black Point.

Lights.—On the north extreme of Cape St. Lawrence there is a square white lighthouse, 56 feet high, from which is exhibited two fixed white lights, at 137 feet and 95 feet above high-water mark, visible, respectively, 17 and 15 miles.

The upper light is visible seaward from N. 58° E. (N. 84° E. mag.) to S. 69° W. (N. 85° W. mag.) and the lower light from N. 61° E. (N. 87° E. mag.) to S. 66° W. (N. 88° W. mag.).

The keeper's dwelling is attached to the lighthouse.

Telegraph and Signal Station.—Meat Cove is in telegraphic communication with the United States and Canada.

Information as to ice, wind, temperature, and weather indications may be obtained during the months of April and May, by communicating with the signal station. The signals used are flags.

Coast.—From Cape St. Lawrence to Grandanse, a distance of 15

miles, the coast is mountainous, with precipitous shores, affording an indifferent landing for boats at one or two places, and there only with a smooth sea. At Grandanse there is a settlement, and a small river silted up by a shingle beach on which boats can land and be hauled over in case of need. From Grandanse to Presqu'ile, where the foot of the mountains are close to the shore, there are no inhabitants nor any good landing place.

Jerome Ledge, with only 5 feet water, lies N. 30° E. (N. 55° E. mag.) from Cape Gros, and at the distance of $1\frac{3}{4}$ miles. It is of considerable extent, being $\frac{3}{8}$ mile long, and its NE. point reaches to the distance of a mile from the shore. The line of 10 fathoms water is only 600 yards outside this ledge and the Caveau Shoals. There is, therefore, little warning from the lead, but vessels beating along shore and standing toward them will avoid them by tacking when the points on the outside of Chetican Island come in line, bearing S. 27° W. (S. 52° W. mag.).

Caveau Shoals.—Caveau Shoals, which are much in the way of vessels wishing to anchor off the entrance of Chetican Harbor, are two rocky patches, with 11 feet least water, lying at the distance of $\frac{1}{2}$ mile off Caveau Point, and N. 30° E. (N. 55° E. mag.), from $\frac{1}{3}$ to $\frac{3}{4}$ mile from Cape Gros.

Chetican Island.—Chetican Island is only an island when high tides overflow the low and narrow beach of sand and shingle which at other times unites it to the mainland at its southern extremity. This beach forms the shore of the bay, within the SW. point of the island, where the vessels employed in the fisheries usually lie moored during the summer months, receiving some shelter from the shoal which runs out $\frac{1}{2}$ mile southward from Chetican Point, but completely exposed to winds from between SSW. and WNW., which send in a heavy sea. The depth of water on this roadstead is $4\frac{1}{2}$ fathoms, but the bottom, of sand and gravel, is so loose and bad for holding that the anchorage becomes quite unsafe after the month of August.

At no time is this anchorage to be recommended, and therefore vessels merely wishing to communicate with the shore had better anchor outside at the distance of a mile or two, where they will have room to weigh in the event of the wind coming in from the westward.

There is no landing on the outside of Chetican Island, where the cliffs of sandstone, containing coal fossils, are everywhere perpendicular or overhanging, being constantly undermined by the sea. These cliffs, which extend the whole length of the island, from Enragée Point south to Chetican Point, are nearly equal in elevation to any part of the island, rising in one part to the height of 200 feet above the sea.

Chetican Harbor, between the island and the mainland, is entered from the northward between the shingle pit at Cape Gros, the NE. extreme of the island, and Caveau Point. Within this entrance, but outside the bar, which is $\frac{1}{2}$ mile farther in, small fishing vessels sometimes anchor, but the northerly winds send in so heavy a sea that this

is considered even less secure than the unsafe anchorage at the SW. end of the island. There is a depth of 3½ fathoms within the harbor, but only 2 feet at low water over its bar of sand, which is then in great part dry.

Supplies.—The establishment on Chetican Point is the principal fishing station on this coast, and will be easily recognized by the buildings, fish stages, and flagstaff. There are several other houses on the inner side of the island, and a settlement of Acadians on the mainland opposite, where supplies of fresh provision to a limited extent may be obtained, and also water, which can not be had good or in any considerable quantity upon the island.

Tides.—It is high water, full and change, in Chetican Harbor at 8¼h.; ordinary springs rise 3½ feet, neaps 2 feet. NE. winds cause high tides, and SW. winds the contrary.

Lights.—The square building, 24 feet high and painted white, erected on the SW. end of Chetican Island, exhibits at an elevation of 149 feet a revolving white light every forty-five seconds, and visible 20 miles.

Two leading lights are exhibited on the eastern side of Chetican Eastern Harbor.

The front light is a fixed red light, at the height of 45 feet above high-water mark, and is visible over a small arc on either side of the lights in line, 8 miles. It is 60 feet from the water.

The rear light is a fixed white light, 62 feet above high water. It is S. 6° E. (S. 19° W. mag.) 330 yards from the front light, and is visible over a small arc on either side of the alignment, 13 miles.

Each light is exhibited from a four-sided, pyramidal building, painted white, with red lantern. The front lighthouse is 30 feet high and the rear one 38 feet.

The lights in line lead through the dredged channel, which is marked by spar buoys on both sides, to the anchorage in Eastern Harbor.

Squirrel Pond.—Between Chetican Island and Margaree River, 10 miles to the southward, there are several places where boats can land in fine weather, especially at Squirrel Pond, distant 3 miles from Chetican. There are farms all along this part, the mountains running parallel to the shore at a short distance back, and attaining at Mount Squirrel, in rear of Squirrel Pond, an elevation of 1,220 feet above the sea.

Margaree River has 5 feet over its rocky bar at low water, in a very narrow and intricate channel, through which the tides run at the rate of 4 knots. It is only under favorable circumstances of wind and weather, and with a smooth sea, that schooners can safely attempt to enter it. The surf on the bar is at times heavy and dangerous to boats, especially when the strong tide is running out against the wind and sea. The shores of this river are well settled. In 1881 the population of Margaree district numbered 1,755 inhabitants.

Tides.—It is high water, full and change, in Margaree River at 8h.

40m.; ordinary springs rise 3½ feet, neaps 2 feet. Boats can ascend 5 or 6 miles from the entrance, at which distance the tide ends.

Light.—A harbor light is exhibited from a lighthouse on the outer end of the breakwater pier, on south side of Margaree River entrance.

The light is a fixed red light between the bearings of S. 45° E. (S. 20° E. mag.) and S. 25° W. (S. 50° W. mag.) and fixed white on the eastern and western sides. It is 21 feet above high-water mark, and should be visible 4 miles.

The lighthouse, 21 feet high, is a white square tower.

This light is to guide into Margaree River, and in order to keep the channel should be passed closely on the eastern side.

Sea Wolf Island, 7½ miles SW. of Margaree River, is of an oval shape, $1\frac{1}{10}$ miles long, parallel to the shore, 600 yards broad, and 200 feet high. It is of sandstone, precipitous and quite bold all around, excepting at the NE. point, and there the shallow water extends only to the distance of 200 yards. It affords some shelter to small fishing vessels and boats, which can land upon it only in fine summer weather; at other times the sea rolls completely round it, and the anchorage is never safe, the ground being everywhere rocky.

The depth between this island and the shore, from which it is distant rather more than 2 miles, is 7 fathoms, over a bottom of rock, with loose sand and gravel occasionally.

The neighboring sea abounds with fish.

Light.—The lighthouse, erected on the summit and near the middle of Sea Wolf Island, is a square white building, showing at 298 feet above the level of the sea a fixed white light, visible 21 miles.

Caution.—To vessels in dangerous proximity to the island, the light may become obscured by the abrupt cliffs on the sides of the island.

Mabou Highland commences at Cape Mabou, about 14 miles SW. of Sea Wolf Island, and is a very remarkable feature of the coast, seen from great distances seaward. It extends 11 miles along the coast to the NE., forming a lofty and precipitous shore, and rising to the height of 1,000 feet above the sea. After passing these highlands, the coast becomes less elevated, the beaches and landing places more frequent, and the settlements are continuous until past Chetican Island.

Mabou River, at 5 miles from Port Hood, admits small schooners, having 6 feet at low water over its bar of sand through a dredged channel. The bar shifts occasionally during heavy NW. gales, but is seldom disturbed during the summer months, when those gales are of rare occurrence.

From the entrance to the bridge, a distance of 3¼ miles, this river resembles a mountain lake, being in one part ¾ mile wide and carrying 8 fathoms water. Boats can ascend with the tide to 2 or 3 miles above the bridge, where the fresh water forms only a small stream. Besides the Mabou, which is the main branch, there are two other smaller streams, the Southwest Arm and Becket River, which last enters from the northeastward.

The shores of the Mabou are well settled, farms are seen on either side, and there is a church on the northern bank 3 miles within the entrance. The scenery is very beautiful, the mountains rising immediately from the northern shore to the height of 870 feet.

Lights.—Two leading lights are exhibited from masts, with white sheds at the base, at Mabou Harbor entrance.

The outer light is a fixed white light, shown from the extremity of the breakwater pier on the SW. side of the dredged channel; it is 25 feet above high water, and should be visible 9 miles.

The inner light is a fixed red light, shown on the shore at McFaydens wharf, and distant 1,000 yards from the other light; it is 30 feet above high water, and should be visible 7 miles.

The lights in line lead through the dredged channel past the breakwater.

Tides.—The entrance to Mabou River, at the southern end of a low sand bar, is only 300 yards wide, and the tides frequently run there at the rate of 4 knots; it is therefore a dangerous place to enter, excepting with a flowing tide and a smooth sea. It is high water there, full and change, at about 9h.; ordinary springs rise 4 feet, neaps 2 feet. NE. winds often cause high tides; SW. winds the contrary.

Coal Mine Cove is 2½ miles northward of Mabou; here a breakwater 320 feet long has been built and a double track laid to the mine; the Dominion Government are adding an extension 160 feet long. It is intended to have 18 feet water at the loading ground. In fine weather both of these wharves can be used for shipping coal.

Port Hood, the only safe anchorage on the west coast of Cape Breton Island to the north of the Gut of Canso, was formerly a much more secure harbor, Smith Island being then a peninsula, united to the mainland by a range of high sand hills, which has since been entirely swept away.

Anchorage.—At the anchorage in the NW. part of Port Hood, formed by the east side of Smith Island, there are depths of 3 to 4½ fathoms, mud, and the heavy swell is prevented from rolling in round the NE. extreme of the island by a shoal which extends about 800 yards southward from Smith Point, with 2 to 4 feet water, and is marked by a small red buoy.

Supplies.—The village of Port Hood will be seen on the mainland opposite the northern part of Smith Island; it is well situated, and will be recognized by the steeple of the church and the courthouse of stone. Supplies of fresh provisions may be obtained there, but there is no good watering place, the supply from the wells of Smith Island being scanty and not very good, while the brooks of the mainland are difficult of access, and sometimes nearly dry in summer.

Spithead, a sandy flat, nearly dry at low water, extending 1,200 yards northeastward from Portsmouth Point, the south extremity of Smith Island, affords partial shelter from south winds, but a strong south or southwesterly gale of any duration sends in a heavy swell.

Clearing Marks.—A vessel will pass to the eastward of the Spithead (which is steep-to and can usually be seen) by keeping the south end of the trees NE. of the town in line with the Roman Catholic church bearing N. 19° E. (N. 43° E. mag.) and the east end of H. Smith's house in line with the west end of the chapel bearing N. 24° W. (north mag.).

Dean Shoal, on the mainland side of the port, extends 600 yards from the sandy beach at Mill Creek. It is a steep sandy flat, which, together with the shallow water, as far out as opposite Portsmouth Point, but not farther to the south, will be cleared at the distance of 200 yards by keeping Cape Linzee and Isthmus Point in line, bearing about N. 9° W. (N. 15° E. mag.).

Rocky Shoal.—On the same side, but outside the entrance of the harbor, a rocky shoal, with 12 feet least water, runs out 700 yards from the shore ½ mile northward of Ragged Point. This being steep-to, must be carefully avoided by a vessel of large draft.

Smith Island is 2 miles long and 210 feet high; it possesses much fertile land, and there are farms on the inner side of the island. With the exception of the sandy beach in the harbor, the island is everywhere surrounded by cliffs of various heights up to 123 feet. They are formed of soft reddish sandstones, shales, and marls, containing occasionally thin seams of coals, with beds of gypsum, limestone, and trap, which last are well shown at the NW. end of the island.

St. George Bay.—See page 67.

Henry Island, or Just au Corps, lies about a mile SW. of Smith Island. It is one mile long and its greatest height is 195 feet. It is of rock formation, and nearly surrounded with cliffs which yield rapidly to the action of the waves and of the atmosphere, and which on the outer side attain the elevation of 100 feet. It has no permanent inhabitants, but is much frequented by fishermen during the fishing seasons.

This island is bold to seaward, but shallow water runs out from Fishery Point, its SE. extremity, ⅛ mile to the depth of 3 fathoms and ¾ mile to 5 fathoms.

The passage between the islands is rendered so extremely intricate and dangerous by rocky shoals that it should never be attempted unless in a very small vessel and with fine weather.

Buoyage.—The following buoys are removed at the end of the navigable season, namely:

At Portsmouth Point Spit, a black buoy; Spithead Shoal, a black buoy; Dean Shoal, a red buoy.

A small red buoy marks the southeastern and a similar buoy the southwestern extremes of the shoal extending southward from Smith Point.

Caution.—Too much reliance must not be placed in the buoyage, as they are frequently out of position.

Light.—The lighthouse erected on the cliff southward of Mill Creek, at the east side of the south entrance to Port Hood, is a small square building, painted white. It exhibits, at 55 feet above high water, a

fixed light, which shows red from S. 22° E. (S. 2° W. mag.) to S. 85° E. (S. 61° E. mag.) and white from S. 85° E. (S. 61° E. mag.) to north (N. 24° E. mag.). These lights should be visible 10 miles.

Ice.—The harbor is usually frozen over about January 20 and is clear of ice about April 20, being completely closed between those dates; field ice comes in and disappears about the same time as the harbor ice.

The first vessel arrives about May 1 and the last one leaves about January 1.

Directions.—Having a fair wind, pass to the southward of Henry Island at a distance not less than ¼ mile, steering N. 76° E. (S. 80° E. mag.) until the south end of the trees is in line with the spire of the Roman Catholic church, bearing N. 19° E. (N. 43° E. mag.), which will lead east of the Portsmouth and Spithead Shoals, and when the east end of H. Smith's house is in line with the west end of the chapel, bearing N. 24° W. (north mag.), steer for the anchorage in the NW. part of the port.

Tides.—It is high water, full and change, at Port Hood at 9h.; ordinary springs rise 4½ feet, neaps 2 feet. The tidal streams are weak at the anchorage, and their rate does not ordinarily amount to one knot anywhere within the harbor. The flood comes from the north and the ebb from the south. The flood stream from the north meets that which comes in through the Gut of Canso, off Long Point, whence they set to the NW., curving round the bay toward Cape George.

Coast.—South of Port Hood at Emersion Point the coast is dangerous to approach, and continues so to Long Point, a low cliff of red sandstone, a distance of 7 or 8 miles; off this stretch are Judique Bank and Shoals.

Judique Pond, close to the north of Judique church, is barred by a sandy ridge so as only to admit boats at high water. The shallow water extends off it to the distance of 1¼ miles. Catherine Pond and Susan Creek, distant 3 and 5 miles, respectively, to the north of the church, are similar places; the latter admits boats at high water, and is just to the north of Cape Susan, rendered remarkable by the white gypsum in its cliffs.

From Long Point to Heffernan Point there are no detached dangers, nor does the shallow water anywhere extend to the distance of ½ mile from the shore. The land is high and rather barren looking, rising at the distance of ½ mile from the shore to the summit of a ridge 850 feet above the sea, and which runs parallel to the coast line. The only remarkable object in this interval is the church at Craignish.

Judique Shoal, the greatest danger on this coast and in St. George Bay, is of rock, and about ½ mile in length, if the very shallow part is only reckoned, but there are patches with 2 or 3 fathoms, and much rocky ground both to the north and south of it.

The least water, 4 feet, is close to the outer point of the shoal, and

when on it the western extremity of the highland of Cape Porcupine will appear in the same line as Flat and Heffernan Points, which form the right extremity of Breton Island at the entrance of the Gut of Canso, and which bear S. 20° E. (S. 4° W. mag.).

There are 4 fathoms water between the shoal and the land, but only small craft should attempt the passage.

Clearing Marks.—By keeping the whole of the highland of Cape Porcupine open to the west of Heffernan Point, it will lead to the westward of the shoal in 6 or 7 fathoms; or if the church at Port Hood be kept open to the west of Cape Susan, the shoal will be cleared in not less than 4 fathoms.

Buoy.—A red buoy is placed on Judique Shoal about the 1st of May and taken up in November.

Judique Bank lies NW. 2¾ miles from the Judique Shoal; it has 4½ fathoms least water on a small rocky patch, with much foul ground around it. When on this patch, Portsmouth Point (the south end of Smith Island) and Cape Linzee will appear touching, and bearing N. 4° E. (N. 28° E. mag.); Judique church, N. 84° E. (S. 72° E. mag.) 3¼ miles, and the left or eastern termination of the highland of Cape Porcupine just shut in behind Heffernan Point.

Clearing Marks.—A vessel will pass to the westward of Judique Bank, which is only dangerous to vessels of large draft when there is a heavy sea running, by keeping Cape Linzee shut in behind Smith Island, or the whole of the highland of Cape Porcupine open to the westward of Heffernan Point.

Gut of Canso, separating Cape Breton Island from Nova Scotia and forming the southern entrance to the Gulf of St. Lawrence, is described in U. S. Hydrographic Publication No. 99, Bay of Fundy, SE. coast of Nova Scotia, and the SE. and east coasts of Cape Breton Island. Directions only for passing through the gut will be given here.

Directions.—When bound through the Gut to the southward, the distance from Cape St. George to the light at the north entrance of the Gut is 20½ miles. The approach in this direction, through St. George Bay, is unattended with difficulty or danger, excepting when fogs or snowstorms hide from view the light which has been judiciously placed at its northern entrance. The soundings are then the only guides, and they will be found sufficient, in all ordinary cases, for the safety of vessels prudently conducted, with their leads going. In vessels so circumstanced, the endeavor should be to strike soundings on the bank off Long Point, and then to follow its ledge along the shore of Cape Breton Island, in the low-water depth of 10 fathoms, to the entrance of the Gut. It is seldom so thick, especially in a breeze of wind, but that some part of the shore will be seen before the vessel has run far after entering so narrow a strait. With a beating wind, she should board off and on the same shore, until soundings are struck (in the board to the westward, and after crossing the deep water) on the edge of the bank

off Cape Jack, where, if it be night, and the fog so thick that the light can not be seen, or if the tide be nearly done, it will be advisable to anchor, and wait for a change. The ground there is not good, but it is out of the strength of the tides, and an anchor will hold in moderate weather. The anchorage ½ mile to the SE. of the lighthouse and on the same side of the channel should be preferred if attainable. There are some spots of mud there in which an anchor holds well in 7 to 9 fathoms, and where the strength of the tide is not great.

Vessels outward bound, and proceeding through the Gut to the southward, very frequently meet a south or SE. wind, with its usual accompaniments of fog and rain, in which case the roadstead off Port Hawkesbury will be found the most roomy and convenient anchorage. Eddy Cove, from its more advanced position at the entrance of the Gut, offers to vessels sailing with the first of a fair wind, a better chance of clearing Chedabucto Bay and the Canso Ledges before dark; but it can only be recommended in fine settled summer weather, for the ground is not good, and the anchorage is much exposed on the occurrence of a sudden change of wind. Turbalton Bay is much more secure, but it is rather small for a large and weakly manned vessel to weigh from in the event of a strong wind setting in suddenly from the westward.

Tides.—It is high water, full and change, at the north and south entrances of the Gut at 9h. 15m. and 8h., respectively. Ordinary springs rise 4 feet, neaps 2 feet; but extraordinary tides may rise 6 or 7 feet or only 2 feet, owing to the irregular influence of unknown causes—probably strong winds at a distance. The rise and fall of the tides on the shore usually continue through nearly equal periods of time, but the duration of the tidal streams (the flood being to the northward and the ebb to the southward) varies from one to 4 hours after it is high or low water by the shore, even in the fine weather of summer; whilst in the blowing weather, so frequent on the approach of winter or in early spring, they are reported to be still more irregular, running at times in the same direction for several days in succession; but this never occurred during the Admiralty survey.

The rate of these streams off Cape Porcupine, where it is most rapid, is ordinarily about 4 knots, but is increased occasionally to 5 knots by strong winds. At most of the anchorages, and under almost every point, there are eddies, usually running in the opposite direction to the main stream outside, but at a much inferior rate, and they render great attention necessary to insure a clear anchor.

The set of the flood stream from the north entrance of the Gut is nearly toward Cape St. George, diminishing rapidly in strength as it expands in advancing to the northward. It is weak in the western part of St. George Bay, sweeping round it to the NW., with slight indraughts toward Pomquet, Antigonish, etc. The ebb stream will be found setting in the contrary direction.

On the eastern side of St. George Bay the flood stream from the Gut

is usually met by much weaker and contrary stream of flood, coming from the NE., along the west coast of Cape Breton. These opposing flood streams will be found, in general, to unite somewhere off the Judique Shoals, and then to set toward the NW. The two corresponding ebb streams generally diverge from about the same place, the one setting toward the Gut, with increasing strength as it proceeds to the southward, and the other in the contrary direction, toward Port Hood. All, however, that has been said respecting these streams must be understood as of usual, and not of constant, occurrence, since they must necessarily partake of the irregularity in the strength and duration of the tidal streams of the Gut of Canso. Nevertheless, it will be highly useful, and may materially aid the progress of the vessel, to bear in mind the usual set of these streams.

NOVA SCOTIA.

(H. O. Chart No. 1066.)

St. George Bay is of great extent, being 13½ miles wide at entrance, between Henry Island and Cape St. George, and 20 miles deep, from the same cape to the Gut of Canso. It is traversed by all the numerous vessels which pass in or out of the gulf by its southern entrance, and hence its navigation assumes a more than usual degree of nautical importance.

Anchorage.—Half mile SE. of the lighthouse at the north entrance, and on the same side of the Gut, there is tolerable anchorage in all but northerly winds. Vessels frequently stop there to wait tide.

Light.—The lighthouse at the north entrance of the Gut of Canso is a conspicuous object, standing on a bank on the western or Nova Scotia shore, 120 yards within the high-water mark. It is a square building, 35 feet high, and painted white. It exhibits at an elevation of 110 feet a fixed white light, which can be seen in favorable weather from all the northern parts of St. George Bay about 16 miles.

Havre Bouche is a small but convenient harbor for schooners, lying between Cape Jack and the lighthouse at the north entrance. It has 4 feet at low water in its narrow entrance between stony points, having no bar outside, and 13 or 14 feet within. There is a small stream at its head. The shores and neighborhood are well cultivated, and the church will be seen near the shore and a mile to the westward of the entrance, or half way toward Cape Jack.

Lights.—On the SW. shore of Havre Bouche Harbor is a square white lighthouse, 32 feet high, from which, at an elevation of 36 feet, is exhibited a fixed white light.

At 473 yards S. 12° W. (S. 36° W. mag.) from the above light stands a similar lighthouse, exhibiting from an elevation of 107 feet a fixed red light. These lights should be visible 9 miles, and in line indicate the dredged channel leading to the harbor.

Tides.—It is high water, full and change, at Havre Bouche at about 9h. 30m., and the rise, unless increased by northerly winds, is from 4 to 2 feet, accordingly as it may be spring or neap tides.

Jack Shoal.—Cape Jack, a cliff of red sandstones 45 feet high, is the most prominent headland on this part of the coast. Jack Shoal runs out from the cape one mile to 3 fathoms water, and 1½ miles to 5 fathoms. Between the distances of ½ and ¾ mile off shore there are two large patches of rock, which dry at half tide, leaving a passage carrying 11 or 12 feet water for small craft between them and the cape.

Caution.—The Jack Shoal has often proved dangerous to vessels in thick weather, when it should be approached with great caution, especially from the eastward, the soundings on that side being irregular and deep near the shoal, but nevertheless quite sufficient to insure safety if the lead be kept going. On the outer point of the shoal, in 3 fathoms, the lighthouse at the north entrance of the Gut of Canso bears S. 72° E. (S. 48° E. mag.) 3⅛ miles. If the light can not be seen the shoal should not be approached nearer than the low water depth of 10 fathoms.

Little Tracadie Harbor has only one foot at low water over its bar. Its entrance is in the bay between Cape Blue and Barrio Head, the latter being a cliff of red sandstone 110 feet high; the former remarkable from being of limestone, and sheltering the entrance from NE. winds. The inhabitants of these small harbors, including Pomquet, are Acadians, of French extraction, who live principally by agriculture.

Tracadie Harbor has its narrow entrance about ½ mile eastward of Bowman Head. It is extensive, and has 14 feet of water in some parts within, with many coves, islets, and small streams, the principal of which, called Tracadie River, is at the head of the eastern arm, 2½ miles in from the sea. The depth over its dangerous bar of gravel and stone is only 2 feet at low water, in a narrow and crooked channel; it therefore admits only boats or very small vessels at high water.

Tracadie Village and the church are about a mile within the entrance. The church is large, and can be seen from a great distance out at sea. The village had 440 inhabitants in 1891.

Railway.—Tracadie is connected with the Intercolonial Railway.

Pomquet Road.—Pomquet or Bayfield Island, which is SE. by S. 14¼ miles from Cape George, is of red sandstone, low, wooded, about ½ mile long, and is joined by a reef to Pomquet Point, from which it is distant 350 yards. The reef dries out from the point more than half way over toward the island, and leaves a passage with only 3 or 4 feet in it at low water. Shallow water runs out from the island nearly 800 yards NE., and a reef, with a large rock near the end of it, dries out from its eastern shore 300 yards.

This roadstead, which is considered safe during the summer months, but where the riding must be very heavy in NE. gales, is in the bay

between Pomquet Point and Little River, which last admits boats only at high water, and with its church and settlement will be seen to the southward a long mile from the island.

Anchorage.—Vessels may anchor in any depth from 3 to 6 fathoms over sandy bottom, but the best-sheltered berth is in 4 fathoms at low water, with the south point of the island bearing N. 7° W. (N. 17° E. mag.), distant ½ mile.

Pomquet Road is sheltered by the island and its reefs from all points excepting between north and ENE.

Light.—From a square tower, painted white, on the NE. end of Pomquet Island a fixed red light is exhibited at an elevation of 50 feet, and should be seen in clear weather 9 miles. The light is obscured on easterly bearings.

Directions.—To run for this anchorage from the northward, pass the eastern shore of Pomquet Island at the distance of ½ mile, or in not less than 8 fathoms water, until Pomquet Point comes in sight to the southward of the island, when haul to the westward into the bay.

Approaching from the eastward Bowman Bank must be avoided in a vessel of large draft, either by the lead, or by not bringing the north point of the island to bear to the westward of S. 43° W. (S. 66° W. mag.) until the north point of the bank is passed. The bank is of great extent, running off fully 2 miles northwestward from Quarry Point and Bowman Head, and has rocky patches on it, with 13, 16, and 19 feet at low water, at various distances, from ¾ to 1½ miles off shore.

Pomquet Banks lie off Pomquet Island to the northward, distant from 3 to 6 miles. The soundings on them are rocky and irregular, the least water, 6 fathoms, being on the outer and smaller of the two banks, with the church at the Little River shut in behind the east side of Pomquet Island, bearing S. 3° E. (S. 20° W. mag.) 5½ miles from Pomquet lighthouse.

Pomquet Harbor has its narrow entrance, at the eastern extremity of a range of low sand hills and sand beach, 2½ miles SE. from Monk Head, and in the bay between it and Pomquet Point. It is an extensive place, branching into two principal and many smaller inlets, coves, and islets. It is navigable for small craft and boats nearly 3 miles in from the sea, but it is of no use to shipping, having usually only a depth of 2 feet at low water over its shifting bar of sand. The principal settlements and the church are on the western shore of the NW. arm, and the Indians have a chapel and a reservation of land on the eastern and larger branch, at the head of which is Pomquet River, a small stream (1860).

Tides.—It is high water, full and change, in Pomquet Harbor at 9h. 15m.; springs rise 4 feet, neaps 2½ feet.

Monk Head is a cliff of gypsum 45 feet high, 2¾ miles from the entrance of Antigonish Harbor. A rocky bank, with 3 fathoms least water, extends off it ¾ mile to the eastward, and there are no more than 4½ fathoms at double that distance from shore.

Antigonish Harbor, at 2½ miles westward of Monk Head, is nearly 200 yards wide at the entrance, between low points of sand, from which a dangerous bar extends to the distance of ½ mile. The bar and the deep water up the harbor are marked by spar buoys on either side (1871). The bar has a depth of 6 feet at low water, but both the depth and direction of the very narrow channel are said to change occasionally. The anchorage off the bar (rock) is not good, and would be quite unsafe in a gale from the NE.

The harbor is of great extent, running in 6 or 7 miles to the SW., the channel, between flats of mud and weeds, having in some places 5 or 6 fathoms water. There are flourishing farms on either side.

Antigonish, containing two churches, stands at the head of the western arm, distant 6½ miles from the entrance. In 1891 Antigonish Division contained 6,331 people. Gypsum abounds here, forming, with lumber and the produce of an increasing agriculture, the cargoes of the schooners which frequent the harbor.

The United States is represented by a consular agent.

Tides.—It is high water, full and change, in the entrance of Antigonish Harbor at about 9h.; ordinary springs rise 4 feet, neaps 2 feet. Northerly winds cause high tides and southerly winds the contrary. The rate of the tides in the entrance seldom exceeds 2 knots, unless it may be in spring, after the melting of the winter's snow.

MacIsaac Rock, with 9 feet least water, is the center of a small detached shoal, distant nearly 600 yards from the shore, between MacIsaac Point and a remarkable patch of white gypsum cliff. This rock, which is the only danger on the west side of St. George Bay, bears from the gypsum patch N. 49° E. (N. 72° E. mag.) ⅔ mile; it is 2¼ miles northward of the entrance of Antigonish, and is shown occasionally by heavy breakers.

Cape St. George, the NW. point of St. George Bay, is a bold and precipitous headland, composed principally of slate, conglomerate, and trap rocks, attaining the elevation of 600 feet above the sea. The shallow water does not extend off it beyond ¼ mile, but as there is a depth of 20 fathoms at double that distance, the lead affords but little warning, and it should therefore be approached with caution in thick weather. A church has been built westward of the lighthouse, forming a useful landmark. Off Ballantyne Cove, on the eastern side of the cape, there is an anchorage in westerly winds, but the ground is not very good.

Light.—From a square lighthouse, 39 feet high, painted white, on the north side of Cape St. George, is exhibited, at an elevation of 350 feet, a revolving white light, attaining its greatest brilliancy every thirty seconds, visible in clear weather 25 miles. The light is said not to be seen when bearing to the eastward of S. 68° E. (S. 45° E. mag.)

Tides.—It is high water, full and change, at Cape St. George at 9h. 15m.; springs rise 4 feet, neaps 2 feet.

CHAPTER IV.

NORTHUMBERLAND STRAIT, SOUTH AND WEST SHORES—CAPE ST. GEORGE TO MIRAMICHI BAY.

NOVA SCOTIA.

(H. O. Chart No. 1066.)

The Coast from Cape St. George to Merigomish Harbor, 27 miles SW., is bold and free from danger. The land, rising from the sea to the summit of a ridge 2 or 3 miles in rear of and parallel to the coast line, is well settled, the cultivation extending occasionally to the summit of the ridge, which attains the extreme elevation of 1,100 feet above the sea.

Malignant Bay has a small stream at its head, affording good landing for boats, and will be known by the Sugar Loaf Hill, a mile in rear of it, and 680 feet above the sea.

There is no harbor in this distance, the wooden pier at the village of Arisaig affording shelter only to boats and shallops in easterly winds, but none in winds from between north and west.

The remarkable rock called Frenchman Barn lies nearly a mile eastward of this pier and ½ mile NE. from Arisaig church, which last is 14 miles from the entrance of Merigomish.

Merigomish Harbor has 14 feet at low water over its bar, and sufficient depth within for vessels of large draft; but it is so intricate and difficult of entrance that no directions would enable a stranger to take his ship in safely, and the northerly winds send in so heavy a sea over the bar that to get on shore going in would probably be attended with the loss of the vessel. The outer entrance of the harbor (¾ mile wide) is between Merigomish Point and King Head, the former being the west extreme of Merigomish Island. The bar is formed by rocky shoals running out from these points of entrance, ¾ mile to the northward. The channel over the bar, and leading in from it between the shoals, is over 200 yards wide; but the shoals are so steep that the lead affords little guidance, and there are no leading marks. The course running in is at first to the southward, and then by a sharp turn to the eastward close past Savage Point (the sandy spit at the SW. extreme of Merigomish Island) into the harbor. This inner entrance of the harbor, between Savage Point and the east end of Olding Island, is about ¼ mile wide; but the navigable breadth is reduced to 100 yards by the shoal off Olding Island, and the tides frequently run there at the rate of 5 miles an hour.

This harbor is seldom visited by anything larger than a coasting schooner. The pilots are therefore incompetent from want of practice, and the channel is no longer buoyed as it used to be. The harbor is of great extent, running in 5 or 6 miles to the eastward, within Merigomish Island and the sand bar which joins it to the mainland, and also 4 miles to the westward, up a bay full of islands, coves, and precipitous headlands. Several small streams enter the harbor, of which French River, opposite the east end of Olding Island, is the principal. It is approached by a very narrow channel, through flats of mud and weeds, and can be ascended by boats to the bridge, about a mile within its entrance.

Merigomish Island, 3¼ miles long and 1½ miles broad, is of clay and sandstone, belonging to the coal formation, rising to the height of 150 feet above the sea. Thin seams of coal may be seen at Coal Point, where the cliffs, which form the northern shore of the island, are 35 feet high. Its southern shore is broken into coves, cliffy islets, and peninsulated points similarly to the western part of the harbor. A sand bar 2½ miles long unites the island and mainland to the eastward, excepting in unusually high tides, when the water washes over one part of it into the harbor.

Merigomish is 9¾ miles by rail from New Glasgow. Shipbuilding is carried on.

Tides.—It is high water, full and change, at Betty Point, in Merigomish Harbor, at 10h. 6m.; springs rise 5¼ feet, neaps 3¼ feet; but the diurnal inequality is strongly marked here, as well as at Pictou, causing a considerable difference in the times and the heights of the two tides on the same day.

Little Harbor.—In the shoal bay between Colquhoun and Evans Points, which are distant 6½ and 5 miles, respectively, from the lighthouse in Pictou Harbor, are two narrow, dangerous, and intricate channels, leading through shoals into Little Harbor. Of these channels, the eastern and best turns sharp in to the eastward, within Roy Island, and close round the sandy spit at its SW. extreme. The other has only a foot or two of water, and leads into the western part of the harbor, which is several miles in extent, and broken into bays, coves, and picturesque points, but only fit for boats, being nearly all dry at low water, excepting the intricate and narrow channels.

Roy Ledge, a small rocky shoal, with 9 feet least water, lies off the north shore of Roy Island at the distance of 700 yards and ¾ mile N. 73° W. (N. 50° W. mag.) from Colquhoun Point. There is also a reef of sandstone, in great part dry at low water, running out from Colquhoun Point ½ mile to the eastward; and as all these dangers have 5 fathoms water close to them, vessels should be careful not to stand into less than 6 fathoms along this part of the coast.

Roy Island is united at its east end to the mainland by a long and narrow sand bar, stretching to the SE. across the east end of Little Harbor to within ¾ mile of King Head.

Roaring Bull, distant 4 miles eastward of the lighthouse in Pictou Harbor, is the cliffy north point (with a remarkable red patch on it) of a small peninsula, united to the mainland at its western end by a sandy beach, and having at the other extremity the gully or entrance to Chance Harbor, dry, or nearly so, at low water. A reef of sandstone runs out NE. from the Roaring Bull, 600 yards to the 3-fathom line of soundings.

Pictou Harbor, in every respect the finest on the southern shore of the gulf, derives additional importance from the coal mines, valuable quarries of building stone, and finely settled country in its neighborhood. It is at the bottom of a bay, which is 1¾ miles wide at its entrance, from Mackenzie Head to Logan Point, and 1½ miles deep. Mackenzie Head will be recognized by its sharp-pointed cliff of clay and sandstone, 40 feet high, with a small white house on the edge, and by its bearing S. 23° W. (south mag.) from Logan Point.

Opposite the town the harbor expands into three large arms, at the heads of which are the East, Middle, and West Rivers. The channels of the last two are seldom used, excepting by boats or very small craft, unless it be to bring down newly built vessels, when they are staked for the purpose. They may be navigated without much difficulty for 2 or 3 miles above their confluence; but higher up they become divided into several narrow channels, often obstructed by oyster beds, and winding through extensive flats of mud and weeds, which render landing difficult at low water.

The shores of the West Arm are well settled all the way to the head of the tide, 5 miles from Pictou, and the post road to Truro and Halifax passes along the northern shore. Several of the hills to the westward of this arm are of considerable height. Rogers Hill, 5 miles from Pictou, is 546 feet, and Dalhousie Mountain, 3 miles farther SW., the highest point of which is 950 feet above the sea at high water. West River, above the tide water, is a considerable stream, although shallow and rapid. It winds its way through a beautiful and well-cultivated valley, containing a large population.

Middle Arm runs in 5½ miles from Pictou to the SSW., at which distance the tide ends, and the river is rapid and fordable at low water.

East Arm is navigable by vessels for 2½ miles from Pictou, to the coal-loading place, or railway terminus from the Albion Mines. Its channel, which joins the harbor directly opposite Pictou, is of the average breadth of 180 yards, and marked out by spruce-bush stakes driven into the mud flats at intervals on either side. Half a mile below the loading place a bar of hard ground with 12 feet at low water crosses the channel; and therefore vessels must not be laden to draw more than 15 feet neap and 18 feet in spring tides. At a short distance above the loading place the channel is so divided and obstructed by old oyster beds that it is difficult to carry the depth of 3 or 4 feet through at low water, and similar obstructions occur several times up to the bridge at New Glasgow, 6½ miles from Pictou.

New Glasgow is a large town on the east side of East Arm, owing its existence to the coal mines which are about 2 miles higher up and to which boats can ascend with the tide. New vessels of considerable burden are built at the town and are taken down the river when light with the assistance of the tide.

Pictou stands on the north shore of the harbor, 2 miles within the lighthouse, on the declivity of a ridge, which rises to the height of 200 feet above the sea, at a short distance in rear of the town. A spur from this ridge forms Battery Point, which shelters the place from the NE. winds. On Town Point has been built the customhouse, a new brick building faced with stone, and having a square tower at its south extreme. The most conspicuous of the new public buildings is the Roman Catholic church, a red-brick edifice with a spire, near the summit of an eminence to the eastward of the town; the convent, a large, square brick house, stands near this church. The academy is a square building of brick, surmounted by a small pinnacle, and on the summit of the hill over the town. The shore margin of the town has been improved by the erection of new wharves.

A little more than ½ mile west of the lighthouse and on the same shore are three coaling wharves, alongside which large steamers are loaded with great dispatch, and farther westward is the railway wharf, at that terminus of the International Railway, known as Pictou Landing.

From this wharf a steam ferryboat plies at alternate hours to and from Pictou.

The United States is represented by a consular agent.

Port Charges.—Entrance fee, from 25 cents to $2.50. Tonnage tax, in, 2 cents per ton; out, 1½ cents per ton. Port dues, 1½ cents per ton. Wharfage, $2 per day. Berthing dues, $4. Shifting rates, $5. Towage, 3 cents a ton; not necessary. Tugs are available and of sufficient size and power. Vessels in distress or in ballast are not relieved from dues; those calling for orders are.

Health dues are 2 cents per ton. Bill of health, $1. There are no quarantine or hospital fees.

Pilotage is compulsory. The rate for vessels in is 2½ cents per ton for vessels of 1,000 tons and upward. For smaller vessels it goes by "lump sum." The rate out is 2 cents per ton for size named above. Rates are the same whether with cargo or in ballast. Detention rates, $3 per day. Pilot rates for moving in port, $4.

Pilots.—The branch pilots of Pictou are, for the most part, able and experienced men, and are always on the lookout for vessels.

Supplies.—Fresh meat plentiful and cheap; water plentiful and good; cost, $5 per 1,000 gallons; put on board by water boat.

Coal may be obtained at the Acadia Company's wharf; the facilities for coaling are such that 150 tons an hour have been put on board colliers. Vessels go alongside head upstream, and secure to spar buoys one on each bow and another on the starboard quarter.

From 1,000 to 2,000 tons can be supplied immediately; heavy-draft vessels unable to cross the bar can be coaled outside by lighters.

The trade in coal has greatly developed, the harbor is generally crowded with shipping, and there are several coaling stations in each of the three rivers.

Cost, trimmed in bunkers, $2.50 per ton.

Quarantine and Hospital.—Pictou is a minor quarantine station and has a hospital for mariners.

Repairs.—A marine railway with two cradles—largest 1,[illegible] tons, smallest 800 tons. Charges, first day, 15 cents per ton; succeeding days, half rates. Divers may be obtained; charges, $3 per day.

Telegraph.—Pictou is in telegraphic communication with [illegible]rts of Canada and the United States. It is connected with Halifax, St. John, and Quebec by the Intercolonial Railway; also with Port Hawkesbury in the Gut of Canso. Passenger steamers run to all parts of the gulf.

Mackenzie Shoal is a rocky bank nearly ¼ mile in diameter, with 16 feet least water, and with 12 or 20 feet between it and the shallow water to the westward. Vessels of large draft should not attempt to pass within or to the southward and westward of it. Caribou and Doctor Points in one, bearing N. 41° W. (N. 18° W. mag.) will lead 200 yards northeastward of the shoal, and the tower of the customhouse in line with the north extreme of the lighthouse embankment bearing S. 69° W. (N. 88° W. mag.) will lead to the northward.

Entrance.—The shallow water extends a long ½ mile northward from Mackenzie Head, and its edge, in 3 fathoms, trends thence westward toward the lighthouse, the whole bay on that side being shoal, with ridges of sand drying out to a considerable distance from the shore at low water. In the bay between Mackenzie Head and the lighthouse, and on the west side of Powell Point, is Boat Harbor, the entrance of an extensive inlet or lake, full of mud and weeds, and which boats can traverse only when the tide is in. On the opposite or northern side reefs extend off Logan Point east and SE., a long ½ mile to the 3-fathom line of soundings.

Cole Point, which is of clay and sandstone cliff 30 feet high, and lies a short mile farther in or south of Logan Point, has also a reef stretching out eastward ⅓ mile, and the shallow water continues from it southwestward to the commencement of Loudon Beach on the north side of the entrance of the harbor.

Pictou Bar and Road.—The distance across the harbor's mouth from the lighthouse, on the sandy pit, to Loudon Beach is about 400 yards, and the greatest depth is 7 fathoms water; but the channel over the bar is much narrower, and has besides a turn in it, which, together with the necessity of knowing exactly the set of the tides, renders a pilot indispensable in a large ship. After passing the bar the depth will increase to 5, 6, and 7 fathoms, sand.

Anchorage.—There is good anchorage, although exposed to NE. winds, in Pictou Road, where the depth is 5 fathoms, clay and mud

bottom. Vessels running or beating up to this road at night will find the soundings in the chart sufficient guidance, when keeping the southern shore aboard with the prevailing SW. winds; and on the opposite side or with northerly winds will have the advantage of the following excellent leading marks: The light on Lighthouse Point can be seen in a clear night from a distance of about 11 miles, and when in one with Cole Point bearing S. 46° W. (S. 69° W. mag.) leads a long ½ mile to the eastward of the reef off the east end of Pictou Island, and also clears the southern extremity of the Pictou Island Bank in 5 fathoms, therefore, if beating, tack in the board to the northward the instant the light begins to disappear behind Cole Point; and if running, keep the light just open to the southward of Cole Point until soundings are struck in the low-water depth at 5 fathoms, on the edge of the bank off Logan Point; then follow the same depth about 1½ miles to the SW., taking care not to bring the light to bear to the northward of S. 69° W. (N. 88° W. mag.), and the vessel will be in safe anchorage in the road, where she may wait for daylight, or a pilot, according to circumstances. Although 19 feet at low water, in ordinary spring tides, can be carried over the bar, yet the aid of an able and experienced pilot would be required to insure that depth.

Lights—South Entrance Point.—The lighthouse, standing close to the water at the extremity of the spit forming the south side of the entrance to Pictou Harbor, is an octagonal building, 56 feet high, painted vertically with red and white stripes, and exhibits at an elevation of 65 feet a fixed white light, which should be visible 11 miles. A small fixed red light is shown 25 feet below the white light, to clear the reefs off Pictou Island.

Customhouse.—From the highest window in the tower of the customhouse is exhibited, at an elevation of 60 feet, a fixed white (gas) light, which should be visible 8 miles. The masts of vessels moored in Pictou Harbor occasionally obscure this light from seaward.

These lights in line bearing S. 69° W (N. 88° W. mag.) lead through the channel seaward of the bar.

Fraser Farm.—Two leading lights are established on the north side of the entrance to Pictou Harbor, which are exhibited throughout the season of navigation, and during the winter whenever steamers are running into the harbor.

The lights are fixed red lights, visible through a small arc on each side of their line of direction from a distance of 8 miles.

The towers are square buildings, surmounted by square lanterns, the whole painted white. The rear light is 384 feet N. 83° W. (N. 60° W. mag.) from the front light, and the range shows the direction of the channel between the sand spit off Pictou Bar on the south and Murdoch Shoal on the north.

Buoys.—A black buoy, marked 1, is moored in 14½ feet at low water near the north extreme of the bank eastward of the lighthouse on Lighthouse Point.

ht will find
g the south-
he opposite
ne following
n be seen in
in one with
½ mile to the
so clears the
, therefore, if
light begins
ght just open
t in the low-
ogan Point;
ing care not
. (N. 88° W.
l, where she
s. Although
ried over the
e required to

ding close to
h side of the
high, painted
levation of 65
es. A small
clear the reefs

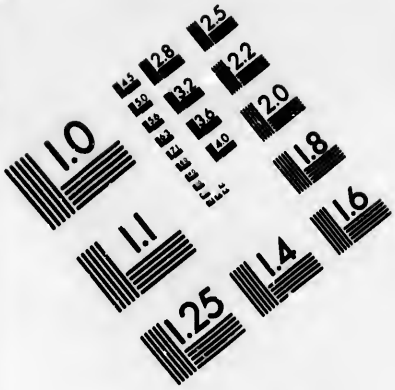
er of the cus-
d white (gas)
sels moored in
ard.
) lead through

the north side
hroughout the
steamers are

ll arc on each

e lanterns, the
W. (N. 60° W.
irection of the
n and Murdoch

et at low water
lighthouse on



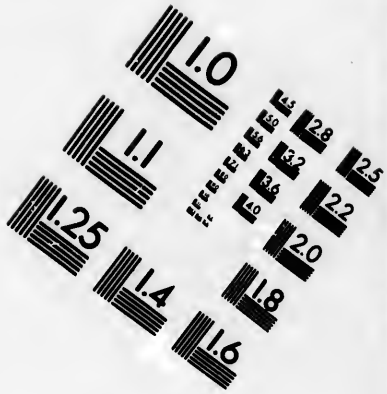
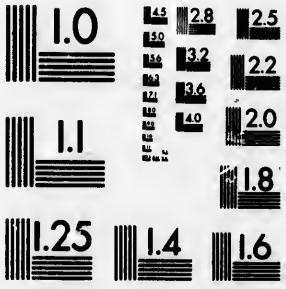
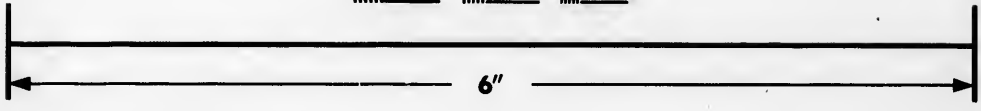
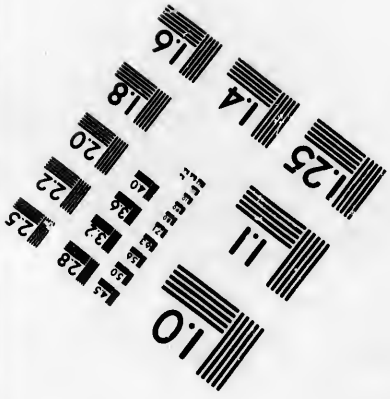
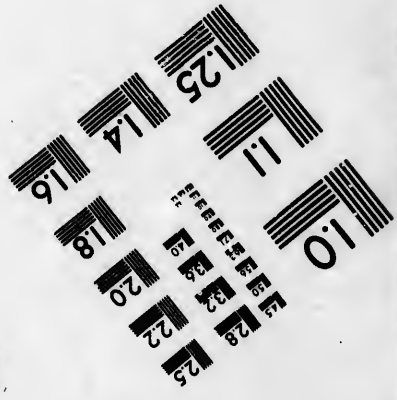


IMAGE EVALUATION TEST TARGET (MT-3)









Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

A red spar buoy in 12 feet water lies N. 73° W. (N. 50° W. mag.) 1⅛ miles from Mackenzie Head. During the strength of the ebb this buoy almost disappears, and is difficult to see.

A red buoy, marked 1, in 13 feet water, lies N. 84° E. (S. 73° E. mag.) from Cole Point, ¼ mile from the high-water line.

A red buoy, marked *Macdonald Reef*, lies in 23 feet water S. 76° E. (S. 53° E. mag.) 930 yards from Logan Point.

A red buoy, marked *Skinner Reef*, lies in 4 fathoms N. 50° E. (N. 73° E. mag.) 1,660 yards from Doctor Point.

A black can buoy is placed on the east side of entrance to East River on the edge of the bank.

A black can buoy marks the point of the spit at the junction of West and Middle Rivers.

A red spar buoy is placed on the edge of the bank SW. of Town Point, to mark the port side of entrance to a channel 50 feet wide with 14 feet least water.

The direction of this channel is N. 63° W. (N. 40° W. mag.) for about 1,200 feet, to a pier built out 400 feet from the shore.

These buoys are laid down in the spring and removed in the autumn of each year.

Ice.—The harbor is usually frozen over about December 26, and clear of ice about April 18, being completely closed between about January 9 and April 3. The first vessel arrives about April 20 and the last leaves about December 21. A small quantity of field ice occasionally drifts in after the harbor has opened.

Directions.—A pilot would be indispensable in a vessel of large draft with beating winds, and even smaller vessels must know the tides and the place well to beat in or out with safety.

To enter Pictou Harbor, having a fair wind and being farther out than Mackenzie Shoal, keep Pictou Bar and the customhouse lights in line bearing S. 69° W. (N. 88° W. mag.) until Frazer Farm lights are brought in line bearing N. 83° W. (N. 60° W. mag.), which should then be steered for until Pictou Bar light is nearly abeam, whence a S. 62° W. (S. 85° W. mag.) course will lead to the anchorage off Pictou.

From the lighthouse to the usual anchorage, in 6 or 7 fathoms, mud bottom, off the easternmost wharves at Pictou, the channel of the harbor is direct, nearly ⅛ mile wide, deep enough for the largest ships, and clear of danger. The chart will therefore afford all further information that may be necessary, for the vessel will be in safety, and may anchor as convenient within Lighthouse Point.

Tides.—It is high water, full and change, at the entrance of Pictou Harbor at 10h.; springs rise 6 feet, neaps 4 feet. With a good tide it is possible to carry 25 feet over the bar, and 23 feet may generally be reckoned upon. The harbor, therefore, is capable of admitting vessels of large draft, but it must be remembered that the best of the two tides is always spoken of in the 24 hours, for the diurnal inequality in the rise of the tides, which occurs more or less in all parts of North-

umberland Strait, is very strongly marked in this harbor. It may also be added that in the month of August, when these observations were made, the a. m. tides were always the highest, following the inferior transit of the moon with north declination in the first part of the lunation and the superior transit with south declination in the latter part.

It is high water, full and change, at New Glasgow Bridge at 12h.; springs rise 6 feet, neaps 3½ feet.

Pictou Island, 4¼ miles long ENE. and WNW. and 1¼ miles wide, is of clay and sandstone, rising in the central parts to the extreme height of 150 feet above the sea. It is wooded on the northern side, but there are settlements and farms along its southern shore. Low cliffs form its outline, with the exception of several small bays and Roger Point, on the south side, which is of sand, and affords the best landing for boats.

West Point may be passed in 3 fathoms water within ½ mile; but on either side of the west end of the island there are rocks, nearly dry at low water, just within the 3-fathom line and extending to the distance of 600 yards off shore. The shallow water runs occasionally to the same distance off the north shore of the island, which should not be approached nearer than the depth of 8 or 9 fathoms in the nighttime. The southern shore may be approached to 5 fathoms; but at East Point a dangerous reef, in great part dry at low water, runs out ½ mile to 3 fathoms, and nearly a mile to the 5-fathom line. There are 9 fathoms not far off this reef both to the northward and eastward. It should therefore be approached with caution at all times, but especially at night and with a flood tide.

Reported Shoal.—In most of the old charts a shoal is laid down about 4 miles eastward of Pictou Island, but no indications of its existence were discovered during the survey of 1843.

Light.—The lighthouse, on the SE. point of Pictou Island, is a square tower, 32 feet high, painted white, and exhibits at an elevation of 52 feet a fixed white light, which should be visible 12 miles.

Caution.—When standing to eastward through Northumberland Strait, remember that Pictou Island light does not open out until it bears S. 16° W. (S. 39° W. mag.); also the light on Cape St. George is not seen to the eastward of S. 68° E. (S. 45° E. mag.)

Lifeboat.—A lifeboat is stationed near the lighthouse on Pictou Island.

Pictou Island Bank extends from Pictou Island to the west and south 3¼ miles. It is of irregular outline, of great extent, and of sandstone thinly covered with sand, gravel, mud, and broken shell. The depths are as irregular as the nature of the bottom, being from 2¾ to 6 fathoms, excepting on the Middle Shoals.

The Middle Shoals are a chain of rocky patches, with 11 feet least water, stretching across the northern part of the bank 1¼ miles in a southwesterly direction, so as to approach within ½ mile of the Caribou

Channel, on the one hand, and within 1¼ miles of the west point of Pictou Island on the other. There is but little doubt that at least 3¼ fathoms at low water can be carried through between these shoals and Pictou Island, although the irregular soundings forbid absolute certainty. Roger Point and West Point (Pictou Island), bearing east (S. 67° E. mag.), will lead close to the northward of them in 4 fathoms, but large ships had better not approach them on that side nearer than 7 fathoms.

Buoy.—A red buoy is moored near the 11-foot patch on the Middle Shoal.

Caribou Harbor, between Doctor and Caribou Islands and the mainland, is an extensive place, being 6 miles long from the southern entrance to the West Gully, and in some parts a mile wide. The whole of this large space is occupied by shallow water, excepting the narrow channel of the harbor, which is deep enough for vessels of far larger draft than can pass the bar, but does not run through, being lost in mud flats at the distance of 3½ miles from the southern entrance. The West Gully is dry at low water; about a mile within it Caribou River enters the harbor, and is navigable for boats to the distance of 2 or 3 miles. There are settlements and farms along the southern shore of the harbor, also upon the inner side of the islands, and a road from the former to Pictou.

The vessel entrance to this harbor between Widow Point and Doctor Spit is only 120 yards wide, and the navigable breadth is reduced by the shallow water off Widow Point to 80 yards. The depth is here 5 fathoms, but an abrupt turn and a tide of 4 knots render so narrow a channel extremely difficult. Outside the entrance the channel between the shoals becomes wider, and the depth diminishes gradually out to the bar at the distance of a mile, and over which only 9 feet can be carried at low water. The great superiority of the neighboring harbor of Pictou renders it in the highest degree unlikely that this harbor will ever be much frequented by shipping; and its bar and entrance are too difficult and dangerous to be attempted without some special object, and then a pilot should be employed. Widow Point, the south or mainland point of entrance of the harbor, is of sand and shingle, and Oak Tree Point, a steep clay bank, with a house and barn upon it, is the first point of the mainland within the entrance, from which it is distant ½ mile.

Light.—The lighthouse on the NE. part of Caribou or Gull Island is square, 26 feet high, painted white, and exhibits at an elevation of 35 feet a revolving white light every minute, which should be visible 10 miles.

Directions.—To enter Caribou Harbor—having a fair wind, and being in not less than 5 fathoms water—bring the high-water extremes of Widow and Oak Tree Points in one bearing N. 89° W. (N. 66° W. mag.), and run toward them till the vessel has passed the bar in the low-water

depth of 9 feet and has deepened to 13 or 14 feet; then lookout when Caribou and Doctor Points come in one, bearing N. 36° W. (N. 13° W. mag.), when sheer immediately to the northward sufficiently to bring Oak Tree Point and Doctor Spit in one, bearing S. 85° W. (N. 72° W mag.). Keep the last-named marks accurately in one, or closely touching, until the vessel is not more than 60 yards from the end of the spit, when sheer to the SW. so as to pass its south extreme at the same distance into the harbor. The channel for the first ½ mile in from the entrance is not more than 180 yards wide, the tide is stronger there, and the bottom not quite so good as farther in, where the channel expands to 260 yards in width, with a depth of from 4 to 7 fathoms over mud bottom.

Tides.—It is high water, full and change, in Caribou Harbor at 10 h., the diurnal inequality causing at times a difference of nearly 2 hours in the two tides of the same day, and also 2 feet in the height of the water. The rise of the highest of the two ordinary spring tides of the same day is 6 feet, and of neap tides 4 feet; there are, therefore, 15 feet over the bar at high-water ordinary springs.

Caribou Channel, between the Caribou Reef and the Pictou Island Bank, has sufficient depth for vessels of large draft, and in breadth, at the narrowest part, exceeds ½ or ⅓ mile, according as it is conceived to be bounded on either side by the 3-fathom or the 5-fathom line; but it is nevertheless difficult, because so crooked that no marks can lead through its whole extent.

The safest mode of running through this channel to the westward is to strike soundings in 6 or 7 fathoms on the edge of the shoal water off Doctor Island, and follow it to the NW. until McKenzie Head is just shut in behind Logan Point, bearing S. 17° E. (S. 6° W. mag.); then steer from those marks, keeping the head just shut in, and they will lead across the deep water, and afterwards along the western edge of the Pictou Island Bank out to sea. If the wind were strong from the SW. with an ebb tide, it would be preferable to keep on the weather side of the channel, in which case the edge of the shoal water off Doctor Island should be followed farther to the NW., until Logan Point is only a little open to the eastward of Doctor Point, bearing S. 23° E. (south mag.). Those points in one lead along the east side of Caribou Reef in 4 fathoms water. Keep Logan Point a little open, and it will lead clear out to sea in not less than 4½ fathoms.

The same marks and directions taken in the reverse order will enable a vessel to take this channel from the northward or westward, it being only necessary to add that she should not haul to the eastward until the Hawksbill is well shut in behind Caribou Point, nor open out the former again, after having shut it in, until the lighthouse at Pictou is open to the southward of Cole Point, the lighthouse and Cole Point in line, bearing S. 44° W. (S. 67° W. mag.), being the mark for clearing the south extreme of the Pictou Island Bank in 5 fathoms.

Allow for a strong set over Pictou Bank, according to the tide.

The light on Caribou Island is a very brilliant one, and from an elevation of 25 feet has been seen 10 or 20 miles.

Doctor Island, at the entrance to Caribou Harbor, forms two entrances into the harbor, of which the northern, between two sandy spits, is 800 yards wide, but has only 4 feet in it at low water.

Doctor Reef, very dangerous, extends from Doctor Point eastward 1¼ miles, to the depth of 3 fathoms, and shows rocks dry at low water to the distance of ½ mile. Southward of this reef, and ⅜ mile SE. by E. ½ E. from Doctor Point, lie the Seal Rocks, dry at low water, and from which the shallow water, forming the bar of Caribou Harbor, extends to Logan Point, the north point of Pictou Bay.

Buoy.—Skinner Reef buoy is red, and is moored in 4 fathoms N. 50° E. (N. 73° E. mag.) 1,660 yards from Doctor Point.

Caribou Reef.—Caribou Reef, of large stones, which dry out to the distance of 600 yards from the shore, is also very dangerous, the deep water approaching nearly close to its north point and eastern side. It stretches out from Caribou Point northward ½ mile to the 3-fathom and ⅜ mile to the 5-fathom line of soundings.

The Coast.—From the Caribou Point to West Gully the coast is formed by the northern shore of Caribou Island, appearing from a distance like several islands; but on a nearer approach the wooded parts are found to be joined together by sand bars. From West Gully of Caribou to Cape John it is nearly straight, unbroken, and free from danger, the shoal water nowhere extending beyond ⅛ mile off shore. Cliffs of clay and sandstone, not exceeding the height of 50 feet, and in general much lower, form the predominating feature; but there is, nevertheless, good landing for boats almost everywhere in fine weather.

Amet Sound is very extensive, affording excellent anchorage for any number and class of vessels. Cape John and Mullegash Point, its eastern and western points of entrance, are more than 4 miles apart, but there are detached dangers outside, or off the entrance, which require to be described before directions can be given for entering by either of the three channels which they form.

Amet Isle is very small, and is divided into two parts, of which the western is the larger, presenting clay cliffs on every side, excepting where they are joined together by a sandy neck. It is flat at top, bare of trees, covered with a coarse grass, and about 20 feet above the sea at high water.

This islet was formerly much larger than at present, and the cliffs still continue to be undermined by every heavy gale and high tide; the frosts also aid in the work of destruction, so that the time can not be very distant when there will only remain a reef of the highly inclined sandstone which at present forms the base of the islet, and dries out about 400 yards, excepting on the southern side, where boats can generally land at all times of tide (1860). Shallow water extends

off the islet 600 yards westward, and will be cleared in not less than 3¼ fathoms if St. John's church steeple, at the John River, be kept in line with Reef Point S. 50° E. (S. 28° E. mag.); but vessels of large draft should stand in only to 6 fathoms, remembering that in every other direction shallow water extends from the island to far greater distances.

Amet Shoals are rocky, with very irregular soundings, and are much more extensive and dangerous than have been hitherto represented. They extend nearly 4 miles from the islet to the eastward, and also 2 miles to the SE. toward Cape John. In both directions there are rocky patches, with no more than 5 or 6 feet of water, a long mile out from the islet; at a greater distance than 2 miles there are not less than 16 feet; but there is East Patch, with that depth, fully 3 miles to the eastward of the islet. The marks for East Patch are the north extreme of Amet Islet and Treen Bluff in line and Cape John S. 19° W. (S. 41° W. mag.).

Conn House and Cape John bearing S. 25° W. (S. 47° W. mag.), lead about a ¼ mile SE. of it in 4 fathoms of water; but to clear the extreme east end of the shoal in a greater depth, Cape John must bear to the westward of S. 33° W. (S. 55° W. mag.). The northern side of these shoals is very steep, and should not be approached in a large vessel, especially at night, to a less depth than 10 fathoms. Treen Bluff and Saddle Island touching, and bearing S. 84° W. (N. 74° W. mag.), lead along the southern side in 2¾ fathoms.

Light.—The lighthouse on the center of Amet Isle, a square building, painted white, exhibits, at an elevation of 44 feet, a fixed white light, which should be visible 10 miles.

Waugh Shoal, which from its position and steepness is extremely dangerous, is a rocky bank nearly 1¼ miles long and ½ mile broad, with irregular soundings from 3½ to 5 fathoms, excepting toward its northern end, where there is a patch of considerable extent with from 2 to 2¾ fathoms, 12 feet being the least water, unless it may be in unusually low tides. In this shallowest part the shoal is very steep, and should not be approached from the northward nearer than the depth of 7 fathoms; but in all other parts vessels may approach to 5 fathoms at low water. There are no clearing marks for the western side of this shoal, the lead is the only guide. The NE. side is just cleared in 5 and 6 fathoms, either by the eastern extremes of Amet Isle and Cape John in line or by the English church steeple, at the John River in line with Reef Point, bearing S. 49° E. (S. 27° E. mag.). The SE. side is cleared in 4 fathoms, by the eastern extremes of Mullegash and Chamber Points in one bearing S. 16° W. (S. 38° W. mag.). All these objects will easily be made out excepting Chamber Point, which, being very low, is at times difficult to distinguish from the high land behind it.

Eastern Passage into the sound, between the Amet Shoals and Cape

John, is ⅝ mile wide, between the 3-fathom lines, with irregular soundings from 3½ to 6 fathoms, and with rock, red sand, broken shell, and mud bottom.

It is difficult to carry more than 4 fathoms through at low water. To safely take this passage from the eastward with a fair wind, bring Cape John to bear to the westward of S. 33° W. (S. 55° W. mag.), or bring that cape and Brulé Point to touch, bearing S. 39° W. (S. 61° W. mag.), and steer for them till Treen Bluff opens to the southward of Saddle Island, when alter course to S. 62° W. (S. 84° W. mag.), which is for the mouth of Tatamagouche Bay, and the vessel will sail nearly through the middle of the passage. There will be no danger from the Amet Shoals, if Treen Bluff be kept open to the southward of Saddle Island, nor yet from the shallow water off Cape John if it be not approached nearer than the depth of 4 fathoms.

Middle Passage.—The Middle Passage into Amet Sound, between the Waugh Shoal and Amet Isle, is a long mile wide from the depth of 5 fathoms to 5 fathoms on either side, clear of all danger, and carries 6 to 10 fathoms water, with sand and mud bottom. An excellent leading mark for running through this passage with a fair wind is Conn House and Brulé Point in line, bearing S. 9° E. (S. 13° W. mag.) (1860).

Western Passage, between Saddle Island and Reef and Waugh Shoal, is a mile wide, with irregular soundings from 5 to 8½ fathoms, the lesser depth being to the southward of Waugh Shoal, where the bottom is rocky and uneven, whilst farther westward it is of mud.

If bound to Brulé Harbor, after rounding Saddle Reef, steer for Brulé Point, or a little to the east of it, until the mark for clearing the NE. side of the Brulé Shoals, namely, the English church steeple, at the John River, a little open to the northward of Long Point, comes on S. 70° E. (S. 48° E. mag.), then alter course, and run toward those marks till Brulé Point bears S. 36° W. (S. 58° W. mag.), when haul in to the southward, and run by the lead along the SE. side of the Brulé Shoals in from 3¼ to 3½ fathoms, until the anchorage is reached. A pilot, or a previous buoying of the channel, would be necessary to take the vessel into the harbor.

If bound to the anchorage off the bar of the John River, it is only necessary to run up the middle of John Bay till the water shoals to 3½ fathoms, which is as near as a large ship should go, although distant 1½ miles from the river's mouth.

Tides.—It is high water, full and change, in Amet Sound at 10h.; springs rise 8 feet, neaps 5 feet. The tidal streams are very weak within the sound, setting regularly up the bays and rivers. In the Western Passage both tides in general set fairly through, the flood about west and the ebb about east, at rates never exceeding 1½ knots, and usually much less. In Middle Passage the ebb sets out to the northward and eastward less than a knot and the flood to the westward, at the same rate, over Waugh Shoal. In the Eastern Passage

the ebb sets out to the NE. and the flood in the opposite direction, the rates varying from ½ to 1½ knots.

John Bay runs in nearly 4 miles to the SE. from Cape John to Murphy Point, which is the sandy east point of entrance of the river. The bay is free from detached dangers, but the shoals extending out from its shores are often very steep, and should not be approached nearer than the low-water depth of 3½ fathoms, nor without due caution. Sandy shoals occupy the head of the bay, drying out nearly ½ mile, and extending 1¼ miles from the entrance of the river to the 3-fathom line.

Cape John, the northern point of John Bay, will be easily recognized by its sharp-pointed cliffs of sandstone, 40 or 50 feet high, and by two high rocks, always above water, on the inner part of the reef, which extends from it 800 yards to the NW. This reef is very steep, especially at its western point, where there are nearly 6 fathoms at low water quite close to it, being a greater depth than occurs anywhere else near by. Off the northern side of the cape shallow water extends nearly ½ mile, and as there are only 15 or 16 feet close within the 3-fathom mark, large vessels should not approach nearer than the low-water depth of 4 or 3½ fathoms.

John River has only one foot at low water over its bar of sand, and an irregular depth, from 3 to 11 feet, in a very narrow channel up to the bridge, a distance of nearly a mile. Several ships are built here annually, and notwithstanding the shallow bar, are taken out light and moored outside to take in cargoes of lumber which are brought down the river. The vessels lie off the entrance in from 2½ to 3½ fathoms, over mud bottom; and although the bay is completely open to the NW., are considered safe in the summer months.

There are extensive and flourishing settlements on either side of this river. The English church will be known by its spire, about ¼ mile to the eastward of the bridge, and the chapel by its cupola, on the opposite or western bank, ⅓ mile from the bridge toward the river's mouth.

Brulé Peninsula.—Brulé Peninsula is wooded, rather low, and united to the mainland at its SW. end by a low and marshy isthmus. Peninsula Point, its NW. extreme, has a reef extending from it 800 yards to the NW., in great part dry at low water, and so bold that there is little warning by the lead. Brulé Point is 1½ miles farther to the eastward, the intermediate northern shore of the Peninsula being nearly straight, and of clay cliffs 8 or 10 feet high, the whole appearing to a vessel in the offing like a low island in the center of Amet Sound.

Brulé Shoals, extending 1½ miles to the north from Brulé Point, are rocky, with irregular soundings, and there is only 9 feet water not far from their outer edge. The north and NW. sides of these shoals should be approached very cautiously, for they are there extremely steep, having 4 or 5 fathoms close to the edge, and no good clearing mark. The English church steeple, at the John River, just open to the northward

of Long Point, bearing S. 70° E. (S. 48° E. mag.), leads along their NE. side in 3 fathoms; their east and SE. sides may safely be approached by the lead to 3½ fathoms.

Brulé Harbor runs in within Brulé Peninsula, 2¼ miles, in a SW. direction, and is nearly a mile wide, but the far greater part of this large space is occupied by flats of mud and weeds. There are 14 feet on the bar at low water, and 19 feet for a short distance within, but the channel soon becomes very narrow and divided into several branches.

Anchorage.—The anchorage outside the bar, in 3¼ fathoms, mud bottom, is the best sheltered of any in the sound, and a ship or two usually lie there to take in lumber every year. In the best berth Brulé Point will bear N. 60° W. (N. 38° W. mag.), with the eastern end of Saddle Island showing open one point to the right of it and Cape John N. 25° E. (N. 47° E. mag.).

Barachois Harbor. Between Peninsula and Chamber Points, is the entrance to a small harbor called the Barachois, which runs in, within Chamber Point, SW. 1½ miles, and is then contracted to a very narrow channel, turning to the SE. into a shallow lake one mile long, with steep banks and an island at its head. This place, which is seldom visited by shipping, has 12 feet over its bar and 14 feet within at low water.

Tatamagouche Bay, 2¼ miles wide at entrance, between Mullegash Point and Brulé Peninsula, runs in 7 miles to the southwestward, affording everywhere good anchorage over a bottom of soft mud, but with insufficient depth of water for large ships far up the bay. From 5 fathoms at entrance the depth decreases to 3 fathoms at the distance of 1½ 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 boat channels leading to the Basin and to Millbrook. The only detached danger in the bay is a rock with 7 feet least water, lying 700 yards off the northern shore and 2 miles in from Mullegash Point; Amet Isle and Mullegash Point touching, and bearing N. 47° E. (N. 69° E. mag.), will lead to the southeastward of it. A stranger may safely approach to the low-water depth of 3 fathoms in the outer part of the bay, and to 2½ fathoms farther in; but in entering should keep well over to the northward to avoid the Brulé Shoals.

Anchorage.—In 4 fathoms, good holding ground (mud), with Cape John N. 65° E. (N. 87° E. mag.), Amet Island N. 31° E. (N. 53° E. mag.), and Mullegash Point N. 47° W. (N. 25° W. mag.)

Tides.—It is high water, full and change, at Tatamagouche Bay at 10h.; springs rise 8 feet, neaps 5 feet.

Tatamagouche River, in the SW. corner of Tatamagouche Bay, and 5 miles from its entrance, is approached by a very narrow channel through the flats, obstructed by oyster beds, and only one foot deep at low water in ordinary spring tides; nevertheless, new ships of considerable burden are brought down it occasionally. The principal settle-

ment in the bay, containing a ship-building establishment and a chapel, stands on the western bank, and there is a bridge 2 miles from the entrance of the river.

Several vessels visit this river for lumber every year; they anchor off it where there are only 11 or 12 feet at low water, and as the tide falls are suffered to ground on the soft mud without injury.

Mullegash Point, the north point of Tatamagouche Bay, is one mile to the southeastward of Saddle Island; shallow water extends from the one to the other, and off the point to the distance of a long ½ mile.

Saddle Island is low, wooded, and joined to the shore by shoals at low water.

Saddle Reef runs out from the east point of the island one mile to the depth of 3 fathoms, and is very dangerous, having on it a round-backed rock called the Washball, dry at low water, and distant ⅓ mile from the island. There are only a few feet of water much farther out. In approaching this reef from the northward, the soundings give little warning, but an excellent leading mark, namely, Treen Bluff, just open to the northward of Saddle Island, and bearing S. 75° W. (N. 83° W. mag.), just clears it in 4 fathoms. The lead affords the only guide for clearing it to the eastward, where it may be safely approached to the depth of 6 fathoms with care.

Wallace Harbor is the finest on this coast, excepting Pictou, having 15 feet over its bar at low water in ordinary spring tides, which rise 8 feet, so that it is capable of admitting vessels of large draft. Its entrance, 2½ miles SSW. of Oak Island, and between two sandy spits, named Caulfield and Palmer Points, is nearly 400 yards wide and carries 6½ fathoms water; but the approach to this entrance, over the bar and through the bay for a distance of 3 miles, is by a crooked channel, which, although nowhere less than 300 yards wide, is difficult without the aid of buoys or sufficient leading marks. The services of the pilots of the place will, therefore, always be necessary to insure safety.

Wallace stands on the southern shore, 1½ miles within the entrance of the harbor. The land rises gradually in the rear to the summit of a ridge extending to the eastward, and attaining the elevation of 400 feet. Opposite Wallace the river is more than ½ mile broad, whilst the channel between the flats is only 60 or 70 yards wide, and with 5 or 6 fathoms water. At the distance of 2 miles higher up the river is divided into two branches, both of which are rendered narrow and intricate by oyster beds in the channel.

Wallace, under the name of Ramsheg, was formerly visited annually by many more vessels than at present, the supply of lumber being then much greater; at present only a few cargoes are embarked and two or three vessels built there every year. There are no fisheries of commercial consequence; the salmon and gaspereux, or alewives, still visit the river, but in diminished numbers, and a few codfish are caught off Oak Island and the neighboring coast in the months of May and June.

There is difficulty in obtaining a large supply of fresh water at Wallace, also at Pugwash; it is obtained from wells and springs, which boats can only approach at high water.

The United States is represented by a consular agent.

Ship Channel.—Oak Island Bar is of sand, and extends from Oak Island nearly 2¼ miles to the southward toward Gravois Point, which may be recognized by its being the highest part of the clay and sandstone cliffs, and by its bearing and distance from the east end of Oak Island, namely, S. 22° E. (south mag.) 3 miles. Within or to the westward of the bar the whole bay is shallow, excepting the Ship or Wallace Channel leading to Wallace Harbor. The outer or eastern side of this bar may be safely approached by the lead to the depth of 4 fathoms.

Ship Channel is fully 600 yards wide at its entrance, between the south point of the bar and the shoal which stretches out 800 yards from Gravois Point, and 3½ fathoms in it at low water. From the entrance the channel runs to the northward and westward, curving round Horton Shoal, and between it and the shallow water to the northward, which is continuous from the bar to Mullin Point.

Horton Shoal, of sand, stretches out ½ mile to the eastward from Horton and Cantwell Points, and its northern part, drying out to the distance of 800 yards from the Horton Spit, can therefore generally be seen.

Horton Spit, of low sand, inclosing a marsh, extending to the northward from Horton Point, and distant 2¾ miles northwestward of Gravois Point, will easily be recognized by a vessel entering the Ship Channel. The northern end of this spit is quite bold, the channel passing close to it, and thence ¾ mile W. by S. of the entrance of the harbor.

Buoys.—On entering Wallace Harbor, if any buoys are placed, the black buoys must be left on the port and red buoys on the starboard hand.

Lights.—On Mullin Point stands a square white building, 25 feet high, exhibiting at 39 feet above high water a fixed white light, which should be visible 11 miles.

The inner leading light is fixed red, 82 feet above high water and visible 8 miles, over a small arc on each side of the leading mark. The lighthouse, a square tower 48 feet high rising through a dwelling, is painted white, and stands 1,473 feet N. 76° W. (N. 52° W. mag.) from the outer light.

The two lights in line lead over the bar in 9 feet water and up to the entrance of the harbor.

Directions.—Approaching from the northward pass Oak Island at a distance of fully ¾ mile, or in 5 fathoms water, to avoid the reef off its east point. Approaching from the eastward, Treen Bluff (the cliffy point 2½ miles to the eastward of Gravois Point) must be passed at an equal distance or depth to avoid the Treen Reef, which is sandstone,

and stretches out ½ mile from the bluff to the 3-fathom line of soundings; the north extremes of Saddle Island and Cape John in one, bearing S. 87° E. (S. 65° E. mag.), lead to the northward of it in 4 fathoms. In either case, approach the shore about ½ mile to the eastward of Gravois Point, taking care not to bring the east end of Oak Island to bear less to the westward than N. 34° W. (N. 12° W. mag.) until the south side of Saddle Island is only one degree open to the northward of Treen Bluff, bearing N. 82° E. (S. 76° E. mag.).

Steer now S. 82° W. (N. 76° W. mag.), taking all possible care to keep the island as nearly as possible one degree open,* but remembering that the lead must be principally depended upon to guide the vessel along the edge of the shallow water off the mainland, in 3¼ or 3 fathoms at low water, or a corresponding depth at other times of tide, until Smith Point (the eastern extreme of the mainland outside or to the northward of Oak Island) appears through the middle of the opening in the trees of Oak Island and over the low and narrow neck which joins the south-western part to the rest of the island, and bearing N. 31° W. (N. 9° W. mag.). Then alter course to N. 56° W. (N. 34° W. mag.), and a run of ½ mile will place the vessel within, or to the westward of the south point of the bar, in about 15 feet at low water.

Let the course be now immediately changed to N. 22° W. (north mag.) for another ½ mile, and when Palmer Point opens out to the northward of the Horton Spit, bearing west (N. 68° W. mag.), steer N. 70° W. (N. 48° W. mag.), and the water will soon deepen to 4 and 5 fathoms with mud bottom, affording tolerably safe anchorage under shelter of the bar, on which the sea breaks in heavy weather. But if it be wished to proceed to the harbor, let the N. 70° W. (N. 48° W. mag.) course be continued for ½ mile, and Caulfield Point will open out to the northward of the Horton Spit; and, immediately afterwards, Smith Point will open out to the westward of the west extreme of the trees on Oak Island, when the vessel must be kept gradually away to the westward, and toward Palmer Point, so as to run along the northern edge of Horton Shoal, which can generally be seen until off the Horton Spit at the distance of 200 yards, whence the course is S. 79° W. (N. 79° W. mag.) for ¾ mile to the harbor's mouth.

In entering the harbor keep two-thirds of the way over toward the northern or Palmer Point, which is quite bold, to avoid the shoal water extending 100 yards from Caulfield Point.

Anchorage.—Anchor about 500 yards within the entrance, where the channel is 300 yards wide and carries from 3 to 6 fathoms, with mud bottom. On either side, flats of stiff red clay, dry at low water, extend to the shore and render the landing difficult. At 1,200 yards within

*This mark is given as only better than none, for it is not easy to keep the island so nearly one degree open as is required. If the island and bluff be brought to touch, the vessel will be ashore on Gravois Reef, and if they be opened to the extent of 2 degrees only, she will be on the south point of the bar.

the entrance, a middle ground commences and diminishes the breadth of the channel to 100 yards. Nearly abreast the eastern end of this middle ground there is a narrow channel through the flats and up Lazy Bay, which runs in more than a mile to the SE., and has, on the southern shore near its head, cliffs of gypsum 30 feet high.

Tides.—It is high water, full and change, in Wallace Harbor at 10h. 30m.; springs rise 8 feet, neaps 5 feet. The rate of the tidal streams is greatest in the entrance of the harbor, and there it does not exceed 1½ knots during the summer months; whilst outside, in the Ship Channel, it is usually from 1¼ to one knot. The ebb, however, may be somewhat stronger in spring after the melting of the winter snows.

Oak Island is low, wooded, and about a mile long, having Jerry Island, small and wooded, a long ½ mile to the westward of it, and on the north side of Fox Harbor, just within Mackenzie Point.

Fox Harbor.—Within or southward of Oak Island a bay runs in to the westward about 2 miles, to Mullin Point, which separates Wallace Harbor from Fox Harbor. Fox Harbor runs in 3 or 4 miles to the NW., with a channel through flats of tenacious red clay and weeds, which are nearly dry at low water. There are 3 or 4 fathoms water in this channel; but a depth of 8 or 9 feet is all that can be carried over the bar at low water in ordinary spring tides.

The Coast.—Mackenzie Point is separated from Oak Island by sand bars and a gully for boats, nearly dry when the tide is out. From Mackenzie Point to Pugwash Point the coast is unbroken, and for the most part composed of clay and sandstone cliffs, of the height of 50 feet, from which the land rises to the summit of a ridge 150 feet high.

Pugwash Reef extends ¾ mile northwestward from Pugwash Point, and dries out about half that distance. There are rocky patches, with 11 and 12 feet water, ¾ mile off the point to the northward, and others farther to the eastward, a full mile out from the shore; moreover, there is uneven rocky ground, with a less depth than 4 fathoms, 2 miles offshore, which renders it unsafe for a stranger in a vessel of large draft to go within the depth of 5 fathoms.

Light.—The lighthouse on Fishing Point, a square building, 44 feet high, and painted white, exhibits at an elevation of 48 feet a fixed light, showing red seaward and white toward the harbor. It should be visible 8 miles.

Pugwash Road, in the entrance of Pugwash Bay, affords excellent anchorage, in from 16 to 19 feet at low water, with sand and clay bottom, being sheltered by Phillip Bar and Lewis Reef from westerly and by Pugwash Reef from easterly winds. This anchorage is exposed between NNW. and NNE., but the shallow water outside prevents any sea from coming in sufficient to endanger a vessel during the summer months.

Directions.—To run for Pugwash Road from the northward, the vessel being in not less than 5 fathoms water, bring the English church

steeple at Pugwash so as to be seen over and just within the west extreme of the low cliff of Fishing Point (the east point of the bay), bearing S. 35° E. (S. 13° E. mag.).

Run toward those marks, taking care not to open out the church in the least to the westward of the point until Bergeman Point (the south point of entrance of the Phillip River) bears S. 34° W. (S. 56° W. mag.), or until the depth decreases to 3½ fathoms at low water. The vessel will then be close off the NW. end of Pugwash Reef, and must steer south (S. 22° W. mag.) for ¾ mile, when she will be in from 16 to 19 feet at low water, with clay bottom.

Anchorage.—Directly in the line joining Bergeman and Pugwash Points, and with Fishing Point N. 85° E. (S. 73° E. mag.), distant nearly ½ mile. This is the best anchorage; but vessels may lie ½ mile farther in to the southward, or close off the bar, in 14 feet at low water. Still farther in, the bay is all shoal, excepting the narrow channel, which curves round its eastern side and leads to the harbor.

To run for Pugwash Road from the eastward, the vessel being in more than the low-water depth of 5 fathoms, bring Bergeman Point to bear S. 34° W. (S. 56° W. mag.), and steer for it until the church opens out to the westward of Fishing Point, when immediately alter course to the south (S. 22° W. mag.), and having run nearly ¾ mile, anchor in the same berth as before directed.

Pugwash Harbor, at the head of the bay and entrance of the river of the same name, is small but quite secure, and has more than sufficient depth of water for any vessel that can pass the bar, on which the depth is 14 feet at low water in ordinary spring tides. The bar is about ½ mile within the entrance of the bay, and a crooked channel, from 100 to 200 yards wide, and through flats of sand and weeds for the distance of one mile, leads from it to the harbor's mouth. No directions would avail for this channel, and the assistance of one of the able pilots of the place is indispensable, and will be readily obtained in answer to the usual signal.

Pugwash.—The town of Pugwash, with its wharves and small wooden English church, stands on the east side of the entrance of the harbor. Immediately within there is a fine little landlocked basin, with a depth of nearly 7 fathoms, in which vessels lie moored in security, to take in cargoes of lumber that are brought down the river.

Water.—There is no good watering place at Pugwash, the supply being from wells, or from springs which are frequently dry in summer.

Pugwash River, immediately within the harbor, extends into a small lake 1½ miles long and one mile wide, in which there are several small islands and peninsulas. The channel through the lake, and between flats of mud and weeds, nearly dry at low water, is from 100 to 200 yards wide, and has 2¼ to 6 fathoms water in it. On the western side the narrow channel of Limestone Creek leads to quarries of limestone, unfit for building, but which supply Prince Edward Island

as well as the neighboring country with lime. The river continues navigable for small vessels about 2 miles above the lake and for boats to a distance of 7 miles from its entrance.

Tides.—It is high water, full and change, at Pugwash at 10h. 30m.; springs rise 7 feet, neaps 4 feet. The rate of the tidal streams, which is greatest in the entrance of the harbor, does not exceed 2 knots, unless it may be the ebb in the springs after the melting of the winter's snows. In Pugwash Road it seldom exceeds a knot.

Phillip River enters the sea immediately to the southward of Lewis Head, and between the latter and Bergeman Point. Its mouth is ¾ mile wide, but a dangerous bar of sand and stones stretches across it, so as to leave only a narrow and tortuous channel of 8 feet at low water, through which the new vessels, built up the river and brought down light, are taken with difficulty on their way to Pugwash, where they take in their cargoes, and where also the lumber and produce brought down this river are taken to be shipped. Within the bar a depth of 12 feet at low water can be carried up the river for 5 miles, and there are in some places 4 and 5 fathoms; the channel, between flats of mud and weeds, being, in some parts, not more than 40 or 50 yards wide. Boats can easily ascend about 9 miles, at which distance the tide ends, and there is a slight rapid.

Lewis Reef extends 2½ miles NNE. from Lewis Head. Its outer part is composed of detached rocky patches, on which there are from 14 to 18 feet water, with a greater depth between them; but the inner part is shallow, and has as little as 6 feet water at 1½ miles from the shore.

Coast.—From Pugwash and Phillip River to Cold Spring Head, the south point of entrance of Bay Verte, a distance of 10 miles, there is no place of use to shipping.

Bay Verte is 9 miles wide across its entrance, from Cold Spring Head, Nova Scotia, to Indian Point, New Brunswick, but contracts to the breadth of 2½ miles near its head. It is 11 miles deep, and separates the two provinces just named, their boundary continuing across the isthmus from the head of Bay Verte to Cumberland Basin, a distance of about 11 miles. There is no harbor in Bay Verte, which is completely open to easterly winds, as well as very shallow near its head, where flats of mud and weeds dry out ¾ mile from the shore.

In the western corner of the bay is the Gaspereaux River, a small stream only fit for boats.

There are thriving settlements on either side of Bay Verte, and especially at its head, where extensive tracts of meadow land have been reclaimed by diking.

Tignish River is the most considerable stream in Bay Verte, which it enters on the south side near its head. It has only 3 feet depth of water, in a very narrow channel, when the tide is out, and it is approached by a narrow channel, carrying 3 to 7 feet, through flats of mud and weeds, which dry out a mile from its mouth. The river is crossed

by a bridge 2¼ miles up from its entrance, following the windings of the river; and about 3 miles farther up the tide is limited in its ascent by Toby's mill. The spring tides rise 9 feet and the neap tides 5 feet.

Marine Transport Railway.—A ship railway is proposed across Chignecto Isthmus, 17 miles wide, separating the Bay of Fundy from the headwaters of the Gulf of St. Lawrence, and connecting Nova Scotia and New Brunswick. Ships up to 1,000 tons burden, instead of sailing round the stormy coast of Nova Scotia, a distance of 700 miles, will be raised by hydraulic lifts upon an immense iron cradle resting upon wheels, and then hauled across the isthmus. The railway will lessen by 500 miles the distance between St. Lawrence ports and New York, Boston, and Portland.

Nothing doing on the railway in 1893, or since that date.

Light.—At 35 yards from the north extreme of Cold Spring Head is a white square lighthouse with a red lantern, 36 feet high, from which is shown a fixed white light, 60 feet above the sea, which should be visible 13 miles.

Spear Shoal, having a patch of rock with 10 feet least water near its east end, and from 15 to 18 feet in other parts, is a bank of sand and stone, resting on sandstone, about a mile long, in an east and west direction, and ⅛ mile broad. From the shoalest part Cape Spear bears N. 56° W. (N. 34° W. mag.) 1¾ miles and Indian Point N. 2° W. (N. 20° E. mag.) 2¼ miles. The lead gives little warning in approaching this dangerous shoal from the eastward, on which side there are from 3¾ to 4¼ fathoms close-to; but vessels will avoid it by coming into no less than 4½ fathoms, as they pass to the southward of it. There are 3¼ fathoms between it and Cape Spear.

Heart Shoal, about a mile westward of the Spear Shoal, and S. 14° W. (S. 36° W. mag.) 1¼ miles from Cape Spear, has 9 feet least water and 15 feet between it and the shore; but it lies within the 3-fathom line of soundings.

Laurent Shoal, of rock and sand, with 16 feet least water, is about ¾ mile long by half that breadth. From the shoalest part, Cape St. Laurent bears N. 57° W. (N. 35° W. mag.) 2¾ miles, Ephraim Island N. 70° W. (N. 48° W. mag.), Indian Point N. 40° E. (N. 62° E. mag.), and Cold Spring Head S. 5° W. (S. 27° W. mag.). This shoal is also bold on the east side, where there are 4½ fathoms close-to.

Aggermore Rock, with 18 feet least water, and bearing N. 28° E. (N. 50° E. mag.) 2¾ miles from Cold Spring Head, is, like the Laurent Shoal, merely one of the shallowest points of an extensive rocky bank, which is thinly covered with mud and sand, and which extends out from Cape St. Laurent and Ephraim Island, in a SE. direction, so as to leave a deep channel about 2 miles wide between it and Cold Spring Head. At low water not more than 19 feet could be safely reckoned upon in running between the Aggermore Rock and the Laurent Shoal, or between the latter and the Ephraim Banks extending off the northern shore.

Directions.—Vessels bound up the Bay Verte should keep the Nova Scotia coast aboard, running up in 6¾ and 7 fathoms water till they arrive off Cold Spring Head, where at the distance of about 1½ miles from the shore they will find the water deepen to 8 or 9 and even nearly to 10 fathoms, as they pass to the southward of the banks and shoals which have been described. After passing Cold Spring Head about 3 miles 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. The Boss Spit, which extends ¾ mile from the south shore between Boss and Jackson Points, and 3¼ miles to the NW. from Cold Spring Head, is dangerous, as it dries out to its edge, and is so steep-to that there are 17 feet water close to its outer point. Vessels should be careful not to go into less water than 3¼ fathoms until they are past this sand spit. Farther up the bay there is nothing in the way, excepting two patches of stone with 3 and 5 feet water at the distance of ½ and ¾ mile northward of Tignish Head.

NEW BRUNSWICK.

Tormentine Reefs are extremely dangerous, and are rendered doubly so by the strong tides. They extend off Indian Point rather more than 3 miles to the eastward, and there is rocky ground with 4 fathoms fully a mile farther off shore. The part of these reefs which dries at low water is very small, and bears N. 85° E. (S. 73° E. mag.) 2¾ miles from Indian Point. It lies about 300 yards to the southward of the line joining Cape Spear and the south side of Ephraim Island, and the whole of that island open to the southward of Cape St. Laurent will lead more than a mile to the southward of it. The only sufficient guides, therefore, are the lead and the chart.

Caution.—Vessels running through Northumberland Strait at night or at any time without a commanding breeze should not approach this reef from any direction between north and east, nearer than 9 fathoms water, for the flood tide sets over it to the southward, in Bay Verte, at the rate of 3 knots, causing a great rippling over the part that dries, and generally indicating its position. Nearly midway between the dry part of the reef and Indian Point there is a patch of rocks with 7 feet at low water. Small craft carry a depth of 2½ fathoms at low water between that and Indian Point, and often take shelter under the latter in northerly winds; but large vessels wishing to do the same must run around outside the whole of the reef, and will find the soundings in the chart a sufficient guide.

Directions.—To run through the 2½-fathom channel between Indian Point and dry part of the Tormentine Reefs, bring Indian Point and Cape Spear in one, bearing S. 45° W. (S. 67° W. mag.), and run toward them until the east extreme of Cape Tormentine touches the west side of the outer Jourimain Island, bearing N. 45° W. (N. 23° W. mag.); then alter course and run S. 45° E. (S. 23° E. mag.) with the last-named

marks on astern, until the water deepens to 5 fathoms at low water, when the vessel will be to the southward of the reefs.

Cape Tormentine is a name sometimes applied to the whole and sometimes to different points of the great headland which forms the eastern extremity of New Brunswick within the gulf, and which separates Bay Verte from the rest of Northumberland Strait; but it is here restricted to the comparatively high central point, to which the inhabitants also seem to confine it; and, again, in conformity with their usage, as well as for precision of description, the names of Indian Point and Cape Jourimain have been adopted for the southern and northern extremities of this promontory.

Cape Jourimain, the north extreme of the Jourimain Islands, forms the extreme point of land to vessels running through Northumberland Strait, either from the eastward or westward. It bears S. 83° E. (S. 61° E. mag.) 6½ miles from Cape Brain; and there is good anchorage in the bay between them, in 5 fathoms sandy bottom, and in winds from the ESE. round south, to west. The islands are connected together, and with the mainland, by sand bars and marshes; but still they appear as islands when seen from a distance sufficient to sink the sand bars below the horizon.

Jourimain Shoals are extremely dangerous to vessels running at night without their leads going; they commence at Peacock Cove, off which there is a patch of 3½ fathoms, at 2 miles off shore. They extend from Cape Jourimain 1¼ miles NW., and there is a patch of 4 fathoms 1¾ miles NNW. from the same point. They are of sandstone, thinly and partially covered with sand, and their SE. point, a narrow ridge with only 6 feet at low water, and distant 1¾ miles from the shore, is the most dangerous, because the boldest, part of the shoals. It should not be approached nearer than the depth of 9 fathoms in the night-time; but farther westward the shoals may be neared with proper caution to 6 fathoms at low water.

Light.—The lighthouse on the east end of Jourimain Island, octagonal shaped, 45 feet high, and painted white, exhibits at an elevation of 72 feet a flashing white light, showing a flash every ten seconds, which should be visible seaward 14 miles, from S. 76° E. (S. 54° E. mag.) to N. 26° W. (N. 4° W. mag.).

Anchorage.—Southward of the Jourimain Shoals and between them and the Tormentine Reefs there is good anchorage with westerly winds in from 5 to 6 fathoms, the bottom being of sand, with clay underneath.

Ice and Lifeboats.—A building has been erected for the ice boats used for the mail service between Cape Tormentine and Cape Traverse; also for the lifeboat stationed at this point. The building is immediately north of the railway track at Cape Tormentine wharf and close to high-water mark..

Railway Pier.—Between Tormentine Reefs and Jourimain Shoals, at 1½ miles northward of Indian Point, the railway pier of the New

Brunswick and Prince Edward Railway projects from the coast for about ⅜ mile seaward over the shoal which borders the shore. The railway goes to Sackville, where it joins the Intercolonial Railway.

Tides.—It is high water, full and change, at Jourimain Island at 9h. 30m.; springs rise 6 feet, neaps 3 feet.

Little and Great Shemogue Rivers, westward from Cape Bruin, are only fit for boats and very small vessels, having narrow and intricate channels over shifting bars of sand.

Anchorage.—There is good anchorage, in 5 or 6 fathoms, sandy bottom, off these rivers in the bay between Cape Bruin and Cape Bald, the former bearing from the latter S. 76° E. (S. 53° E. mag.) nearly 12 miles.

Caution.—In the distance just named the coast is free from danger, the shoal water extending only about ½ mile off shore; and a vessel may safely approach at night to the depth of 6 fathoms at low water. But farther to the eastward greater caution will be requisite, on account of the dangerous shoals commencing off Peacock Cove, which is in the bay between Cape Jourimain and Cape Bruin.

Cape Pillet Church, 1½ miles southwestward of Cape Bald, has a square tower, and is a conspicuous mark from seaward.

Kouchibouguet and Abouchagan Rivers, in the sandy bay between Cape Bald and Bouleaux Point, and 6¼ miles eastward of Shediac, are small, and can only be entered by boats at high water.

Cape Bald, a sandstone cliff, 40 feet high and 11 miles eastward of Shediac Island, is bold and may safely be approached by the lead to the depth of 5 fathoms; but off Bouleaux Point a reef extends more than a mile from the shore.

Shediac Bay is 6½ miles wide from Bouleaux Point (Birch Point) to Shediac Point, a low sandstone cliff, and about 5 miles deep. On its north side will be seen the church and village of Upper Grandigue, and along the head of the bay, within the island, the village of Shediac, with its small church. There is less than 3 fathoms water in the greater part of this bay; it is therefore unsuited to large vessels, and it is rendered dangerous to strangers by shoals.

On Shediac Island there are two conspicuous trees, ⅓ mile northeastward of the beacon leading lights; these trees show in misty weather when the beacons are not visible.

Medea Rock is very small, with 6 feet least water; there are 3 and 4 fathoms water around it at the distance of 200 yards, excepting to the southward, in which direction there are several rocky patches, with 12 feet water, between it and the shore, which is nearly 1¾ miles from it. This dangerous rock lies 400 yards within the line joining Shediac and Cocagne Points.

Zephyr Rock is also very small, with 9 feet least water, and lies rather more than a mile almost west from Medea Rock. It is a long mile from the SE. point of Shediac Island, which is the nearest part of

the shore. There are from 14 to 22 feet of water between Medea and Zephyr Rocks, but the best channel is to the NW. of them both.

Buoys.—A can buoy, painted red and black in horizontal stripes, is moored in a depth of 8 feet, 100 yards northward of the shoalest part of Medea Rock; it may be left on either hand by vessels of less than 12 feet draft.

A can buoy, painted black and red in horizontal stripes, is moored in 18 feet water, 200 yards westward of Zephyr Rock; it may be passed on either hand.

Clearing Marks.—The marks for clearing Medea and Zephyr Rocks are the leading lights and beacons on Shediac Island, and on the railway wharf, Chêne Point, which lead in 13 feet least water to the railway wharf. Grandigue church in line with north extreme of Shediac Island, bearing N. 53° W. (N. 31° W. mag.), leads westward of Zephyr and Medea Rocks.

Cocagne Point can not be distinguished by a stranger, but Cassie Point lighthouse, bearing westward of N. 28° W. (N. 6° W. mag.), leads eastward of Medea Rock.

Shediac Harbor is the easiest of access on this part of the coast, being the only one which a vessel in distress can safely run for, as a harbor of refuge. It is superior to Cocagne and Buctouche in the depth of water over the bar, and it is also much more extensive within than the latter; the space in which shipping may be moored, in from 13 to 16 feet at low water, being ⅔ mile long and from 300 to 600 yards wide. The depth that can be carried in under ordinary circumstances, by a good pilot, is 14 feet at low water and 18 feet at high water, ordinary spring tides; and the bottom in the channel is of mud and sand, as it is also within the harbor.

The harbor is unsafe with the northeasterly gales of autumn, instances having occurred when all vessels, whether at anchor or moored to the wharf, were driven on shore; but, except on these rare occasions, it is a safe harbor.

A swell may be felt in the harbor at high water in a NE. summer gale, yet it is never sufficient to endanger a vessel with good anchors and cables. Even in the bay just outside the bar, a well-found vessel would ride safely in any moderate gale for the summer months.

The harbor lies between the south point of Shediac Island and Chêne Point (Point du Chêne), the latter bearing from the former S. 45° E. (S. 23° E. mag.) ¾ mile. From Chêne Point a long wharf extends, on which the railroad from Moncton terminates; a sandy bar also runs out 1,600 yards to the northward, and is dry for nearly half that distance at three-quarters ebb. It is this bar, together with the shoal farther out, off the SE. point of Shediac Island, which renders the harbor so secure.

The wharf at Chêne Point has been enlarged by the addition of another pier, making with the old pier a safe dock, and from the latter

a wharf has been extended eastward, alongside which vessels must discharge their ballast.

The entrance between the north point of the bar and the edge of the shoal water off the island is the narrowest part of the channel and only 250 yards wide, between the 12-foot lines.

Shediac is a port of entry.

Tides.—The tides in Shediac Bay are extremely complicated. The establishment, at the only full and change period observed, was 0h. 0m. The highest tides occur at full and new moon, and rise 4 feet above the lowest water. At other times the rise of tide is about 3 feet. The low water occurs at intervals varying from one to 18 hours after high water, and ranging from 3 inches to 4 feet, without any apparent law. The streams generally are weak.

Pilots.—Pilotage is compulsory in Shediac Harbor.

Ice.—Shediac Bay is generally frozen over from the first week in December until the end of April, being completely closed between those dates. The first vessel arrives from sea about April 30 and the last one leaves about December 8.

Buoys.—A black can buoy has been moored on the northern end of the shoal south of Zephyr Rock and northward of Chêne Bank, and near the line of Shediac Island beacon lights; the buoy lies in 17 feet at low water. A red can buoy is moored, in 13 feet at low water, 200 yards to the northward of the line of the leading lights on Shediac Island, with the hotel S. 8° W. (S. 30° W. mag.) $1\frac{2}{10}$ miles.

The red can buoy at the intersection of the line of the leading lights on the railway wharf with that of the leading lights on Shediac Island is moored westward of the former and northward of the latter. It must be left on the starboard hand entering the harbor in turning from one line of leading lights to the other.

Three spar buoys, painted red, were moored westward of Chêne Bank, and immediately westward of the line of the railway wharf leading lights, Chêne Point, in line in 1885.

Lights.—The beacons on Shediac Island are white, square towers 619 feet apart N. 81° E. (S. 77° E. mag.) and S. 81° W. (N. 77° W. mag.), and exhibit 36 and 52 feet above high water fixed white lights, which should be visible 11 and 12 miles.

The leading lights at Shediac north channel are fixed red lights, 602 feet apart, S. 11° W. (S. 33° W. mag.) and N. 11° E. (N. 33° E. mag.); elevated respectively, 32 and 28 feet above high water, and visible 7 miles. They are exhibited on iron masts 20 and 28 feet high, with white sheds at their base, on the northernmost part of Chêne Point (front light).

The leading lights at Shediac Harbor are exhibited on the Government wharf, NW. end, and Chêne Point, south railway wharf. The lights are fixed white, and are shown from masts with sheds. They should be visible 7 miles. The rear light is about 631 feet S. 15° W.

(S. 37° W. mag.) from the front light. The front light is elevated 32 feet and the rear 38 feet.

Shediac Village (locally known as The Cape) is on the southeastern shore of Shediac Bay. The village contains four churches, the most conspicuous from seaward being the Episcopal and Roman Catholic, which are surmounted by spires and stand at the eastern end of the village. The Methodist also has a spire, and is situated in the middle, while the Presbyterian, a white building with a square tower, is built near the western end of the village. Westward of Scoudouc River is a Baptist church, a yellow building with a small tower, but, like the Cape church, it is not visible from seaward.

Scoudouc and Shediac Rivers, in the SW. and NW. corners of Shediac Bay, respectively, are small streams navigable for boats for a few miles to sawmills at the head of the tide. There are bridges across each of these streams near their mouths, where there are oyster beds.

Chêne Point (Point du Chêne) is a terminus of the Intercolonial Railway, and the entrepôt of trade to Prince Edward Island. A small village has been built at Chêne Point, with a conspicuous hotel which is surmounted by a tower and flagstaff; the place is much resorted to for bathing in the summer months.

Water is very scarce at Shediac; it may be bought from a contractor. At high water it may be obtained with difficulty from Scoudouc River, but it is not very good.

Supplies of all kinds may be obtained at Chêne Point.

Coal.—About 60 tons of coal are usually stored at Chêne Point by the railway department, but any quantity can be procured from Pictou in about one day.

Charges.—Pilotage, $1.50 per foot (compulsory); harbor master's fee, $4; health visit, $5; tonnage dues, 2 cents per ton.

Trade.—The exports consist of lumber, salmon, potatoes, and oats.

Repairs.—There are no means of repairing vessels at Shediac.

Telegraph and Railways.—Chêne Point is in telegraphic communication with all parts of Canada and the United States. It is connected with Halifax, St. John, and Quebec by the Intercolonial Railway, and, during the season of navigation, with Prince Edward Island by a daily steamer.

Grandigue Bank, with from 14 to 18 feet water, extends off Shediac Point 2 miles, having the least water near its outer edge. This extensive rocky bank is dangerous to vessels of large draft, which, however, will pass outside it if they do not approach the shore nearer than the depth of 5 fathoms at low water.

A rocky bank, with 10 feet least water, lies ESE. from the north extreme of Shediac Island.

Light.—From a square white tower, 27 feet high, erected on Cassie Point, is exhibited a revolving white light every half minute. The light is 47 feet above high water, and should be visible 14 miles.

Anchorage.—There is good anchorage under Shediac Point in NW. winds, in 17 or 18 feet, mud bottom.

Directions.—Vessels approaching Shediac Harbor should, for the first time, take a pilot; if one can not be obtained, the following directions will lead in by day or night, but no other route than the one indicated should be attempted:

The light on Cassie Point having been sighted, the center of the bay should be steered for and the lights or beacons on Shediac Island brought in line, bearing S. 81° W. (N. 77° W. mag.), taking care to keep Cassie Point light bearing westward of N. 32° W. (N. 10° W. mag.) until that leading mark is on.

Keep the Shediac Island lights or beacons in line until near the northern red buoy, when the vessel's course should be altered to the southward in time to bring the leading lights or beacons on the railway wharf in line, bearing S. 15° W. (S. 37° W. mag.), just before reaching the red buoy. This mark will lead up to the wharf; but if an anchorage is sought by day, bring the cliff of Cape Brûlé in line with the end of the grass off Chêne Point, bearing S. 78° E. (S. 56° E. mag.), then steer westward and let go the anchor; by night, proceed for rather more than ½ mile with the railway wharf leading lights in line S. 15° W. (S. 37° W. mag.), and then anchor slightly eastward of that line.

Vessels from the northward may bring Chêne Point range in line S. 11° W. (S. 33° W. mag.), and steer in on this range, passing westward of Zephyr Rock until the Shediac Island range comes on, when proceed as before directed. A place, locally known as the Deep Hole, with 19 to 20 feet water, is ¼ mile southwestward of the western red buoy, on the mark of the wharf lights in line; vessels anchor there to complete their cargoes or to wait until the tide is high enough to enable them to leave. The water shoals rapidly eastward of Deep Hole, to 10 and 11 feet on Chêne Bank.

The beacons on Shediac Island are difficult to distinguish from any great distance, and those on the railway wharf, from which the inner leading lights are shown, are often hidden by the masts of vessels lying there.

The harbor is much more extensive for vessels of light draft than has been mentioned, although encumbered by ballast heaps, and vessels drawing 7 or 8 feet may be taken through the bay within the island to the wharf at the village.

Cocagne Harbor has its entrance to the southward of Cocagne Island, and between it and Renouard Point, the latter being formed of reddish sandstone cliffs 50 feet high. It is a very small harbor, and the channel over the bar of sand, gravel, and sandstone is narrow and crooked, with 10 feet at low or 14 feet at high water in ordinary spring tides. Within the bar there are from 2½ to 4 fathoms, in a very narrow channel, for a distance of about ¾ mile. Farther in the bay is shallow, with oyster beds and mud flats, covered with from 4 to 6 feet water.

To enter this harbor, fine weather and a good pilot are absolutely necessary.

Cocagne River enters the head of the bay ½ mile southward of the church. It is crossed by a bridge just within its entrance, and is navigable by boats for several miles. The shores of the river and bay are well settled by families engaged in agriculture, together with lumbering and shipbuilding to a limited extent.

Buctouche Road, off the entrance of the Buctouche River, and in the widest part of the channel within the Outer Bar, is quite safe for a vessel with good anchors and cables, the ground being a stiff tenacious clay, and the Outer Bar preventing any very heavy sea from coming into the anchorage. It is here that vessels of too great draft of water to enter the river lie moored to take in cargoes of lumber. In approaching this anchorage there is nothing in the way of vessels that do not draw too much water to pass the Outer Bar, excepting the North Patch; but larger vessels will find more water (not less than 3¼ fathoms) by approaching from the northward, according to the following directions:

Lights.—There are two leading lights at 3 miles north of Dixon Point, on the south side of the entrance to Buctouche River.

The lights are fixed, white lights, elevated 41 and 36 feet above high-water mark, and should be visible 12 and 11 miles, respectively. Both the lights are exhibited from white square towers; the western or high light tower is 34 feet high, and the eastern one, which is on the extreme of the point, 30 feet high. They bear from each other N. 79° W. (N. 57° W. mag.) and S. 79° E. (S. 57° E. mag.), distant 1,050 feet.

Two lighthouses are erected on Church (Indian) Point, on the north side of Buctouche River, bearing N. 48° W. (N. 26° W. mag.) and S. 48° E. (S. 26° E. mag.), distant 1,980 feet from each other.

The southern light is a fixed white light, 23 feet above high water, and should be visible 9 miles upon the bearing of the lights in line.

The northern or high light is a fixed white light, 53 feet above high water, and should be visible when in line with the low light 12 miles.

Both lighthouses are small white square towers, 23 feet high, with red roofs.

Directions.—Bring Buctouche steeple to bear to the southward of S. 68° W. (west mag.), and run inshore with it on that bearing, in order to pass to the northward of the North Patch. In running in, if the weather be favorable, Cocagne steeple will be observed to open out to the westward of Cocagne Island, so as to be seen between the latter and the mainland; the course must be continued till the steeple comes in line with the extreme of Dixon Point, which is a small, low, and rocky peninsula of the mainland, 2½ miles to the southward of Buctouche Sandbar. Alter course immediately, running with Cocagne steeple and Dixon Point in line, bearing S. 5° W. (S. 27° W. mag.), and they will lead close inside the Outer Bar and clear of a small shoal, which lies between it and the shore, and on which there are not less than 2¾

fathoms. Take care not to shut the steeple in behind Dixon Point, as the vessel runs along the sand bar, and immediately after Buctouche steeple opens out to the westward of the small sandy islet which forms the SW. point of Buctouche Sandbar, two white lighthouses on the mainland come in line N. 79° W. (N. 57° W. mag.), the vessel will be in the best berth for anchoring.

Anchorage.—Anchor with the white lighthouses in line, bearing N. 79° W. (N. 57° W. mag.), and Cocagne steeple open about its own breadth to the eastward of Dixon Point, in 3¾ or 4 fathoms at low water, and with excellent holding ground.

Tides.—It is high water, full and change, at Buctouche at 7h. 0m.; springs rise 4 feet, neaps 2 feet.

Buctouche River enters the sea through the shallow bay within the Buctouche Sandbar. The two white lighthouses by day, or lights by night, just mentioned, as pointing out the best anchorage in the roadstead, are intended to lead in over the bar of sand and flat sandstone, in the greatest depth, namely, 8 feet at low and 12 feet at high water in ordinary spring tides; and when the two lights on Church (Indian) Point come in line N. 48° W. (N. 26° W. mag.), steer from them, and it will lead to the anchorage within the bar or on through the narrows off Giddis Point. Within the bar is a wide part of the channel, in which vessels may ride safely in 2½ and 3 fathoms over mud bottom; off Giddis Point the channel becomes as difficult, narrow, and shallow as at the bar. But the channel is so narrow, intricate, and encumbered with oyster beds that written directions are useless, as the assistance of a pilot is absolutely necessary to take a vessel safely into the river. It is in its course through the bay that the Buctouche is so shallow and intricate; higher up its channel is free from obstruction, and in some places has 5 fathoms of water.

Having crossed the bar, a vessel may ascend about 10 miles farther, and boats 13 or 14 miles, to where the tide water ends. One mile above Buctouche church there is a bridge, but it is so constructed as to permit the vessels which are built higher up the river to pass. There is also a bridge over the southern and smaller branch.

The country on either side of the Buctouche is considerably higher than at Richibucto, the ridges attaining an elevation of about 200 feet above the sea. The banks of the river are well settled, and the clayey soil is very fertile. There are saw and grist mills at the head of the tide. A few vessels are built in the river annually, and several visit it for lumber; but it is a place of no great trade.

North Patch of rocks, with 12 feet least water, is small, with 5 fathoms close outside of it. It lies 2 miles off shore on the NE. point of the Outer Bar of the Buctouche, with Cocagne steeple and the NW. extreme of Cocagne Island in line, bearing S. 8° W. (S. 30° W. mag.), the south end of Buctouche Sandbar S. 33° W. (S. 55° W. mag.) and Buctouche steeple seen over the sand bar S. 76° W. (N. 82° W. mag.).

Vessels will pass outside of it, if they do not come into less than 5 fathoms at low water.

Outer Bar of Buctouche River is a long ridge of sandy and rocky ground, carrying 2¼ to 3¾ fathoms of water, and extending from North Patch 7 miles, nearly to Cocagne.

Richibucto Head.—Off Richibucto Point, which is the SE. extreme of the south beach, and 3½ miles from the mouth of the Richibucto, a reef of sandstone extends off shore for a mile from the high-water mark, and continues 2 or 3 miles farther southward, to Richibucto Head, which is of sandstone and clay cliffs, 50 feet high.

From Richibucto Point, the SE. extremity of the Buctouche Sandbar bears S. 22° E. (south mag.), and is distant 14½ miles. There is nothing requiring notice in the bay between them, excepting the small Chockpish River, affording shelter for boats at high water.

Light.—On Richibucto Head stands a square white tower, 50 feet high, exhibiting at 70 feet above high water a fixed white light, which should be visible 14 miles.

Richibucto River is inferior only to the Miramichi, either in the distance to which it is navigable or in the depth of water over its bar. It is annually visited by a considerable number of vessels for cargoes of lumber. There are flourishing and rapidly increasing settlements on its banks, as well as on those of its principal tributaries, the Aldouin, the St. Nicholas, and the Molus or Molies Rivers. The population are engaged in agriculture, lumbering, and shipbuilding; but they do not prosecute the fisheries. Traces of coal are reported to have been found in the sandstone, which forms the substratum of this and of all the neighboring country.

The Aldouin enters on the northern side, about 2 miles within the entrance of the river.

The entrance of the Richibucto is about 700 yards wide; it lies between two sand bars, several miles in length, called the north and south beaches, on which there are sand hills as high as 30 feet. Immediately within the entrance there is a wide expanse of mud and weeds, nearly dry at low water, excepting the channel of the river. On the northern side, a shallow bay leads, within the north beach, to the lagoons, whilst on the south side, within the south beach, lies French Island, and still farther to the SE., French Creek and Low Village, where there is a church, visible in some directions from the sea. Within the wide part just mentioned the breadth of the Richibucto is rendered irregular by numerous bays on either side. Just below the town it is above 800 yards wide, but contracts to 300 yards 1¾ miles farther up, after which it expands again for a considerable distance, and is nowhere less than 160 yards broad, nearly to the end of the navigation, although the channel between mud banks, nearly dry when the tide is out, is much narrower. Low cliffs of sandy clay are frequent on either side of the river; but the adjacent country, although undulating, is everywhere of

very small elevation, not exceeding 80, or at the utmost 100, feet above the sea.

The Richibucto is navigable for boats nearly to the head of the tide, being a distance of about 22 miles, following the stream, the general direction being SW. Any vessel that can pass the bar may be taken about 13 miles up the river, the depth in the channel varying in that distance from 3 to 9 fathoms, over mud bottom. Smaller vessels may ascend to within 2 or 3 miles of the head of the tide, where the river is quite shallow and rapid at low water.

Richibucto.—About a mile higher up, on the same side as the Aldouin, stands the town of Richibucto (Liverpool). It has a church, a chapel, courthouse and jail, etc., being the capital town of the county of Kent. There is a church 1¾ miles above the town, and opposite to it, on the southern side of the river, a shipbuilding establishment, together with a village of Micmac Indians, who are employed as laborers and choppers.

The United States is represented by an agent.

Lights.—The leading lighthouses erected to supersede the day beacons on South Beach, Richibucto River entrance, bear from each other S. 39° W. (S. 61° W. mag.) and N. 39° E. (N. 61° E. mag.), distant 326 feet. The low lighthouse, 33 feet high, square, and painted white, exhibits at 40 feet above high water a fixed white light.

The upper lighthouse, 43 feet high, an open frame square tower, and painted white, exhibits at 44 feet above high water a fixed red light.

These lights should be visible 12 miles; and kept in a line bearing S. 39° W. (S. 61° W. mag.), lead through the channel and over the bar at the river entrance.

The lights are moved to suit the bar.

The Bar of the Richibucto is extremely dangerous, especially to large, deeply laden, and dull sailing vessels outward bound in the fall of the year. Taking advantage of the highest spring tide, and sailing at high water, if the wind becomes unsteady or too light, they are almost certain to be thrown ashore by the ebb tide, on the southeastern part of the bar; and should a NE. gale occur, to be destroyed before they can get off again. To take a ship in with a leading wind and flowing tide is attended with no other difficulty than that which arises from the narrowness of the channel; but in all cases the assistance of a pilot is absolutely necessary, since the bar is subject to occasional changes from the effect of heavy gales. The bar extends from the north beach, for 2 miles to the eastward, parallel to the south beach; there is a rock in the eastern part of it, but the remainder is of sand, dry at low water.

No part of this bar extends to seaward so much as a mile from the lighthouses, and it may be safely approached by the lead to 6 fathoms water at any time of tide; but for the purpose of anchorage 9 fathoms is a better depth, the bottom being there of fine brown and gray sand, affording far better holding ground than farther inshore. The situa-

tion of the narrow channel over the bar (1½ miles eastward from the river's mouth) is indicated by the two white lighthouses on the south beach and a large red buoy moored off in 3¾ or 4 fathoms at low water, with the two lighthouses in line, distant not quite a mile.

The depth of water over the bar is 9 feet at low water, or 13 feet at high water in ordinary spring tides, and is gradually becoming deeper; and there is not a continuously greater depth for the first mile in from the red buoy, the channel being from 100 to 180 yards wide between the 2-fathom lines, excepting at the turn to the westward, which is the narrowest part, and only 80 yards broad. Farther in the channel expands in breadth to about 370 yards, increasing in depth to 3¼ fathoms; it then shoals to 2¾ fathoms and contracts again to only 100 yards wide at the north beach, where the depth is 5 fathoms, and the stream of tide strongest, being about 2½ knots. About ½ mile within the north beach the channel widens for a short distance to 400 yards, and has 3 to 4 fathoms water in it, with mud bottom. The depth increases farther in, and is nearly 9 fathoms in some places.

Pilots.—The branch pilots of Richibucto River are able, intelligent, and attentive to their duties. They keep a good lookout for vessels from the beach at the mouth of the river.

Pilots are necessary.

Directions.—Having made the lighthouse on Richibucto Head, look-out for the red buoy, and keep outside of it, in not less than 5 fathoms water, until it and the two lighthouses come in line, bearing about S. 39° W. (S. 61° W. mag.); then steer in close past the buoy, keeping the two lighthouses exactly in line, and looking out for the small red buoys, which are placed along the southern edge of the bar, and must be left on the right hand going in. Having run in about ½ mile with the two lighthouses in line, the vessel will be within 400 yards of the south beach, and the small red buoys along the south or inner side of the bar will be seen to come in one with each other. Haul up immediately, passing about 40 yards to the southward of the buoys.

Having run to the west (N. 68° W. mag.), between the bar and the south beach, about 1¼ miles, the channel becomes again very narrow, and is marked by small buoys on either side, red on the starboard hand, black on the port; but as these buoys might not be readily made out by a stranger, bring the SW. point of the north beach to bear N. 67° W. (N. 45° W. mag.), and steer for it, observing that the channel, which is then only 100 yards wide, passes close to the north beach. As soon as the vessel is abreast of this edge, steer to the SW. for ½ mile, when there will be plenty of room to anchor in quite a secure harbor. The small red buoys just mentioned are merely pieces of wood painted red, and placed at convenient distances, according to the judgment of the pilots.

Tides.—It is high water, full and change, at Richibucto River at 3h. 30m.; springs rise 4 feet, neaps 2½ feet.

On the day of the full moon in July, 1839, there was only one high water, at 3h. 30m. a. m., and one low water, at 4 p. m. But toward the time of neap tides, two high waters in 24 hours became apparent for a few days. There would seem to be two interfering tides, presenting phenomena which it would require accurate and long-continued observations to explain. The rate of the tides in the river is from 1½ to 2 knots.

Kouchibouguac Bay is nearly 20 miles wide from Richibucto Head to Sapin Point. Its shores are exceedingly low, with sand bars and beaches inclosing extensive and shallow lagoons, through which the river flows to the sea. The shoal water (depths not exceeding 3 fathoms) extends off shore to a considerable distance in the northwestern part of this bay, and there is foul ground, with as little as 3 fathoms water, more than 2 miles out to the eastward from the mouth of the Kouchibouguac River. Northeast gales send a heavy swell into the bay, so that it will be prudent not to get embayed there, especially at night or in a dull-sailing vessel.

Kouchibouguacsis River becomes rapid, shallow, and consequently unnavigable above the point reached by the tide. It has saw and grist mills and settlements on its banks. Of its two outlets through the sand bars, the most northern, 3 miles southward of the Kouchibouguac, is only fit for boats, the channel leading to it through the lagoon having become nearly filled up with sand and weeds.

The river, after entering the lagoon and running for some distance toward this outlet, turns to the southward, and continues its course within the sand bar for a distance of 3 miles to the southern and main outlet, which is called Big Cove, and is 6 miles south of the Kouchibouguac and 3 miles north of the Richibucto River. The depth by a narrow channel over the shifting bar of sand is 9 or 10 feet at high water in spring tides. There are 3 fathoms just within the sand bars, from one to 3 fathoms through the lagoon, and 2 or 3 fathoms for several miles up the river. There is a communication by boats at high water through the lagoons and within the sand bars, not only between the Kouchibouguac and Miramichi Rivers, but also southward to Richibucto and northward nearly to Marsh River, 15 miles.

Kouchibouguac River, after flowing for more than a mile through an extensive lagoon, nearly dry at low water in spring tides, enters the sea by an outlet through sand bars about 9 miles SW. from Sapin Point. Its bar of sand not infrequently shifts in heavy easterly gales, and the channel is at all times narrow and intricate.

A depth of 9 feet at high water and spring tides could be carried in over the bar at the time of the Admiralty survey in July, 1839.

Large ships, which are occasionally built in this river, are taken out light, and towed by a steamer to be fitted at Richibucto or Miramichi. The banks of this river are well settled, and there is a saw mill at the head of the tide.

The Tides rise from 2½ to 4 feet, flowing about 8 miles up the river,

and affording a depth of from 2 to 3 fathoms through a very narrow and crooked channel, for a distance of 5 miles in from the bar. It was high water at the full and change, in July, at about 4 a. m., but the "diurnal inequality," belonging to two interfering tides, caused the p. m. tide to nearly disappear.

Sapin Point is south 5½ miles from Escuminac Point, with a low shallow shore between.

Sapin Ledge, of sandstone, and with 12 feet least water, is very dangerous, lying directly in the way of vessels running alongshore. It should not be approached nearer than the depth of 9 fathoms in the nighttime, and at all times it should be remembered that the 5-fathom line of soundings is distant from it only about 400 yards. The ledge is 1¼ miles long, east and west, and abont ½ a mile wide, between the 3-fathom lines, and its eastern or outer extremity bears S. 17° E. (S. 6° W. mag.) 6 miles from the lighthouse on Escuminac Point, and east (S. 67° E. mag.) 2½ miles from Sapin Point. There is a depth of 3½ fathoms between it and the last-named point.

CHAPTER V.

PRINCE EDWARD ISLAND—NORTHUMBERLAND STRAIT—NORTH SHORE.

(H. O. Chart No. 1066.)

Prince Edward Island is rendered extremely irregular by large bays, inlets, and rivers, which penetrate the island so that no part of it is distant more than 7 or 8 miles from navigable water. Its shape is an irregular crescent, concave toward the gulf, the northern shore forming a great bay, 91 miles wide and 22 miles deep, out of which the set of the tides and the heavy sea render it very difficult to extricate a ship when caught in the NE. gales, which frequently occur toward the fall of the year, occasionally blowing with great strength, and at such times proving fatal to many vessels.

In the interior of the island the most elevated ridges do not exceed 400 or at the utmost 500 feet above the sea, and the land is in general much lower, especially near the coast, the prevailing feature being undulating, and the alternation of hill and dale and inlet forming very pleasing scenery.

Prince Edward Island is part of the Dominion of Canada, but has a provincial government for administering local affairs. The seat of the local government is in Charlottetown.

Climate.—The climate is less severe than in Lower Canada; not quite so cold in winter nor so hot in summer, being tempered by the sea breezes; but, on the other hand, the advance of spring is checked by northerly winds from the gulf, driving down ice, which sometimes fills the strait as late as the middle of May, so that instead of the sudden outbreak of vegetable life which is observed in Canada, it is here frequently retarded till the month of June is well advanced, and there is seldom any settled warm weather much before July.

Fogs.—The most important advantage of the climate to the seaman is the rare occurrence of the dense fogs which so frequently embarrass him in other parts of the gulf, and which in Northumberland Strait are seldom seen. It is worthy of remark that the prevailing SW. wind of summer, which in the Bay of Fundy is generally accompanied by thick fog, parts with its moisture in passing over the heated land of Nova Scotia, and becomes a hot dry wind off its northern coast. It becomes tempered in its passage over the water of the strait, heated and dried again in some degree in passing over the island, but acquires again its moist and foggy character long before it reaches the coast of Labrador, and not infrequently before it arrives at the Magdalen Islands.

Produce and Trade.—The inhabitants are almost exclusively engaged in agriculture and the breeding of horses and sheep.

The export trade of the island consists chiefly of agricultural produce, small quantities of lumber being also sent away. The fisheries are prosecuted on the north shore. There are factories for canning and preserving fish and meat.

The population in 1891 amounted to 109,078.

SOUTH COAST OF PRINCE EDWARD ISLAND.

The Coast to the westward of Cape Bear (the SE. point of the island) to White Sands is formed of sandstone cliffs, which are in some places 40 feet high, without beach or landing, except at Guernsey Cove, and from which the shallow water does not extend beyond 700 yards except near Cape Bear.

Cape Bear will be known by the large rock, 12 feet high, which lies close under its cliffs of red sandstone; and Murray Head, a mile farther to the northward, by its forming the extreme northeastern point of the cliffs, where they turn abruptly to the westward toward Murray Harbor.

Bear Reef runs out to the eastward, from between Cape Bear and Murray Head, ¾ mile, to the depth of 3 fathoms, and one mile to 5 fathoms, and is composed of sandstone and large stones. There is but little water over the greater part of this extensive and irregularly shaped reef, which has 7 or 8 fathoms close to its edge, and is therefore dangerous to vessels rounding the cape at night or in foggy weather, when they should not approach nearer than the depth of 10 fathoms, either to the eastward or southward of the reef.

Leading Marks.—There are no close leading marks for passing eastward of this reef, but Panmure Head and Terras Point in line, bearing N. 15° W. (N. 8° E. mag.), clear it at the distance of one mile in that direction; at night the light on Panmure Head must be kept open of Terras Point. Guernsey Point kept well open southward of Black Rock Point will lead to the southward.

Light.—The lighthouse, which stands on the headland of Cape Bear, is a white, square building, 46 feet high, with dwelling attached. A red light, revolving every ½ minute, is exhibited at an elevation of 74 feet. It should be visible 12 miles.

Tides.—It is high water, full and change, at Cape Bear at 9h.; springs rise 6 feet, neaps 3 feet. *See* Tidal stream, page 153.

Water.—At 700 yards southward of Murray Head there is a fine little stream of fresh water worthy of notice, because there are so few places on the island where a large ship can readily water. Boats can land there in westerly winds, when vessels will find good anchorage under the head.

Fishermans Bank is of sandstone, thinly covered with stone, gravel, and broken shell. Within the depth of 10 fathoms it is 3 miles long

ENE. and WSW. by 1½ miles broad; but the shallow central part, with from 4 to 5 fathoms at low water, covers scarcely half that space. From the least water, 4 fathoms, Murray Head, the nearest land, bears N. 88° W. (N. 65° W. mag.) 7½ miles; and there is another patch with 5 fathoms ¾ mile farther NE. There are irregular soundings, from 10 to 20 fathoms, between this bank and Bear Reef, and in every other direction around it from 15 to 20 fathoms. It is very dangerous to vessels of large draft when there is a heavy sea running, and should not then be approached nearer than the depth of 13 fathoms, which in most parts is close to its 10-fathom edge, and little more than ½ mile from the shallow water.

The steeple of the English church at Georgetown, in line with Panmure Head, bearing N. 52° W. (N. 29° W. mag.), would lead over the bank in 5 fathoms; but the church can seldom be seen from the bank, being 15 miles from it.

Black Rock and Guernsey Points, ½ and 2 miles, respectively, southwestward of Cape Bear, have each large rocks above water close off their cliffs, as also has Cape Bear; but the rock off the cape is much higher than the others, its summit being about 12 feet above the sea at high water, whilst Black Rock is only 7 feet, and the other still lower.

White Sands is a settlement, receiving its name from the sandy beach of a small bay, 4½ miles SW. of Cape Bear. There is a sandspit there, just covered at low water, which affords some shelter to boats, and a sandy shoal extending ½ mile off shore.

The edge of this shoal is so steep and the water near it so deep that the lead gives no warning; but if Black Rock Point (the extreme to the eastward) be kept open to the southward of Guernsey Point (the west side of Guernsey Cove), it will lead to the eastward of the shoal; for those points in one, bearing N. 50° E. (N. 73° E. mag.), lead along its southern edge.

From White Sands to Little Sands, 6 miles to the westward, the sandstone cliffs are 40 to 50 feet high and quite bold.

Wood Islands, 9 miles westward of White Sands, are now only in part covered with timber. They are two small islets, and with their connecting sand bars are 1,400 yards in length, parallel to the shore, from which they are distant about ½ mile. The eastern or larger islet is 700 yards long and about 50 feet high. They both present cliffs of sandstone to seaward, and are united to the shore by a long sand bar at their western extremity. The space between the islets and the shore forms a secure boat harbor, having an entrance from the eastward, but it is all nearly dry at low water.

The Anchorage to the eastward of the islands, within the distance of a mile, and at any depth from 3 to 9 fathoms, is good in NW. winds, Indian Rocks breaking the sea.

Light.—The lighthouse on the south point of Wood Island is a square building, 40 feet high, with dwelling attached, and exhibits at an elevation of 80 feet a fixed white light, which should be visible 15 miles.

Indian Rocks, considering them to be bounded by the depth of 3 fathoms, occupy a space 1½ miles in length, parallel to the shore between Wood Islands and Bell Point, and ½ mile in breadth. They are of sandstone, dry to a considerable extent at low water, and their southern edge is 1½ miles off shore. The SE. point of the Wood Islands, not brought to bear to the eastward of N. 45° E. (N. 68° E. mag.), will lead to the southward of their SE. extreme, which bears S. 34° W. (S. 57° W. mag.) nearly a mile from the west end of the Wood Islands; MacDougall and Pinette Points in one, bearing N. 41° W. (N. 18° W. mag.), will lead ¾ mile westward of the western extreme, which bears from Bell Point S. 34° E. (S. 11° E. mag.) 1¾ miles; but Pinette Point can not always be distinguished.

Caution.—The want of sufficient leading marks, and the deep water so close to the southward, would render these rocks exceedingly dangerous by day as well as by night if there were not nearly always breakers or a rippling to be seen on the part which dries. In standing toward them at night, if Wood Islands light is not seen, observe that there are 10 fathoms within ¼ mile of their southern edge, and that 13 fathoms is near enough to their SE. extreme and 10 fathoms to their SW. point, taking care not to get between the latter and the Bell Point Reef, where there are also 10 fathoms.

There is a channel between the Indian Rocks and the shore more than ½ mile wide, and carrying from 4 to 16 fathoms water; but it is of no use to shipping, the soundings being irregular, with rocky or gravelly bottom and strong tides.

Leading Marks.—The extreme of the land to the eastward and the inner side of the Wood Islands in one will lead in between the Bell Point Reef and the rocks, and clear their northern edge in 5 fathoms; and the line of Stewart and Bell Points in one, bearing N. 63° W. (N. 40° W. mag.), passes along the NE. side in 3 fathoms; the former of those points must therefore be shut in behind the latter to pass between the rocks and the Wood Islands.

Buoy.—A whistling buoy is moored in 10 fathoms off Indian Rocks. The buoy is red and lies with Prim Point lighthouse N. 47° W. (N. 24° W. mag.) and Wood Island lighthouse N. 53° E. (N. 76° E. mag.).

Tides.—The tidal streams are strong in the deep water just outside the Indian Rocks, frequently running at the rate of 3 knots per hour. It is high water, full and change, at 9h. 45m. nearly; springs rise 6 feet, neaps 4 feet.

Bell Point, a mile SE. of Stewart Point, is a cliff of sandstone 40 feet in height. The shallow water is continuous from the Rifleman Reef to this point, from which it extends a mile to the 3-fathom line, having 9 or 10 fathoms close to its edge.

Rifleman Reef, of sandstone, extends 2 miles westward from Stewart Point. On the extreme outer point of this reef, in 3 fathoms, the light on Prim Point bears N. 51° W. (N. 28° W. mag.) 8 miles. Just within

this point of the reef there are 8 feet water, and halfway between that and the shore only 5 feet, while between those and other shallow patches there are 12 feet at low water.

Caution.—The very irregular soundings off Rifleman Reef, and the deep water close to it (16 fathoms within less than ½ mile, while there is a much less depth farther out), render it one of the greatest dangers in Northumberland Strait. The bearing of the lights on Prim Point and Wood Islands, and the whistling buoy off Indian Rocks, will greatly assist vessels in avoiding it, but at all times, either by night or by day, and especially in thick weather, it should be approached with care. There are no leading marks to clear its west extreme, which has 7 fathoms close-to, but the soundings give better warning there than farther to the southward. The wooded point within and opposite Wood Island in one with Black Point, the extreme to the eastward, bearing east (S. 67° E. mag.), just clear the southern side of the reef; but the safest plan, when approaching it from the southward, will be to tack as soon as the extreme of the land to the eastward appears within the Wood Islands, bearing N. 81° E. (S. 76° E. mag.), when the vessel will be 1¼ miles from the reef.

When standing toward the reef at night, take care that the light on Prim Point is not brought to bear to the westward of N. 45° W. (N. 22° mag.). If the light is not seen, a close attention to the soundings can alone insure safety. It must be borne in mind, in standing across the strait from the southward toward the reef, that after having had upward of 20 fathoms toward the southern shore, the soundings will decrease to between 11 and 9 fathoms for several miles, and then suddenly increase again to from 14 to 16 fathoms. When the vessel arrives at this deep water she will be less than a mile from the reef, and if she ventures across it to 10 fathoms she will be only 600 yards from its edge.

Flat River, which is only fit for boats, is 3 miles SE. from Pinette Harbor. Shallow water runs off Macdougal Point, its eastern point of entrance, a mile.

Pinette Harbor, 4 miles eastward from Prim Point, has only 2 feet at low water over its rocky and exceedingly dangerous bar. It is, therefore, fit only for small schooners, although it has from 3 to 4½ fathoms in its narrow channel, which runs in several miles through flats of mud and weeds, dry at low water, and then divides into several shallow branches. The bar is nearly a mile out from the entrance, and the Pinette Shoals reach to double that distance, their outer point, in 3 fathoms, extending a long distance beyond the line joining Prim Point, and the extreme to the southeastward. There are only 9 feet water just within this point, and only 3 feet at no great distance, the bottom being rock. These shoals are, therefore, very dangerous, and should not be approached nearer than the low-water depth of 6 fathoms.

Tides.—It is high water, full and change, at Pinette at 10h.; springs rise 8 feet, neaps 5 feet.

(H. O. Chart No. 1068.)

Hillsborough Bay, having in it the principal harbor and capital town, and, being the outlet of an extensive inland navigation, is the most important as well as the largest of any in Prince Edward Island.

Lights—Prim Point.—The lighthouse on Prim Point, the SE. point of Hillsborough Bay, is conical, 55 feet high, and white. It stands at 100 yards within the SW. extreme of the point, and exhibits, at an elevation of 68 feet, a fixed white light, which should be visible 12 miles. It is of the greatest use to vessels, especially when approaching from the eastward, guiding them, by its bearing, clear of the Rifleman and Pinette Shoals, and enabling them to enter the bay in the darkest night.

Haszard Point leading lights are both fixed red lights, visible through a small arc on each side of the line of direction when in one.

The front or lower light is elevated 45 feet, and should be visible 8 miles.

The light is shown from a square white building, 47 feet high, with a brown roof, standing on Haszard Point, 35 feet from the coast.

The back or high light is 125 feet above high-water mark, and should be visible 12 miles. The lighthouse building is in all respects similar to the front one; it is in rear of the farm buildings on Bellevue farm, at 2,244 feet N. 20° E. (N. 43° E. mag.) from the other.

St. Peters Island.—On the south side of St. Peters Island, an intermittent white light is exhibited at 70 feet above high water, from a square white building, 38 feet high.

The light is visible between S. 62° W. (S. 85° W. mag.) through north to S. 56° E. (S. 33° E. mag.) for 10 miles.

Blockhouse Point.—The lighthouse on Blockhouse Point, west side of entrance to Charlottetown Harbor, is a square tower, 42 feet high, painted white, and exhibits at an elevation of 56 feet a fixed white light, which should be visible 12 miles.

Brighton Beach.—Two red fixed leading lights are exhibited on the eastern side of York River.

Both lights are shown from skeleton towers with their southern faces closely slatted so as to make conspicuous day marks, and surmounted by wooden lanterns. The towers are painted white and the lanterns red.

The outer (southern) tower, placed on the NW. corner of the breakwater, is 40 feet high; and the light, 41 feet above high-water mark, should be seen over a small arc on each side of the alignment 7 miles.

The inner tower is 50 feet high and stands on the old Asylum grounds, 425 yards N. 23° W. (north mag.) of the outer tower. The light is 77 feet above high-water mark, and is visible, over a small arc on each side of the lights in line, 9 miles.

Note.—These lights are maintained during the season of general navigation, and at such times in winter as any steamers are running to Charlottetown.

Buoys.—On entering Charlottetown Harbor, red buoys must be left on starboard and black buoys on port hand.

Caution.—The buoys in this harbor are frequently out of position; therefore in clear weather use the leading and clearing marks.

East Side of Channel.—Prim Point, is low, with cliffs of sandstone 10 to 15 feet high, and may be recognized by the lighthouse. Prim Island, which has also low cliffs, is distant 1¼ miles NE. from the extremity of the point, and is united to its north side by sand benches, inclosing marshy ponds.

Prim Reef, of sandstone, runs out to the westward, both from the island and the point, so as to form a forked reef, with very uneven soundings; its western point, in 3 fathoms, is west 2 miles from the lighthouse, and the other point SW. by W. 1¼ miles: but if the reef is considered as bounded by the depth of 5 fathoms, it is much more extensive, reaching out to the distance of 3 miles.

Buoy.—A buoy, painted red, marks the western extreme of Prim Reefs; it lies 2$\frac{1}{10}$ miles from Prim Point lighthouse.

Clearing mark.—The old Scotch church, formerly a clearing mark for this reef, has been superseded by a new graystone edifice with a spire, to the southward of the old building. This color prevents it from being seen as far as Prim Reef, but it may be used as a clearing mark for Fitzroy Rock by being kept just open west of Battery Point; therefore, the red buoy on the extremity of Prim Reef and the lead must be the main dependence, the soundings, combined with the bearing of the light, being amply sufficient for rounding the reef, as will be seen in the chart.

Governor Island, lying in the middle of Hillsborough Bay, is low, in great part wooded, based upon sandstone, and has dangerous shoals round it on all sides.

Governor Shoals, extending from Governor Island to the SW., and adding greatly to the dangers of the navigation, require especially to be noticed. Stretching out from the west end of the island, the sandstone reef is dry at low water for the first ½ mile, and has less than 3 fathoms for an equal distance farther; after which rocky and irregular soundings continue to the west extreme of the shoals, in 5 fathoms, distant 2 miles from the island.

Buoy.—A bell buoy is moored in 4 fathoms, 200 yards within the west extreme of the shoals.

Fitzroy Rock, with 20 feet least water, lies about 200 yards to the eastward of the above buoy, and was considered the principal danger off the island until the discovery of the much more dangerous rocky patches which are scattered over these shoals farther to the southward.

Of these patches, the Huntley Rock, bearing S. 5° E. (S. 18° W. mag.), 1¾ miles from the west end of Governor Island, has the least water, namely, 12 feet at low water; but there are others, with from 17 to 22

feet water, as far out as 2½ miles, and the SW. extreme of the shoals in 5 fathoms is distant 3½ miles from the island. The new Scotch church, which may be known by its spire, and Battery Point, bearing N. 7° W. (N. 16° E. mag.), leads along and clears the west side of the Governor Shoals in 5 fathoms, excepting the small portion of the west extreme to the westward of the buoy.

On the eastern side of the channel into Charlottetown Harbor, to the northward of Governor Island, the shallow water is continuous, from Sea Trout Point, at the entrance of the harbor, to Governor Island, there being only a passage for boats or small craft between that island and the land north of it. The edge of the bank, in 5 fathoms, runs to the south from Sea Trout Point to abreast the Spithead buoy; consequently parallel, in this part, to the bank on the opposite side, leaving a channel with 7 to 12 fathoms water, and either ⅛ mile or ¼ mile wide, according as it is conceived to be bounded by the 5 or 3-fathom line of soundings.

Squaw Shoal, with 10 feet least water, approaches close to the edge of the bank where it is most steep. Battery and Sea Trout Points in one, bearing N. 23° E. (north mag.), form an excellent mark for this side of the channel, leading along the edge of the bank, in 4½ fathoms least water, from near Sea Trout Point to ¼ mile beyond the Spithead buoy on the opposite side; but it had better not be followed farther to the southward in a large ship, although smaller vessels may do so, until Governor Island and Gallows Point are touching, bearing in mind that it finally leads over the reef off the west end of the island.

West Side of Channel.—St. Peters Island, lying off the western point of entrance to Hillsborough Bay, is rather more than 3 miles in circumference, and of very moderate height, having cliffs of red clay and sandstone, 35 feet high, along its eastern shore. There are several farms on either side, but the central parts of the island are thickly wooded. It is joined to Rice Point, the western point of the bay, by sands dry at low water.

Shallow water extends off this island 1¼ miles to the SW. and south, but the soundings, deepening out gradually, afford ample guidance in that part. Farther eastward St. Peters Shoals become much more extensive, stretching out 3¼ miles NE. by E. from the NE. point of the island. For the first 2 miles of that distance, St. Peters Spit of sand dries out, affording shelter to St. Peters Road which is fit only for small vessels, having only from 9 to 12 feet at low water. The Spithead, a rocky shoal, with 8 feet least water, lies off the end of St. Peters Spit, and extends to within ¼ mile of the east extreme of the St. Peters Shoals, where the Spithead buoy is moored in 3 fathoms.

Caution.—The 5-fathom edge of the bank, forming the western side of the channel into Charlottetown Harbor, trends northward 2¼ miles from the Spithead buoy to about 200 yards off Blockhouse Point, at the entrance of the harbor. The edge of the St. Peters Shoals may

be safely followed by the lead in 5 fathoms as far in as the Spithead buoy; after which the bank becomes steep, and must be approached with caution in a large vessel.

Trout Rock, with 7 feet least water, lies 400 yards within the edge of the bank, and a long ½ mile from Blockhouse Point.

Charlottetown Harbor is 900 yards wide at entrance, between the cliffs of Sea Trout and Blockhouse Points; but shallow water, extending from both shores, reduces the navigable width of the channel, reckoning from the depth of 3 fathoms, to about 450 yards; and as the shoals are very steep, it would require to be well buoyed before a ship of large draft could beat in or out with safety. Cliffs of red sandstone, from 10 to 30 feet high, form the shores on either side, the land rising gradually from them in undulations, and being partly cultivated and partly wooded. A lighthouse and signal post stand on Blockhouse Point, the west point of entrance. The next point of cliff on the west side of entrance is Alchorn Point, and at the distance of ½ mile from the lighthouse are the remains of Amherst Fort, on the hill, 93 feet above high water. On the same side, north of Alchorn Point, is Warren Cove, and, lastly, Canseau Point, 1¼ miles from the lighthouse.

Canseau Spit extends off Canseau Point 700 yards, and will be cleared by keeping the lighthouse just open, clear of Alchorn Point, observing that the extremes of the cliffs of Blockhouse and Alchorn Points in one lead over the point of the shoal in 16 feet at low water.

Canseau Spit Buoy, painted black, marks the eastern extreme of Canseau Spit.

On the eastern side of the entrance and less than a mile within Sea Trout Point is Battery Point, with its shoal, the latter running out 400 yards and having on its extreme point a red buoy, moored in 3 fathoms at low water. Outside that depth, on either side, the water deepens abruptly, and there are 12 fathoms in the middle of the channel. The belfry of St. Dunstan college, in line with the flagstaff at Government house, leads clear of the shoal off Battery Point in 10 fathoms and at the distance of 120 yards.

Three red piles mark the shallow ground off Battery Point (August, 1877).

Middle Ground.—Within the harbor, in addition to the flats of mud and weeds extending off shore, there is Middle Ground, with 17 feet least water. When on this 17-foot patch the west turret of the tower of the Wesleyan chapel (built of brick and the turrets crowned with high skeleton work) is just shut in with the edge of the Roman Catholic church tower.

The lunatic asylum, just open eastward of the end of the railway pier at Charlottetown, bearing N. 37° E. (N. 60° E. mag.), leads southward and eastward of Middle Ground.

Immediately within Battery and Canseau Points, which are the inner points of entrance, the channel expands into a fine harbor, having depth

and space sufficient for any number and description of vessels. In sailing in, York River will be seen running in to the northwestward, the Hillsborough River stretching away to the NE. as far as the eye can reach and Elliot River running in to the southwestward. The confluence of the streams of these three rivers between Canseau Spit and the mouth of York River forms the Three Tides, where there is excellent anchorage, used occasionally by laden vessels preparing for sea, the usual anchorage being off the wharves of the town, where the channel is 550 yards wide and carries nearly 10 fathoms water.

Of the three rivers which unite in the harbor, the Hillsborough is the largest, being navigable for vessels of large draft for 7 or 8 miles, and for small vessels 14 miles above Charlottetown, where there is a bridge 2 miles from the head of the river. There is a portage of less than a mile across from the Hillsborough near its head to Savage Harbor, on the north coast of Prince Edward Island. York River, the smallest of the three, is crossed by Poplar Island bridge, 2¾ miles from its mouth. Elliot River may be ascended 4 or 5 miles by large vessels and 9 or 10 miles by small craft and boats. The shores of all three rivers are settled, and the country generally fertile.

Charlottetown, the capital of Prince Edward Island, is advantageously situated on the north bank of Hillsborough River, a short distance within the entrance, and at the point where the deepest water approaches nearest to the shore, the wharves, however, still requiring to be 240 yards long to reach the edge of the channel. The city is well laid out, with spacious squares and wide streets at right angles to each other, and contains several fine buildings.

The provincial building occupies the center of the public square, and is flanked on either side by the law courts and post-office, both substantial brick structures. The market house, a large wooden building, with a belfry at the west end, is west of the post-office, while St. Paul's church, a wooden building with a spire, occupies the east end of the square. The Presbyterian church, a handsome stone building, is at the NW. end of the town, and a convent, built of brick, with a small belfry at the top, is conspicuous from the harbor. The Roman Catholic cathedral, a wooden building with a large guilt cross at the top of the spire, and bishop's palace, of stone, near it, also show prominently. West of the town stands Government house. The lunatic asylum, a fine building of stone, with a high tower, stands just north of Falcon Point. The railway station is at the east end of the town, and may be known by the wharf in connection with it, on which stand large chocolate-colored warehouses. St. Dunston college stands on a hill 150 feet high, 1½ miles to the northward of the town.

The United States is represented by a consul and vice-consul.

Population.—In 1891 there were 11,374 inhabitants.

Telegraph.—Charlottetown is in telegraphic communication with the principal towns and ports in Prince Edward Island, also with Canada and the United States.

Communication.—It is connected by rail with Georgetown and Souris on the eastern coast of the island, with Cape Traverse and Summerside on the southwestern coast, and with Alberton and Tignish at the northwestern point of Prince Edward Island.

During the season of navigation a steamer runs to Pictou 5 days each week, and sometimes there is direct steam communication with England.

Coal.—About 6,000 to 8,000 tons of Pictou and Cape Breton coal are usually kept in stock under sheds. The coal is weighed into schooners and taken off alongside; a tug can be hired if required. Labor is plentiful, and from 75 to 112 tons can be put on board in bags or buckets in an ordinary day's work, but from 112 to 200 tons by working day and night. The weather does not interfere with coaling.

There are two coal wharves, one 300 feet long with 8 feet alongside at low water, the other wharf is 500 feet long with 18 feet at low water and 25 feet at high water alongside of it.

Hospital.—Sick seamen are cared for in the Charlottetown hospital.

Quarantine.—Charlottetown is a minor quarantine station.

Supplies.—Meat, vegetables, and bread are plentiful and good, and all kinds of other supplies may be obtained at Charlottetown; good water in large quantities from standpipes on wharf, or from boats fitted as tanks. There is an iron foundry.

Tides.—It is high water, full and change, in Charlottetown Harbor at 10h. 45m.; springs rise 9½ feet, neaps 8 feet. Their rise is considerably influenced by the winds, so that spring tides during NE. gales have risen 11 feet and neaps during SW. gales 6 feet; but these are extraordinary cases. The range of the neap tides has been at times less than 3 feet. The duration of the two tides is nearly equal, and their streams continue about a quarter of an hour after high and low water by the shore, running usually at the rate of 1¾ knots off the town, and 2½ knots in the entrance of the harbor.

There is considerable diurnal inequality in height of the tides which, however, principally affects low-water level, consecutive high waters varying from 3 to 15 inches, the low water from 3 inches to 3½ feet.

Ice.—At Charlottetown, taking the mean of 10 years' observation, the harbor is usually frozen over about December 21, and is clear of ice about April 10, being completely closed between those dates. In one of those years the harbor was clear of ice on the 1st of April, and in another year it remained open until the 27th of December.

The first vessel arrives from sea about April 26, and the last vessel leaves about December 20.

Pilots.—There are no licensed pilots from Charlottetown.

Charges.—Pilotage (not compulsory), per foot, 50 cents; discharging ballast, 12 cents per ton; consul fees, 1 cent per ton; tonnage dues, 2 cents per ton; tugboat charges inward, $5 to $10; outward, $5 to $15; ballast, 40 cents per ton.

Directions from the Eastward.—Vessels bound to Charlottetown

from the eastward with a fair wind will avoid the Rifleman Reef by attending to the soundings on the chart, and by not bringing the light on Prim Point to bear to the westward of N. 45° W. (N. 22° W. mag.). A large ship should round Prim Reef by the lead in 10 fathoms water; a smaller vessel may go nearer with attention to the soundings.

When Prim light bears east (S. 67° E. mag.), the vessel, being in not less than the low-water depth of 10 fathoms, will be abreast of the red buoy on the western extreme of Prim Reef, distant about one mile, and the course across the bay must be N. 18° W. (N. 5° E. mag.) in thick weather, the object being to strike soundings on the southern edge of the bank off St. Peters Island, and then to follow it to the northeastward in 5 fathoms, until about 2 miles within the Fitzroy Rock, where there is excellent anchorage off Governor Island, and where the vessel had better wait.

If it be day and clear weather, and the leading marks shown on the plans can not be seen, and Prim Reef has been passed as above directed, steer N. 3° W. (N. 20° E. mag.), attending to the soundings, to avoid being set to the eastward too near the Governor Shoals.* If the spire of the Scotch church (which is the leading mark for clearing Prim Reef) can be made out before arriving near the Fitzroy buoy, bring it in line with Blockhouse Point bearing N. 3° W. (N. 20° E. mag.), and keep it so until Governor Island and Pownal Point are touching, and bearing N. 58° E. (N. 81° E. mag.), when the Fitzroy bell buoy will be seen on the same bearing, and distant ⅔ mile.

Steer now N. 33° E. (N. 56° E. mag.) with the flood tide, or N. 27° E. (N. 50° E. mag.) with the ebb, until the west side of Government house and Battery Point come in line, bearing N. 17° W. (N. 6° E. mag.), when alter the course toward them, taking care not to open out any more than the west side of Government house, and they will lead to the eastward of the Spithead buoy, which having passed, continue running on the same leading mark until Brighton Beach lighthouses (day beacons) are in line bearing N. 23° W. (north mag.). This mark will lead west of the buoy on Battery Point shoal, and when Blockhouse Point comes nearly on with Alchorn Point bearing S. 12° E. (S. 11° W. mag.), keep it so for about ⅓ mile, passing Canscau Spit buoy at nearly 200 yards east of it, until the lunatic asylum is just open eastward of the end of the railway pier at Charlottetown, bearing N. 37° E. (N. 60° E. mag.); this mark leads southward and eastward of the Middle Ground to the anchorage in mid-channel off the town. Or keep Government house open west of Sea Trout Point N. 17° W. (N. 6° E.) until either the day beacons on Brighton Beach bearing N. 23° W. (north mag.) or the western house on May Point is in line with the west edge of the trees

* The best marks for a stranger are the two leading lights on Haszard Point in line N. 20° E. (N. 43° E. mag.), until the two lights on Brighton Beach are in line N. 23° W. (north mag.), taking care not to overshoot the latter line. The Haszard lights in line lead rather close to Fitzroy Rock. The Governor's house is nearly hidden by trees.

at Brighton bearing N. 23° W. (north mag.); either of these marks should then be kept on till the belfry of St. Dunstan college is in line with the flagstaff at Government house, which leads west of the buoy on Battery Point Shoal, when proceed as before. These marks lead through a slightly better part of the channel than the former; but the houses on May Point are not easy of recognition by a stranger.

In a small vessel the turret of the Roman Catholic college can not be seen more than 400 yards to the northward of the buoy off Battery Point on account of the trees.

Caution.—In entering Charlottetown, care must be taken not to confuse a conspicuous building to the westward of Government house either for Government house itself or the Whitehouse on May Point.

From the Westward.—Approaching from the westward with a fair wind, bring Governor Island and Pownal Point to touch bearing N. 58° E. (N. 81° E. mag.), and run for them until the thin spire of the Scotch church comes in sight, and in line with Blockhouse Point, bearing N. 3° W. (N. 20 E. mag.), when steer N. 33° E. (N. 56° E. mag.) or N. 27° E. (N. 50° E. mag.), according as it may be flood or ebb tide, until Government house is just open west of Sea Trout Point, bearing N. 17° W. (N. 6° E. mag.), and then proceed as before directed.

If the leading marks can not be made out, follow the southern and eastern edge of the St. Peters Shoals in 5 fathoms up to the Spithead buoy, and then proceed as before directed.

With Beating Winds little difficulty will be experienced, if attention be paid to the soundings on the chart and to what has been said of the Prim Reef and the Governor Shoals. On approaching the narrow part of the channel, the buoy, or the leading marks, will point out the position of the Fitzroy Rock, the vessel making short boards off and on the edge of the St. Peters Shoals, until more than a mile within it; after which (and in addition to the lead), the west side of Government house and Battery Point in one will show when to tack in the board to the westward, until well within the Spithead buoy, and Battery and Sea Trout Points in one will do the same on the east side of the channel until the vessel arrives close off the entrance of the harbor. It has been already remarked that more buoys would be required before a vessel of large draft could safely beat in and out through the entrance, and even in smaller vessels it is necessary to be well acquainted with the place, and to be constantly on the guard against the flawing and unsteady wind which so commonly prevails there.

At Night the buoys would require to be seen for the safety of large sailing vessels.

Keep the white light on Blockhouse Point on a N. 6° W. (N. 17° E. mag.) bearing when approaching from seaward until Haszard lights are in line N. 20° E. (N. 43° E. mag.); the lights kept so, lead to the bell buoy, marking the Fitzroy Rock, pass to the westward of the buoy, and when Brighton Beach lights come in line bearing N. 23° W. (north

mag.), steer from them until abreast Canscau Point, when the course should be altered for the anchorage, the course being judged by the town lights.

Wreck.—The wreck of two steamers sunk in the channel to Charlottetown, east of Alehorn Point, form a danger to navigation; their position is marked by a barrel buoy, which may be passed to the westward.

Anchorage.—The best anchorage ground will be found off the Ferry Pier on the town side, and in the fall of the year it is advisable to moor NE. and SW.

Tides.—It is high water, full and change, at the head of Hillsborough River at 11h.; springs rise 10 feet, neaps 8½ feet.

Squaw Bay.—The eastern part of Hillsborough Bay being out of the principal line of navigation, is but little frequented by shipping. On this account, and also because it abounds with dangers, so that no directions would avail, the services of competent pilots there would be indispensable.

Anchorage.—Northeast of Governor Island, under shelter of the shoal at its east point, and off the mouth of the shallow Squaw Bay, there is good anchorage for small vessels in from 9 to 12 feet with mud bottom.

Pownal (Pownell) Bay requires but a brief notice, being shallow and open to westerly winds; it affords shelter to small craft and boats near its head, which dries extensively at low water.

Gallows Point, separating Pownal and Orwell Bays, has a long reef of sandstone and extensive shoals off it, on which are scattered rocks covered with only a few feet of water. These shoals extend in the direction of Governor Island 2 miles, and also a long mile toward Prim Point. There is, moreover, a detached shoal, with 13 feet least water, bearing S. 73° W. (N. 84° W. mag.) 2 miles from Gallows Point.

Orwell Bay, leading to Orwell, Vernon, and Seal Rivers, is 2 miles wide at its entrance, between Gallows and Buchanan Points; the latter, on the southern shore, being 5 miles within or to the eastward of Prim Point. In proceeding in from Prim Island toward Orwell, the shallow water extends to greater distances from the shore, until at last it stretches nearly halfway across the mouth of Orwell Bay. Its edge in 3 fathoms is there 1¼ miles out from the cliffs and has a rock upon it, with 9 feet least water, which bears N. 79° W. (N. 56° W. mag.) a long mile from Buchanan Point, and south (S. 23° W. mag.) 1½ miles from Gallows Point. Between the shoals just mentioned and those which stretch over to the southward from Gallows Point, the channel is 800 yards wide and carries nearly 5 fathoms water, becoming shallower and narrower within the bay until off McInnis Point (1½ miles in from the entrance on the northern shore) it suddenly contracts to less than 200 yards in breadth, and decreases in depth to 14 or 15 feet at low water in spring tides. This is the bar which would require to be

buoyed, as would also the channel, which becomes only a little wider within, the depth at the same time increasing to 7 or 8 fathoms between steep shoals on either side.

Just within China Point (on the northern shore and 2 miles within the bar) is the confluence of the Orwell and Vernon Rivers, and there vessels may lie landlocked, the channel being 170 yards wide, and carrying 5 fathoms water between mud flats dry at low water. Vessels can ascend more than a mile up the Orwell and Vernon Rivers, and new vessels are brought down the latter with the tide from a much greater distance; but both rivers are obstructed with oyster beds at the distance of 1¼ miles from China Point, and their channels higher up become very shallow and narrow, the Orwell being quite dry at low water, as is also Seal River, which enters the Vernon from the northward.

Light.—At Orwell a fixed red light, visible 8 miles, is shown from a square, white lighthouse, 22 feet high, on Brush Wharf. The light is 28 feet above high-water mark.

(H. O. Chart No. 1066.)

Coast.—From St. Peters Island to Marle Head, a distance of 9 miles to the westward, the coast is straight and unbroken, and may be approached by the lead to 5 fathoms water, bearing in mind that that depth is occasionally within 400 yards of shallow water, extending in some places ¾ mile from the shore.

Marle Head has a reef running out from it nearly a mile, which should not be approached nearer than the depth of 5 fathoms. Sable Cove, west of Marle Head, is nearly dry at low water, and crossed by a bridge one mile from its entrance.

Inman Rock, with 4 feet least water, lies near the outer point of this reef, south ⅔ mile from Brockelby Head, and has from 13 to 19 feet of water around it. Large vessels should not approach it nearer than the low-water depth of 4½ fathoms.

Brockelby Head is the eastern point of the bay in which Crapaud Road and Brockelby River are situated. It has clay cliffs, 15 feet high, based upon sandstone, which runs out a mile to the southward, forming a dangerous reef, which must be carefully avoided by vessels approaching Crapaud from the eastward.

Crapaud Road is a small but secure anchorage off the mouth of Brockelby River, and between the eastern part of Tryon Shoals and the land. The space in which vessels may ride in from 12 to 15 feet at low water is about ½ mile long and 400 yards wide; but the anchorage for small craft in from 7 to 9 feet is more extensive, continuing nearly a mile farther to the westward in a narrow channel or cove in the sands, which dry at low water. The entrance to this road between the eastern point of Tryon Shoals and the shallow water off the shore to the eastward is only 180 yards wide, and carries 9 feet at low-water spring tides.

Channel.—A dredged channel, with a depth of 8 feet in it, and marked by poles, extends from the western buoy to a basin, which has a depth of 8 feet, and is 300 yards in extent, situated close to the bridge.

Victoria.—In 1881 the village of Victoria had about 1,500 inhabitants.

Brockelby River is all dry at low water, excepting a very narrow, winding channel through mud flats, by which boats can ascend to the bridge, 1¼ miles from the entrance. The land rises to the height of 250 feet from the eastern bank of this river and the neighboring country is pleasing and well settled.

Lights—Leards Range.—On the west end of bridge, head of Crapaud Harbor, stands a square white building, 38 feet high (with a red diamond on its south face), from which, at an elevation of 41 feet, a fixed white light is exhibited, visible 6 miles.

Half a mile N. 23° W. (north) from the outer lighthouse, a fixed white light is shown at 60 feet above high water from a window in a house 24 feet high, surmounted by a white diamond beacon. The light should be visible 6 miles.

Wrights Range.—The front light, known as Paul Bluff light, is on the south extreme of the bluff, and exhibits a fixed red light from a mast 30 feet above high water, and visible about 3 miles over a small arc in the direction of the leading line.

The back light, which is a fixed red light 50 feet above high water, and visible in clear weather 3 miles over a small arc in the direction of the leading line, is 700 yards N. 65° W. (N. 42° W. mag.) from Paul Bluff light. It is shown from a square open framed tower 27 feet high, and painted white, with red lantern.

An Additional fixed red light is exhibited from a post on Palmers wharf, south (S. 23° W. mag.) 200 yards from the outer fixed white light which leads over the bar. It is 10 feet above high water, and visible 2 miles. This light, in line with the front (white) leading light over the bar (Leards range), bearing about north (N. 23° E. mag.), leads through the dredged channel to the wharves and road.

Day Marks.—On the outer lighthouse is a red diamond, reaching from the underside of the gallery to the top of the basement window by the full width of the tower.

On the dwelling from which the inner light is shown is a slatted diamond-shaped beacon 20 feet high by 12 feet wide, painted white, the bottom of the diamond being level with the ridge of the house. This beacon will show against a background of spruce woods.

Buoyage.—A can buoy, painted black and white, in vertical stripes, is moored nearly a mile W. ½ S. of Brockelby Head; also with Crapaud leading lights in line, bearing N. 23° W. (north mag.). A smaller buoy, similarly painted, is also moored on the mark of the leading lights in line, distant ¾ mile from the first buoy. A small cask buoy painted black and white, in vertical stripes, lies N. 76° W. (N. 53° W. mag.) ½ mile from the northern of the above buoys.

Directions.—To enter Crapaud Harbor, vessels should bring the two old lights (which will be known hereafter as "Leards range," and are both fixed white) into alignment, and keep them in one on a N. 23° W. (north mag.) course until the lights of Wrights range are in alignment when they should follow this range N. 65° W. (N. 42° W. mag.) until the red light on Palmers wharf is in alignment with the front light on Leards range. These two in one will lead in from the black buoy, at the entrance to the dredged cut, through the cut to the wharves, but strangers entering at night are advised to anchor in the road at this last described turning point near the black buoy, as they will be in good anchorage inside the shelter of Tryon Shoals, while it is not safe to attempt the dredged cut at night.

No sea of consequence ever comes into this anchorage, the sands outside being covered only to a depth of a few feet at high water, and the shallow water to the eastward, off Inman Point and Brockelby Head, overlapping the entrance.

Tides.—It is high water, full and change, in Crapaud Road at 10h.; springs rise 8 feet, neaps 6 feet; there is, therefore, a depth of from 15 to 17 feet at high water in the entrance or on the bar of the road. The tidal streams are weak and irregular; in general, their rates do not exceed ½ a knot at the anchorage, but they sometimes amount to 1½ knots for a short time along the edge of the shoals and in the entrance.

Tryon Shoals, of sand upon sandstone, dry out 1¼ miles off shore between the Brockelby and Tryon Rivers, and their SW. extreme, in 3 fathoms, is south 2¾ miles from Tryon Head. At ¼ mile NNE. from the SW. point of the shoal there are only 2 feet water over rocky bottom, and at twice that distance the sands are dry at low water. The SW. point is steeper than any other part of these shoals, having 4½ fathoms close-to; but there is, nevertheless, sufficient warning by the lead, since the depth of 5 fathoms is nowhere less distant than ½ mile from their edge.

There is, moreover, an excellent leading mark, namely, Cape Traverse and Carleton Head, in line, bearing N. 49° W. (N. 26° W. mag.), which clears the SW. point of the shoals in 5 fathoms, and at a distance of a long ½ mile.

Caution.—Farther eastward, these shoals may be safely approached to any convenient depth by the lead, which should never be neglected when in their vicinity, for the tides round the island meet off them, causing variations in the strength and set of the streams, which it would require long-continued observations to understand or account for. The stream of ebb out of Verte Bay frequently sets over toward these shoals, so that a vessel standing along the land with a scant southerly wind will often find herself dropping to leeward toward them much faster than her usual amount of leeway would lead her to expect.

Buoy.—A whistling buoy, painted red, is moored southwestward of Tryon Shoals, in a position with Crapaud outer lighthouse bearing N. 25° E. (N. 48° E. mag.), distant 4 miles.

Tryon River, between Tryon Head and Birch Point, is approached by a very narrow channel through the western side of Tryon Shoals. There is a foot water over the bar of this channel at low water in spring tides, but the depth increases to 11 or 12 feet for a short distance within, and then the channel becomes still narrower, winding through flats of sand, mud, and weeds to the bridge, a distance of nearly 3 miles, following the channel. Small schooners enter the Tryon, with the assistance of the tide, which rises from 6 to 8 feet; and there are flourishing farms on each side of the river.

Cape Traverse, Carleton Head, Sea Cow Head.—The points between these headlands are formed of red sandstone and clay cliffs, with coves between, affording shelter and landing for boats, and also anchorage for small craft with the wind off the land or in fine weather. The shallow water does not extend beyond 600 yards off either of these headlands, but in the bays its 3-fathom edge is sometimes twice that distance from the shore; and as the line of 5 fathoms is sometimes quite close to it, the general rule for vessels at night should be not to approach nearer than the depth of 7 fathoms. In the old charts a shoal with 3 fathoms water is shown off Carleton Head, but a diligent search proved that it has no existence.

Between Tryon Head and Cape Traverse are three coves, namely, Cumberland, Augustin, and Provost, which are separated by points of cliff and are dry at low water.

Light.—The lighthouse on Sea Cow Head, or Salutation Point, a white octagonal building, 60 feet high, exhibits at 88 feet above high water a fixed white light, which should be visible 15 miles.

Bedeque Bay.—From Sea Cow Head to Cape Egmont the course is N. 71° W. (N. 48° W. mag.) and the distance 14½ miles. A bank of comparatively shoal soundings commences at the latter and terminates at the former headland, curving to the southward, so as to extend to the distance of 3½ miles off shore; its southern edge, in 5 fathoms, forms an excellent guide for vessels at all times; but if of large draft, they should be careful of venturing within that depth, since there are only 3¼ fathoms, with rocky bottom, in one part.

Bedeque Harbor, in the bay to the northward of Sea Cow Head, runs in to the eastward between Indian Head and Phelan Point; the former, the south point of entrance, will be easily distinguished, being faced by sandstone cliffs 25 feet high, and rising to double that height a short distance back from the shore, whilst the other is comparatively low and wooded. The Roman Catholic church eastward of Phelan Point is very conspicuous and forms a good mark from the offing. The entrance between these points is 1¼ miles wide, but Indian Spit, which dries out ½ mile from the head, and the shallow water off the opposite shore leave only a narrow channel into the harbor. Indian Island is a mile within the entrance, having no passage southward of it, and Island Shoal extending from it 800 yards in the opposite direction. The channel passes northward of this shoal, and then turns to

the southward, within or to the southward of the island, where vessels may lie quite landlocked in 5 fathoms water.

A depth of 20 feet at low water, ordinary spring tides, can be carried into the harbor, and, since the tides rise from 5 to 7 feet, there is water enough for vessels of large draft; but the channel is rendered so intricate by the Island Shoal and Middle Ground, which lies a little farther out on the opposite side of the channel, that no directions would enable a stranger to enter this harbor without great risk of accident.

Summerside, a town of considerable size, is on the north side of Bedeque Harbor. Several wharves extend from the town, to one of which the railway runs. This latter may be distinguished by the light tower on a storehouse near the extreme. A large hotel has been built on Indian Island, and communication is kept with the town by a steam ferry. There were 2,883 inhabitants in 1891.

The United States is represented by a consular agent.

Coal.—There are usually 1,000 tons in stock, exclusive of the amount stored by the railway department. Vessels of less than 20-feet draft can coal alongside the railway wharf; coal can be lightered to larger vessels in the harbor, the lighters being loaded in bulk. The railway department has usually about 1,100 tons in stock.

Lights.—The light at Summerside railway wharf is exhibited from the roof of a shed 30 feet high. It is a fixed red and white light, 33 feet above high water, and should be visible 10 miles. It shows red in line of range, white over head of wharf.

A fixed red light is exhibited $\frac{3}{4}$ mile N. 70° E. (S. 87° E. mag.) from the light on railway wharf. The light is shown at an elevation of 65 feet, and should be visible 8 miles. The tower, 56 feet high, is square, painted white, open framework, with front face boarded.

The lights in line lead up to the railway wharf.

Indian Spit.—A white octagonal lighthouse, 42 feet high, has been built on Indian Spit, from which is exhibited at 48 feet above high water a fixed light showing white, with a green sector, between N. 50° E. (N. 73° E. mag.) and east (S. 67° E. mag.), over Miscouche Shoals. The light should be visible 13 miles.

Buoyage.—A black buoy is moored off the southern extreme of Miscouche Spit; it lies with Indian Head bearing N. 63° E. (N. 86° E. mag) and Sea Cow Head lighthouse S. 50° E. (S. 27° E. mag.), distant $3\frac{1}{10}$ miles. Indian Spit buoy is a can buoy, painted red; Middle Ground buoy is painted black, and Island Shoal buoy is a can buoy, painted red.

The north side of the channel opposite Island Shoal is generally marked by a stake with a bush on the top.

Ice.—The harbor is usually frozen over about December 11, and is clear of ice about April 16, being completely closed between those dates. The first vessel arrives about April 24, and the last one leaves about December 11.

Directions.—As the assistance of a pilot is indispensable to enter

Bedeque Harbor, it would be advisable to anchor in the bay or roadstead outside until one is obtained. The anchorage in the roadstead in 22 feet at low water, sand and clay bottom, is quite safe during the summer months, although open to SW. winds, the shallowness of the water and the land at the distance of several miles preventing any very heavy sea from coming in. Should, however, any extraordinary circumstances render it expedient to attempt running into the harbor, the best mode of proceeding would be to run along the SE. and eastern edge of the Miscouche Shoal, and in the low-water depth of 18 feet, until Indian Point light is reached; leave the light and buoy to starboard, and when the light is abaft the beam, haul in N. 78° E. (S. 79° E. mag.) until the range lights are in one. The two red lights kept in line N. 70° E. (S. 87° E. mag.) lead up to the railway wharf in not less than 15 feet at low water. Vessels wishing to pass and clear the railway wharf will have to leave the two lights on the port bow after arriving opposite Holmans wharf.

If the vessel be approaching from the eastward with an easterly wind, Sea Cow Head may be safely rounded at the distance of 500 yards, Graham Head may be passed at twice that distance, and then the edge of the shallow water off Salutation Cove may be safely followed by the lead till Indian Head is approached, where the shoal becomes very steep, as is also Indian Spit, which, however, can frequently be seen, being dry at low water.

Vessels approaching from the westward can steer toward the harbor as soon as Indian Spit white light is opened, and after leaving it on the starboard hand, the lights on the railway wharf will guide. Vessels outside the light, working in or out, should tack immediately the white light is lost sight of.

At a short distance within Indian Island the harbor is divided into two arms, of which the northern, Wilmot River, has only 2 or 3 feet water in it, and is obstructed by oyster beds and crossed by a bridge 2 miles from the island. Vessels can ascend the southern arm 1¼ miles beyond the island; the channel then becomes obstructed by oyster beds, so as to leave only an intricate channel carrying 4 feet at low water. At 1½ miles higher up, on the south shore, is Popes wharf, ½ mile above which this arm, which is called Dunk River, divides into two narrow and shallow channels, crossed by bridges at the distance of a mile.

Tides.—It is high water, full and change, at Greens wharf, on the north shore of Bedeque Harbor, at 10h. 15m.; springs rise 7 feet, neaps 5 feet.

Miscouche Bank dries out for 1¼ miles from Miscouche Point, and extends 2¾ miles southward to the depth of 3 fathoms, sheltering the roadstead in Bedeque Bay, outside Bedeque Harbor, from westerly winds. The northern extremes of Indian Point and Indian Island in one, bearing N. 65° E. (N. 88° E. mag.), clear the south point of the spit in 14 feet water, but the lead will be a sufficient guide when a greater depth is required.

Sunbury Cove, 9 miles to the eastward of Cape Egmont, is an extensive place, but nearly dry at low water, excepting a narrow channel through the flats only fit for boats or very small craft. Miscouche Point is the eastern point of this cove; and Miscouche church will be seen to the NNE. of it at the distance of 2 or 3 miles inland.

Fifteen Point.—The church and village at this point stand near the shore 4¼ miles to the westward of Sunbury Cove, and can be seen at great distances, either from the eastward or westward. The Roman Catholic church may be distinguished by the body of the building and spire being white, the roof light brown; a small white nave with a black top is also attached. A tall white beacon stands a little to the eastward. At the extremity of the point, one mile to the eastward of the church, there is a low rock above water, called the Little Dutchman, and shallow water to the distance of a long mile off shore; the depth then increases to near 4 fathoms for 2 miles farther off, and then decreases again to 3¼ fathoms over sandstone bottom not far from the edge of the bank, the church bearing from the shallow part nearly N. 23° W. (north mag.) 3 miles.

Cape Egmont is a remarkable headland with cliffs of sandstone 50 feet high. About 2 miles to the northward of it will be seen the Dutchman, an isolated rock 30 feet high, and lying 200 yards from the shore. The cape itself is quite bold to the southward, but to the westward there is shallow rocky ground ½ mile off shore, and which should not be approached nearer than the depth of 6 fathoms.

Light.—On the extremity of Cape Egmont is a square, white lighthouse with dwelling attached.

The light is a fixed red light, 72 feet above high water, and should be visible 10 miles.

Egmont Bank, of fine red sand, and with 4 fathoms least water, is very narrow and 2½ miles long SE. and NW. Its northern end bears S. 88° W. (N. 69° W. mag.) 5 miles from Cape Egmont; its southern end S. 59° W. (S. 82° W. mag.) 4 miles from the same headland, and there are as much as 8 fathoms and a clear channel between it and the cape.

Egmont Bay is formed between Cape Egmont and West Point, which is distant 17 miles. It is 8 miles deep, and affords excellent anchorage, with offshore winds, in from 4 to 7 fathoms, over sand and clay bottom; but vessels should not anchor in less than 5 fathoms anywhere excepting on the NW. side of the bay, because there is rocky ground, with only 3½ fathoms water off the river at its head, lying just within the 5-fathom line, and at a distance of 3 miles from the shore, whilst along the eastern shore 5 fathoms would be too near the edge of the shoals.

The eastern side of Egmont Bay should not be approached to a less depth than 5½ fathoms in a large vessel, for the shallow water off Rock Point and the bar of St. Jacques extends a mile from the shore. The church of St. Jacques is conspicuously situated 5 miles to the north-

ward of Cape Egmont, having the French or Acadian settlement along the ridge to the northward of it, and the small river, St. Jacques, with its sawmills, ½ mile from it in the opposite direction. This church is white, with a red roof; the tower, with a portico attached, is painted yellow, and forms a very useful landmark. Haldimand River, shallow and running in to the southward about 2 miles, is about halfway between the church and Cape Egmont, and has sand hills on its west or outer point of entrance. From those sand hills a sand bar, dry at low water, extends 3 or 4 miles to the northward parallel to the shore, having very narrow channels through it, which are said to shift at times during heavy westerly gales. At the time of the Admiralty survey the principal channel was pointed out by two small beacons on the shore about a mile to the southward of the church. The course in, with those beacons in one, was S. 76° E. (S. 53° E. mag.), turning short to the southward within the bar into a harbor for small schooners, with 5 feet in it at low water, and extending to the entrance of Haldimand River.

Elmire and Percival Rivers, at the head of the bay, are only useful to boats and very small craft, having a depth of only 4 to 7 feet at low water, and being approached by exceedingly narrow and intricate channels through flats of sand, clay, and oyster beds, which are dry in part at low water, and extend 1½ miles from the shore. The tides flow about 5 miles up these rivers, between low and marshy banks.

On the northern shore of the bay, Brae and Wolf Rivers are sandy places dry at low water.

Tides.—It is high water, full and change, in Egmont Bay at 3h.; springs rise 4 feet, neaps 2 feet.

West Point.—The western point of Prince Edward Island consists of sand hills 12 feet high. Excepting in the direction of the spit, the shallow water does not extend far from it.

Buoy.—The whistling buoy formerly off North Point has been moved to a position off West Point. The buoy is painted red and marked WEST POINT BUOY, CANADA, in white letters. It is moored in 13 fathoms of water, ¾ mile west of the middle of the outer shoal, with West Point lighthouse bearing S. 57° E. (S. 34° E. mag.), distant 5¾ miles.

Vessels going south should leave the buoy on the port hand.

Tides.—It is high water, full and change, at West Point at 6½ hours; springs rise 4 feet, neaps 2 feet.

Anchorage.—There is good anchorage under West Point in winds from between north and east, in 4 fathoms, fine sandy bottom.

Light.—The lighthouse on West Point (with a keeper's dwelling attached), a square building, 67 feet high, and painted in broad horizontal bands red and white, exhibits, at 66 feet above high water, a revolving light, showing one red and three white flashes every one and one-half minutes, the flashes attaining their greatest brilliancy every twenty-two and one-half seconds; the light should be visible 13 miles.

West Spit.—The west spit of sand upon sandstone, covered in some parts with only a few feet of water, runs out from West Point 3 miles to the NW. and then trends NE. within West Reef, so that the latter overlaps it at the distance of ½ mile. There is a "cul de sac" between the spit and the shore, open to the northward, and in which there are from 6 to 4 fathoms water. The only way to avoid getting into this opening, or within West Reef, when running from the northward, is not to approach the island nearer than the low-water depth of 11 fathoms.

West Reef is a narrow and rocky ridge, 4 miles long, with irregular soundings from 2¾ to 5 fathoms. The least water, 16 feet, is near the middle of the reef, and there are 18 feet near its southern extreme, which bears from West Point N. 74° W. (N. 51° W. mag.) 3½ miles, and is distant 2½ miles from the nearest part of the shore. Its northern end is 3½ miles off shore at the highest part of the cliffs between McWilliams Cove and Cape Wolfe.

There are no leading marks for this reef, and as there are 13 fathoms in one part close to its outer edge, it is very dangerous to ships rounding West Point, and can only be certainly avoided at night or in thick weather by following the edge of the bank of soundings off the mainland in 9 or 10 fathoms, which will lead past it at the distance of 3 miles to the westward. There is a passage within the reef, between it and the West Spit, but it is narrow, with irregular soundings and strong tides, and should therefore never be attempted in a large vessel.

Tides.—The strength and direction of the tidal streams about West Reef are very irregular, being influenced by winds, varying also with the time of tide and probably with the age of the moon. In the deep-water channel, passing close on the outside of West Reef, the rate of the stream sometimes amounts to 2½ miles per hour, causing a heavy sea when running against the wind.

The West Coast of Prince Edward Island, from West to North Points (33 miles), is unbroken and formed of red-clay and sandstone cliffs, with intervening sandy beaches, affording landing for boats in fine weather. There are several ponds where boats can be secured, such as North and South Minimegash, Black, and Nail Ponds, but their outlets, through sandy beaches, are all nearly dry at low-water and of no use to vessels. The shallow water runs out to considerable distances off various parts of this coast, and, as a general rule, for large ships it should not be approached nearer than the depth of 11 fathoms at night or in thick weather.

Off Nail Pond and Nail Head, 6 miles SW. by S. of North Point, shallow water extends out 2 miles from shore.

Minimegash Reef is a ledge of rocks, nearly dry at low water and nearly a mile in length, parallel to the shore, from which its outer edge is distant ½ mile. It lies directly off the sandy beach and across the outlet of North Minimegash Pond, which is 15 miles from North Point.

There are 2½ fathoms of water between the reef and the shore, and vessels have in one or two instances been moored there during the summer months to take in cargoes of lumber, but it is a very unsafe place.

Lights.—Two leading lights are exhibited at Minimegash. When in line, they lead to the outer end of the north breakwater.

The outer light is shown from a mast 25 feet high with a white shed at its base, situated on a sand hill about 500 feet southward of the breakwater. The light is fixed, showing red seaward between the bearings of N. 20° E. (N. 43° E. mag.) through east to S. 25° E. (S. 2° E. mag.), covering the whole of Minimegash Reef, and white from S. 25° E. (S. 2° E. mag.) to S. 31° W. (S. 54° W. mag.). It is 30 feet above the sea, and should be visible 5 miles.

The inner light is a fixed white light 45 feet above high-water mark and visible 8 miles through a small arc on each side of the direction of the lights in line. It is shown from a mast 35 feet high with a white shed at its base, situated on Rix Point S. 19° E. (S. 4° W. mag.) from the outer light, distant about one mile.

Tides.—It is high water, full and change, at Minimegash at 3h. 30m.; springs rise 5 feet, neaps 3 feet.

Directions.—Vessels approaching Minimegash from the southward should stand along the coast within the red sector of the outer light, and having passed through it, should bring the leading lights in line, which kept so, lead to the outer end of the north breakwater.

Anchorage.—With offshore winds, there is good anchorage for small vessels, in 3 fathoms water, near a spar buoy about ½ mile NW. from the north breakwater.

North Point is of low red cliffs. It has a reef extending from it to the northward and eastward 1¼ miles to the depth of 3 fathoms; moreover, rocky and irregular soundings from 6 to 7 fathoms continue for several miles farther out to the NE., causing at times a dangerous breaking sea, and terminating in a small patch of rocks on which there is little more than 4 fathoms in low spring tides, and which bears from North Point N. 21° E. (N. 44° E. mag.) 4¼ miles. Fishermen report the existence of a shoal of 3½ fathoms, which breaks in bad weather about 8 miles NNE., which is most probably the 4-fathom patch. Vessels should therefore always give this reef a wide berth in thick weather, or at night, and this the soundings on the chart will enable them to do; it is therefore only necessary to add that it is most steep on the west side, where there are 10 fathoms at the distance of ¼ mile. The inner part of the reef dries out ½ mile from the point, affording shelter to fishing schooners which shift from side to side as the wind changes.

Light.—The lighthouse, on the extreme of North Point, is octagonal, 60 feet high, painted white, and exhibits at 80 feet above high water a revolving white light every minute; the light should be visible 14 miles.

Bear Cape and Reef.—Fishermans Bank. (See page 108.)

Murray Harbor has an exceedingly dangerous bar of sand, over which 10 feet can be carried at low water in ordinary spring tides; but strong easterly winds send in so heavy a sea as to render it at times impassable, a line of breakers extending then completely across the bay from Murray Head northward to Cody Point, a distance of nearly 2½ miles.

Buoys.—On the outer edge of the bar a buoy is moored in 3 fathoms, with the white beacon on Old Store Point (the sandy south point of entrance) in line with the black ball on the white gable of the Transit barn, bearing S. 54° W. (S. 77° W. mag.). The barn stands on the southern shore of the harbor ¾ mile within the entrance, and when in line with the beacon leads in through the deepest water (1860). There is, moreover, an inner buoy in the fairway ½ mile within the outer one, and which is intended to enable vessels to run in, when hazy weather prevents the leading mark from being seen.

Lights.—The front light, on the edge of the sand bar, south side of Murray Harbor, is a fixed white light, exhibited at an elevation of 33 feet, visible 8 miles. The lighthouses are square white buildings, the front one 30 feet and the back one 40 feet high.

The rear light, exhibited at 57 feet above high water, is also fixed white and visible 10 miles. The lights, one mile apart, bear from each other S. 54° W. (S. 77° W. mag.) and N. 54° E. (N. 77° E. mag.).

Directions.—Proceeding in from the bar, the channel into Murray Harbor, between sandy shoals extending from the shore on either side, contracts gradually in breadth to 120 yards, and expands again to 400 yards within the entrance. The depth also gradually increases after crossing the bar to 6 fathoms, as the vessel passes close to the steep sandy beach of Old Store Point, on which the beacon stands.

To run in, with the aid of the chart, look out for the outer buoy, or, being in not less than 5 fathoms, bring the white beacon and the black ball on the white gable of the Transit barn in line, bearing S. 54° W. (S. 77° W. mag.), and keep them so exactly until the vessel arrives about 300 yards from the beacon, when haul a little to the northward, so as to pass Old Store Point at the distance of about 50 yards.

By night, the leading lights in line, show the channel to the outer buoy.

Tides.—It is high water, full and change, in Murray Harbor at 9h. 6m.; springs rise 6¼ feet, neaps 3¼ feet.

Anchorage.—Anchor within Old Store Point, or to the west of it, at any distance not exceeding ¼ mile, because farther in the channel which passes to the southward of all the islands becomes very intricate, and would be difficult to follow without a pilot. The depth in the

anchorage recommended is from 3 to 5 fathoms, with sand and clay bottom, and a tide of 2 knots.

The entrance of Murray Harbor, between Old Store Point and the long sandy spit which runs out SSW. from Cody Point, is more than ½ mile wide, but it is all nearly dry at low water, excepting the channel already described. Within this entrance the harbor is of great extent, containing five wooded islands, and several rivers or sea creeks on either side, besides the main inlet, Murray River, which is much larger than the rest, and navigable 6 miles from the entrance, or nearly to the dam which has been constructed across it near its head. There are flourishing settlements all around, the principal one being at South River, where the English church, distinguished by its steeple, will be seen on the southern shore 2 miles within the entrance of the harbor.

Graham Ledge.—At 4½ miles north from Murray Head is Graham Point, from which Graham Ledge runs out one mile to the depth of 5 fathoms and ¾ mile to 3 fathoms. The shallowest part of this ledge, with 6 feet least water, bears N. 45° E. (N. 68° E. mag.) 800 yards from the extremity of the point. There is also a rocky shoal one mile farther to the northward, which runs out ⅜ mile from between Terras and Smith Points, and foul ground with from 4 to 5 fathoms at low water extends off the latter 1½ miles. The soundings are very irregular off this part of the coast, between Graham Point and Panmure Head, varying from 13 fathoms, mud, to 5½ fathoms, rock, until beyond 3 miles from the shore.

(H. O. Chart No. 1077.)

Cardigan Bay is 3¼ miles wide between Panmure and Boughton Islands. It affords good anchorage in from 6 to 10 fathoms, mud bottom, with winds off shore, but winds from NE. to south send in a heavy sea.

Georgetown Harbor, sometimes called Three Rivers, is on the western side of Cardigan Bay, 3 miles within Panmure Head, which is 9 miles northward from Cape Bear. It is the finest harbor in the southern part of the gulf, excepting Charlottetown, having depth of water and space sufficient for large ships. The rise of ordinary spring tides being only 5 feet is a great disadvantage as compared with Charlottetown Harbor, but, on the other hand, the ice does not, in general, form in it so soon in the fall by several weeks, and also breaks up earlier in the spring, so that vessels can enter later and leave it earlier, which is an important advantage in a climate where the navigation is closed by ice for so long a portion of each year.

Georgetown, the capital of Kings County, is well situated on the northern shore of the harbor, just to the eastward of Gaudin Point. Its streets are wide and at right angles. The principal buildings are the two churches (the northern church has a steeple and the southern church a tower) and the courthouse.

The United States is represented by a consular agent.

Population.—There are about 1,100 inhabitants (1897).

Supplies.—Almost all kinds of supplies may be obtained at Georgetown; fresh water from pump at ferry wharf. Has to be transferred by vessels' own boats.

Coal.—About 1,000 tons are usually kept in stock, exclusive of the quantity stored by the railway department.

Vessels of less than 24 feet draft can coal alongside the railway wharf. In the summer months, with short notice, coal can be brought alongside in schooners of 30 to 60 tons.

The railway department has generally about 550 tons of coal in stock.

Telegraph and Railway.—Georgetown is connected with Charlottetown by telegraph and railway.

Communication.—There is steam communication with Pictou once a week during the summer, and as often as possible before and after the close of ordinary navigation, by a steamer specially constructed for breaking through ice. This vessel is usually unable to make the passage from Georgetown to Pictou between the end of January and the end of March.

Light.—The lighthouse on Panmure Head, the east extreme of Panmure Island, is an octagonal building, 50 feet high, painted white, and exhibits at 96 feet above high water a fixed white light, which should be visible 16 miles.

Clearing Mark.—The light kept open off Terras Point clears the reef off Cape Bear.

Panmure Island.—Panmure Island is about 2 miles long by one mile broad, in great part wooded, and has cliffs of red sandstone 40 feet high along its northeastern shore. It is joined to the land to the southward by a narrow sand bar always above water, and more than a mile in length. Within this bar is St. Marys Bay, and farther westward Sturgeon and Livingstone Bays, all three having a common entrance to the NW. of the island, between Panmure Spit and the shoal off Grave Point, and which, although very narrow, has depth of water sufficient for vessels of large draft.

Panmure Ledge, of sandstone, covered by only a few feet of water, runs out 1,200 yards from Panmure Head to the depth of 3 fathoms, and its outer extreme, in 5 fathoms, and ¾ mile off shore, will be just cleared by keeping Graham Point and Murray Head in one, bearing S. 1° W. (S. 25° W. mag.).

Panmure Shoal.—Panmure Shoal extends ⅔ mile off the northern shore of Panmure Island, and Panmure Spit, which forms the western side of the shoal and is of sand, dry at low water, equally as far to the NW. from Billhook Point, the NW. extreme of the island. The buoy marking its northern edge is a black can buoy, and a black spar buoy marks the shoal extending eastward from Grave Point.

Cardigan Shoal, stretching to the south and east from Cardigan Point, which separates Cardigan River from the harbor, is an extensive

shoal of sandstone; the least water on it is 4 feet, and it has only 6 feet at low water ¾ mile out from the shore. At 200 yards farther out there are 3 fathoms. Buoys, *see* page 135.

In a direct line from the outer to the inner buoy of the Cardigan Shoal there is not less than 3½ fathoms, and the southern edge of the shoal in 5 fathoms may be followed by the lead from the one to the other. From the inner buoy the western edge of the shoal trends northward to within 200 yards of the shore, sheltering the outer anchorage, in 4¾ fathoms mud bottom, between it and the Knoll.

The Knoll, a small sandy shoal, probably based upon sandstone and with 9 feet least water, lies just outside the entrance of Georgetown Harbor, and directly in the way of its navigation. To enable vessels to beat in and out, a red buoy has been placed on its SW. extreme.

Thrumcap Shoal runs out from the Thrumcap (which is a small wooded and cliffy islet joined to the eastern point of entrance of Georgetown Harbor by a sand bar) 600 yards in a southwesterly direction. This shoal, which is of sand, and dry at low water to 200 yards from the buoy, completes the shelter of the harbor, preventing any sea of consequence from rolling in. Buoy, *see* page 135.

The Entrance to Georgetown Harbor between the Thrumcap and St. Andrew Point on the southwestern shore is ⅜ mile wide, but the shoals diminish the breadth of the channel to 450 yards, and it is still narrower at the Knoll, where it is scarcely 400 yards; whilst farther out still, between the Cardigan and Panmure Shoals, it is ¼ mile, considering it to be bounded by the depth of 3 fathoms on each side. Within the Thrumcap the northern shore of the harbor forms a bay ⅜ mile wide, the NW. point of which is Gaudin Point, having a sandy spit running out from it ¼ mile SW.

Anchorage.—The usual and best anchorage in Georgetown Harbor for large vessels is between this spit and the Thrumcap Shoal, with Doctors Point touching Brudenell Island, and the shore end of the pier in a line with the square tower of the English church, good holding ground, mud; but smaller vessels may anchor farther within the bay, and will find 2¾ fathoms within the distance of 200 yards from the wharf at the town.

Between the Gaudin Spit and Aitkins Point the channel of the harbor is only 350 yards wide, between the 3-fathom lines, and carries 6½ fathoms water; but it expands again immediately, affording excellent anchorage all the way to Brudenell Point, one mile above the town.

Lights.—The lighthouse on St. Andrew Point, Georgetown, a square building, 34 feet high, painted white, exhibits at an elevation of 50 feet a fixed light, which shows red to seaward and white inside the harbor between N. 21° E. (N. 45° E. mag.) and N. 69° W. (N. 45° W. mag.), which should be visible 8 miles.

The back light on Westaway's farm is a white fixed light, elevated 62 feet, and should be visible in clear weather from a distance of 12

miles when in line with the light on St. Andrew Point. The light shows also across the harbor to Georgetown.

The light is shown from a white square tower, 46 feet high; it is N. 80° W. (N. 56° W. mag.), about ½ mile from St. Andrew Point light.

Buoyage.—The buoy marking the northern edge of Panmure Shoal is a black can buoy, and a black spar buoy marks the shoals, extending eastward from Grave Point.

Two red can buoys mark, respectively, the SE. and SW. sides of Cardigan Shoal.

A red can buoy marks the SW. edge of the Knoll.

A small cask buoy, painted red, marks the western edge of Thrumcap Spit.

A buoy, painted red, is moored southward of Gaudin Point, and a buoy, painted black, is moored northward of Aitkins Point.

The buoys are taken up at the end of the navigable season, with the exception of those marking Panmure and Knoll Shoals.

Caution.—Too much reliance must not be placed on the buoys, as they are frequently out of position.

Ice.—Georgetown Harbor is usually frozen over about December 26, and is clear of harbor ice about April 21, being completely closed from January until April. Field ice comes in from the middle of January until the end of April.

Directions.—From what has been said of the narrowness of some parts of the channel leading into Georgetown Harbor, it will appear manifest that a competent pilot, acquainted with the set of the tides, etc., would be required to beat a large ship in or out.

Observe that, in addition to the aid afforded by the buoys, the leading lighthouses in line, or the lighthouse on St. Andrew Point, kept on with a small clump of fir trees, same distance west of the lighthouse bearing N. 80° W. (N. 56° W. mag.), leads in between the Panmure and Cardigan Shoals nearly in mid-channel, until Brudenell Islet and Doctors Point come in one, bearing N. 54° W. (N. 30° W. mag.), when the last-named objects kept touching lead into the harbor.

Approaching from the Eastward, pass Boughton Point, the SE. extreme of Boughton Island, at the distance of one mile, steering S. 83° W. (N. 73° W. mag.), and looking out for St. Andrew Point lighthouse, which will be a little on the starboard bow. As soon as the vessel arrives within one mile of Panmure Islands, bring the lighthouses in line, or St. Andrew lighthouse in one with the small clump of trees bearing N. 80° W. (N. 56° W. mag.), and steer for them. When Panmure Head and Terras Point come in one, the outer red buoy on the Cardigan Shoal should be seen distant about ½ mile, and the vessel should be in 7 or 8 fathoms water. At the same time, the inner red buoy on the Cardigan and the black buoy on the Panmure Shoal should be seen on the starboard and port bows, respectively, and at the distance of about one mile.

Continue to run toward the lighthouse (passing between the last named buoys) until the vessel has approached within about ½ mile of St. Andrew Point, when Brudenell Islet and Doctors Point will be seen (up Brudenell River to the NW. of the town) touching and bearing N. 54° W. (N. 30° W. mag.); the vessel will then be near the black spar buoy off Grave Point, and the red buoy on the SW. edge of the Knoll, and also the one on Thrumcap Spit, should now be seen; run toward Brudenell Islet and Doctors Point touching, which will lead about 200 yards to the SW. of the two red buoys, until the steeple of the northern church is seen well to the NW. of the tower of the southern church, or until the latter bears about north (N. 24° E. mag.), when haul toward it, and choose a berth in from 6 to 3 fathoms over mud bottom.

Approaching from the Southward, round Panmure Ledge by the lead in 7 fathoms, or by keeping Murray Head open to the eastward of Graham Point till the north side of Panmure Island bears as far to the westward as N. 85° W. (N. 61° W. mag.), when the vessel may haul in to the northwestward, following the northern edge of the Panmure Shoal until the leading marks can be made out, and brought in one, as before directed. If it should so happen that, from thick weather, or other cause, this mark can not be seen, the northern edge of the Panmure Shoal may safely be followed by the lead, in 6 fathoms, to within ½ mile of the buoy, when the shoal becomes too steep to be safely followed farther. In like manner the southern edge of the Cardigan Shoal may be followed, from the outer buoy to the inner buoy on its SW. extreme, as already remarked; and the vessel may either bring up, in the outer anchorage, ½ mile within the latter in a line toward the Thrumcap, or proceed into the harbor, as may be expedient.

Caution.—Give Wheeler Bar a wide berth, as it is steep-to.

Tides.—It is high water, full and change, in Georgetown Harbor at 8h. 40m., by the mean of the morning and evening tides, the latter being generally the latest by about an hour in the summer months; springs rise 5 feet, neaps 3¼ feet. The rate of the tidal streams does not exceed ¾ knot.

Brudenell and Montague Rivers, which unite their streams at Brudenell Point, to the westward of Georgetown Harbor, require only a brief notice. The former, the northernmost of the two, is navigable for large vessels to Brudenell Islet 1¼ miles up, and for small craft and boats about 3 miles farther, to the head of the tide. Vessels of considerable burden can ascend the Montague nearly to the bridge, a distance of 4 miles, and boats about a mile farther, to where the tide ends. The fresh-water streams at the heads of those sea creeks are mere brooks.

Cardigan River, which, with the other two just noticed, has occasioned Georgetown and harbor to be called Three Rivers, is much the largest of the three, being navigable for large vessels to the distance of 5 miles above Cardigan Point; and smaller vessels can ascend it 2 miles farther, or to within ½ mile of the head of the tide, where the fresh

water is insignificant in quantity. This river, which enters Cardigan Bay on the NE. side of Cardigan Point, is rendered somewhat difficult of entrance by the MacPhee Shoal and the Maitland Flat, which are very steep, and contract the navigable channel to 400 yards.

Light.—Cardigan River light is fixed, and at an elevation of 43 feet shows green seaward and white to the northeastward across the river; it should be visible 8 miles.

The lighthouse, 32 feet high, consists of a square white tower, and is close to the shore at a short distance above South Ferry wharf and below Morrison Beach.

Directions.—Vessels entering the river should stand to the northward into Cardigan Bay until Panmure Head light bears S. 13° E. (S. 11° W. mag.) and Cardigan River light N. 69° W. (N. 45° W. mag.); they should then steer toward Cardigan River light, keeping it on the port bow and nothing to the northward of N. 69° W. (N. 45° W. mag.), thus clearing MacPhee (or Horseshoe) Shoal on the south side of the river entrance and Maitland (or Campbell) Point Shoal on the north side. When Cardigan River white light is opened, safe anchorage off the south ferry ship has been reached.

Boughton Island, at the north entrance to Cardigan Bay, is united on the NE. side to Bruce Point by a dry sand bar one mile in length, and is divided into two parts, of which the southern, ⅛ mile long, is joined to the remainder by a double bar of sand and shingle inclosing a large pond. Boughton Ledge runs out at this bar to the distance of 1,200 yards to the eastward, and has rocks near its outer extreme which always show. Boughton Point, the SE. extreme of the island, is a cliff of red sandstone 30 feet high, and has a rock, which dries, off it, and shallow water to the distance of ½ mile. Rocky and irregular soundings, 4 to 5 fathoms, run out to the eastward still farther, and therefore a vessel of large draft, at night or in thick weather, should not round the point in a less depth than 9 or 8 fathoms.

Off the west side of the island a bank, with from 3 to 5 fathoms, extends 1¼ miles, and farther westward there are dangerous shoals, which, together with the Boughton Spit and the Mosquito Sands, extend along the north shore of Cardigan Bay nearly to Maitland Point at the entrance of the Cardigan.

Off Boughton Sand Bar and Brice Point the shallow water extends ⅜ mile, and in Boughton Bay the line of 3 fathoms is a mile out from the shore.

(H. O. Chart No. 1066.)

Boughton or Grand River, 5 miles north from Boughton Point, has a dangerous bar of sand one mile out from its entrance, and over which 6 feet, at low-water ordinary spring tides, can be carried in a very narrow channel marked out by three buoys. The outer buoy is moored in 3 fathoms, the next in 2 fathoms, and the inner one in 11 feet, the

bar of 6 feet being between the last two (1860). The buoys are taken up at the end of the navigable season.

At a short distance within the inner buoy, the sands on each side are dry at low water, and the channel generally can be seen all the remainder of the way to the entrance, where it passes close round the northern point of the long sand bar which stretches across from the southern shore to within 350 yards of Banks Point, where there is a wharf and a ferry.

Immediately within the entrance the inlet is a mile wide, but the channel is divided, narrow, and intricate, and marked out by stakes between sandy shoals for about one mile; after which it is clear, wide, and has from 3 to 5 fathoms water in it, to the Narrows, 3 miles from the entrance. Boats can ascend 3 miles farther, or to the bridge. There are settlements on each side of this extensive inlet, which if it were not for the shallow bar would be a fine harbor.

In Boughton Bay the line of 3 fathoms is a mile out from the shore.

Tides.—It is high water, full and change, at the Ferry wharf, Boughton River, at 8h. 40m.; springs rise 5 feet, neaps 2¾ feet. The rate of the tides in the entrance is 2 knots.

Little River, Fortune River, Rollo Bay, and Colville Bay and River, occurring in order in proceeding along the coast to the northward, are tide inlets nearly barred up with sand, and having small streams at their heads; they are places only fit for small craft and boats, having from 3 to 5 feet over their bars at low water.

Colville River, in Colville Bay, between Souris Head and Swanton Point, and distant 12 miles NNE. of Boughton Point, is the most important, being the place where the produce of the more eastern parts of the island is principally shipped. Colville Bay affords good anchorage with offshore winds, and the settlement of Souris and the church will be seen on its eastern shore.

Sharp cliffy headlands and points of red sandstone separate the bays in which these rivers are situated, the cliffs being from 25 to 50 feet high, and the shallow water off them not extending beyond the distance of 600 yards, excepting at Eglington Point (separating Fortune Bay from Eglington Cove), where the reef is very shallow for the first 800 yards out from the shore, and continues 1,200 yards farther with from 3 to 4¼ fathoms over rocky bottom; but this is within the line adjoining Howe Point and Souris Head, and therefore out of the way of vessels running along the coast.

Souris is a large village 60 miles NE. by rail from Charlottetown. It has a wharf with three large fish-curing stores on it. The eastern entrance is marked by a red flagstaff, and three black buoys mark the passage up the river for small craft. In 1881 the population numbered 700. The chief industries are shipbuilding and the fisheries. In 1882 the depth of water alongside the breakwater was about 14 feet.

The Roman Catholic church is an excellent landmark; Souris Head

is bluff and covered with trees, whilst the point near it is red sandstone, and bare.

The United States is represented by a consular agent.

A Shoal (not marked on the chart), called by the fishermen the Charlow Shoal, having a depth of 17 fathoms (stones), lies ESE. 8½ miles from Souris, with the following bearings: East Point N. 21° E. (N. 45° E. mag.); Souris Head N. 69° W. (N. 45° W. mag.). Coasters during thick weather endeavor to make this shoal, it being a good guide for working into Souris, or the adjacent coves.

A Shoal patch having 10 fathoms water on it lies S. 47° E. (S. 23° E. mag.) 8½ miles from Souris Head and S. 26° W. (S. 50° W. mag.) from East Point.

Ice.—The harbor is usually frozen over about January 7, and the harbor ice breaks up about May 6; it is completely closed between those dates. Field ice arrives about February 1, and disappears between April 1 and May 1, its departure depending on the prevailing winds. The first vessel arrives about April 28, and the last one leaves about January 2.

Lights.—On Knight Point, about 100 yards southeastward of the eastern breakwater at Souris, stands a square tower, 45 feet high, painted white, from which a fixed white light is exhibited at an elevation of 85 feet; it should be visible 15 miles.

A temporary light is in operation on the outer end of Souris East Breakwater.

The light is fixed red, elevated 21 feet, and visible 6 miles from all points seaward. The lantern is hoisted on a mast.

The light shows the end of the breakwater, and will be used similarly to the old light, carried away, until a proposed new block is added to the outer end of the breakwater, when a more permanent structure will be built.

The Coast to the eastward of Colville Bay is bold and free from danger, excepting Hervey Reef, which extends 800 yards from Hervey Point, and has on it the Shallop Rock, which always shows. Hervey Point is 5 miles from Colville Bay, and will be known by its being the eastern point of Hervey Cove, in which there are some remarkable and high sand hills. At Basin Head, one mile farther NE., the cliffs terminate, and sand hills and sandy beach form the shore nearly all the way to East Point, a distance of nearly 9 miles. In this distance East Lake is all that requires notice. It is a shallow and narrow pond, within the sand bars, extending from Basin Head to within 2 miles of East Point, and having a narrow outlet (2 miles from the head), which is nearly dry at low water. Boats and small craft enter it for produce, the country being well settled along its northern shore.

East Point.—The eastern point of Prince Edward Island is a cliff of red sandstone from 30 to 60 feet high, from which a reef runs out ⅔ mile to the depth of 3 fathoms, and not quite a mile to 5 fathoms.

There is frequently a great rippling off the point, but the reef does not extend farther than has been stated. Northward of the reef the sounding decreases gradually to 8 fathoms, after which it shoals rapidly. The depth of 20 fathoms is as near as a vessel should approach when the land or light can not be seen at night or in foggy weather.

Caution is necessary when navigating in the immediate neighborhood of East Point, as the tidal streams are influenced by strong winds, and therefore are reported to be irregular both in direction and velocity.

Tides.—It is high water, full and change, at East Point at 8h. 30m.; springs rise 3½ feet, neaps 2 feet.

The tides run at the rate of 2½ knots between the north end of Milne Bank and the point, but are not nearly so strong farther to the westward.

Light.—The lighthouse on East Point stands within 67 yards of the eastern extreme and 83 yards from the south shore of East Point; the dwellings, painted white, with brown roofs, are 50 yards in rear of the lighthouse; the building is octagonal, 60 feet high, painted white, and exhibits, at an elevation of 100 feet, a revolving white light every three minutes, which should be visible 15 miles between the bearings of S. 58° E. (S. 34° E. mag.), through west, and N. 49° E. (N. 73° E. mag.).

Fog Horn.—During thick or foggy weather a horn will give a blast of about eight seconds during every half minute.

The fog-signal building is painted white, with a brown roof, and stands 33 yards eastward of the lighthouse.

These two buildings in line indicate nearly the outer extreme of East Point Reef.

Anchorage.—The anchorage is not good to the northward of East Point, the ground being either loose or rocky, but to the southward of it there is good riding with northerly winds as far as the East Lake outlet, in a moderate depth of water, and over a bottom of red sand.

Milne Bank, if considered to be bounded by the depth of 10 fathoms, is 5¾ miles long, north and south, and 1¾ miles broad, the bottom being of sandstone, thinly covered here and there with red sand. The soundings are irregular, between 6 and 9 fathoms, over the northern part of the bank; but toward the southern end, and close to the outer edge, there is a shallow part, 1½ miles in length, on which there are less than 5 fathoms; and it is here that the least depth is found, namely, 4½ fathoms at low water, in spring tides. This shallowest part of the bank lies between SE. by S. and SSE. from East Point, and is distant from it 4¼ to 5¾ miles.

The extreme south end of this bank, in 10 fathoms, bears S. 24° E. (south mag.) 6¼ miles from East Point, and the north extreme N. 88° E. (S. 68° E. mag.) 2 miles. Between the northern part of the bank and East Point there are from 10 to 11½ fathoms, red-sand bottom, the deepest water being close to the bank. The eastern or outer edge of the bank is steep-to, there being from 12 to 15 fathoms close to it, and

there is frequently a great rippling along it, caused by the abrupt opposition which it presents to the flood tide from the NE. The sea is very heavy here, and also off the point, in strong NE. gales.

NORTH COAST OF PRINCE EDWARD ISLAND.

The great bay formed by the northern coast of Prince Edward Island, and the difficulty of beating a ship out of it in heavy and long-continued NE. gales has been already mentioned. That difficulty seems to be caused by an acceleration in the rate of the current so frequently found running past Cape Gaspé, Bonaventure Island, and the Miscou Banks, and which doubtless continues farther south; or it may arise from an extension of that general set to the southward so often experienced by vessels crossing from the Bird Islands toward Anticosti or Cape Rosier, and which has been observed to be increased by strong NE. winds, as might have been inferred from the great rise of water which they cause in all the southern ports of the gulf.

The set of the tidal streams may also at times be very unfavorable to a vessel under the supposed circumstances, for the stream of flood is known to set to the southward into the bay, in conformity with the progress of the reflux tide wave, from North Point southeastward to St. Peters, whilst farther eastward the tide which comes from the NE., from between the Magdalen Islands and Cape Breton, also sets toward the shore, especially near East Point.

The reflux course of the tide wave on this coast has been inferred from observations made during the Admiralty surveys of all the harbors, from which it appears that the time of high water on the full and change days becomes later in succession, in proceeding southeastward from North Point to Cascumpeque, Malpeque, Grenville Bay, Rustico, Tracadie, and St. Peters. At St. Peters the time of high water, full and change, namely, 8h. 40m., is rather later than at East Point; and as there is also a considerable increase in the rise of the tide, there seems reason to conclude that the two tide waves meet somewhere about this harbor, the western being 12 hours older than the eastern wave.

With the exception of a few places off the bars of the harbors, the anchorage is, generally speaking, very bad all along the northern shore of the island, the bottom being of red sandstone, thinly covered occasionally with sand, gravel, and broken shell.

The harbors are all of the same character, having narrow entrances between sand bars, with dangerous bars of sand at various distances from the shore. They are only fit for small vessels, with the exception of Richmond Bay and Cascumpeque, and even those could not be safely run for in bad weather, and with a heavy sea running, at which times the breakers on their bars extend quite across, leaving no visible channel. New vessels are built in these harbors almost every year, the smaller for the Newfoundland trade, and besides the coasting schooners

for produce, American fishing schooners frequently call at them for wood and water, or shelter on the approach of bad weather.

The Coast from East Point to St. Peter Bay, a distance of 33 miles, is unbroken, formed of red-sandstone cliffs, with occasional patches of sandy beach at the mouths of small streams, where boats can land only in fine weather or offshore winds. Surveyor Inlet will not now admit a boat, being closed with sand.

The shallow water does not extend beyond 1½ miles anywhere off this division of the coast, and there are in general 10 fathoms water within one mile of the shore, the bottom being of sandstone, and the anchorage bad in consequence.

St. Peter Harbor, generally called St. Peter Bay, runs in 7 miles to the eastward, with a depth in some parts of 3 fathoms; nevertheless, it forms a harbor only for small vessels, there being only 9 feet at ordinary high water over its bar of sand, the outer edge of which, in 3 fathoms, is ⅔ mile from the shore.

Morrell River enters this harbor on the SW. side 3 miles in from the entrance, and is navigable for boats to the same distance inland, where the piles, which steady the floating bridge, prevent farther ascent. There are several smaller streams on the same side of the harbor, and at its head St. Peter River, which, like the rest, becomes a mere brook at the head of the tide.

The shores of the harbor are well settled, and there is a church on the eastern shore near its head, and another with a white steeple to the westward. The population of St. Peter in 1891 numbered 1,299. Its position will be recognized by its magnificent range of sand hills, which near the entrance attain the elevation of 70 feet above the sea, and continue for several miles to the eastward; after which there are no more high sand hills to Surveyor Inlet, within 4 miles of East Point.

There is a railway station at St. Peter.

The two lights in one lead over the bar at the mouth of St. Peter Bay, where the water is best, and clear of a rocky reef on the west side of the entrance. The channel, which now carries about 9 feet at ordinary high water, is also marked by buoys (1896).

The channel is liable to shift in heavy gales, and there is a sharp turn to the eastward immediately within the entrance, so that altogether it is a very dangerous place for a stranger to attempt, or indeed for anyone excepting in fine weather.

Lights.—The lighthouses erected on the west side of the channel to St. Peter Harbor S. 13° E. (S. 11° W. mag.) and N. 13° W. (N. 11° E. mag.), 1,458 feet apart, exhibit fixed white lights, elevated, respectively, 34 and 32 feet, and visible 6 miles.

The high lighthouse, 35 feet high, is square and white, near the end of the breakwater. The low one is 33 feet high; it is a square, white frame, and stands on the sand beach.

The inner light is shifted as the bar alters.

Tides.—It is high water, full and change, in St. Peter Harbor at 8h. 30m.; springs rise 4 feet, neaps 2½ feet. The rate of the tide streams in the narrow entrance to St. Peter Harbor is nearly 3 knots (ebb at times 4 knots).

Savage Harbor, at 3 miles westward of St. Peter, has only 2 feet at low water over its bar, and is therefore only fit for boats or very small craft. The church here is a good landmark. Just westward of its entrance there is some comparatively shallow water, 4¼ fathoms, over rocky bottom, at the distance of a long mile from the shore. The distance across from the head of this harbor (which runs inland 3 miles) to the head of the Hillsborough River is less than one mile, and there is a road across.

Lights.—The two leading lights are fixed white lights, shown on masts respectively 20 and 25 feet high, with brown sheds at their base.

The outer light on McEachern's farm near the western edge of the inner shore of the harbor is elevated 22 feet from high water. The outer light is liable to be moved.

The inner light stands 110 yards S. 29° E. (S. 5° E. mag.) from the outer one, and is 30 feet above high water.

Both lights are visible 5 miles.

Directions.—The lights in line lead to the black and white striped buoy moored in 12 feet water just outside the bar. Vessels entering must open the lights about a point on the starboard bow after passing this buoy until the inner fairway buoy is reached, whence the channel leaves the range and leads S. 80° E. (S. 56° E. mag.) about ¼ mile, and then S. 21° W. (S. 45° W. mag.), or direct for the outer light, to the fishing stakes.

Tracadie Harbor, or Bedford Bay, is 9 miles from Savage Harbor. Its entrance is at the western extremity of a remarkable range of sand hills 50 or 60 feet high. The bar of sand, which shifts occasionally in heavy gales, extends out ¾ mile from the entrance, and has a varying depth of from 5 to 9 feet over it at low water in a channel only 80 yards wide at the time of the survey. The place, therefore, is only fit for small vessels, and even they require the assistance of buoys and favorable weather to take the bar with safety. The harbor is 3 miles wide within the sand bar, and carries 2½ fathoms water; it sends off a branch to the westward called Winter Cove, and runs in 4 or 5 miles to the southward, approaching at its head to within 1½ miles of the Hillsborough River, to which there is a good road across.

There is a railway station at Tracadie.

Lights.—The lighthouses erected on the west side of channel to Tracadie Harbor are white square structures, 28 and 21 feet high, exhibiting fixed red lights, elevated, respectively, 32 and 40 feet above high water, both visible 8 miles.

The towers are liable to be moved at any time without notice, as the channel shifts.

Tides.—It is high water, full and change, at the entrance of Tracadie Harbor at 7h.; springs rise 3½ feet, neaps 2 feet. These heights vary according to the direction of the wind. The rate of the tide streams in the entrance is about 2 knots.

Directions.—The lights in line lead past the buoys, leaving the buoy outside the bar on the starboard hand, the buoy inside the bar on the port hand, and the red spar buoy on the westernmost bend of the channel on the starboard hand.

The channel is intricate and liable to change in any storm, consequently strangers should not attempt the entrance with any wind on the shore, nor under any circumstances if drawing more than 5 feet.

Cape Stanhope, on which there is a sand hill 30 feet high, ½ mile to the eastward of the entrance of Little Rustico and 9 miles to the SE. from Cape Turner, has a dangerous reef running out from it ¾ mile to the depth of 3 fathoms and one mile to 5 fathoms. On some parts of this reef there is only one foot of water, at ½ mile from shore. Between Cape Stanhope and Cape Turner the coast forms a curve or bay, in which are the entrances of the Rustico Harbors, and where the 3-fathom edge of the shallow water is seldom less than ¾ mile off shore. Farther out the holding ground is bad, being of red sandstone, with an occasional thin covering of sand.

Lights.—Cove Head leading lights, 75 yards apart, are a little to the westward of Stanhope Head. The lights are exhibited on masts 27 and 17 feet high.

The front light is fixed white, elevated 18 feet from high-water mark, and visible 3 miles. The light is close to the edge of the sand beach at the entrance to the harbor.

The back light is fixed white, 25 feet above high-water mark, and visible 3 miles.

The position of the lights is changed to suit alterations in the channel, which has only 3 feet at low water.

Little Rustico Harbor has its narrow sandy entrance on the western side of Cape Stanhope, with a depth of only 2 feet over its shifting bar. It is therefore only fit for boats or very small vessels, the rise of tide being the same as at Grand Rustico. This shallow place extends for several miles within the sand bars, and is divided by Black Point into Petersham and Stanhope Coves, which have small brooks at their heads and are navigable for boats 3 miles.

Grand Rustico Harbor has two narrow sandy entrances on either side of McAuslin Island, and which are distant 3 and 5 miles, respectively, to the SE. of Cape Turner. Although vessels of 200 or 300 tons are occasionally built here and floated light over the bars in fine weather, yet it is a place only fit for small vessels, for its shifting bars of sand are extremely dangerous, having a varying depth of 4 to 6 feet, and extending out ¾ mile from the shore, at which distance there are 3 fathoms at low water. The line of deepest water over each of these

bars is pointed out by two buoys, the positions of which are changed as occasion requires.

Hunter and Wheatley Rivers, navigable for boats 5 miles, with Winter Creek between them, run into this shallow place, which extends 5 miles along the coast within the sand bars of McAuslin Island and Brackley Point.

There are extensive settlements here. The two churches on the western side of Winter Creek will be recognized by their steeples. Coming from the eastward these churches do not open out very soon, but the harbor may be recognized by the remarkable hummocks in its vicinity. There is also a small chapel at the settlement of New Glasgow, on the western side of Hunter River, but it can not be distinguished from the sea.

Lights.—The high lighthouse at the west side of entrance to Grand Rustico is a white, square building, 35 feet high, exhibiting a fixed white light, elevated 40 feet, and visible 8 miles.

The low light is a fixed red light, shown from a mast 20 feet high, at 22 feet above high water; the light should be visible 5 miles.

The lights bear S. 49° W. (S. 72° W. mag.) and N. 49° E. (N. 72° E. mag.) from each other, distant 75 yards, and are visible from S. 67° E. (S. 44° E. mag.) through south to north (N. 23° E. mag.). The outer or low light is subject to alteration to suit the channel.

Beacon.—A white beacon has been erected on the outer end of the breakwater to more clearly indicate its position, but it can not be otherwise used as a guide. It consists of a mast 25 feet above the deck of the pier, with a diamond-shaped slatted beacon at its head.

Tides.—It is high water, full and change, in Grand Rustico Harbor at 6h. 40m.; springs rise 4 feet, neaps 2 feet. The rate of the tide streams in the entrance is 2 knots.

Directions.—The two leading lights in line lead to the Bar Buoy. After passing this, vessels entering must open the lights, leaving the range on the starboard side.

Vessels of 8-feet draft can only enter the harbor at high water and in moderate weather.

Cape Turner is the highest cliff on the island, being of red sandstone and conglomerate, 120 feet high. It is 8½ miles E. by S. from Cape Tryon, Grenville Harbor lying between.

Tides.—It is high water, full and change, at Cape Turner at 6h. 10m.; springs rise 4 feet, neaps 2 feet.

Grenville Harbor has its entrance at the northwestern extremity of a long range of sand hills, the highest of which is 55 feet above high-water mark. The entrance of this harbor is ⅛ mile wide, and carries 3 fathoms water, but it is nevertheless only fit for small vessels, in consequence of its dangerous and shifting bar of sand, over which, at the time of the survey, only 5 feet at low water could be carried in a very narrow channel indicated by two buoys. The bar extends out

⅔ mile from the entrance, and the shallow water one mile, at which distance there are 5 fathoms over sandy bottom.

Within the entrance the harbor is 3 miles wide, branching into two principal and many smaller creeks, with small brooks at their heads. The principal two of these, namely, Stanley and Mill Rivers, are navigable for small craft and boats to the head of the tide, a distance of 6 or 7 miles. There are increasing settlements and a fertile country around the harbor, the principal settlement being New London, where the English and Scotch churches are situated on the western shore, 1½ miles within the entrance, the former being distinguished by its steeple.

Lights.—The inner lighthouse on the beach, west side of entrance to Grenville Harbor, is a white tower, with dwelling attached, 35 feet high, and exhibits, at an elevation of 45 feet, a fixed red light; this lighthouse is 500 yards S. 21° W. (S. 44° W. mag.) from the outer lighthouse.

The outer lighthouse is on the outer end of the breakwater on the west side of Grenville Harbor entrance. The upper part of the tower is painted white; the posts and framework below are brown. The light is a fixed red light.

The lights are visible through an arc of about 110 degrees between Sims Point on the west and the sand hills on the east side of the harbor, and should be visible 7 miles.

Tides.—It is high water, full and change, in Grenville Harbor at 6h. 10m. by the mean of the morning and evening tides, the morning tide being the earlier and highest during the summer months. Ordinary springs rise 3½ feet, neaps 2 feet, unless increased by easterly winds.

Directions.—The lights kept in line bearing S. 21° W. (S. 44° W. mag.) lead in the best water over the bar, but the inner light must be opened eastward of the outer light when abreast of Sims Point, to avoid the rocky ledge off that point.

Caution.—Strangers should not attempt to enter the harbor without a pilot, and the lead is required, especially off Sims Point.

Cape Tryon, 1½ miles NW. of Grenville Harbor, is a remarkable cliff of red sandstone, 110 feet high. The coast between Cape Tryon and Richmond Bay is nearly straight, and free from detached dangers; but the shallow water runs out a considerable distance, and a large ship should not approach nearer than the depth of 7 fathoms.

Richmond Bay is of great extent, running in about 10 miles to the southward, and crossing the island to within 2½ miles of the waters of Bedeque Harbor. It contains seven islands and a great number of creeks or rivers, some of which are navigable for vessels of considerable burden, and all of them by small craft and boats. Grand River, which is the principal inlet, can be ascended in boats to the bridge, a distance of 7 or 8 miles.

There are fine settlements at Grand River, and also at Port Hill, in the NW. part of the bay within Lennox Island, and where several vessels load every year. There is an Indian church and settlement on

Lennox Island, but it can not be seen from the sea. There are also large settlements at the head of the bay, where the churches of St. Eleanor and Miscouche are seen on the ridge which separates its waters from those of the Straits of Northumberland.

Ice.—The bay is usually frozen over about December 15, and the harbor ice breaks up about April 1. At that date field ice drives the harbor ice back, and the ice does not disappear until May 1. The bay is completely closed from about December 10 to May 1.

Tides.—It is high water, full and change, in Richmond Bay at 6h; springs rise 3 feet, neaps 2 feet.

Malpeque Harbor, which is within the eastern entrance of Richmond Bay, has 12 feet over its outer bar at low water and 15 feet at high water in ordinary spring tides, together with depth and space enough within for a large number of vessels.

A competent pilot, or a chart on a large scale, could alone enable anyone to navigate a ship through the various channels and inlets of this bay. The following remarks and directions will, therefore, be confined to the principal harbor in its entrance.

The principal entrance to the harbor is to the southward of Billhook or Fish Island, and between it and Royalty Sand, which dries out a long ½ mile from Royalty Point. The ground is good, in the usual anchorage, just within this entrance, the bar outside preventing any sea from coming in, and the Horseshoe Shoals sheltering them from westerly winds down the bay. The other entrance, to the NW. of Billhook Island, is called the West Gully, and is so narrow and intricate as to be only fit for boats or very small craft, although it has a depth of 9 feet over its dangerous bar of sand, which is 1¼ miles out from the shore. There will be no probability of this being mistaken for the main entrance, even if the buoys are gone, if it be remembered that the main or ship channel is to the SE. of all the sand bars, including Billhook Island, and between them and the red sandstone cliffs of Cape Aylesbury, the SE. point of the bay.

Malpeque, which has given its name to the harbor, is one of the oldest settlements on Prince Edward Island, and, with its church, an excellent landmark, and the Roman Catholic college, with its two spires to the eastward, stand on the neck of land between Darnley Inlet and March Water, 2½ miles south from the entrance of the bay.

Railway.—There is a railway station here.

Supplies.—Abundance of fresh provisions may be obtained at Malpeque, but water can only be procured from wells (1860).

Lights.—Two leading lights are exhibited at Darnley Point, eastern side of entrance to Malpeque Harbor.

The front or low light is a fixed red light, 40 feet from high water, and should be visible 7 miles.

The rear or high light, S. 10° W. (S. 33° W. mag.), 447 yards from the front light, is a fixed red light, elevated 65 feet, visible 7 miles.

The lights are shown from open framed towers painted white, and 25 feet high.

The lights can be seen between the bearing of S. 43° W. (S. 66° W. mag.) to along the North Bar at the entrance.

The lights decrease in power as the line of range is departed from, and when not in range must be used as guides to small boats only.

Two fixed green lights, visible 3 miles from a range for Darnley Basin. The front tower is on the west side of the basin and south of the entrance. The rear tower is 380 feet S. 14° E. (S. 9° W. mag.) from front tower. In line they lead in with 4 or 5 feet low water. Strangers should not attempt the entrance.

Malpeque Leading Lights.—The main light is exhibited from a square, white lighthouse, 46 feet high, on Billhook or Fish Island, north side of entrance to Malpeque Harbor. The low light is shown from a white open-framework building, 22 feet high, S. 86° E. (S. 63° E. mag.) 400 yards from the main light. They are fixed white lights, elevated, respectively, 50 and 18 feet above high water, visible 12 and 6 miles. The lights in line show the channel over the bar. The outer light is liable to be moved to suit shifting of the channel.

Buoy.—A buoy, painted black, with N. P. in white letters, is moored in 4 fathoms northward of the bar at entrance to Richmond Bay.

Ice.—The harbor does not close until field ice drifts in, about the middle of January, and opens only when the field ice disappears, about the middle of May. It is completely closed from about February 1 to May 1. The first vessel arrives about the middle of May, and the last one leaves about the middle of December.

The Bar of Malpeque Harbor runs out eastward 2¼ miles from Billhook Island, and then turns to the southward, so as to join the shore to the eastward of Cape Aylesbury. It is of sand thinly and irregularly spread upon sandstone, the rock being in many places quite bare. It is exceedingly dangerous in bad weather, when all signs of a channel are obliterated by heavy breakers. The northern part of the bar, for 1½ miles out eastward from Billhook Island, is very shallow, there being in some places only 4 feet at low water; but the extent of this shallow part is well shown by a good cross mark, namely, the church at Malpeque and Darnley Point in line, bearing S. 10° W. (S. 33° W. mag.).

The narrowest part of the ship channel just within, or to the westward of the above-named cross mark, is 200 yards wide, and carries 4 fathoms water. The inner bar of sandstone, and with 19 feet at low water, is ¼ mile farther in, and has in general a buoy upon it.

Directions.—Darnley Point lights in line, S. 10° W. (S. 33° W. mag.), lead to the black can buoy at the eastern passage over the bar, entrance to Malpeque Harbor. Vessels entering should bring the lights in line outside the bar and steer in, keeping them in line until Billhook Island lights are in line N. 86° W. (N. 63° W. mag.); then alter course to the westward, keeping the Billhook Island lights in line as far as the mid-channel buoy, above which the course is marked by the harbor buoys.

Caution.—The bar has shifted since the survey of 1845, and the buoys are not to be depended on. Strangers should not attempt to cross the bar without a pilot, or examination if compelled to enter the harbor without.

Anchorage.—Vessels may anchor outside the bar in from 5 to 7 fathoms, sand bottom, to wait for a pilot; and in the event of the wind or tide failing, the anchorage is considered tolerably safe between the inner bar and the entrance, and probably is so with any wind that would prevent a vessel from running in, but the holding ground is not good there, and should only be trusted in fine summer weather. Within the harbor the bottom is of sand and clay, and a vessel may choose any depth from 3 to 10 fathoms, the deepest water being close off the point of the Royalty Sand, the shoal water being marked by a can buoy.

Tides.—It is high water, full and change, in Malpeque Harbor at 6h.; springs rise 3 feet, neaps 2 feet, but the rise is so irregular that it would not be safe to count upon a rise of more than 2 feet on any particular day. Northeast winds cause high tides, westerly winds produce the contrary effect. The morning tides are the highest during the summer months. The rate of the tides is strongest in the entrance and off the point of the Royalty Sand, running in spring tides 2½ knots. In the ship channel from the entrance to the bar the rate is 1½ to 2 knots. Within the bay the tides are in general much weaker, seldom amounting to one knot.

Coast.—From the principal entrance to Richmond Bay the coast trends NW. 20 miles to Cascumpeque Harbor, the intervening shore being formed exclusively of sand bars and sand beaches, from which the shallow water extends ⅔ mile to 3 fathoms and one mile to 5 fathoms. In the above-named distance there are two openings through the sand bars, Conway and Cavendish Inlets, which afford shelter to boats and are distant 11 miles and 7 miles, respectively, from the lighthouse at Cascumpeque.

Boats can enter Richmond Bay by Conway Inlet, passing to the westward of Lennox Island at high water.

Lights.—The leading lights at Conway Inlet, north side of entrance, are exhibited from white buildings, 30 and 20 feet high and 66 yards apart. The lights are fixed white, at an elevation of 26 and 16 feet, and should be visible 10 and 8 miles. The position of the outer light is altered to meet changes in the channel.

Cascumpeque Bay is of great extent, and broken into inlets or rivers which penetrate the country in a variety of directions and to the distance of many miles. The chart must be referred to for these, and also for the boat communications within the sand bars, when the tide is in, southward to Richmond Bay and northward to Kildare River.

Cascumpeque Harbor, sometimes called Holland Harbor, is known by the remarkable high sand hills 3½ miles to the southward of its entrance; these are the remains of a range of sand hills formerly known

as the Seven Sisters, and are 50 feet high. There are no high sand hills to the northward of the harbor.

The entrance to this harbor is 350 yards wide, between two sand bars resting upon the sandstone which forms the inner bar, over which there are 10 feet at low water. The outer bar, of sand, lies 1¼ miles out from the entrance, and has a depth of 13 feet at low water, in a very narrow channel indicated by a fairway buoy which vessels must pass close to the southward of.

The channel, from the one bar to the other, and between sand, covered by only a few feet of water, is 200 yards wide, and affords tolerable anchorage in from 2½ to 3½ fathoms sand bottom; the best berth being just outside the entrance, where the sand on each side is dry at low water. There is a second entrance into the bay, the beach in the sand bar, which was at first effected by the sea during a heavy NE. gale, and has been increasing ever since. This newer entrance into the bay, which has at present 5 feet over its bar, is about 2 miles to the southward of the harbor.

Light.—The lighthouse erected on the SW. part of Sandy Island is a square white building; a fixed white light is exhibited at an elevation of 45 feet, visible in clear weather from a distance of 12 miles. This light is maintained as a coast light and guide to the harbor.

Leading Lights.—The front range light, fixed red, 22 feet above high water, and visible 6 miles in the line of range, is shown from a lantern hoisted on a mast, carrying a white slatwork day beacon, which stands on the cribwork block near the outer end of the next wharf east of the railway wharf at the head of Cascumpeque Harbor.

The back range light, fixed red, 40 feet above water, and visible 6 miles in the line of range, is shown from a lantern hoisted on a mast above an open-frame tower painted red. The mast carries a slatwork day beacon.

This building stands on a street of the village, 1,100 feet S. 72° W. (N. 85° W. mag.), from the front mast.

Two additional range lights have been established on Savage Island, inside the sand hills on the south side of the harbor. The lights are fixed white, shown from lanterns hoisted on masts, with a small hut at the base, and a diamond-shaped day beacon at the head of each mast, the whole structure painted white.

The front mast stands on the NE. part of Savage Island, and is 22 feet high. The light is 35 feet above high water and should be visible 5 miles in the line of range.

The black mast stands 900 feet S. 35° W. (S. 58° W. mag.) from the front one and is 26 feet high. The light is 45 feet above high water and should be visible 5 miles in the line of range.

Tides.—It is high water, full and change, in Cascumpeque Harbor at 5h. 40m.; springs rise 3 feet, neaps 2 feet; but this is not regular, and therefore 14 feet over the bar at high water is all that can be safely

reckoned upon on any particular day, unless in strong easterly winds, which cause a rise of a foot or more in all the harbors of this coast.

Note.—It must also be observed that the rise given is always that of the best tide in the 24 hours, and that the morning spring tides are the highest during the summer months. It frequently happens at or near the springs that the evening tides rise only a few inches, and sometimes they entirely disappear, causing single day tides for a short time, as at Richibucto and Shediac.

The morning spring tides are also the earliest during the summer months, as, for instance, at Cascumpeque beacon at the full and change, in July, when the morning high water occurred at 4h. 22m. and the evening tide at 6h. 58m., the mean being 5h. 40m., as given above and in all other similar cases.

At or near the neaps the two tides of the same day become nearly equal in time and rise for a short time. There is reason to believe that the diurnal inequality of the tides ceases for a time soon after the equinox, and that it is reversed in winter, but the ice has hitherto prevented observations during that season. These remarks apply to all the harbors of this island and of the neighboring provinces; their importance to vessels seeking refuge and taking the dangerous bars in bad weather will be evident. The rate of the tidal streams in the entrance of Cascumpeque Harbor is in general 1½ knots, but frequently over 4.

Ice.—The harbor is usually frozen over about January 3 and is clear of harbor ice about April 6, being completely closed between those dates; field ice drifts in about January 4 and disappears about May 10. The first vessel arrives about April 28 and the last leaves about December 20.

Directions.—As the bars of Cascumpeque Harbor shift so much, a pilot would be indispensable to a stranger visiting it.

Vessels approaching Cascumpeque Harbor stand along the shore until they bring the Savage Island range lights in one. They then keep the alignment S. 35° W. (S. 58° W. mag.), until the red range lights near the wharves are brought in one; these lead S. 72° W. (N. 85° W. mag.), directly up the harbor.

The large black can buoy moored outside the bar will be found in 5 fathoms of water, a short distance south of the alignment of the Savage Island range lights. At the intersection of the Savage Island range and the Wharves range the red cask buoy marking Malones Point is moored. There are 11 feet at low water on the bar in the alignment of Savage Island range lights.

In strong easterly gales the bar is covered with a continuous line of heavy breakers.

The best landmark in this neighborhood is the Roman Catholic church at Tignish, the lofty spire of which is distinguished before any other feature of the coast from the eastward and is visible also to vessels on the west side of North Point.

Anchorage.—There is good anchorage off the bar in fine weatner in 5 or 6 fathoms, sand bottom. Within the entrance the harbor has plenty of water and a clear channel, which, after running in one mile to the westward, turns to the southward within Savage Island and between it and Hill Point, where there is a wharf at which vessels generally load (1860).

Alberton, a small town, rising in importance, is on the west shore of Cascumpeque Harbor. There is a wharf here in connection with the railway. The churches, courthouse, and buildings generally are of wood and painted white. There were 900 inhabitants in 1881.

The United States is represented by a consular agent.

Tignish River.—From Cape Kildare to the north point of Prince Edward Island, 11 miles north, there is little requiring notice, excepting Tignish River, with only 2 feet of water in its narrow sandy entrance at low water, and affording shelter to fishing boats; and where also there is a fishing village and two churches, the new one of brick (standing a mile to the eastward of the old one) forming with its spire one of the best landmarks on the island. About a mile northward of the entrance a rocky ledge runs off 1½ miles, with no more than 3 fathoms on it at low water.

The shallow water extends the same distance off Cape Kildare, which is a cliff of red sandstone 30 feet high, with the land about it red and surmounted by clumps of trees; and generally it must be borne in mind that there are rocky and irregular soundings, between 3 and 5 fathoms, all along this part of the coast, freqnently extending nearly 2 miles off shore.

Lights.—Leading lights at Big Tignish River entrance.

The high light, a fixed white light, is shown from a square building, painted with black and white horizontal bands. The lighthouse is 33 feet high, and stands on the beach at the inner end of the north breakwater pier. The light is 35 feet above high water, and should be visible 11 miles.

The low light is a fixed red light, elevated 18 feet, and visible seaward 5 miles. It is hoisted on a pole 14 feet high, placed on the outer end of the north breakwater pier, to indicate the position of the pierhead. The light bears S. 73° E. (S. 50° E. mag.) from the high light, distant 620 feet.

The low light is for the convenience of fishing boats and light-draft vessels only. When the lights are in line they lead between the breakwaters.

North Point and Light.—*See* page 130.

NORTHUMBERLAND STRAIT.

A full description of Prince Edward Island and of the opposite coasts of Nova Scotia and New Brunswick having been given, it now only remains to offer a few general remarks respecting Northumberland Strait. There are few places in which such precision of knowledge is

more requisite than in this strait, which presents a confined navigation 160 miles in length, and which, at Cape Tormentine, the narrowest part, is but 7 miles from shore to shore, and only 5½ miles wide, if only the navigable breadth is reckoned between the shoals.

The description of the dangers and of the soundings have been made very full in consequence, and the times of high water and the rise of the tides in the various harbors, together with the strength of the tidal streams in their entrances, have also been given; but the tides of the strait are so peculiar that it will be both interesting and useful to add a general view of the course of the tide waves, and of the strength and direction of the streams which they occasion.

To this will be added briefly the mode of proceeding recommended to be adopted in a vessel running through the strait in a dark night or in thick weather when the soundings alone can safely guide her.

Tidal Streams.—It will be convenient to divide the strait at Cape Tormentine into two nearly equal portions, distinguished by the different set of their tidal streams and by different tide waves, which, advancing from opposite directions, meet in the central part of the strait. The course of these waves appears to be as follows: The principal tide wave, after entering the gulf between Cape Breton and Newfoundland, sends off, laterally, waves to the SW., on either side of the Magdalen Islands. The first of these, the eastern wave, coming from between those islands and the western shore of Cape Breton Island, arrives at the eastern entrance of the strait soon after 8 o'clock, and proceeds to the westward, making high water later in succession from east to west as far as Pictou, which it reaches at 10 hours. At the same nominal hour, but 12 hours later, the other or western wave arrives at Cape Tormentine, having been retarded by the long detour which it has taken to the northward and westward of the Magdalen Islands and by the great extent of comparatively shallow water which it has passed over in its subsequent progress to the SW. This wave makes high water later in succession at places along the eastern coast of New Brunswick, as we proceed to the southward, and after entering the strait from NW. to SE., contrary to the course of the other or eastern wave.

Thus it is high water, full and change, at Miscou at about 2½ hours; at Escuminac Point and the North Point of Prince Edward Island, forming the western entrance of the strait, soon after 4 hours; at the West Point of Prince Edward Island at 6 hours; at Shediac at 8 hours, and at Cape Tormentine at 10 hours.

When, therefore, the eastern wave arrives between Pictou and the Wood Islands, the western part of the preceding tide wave arrives between Cape Tormentine and Cape Traverse. They then meet and combine to make high water at the same hour, namely, 10 hours, or a little later in the harbors, all over the central portion of the strait from Pictou to Cape Tormentine, causing also an amount of rise of the tides everywhere more than double, and in some of the harbors nearly

three times as great as that which occurs at either entrance of the strait.

The direction of the tidal streams corresponds generally, and in fine weather, with the progress of the tide wave, but is disturbed occasionally by strong winds. The eastern flood stream enters the strait from the NE., running at the rate of 2½ knots round the east point of Prince Edward Island, but is much weaker in the offing and over toward the southern shore. It runs round Cape Bear, and with an increasing rate along the land to the westward; is strongest in the deep water near the land, and runs at its extreme rate of 3 knots close past the Indian Rocks and Rifleman Reef. Losing strength as it proceeds farther to the NW., it is quite a weak stream when it meets the other flood stream off the Tryon Shoals.

This eastern flood stream is not so strong along the southern or Nova Scotia shore, unless it be in the Caribou Channel for a short space near the Caribou Reef; and it is weak, not generally exceeding ½ knot, in the middle of the strait.

The other or western flood stream comes from the northward, along the west coast of Prince Edward Island, sweeping round West Point, and running strongest in the deep water near West Reef, where its rate is 2½ knots. Over toward the New Brunswick shore its rate seldom exceeds 1½ knots, and this is its average speed as it pursues its course to the SE., until near Cape Tormentine, where the strongest part of the stream runs near the Jourimain Shoals, and thence to the southward round and over the dangerous Tormentine Reefs with a great ripple, and at the rate of 3 knots.

After passing these reefs, part of it curves round to the SW. with decreasing strength, and unites with the other flood stream in Verte Bay, whilst the remainder is lost in the central part of the strait. The ebb stream, generally speaking, pursues a contrary course to the flood, and at nearly the same rates.

From this account of the tidal streams, it appears that a fast sailing vessel, under favorable circumstances, might enter the strait with the flood, and, arriving at Cape Tormentine soon after high water, there take the ebb, and thus have the stream with her, with but slight interruption from one end of the strait to the other. Or, a vessel beating with the flood might so time her arrival at the same point as to be able to continue her voyage in the same direction with the ebb.

The tidal streams were observed in general to change their directions soon after it was high water or low water by the shore; but not infrequently there were exceptions to this which it would be difficult to account for with certainty. Strong winds in the gulf greatly influence the strength and direction of the streams in the strait, as well as the height to which the tides rise; moreover, as the two tide waves which meet in the central parts of the strait are 12 hours different in age, so they are in consequence of unequal heights, owing to the diurnal

inequality, each of them being alternately and in turn the highest, and probably occasioning the stronger stream.

But it would require a long series of simultaneous observations at different points, and continued through the different seasons of the year, to reduce to order or to explain satisfactorily the seeming irregularities thus produced. Nevertheless, enough remains of general occurrence during the summer months which it is highly useful for the seamen to know, and which has been stated in consequence.

Directions.—Vessels bound to Miramichi and the ports in Northumberland Strait to the westward of Cape Tormentine, after entering the gulf on either side of the Island of St. Paul, usually pass to the southward of the Magdalen Islands, and round North Point of Prince Edward Island. The reef off this last-named point is exceedingly dangerous, and the lead should be kept constantly going when approaching it at night or in foggy weather, bearing in mind the probability of having been previously set to the southward in crossing from the Magdalen Islands, especially if the wind has been from the northward.

Under the same circumstances, after rounding North Point, the course should be shaped well to the westward, so as to insure clearing West Reef, which should be passed by the lead, running along the edge of the bank off the New Brunswick shore. Proceeding southeastward, after having passed West Reef, the lead will afford sufficient guidance along either shore, reference being had to the soundings on the chart, until the vessel is near the narrow part of the strait at Cape Tormentine.

Then, if bound farther eastward, the shore of Prince Edward Island should be preferred, the lights and soundings on that side being quite sufficient to guide the vessel past Carleton Head, Cape Traverse, and more particularly Tryon Shoals, if the irregular tides of the latter and the frequent set of the ebb stream toward them be remembered. The tides, however, in this narrow part of the strait are not very strong along the Prince Edward Island shore, off which the anchorage is good in the event of the wind failing, whilst on the opposite side there is deep water and very strong tides close to Jourimain and Tormentine Reefs.

If the wind be adverse, or scant from the southward, with the ebb tide running, a stranger had better not attempt this narrow passage at night or when the land can not be seen. Under such circumstances, it is recommended to anchor to the westward of Cape Tormentine till daylight or a change of tide renders it less hazardous to proceed.

Vessels bound to ports in the eastern division of the strait enter the gulf either through the Gut of Canso or by the Island of St. Paul. In the first case, the bearing of the light at the northern entrance of the Gut will guide them up to Cape St. George, from which, if bound to Pictou, there will be no difficulty in running along the land to the westward, if due attention be paid to the soundings in the chart, and

afterwards to the bearing of Pictou Island and Pictou Harbor lights. If the weather be thick, or the light not seen, beware of the reef off the east end of Pictou Island, which should not then be approached nearer than the depth of 10 fathoms, especially if the flood tide be running.

Vessels approaching from St. Paul Island, and entering the strait at East Point, should not approach the latter nearer than the depth of 20 fathoms in thick weather. If the night be clear, the lights on Sea Wolf and Chetican Islands, East Point, and Cape St. George will be of service.

Cape Bear and its reef should not be rounded in less than 15 fathoms, under the same circumstances, regard being had to the light on Panmure Head, and then, if bound anywhere to the westward of Pictou, the vessel should be kept more over toward Pictou Island and the southern shore, where the soundings will guide her, till Indian Rocks and Rifleman Reef are passed. The lights on Prim Point and Wood Island will greatly assist in passing the last-named danger, after which the lead will again afford sufficient guidance along the Prince Edward Island shore, past Tryon Shoals, and through the strait to the northwestward.

On the opposite or Nova Scotia shore, westward of Pictou, the principal dangers to be avoided are Middle Shoals, between Pictou and Island Caribou, Amet Island and Shoals, and Waugh Shoal. The approach to all these is sufficiently indicated in thick weather by the soundings, and therefore a constant use of the lead and a careful reference to the chart will enable the intelligent seaman to pass them at all times in safety, and also to conduct his vessel to any of the harbors of this coast, where pilots may readily be obtained.

CHAPTER VI.

GULF OF ST. LAWRENCE, WEST COAST—MIRAMICHI BAY TO GASPÉ BAY.

NEW BRUNSWICK.

(H. O. Chart No. 1179.)

Escuminac Point, the SE. point of Miramichi Bay, is of peat, upon a very low sandstone cliff, and is wooded with spruce trees, which form a very dark ground for the white lighthouse on it, rendering it so conspicuous that it can be seen at times from a distance of 13 or 14 miles. It is so difficult, especially for a stranger, to distinguish one point of this low coast from another, that this lighthouse is very useful to vessels bound to Miramichi, and making the land from sea. It also points out the position of the dangerous Escuminac Reef.

Escuminac Reef extends 2 miles to the northeastward from the lighthouse to the 3-fathom mark, and 2¾ miles to 5 fathoms at low water.

Buoy.—A black can buoy has been moored at the outer edge of the shoal ground off Escuminac Point in 5 fathoms water, with Escuminac lighthouse bearing S. 19° W. (S. 42° W. mag.), 2¼ miles.

Telegraph.—There is a telegraph station at Escuminac Village, at about 3½ miles westward of Escuminac light.

Light.—The lighthouse on Escuminac Point, an octagonal tower, painted white, and 58 feet high, exhibits, at an elevation of 70 feet, a fixed white light, which should be visible 14 miles.

Fog Whistle.—The steam whistle, 300 feet west of the lighthouse on Escuminac Point, in thick or foggy weather will be sounded for six seconds' duration, with silent intervals of twenty-nine seconds.

Signals.—There is a telegraph and signal station at the lighthouse.

Miramichi Bay is nearly 14 miles wide from Escuminac Point to the sand bars of Blackland Point, and 6½ miles deep from that line across its mouth to the main entrance of the Miramichi, between Fox and Portage Islands. The bay is formed by a semicircular range of low sandy islands, between which there are three small passages and one Main or Ship Channel leading into the Inner Bay or estuary of the Miramichi.

Coast.—At 6¼ miles from Escuminac Point, along the low shore of the mainland, is Huckleberry Gully.

Several lobster factories have been built between Escuminac Point and Escuminac Village, the most conspicuous at Herring Cove and

Winter Portage, distant one and 2 miles, respectively, from Escuminac lighthouse.

The Roman Catholic church, west of Escuminac Village, has a square tower, and is a conspicuous object from the eastward when north of Escuminac Point.

Lights.—At rather more than a mile eastward from Huckleberry Gully the NW. or outer beacon light at Preston Beach is exhibited from a white beacon; the SE. or inner beacon light is exhibited from the east side of a white barn, which is made conspicuous by a black band painted down the center of the roof.

The lights are fixed white; the front light is 52 feet and the back one 66 feet above high-water mark; each light should be visible 10 miles.

In line, the lights lead in the best water across the bar, and to the Lump buoy; the day mark for the same purpose is the black band in line with the outer beacon bearing S. 40° E. (S. 17° E. mag.).

Huckleberry Island is 33 feet above high water and one mile long. Fox Gully, between Huckleberry and Fox Islands, and Huckleberry Gully are almost dry at low water. They are both only fit for boats or very small craft, and the channels leading from them to the westward, up a bay of the main within Huckleberry Island, or across to the French River and village (where there is a wooden church not easily distinguished from a barn), are narrow and intricate, between flats of sand, mud, and eelgrass, and with only water enough for boats.

Buoy.—A black spar buoy in 2 feet water marks the entrance to Huckleberry Gully.

Fox Island, 3¾ miles long, is narrow and partially wooded; it is formed of parallel ranges of sand hills, which contain embedded drift timber, and have evidently been thrown up by the sea in the course of ages. These islands are merely sand bars on a large scale, and nowhere rise higher than 50 feet above the sea. They are incapable of agricultural cultivation, but yet they abound in plants and shrubs suited to such a locality, and in wild fruits, such as the blueberry, strawberry, and raspberry. Wild fowl of various kinds are also plentiful in their season, and so also are salmon, which are taken in nets and weirs along the beaches outside the island, as well as in the gullies.

Lights.—At the NW. end of Fox Island, three fixed white lights are exhibited from three masts, 40, 38, and 28 feet high, with white sheds at their bases. The lights should be visible 8 miles.

No. 1 light is 1,830 feet from the NW. point of the island, and is 47 feet above high-water mark.

No. 2 light is 1,051 feet S. 73° E. (S. 50° E. mag.) from No. 1, and is 46 feet above high-water mark.

No. 3 light is 954 feet S. 43° W. (S. 66° W. mag.) from No. 1, and is 36 feet above high-water mark.

Nos. 1 and 2 lights in line lead into Old Horseshoe Channel.

Nos. 1 and 3 lights in line lead through Portage Island Channel.

Nos. 2 and 3 lights in line lead to the upper buoy of Horseshoe Shoal.

Swashway Range Lights.—Two white square skeleton towers, with horizontal slat work seaward and sheds at their bases, are erected on the east side of Fox Island.

A fixed white light is exhibited from the top of each tower, showing over a small arc on each side of the line of range.

The front tower is 1½ miles from the south end of the island, on ground 6 feet above the sea and 100 feet back from the coast line. The tower is 46 feet high and the light 47 feet above high-water mark, and should be visible 12 miles.

The back tower is 1,220 feet S. 81° W. (N. 76° W. mag.) from the front one. It is 71 feet high. The light is 72 feet above high-water mark, and should be visible 14 miles.

These lights in line lead from the deep water of the outer bay through the Swashway, with (in 1891) nowhere less than 2¾ fathoms water, to the buoys in the ship channel.

Portage Island is 4½ miles long, narrow, low, and partly wooded with small spruce trees and bushes. Portage Island has extended considerably southward. Several conspicuous houses have been built on the island, the most prominent a lobster factory, with dwellings attached, on the east coast, about 1½ miles from the south extreme of the island; also a similar group of buildings on the west coast, at the same distance from the north extreme. The island shows from a distance in three parts, composed of clumps of trees 61 feet high, with marshes between.

Light.—The lighthouse on the SW. end of Portage Island, 42 feet high, and painted white, exhibits at an elevation of 45 feet a fixed white light. The light should be visible 12 miles.

Miramichi Bar commences from the SE. end of Portage Island, and extends across the main entrance, and parallel to Fox Island, nearly 6 miles SE. It consists of sand, and has not more than one or 2 feet of water over it in some parts at low spring tides. Near Portage Island there is water enough over it for small vessels, and there is a still deeper part near its SE. end, called the Swashway.

Both the Lump and Spit are steep shoals, but between them a vessel may run along, or even work on the SW. side of the channel in 4 or 3 fathoms by the lead.

On the opposite or NE. side of the channel the bar is extremely steep. The spit of Fox Island is gradually extending out.

Horseshoe Shoal consists of sand and gravel, and is of great extent. The least water on it is 3 feet, and it is separated from the shoal on the inner side of Portage Island by a narrow and intricate channel, which is seldom or never used.

Inner Bar.—To the southward, the Horseshoe is separated from the shoal which connects Fox, Egg, and Vin Islands by the very narrow Ship Channel (over the Horseshoe or Inner Bar), which is only 400 yards, having a depth of 18 feet at low water (in 1885).

Caution.—Too much reliance must not be placed on the buoyage, as it is subject to alterations.

Pilots.—Pilotage is compulsory in Miramichi Bay and River. Pilots are generally to be met with in the entrance of the bay, though their district extends eastward to Magdalen Islands, southward to Kouchibouguac River, and westward to Miscou Point.

Light.—The lightvessel, a schooner, between Fox and Portage Islands, exhibits at an elevation of 35 feet a fixed red light, which should be visible 8 miles. This vessel is often out of position after heavy weather.

Buoys.—A black spar buoy lies in 17 feet water at the eastern entrance to the channel, near Portage Island, for small vessels between the bars, and a red spar buoy is moored in 19 feet in the same channel, at the SW. side of the outer part of the bar. These buoys are nearly on the line of the SW. and NE. beacons, near the north point of Fox Island.

Bar buoy, a can buoy, painted black and white, in vertical stripes, and numbered one, is moored in 22 feet water, at the south extreme of the outer bar, with Escuminac lighthouse bearing S. 75° E. (S. 52° E. mag.), distant 6¼ miles, and south extreme of Huckleberry Island S. 20° W. (S. 43° W. mag.). Close south of this buoy there is a depth of 32 feet, the western limit of a deep channel from seaward.

Lump buoy, a can buoy, painted black and numbered 2, is moored in 16 feet water on a shoal between the SE. extreme of the bar and Fox Island, and lies N. 43° W. (N. 20° W. mag.), 1,800 yards from Bar buoy. A black spar buoy lies a short distance northward of Lump buoy.

A can buoy, painted red and numbered 3, lies in 29 feet water N. 34° W. (N. 11° W. mag.), about 1¼ miles from Bar buoy, and at the SW. angle of the bar, northward of the Swashway. The water shoals rapidly to 11 feet northward of this buoy.

Spit buoy, a can buoy, painted black and numbered 4, is moored in 18 feet water at the east extreme of a shoal extending one mile from the northern end of Fox Island, and lies with Portage Island lighthouse bearing N. 40° W. (N. 17° W. mag.), distant about 1½ miles, and NW. extreme of Fox Island S. 59° W. (S. 82° W. mag.).

A can buoy, painted red and numbered 5, is moored in 18 feet water, bearing S. 86° W. (N. 71° W. mag.), distant 1$\frac{4}{10}$ miles from Spit buoy, and at the eastern edge of the inner bar. Three buoys similar to No. 5, numbered, respectively, 6, 7, and 8, mark the channel southward of Horseshoe Shoal, Nos. 6 and 7 being northeastward and No. 8 southwestward of the lightvessel. They are moored in 18, 21, and 20 feet water, respectively.

A can buoy, painted red and numbered 9, is moored in 23 feet water at the SW. extreme of Horseshoe Shoal.

Three spar buoys, painted black, lie southeastward of Grandoon Island; the two eastern buoys are in a depth of 16 feet, and the western one in 19 feet.

Grandoon buoy, a can buoy, painted red and numbered 10, is moored in 25 feet water 400 yards southeastward of a shoal extending from the shore eastward of Oak Point.

Anchorage.—There is good anchorage, in 4 or 5 fathoms, between the Horseshoe and the southern end of Portage Island, where vessels may safely anchor during the summer months.

Within the buoy, on the SW. extreme of the Horseshoe Shoal, is the usual place where vessels, bound to sea, anchor, to wait for a wind or high tide, to enable them to cross the inner bar.

Tides.—It is high water, full and change, at Portage Island lighthouse at 4h. 45m.; springs rise 5 feet, neaps 1¾ feet, and neaps range ¾ foot. Easterly winds cause the highest tides and northwesterly winds the lowest.

It is high water, full and change, at Miramichi Bar at 5h. 30m.; spring rise 5 feet, neaps 3 feet.

From observations made during the survey of 1885, the flood stream was found to flow strongest through Ship Channel toward Portage Island, whence it divided, a strong stream that runs southward along the west coast of that island meeting the flood stream there. The stream then decreases in strength and distributes itself generally over Miramichi Bay, the greatest velocity being observed in the channel south of Horseshoe Shoal, and between that shoal and the Portage Island.

Southward of Horseshoe Shoal the ebb stream runs in the direction of the channel straight to seaward, its velocity gradually diminishing as the bay is reached. It is joined by a stream running down the west side of Portage Island, which deflects it slightly to the southward. The stream down Ship Channel is not very strong, and runs in the line of that channel. There is scarcely any ebb stream eastward of the Bar buoy.

The greatest velocity of tidal stream ascertained near Miramichi Bay was 2½ miles an hour.

At the anchorage south of Portage Island the ebb stream makes about an hour after high water, and runs 7 hours, whilst the flood stream begins about 1¼ hours after low water, and runs 5½ hours, with about ½ hour slack water between each tide.

Directions.—The bar of Miramichi should never be attempted by a vessel of large draft, or by persons not thoroughly acquainted with it, without a branch pilot; but in case of emergency proceed as follows: Observing, first, that if the lighthouse on Escuminac Point has been sighted too late in the day to run in before dark, the vessel must stand off and on till daylight, coming into no less than 12 fathoms water, especially with an easterly wind.

In heavy easterly gales in the fall of the year, especially during the ebb tide, there is a dangerous and heavy-breaking sea on the banks extending from Fox and Huckleberry Islands, which has in several

instances proved fatal to vessels, rendering them unmanageable, so that they have been cast ashore on the islands.

To avoid this difficult part, the Swashway is used by the pilots as being more direct with vessels of suitable draft.

Escuminac Point, having been made, should be rounded in 5 fathoms by day and 10 fathoms by night, or at distances of 2½ and 4 miles, respectively; thence steer for the Bar buoy, which should be passed close-to on its south side, and immediately alter course to bring the beacons or lights at Preston Beach in line, bearing S. 40° E. (S. 17° E. mag.).

Keep the Preston Beach beacons or lights in line until the Swashway beacons or lights are also in line, bearing S. 81° W. (N. 76° W. mag.); then steer N. 54° W. (N. 31° W. mag.) for 3 miles, which will lead to the Spit buoy. Continue that course until the lightvessel at the inner bar bears S. 72° W. (N. 85° W. mag.), when the spit off Fox Island will be cleared, and a course may be steered for No. 5 buoy, at the eastern edge of the inner bar. With a long vessel, buoys 5, 6, and 7 should be brought in line before reaching No. 5 buoy, and then to obtain the deepest water in the channel, 18 feet, vessels should pass quite close to the buoys and on the south side of them. From No. 7 buoy steer for No. 8 buoy, and thence for No. 9, at the southwestern extreme of Horseshoe Shoal. From No. 9 buoy steer N. 82° W. (N. 59° W. mag.) to the eastern extreme of Oak Channel, passing 600 yards northward of the southeastern spar buoy. Not more than 16 feet at low water will be found over the flats southeastward of Oak Channel. There are only 15 feet for a short distance in the direct line from No. 9 buoy to the southeastern spar buoy, but the mud is so soft that with a strong fair wind vessels can force their way when drawing 2 feet more water than the apparent depth.

From the eastern end of Oak Channel the course is S. 50° W. (S. 73° W. mag.) to Grandoon buoy, passing close north of the northwestern spar buoy; or if the spar buoy be seen steer for it, and then for Grandoon buoy. Pass close southward of Grandoon buoy, and then alter course to S. 72° W. (N. 85° W. mag.) until Oak Point beacons are in line, bearing N. 30° E. (N. 53° E. mag.); keep these beacons in line astern past Musselbed buoy, and up to Narrows buoy.

The mark, Black Brook mill chimney, on St. Andrew Point, open north of the trees on Sheldrake Island, now leads over 13 feet water only, and Sheldrake Island lights in line over 15 feet. The shoal southwestward of Sheldrake Island has apparently extended.

Black Brook mill is on St. Andrew Point, and has a large chimney, which shows plainly from Grandoon buoy.

The Inner Bay of Miramichi is of great extent, being about 13 miles long from its entrance at Fox Island to Sheldrake Island (where the river may properly be said to commence), and 7 or 8 miles wide. The depth of water across the bay is sufficient for vessels that can cross the Inner Bar.

Egg and Vin Islands are on the southern side of the bay; the first small, low, and swampy, the other much larger, being 2¼ miles long, and for the most part thickly wooded.

Vin Harbor is southward of Vin Island, and must be approached round its west end, which is nearly 4½ miles from the north point of Fox Island. It is quite sheltered from all winds, and has plenty of water for the largest ships that can enter the Inner Bay. The harbor is a bay of the island, ¾ mile wide and 600 yards deep.

The long sandy Vin Spit and shoal of the main runs out northward nearly to the line joining the sandy points of the harbor, but leaves a narrow channel to the eastward, which continues for about 2 miles, and may be considered as a prolongation of the harbor in that direction, or toward French River Point.

French River is small and shallow and has a village. Fox Gully is difficult to recognize; there is, however, a conspicuous clump of pine trees on French River Point. The space to the eastward of the line joining Egg Island and French River, and in the bay to the southward of the latter, is occupied by flats of sand, mud, and eelgrass.

Lights.—On the SW. end of Vin Island are two fixed white leading lights, to enable vessels seeking shelter to clear the point of the shoal lying off the island. The front light is 30 feet above high-water mark, and should be visible in the range for 10 miles.

The back light is N. 33° E. (N. 56° E. mag.), distant 1,222 feet from the front one, is 42 feet above the sea, and should be visible 10 miles.

Both lights are hoisted on masts with sheds painted red at their base, the front mast being 25 feet and the back one 30 feet above the ground.

Anchorage.—Anchor near the center of the harbor in 10 or 11 fathoms, mud bottom.

Tides.—It is high water, full and change, in Vin Harbor at 5h. 45m. Springs rise 5 feet, neaps 3 feet, but the rise is at all times uncertain, neap tides sometimes not ranging above a foot and spring tides not above 2 feet. It must also be remembered that the a.m. tides rise higher in general by 2 feet than the p.m. tides in the beginning of August.

Directions.—A pilot will readily be procured to take a ship into Vin Harbor; if unable to get one, with the assistance of the chart steer S. 50° W. (S. 73° W. mag.) from the SW. buoy of the Horseshoe for about 3 miles, keeping the lead going, and then to the southward round the SW. end of Vin Island, at a distance not less than ¾ mile, until the leading lights are in line bearing N. 33° E. (N. 56° E. mag.). The vessel will then be to the southward of the shoal extending from the SW. end of the island. Steer toward them, keeping the high light open to the right of the low one, and on shoaling the water when approaching the sandy SW. point of the island, sheer to the southward sufficiently to give it a berth of 150 yards as the vessel rounds it into harbor. When past the point, do not go to the southward of the line

joining the sandy points of the harbor, or she will be on shore on the sandy shoal which extends off the mainland opposite.

Vin Bay is more than 3 miles wide and nearly as deep. Quart Point, its western point, is a low cliff of sandstone with high trees, 3¼ miles from the west end of Vin Island. There is good anchorage in the eastern part of this bay in 3 fathoms, mud bottom, and about ¾ mile to the westward of the island. The western side of the bay is shallow. In its SW. corner is Black River, into which 9 feet can be carried at low water through a narrow and difficult channel, and the river has 3 fathoms in it for some distance within the entrance.

Vin River also runs into this bay 2½ miles to the southward from the SW. point of the island. It is a smaller river than Black River, having only 6 feet at low water in its entrance. There is a small church on its eastern shore a short distance within its entrance, and farms on either side, where supplies may best be obtained. The best watering place will also be found at this river; but it is difficult to obtain large supplies of good water in so flat a country near the sea. There is a tolerable road from Vin River to Chatham, the principal town on the Miramichi River.

Cheval Point, west nearly 3 miles from Quart Point, is sandy, with a remarkable clump of high trees upon it.

Immediately to the westward of Cheval Point is the shallow Napan Bay and River, which boats can ascend for several miles, or as far as the tide reaches. Above that point the river, which is small, runs through a fertile and well-cultivated valley, extending westward in rear of the town of Chatham.

Middle Ground is a long sandy bank, with less than 2 fathoms water, which stretches down the center of the estuary from Cheval Point, and extends from it 2¾ miles to the northeastward.

Sheldrake Island lies off Napan Point, at the distance of rather more than ¾ mile. It is low, swampy, partly wooded, and has two buildings on its eastern side, which were formerly used as a cholera hospital. The island is ⅓ mile long by ¼ mile wide, and is separated from the north shore by a channel ½ mile wide, but with only one or 2 feet in it at low water. Shallow water extends far off this island in every direction—westward to Bartibogue Island and eastward to Oak Point. It also sweeps round to the south and SE., so as to leave only a very narrow channel between it and the shoal, which fills Napan Bay, and trending away to the eastward past Cheval Point, forms the Middle Ground already mentioned.

Lights.—The two lights on the north side of Sheldrake Island are hoisted on masts 500 yards apart. They exhibit, at an elevation of 45 and 35 feet above the sea, fixed white lights. The high light should be visible 12 miles and the low one 10 miles.

Tides.—It is high water, full and change, at Sheldrake Island at 6 h.; springs rise 5 feet, neaps 3 feet.

Murdoch Spit and Murdoch Point are two sandy points on the south shore, ⅓ mile apart, with a cove between them, and about a mile SW. of Sheldrake Island. The entrance of Miramichi River is ¾ mile wide between these points and Moody Point, which has a small Indian church upon it, and is the east point of entrance of Bartiboque River, a mile west from Sheldrake Island.

Above Murdoch Point 1½ miles, and on the same, or south side of the river, is St. Andrew Point, showing as the extreme of the land from Sheldrake Island. Both these points were wooded at the time of the survey in 1837, and used as leading marks.

Bartiboque River is ¾ mile wide at the entrance, between Malcolm and Moody Points, but contracts to 300 yards a short distance within, where a wooden bridge is thrown across. Bartiboque Island lies in the entrance of the river, and has steep banks or clay cliffs on every side, and is nearly joined to the shore to the northward by a sandy spit. The narrow channel into the river passes close to the east end of the island, and has not more than 4 feet in it at low water.

Lights.—The two lighthouses at Grant Beach, Bartiboque, are white sheds with masts, 34 feet high, and bear from each other east (S. 67° E. mag.) and west (N. 67° W. mag.), 433 yards apart. They exhibit from an elevation of 140 and 120 feet fixed white lights. These are leading lights, and should be visible 10 miles.

Oak Point.—Returning back to the eastward along the north shore, the first point requiring notice is Oak Point, nearly opposite Cheval Point, and distant from it 2 miles to the northward. The eastern part of this point has dark-colored sandstone cliffs about 12 feet high, and forming an extreme point, with a beacon on it. It is used as a leading mark with the white beacon which stands N. 34° E. (N. 57° E. mag.) at ⅔ mile from it on the shore of the bay. The latter beacon is lofty and large, and shows so conspicuously on the dark background of the woods that it can be easily seen on a fine day from Fox Island.

Lights.—From a mast 28 feet high, with a white shed at its base, to the NE. of, and from a similar mast with shed erected on Oak Point, fixed white lights are exhibited, elevated, respectively, above high water 48 and 43 feet. These lights bear from each other N. 32° E. (N. 55° E. mag.) and S. 32° W. (S. 55° W. mag.), distant 600 yards, and point when in line to the Narrows Buoy. The lights should be visible 10 miles.

Grandoon Island, low and marshy, and difficult to distinguish from the mainland till very near. It is NE. 2½ miles from Oak Point and 3½ miles north from Quart Point. Farther eastward, along the northern shore of the Inner Bay, are Burnt church and the Indian village, and small river of the same name; also Hay Island and the villages of Upper and Lower Neguac. There is a clear channel with 3½ to 2¼ fathoms water in it to the northward of the Horseshoe and the shoals of Portage Island, as far northeastward as ¾ mile from Hay Island, where a narrow channel leads out to sea through the Neguac Gully.

Lights.—Two fixed white leading lights have been established on Hay Island, to enable vessels when seeking shelter to avoid the shoal extending from the east end of that island.

The outer light is exhibited on a mast 15 feet high. It is elevated 23 feet, and should be visible 10 miles. At the base of the mast there is a small red shed.

The inner or high light is shown at 30 feet above high-water mark, and should be visible 11 miles. It is exhibited from a white, square wooden tower 21 feet high, 210 feet from the outer light.

Miramichi River may be said to commence at Sheldrake Island, for below that point the Inner Bay, with its low and widely receding shores, bears no resemblance to a river. At its entrance the country begins to rise into gentle undulations, terminating in steep banks and cliffs of sandstone, which in some places attain a height of 50 feet above the river. The settlements, too, increase in number and extent, and soon become continuous on either side, dotted here and there with steam sawmills.

The Miramichi is navigable up to Beaubère Island by any vessel that can cross the Inner Bar. Written directions, however, will not much avail above Sheldrake Island, not only on account of the contracted nature of the navigation, but also because there are few leading marks of a permanent nature which could be certainly recognized by a stranger. Directions, too, are not requisite for this inland navigation, for which pilotage is compulsory, and there are a number of well-qualified pilots.

The buoys to the westward of the St. Andrew Banks have been removed and stakes substituted, black to the northward, red to the southward.

Ice.—From observations taken each year from 1830 to 1885, the average date of the opening of navigation at Chatham is April 20, and of the close December 5, the river being completely closed between those dates. At Portage Island navigation opens about a week earlier and closes about a week later than at Chatham.

The first vessel arrived on May 12 and the last left on November 26 in 1885.

Leggat Shoals lie nearer the north than the south side of the river, and at the time they were surveyed had 12 feet upon them at low water; but this depth is said to vary, and also upon the banks of St. Andrew, in consequence of old trees, logs, and other lumber lodging upon them. The same cause is said to render the depth uncertain to the southward of these shoals, where there is a wider channel (1860). The channel at the stake on the NW. extreme of the shoals has 5 fathoms water in it, and is nearly 200 yards wide between the Leggat Shoals and a shoal bank which extends off the north shore. On the point of this shoal off the north shore there is another stake, which will be seen at ¼ mile S. 53° W. (S. 76° W. mag.) from the former. Vessels must pass close to the northward of the first of these stakes and close to the southward

of the second, which is 2 miles above the Bartiboque River. The river is clear of detached shoals from the stakes last mentioned to Middle Island, which, together with its shoal, confines the ship channel to the north side of the river, where the shore is so bold that there are 7 or 8 fathoms close to the sandstone cliffs until the vessel is off the Gilmour Mills and Cove, nearly opposite the west end of Middle Island.

Middle Island is rather smaller than Sheldrake Island, from which it is distant 5½ miles; and there is no channel to the southward of it at low water. There is nothing in the way of vessels from Gilmour Mill to the wharves at Chatham.

Lights.—The beacon lighthouse on the north side of Middle Island, painted white, exhibits at 44 feet above high water a fixed white light, which should be visible 12 miles.

A fixed red light is exhibited from a lighthouse on Limekiln Bank on the north side of the river below the town of Newcastle.

The light is 87 feet above high water, and should be visible 9 miles. The lighthouse is a white square tower, 23 feet high, with a red roof.

Chatham, the principal town on the Miramichi, and containing, in 1883, about 5,762 inhabitants, commences ½ mile above Middle Island, and extends along the south shore for 1¼ miles to the westward. It is conveniently situated for shipping, having 6 to 8 fathoms water close to its wharves. It is a straggling but increasing town, and contains some handsome buildings, among others a college and hospital.

Quarantine.—Chatham is a minor quarantine station. There is a seamen's hospital here.

Tugs may be obtained from Chatham by signal to Escuminac lighthouse, but there is no regular charge.

Telegraph and Railways.—Chatham is in telegraphic communication with all towns of the Dominion of Canada and the United States, and is directly connected by the Intercolonial Railway with Halifax, St. John in New Brunswick, and Quebec; also by a direct railway with Fredericton, New Brunswick.

Douglastown, on the northern shore, about 1½ miles above Chatham, is a much smaller place, containing 400 inhabitants. It is prettily situated on a rising ground, and has sufficient water at its wharves for large vessels. The most remarkable building is the Marine hospital, built of stone. There is a shipbuilding establishment 1¼ miles above Douglastown on the same side of the river, and opposite to it on the south-side shore is the church of St. Paul.

Newcastle, 2 miles farther up the river, and on the north shore, is the county town, containing the courthouse and jail. Standing on an acclivity which rises to the height of 100 feet at ¼ mile from the river, and commanding a view over the lower ground westward and southward to Beaubère Island and Nelsontown, and down the river to Chatham, a distance of nearly 5 miles, its situation is as beautiful as could have been selected, while at the same time it is not unfavorable for

mercantile purposes, the channel of the river opposite it being ⅛ mile wide, clear of shoals, and 6 or 7 fathoms water close to the wharves of the town.

Nelsontown, the last village within the navigable waters of the Miramichi, is a straggling place with 200 inhabitants, and possessing a large wooden church, which stands on the south shore opposite the east end of Beaubère Island and 1½ miles above Newcastle.

Water and Supplies.—The surface water is quite fresh, on the ebb tide, at Chatham. Supplies of any kind can be procured at Chatham or Newcastle.

Coal.—About 1,000 tons of coal are usually kept in store at Chatham, and about 200 tons at Newcastle, but any quantity can easily be obtained at short notice by Intercolonial Railway from Springhill or Picton.

Trade.—The chief exports from Chatham and Newcastle are timber, deals, palings, salmon, lobster, and extract of hemlock bark for tanning.

Repairs.—There is neither dock nor slip in Miramichi River, but at Chatham there is a wharf for heaving down vessels in need of repairs.

Beaubère Island, 1¼ miles long and ¼ mile wide, has steep clay banks, based on sandstone, and rising to about 20 feet above the river.

The Miramichi is easily navigable to this point by any vessels that can cross the Horseshoe or Inner Bar. There are some parts of the channel above Chatham where there are only 2¼ fathoms, and which would have to be avoided by a large vessel at low water, but there is only one detached shoal, which has 9 feet least water, and lies less than halfway across from the south shore, S. 28° W. (S. 51° W. mag.) from the hospital at Douglastown.

Tides.—It is high water, full and change, at Beaubère Island at 6h. 30m.; springs rise 6 feet, neaps 4 feet.

The usual average rate of the ebb tide is 2 knots and the flood one knot in this part of the river. The ebb in some places runs 2½ knots, and in the spring of the year is said to be still stronger. In July and August, when the observations were made, excepting for 2 or 3 days at neap tides, the morning tides rose 2 or 3 feet higher than the evening tides, and were of longer duration by one or even 2 hours at a time. But this is much influenced by winds, and consequently by no means regular. The mean length of the flood tide is 6h., and of the ebb 6½h. The duration and length of the tidal streams are also influenced by the winds, but in general they continue in the channel about ½ hour after it is high or low water by the shore.

Northwest and Southwest Arms.—At Beaubère Island the two great arms of the Miramichi meet. The Northwest Arm is much the larger, as respects the tidal water, although the Southwest Arm is considered the main branch, being of greater length, and discharging more water. The Northwest Arm would be navigable for large vessels to Shilelah Cove, 7 miles above Beaubère Island, as there is sufficient

depth of water, if the channel were buoyed or staked in the narrow parts, which are not more than 100 yards wide. Above Shilelah Cove there are from one to 1½ fathoms water, in intricate and narrow channels, between shoals of mud and low marshy islands, all the way to the rapids, which flow in narrow channels between meadow islands. There the tide ends, and the water becomes quite fresh 13 miles from Beaubère Island, and 39 miles from the entrance of the inner bay at Fox Island.

The Southwest Arm is not navigable for large vessels, as not more than 6 or 7 feet at low water, spring tides, can be carried through between Beaubère Island and the mainland, and even above that shallow part, although there is often more than 3 fathoms water, yet the channel is too narrow and intricate for any but very small vessels. The arm is about ¼ mile wide for the first 5 miles, or up to Barnaby Island; after which it varies from 200 to 400 yards up to the rapids, 12 miles from Beaubère Island. Both shores of this arm are settled, and many of the farms appear to be in a flourishing condition.

Tides.—The tide, which ends at the rapids, was observed to rise 2 feet there, and it was high water on the day of the full moon at about 8 hours; as it was also at the foot of the rapids in the Northwest Arm.

Neguac Gully, between the sand bar of the same name and a small one to the SW., is nearly 400 yards wide and carries 2 fathoms water; but a sand bar, of the usual mutable character, lies off it with 7 feet over it at low water. Within the gully a narrow channel, only fit for boats or very small craft, leads southwestward up the Inner Bay. The shoal water extends 1¼ miles off this gully, but there is excellent warning by the lead here and everywhere in this bay. Shoals, nearly dry at low water, extend from the Neguac Gully to Portage Island, a distance of ¾ mile.

Buoys.—A can buoy, painted red, is moored in 4 fathoms at the entrance to Neguac Gully. A similar buoy is moored northwestward of the first buoy, to show the direction of the channel.

Lights.—The lighthouse on the NE. side of Neguac Gully is a square building, 30 feet high, and painted white; it exhibits at 32 feet above high water a fixed white light, which should be visible 11 miles.

The front light is a fixed red light, shown from a mast with white shed at its base.

The mast stands 900 feet S. 12° E. (S. 11° W. mag.) from the main light, and the alignment guides to the buoy marking the crossing of the outer bar; also gives the middle of the channel and clears the south and north bars.

Lower Neguac.—The wharf at Lower Neguac is a crib-work block, with about 8 feet water at the end of it, which is connected with the shore by a roadway supported on temporary trestles. The roadway runs NNW. and is 1,050 feet long to high-water mark, where it ends near a fishhouse and a store.

Lights.—A square tower, painted white, surmounted by a red lantern,

and 33 feet high, stands on the beach. The light is a fixed white light, 32 feet above high-water mark, and should be visible 10 miles.

A mast with oval slat-work day mark attached, shed at base, is on the end of the wharf, S. 50° E. (S. 27° E. mag.), 1,080 feet from the preceding light. A fixed red light is shown from it at an elevation of 25 feet, which should be visible 8 miles. The rear light is only visible over a small arc on each side of the alignment.

Neguac.—A church with a spire has been built at Neguac Village, about 2¾ miles northwestward of Neguac lighthouse. There is a post-office. Population about 150.

Burnt Church Village has extended westward; a large white store at the west end, and a long white barn a short distance inland, are the most prominent buildings there. Population, 200.

Remarks.—Since the examination of Miramichi Bay in 1857, the bars have altered very little in their general direction and depth, but the channel for small vessels close to Portage Island has become blocked, whilst the deep-water channel close westward of that island has extended considerably northward, and some of the shoals have been deepened by dredging.

Blackland Point, the north point of Miramichi Bay, is low and swampy, with steep and black peaty banks, and there is a communication round it for boats within the sand bars from Tabusintac lagoon into the Inner Bay of Miramichi.

(H. O. Chart No. 1079.)

Tabusintac River.—Tabusintac Gully is about 300 yards wide at high water, and has a shifting bar of sand, over which 6 or 7 feet could be carried at low water when it was surveyed, and 11 or 12 feet at high water in spring tides. The entrance of the Tabusintac River from the lagoon inland is 3 miles to the northward of the gully, and can be seen over the sand bars. There is plenty of water in this river when once over the bar; 2 and 3 fathoms is the depth in the channel through the lagoon, and there is as much as 4 and 5 fathoms in some parts of the river; but the channel is too narrow and intricate for anything larger than boats or very small vessels. The tide flows 10 miles up the river, through an undulating country, and occasionally between steep banks of sandstone, which rise to about 100 feet above the sea. There are settlements on either shore, and there is a church on the south bank 1½ miles up from the lagoon.

Salmon are taken in considerable quantities in the Tabusintac. There are lobsters, oysters, and other shellfish in the lagoon; and codfish come in upon the coast early in the season, and are fished for upon a small scale.

Raft Gully.—There is an entrance into the lagoon through Raft Gully, 6 miles to the northward of Tabusintac Gully, but it is nearly blocked up with sand. Barreau Point lies about midway between Raft and South Tracadie Gullies.

d white light,
iles.
at base, is on
feet from the
n elevation of
s only visible

guac Village,
here is a post-

ge white store
nland, are the

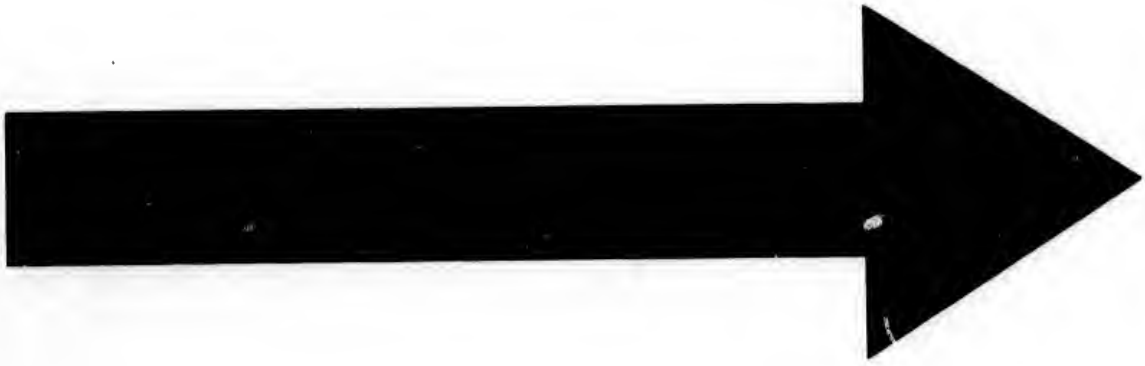
y in 1857, the
nd depth, but
ecome blocked,
at island has
oals have been

ay, is low and
a communica-
usintac lagoon

yards wide at
or 7 feet could
12 feet at high
River from the
nd can be seen
river when once
nel through the
me parts of the
anything larger
les up the river,
een steep banks
sea. There are
e south bank 1½

usintac. There
on; and codfish
ished for upon a

n through Raft
, but it is nearly
way between Raft



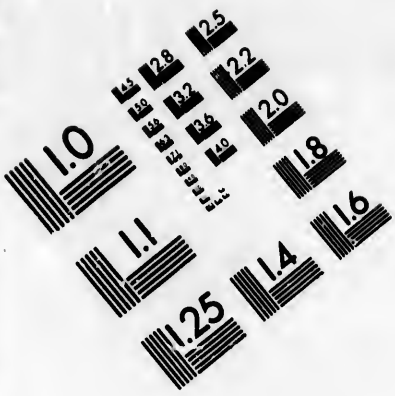
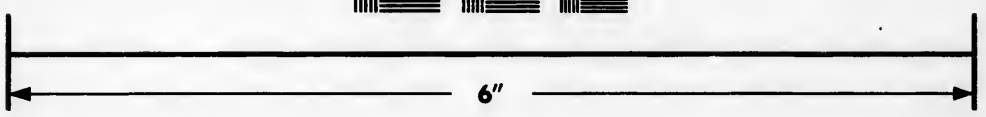


IMAGE EVALUATION
TEST TARGET (MT-3)



Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Tracadie River is somewhat larger, but in other respects similar to the Pokemouche, which is about 10 miles farther north. It has a church and village on the south side of its entrance from the lagoon inland, which can be seen over the sand bars; the church bears S. 32° W. (S. 56° W. mag.) 3¼ miles from the north and principal gully, instead of N. 80° W. (N. 56° W. mag.), as at Pokemouche, which will help to distinguish the one from the other. Both rivers supply a considerable quantity of pine timber and deals.

The North Gully of Tracadie is at present the principal entrance to the very extensive lagoon, through which the river flows in a narrow channel between flats of sand, mud, and weeds. There are several huts and stores at the entrance to this gully, which is 300 yards wide at high water; but, like all the rest of this coast, has a shifting bar of sand off it, causing the depth, breadth, and directions of the channel to vary so frequently in heavy gales as to render all instructions for entering it useless. In the entrance of the gully, and sheltered by the bar outside, small vessels may lie moored in from 1½ to 3 fathoms water. There are 2 and 3 fathoms in the channel of the river opposite the village, but that can only be reached by passing through the lagoon, where the channel in one part is so shallow that boats can only pass when the tide is in.

At 2 miles to the southward of the North Gully is the Old Gully, now nearly blocked up with sand, but which was formerly the principal entrance. South Tracadie River, which discharges its waters, after traversing a lagoon, by South or Little Tracadie Gully into the sea, is separated from the North Tracadie by a point of the mainland which approaches near the sand bars, but still leaves a communication within them from one lagoon to the other. There are huts and fish stores at the entrance of this gully, and settlements at the entrance of the river. Within the sand bars which inclose the lagoons of Tracadie there is a well-sheltered boat or canoe navigation for 8 or 9 miles.

Buoys.—A red can buoy is moored on the outer edge of the bar (North Tracadie) at the point where vessels should cross it and pick up the line of the range lights. To mark the channel over the bar, three red spar buoys have been placed at the turn on the north side of the channel, and a black spar buoy and a red can buoy on the south side. A red spar buoy is also moored on the east point of the sand bar inside the gully southwestwardly from the main light tower. The channel is between this buoy and the lighthouse.

Lights—North Gully.—North Tracadie light is a fixed white light 37 feet above high water, and visible 11 miles. It is used as a coast and beacon light. The lighthouse, 33 feet high, is a square white building on the point on the south side of North Gully entrance.

A fixed white light, visible 6 miles, is used with the above as a range light, and marks the channel in; the channel is a shifting one, and the light is moved as the channel shifts.

Caution.—Nothing larger than fishing boats should attempt to enter the gully by night, and no stranger must attempt the entrance without a pilot.

South Gully.—The leading lighthouses on the north side of Tracadie, South Gully, bear from each other N. 51° W. (N. 27° W. mag.) and S. 51° E. (S. 27° E. mag.), distant 276 feet.

The upper lighthouse, a square tower, painted red, exhibits at an elevation of 26 feet a fixed red light. The lower lighthouse, an open-framed tower, painted white, exhibits at an elevation of 20 feet a fixed white light.

These lights should be visible in clear weather from a distance of 8 miles. Vessels crossing the bar (800 yards wide) from seaward should keep the lights in line.

Green Point, which separates the lagoons of North Tracadie and Pokemouche, has a rocky shoal extending off it ¾ mile to the depth of 3 fathoms and 1¼ miles to 5 fathoms at low water.

Pokemouche (Pocmouche) River, after traversing a shallow and extensive lagoon, enters the gulf by a gully through the sand bars about 200 yards wide. A shifting bar of sand outside generally leaves a narrow channel with 4 or 5 feet in it at low water into the gully, and there are from 9 to 12 feet for some distance within.

Tides.—The spring tides rise 5 feet; and in fine weather large schooners can be taken in by a native pilot.

Pokemouche (Pocmouche).—On the south side of the entrance of the river from the lagoon inland, and 1¾ miles from the gully, there is a church, village, postoffice, and sawmill. The inhabitants, 300 or 400 in number, live by fishing, a very limited agriculture, and lumbering.

Lights.—The lighthouse at Pokemouche Gully is a square building, 37 feet high, painted white, with a keeper's dwelling attached, and exhibits at an elevation of 35 feet a fixed green light, which should be visible 8 miles.

A fixed red light is hoisted on a pole, 23 feet high, arranged to slide on a tramway so that it may be moved to suit c[illegible]es in the channel. The light is elevated 25 feet, and is visible 5 mi[illegible] the line of range and in the channel in entering the gully. It is 2.[illegible] feet from the green light, and when the two lights are in line they lead to the mid-channel buoy which indicates the outside entrance to the channel.

Buoys.—An iron buoy, painted in black and white vertical stripes, moored in the middle of the outside entrance.

A black can buoy on the port side of the channel opposite the south beach.

A black spar buoy on the port side where the river turns from the eastward inside the north beach.

A spar buoy, painted red on the starboard side, marking the point at the same turn.

Shippegan Gully, 5½ miles NE. of the Pokemouche, with its bar of sand, its rapid tide, and dangerously heavy surf, occasioned by easterly

gales, is 20 miles from the north point of Miscou. The oar of sand, which dries in part at low water, shifts in heavy gales; but there is generally a channel with 4 or 5 feet in it at low water, and the tide rises from 3 to 5 feet, according as it may be neap or spring tide. The 3-fathom edge of the shoal water outside the bar is $\frac{2}{3}$ mile off shore, after which the depth increases rapidly.

The passage over the bar and into this gully is difficult and dangerous to strangers.

Buoys.—The gully is buoyed with red and black buoys.

Lights.—The lighthouse on the NE. side of the southern entrance of Shippegan Gully is a square building, 30 feet high, painted white, and exhibits at an elevation of 32 feet a fixed white light, which should be visible 11 miles.

On Indian Point are two leading lights for entering Shippegan Gully. The inner light is a fixed white light shown on a mast at an elevation of 39 feet, and is visible 11 miles.

The outer light is a fixed red light, shown on a mast 28 feet above high water, and should be visible 4 miles.

The inner mast is 35 feet high and the outer one 25 feet, each having a shed at its base.

The lights are 148 yards apart, and bear from each other N. 56° W. (N. 32° W. mag.) and S. 56° E. (S. 32° W. mag.).

These lights when in line indicate the deepest water over the bar, and lead up to a red buoy which has been placed outside the bar at the entrance to Shippegan Gully; after passing which, vessels should keep the lights in line until nearing a black can buoy moored with the lights in line inside the bar; thence the channel inward is buoyed in the usual manner.

Miscou Gully, about 13 miles northward of Shippegan Gully, only admits boats at high water.

Light.—At Sandy Point, on the north-side entrance to Miscou Gully, a fixed white light is placed to mark the entrance. The light is 45 feet above high water, and is visible 7 miles. The light is shown from a mast, 25 feet high, with a wooden shed at its base standing upon a low crib-work pier, all of which is painted white.

Birch Point.—About $1\frac{1}{2}$ miles to the southeastward from North Point of Miscou is Birch Point, a steep cliff of sandstone, about 10 feet high, and which will be easily recognized by the white birch trees, which are higher there than in any other parts near the shore. A reef of stones and sand extends there $\frac{1}{2}$ mile out from the shore. The soundings in the chart will enable the mariner easily to avoid the shoal off North Point, either by night or by day. There is good anchorage on either side of it; under the North Point in from 5 to 10 fathoms, in southerly winds, and off the lighthouse on Birch Point, in from $3\frac{1}{2}$ to 6 fathoms, in westerly winds, the bottom being of sand, which holds sufficiently well for offshore winds.

Light.—The lighthouse on Birch Point, an octagon-shaped building, 74 feet high, and painted red, exhibits a revolving white light, showing four bright rays every seventy-five seconds, with intervals of fifteen seconds between their points of greatest brilliancy, followed by an interval of thirty seconds, during the greater part of which the light will be eclipsed; the light thus completing a revolution in 1¼ minutes, is of the greatest assistance to vessels rounding this low island at night, and especially to the numerous fishing schooners which frequent Miscou Harbor. It is 79 feet above the level of high water, and should be visible 14 miles; it is seen from the westward over the island.

Fog Whistle.—The steam whistle 107 yards east of the lighthouse on Birch Point will in thick, foggy weather or snowstorms be sounded twice in each minute: First, a blast of five seconds' duration, with an interval of twenty-five seconds; then a second blast of five seconds, with an interval of twenty-five seconds.

Signal Station.—There is a signal station at Birch Point, and the lighthouse is connected with Shippegan by telephone.

Coast.—There are no detached shoals along this coast, so that it may be safely approached to 10 fathoms water in the nighttime and to 6 or 5 fathoms in the daytime. Nevertheless, shoal water extends to a considerable distance from the shore in several places, as, for instance, off the east side of Miscou, where, at Wilson Point, 2½ miles to the northward of Miscou Gully, a sandy shoal extends a mile out to 3 fathoms water; a depth of 5½ fathoms was obtained by H. M. S. *Spartan* at a distance of 3 miles east of the lighthouse; therefore give Wilson Bank a berth of 2½ to 3 miles. Off Miscou Gully, 7 miles to the southward of the north point of Miscou, the shoal water extends ⅔ mile, and 4 or 5 miles farther to the southward, off the low sandstone cliffs of Shippegan Island, there are rocky patches with little more than 2 fathoms upon them, and nearly a mile off shore. Still farther to the southward, along the coast of Shippegan Island, and 6 miles to the northward of Shippegan Gully, there is another similar patch at nearly the same distance from the shore.

Miscou Banks extend about 22 miles to the northeastward of Miscou, and the soundings upon them will afford full and sufficient guidance for a vessel approaching this part of the coast. The shoalest parts of the banks will be found on an ENE. line of bearing from the lighthouse on Birch Point, whereon, for the first 6 miles off shore, there are only from 5½ to 8 fathoms on a rocky bottom, after which the water deepens rapidly, there being from 12 to 17 fathoms, with red sand, rock, and shell for the next 9 miles, at the end of which it deepens to 20 fathoms; at 7 miles farther, with depths between 20 and 30 fathoms, over red sand, gravel, shell, and broken coral, is the edge of the bank, where the depth increases rapidly to above 40 fathoms, and the soundings change to mud.

The northern edge of the banks, in 30 fathoms, is 7 or 8 miles to the

northward of the ENE. line of bearing from the lighthouse on Birch Point, and passes the north point of Miscou, at the distance of 4 miles, into Chaleur Bay, thus affording excellent guidance to vessels. These banks continue to extend off the coast to the southward, but with more regular soundings and a greater general depth than in the part to which the name of Miscou Banks has been applied.

Chaleur Bay (Bay of Chaleurs) is the largest bay in the gulf, being 25 miles wide from Miscou Island to Cape d'Espoir, but the entrance is more generally considered to be at Macquereau Point, from which the north point of Miscou Island is distant 14½ miles. The depth of the bay from Miscou to the entrance of the Restigouche River is about 75 miles.

The northern shore of the bay is of moderate height, but an irregular range of hills of considerable elevation is everywhere visible a few miles back from the coast, the predominating features of which are red cliffs of sandstone and shale, with intervening shingle and sand beaches. Trap rocks and limestone are occasionally met with also, but more sparingly. The southern or New Brunswick shore is, generally speaking, much lower, and for the most part composed of similar rocks; but between Caraquette and Bathurst the cliffs of red sandstone rise to a height of 200 feet above the sea. The sandstone either belongs to or is very nearly connected with the coal formation, fossil vegetable remains of which, as well as thin veins of bituminous coal, being not infrequently met with. There are numerous settlements all around the bay, and the several harbors, roadsteads, and rivers are frequented by numbers of vessels engaged in the lumber trade and the fisheries.

The climate is warmer and the weather in general much finer within this bay than it is outside in the adjacent parts of the gulf. The fogs, which prevail so much with southerly winds on Miscou Banks, seldom enter the bay, although rain and mist accompany easterly gales here as elsewhere.

The navigation is by no means difficult, for although there are some dangerous shoals, yet there is everywhere good warning by the lead.

Tides.—It is high water, full and change, in the entrance of Chaleur Bay at 2h.; springs rise 5 feet, neaps 3 feet. The tidal streams are regular within the bay, and seldom amount to the rate of one knot per hour; but outside, off its mouth, and especially on Miscou Banks, the currents and tidal streams are so irregular, both in strength and direction, that nothing definite can be said of them, and their dangerous effects upon the course of vessels can only be guarded against by the constant use of the deep-sea lead and attention to the soundings.

Directions at Night and in Fogs.—Vessels bound for Chaleur Bay and approaching its entrance on a dark night or in foggy weather should not attempt to make Macquereau Point, which is so bold that there is little or no warning by the lead, but should strike soundings on the Miscou Banks, which extend nearly 22 miles to the eastward of Miscou

Island. A cautious lookout should be kept for the numerous fishing schooners which are generally riding on the banks, and the northern edge of the latter, being followed in 30 fathoms of water, will safely conduct vessels past the north point of Miscou, at the distance of 4 miles, and form a sure guide up the bay.

The bank of soundings off the north shore is also sufficiently wide to guide vessels everywhere within Macquereau Point; nevertheless, on a dark night and in bad weather, vessels had better not approach the shore much nearer than the depth of 30 fathoms in any part of the bay to the eastward of Carlisle Point. The soundings are generally of sand and shell on the banks, while in the central parts of the bay black and brown mud prevail, with depths between 30 and 50 fathoms. Within, or to the westward of Carlisle Point and the opposite bay of Nipisighit, the depth decreases to less than 30 fathoms, but there is still sufficient warning everywhere by the lead quite up to the head of the bay.

(H. O. Chart No. 1217.)

Miscou Flats and Miscou Island.—The 5-fathom edge of the Miscou Flats is fully 4¼ miles off to the NW. of Goose Lake lighthouse, and there are not more than 3 fathoms at the distance of 2¼ miles from the same point. These flats, which are of sandstone, continue 4 or 5 miles NE. of Miscou Harbor, and near their northern termination there is an opening in the trees which extends across the island, and which has been mistaken by vessels, at night or in foggy weather, either for the harbor or the gully, according as they were west or east of the island. There is moderately good anchorage during the summer season with this opening S. 52° E. (S. 28° E. mag.) in 10 to 11 fathoms. It is easily distinguished, very useful in pointing out a vessel's position, and especially to clear Miscou Flats when working out with a light breeze and flood tide. The remainder of the shore is tolerably bold, with steep sandy beaches, which surround the north end of the island, where several stores and huts of the fishermen will be seen along the shore. The north point is distinguished by a green mound, or grassy sand hill, and the shallow water does not there extend to more than ⅓ mile off shore; but immediately to the eastward of the point and fronting the outlet of a small lagoon, where there are several fishing stores and huts, a sandy shoal commences and stretches off a mile to the NE. At that distance from the shore there are 3 fathoms of water, but it is more than 2½ miles out to the 5-fathom edge of the shoal.

Miscou Harbor, frequently called Little Shippegan by the fishermen, lies between Miscou and Shippegan Islands, and just within the sandy spit at the SW. extreme of Miscou, where the space of deep water, from 4 to 6 fathoms, forming the harbor for large vessels, is 400 yards wide and upward of a mile in length. The harbor for small craft is more extensive, with 2 and 2½ fathoms water, and also a narrow channel extending eastward through the flats of mud and weeds to

within a mile of Miscou Gully, which boats can only enter at high water. The bottom within the harbor is soft mud; in the channel, just outside the entrance, sand, and between the shoals, farther out, sandstone.

Lights.—A fixed white light, elevated 38 feet and visible 6 miles, is shown from a mast at Herring (Harper) Point at the western entrance to Miscou Harbor. The mast is 25 feet high, and has a wooden shed at its base standing upon a low crib-work pier; the whole structure is painted white.

At Goose Lake, on the west side of Miscou Island, a white light, revolving every minute, is exhibited at 40 feet above high water, from a square lighthouse, 28 feet high, with a dwelling house attached, and painted white. The light should be visible 10 miles.

Sandy Point Light.—See page 173.

Signal Station.—There is a signal station at Goose Lake; the lighthouse is connected by telephone with Shippegan.

Directions.—Miscou Channel, leading to the harbor, between the Miscou and the Shippegan Flats, is in one part only 350 yards wide, between shoals so steep that there is not the slightest warning by the lead. In short, none other than small vessels should attempt this harbor without having first buoyed the channel or secured the assistance of a competent pilot. A vessel of 12 feet draft may, however, run in with the assistance of the chart and the following brief directions:

If to the eastward of the harbor, cross the Miscou Flats to the SW., at the distance of 3 miles off shore, in no less than 4 fathoms water; if to the westward, follow the northern edge of the Shippegan Flat, in 4 or 5 fathoms. In either case, open out the NE. extreme of the trees of Shippegan Island, just clear of the SW. extreme of the trees of Miscou Island, or keep the former in one with the extreme of the sandy spit at the SW. end of Miscou Island, the latter being preferable if it can be made out. These marks will bear a little to the eastward of S. 69° E. (S 45° E. mag.). Steer for them until the water shoals to less than 4 fathoms, which will be on a point of the Miscou Flats. Sheer to the SW. for about ¼ mile, or so as to deepen the water to 4 and 5 fathoms; then steer S. 64° E. (S. 40° E. mag.), or for Pandora Point, a wooded extreme of Shippegan, ½ mile within Pecten Point, which is the sandy south point of entrance of the harbor.

In running this course the vessel will cross a bay in the Miscou Flats in 4 and 5 fathoms. If the soundings deepen to more than the latter depth at low water, sheer to the eastward, for the object is to keep on the Miscou and least dangerous side of the channel, and that will be effected without difficulty by the lead, since there are 8 and 9 fathoms in the channel. After running a short mile toward Pandora Point, the points on the north side of Shippegan will be observed to come in one, bearing S. 49° W. (S. 73° W. mag.), and about the same time a high sand hill, on the sand bars at the head of the harbor, will come on,

with the high-water extreme of the sandy spit of Miscou bearing S. 83° E. (S. 59° E. mag.). The vessel will now be at the narrow part of the channel, and must follow the edge of the Miscou Flats by the lead, in from 4 to 6 fathoms, sheering to the eastward the instant the depth is more than the latter, and to the westward when less than the former. The general direction of the course will be still toward Pandora Point, until the points on the SE. shore of Miscou within the harbor open out, when the vessel will be in safe anchorage, although outside the entrance. If wishing to proceed farther, haul up for the high sand hill on the sand bars already mentioned, and when within the sandy point, steer for the gully for a short distance, choosing a convenient berth.

Tides.—It is high water, full and change, in Miscou Harbor at 2h. 30m.; springs rise 5 feet, neaps 3 feet. The tides appeared to set fairly in and out of the harbor, at a rate seldom amounting to a knot.

Shippegan Flat is an extensive shoal of sandstone, thinly and partially covered with sand, and having in some parts not more than 3 feet water. When on this 3-foot patch, Grasse Point bore S. 19° W. (S. 43° W. mag.) and Mya Point S. 86° E. (S. 62° E. mag.). It is the most northern of the Shippegan Shoals, and extends 2¾ miles off the north side of the island, separating the channel leading to the harbors of Caraquette and Shippegan from that which leads into Miscou Harbor. There is good warning by the lead all along its northern side, which may be safely approached to 6 fathoms in a large, and to 3 fathoms in a small vessel.

Pokesuedie Shoal is an extensive flat of sand extending 2 miles to the northward and eastward from Pokesuedie Island, and having only 6 or 7 feet water over the greater part of it. Caraquette steeple and the sandy SE. extreme of Charaquette Island in line, bearing S. 66° W. (west mag.), lead over its north point in 2 fathoms at low water; and if the steeple be kept halfway between the extreme of the sandy point and the extreme of the trees on the same island, the north point of the shoal will be cleared in 4½ fathoms; but as both the sandy point and the trees may change in the course of years, those marks should not be relied on without previous examination.

Light.—Great Pokesuedie Island lighthouse is a square tower, 34 feet high and painted white, on the NE. extreme of the island. The light is fixed white, elevated 41 feet, and visible 11 miles.

Shippegan Sound, formed by Pokesuedie Island and the mainland on the west, and by Shippegan Island on the east, is an extensive place. On the western side, within Pokesuedie Island, is Simon Inlet, the best harbor in the sound. Within its entrance, between Marcelle and Brulé Points, the anchorage is quite landlocked, with water sufficient and space enough for vessels of large draft. On the opposite or Shippegan side are the bays of Alemek and Little Alemek. The latter is a shallow place, but has good anchorage off its mouth. The former, which is most to the southward, and by far the larger, bay of the two,

is an excellent harbor, with 3 and 4 fathoms water, and secure in all winds. There is a church and village at the head of this bay; and on Alexander Point, its north point, stands an establishment and windmill. There is a bar of sand and mud extending across the sound from Alexander Point to Brulé Point, which limits the depth that can be carried into Alemek Bay to 2¼ fathoms and into Shippegan Harbor to 2¼ fathoms at low water.

Shippegan Harbor.—On the mainland, nearly opposite the south point of Alemek Bay, there is a windmill on Bernache Point, the sandy north point of Basse Bay, which is small and shallow. On the south point of this bay, ¾ mile to the southward of the windmill, stands the church and village of Shippegan; and off them is Shippegan Harbor, which is a narrow channel with 2½ to 4 fathoms water, and between shoals of mud and eelgrass nearly dry at low water. This narrow channel continues 2½ miles beyond the church, terminating at Shippegan Gully, the southern entrance of the sound. The gully is used by shallops and fishing boats. The tide is generally extremely rapid in it, and there is often a heavy surf on its bar of sand, which dries in part at low water, leaving a channel with only 4 or 5 feet water. Shippegan Harbor is quite secure in all winds, and it is there that the greater part of the vessels which visit the place for timber lie moored. The watering place is at a small stream in Basse Bay, a short distance to the westward of the church.

Ice.—The sound is usually frozen over about December 1, and clear of ice about May 10, being completely closed between those dates. The first vessel arrives, from sea, about May 21, and the last one leaves about November 13. In 1876 field ice drifted into Shippegan Sound on May 14, and did not disappear until June 4.

Buoys.—Black and red buoys mark the channel.

Lights.—See page 173.

Shippegan Channel, leading into the sound from the northward, is difficult. The water is deep, but the passage is narrow and crooked, and without leading marks. For 3 miles the breadth of the channel between the Pokesuedie and Shippegan shoals, which are exceedingly steep, is only from ¼ to ⅓ mile. The whole distance from Shippegan Flat to Shippegan church is nearly 9 miles, and the navigation is difficult all the way. No directions which could be given would enable a stranger to take a large vessel into the sound without very considerable risk of getting on shore; but a vessel not drawing more than 12 feet may be taken in by the lead in fine weather and with the assistance of the buoys, if in position, and the chart.

Directions.—Bring Marcelle and Pokesuedie Points in one, bearing S. 1° E. (S. 23° W. mag.), and steer for them. After passing the west end of the Shippegan Flat the depths will be 9 to 7 fathoms in the channel, but they will decrease as the vessel approaches the Pokesuedie and Caraquette Shoals. As soon as the depth is 5 fathoms, alter course to

S. 35° E. (S. 11° E. mag.), or so as may be necessary to follow the eastern side of the Pokesuedie Shoal in that depth, until Caraquette steeple is open clear to the southward of the sandy SE. extreme of Caraquette Island. She will then be at the entrance of the narrow part of the channel between the Pokesuedie and Shippegan Shoals, and if the wind be from the eastward she had better haul over to the weather side into 5 fathoms water and follow that depth along the edge of the Shippegan Shoals by the lead, as before; but if the wind be from the westward, follow the edge of the Pokesuedie Shoal in the same manner. The mode of proceeding which has just been recommended would prevent a vessel from mistaking the side of the channel which she might be on, and from which the greatest danger of running on shore would arise. The depth of water in the channel varies from 6 to 9, and in one place to 12, fathoms over sandy bottom, but changing to clay and mud as the vessel advances into the sound.

Tides.—It would require a much longer experience than was afforded by the few weeks employed in the Admiralty survey to become fully acquainted with the set of the tides in the entrance of the Shippegan and Caraquette Channels, where they doubtless change with the time of tide and other circumstances. The rate of the tides, however, seldom exceeded a knot even in the channels, where, of course, they are stronger than elsewhere. In Shippegan Harbor the stream was very regular in fine weather, running in at the gully and to the northward, through the sound into Chaleur Bay, from about half ebb to half flood by the shore, and in the reverse direction, or to the southward, from about half flood to half ebb. It is high water, full and change, in Shippegan Harbor at 3h. 42m., which is about an hour later than at Caraquette and Paspebiac; springs rise 5½ or 6 feet, neaps 3 feet.

Caraquette Island is of sandstone, low and wooded, and 1¾ miles long in a direction nearly parallel to the coast. Sandy points extend from both ends of the island toward the mainland, or to the southward, so as to form a bay, in which there is landlocked anchorage for vessels not drawing more than 15 feet water. The island rises from an extensive bank of flat sandstone, partially covered with sand, and which, commencing at Mizzenette Point, extends to the eastward parallel to the coast all the way to the entrance of Shippegan Sound, a distance of 8 or 9 miles.

There is no passage for vessels between Caraquette Island and Mizzenette Point 3 miles west; only a narrow channel for boats on the side next the island.

Light.—The lighthouse on the west end of Caraquette Island, a white square tower, 43 feet high, on keeper's dwelling, exhibits, at an elevation of 49 feet, a fixed white light, which should be visible 14 miles.

Caraquette Shoal extends 4¼ miles to the northeastward of the island, from which it dries out occasionally in very low tides to the distance of 2 miles, and is shallow in every part. From its east end, Cara-

quette steeple and the SE. extreme of the trees of Caraquette Island are in line, bearing S. 63° W. (S. 87° W. mag.), and Shippegan steeple and Pokesuedie Point bearing S. 20° E. (S. 4° W. mag.). The last-named marks in line lead to the eastward of this shoal in 3 fathoms at low water, but a large vessel requiring a great depth of water would have to pass farther to the eastward, by keeping Marcelle and Pokesuedie Points in line, bearing S. 1° E. (S. 23° W. mag.).

Caraquette Channel, between the Pokesuedie and Caraquette Shoals, forms the entrance to the harbor of Caraquette for a distance of 2½ miles, and has water enough for vessels of large draft; but it is crooked and only 450 yards wide between very steep shoals, and without sufficient leading marks; hence it becomes a very difficult channel.

Caraquette Harbor may be said to commence immediately within or to the westward of Pokesuedie Island, extending westward between the mainland and the Caraquette Shoal and Island. The church at Caraquette will be seen standing conspicuously on the ridge nearly opposite to Mizzenette Point, and the houses and fish stores of Lower Caraquette nearly opposite to the island. In the eastern part of the harbor, immediately within Pokesuedie, the depth is 5 and 6 fathoms, and there is not less than 3½ fathoms till within ½ mile of the SE. point of the island. Between the island and the main, the channel is only 250 yards wide and carries only 2¼ fathoms water; but farther westward it increases to ¼ mile and 4½ fathoms water, and is there sheltered by the Mizzenette Sands, which dry at low water nearly across to the island. The bottom is of mud within the harbor and of sand in the entrance, or Caraquette Channel.

Caraquette Bay extends 4 or 5 miles to the southwestward of Mizzenette Point, being all shoal water except the narrow channel of the harbor and terminating in the two shallow rivers, the South and the North, in the mouths of which there are oyster beds. The best watering place is at a small stream which descends the steep banks at Upper Caraquette, near Brideau Point.

Although this is an excellent harbor for vessels of moderate draft, and even capable of affording anchorage to much larger vessels, it is, nevertheless, an exceedingly dangerous place to a stranger. The approach to it is between shoals extending several miles from the shore, and there are neither beacons, buoys, nor competent pilots (1860); hence, although 4 fathoms can be carried in at low water sufficiently far for vessels of large draft to be anchored in safety in that depth, yet it would not be prudent even for vessels of a moderate draft to attempt this harbor unnecessarily, nor unless the circumstances of wind and weather be very favorable, with a flowing tide, and her boats ahead. Under such favorable circumstances the passage into the harbor will be attended with little risk to small vessels prudently conducted, and having the assistance of the plan in addition to following the directions.

Ice.—Caraquette Harbor is usually frozen over about December 11,

and clear of ice about May 8, being completely closed between those dates. The first vessel arrives from sea about May 12, and the last one leaves about November 25.

Tides.—It is high water, full and change, in Caraquette Harbor at 2h. 40m.; springs rise 6 feet, neaps 3 feet.

Directions.—If bound from the eastward, having brought the entrance of Miscou Harbor to bear to the eastward of S. 24° E. (south mag.), stand in toward it to 8 fathoms water; then run to the westward in that depth until the NE. extreme of the trees of Shippegan Island opens to the southward of the SW. extreme of Miscou Island, bearing S. 65° E. (S. 41° E. mag.) when, if the weather be clear, Caraquette steeple will be seen in line with the north extreme of Caraquette Island, bearing S. 51° W. (S. 75° W. mag.). From thence steer for Blanchard Point, the wooded NW. extreme of Pokesuedie Island, which may or may not be made out, as it will be on with the mainland and distant 7 or 8 miles. Do not approach the Shippegan Flat nearer than the depth of 7 fathoms; and having run about 3½ miles, Marcelle Point, the wooded SE. extreme of Pokesuedie Island, will be in line with Pokesuedie Point, which is the sandy east extreme of the same island.

These points in line, bearing S. 1° E. (S. 23° W. mag.), will lead westward of the west extreme of the Shippegan Flat. Steer for these points in line until Caraquette steeple comes in line with the SE. extreme of the trees of Caraquette Island, bearing S. 63° W. (S. 87° W. mag.), immediately after which, or when the north extreme of Shippegan is in line with the south extreme of Miscou, bearing N. 74° E. (S. 82° E. mag.), steer toward Blanchard Point, bearing S. 37° W. (S. 61° W. mag.). Having run not quite 1¼ miles toward Blanchard Point, Shippegan steeple will come in line with Pokesuedie Point, bearing S. 24° E. (south mag.), and at the same time, or immediately afterwards, Caraquette steeple will be in line with the sandy SE. extremity of Caraquette Island, bearing S. 66° W. (west mag.).

The vessel will now be within the entrance of the Caraquette Channel, between the Caraquette and Pokesuedie Shoals, and must haul to the westward immediately for Caraquette steeple, keeping it carefully in line with the sandy SE. extreme of Caraquette Island, until the windmill on Alexander Point (Shippegan Island) is in line with Pokesuedie Point, bearing S. 47° E. (S. 23° E. mag.), when the course must instantly be changed to S. 40° W. (S. 64° W. mag.). The vessel will now be about to pass through the narrowest and most difficult part of the channel, and the course must be strictly attended to and the lead kept going on both sides. If the water shoals to less than 4 fathoms after the vessel has run upon this course from ¼ to ½ mile, it will be on the Pokesuedie side, and she must therefore steer to the northward a little, or into 5 fathoms, and then resume the S. 40° W. (S. 64° W. mag.) course again until Caraquette steeple comes in line with the cliff of Brideau Point, bearing S. 71° W. (N. 85° W. mag.). Alter the

course again immediately the last-named marks come in line, and steer for them for ¾ mile; then sheer to the southward a little, so that the steeple may be seen a little within and over the extremity of the point, or in line with the store upon it; keep it so until the cliffy points on the NE. side of Caraquette Island are all shut in behind the east point of the island, and it will have led clear of the south extremity of the Caraquette Shoal. The vessel will now be in safe anchorage, and a berth may be chosen at pleasure with the assistance of the chart, and in from 4 to 2½ fathoms at low water.

Vessels of large draft from the westward should pass outside of Fisherman Ledge, not going to the southward into a less depth than 6 fathoms at low water until Marcelle and Pokesuedie Points come in one, bearing S. 1° E. (S. 23° W. mag.); they should then haul in upon those leading marks, and proceed as before directed. A small vessel may pass through Fisherman Channel guided by the leading marks and the remarks which are given relating to Fishermau Ledge and Mizzenette Ledge. She need not run so far to the eastward as a large vessel, but as soon as Shippegan steeple comes in line with Pokesuedie Point, bearing S. 24° E. (south mag.), she may haul in upon those leading marks, which will take her over the tail of Caraquette Shoal in 3 fathoms; and as soon as the steeple of Caraquette comes in line with the sandy SE. extreme of Caraquette Island, bearing S. 66° W. (west mag.), she must steer for them and proceed as before directed. A person acquainted with the appearance of the objects given as leading marks will find little difficulty, when the weather is favorable for seeing them, in following out these directions. Perhaps Brideau Point will be the most difficult to make out, but it is well described in the chart, and the conspicuous store upon it and the small bay on its east side will assist in pointing it out to strangers.

Fisherman Ledge is a detached bed of rocks, with 10 feet least water, lying to the northward of the Caraquette Shoal and separated from it by Fisherman Channel, which is one mile wide and carries from 4 to 7 fathoms water. This dangerous ledge, which lies more in the way of vessels than any other in Chaleur Bay, is 1¾ miles long and ⅛ mile wide between the 3-fathom lines. There are no marks for it. Its northern edge is distant 3 miles from Caraquette Island, and its east and west ends bear north (N. 24° E. mag.) from the corresponding points of the island. The points of cliffs at Great Anse and Donax Point in one, bearing S. 77° W. (N. 79° W. mag.), lead through Fisherman Channel, which, however, has not been examined very closely, and can not in any case be recommended to vessels of large draft.

Mizzenette Ledge of rocks, with 5 feet least water, bears N. 45° W. (N. 21° W. mag.) 1¼ miles from the west end of Caraquette Island, and a vessel will pass to the northward of it, in 3½ fathoms, by keeping Donax Point just open to the northward of Mizzenette Point, bearing S. 83° W. (N. 73° W. mag.). These marks will also lead to the east-

ward along the northern edge of the Caraquette Shoal until they strike Scollop Patch, which has 14 feet least water over a rocky bottom, and on which the NW. extreme of Caraquette Island and Caraquette steeple are in line, the SE. extreme of the island bearing S. 4° W. (S. 28° W. mag.), distant nearly 2 miles. The marks for clearing the northern edge of the Caraquette Shoal, to the eastward of Scollop Patch, and in 3 fathoms water, are the south extreme of Miscou Island kept plainly open to the northward of the north point of Shippegan Island, bearing N. 77° E. (S. 79° E. mag.). But those marks are low and distant, and often not well defined, therefore they should not be trusted alone; neither will they be required if the northern edge of the shoal be not approached nearer than the depth of 4 fathoms at low water.

(H. O. Chart No. 1067.)

The Coast, which for the most part is of high sandstone cliffs, is very low near Mizzenette Point, and about 3 miles to the westward of that point, where the sandy cliffs end, the shoal water extends to ½ mile from the shore; but in general it does not extend to more than half that distance, and the coast may everywhere be approached by the lead to 10 or 12 fathoms with care, the greater depth being quite near enough at nighttime. There are settlements all along the coast, and villages and fishing establishments at Great Anse and Pokeshaw. Great Anse, where there is a church, is 8 miles and Pokeshaw 11 miles westward of Mizzenette Point. There are small bays at both places where boats find shelter, and a small river at Pokeshaw.

Norton Shoal, carrying 3 fathoms water, and lying ¾ mile off shore, one mile to the westward of Norton Point and 9 miles eastward of the Nipisighit, is the only danger in the way of vessels along the coast from Mizzenette Point to Bathurst Harbor, a distance of 29 miles.

Bathurst Harbor, at the mouth of the Nipisighit River, is 400 yards wide at the entrance between Carron and Alston Points, which are of sand, with several stores and other buildings upon them (1860).

The lighthouses on Carron Point kept in line will lead in through the narrow channel over the bar in 7 feet at low water, or in 14 feet at high water in the best spring tides. The distance from the outside of the bar in 3 fathoms to the entrance of the river is 1½ miles; and for the whole of that distance the very narrow channel is between sandy shoals, nearly dry at low water, and extending from either side of the river's mouth.

Within the entrance there is an extensive and well-sheltered basin, nearly 3 miles long and 2 miles wide, but nearly all dry at low water, excepting the channels of the four rivers, which, after uniting their streams below Bathurst, flow through it to the entrance, forming by their junction what is called the Main Channel. On the eastern side of the basin there is an islet called the Indian or Bathurst Island.

Half a mile to the westward of the town, and across the mouth of the

Middle and North Rivers, is Peter Point, with its church and village, and on the north side of that point the Teteagauche River enters a bay on the NW. side of the basin. These streams are all unnavigable for any distance. Even the Nipisighit, which is by far the largest, and a very considerable river, ceases to be navigable 1½ miles above Bathurst, where the tide ends and rapids begin.

Bathurst.—The town of Bathurst is well situated at the head of the basin, 2½ miles within the entrance, and on the point of land which divides the Nipisighit River from the Middle and North Rivers. The salmon fishery is carried on extensively. There is a seaman's hospital at Bathurst.

The United States is represented by a consular agent.

Communication.—Bathurst is in communication with all parts by the Intercolonial Railway and Telegraph Company.

Lights.—Stonehaven lighthouse, on the bank at the shore end of the breakwater at Grindstone Point, is a square tower, 37 feet high, and painted white. The light is a fixed red light, 88 feet above high-water mark, and should be visible 15 miles. This light, besides being a general coast light, indicates the position of the breakwater, which affords shelter to small vessels.

On Salmon (Belloni) Point is exhibited a fixed white light at 30 feet above high water, visible from the bearing of N. 67° E. (east mag.) through south to S. 67° W. (west mag.), which should be visible 10 miles.

The lighthouse is 22 feet high, square shaped, and painted white.

On Carron Point, which is on the SE. side, there are two leading lights, 356 feet apart. The outer lighthouse, 34 feet high, and painted white, exhibits at 33 feet above high water a fixed white light, visible 10 miles.

The inner lighthouse is square shaped and painted with red and white stripes; it exhibits at an elevation of 43 feet a fixed red light, which should be visible 14 miles.

Buoys.—There is an outer buoy in 7 fathoms water at about ¾ mile northeastward of the Outer Bar buoy.

Anchorage.—In the entrance between the sandy points, or rather just outside it, there are 3 and 4 fathoms water; and here vessels usually moor to take in timber, sheltered by the bar and the sandy shoals on either side. Some of the smaller vessels load within the entrance, and some of the larger ones complete their loading outside the bar, where the anchorage, in 6 or 7 fathoms, muddy bottom, is considered safe in the summer months, although the NE. gales send in a heavy sea.

A depth of 14 feet at high water in spring tides can be carried up to the wharves of the town, and in the main channel there are several places where vessels may lie afloat and load in 14 feet at low water.

Pilots.—There are good pilots for the Nipisighit River, and no one should attempt the bar without one, excepting in case of necessity.

Tides.—It is high water, full and change, at Bathurst at 3h. 15m.; springs rise 7 feet, neaps 4 feet. The rate of the tides in the main channel is about 2 knots and over the bar about 1½ knots. The stream sets fair in and out and over the bar.

Belledune Point is about 17 miles from Alston Point, and the extreme seen from it is low and sandy, and has shoal water off it to the eastward ¾ mile. About halfway between these points, on the western shore of Nipisighit Bay, is the church and village of Rochette. The whole of this coast is low, and composed of sandstone, limestone, and trap rocks. The shoal water generally extends to ½ mile from the shore, and vessels of large draft had better not stand nearer than the depth of 10 fathoms, especially at night, unless it be in the head of the bay, where they may safely approach the sandy beach to 7 or 6 fathoms.

Lights.—The lighthouse, named Petite Rocher, on Elm Tree Point, a square building, 31 feet high, painted white, exhibits at an elevation of 36 feet a fixed white light, which should be visible 12 miles.

A fixed white light is exhibited from a mast, 28 feet high, on Little Belledune Point, at an elevation of 38 feet, and should be visible 11 miles. The mast has a white shed at its base.

Heron Island, 13 miles westward of Belledune Point, is of moderate height, wooded, and with red sandstone cliffs at both its NW. and SE. points. Shoal water extends off this point to ¾ mile. The island is 4 miles long, parallel to the coast, and there is good anchorage in the channel between it and the mainland; but the channel is rendered narrow and difficult by shoals, which extend a great distance out on either side.

Heron Channel.—At the western end the channel is only 400 yards wide, with 3 fathoms water in it. It becomes wider to the eastward, and the depths are 4 and 5 fathoms; but there the dangerous Heron Rock lies, nearly in mid-channel, and consequently right in the way of vessels. When on this small rock, which has 6 feet least water, and 4 or 5 fathoms all around it, the SE. extreme of Heron Island bears N. 44° E. (N. 67° E. mag.) about one mile, and a rock lying 600 yards NNW. of Beaver Point, and almost always above water, S. 67° W. (west mag.) 700 yards. This latter rock, which lies on the edge of the shoal off the mainland, is quite bold; and a vessel, by sailing within the distance of 300 yards of it, will pass to the southward of the Heron Rock, as she will also to the northward, by running along the southern edge of the shoal off the island, in 3 fathoms at low water. But this is an intricate and dangerous channel for a vessel of any size, and requires the aid of a good pilot.

Anchorage.—Vessels occasionally anchor, for the purpose of loading with timber, in the bay of Nash River, in 4 fathoms, mud bottom, where they are much exposed to easterly winds, but the ground is so good that they ride safely during the summer months. At this anchorage the east point of Heron Island bears N. 37° W. (N. 14° W. mag.) 2½ miles and Black Point N. 68° W. (N. 45° W. mag.) one mile.

The shoal water extends off Fowler Point a mile out to the 3-fathom line of soundings. There is also good anchorage in 4 fathoms, mud bottom, to the westward of Heron Island, and nearly midway between it and the Charlo River. This river will only admit boats.

Light.—The lighthouse on the east side of Heron Island is a square building, 20 feet high, painted white, exhibiting at an elevation of 66 feet a fixed white light, which should be visible 15 miles.

Maguacha Point, on the north shore of Chaleur Bay, of red-sandstone cliffs, is the NE. point of entrance of the Restigouche River.

Restigouche River, from its entrance at Maguacha Point, varies in breadth for the first 17 miles from 1½ to 3 miles. At that distance Campbellton is situated on the southern or New Brunswick shore, and at the foot of a remarkable conical mountain called the Sugar Loaf. Between Campbellton and Indian Point, on the northern shore, the breadth of the estuary is only ½ mile; but it expands again to 1½ miles at its head, just below the islands. At Indian Point, a mile above Campbellton, the navigation for shipping ends, there being only 12 feet in a narrow channel at low water; but small craft may ascend through very narrow passages, on either side, carrying from 6 to 9 feet water, to within ¾ mile of the head of the estuary, where the Restigouche River, properly so called, enters it through narrow channels between the islands, 21 miles from the head of Chaleur Bay.

Off Loup River, which enters a bay from the northern shore 2 miles below Campbellton, there is a shallow part of the channel called the bar, over which there is not more than 13 or 14 feet at low water; but the tide, which rises from 6 to 9 feet, enables vessels of moderate draft to ascend to Campbellton, off which they may moor in from 3 to 3½ fathoms at low water. Vessels of about 18 feet draft may ascend at all times of the tide nearly to Oak Point, which is about 14 miles up, and within a mile of the bar; and larger vessels might proceed 10 miles up, or nearly to Guarde Point, with assistance of buoys and a good pilot.

The charts and directions will enable the seaman to take his vessel in as far as Dalhousie Harbor, or the anchorage off Fleurant Point; but to proceed farther up, the services of a pilot should be engaged, for there are no good leading marks beyond the above places, where the shoals become too steep for the lead to give sufficient warning, and the channels too narrow for a large ship.

Anchorage.—The most convenient anchorage for men-of-war, or other vessels visiting the Restigouche for supplies of wood or water, is off Fleurant Point, on the northern shore, and about 2 miles to the northward of the Harbor. There a vessel can weigh in all winds and at all times of tide; and no other directions are necessary than to anchor anywhere off the point in 6 or 7 fathoms of low water. There is a tolerably good watering place at a brook ½ mile to the westward of the point, and a little farther westward the Mussel Bank, a dangerous reef, extends out from the high cliffs, nearly halfway across the estuary.

Bonami Rocks.—The entrance of the Restigouche River, between Maguacha Point and the Bonami Rocks, is nearly 2 miles wide. The rocks are steep and high, and so rough and broken that a stranger would be led to expect danger on their side instead of on the opposite, where the steep red cliffs of Maguacha Point give the usual, although in this case deceptive, indications of a clear channel.

The extreme point of the Bonami Rocks may be safely passed at 400 yards, but shallow water extends from the rocks to Bonami Point, from which a reef runs ¼ mile, and the shoal continues from it to Dalhousie Island.

Light.—The lighthouse on Bonami Point is square, 33 feet high, painted white, and exhibits from an elevation of 49 feet a fixed white light, which should be visible 13 miles.

Maguacha Spit, of sand and stone, with only 6 feet at low water, runs out nearly a mile SW. from Maguacha Point, toward the Bonami Rocks, thus occupying fully half the channel. To clear the SW. extreme of this steep and dangerous spit, keep the highest summit of the Scaumenac Mountains open SW. of Dalhousie Island, for the summit of the mountain and the south side of the island in one, bearing N. 68° W. (N. 45° W. mag.), lead over the extreme end of the spit in 3½ fathoms. The eastern side of the spit will be avoided by not entirely shutting in the south extreme of the Carleton Mountains behind the east side of Maguacha Point.

Buoy.—A buoy lies westward 200 yards from the end of Maguacha Spit, which also serves to mark the quarantine ground. (It is difficult to keep this buoy in position.)

Dalhousie (Douglas) Island, 400 yards long, is high and rocky, round backed, and wooded, and joined by a shoal which dries to the low point of Dalhousie. On that point there are large storehouses belonging to the town of Dalhousie, which, with its church, will be seen on the side of a hill to the SW. of the island. Six hundred yards westward of Dalhousie Island (locally known as Douglas Island) there is a small rocky islet, at the extremity of a narrow sandy spit, forming the western side of the small and shallow bay of Dalhousie. The shallow water extends from the islet to the island, and the timber ships lie moored along its edge, in 6 or 7 fathoms muddy bottom, directly off the town. By keeping just outside these deep water is obtained. This is Dalhousie Harbor, which is quite secure in all winds.

Dalhousie Harbor may be approached in two ways, either through the direct but narrow channel between the Middle Ground and Dalhousie Island, or round to the northward and westward of the Middle Ground, which last, although it involves the necessity of passing over a flat of 3 fathoms at low water, is the route usually taken, because of there being plenty of room there, whereas the channel first mentioned is only 300 yards wide. The narrow channel has, however, the advantage of good leading marks, and carries 6 fathoms water.

Montgomery Island is the name applied to the northern termination of the peninsula from which the railway wharf springs, about 600 yards westward of Dalhousie Island.

Middle Ground, separated from Dalhousie Island by the narrow channel just mentioned, is 1,100 yards long and 800 yards wide. It consists of sand and stone, with 6 feet least water, and is very steep on its eastern side, where a buoy is placed near its NE. point. There are no sufficient leading marks, but beacons might be easily so placed on the shore as to clear it on every side. The main channel between this shoal and the shore to the northward and eastward is more than ¾ mile wide, and in some places there are 15 fathoms water. The rate of the tide, which is stronger there than elsewhere, does not exceed 2 knots.

Caution.—Middle Ground is reported to have shoaled and to have extended nearly 200 yards to the southward, and the channel to have deepened nearer to Dalhousie Island.

Ice.—The harbor is usually frozen over about December 5 and clear of ice about April 15, being completely closed between those dates. The first vessel arrives from sea about May 14, and the last one leaves about November 11.

Lights.—A fixed white light is shown from a square lighthouse, painted white, and 22 feet high, on the east extremity of Dalhousie (Douglas) Island. The light is 30 feet above high water, and should be visible 6 miles. It shows in an easterly direction down the river and northwesterly across it.

On the extremity of Dalhousie railway wharf a fixed white light is exhibited from a square lighthouse, 34 feet high, which projects through the railway shed and has a white lantern. The light is 30 feet above high water, and visible 9 miles.

The light is visible when in line with Montgomery Island light bearing S. 43° E. (S. 20° E. mag.) and northward of that bearing.

A fixed white light is exhibited on the summit of Montgomery Island at an elevation of 34 feet, and should be visible when bearing S. 43° E. (S. 20° E. mag.) 9 miles.

The lighthouse is square, 22 feet high, and painted white.

The above two lights are 296 feet apart, and kept in line bearing S. 43° E. (S. 20° E. mag.) lead to the railway wharf.

Anchorage.—The best anchorage in Dalhousie Harbor is in 6½ or 7 fathoms, with Dalhousie Island and Bonami Point in line.

Tides.—It is high water, full and change, in Dalhousie Harbor at 3h. 10m.; springs rise 9 feet, neaps 6 feet. The rate of the tidal streams in the entrance does not exceed 2 knots.

Dalhousie is the chief town of Restigouche County, and in 1891 had a population of 2,354 inhabitants.

It has a trade in lumber and preserved salmon and lobsters.

Communication.—The Intercolonial Railway has a station at Dalhousie, and there is a telegraph office.

Pilots can be had at Dalhousie for the river.

Supplies.—Fresh provisions are to be obtained at Dalhousie.

Campbellton, 16 miles WSW. from Dalhousie by rail, is the northernmost town of New Brunswick. It has a trade in lumber and fish.

The United States is represented by a consular agent.

Lights.—The leading lighthouses at Campbellton are square wooden towers, 22 feet high, painted white, the outer on a pier near the railway wharf, the inner on Moffats Wharf, and from them at an elevation of 24 feet are exhibited fixed white lights. These lights should be visible 9 miles.

Tides.—It is high water, full and change, at Campbellton at 4h.; springs rise 10 feet, neaps 7 feet.

Directions.—When within a mile or two of Maguacha Point, bring the marks on for clearing the Maguacha Spit; namely, the highest summit of the Scaumenac Mountains open to the SW. of Dalhousie Island. Stand in upon this mark until the depths are 9 or 8 fathoms on the New Brunswick shore, which will be when the Bonami Rocks are about SSW., and are distant about ½ mile; then haul to the northward, so as to keep in that depth until Lalime Point (the extreme point to the westward on the New Brunswick shore) comes just open to the northward of Dalhousie Island and of the islet and rocks to the westward of it bearing S. 80° W. (N. 77° W. mag.); then, if wishing to enter the harbor by the narrow channel to the southward of the Middle Ground, steer S. 80° W. (N. 77° W. mag.) upon those leading marks until near Dalhousie Island, which leave to the southward at a distance of 200 yards, and the vessel will pass safely into the harbor.

If wishing to take the more roomy route to the northward of the Middle Ground, instead of steering S. 80° W. (N. 77° W. mag.) for Lalime Point, as soon as it opens to the northward of the island, sheer over to the NE. until the soundings are 8 fathoms, and follow that depth round to the northward and westward until Dalhousie church opens out to the westward of the island bearing S. 10° W. (S. 33° W. mag.); then steer S. 67° W. (west mag.) up the estuary, until Dalhousie church appears midway between Dalhousie Island and the islet to the westward of it, bearing S. 12° E. (S. 11° W. mag.). Steer now for the church, taking care not to bring it to bear to the southward of S. 12° E. (S. 11° W. mag.); or, with the two churches in line, the vessel will pass over the extensive 3-fathom flat, to the westward of the Middle Ground, into the harbor.

With beating winds, in the board to the northward, toward Tracadigash Spit, that danger will be avoided by keeping Dalhousie Mountain open to the southward of Maguacha Point. Westward of the spit vessels may stand in to 6 fathoms water, but there will be no use in standing in to Carleton Bay out of the strength of the tide. On the Heron Island side, observe that the highest summit of the Scaumenac Mountains and the southern side of Dalhousie Island touching,

clear the shoal water to the northward of Heron Island in 4 fathoms; tack, therefore, in the board to the southward when the mountain comes in line with the northern side of the island, or by the lead in 6 fathoms. The vessel will be clear of the reef off the west end of Heron Island when the Charlo River bears southward of south (S. 23° W. mag.), and may then stand to the southward into 4 fathoms, as long as the east side of Maguacha Point does not bear to the eastward of N. 11° E. (N. 34° E. mag.); after which she should tack in the board to the southward in 7 fathoms, because the flat of from 2½ to 3½ fathoms in Eel Bay becomes rather steep as she approaches the Bonami Rocks.

Bonami Rocks may be approached to 7 fathoms of water, and when they bear S. 56° W. (S. 79° W. mag.) the vessel will be within the point of the Maguacha Spit, which must be avoided by means of the leading marks already given. From Bonami Rocks to Dalhousie Island she may stand in on the board to the SW. into 8 fathoms, but she should go no nearer to the east side of the Middle Ground than 10 fathoms, and that with great care, for it is very steep; its northern side may be approached to 9 fathoms. On the board toward the northeastern shore she may stand in to 9 fathoms between Maguacha Spit and Yacta Point, which last, observe, has a very steep shoal off it to the distance of 600 yards. NW. of Yacta Point she can safely stand to the northward into 6 fathoms all the way to Fleurant Point.

QUEBEC.

Carleton Road.—This name has been given to an excellent and capacious anchorage safe in all winds. It is east of Maguacha Point and on the west side of Tracadigash Point, which consists of sand, inclosing a shallow lagoon capable of admitting boats or very small craft at high water. On the northern shore of this lagoon stands the church and village of Carleton, the latter extending to the westward to the shore of the bay where the sand beach of the lagoon joins the mainland. A small stream, with a bridge across it, there enters the NW. corner of the lagoon, and one mile farther westward, near the commencement of the clay cliffs, another small stream will be seen, which is the watering place. Immediately in rear of the village the Carleton Mountain rises abruptly to the height of 1,380 feet above the level of the sea, the hills of the range trending from it both to the northward and westward for many miles.

In 1882 a wooden pier was built, and steamers drawing 6 feet water could go alongside. There was 14 feet water at the head of the pier.

Light.—The lighthouse on Carleton Point, 28 feet high, and painted white, exhibits, at an elevation of 32 feet, a fixed white light. The light should be visible 12 miles.

Anchorage.—Vessels may anchor anywhere in from 5 to 6 fathoms, remembering that although the sandy beach of Tracadigash Point is

quite bold on the west side within the spit, yet shoal water extends off the mainland nearly ½ mile. The best berth, especially with easterly winds, is in 5½ fathoms, mud, with Tracadigash Point bearing S. 38° E. (S. 15° E. mag.), Carleton steeple N. 78° E. (S. 79° E. mag.), and the watering place N. 37° W. (N. 14° W. mag.).

Tides.—It is high water, full and change, at Carleton Point at 3h.; springs rise 6 feet, neaps 4 feet.

The tides are weak in Carleton Road, seldom exceeding one knot.

Buoy.—A red can buoy has been placed in 21 feet at low water, to mark the southern extremity of Tracadigash Spit.

Directions.—Tracadigash Spit, of sand, and running out ½ mile SW. from the sandy point of the same name, is the only danger in the way when approaching the anchorage in Carleton Road from the eastward. Observe that Maguacha Point and the summit of Dalhousie Mountain in line, bearing S. 83° W. (N. 74° W. mag.), pass close to the extremity of the spit in 3 fathoms. Therefore, to clear it keep the mountain well open, or at night go no nearer than 10 or 9 fathoms water. As soon as Carleton steeple comes in line with the SW. extreme of Tracadigash Point, bearing N. 33° E. (N. 56° E. mag.), the spit will have been passed, and the vessel may haul in to the northward, going no nearer than 7 fathoms till the point bears to the southward of N. 67° E. (east mag.).

Cascapediac Bay is of considerable extent, being 13 miles wide and 5 or 6 miles deep. At its head is the Cascapediac River, a considerable stream, but which can only be entered by boats, in consequence of the extensive shoals of sand and mud, which dry out 2 miles from its entrance, and occupy all the head of the bay. Black Point, bold and rocky, and rising 400 feet above the sea, is the eastern point of the bay. The shoals commence about 1½ miles to the northward of Black Point, and at Indian Point, on the east side of Little River, they extend out to the westward nearly 1¾ miles, sheltering the anchorage from SE. winds.

Duthie Point, the east point of entrance of the Cascapediac River, bears N. 51° W. (N. 27° W. mag.) 5 miles from Black Point. One mile eastward of Duthie Point, and in the bay between it and Little River, stand the church and village of Richmond.

The Settlements on the western side of the bay are mostly of French Canadians and Acadians, and they extend alongshore all the way from the river to Tracadigash Point, which is the west point of the bay. In rear of the settlements the Carleton Mountain range will be seen 2 or 3 miles back from the shore.

Anchorage.—The anchorage in Cascapediac Bay, where the timber ships moor in 3 fathoms, is off Richmond Village, with Duthie Point bearing N. 24° W. (north mag.) ¾ mile. Vessels may anchor farther out in 4, 5, or 6 fathoms, but they will not be then so well sheltered from easterly winds.

Buoys.—There are two black buoys in the anchorage off Richmond;

one in 3 fathoms water, 1¼ miles S. 32° W. (S. 56° W. mag.) from Duthie Point, the other apparently on the end of the spit running off from Indian Point.

Directions.—In running for this anchorage from the eastward, observe that the marks for the southwestern or outer edge of the shoal off Indian Point (already mentioned as sheltering the anchorage from SE. winds) are Red Point a little open to the southward of Black Point, bearing S. 72° E. (S. 48° E. mag.). Keep these marks, therefore, well open as the vessel runs to the westward with the lead going, and go no nearer the shoal than the depth of 5 or 4 fathoms, until the church bears N. 33° E. (N. 57° E. mag.); then haul boldly in, steering directly for the church until the vessel is at the anchorage already pointed out.

Bonaventure Point, 16 miles SE. of Black Point, is formed by a low red sandstone cliff, with a thin superstratum of sand and clay containing tertiary shells. The Bonaventure River, with only 2 feet over its bar at low water, together with the village of the same name, and church, with tall spire and red roof will be seen in the bay 2 or 3 miles to the northward of the point. A rocky shoal extends off this point to the westward fully a mile, and continues round the bay to the northward and westward nearly to Red Point, a distance of 7 or 8 miles.

In the bay between Red and Black Points, and 5 miles NW. of the former, is the small Caplin River, remarkable only for a reef which lies off its mouth ½ mile from the shore.

Anchorage.—There is good anchorage under Bonaventure Point, with easterly winds, in 6 fathoms, mud bottom, with the point bearing S. 74° E. (S. 50° E. mag.), the church N. 27° E. (N. 51° E. mag.), and the entrance of the river N. 61° E. (N. 85° E. mag.), 1¼ miles.

Paspebiac Bay.—Carlisle Point, the west entrance point of the bay, is 5 miles east of Bonaventure Point. Paspebiac has an excellent roadstead, and is the principal fishing establishment in Chaleur Bay. A triangular point of sand and shingle beach, inclosing a lagoon, extends out from the mainland to the distance of a mile, and has on its west side several buildings, together with numerous huts belonging to the fishermen. On the west side of the sandy point, and close to the cliffs, the lagoon has an outlet, which has a rough bridge across it, and will admit boats at high water. In rear of this the mainland rises from the edge of dark-red sandstone cliffs.

New Carlisle, the county town, with its jail and courthouse, stands on the ridge in rear of Carlisle Point. Paspebiac Point is 3½ miles from Carlisle Point, and the roadstead is between them, but much nearer the former. In this excellent and convenient anchorage vessels are sheltered from the west, round north and east, to SE.; and although it is completely open to the SW. winds, which send in a very considerable swell, yet the ground is so good that vessels ride here moored all through the season without accident.

At Paspebiac the United States is represented by a consular agent.

Supplies.—At Paspebiac there is an excellent watering place at a stream which will be seen falling from the cliffs just to the westward of the outlet of the lagoon. Supplies of all kinds may be obtained here, but to a limited extent.

Light.—The lighthouse, 110 yards north of the extremity of Paspebiac Spit, is white, 54 feet high, and exhibits at an elevation of 50 feet a fixed white light; the light should be visible 12 miles. The light shows red over the anchorage between east (S. 66° E. mag.) and S. 45° E. (S. 21° E. mag.).

Anchorage.—The best anchorage is in 6 fathoms, clay bottom, with Robins flagstaff, the most eastern one adjacent to the store with a green veranda, and Single Tree Point (the extreme to the eastward seen over the sandy point) in line, bearing N. 66° E. (east mag.), and the extremity of the sandy point, S. 67° E. (S. 43° E. mag.). A sandy spit extends under water rather more than ½ mile southwestward from the sandy point and nearly as far southward.

Buoy.—A red buoy is moored at the western extreme of the shoal extending southwestward from Paspebiac Spit.

Directions.—From the eastward, when the vessel has passed Nouvelle River and is approaching within 2 or 3 miles of Paspebiac Point, keep the summit of Daniel Hill open to the southward of Nouvelle Point, bearing N. 49° E. (N. 73° E. mag.), until the easternmost church is seen well open to the westward of the south extremity of the sandy point, north (N. 24° E. mag.). Then steer for Carlisle Point, keeping the lead going till Le Boutelliers store is on with the above-mentioned church.

Steer in now for the anchorage, taking care not to open out the same church to the westward of the store until Single Tree Point (the extreme to the westward) is well shut in behind the sandy point, when the vessel will be within the spit, and a berth may be chosen by the lead, or by a bearing of the lighthouse, at or near the position already pointed out.

There is nothing in the way when approaching this anchorage from the westward, but in standing out from it with a westerly wind, and especially with a lee tide, the marks for clearing the spit to the westward must be carefully attended to. The above church should not be opened out to the eastward of Le Boutelliers store until Single Tree Point is well open to the southward of the sandy point; nor should the vessel bear up to the eastward of S. 24° E. (south mag.) before Daniel Hill comes open to the southward of Nouvelle Point.

Nouvelle River, 5 miles eastward of Paspebiac Point, has only 2 feet over its bar at low water, and will be known by the fish stores and stages on the sandy beach on the east side of its entrance. The western side is formed by Nouvelle Point, which is a high cliff of red sandstone.

Port Daniel is a fine bay, open to the eastward and about 1½ miles

wide, and deep. In the northern corner of the bay, ½ mile within White Point, which is high and of white limestone, a small river enters the bay through a sandy beach after descending a valley between wooded hills. There are many houses and stores near the entrance of the river, which will only admit boats at high water, being nearly dry when the tide is out.

A shoal extends ½ mile from the shore all around the port from West Point to White Point. West Point is of craggy gray limestone, with a high and remarkable semi-isolated rock at its SE. extremity; on its north side there is a small cove and a good landing for boats. Daniel Hill, about one mile westward of West Point, and rising 400 feet above the sea, is remarkable as the highest land close to the shore on this part of the coast. It serves to point out the situation of Port Daniel, as does also Reddish Point, which often appears like an island close to the shore.

The points in order westward from Macquereau Point, and between it and the river, are Reddish Point, Pillar Point, and White Point, which will all be easily recognized, the first and last by their color and the other by a remarkable rock close off its extremity. The ground is not good outside the line joining West and Pillar Points.

Supplies of wood and water may be obtained at Port Daniel, but fresh provisions are not plentiful.

Anchorage.—The best anchorage in Port Daniel is in 6 or 7 fathoms, mud or clay bottom, in the line between West and White Points, with the entrance of the river N. 28° W. (N. 4° W. mag.), and Reddish and Macquereau Points in one, bearing N. 74° E. (S. 82° E. mag.). Strong SE. winds roll in a heavy swell, but there is no difficulty in getting out on their approach, for the points are all bold, and in standing out or in, vessels may safely pass West Point at 400 yards.

Macquereau Point, 7 miles eastward of Port Daniel, is of bold and dark-colored craggy rocks. It is also wooded, and rises to about 200 feet above the sea.

Light.—The lighthouse on Macquereau Point is a square building, 27 feet high, painted white, exhibiting at an elevation of 56 feet an alternating light, showing flashes of red and white every minute, which should be visible 12 miles.

Fog Signal.—A hand horn answers signals from vessels.

Telegraph Station.—There is a signal and telegraph station at Macquereau Point.

Newport, 6 miles north of Macquereau Point and 3½ miles SSW. from Great Pabos, is another fishing place, where a small vessel or two may be moored (under shelter of a shoal and at some risk) to take in fish during the summer months.

Light.—A fixed white light is shown from a lighthouse in the middle of an island off Newport Point. The light is elevated 36 feet, and should be visible 12 miles. The lighthouse, 27 feet high, is a square pyramidal building, painted white, surmounted by a square lantern.

Grand and Little Pabos are fishing places fit only for boats or very small craft. There is but a foot of water over the bar of the latter at low tide, and ordinary springs do not rise over 5 feet. Great Pabos, which is a similar but much larger place, had 4 feet over its bar at low water when it was surveyed, but the depth and situation of the very narrow channel change with easterly gales.

Grand River, 7 miles westward of Cape d'Espoir, is a considerable stream, but has only 2 feet at low water over its bar. There is a village and a considerable fishing establishment there, and immediately westward of the river a shoal extends fully ½ mile out from the shore.

Light.—Grand River light is exhibited from a lighthouse erected on the eastern side of the entrance. The light is a fixed red light, elevated 52 feet, and should be visible seaward and up the river 8 miles.

The lighthouse, 43 feet high, is an hexagonal building, painted white, with iron lantern, painted red.

The light is intended to guide into the river as well as for a coast light.

Fog Signal.—A hand horn answers signals from vessels.

(H. O. Chart No. 1109.)

Cape d'Espoir, the NE. point of Chaleur Bay, consists of red sandstone cliffs, without beach, and is of moderate height.

Light.—The lighthouse on Cape d'Espoir, a square building 43 feet high, and painted white, with a red roof, exhibits, at an elevation of 90 feet, a revolving white light every ½ minute, which should be visible 15 miles.

Fog Signal.—A hand horn answers signals from vessels.

Telegraph Station.—There is a signal and telegraph station on Cape d'Espoir.

Leander Shoal, lying SE., distant rather more than 1½ miles from Cape d'Espoir, is about ¼ mile in diameter, and has 16 feet least water on one spot, which is very difficult to find. It is a rocky shoal, and there is a clear passage between it and the cape. White Head, in line with the inner or NW. end of Percé Rock, leads just outside of the shoal. From half to the whole of the Percé Rock shut in behind White Head will lead clear between the shoal and Cape d'Espoir.

Buoy.—A can buoy, painted red, is moored in 4 fathoms water in the center of Cock Cove, the first beach north of Cape d'Espoir, to indicate the limit of fishing nets and to prevent vessels from injuring them by anchoring inside it.

Bonaventure Island, 400 feet high, has bold and perpendicular cliffs of red sandstone and conglomerate on all sides except the west. These cliffs, in some parts, attain an elevation of 250 feet above the sea, and their ledges and fissures are the habitation of innumerable gannets. From the west side, shoal water extends ¼ mile, and there is anchorage in 15 fathoms between it and White Head, but the riding is

insecure and heavy in consequence of the swell, which, in bad weather, rolls round the island. The channel between Bonaventure Island and Percé Rock is about 1⅓ miles wide, and free from danger.

Light.—On White Head, the south extreme of Percé Bay, stands a lighthouse, a square building, 29 feet high, and painted white, which exhibits, at an elevation of 149 feet, a fixed white light, which should be visible 13 miles.

Fog Signal.—A hand horn answers signals from vessels.

Percé Rock is 288 feet high, precipitous all round, and bold to seaward. It is narrow, and about ⅓ mile long, and is rendered remarkable by a large hole which has been made through it by the waves, and through which a boat can pass at high water.

Percé Bay is comprised between this rock and White Head. Percé Reef, ½ mile SW. of Percé Rock, extends 800 yards from the shore. Small vessels engaged in the fisheries anchor on either side of this reef, with winds off the land, but it is a dangerous place, and not to be recommended for large vessels. From White Head to Percé Rock is locally known as South Beach and the first small bay northwestward of Percé Rock as North Beach.

Buoys.—A can buoy, painted black, is moored in 17 fathoms off South Beach, and a can buoy, painted red, is moored in the same depth off North Beach. These buoys are intended to mark the outside limits of fishing nets. Vessels, therefore, should not go or anchor inside them.

Percé, a considerable village with a church, and a population in 1891 of 1,800, principally engaged in the fisheries, occupies the shores of the bay, and Percé Mountain, or, as it is sometimes named, La Table Roulante, rises immediately from it to the height of 1,230 feet above the sea. This mountain is very remarkable, and can be seen at sea from a distance of 40 miles. A reef connects Percé Rock with Percé Point, and off the NE. side of the latter small vessels anchor with westerly winds.

Tides.—There is generally a regular stream of flood and ebb, of about one knot, between Bonaventure Island and the mainland, the flood stream running SW. round Cape d'Espoir and up Chaleur Bay, and the ebb in the contrary direction. Two or 3 miles outside, or to the eastward of Bonaventure Island, the current will often be found running to the southward out of the St. Lawrence.

Mal Bay is between 5 and 6 miles wide by 4 miles deep, and entirely open to the SE. On its SW. side, and under the Percé Mountains, there are magnificent perpendicular cliffs 666 feet above the sea. Its NE. side has low cliffs of sandstone, with occasional beaches. A fine broad sandy beach extends across the head of the bay and incloses a shallow lagoon. A considerable river and several small streams discharge their waters into the lagoon, which has an outlet in the NW. corner of the bay called the Tickle, admitting boats at high water and in fine weather. There is anchorage all round the shores of Mal Bay,

but as a heavy sea and thick fog often precede a SE. gale, and render it difficult for a vessel to beat out, it can not be recommended. An open cove or small bay is formed on the NE. side, in which a vessel can be occasionally moored close to the shore and in 3 fathoms water; but this is of no use for the general purposes of navigation.

American Bank, on which H. M. S. *Northampton* found a depth of 7¼ fathoms, is reported by the local fishermen to have a least depth of 5 fathoms. This bank is situated with Cape Gaspé lighthouse bearing N. 52° W. (N. 26° W. mag.), distant 11 miles, and Cape d'Espoir Lighthouse S. 54° W. (S. 80° W. mag.).

Gaspé Bay.—Peter Point, the south point of Gaspé Bay, is of low sandstone and thickly covered with the white houses of the fishermen. Flat Rock, lying about 800 yards off the point, is small, low, and of sandstone. There is a clear channel between the island and the point, but no good anchorage; for although vessels occasionally anchor to the northward of the island, yet the ground is so foul that there is great danger of losing an anchor from its hooking the rocks.

The bay contains an excellent outer roadstead off Douglastown, a harbor at its head, capable of holding a numerous fleet in perfect safety, and a basin where large ships might be hove down and refitted.

Light.—On the summit of Flat Rock stands a square lighthouse, 50 feet high, and painted white, from which at an elevation of 77 feet is exhibited a revolving red light every thirty seconds, visible 10 miles.

Fog Signal.—A hand horn answers signals from vessels.

Cape Gaspé is a remarkable headland, of limestone, having on its NE. side a magnificent range of cliffs, which rise from the sea to the height of 692 feet. Flowerpot Rock lies close off the SE. extremity of the cape; it is always visible, the sea washing over it only at high water. It is sometimes named "Ships Head," at others "Old Woman," by the fishermen, and is so bold that vessels may haul round it into Gaspé Bay within the distance of ¼ mile. Boats may pass between it and the cape when there is no surf. The limestone of Cape Gaspé dips to the SW., so that the cliffs within the bay are very much lower than those on the outside of the cape.

Light.—On Cape Gaspé, at an elevation of 355 feet, is exhibited a revolving white light every minute, showing three flashes, with intervals of fifteen seconds between their points of greatest brilliancy, followed by an interval of thirty seconds, during the greater part of which the light is eclipsed. The light should be visible 26 miles. The building, 46 feet high, is a lighthouse and dwelling combined, the square tower rising from the middle of the south face of the structure, the walls of which are white and the lantern red.

Fog Signal.—In thick or foggy weather, or during snowstorms, a cotton powder cartridge is fired every twenty minutes. A hand horn is in reserve.

Southwest Coast.—The SW. shore of Gaspé Bay from Peter Point to Douglastown, a distance of 12 miles, presents a succession of pre-

cipitous headlands, rising to the height of 200 feet above the sea. The shoals extending out into the bay are too steep for the lead to give warning.

Douglastown, with a population of 1,468 in 1891, is a village of fishermen and farmers, standing on the rising ground at the south side of the entrance of the St. John River. The water is deep in the outer parts of the bay, being from 30 to upward of 60 fathoms, over mud bottom; but on approaching Douglastown the depth decreases regularly to the anchorage.

Cape Haldimand, 2 miles northward of Douglastown, is a bluff point of cliff, and the southeastern termination of the range of hills which separates the harbor, basin, and Southwest Arm from the valley of the St. John River.

Water may be obtained by ascending the St. John River to the islands, a distance of 2 miles. In the spring of the year there is often a depth of 9 feet in the entrance of this river, which is between two points of sand, and there are 12 feet in the narrow channel for some distance within. At the islands the river becomes shallow and rapid.

Anchorage.—The roadstead off Douglastown is extensive; vessels may anchor in any part of it and in any depth from 6 to 11 fathoms, over sand and clay bottom, but the best berth is in 7 fathoms, off the entrance of the St. John River. The riding is much less heavy in southeasterly winds than might be expected, and, as the ground is excellent for holding, a vessel may safely anchor here during the summer months.

Northeast Coast.—At Grande Greve, 3¼ miles within Cape Gaspé, the ridge of land dips and narrows, so that there is a portage across it, leading to the settlements at Cape Rosier. On the NW. side of the portage a range of mountains commences, and they continue along the NE. side of Gaspé Bay and Northwest Arm till they are lost to view in the interior of the country. Opposite to Gaspé Basin they rise to the height of 1,505 feet above the sea.

The NE. side of Gaspé Bay is thickly covered with the houses of the fishermen for a distance of 5 miles within Cape Gaspé. A church has been built at 2¼ miles within the cape, and another stands close to the shore of a cove 2½ miles farther northward. There is anchorage with good holding ground, but in not less than 17 fathoms, except within ¼ mile of the shore, abreast of St. George Cove, Grande Greve, and Little Gaspé. The word "cove" is, however, inappropriately applied to any part of the shore between Grande Greve and the cape, for though there are fishing establishments, there are no coves whatever. This side is bold and free from danger in every part, with the exception of Seal Rock, which is the only detached danger in the bay.

Seal Rock is 6¾ miles within Cape Gaspé, one mile SE. by E. from Cape Brulé, and ½ mile off shore. The length of this reef between depths of 3 fathoms and in a direction parallel to the shore is ½ mile, and its breadth ¼ mile. The least water on it is 4 feet, and there is a depth of

3½ fathoms between it and the shore. When on the outer edge of the rocks, Cape Brulé is in line with the next cliffy point up the bay, bearing N. 60° W. (N. 34° W. mag.), and this only mark is sufficient for the safety of vessels working, for the rocks are out of the track with fair winds.

(H. O. Chart 1167.)

Gaspé Harbor.—From Cape Haldimand, Sandy Beach Point extends northward and forms Gaspé Harbor. It is a low and narrow point of sand, convex to seaward, on which side the water deepens gradually from high-water mark to the depth of 3 fathoms a distance of nearly ½ mile. On the inside it is as bold as a wall. The water deepens immediately outside of 3 fathoms all along the outside of Sandy Beach Point, and also off its north extremity, so that it is both dangerous and difficult to beat in or out of the harbor at night, the lead giving little or no warning.

The population of Gaspé in 1891 was 1,460.

The United States is represented by a consul.

Lightvessel.—Off the extremity of Sandy Beach Point is moored a lightvessel, which exhibits two lights, namely, on the foremast a fixed red light, 29 feet high, and on the mainmast a fixed white light, 37 feet high. The lightvessel is painted red, with the word Light-ship on her sides. The red light is visible 6 miles and the white light 10 miles.

Fog Signal.—A hand horn answers signals from vessels.

The Peninsula, nearly one mile northward of Sandy Beach Point, is a low sand, covered with spruce trees.

Between the shoal water in the bay eastward of the Peninsula and that which extends from the extremity of Sandy Beach Point is the narrowest part of the entrance to the harbor, which is 850 yards wide between depths of 3 fathoms, and has a depth of 11 fathoms in the center. Within Sandy Beach Point—that is, in Gaspé Harbor—the shelter is complete from all winds; the bottom is mud, and the depth nowhere exceeds 11½ fathoms.

Gaspé Basin.—The harbor is divided into the Northwest and Southwest Arms. The Northwest Arm has deep water for nearly 3 miles above the Peninsula, and continues navigable for keeled boats about 3 miles farther, where the Dartmouth River enters the arm between Marsh and Meadow Islands.

Southwest Arm.—The entrance of Southwest Arm is about 360 yards wide, and between two sandy points, but the navigable channel, which is buoyed, is contracted by shoals on either side to about 120 yards; and 27 feet of water can be carried in mid-channel. The deep-water part of Southwest Arm, which continues for ¾ mile within the entrance, is named Gaspé Basin; it has a depth of from 5 to 9 fathoms, over a mud bottom, and is sufficiently capacious to hold a great number of vessels. Boats can ascend Southwest Arm by a narrow channel, between shoals, about 3 miles, as in Northwest Arm, and the

navigation, for all but canoes or flat-bottom boats, is terminated by shallow channels. Above this part of the river it becomes contracted and rapid, and the water fresh.

A small rivulet in the bay, on the inside of the south point of the entrance of Gaspé Basin, is the most convenient watering place in the harbor. Most of the families, as well as those of Northwest Arm and the harbor generally, are farmers, but several of them are also engaged in the whale fishery, which they prosecute in small schooners. The cod fishery is carried on by the people of the bay outside.

Buoys.—The following buoys are moored in Gaspé Basin: A black buoy at the extreme of Gaspé Spit; a red buoy, on ballast ground, 600 yards from Arnold Bluff; a red buoy at the south extreme of the shoal off that bluff, and a red buoy to mark a sunken wharf ¼ mile westward of O'Hara Point.

These buoys are removed on the approach of winter and replaced in the spring of the year.

Lights.—From a square lighthouse, 37 feet high, and painted white, erected on O'Hara Point, the north entrance point to Southwest Arm, is exhibited, at an elevation of 38 feet, a fixed red light, which should be visible 7 miles.

Tides.—It is high water in Gaspé Basin, full and change, at 2h. 40m.; ordinary springs rise 5 feet and neaps 3 feet; extraordinary springs rise 7 feet. There are regular but weak streams of flood and ebb in the entrances of the harbor and basin. In the bay the streams of the tides are so irregular that nothing certain can be said respecting them. They are, however, usually almost imperceptible, excepting near the shore, and even there they are so weak as to be of little or no consequence to a vessel.

Ice.—The harbor is usually frozen over about December 10, the entrance not until December 25, and is clear of ice about May 10, being completely closed between the last two dates. The first vessel arrives from sea about May 11, and the last one leaves about December 6.

Directions.—On the NE. side of Northwest Arm there is a wooded point with low clay cliff, 2¾ miles above the peninsula. This point appears as if it was the extreme on that side, when seen over the end of the peninsula from a vessel approaching the entrance of the harbor, and is named Panard Point, which, so seen, is the mark for the northern extreme of the shoal off Sandy Beach Point, off which, as before remarked, a lightvessel is moored.

Keep Sandy Beach Lightvessel on a N. 54° W. (N. 28° W. mag.) bearing until within one mile of the vessel, and passing close north of her, steer into the harbor when the lightvessel bears S. 71° E. (S. 45° E. mag.).

Caution.—The current down the St. Lawrence runs strongly past Cape Gaspé over toward Flat Rock, especially during the ebb stream, which often increases its rate to 2 knots, and this should be remembered

by vessels making Gaspé Bay with a northerly wind. This current, when it meets the swell which so often prevails from the south and SE., causes a high, short, and breaking sea all along the coast from above Cape Rosier to Cape Gaspé, and extending across the entrance of Gaspé Bay. When the wind is light, a vessel becomes quite unmanageable in this sea, and it is extremely dangerous to be caught in it, close to the shore, by a light breeze on the land.

The soundings off this part of the coast will prove of great use to vessels running up in foggy weather.

In the prolongation of the line of Cape Gaspé, nearly, there are several rocky patches frequented by the fishermen. They all lie in the same direction from Flowerpot Rock, SE. The first is a small patch with 8 fathoms least water, the second has 16 fathoms, and the third 10 fathoms. Their distances from the rock are $\frac{7}{8}$ mile, $1\frac{1}{2}$, and 13 miles, respectively. There is deep water and irregular soundings between them, and the last mentioned is on the banks of soundings which have been already alluded to.

Winds.—In fine summer weather there is often a sea breeze blowing right up Gaspé Bay from about 9 a. m. until sunset. At such times there is generally a light land breeze at night down the arms, which often extends for several miles out into the bay. In the outer part of the bay, however, it will generally be found to be calm, even at times when a fresh breeze is blowing outside Cape Gaspé and Peter Point. The wind at sea on such occasions is generally from the SW.

CHAPTER VII.

ST. LAWRENCE RIVER—SOUTH SHORE—CAPE GASPÉ TO GREEN ISLAND.

QUEBEC.

(H. O. Chart No. 1109.)

Coast.—The bold and high coast between Cape Gaspé and Cape Chatte, a distance of 117 miles, will require only a brief notice, as it is free from danger—with the exception of Serpent Reef—and destitute of harbors. The mountains everywhere approach the shore, which is steep and rocky, displaying cliffs, often of great height, and without beach. After heavy rains, waterfalls, which are not to be seen at other times, descend from great heights, and small bays, with sandy beach and rapid streams at their head, occur occasionally; yet these features are not generally so strongly marked as to enable a stranger to make out one part of this coast from another with facility.

Caution.—Along the coast between Cape Gaspé and Cape Chatte the water is everywhere too deep to afford sufficient warning by the lead for the safety of vessels. The shore along its whole extent, excepting in some of the bays, is of highly inclined slate and graywacke rocks, which would cut through a vessel's bottom in a very short time; and such is the nature of the country that those who might escape to shore would run a great risk of perishing from want before they could reach a settlement.

Cape Rosier, N. by W., 6½ miles from Cape Gaspé, is low, and of graywacke and slate rocks. The shoal water does not extend off it above ¼ mile, but in the bay, 1¾ miles southward of it, there is a reef which extends ½ mile from the shore, off a conspicuous church. Vessels may find shelter under Cape Rosier from NW. winds, but the ground is not very good, and the easterly swell that frequently rolls in renders it a dangerous anchorage. There are fishing establishments on the cape and in its vicinity.

Light.—The lighthouse on Cape Rosier is a circular tower of white stone, 112 feet high. It exhibits at an elevation of 136 feet a fixed white light, which is visible 17 miles.

Fog Signal.—A horn is sounded ten seconds in every minute, with an interval of fifty seconds between each blast, in thick weather or during snowstorms. If the horn be out of order, a whistle is sounded at the same intervals.

Signal Station.—There is a telegraph and signal station at this lighthouse.

Griffin Cove and River are 6½ miles northwestward of Cape Rosier. A small bay here affords shelter to the boats of the fishermen, whose houses will be seen around it. There are from 2 to 3 fathoms water in this bay, over sandy bottom.

Supplies.—This bay is of no use to shipping, except to obtain supplies of water, wood, and occasionally fresh provisions.

Great Fox River, 11½ miles northwestward from Cape Rosier, is a mere brook, which enters a small bay about ¾ mile wide and ½ mile deep. Off each point of the bay there are reefs, which diminish the breadth of the entrance to less than ¼ mile, and afford shelter to boats, and to small schooners, in from 2 to 2½ fathoms, over a bottom of fine dark sand. Round the head of the bay there is a fine sandy beach. Outside the reefs, which extend only a short distance to seaward, there are 15, 18, and 24 fathoms, over a bottom of sand and broken shell, at the distance of ¼, ½, and one mile, respectively.

Buoy.—A buoy, painted black, is moored in 7 fathoms water in the middle of the bay, off Great Fox River, to indicate anchorage ground. Vessels should not go inside this buoy, as fishermen lay their nets out to that limit.

Supplies.—In fine summer weather a vessel might anchor off Great Fox River and obtain water, wood, and supplies of fresh provisions; but it is otherwise of no use to shipping. This coast is now generally inhabited, and the settlements are increasing in numbers. A large stone church has been erected at Great Fox River.

Serpent Reef, the only danger on this coast, extends one mile eastward from Serpent Point, its outer extreme, in 3 fathoms, being ⅔ mile off shore, and N. 48° W. (N. 22° W. mag.), 3¾ miles from Great Fox River.

Buoy.—A can buoy, painted black, is moored in 6 fathoms water off this reef, and about one mile from the shore. Vessels should pass northward of the buoy.

(H. O. Chart No. 1110.)

Fame Point—Light.—A square lighthouse, 50 feet high, and painted white, with one black horizontal band, is erected on Fame Point, about 11 miles westward of Great Fox River, from which is exhibited, at an elevation of 200 feet, a fixed white light, varied by red flashes every twenty seconds, which should be visible 20 miles.

Signal Station.—There is a telegraph and signal station at this lighthouse.

Great Pond (Grand Étang) is a small creek which affords shelter only to boats, and will be known by the houses and stages of the fishermen. The creek is 16 miles northwestward from Great Fox River, and here, as well as in every other cove along this coast to the westward, are seen the houses of the fishermen, by which the bays are so distinctly marked that a ship's position in clear weather may easily be determined by bearings of them, and of the beacons on the coast.

Frigate Point is nearly midway between Fame Point and Cape Magdalen. It may be recognized by a conspicuous waterfall west of the point.

Magdalen River, the next place worthy of notice, is 25 miles from Great Pond, in a westerly direction. The mouth of this river is on the NW. side of a sandy bay, and close under Cape Magdalen, which is rocky, with cliffs of moderate height, and juts out a very short distance from a range of hills which forms the coast line. A reef of rocks, which is dry in part at low water, extends from Cape Magdalen about 400 yards SE., parallel to the coast, and shelters the entrance of the river from northerly winds. The river is 30 yards wide at the entrance, with a depth of 7 feet at low water. Within, for a short distance, there are 10 feet over a clean bottom of fine sand. Farther up, the river becomes shallow and rapid. At spring tides, 13 feet water can be carried into this river, which is occasionally visited by schooners of 30 to 80 tons; they warp in when the sea is smooth and the weather fine. The bay is not deep, being merely a gentle curve with a sandy beach for about one mile SE. of the river. Vessels may anchor here in 7 fathoms over a bottom of sand, fine gravel, and broken shell, at $\frac{3}{4}$ mile from the sandy beach. The shelter is from west, round by south, to east, but it is only a fine-weather anchorage, which may be of use to vessels wanting wood and water.

A shoal with 3 fathoms water on it lies S. 73° E. (S. 47° E. mag.), one mile nearly from Cape Magdalen and 550 yards from the nearest land.

Tides.—It is high water, full and change, off Magdalen River at 1h. 15m. Ordinary springs rise from 6 to 8 feet, and neaps from 3 to 4 feet.

On two occasions a regular alternation of the streams of flood and ebb was observed. The flood extended about $1\frac{1}{2}$ miles from the shore, running one knot, and at the line of junction with the almost constant downward current there was a strong ripple.

Cape Magdalen—Light.—On Cape Magdalen stands a lighthouse, an hexagonal wooden building, 54 feet high, painted white, with one vertical black stripe, which exhibits, at an elevation of 147 feet, an alternating light showing red and white alternately at intervals of two minutes. The red light is visible 15 miles, and the white 20 miles.

Fog Signal.—During thick weather or in snowstorms a steam whistle will give blasts of eight seconds' duration, with intervals of twenty-two seconds between the blasts.

Signal Station.—There is a telegraph and signal station at this lighthouse.

Pleureuse Point is 12 miles westward of Cape Magdalen.

Mount Louis River, 4 miles westward of Pleureuse Point, is a much smaller stream than Magdalen River, being 20 yards wide at the entrance, and capable only of admitting a small boat at low water. There are 7 feet in the entrance at high water, and for a short distance within.

The small bay, with a sandy beach at its head, into which this river flows, is one mile wide, and nearly ¾ mile deep. Vessels may anchor in it during fine weather, in from 8 to 16 fathoms, mud bottom, nearer the west than the east side. The holding ground is excellent; but since a vessel ought not to be more than 600 yards from the west side of the bay, there is not much room to work out, and therefore it would be dangerous for a vessel to be caught there by a wind on the land. Small vessels, having occasion to stop for a few hours for wood or water, may safely anchor there in fine weather, and will find shelter in southerly winds.

Mount Louis River may be thus recognized. In a vessel off this part of the coast, four well-marked openings will be seen in the high land in a space of 10 miles. The easternmost opening is Grande Matte or Pleureuse River, the next westward is Mount Louis River, and the two others Pierre and Claude Rivers; none of them afford good anchorage excepting Mount Louis.

Martin River—Light.—At the entrance of Martin River stands a lighthouse, a square building, 54 feet high, painted white, with two black horizontal bands, and attached to the keeper's dwelling. From the lighthouse is exhibited, at an elevation of 125 feet, a fixed white light, which should be visible 17 miles.

Signal Station.—There is a telegraph and signal station at this lighthouse.

St. Anne Mountains.—Westward of Cape St. Anne the mountains begin to recede a little from the shore and to diminish in height. There is, however, another range of mountains in the rear of the coast, named St. Anne or Shickshoc Mountains, which can be seen from 80 or 90 miles, under favorable circumstances; and their highest peak, which is about 14 miles behind Cape Chatte, rises 3,973 feet above the sea.

St. Anne River, 4½ miles westward of the high cape of the same name and 10 miles eastward of Cape Chatte, can be entered by small schooners at high water. The entrance is difficult to a stranger. A large rock above water divides it into two very narrow channels, through which a rapid current almost always runs. It flows into the sea through the sandy beach of a bay which affords very indifferent anchorage, the depth of water being too great, excepting at a less distance from the shore than would be considered prudent for any but small vessels.

Supplies of provisions can in general be obtained, and also at Chatte River.

Chatte River, 2¾ miles eastward of Cape Chatte, enters between large bowlders a small sandy bay, affording no anchorage for large vessels, and admits small schooners with difficulty at high water. The east point of this bay, 2 miles eastward of the river, is a low spit with a reef off it ½ mile. Small coasting schooners occasionally anchor under it in westerly winds.

Cape Chatte, when seen from the eastward or westward, so that it appears as the extreme point, can easily be distinguished, being a round hill separated from, but of less height than, the land behind it.

Light.—On the NE. extremity of Cape Chatte is a square lighthouse, 32 feet high, and painted white, with two black vertical stripes, which exhibits at 120 feet above high water a revolving white light every half minute. The light should be visible 18 miles.

Fog Signal.—A cotton powder cartridge will be exploded every twenty minutes from a position 35 yards eastward of Cape Chatte lighthouse during fogs and snowstorms.

Signal Station.—There is a telegraph and signal station at this lighthouse.

(H. O. Chart No. 1111.)

Coast.—The coast from Cape Chatte to Matane is straight, bold, and of the same rocks as that which has been just described. Although not a high coast, it is still of considerable elevation above the sea, and St. Anne Mountains continue in the rear of it, at a distance of about 15 miles, to their southwestern termination, which is 15 miles south of Cape Balance, the last being 25 miles southwestward of Cape Chatte. Several detached hills will be seen farther westward, which are also at a considerable distance from the coast. Two of these have been named the Paps of Matane, though they can with difficulty be made out when bearing S. 20° W. (S. 43° W. mag.). On any other bearing it is still less easy to distinguish them, but they are of no use except to enable a vessel, obtaining a sight of land, to judge how far she is up the estuary.

Capuchin Cove and another cove on the west side of Cape Michaux afford shelter to boats. There are settlements at Little Matane, a small stream 3 miles eastward of the Matane River.

Matane River.—The entrance to this stream is 33 miles southwestward from Cape Chatte. The river is reported to have its source in a lake of considerable dimensions, distant about 60 miles, following the stream, inland. The depth over the bar is usually 4 feet at low-water and 15 feet at high-water springs. The rise of the tides is, however, very irregular, and although there is often 12 feet at high-water neaps, yet there has been as little as 10 feet. The depth of water seems to depend so much upon the winds which prevail in the estuary that it is impossible to calculate it at any time exactly. Easterly winds were observed to cause high tides, and westerly winds the contrary. The channel is very narrow, and there are several large bowlders in it, lying on the sand, which diminish the depth 2 feet, and are extremely dangerous when there is any swell. The bar is continually shifting from the effects of gales of wind, so that no directions can be given for sailing in.

Pilots.—There are pilots residing here, and no vessel should attempt the entrance without one.

Buoys.—A can buoy, painted black, is moored in 7 fathoms water

off the bank at Matane River, at about ¾ mile from the shore. There are also two small can buoys to mark the entrance to the river which are shifted with the changes in the sand banks.

Bar.—The bar, when it was surveyed, extended in a circular form from the east entrance point, and was met so nearly by another point of sand, extending from the small isolated cliff on the west entrance point, as to leave only a very narrow channel. The bar dried at low water, and no part of it extended more than 600 yards outside the entrance of the river. Inside the bar the entrance, between two sandy points, is not more than 60 yards wide, and a rapid current runs out during the ebb tide. There is not room enough for a vessel to lie safely afloat inside, but, nevertheless, considered as a tidal harbor, it is a useful place to coasting schooners, which ground at half tide on a good bottom of mud and stone. To a vessel which has lost her anchors, or which has received injury, this river will afford a place of refuge in which she can be safely repaired and refitted. The sandy beach extends about ⅓ mile eastward of the entrance, and incloses a large space dry at low water, with the exception of the narrow and rapid channel of the river, which is full of stones. The tide ascends about one mile to a rapid over a ledge of rocks, above which the stream is swift, shallow, and navigable for canoes, to the lake above mentioned. Landing at this river in bad weather in a boat is very dangerous at low water, in consequence of the heavy surf on the sand banks at the entrance.

Lights.—A lighthouse, 39 feet high, at the entrance of Matane River exhibits, at an elevation of 66 feet, a fixed white light, which should be visible 14 miles. The lighthouse is a square building, painted white, with a black cross, and with keeper's dwelling attached.

A fixed white light is also shown from a mast 20 feet high erected on a wharf at the west entrance point of Matane River at an elevation of 30 feet; it should be visible 7 miles.

Signal Station.—There is a telegraph and signal station at this lighthouse.

Supplies of provisions can usually be obtained at Matane River, which will be easily made out from a vessel, since the entrance shows plainly. The lighthouse on the west side of the entrance and the buildings and large stone church will also serve to point it out.

Matane is the name of the seigniory which contained 2,025 inhabitants in 1891. The soil is good, and gives good crops of wheat and other grain.

Anchorage.—Outside the bar there is anchorage in 5 fathoms ½ mile off shore, and in 10 fathoms a little farther out, the bottom being of sand and clay.

Tides.—It is high water, full and change, in Matane River at 2h. 15m.; ordinary springs rise 11 feet, and neaps 7 feet.

Little Metis Bay, 22 miles southwestward from Matane, is small,

and divided into two rocky coves, which are open to the eastward, and dry at low water. The coast from Matane to Metis is low, rocky, wooded, unbroken, and may be approached with care by the lead, the bank of soundings becoming gradually wider to the westward.

Little Metis River, a small stream, is at the head of the southern cove. There are several buildings and a fishing establishment on Metis Point, the outer extreme of the bay. A reef, which is bold on the north side, and has some of its rocks always above water, extends from this point nearly ¾ mile eastward, and enables small vessels to remain at anchor, in 3 fathoms, over mud bottom, with the wind as far northward as NW. In this berth vessels lie midway between the eastern end of the reef and a large Round Rock near the shore on the SE. side of the bay. Larger vessels may anchor farther out in 5 or 6 fathoms water, but not in the stream of the reef, where the ground is foul and rocky.

The east end of the reef may be passed by the lead in 4 fathoms, or with Round Rock bearing S. 67° E. (S. 45° E. mag.), but vessels of large draft had better not bring it to bear eastward of S. 45° E. (S. 23° E. mag.). This rock, which lies about 1½ miles east (S. 68° E. mag.) from the reef off the outer point of the bay, will serve to point out Little Metis to a stranger. It can not be mistaken for Grand Metis with the charts, since there is no resemblance in the shapes of the bays. Neither place can be easily made out from a greater distance than 5 or 6 miles, because the points are very low.

Metis Point—Light.—On Metis Point stands a square lighthouse, 40 feet high, and painted white, with red roof, which exhibits, at an elevation of 56 feet, an alternating light showing red and white alternately every minute, which should be visible 13 miles. The keeper's dwelling is attached to the lighthouse.

Signal Station.—There is a telegraph and signal station at this lighthouse.

Grand Metis Bay is separated from Little Metis Bay by Metis Point. Grand Metis River, a small stream 5 miles southwestward of Little Metis, is near the west end of the bay, and is nearly dry outside of the very narrow entrance at low water. The bay is rather more than 3 miles wide, and ¾ mile deep; but it is all shoal. Small vessels may anchor in 3½ or 4 fathoms, under its east point, close to the edge of the shoal water, and in tolerable shelter from winds along the coast, but there is no shelter for shipping. Nevertheless, vessels lie here all the summer months for the purpose of taking in timber. They are usually moored in 6 fathoms, at low water, over mud bottom, and with the river bearing about south (S. 22° W. mag.) 1½ miles. In this position they are ½ mile from the 3-fathom edge of the shoal water which extends from the shore, and as they are outside of the line joining the points of the bay, they are exposed to the prevailing winds along the coast, and must ride very heavily at times. There is, however, seldom

much sea with these winds so close in shore, and the northerly winds seldom blow strong until September. This is a dangerous anchorage after the commencement of that month, but at other times, and in fine weather, vessels may safely anchor anywhere off the bay in from 6 to 12 fathoms, the bottom being everywhere good, and plenty of room to get under way.

Cock Cove affords good anchorage for schooners, in 3 fathoms at low water, well sheltered from the winds along the coast. The summit of Mount Camille bears from the west entrance point of Cock Cove S. 48° E. (S. 26° E. mag.) 8 miles, and will serve to point out its position to a stranger.

Buoy.—A can buoy, painted black, is moored in 5 fathoms water at the edge of the shoal off Cock Point.

Anchorage.—Vessels of large draft may anchor, in fine weather, all along the coast from Grand Metis Bay to Green Island.

Father Point, 13 miles from the west entrance point of Grand Metis Bay, is low, and covered with houses. There is a considerable village named St. Anne de la Pointe au Père, with a fine church, about ¼ mile southeastward of Father Point.

Light.—A square light tower, 52 feet high, and painted white, with one black horizontal band, is erected on the extremity of Father Point. It exhibits, at an elevation of 48 feet, a revolving white light every twenty seconds, which is visible 12 miles.

Fog Signal.—In thick weather, or during snowstorms, a cotton powder cartridge will be fired every twenty minutes, and a gun will be fired in answer to signals for a pilot.

Signal Station.—There is a telegraph and signal station at this lighthouse.

Ice.—The river has never been known to freeze over at Father Point. Drifting field ice usually arrives about December 9, and disappears about April 2; there is rarely any heavy ice until the end of December, and always a channel of open water, either on the north or the south side of the river, according to the prevailing wind, a light air of 6 or 7 miles velocity being strong enough to drive the ice to mid-channel. The river is often clear of ice for a month at a time in winter, and is partly clear for about half that season. There is less ice than usual at Father Point whenever the "ice bridge" forms at Quebec. The first vessel arrives at Father Point from sea about April 24, and the last one leaves about November 28.

Rimouski Road.—The eastern point of Barnaby Island is nearly 3½ miles SW. from Father Point, and between them is the anchorage or road of Rimouski, where vessels ride throughout the summer to take in cargoes of lumber. They lie moored in 4 or 5 fathoms at low water, with excellent holding ground, and sheltered from W. by S., round by south, to ENE. The best-sheltered berth is with the pier bearing S. 22° E. (south mag.), in 4 fathoms at low-water spring tides, over mud bottom.

Small vessels can anchor farther westward in 3 fathoms at low water, with the east end of the rocks, off the eastern point of Barnaby Island, bearing N. 80° W. (N. 58° W. mag.) ¼ mile. The reef does not extend above ¼ mile off the eastern point of Barnaby Island, and may be passed by the lead in 4 fathoms. A landing pier has been built at Rimouski, 2,150 feet long, and having at its end a depth of 8½ feet at low-water springs.

Rimouski.—The European mails are landed and shipped at Rimouski, special trains running with them to and from Quebec and Halifax by the Intercolonial Railway. Both mails and passengers are transshipped by a steam tender, the mail steamer stopping about 2 miles from the pier. The anchorage off Rimouski is not good.

Coal.—Only sufficient coal for the supply of the tender to the mail steamer is kept at Rimouski, but at St. Flavie, distant 18 miles northeastward on the Intercolonial Railway, a supply of about 1,600 tons is kept in stock for the use of the railway.

Railway and Telegraph.—From Rimouski to Quebec the various villages are connected with Quebec and Halifax by the Intercolonial Railway, which runs along the right bank of the St. Lawrence at the average distance of one mile inland from the villages. There is also telegraphic communication with all existing lines either from the railway stations or from offices in the villages. From Rimouski eastward the Intercolonial Railway recedes from the coast, running through the valley of Metapedia River to Campbellton, at the head of Chaleur Bay.

Barnaby Island is 3½ miles long and very narrow. It is low, partially wooded, and inhabited, and is composed of slate and graywacke rocks, like all the coast and islands on this side of the estuary. In the interior of the island there is a long pond of fresh, but not good, water, which last must be obtained from Rimouski River.

The channel between the island and Rimouski is dry at low water. There is a depth of 7 to 12 feet through it at high water, according as it is neap or spring tide, but at no time should a vessel drawing more than 8 feet attempt this passage, since there are rocks and large stones here and there, and also fish stakes.

The church of Rimouski, the college and convent, eastward of the river, and many houses, will be seen directly opposite the island.

Off the outside of Barnaby Island there is a shoal with 3 fathoms water over it, extending out fully ⅜ mile, and the reef off its western end runs out in the direction of the island more than ¾ mile. Between the western end of the island and the mainland there is a large high and bare rock, which is distant from the island about ⅜ mile.

Barnaby Road.—Midway between the SW. points of Barnaby Island and Bare Rock there are 2 fathoms at low water, over muddy bottom, in Barnaby Road, which affords good anchorage to small vessels in all but westerly winds. Rimouski church in line with the eastern end of the rock will lead over the tail of the reef off the west end of Barnaby Island, and into this anchorage.

Old Bic Harbor, 7½ miles southwestward of Barnaby Island, dries at low water, and has many rocks in it. Two round and high rocky islets, named Bicoques, will be seen extending westward of its east point, and diminishing the breadth of the entrance to ⅜ mile.

Midway between these rocky islets and the west point of the harbor, small vessels may anchor in Old Bic Road in 3 fathoms at low water, with muddy bottom, and with the point bearing S. 70° W. (N. 89° W. mag.), distant ¼ mile. To run into this anchorage from the NW., keep the western of the two rocky islets its own breadth open eastward of the west point of the harbor, and this will clear the eastern rock of Arignole Reef, which is the only danger in the way.

Arignole Reef, one mile westward from Old Bic Harbor, is composed of two rocks lying across the mouth of the shallow Arignole Bay. The western rock is ¼ mile long and very narrow; its west end is always above water, and is only ¼ mile from the rocks on the eastern side of the cape. The eastern rock is small, covered at high tides, and ⅛ mile from the other rock. There are 5 or 6 fathoms water between these rocks, which are bold to the northward, and vessels might pass between them and the mainland by keeping close to them, were it ever necessary to try so dangerous a passage.

Cape Arignole is 10 miles southwestward from Barnaby Island, and the summit of the high land of Bic, 1,236 feet above the sea at high water, lies S. 29° W. (S. 40° W. mag.) 2½ miles from the NW. extremity of the cape.

Ha-Ha Bay, on the SW. side of Cape Arignole, affords excellent anchorage, in easterly winds off its entrance, in 4 fathoms at low water, and farther in for small vessels in 3 fathoms; but it is seldom used, because the equally safe and more roomy anchorage under Bic Island is justly preferred.

Bic Island lies directly off Cape Arignole, at the distance of nearly 2¼ miles, and is about 3 miles long, without including the reefs, in a direction parallel to the coast and a mile broad. Its shores are of slate rocks; it is thickly wooded and uninhabited. It is about 150 feet high.

Beacons.—On the SW. end of Bic Island are three wooden beacons painted white. The beacon in the form of a sugar loaf and the western beacon in the form of a reversed cross, in line, lead westward of Northwest Reef, and the cross beacon in line with the diamond-shaped beacon lead on to Alcide Rock.

Water.—Supplies of water can only be obtained from the bay between the east and SE. points of Bic Island, and not always there in dry seasons; and from a stream on the west side of a small bay of the mainland, 4 miles westward of Cape Arignole.

Bicquette Island, lying ¾ mile northward of Bic, is ½ mile long, ¼ mile broad, and about 100 feet high above the sea.

Light.—The lighthouse, near the center of Bicquette Island, is a circular, white, stone tower, 74 feet high, from which, at an elevation of 109

feet, is exhibited a white light which revolves every forty-five seconds, and is visible 17 miles.

Fog Signal.—A steam horn, 17 yards northward of the lighthouse, gives blasts of ten seconds' duration, with intervals of fifty seconds between the blasts, during fogs and snowstorms. If the horn be out of order a similar signal will be given from a building 33 yards eastward of the lighthouse.

Northwest Reef.—Several large rocks above water extend ⅓ mile east and SE. of Bicquette Island, and diminish the breadth of the channel between it and Bic Island to little more than ½ mile. Off the SW. end of Bicquette Island, in a SW. direction, there are two large rocks always above water, and a third which covers at high water; these lie nearly in a line, and extend to the distance of one mile from the island.

Northwest Reef of Bicquette Island is the greatest danger, lying 1¼ miles from the west end of the island. In approaching the reef from the westward, the north extremity of Cape Arignole should not be shut in behind the SW. point of Bic Island. The beacons on Bic Island in line also lead clear.

This reef is composed of two rocks about 300 yards long, and which just cover at high water; both it and Bicquette Island are bold to the northward. There is deep water all along the line from the north side of Bicquette Island to this reef, and also between the latter and the rocks to the SE. of it, but these are dangerous passages, which ought not to be generally tried, though it is useful to know of their existence in case of emergency.

Bicquette Channel.—There are no leading marks for running through, but it may easily be done with the assistance of the charts in case of necessity. The southwestern reef off Bicquette Island is most in the way, and there are also two small round rocks on the Bic Island side, 400 yards off shore, and bearing nearly S. 21° E. (south mag.) from the west end of Bicquette Island.

To avoid the first of these dangers, do not bring the south extremity of the rocks off the SE. side of Bicquette Island to bear eastward of N. 50° E. (N. 71° E. mag.); and if the north side of Bic Island, near its east end, is not brought to bear northward of N. 65° E. (N. 86° E. mag.), the second will be cleared, which, however, always shows, excepting in very high tides. These directions are, however, insufficient without the chart, which must be carefully consulted, for this is an intricate and dangerous place. The best time to run through is at low water, when all the dangers show, and a vessel, keeping in mid-channel between them, will have from 9½ to 5 fathoms, with irregular soundings and foul ground occasionally.

Southeast Reef extends from the SE. point of Bic Island nearly 1¾ miles, in an easterly direction. The outer part of this reef is formed of three rocks lying in a straight line, and always above water. The

two easternmost are the largest, and are nearly joined together, whilst the westernmost of the three is detached, so as to leave a channel through the reef 300 yards wide, with a depth of 5 fathoms water.

Vessels of large draft should not attempt to pass between these rocks, or between them and Bic Island, for the tidal streams are rendered irregular by the uneven bottom, and there is much foul ground about. Small schooners can pass on either side of the westernmost rock, keeping close to it, if they pass to the westward. The shoal water does not extend beyond 200 yards from the east end of Southeast Reef; the rocks above water are bold, both on their north and south sides. The inner part of the reef, extending under water from the SE. point of Bic Island, reaches farther southward than the direction of the rocks, and must be avoided by not bringing the south side of Bic Island to bear southward of S. 60° W. (S. 81° W. mag.).

Northeast Reef is a small patch of black rocks, which shows at low water, lying N. 34° E. (N. 55° E. mag.) 800 yards from the NE. point of Bic Island. To pass eastward of this reef, keep both the rocky islets on the east side of Old Bic Harbor open eastward of Southeast Reef, bearing nothing eastward of S. 49° E. (S. 28° E. mag.).

West Grounds of Bic are an extensive flat of slate, which partly dries at low water. The outer point of these grounds, in 3 fathoms, lies nearly ¾ mile S. 64° W. (S. 85° W. mag.) from the SW. point of the island, and they may be approached by the lead, as nearly as the depth of 5 fathoms, at low water.

Alcide Rock, lying S. 25° W. (S. 46° W. mag.) nearly 3¾ miles from the SW. point of Bic Island, has no connection with that island; but as it is extremely dangerous, and lies much in the way of vessels passing through Bic Channel, it is noted here. It is a small rock, about 6 feet long and 2 feet wide, with 4 feet on it at low water. It rises from a small rocky shoal 200 yards long, parallel to the coast, and about half as wide, which is so bold all around that there is no warning whatever by the lead. From the NW. extremity of Cape Arignole the rock bears S. 64° W. (S. 85° W. mag.) 5 miles; and it is rather more than 1¾ miles from the shore to the southward. Two of the white beacons on Bic Island—one in the form of a reversed cross and the other in a diamond form—in line, lead directly on Alcide Rock; and the two white beacons on the south shore of the river, about 5 miles westward of Cape Arignole—one of which is of a diamond shape and the other of a sugar loaf—in line, also lead on the rock. These beacons, therefore, should be kept open of each other. Vessels will be in no danger from it if Mount Camille be not entirely shut in behind Cape Arignole.

Buoy.—A can buoy checkered black and white is moored in 9 fathoms close northward of Alcide Rock with the beacons on the south shore in line and the white diamond-shaped beacon at the west extreme of Bic Island just open north of the beacon in the form of a reversed cross.

Anchorage.—There is excellent anchorage under either end of Bic

Island, and also between it and the mainland, according to the wind; and vessels which may be met by an easterly wind had better anchor than attempt to beat down the estuary in the long and foggy nights of the fall of the year.

Tides.—It is high water, full and change, at Bic Island at 2h. 15m.; ordinary springs rise 14 feet, and neaps 8½ feet. The tide flows 5h. 50m., and ebbs 6h. 34m.

Westward of Bic Island the first of the flood comes from the NE., but there is but little stream of flood in neap tides between Bic Island and the south shore of the river, excepting close to the latter. In spring tides it runs through the channel at the average rate of 1½ knots, being strongest near the mainland. It also runs between Bic and Bicquette Islands, but the stream extends only a very short distance outside the latter island.

The stream of flood continues its course close along the mainland, passing inside, and also very close outside, of Razade, Basque, and Apple Islands, but nowhere extending a sufficient distance off shore to be of use to ships beating to the westward much below Green Island. That part of the stream of flood which passes farther out toward Bic Island, and also that which passes between Bic and Bicquette Islands, runs at its full rate only until at half flood, after which it becomes gradually weaker, turning to the NW., round the west end of the island, and finally to the north and NE. toward the end of the tide.

The stream of flood becomes weaker and of less duration as you proceed to the westward of the islands. Halfway between Bic and the Razade Islets there is slack water for about an hour at the end of the ebb, after which a weak flood makes during the first quarter of that tide at the rate of ¼ knot; and this is succeeded by the eddy flood at the rate of 1½ knots, or 2½ at the edge of the bank of soundings, which comes from the westward, running in the same direction as the ebb during the remainder of the flood tide.

From these remarks it will be seen that vessels will make little way to the windward against a westerly wind on the bank of soundings between Bic and the Razade Islets, and indeed all the way to Green Island.

The set of the latter part of the flood to the northward past the west end of Bic Island should be remembered by vessels weighing from the western anchorage, or approaching the island with light winds, especially in the night or thick weather.

The first of the ebb sets off shore, or from the southward, and this is more particularly remarkable at the eastern anchorage, but it only lasts for a very short time, after which the stream runs fairly between the islands, and along the coast to the eastward, for the remainder of the tide. Its rate, in westerly winds, varies from 2 to 2½ knots, according as it is neap or spring tide, but it does not run so strongly in easterly winds.

Bank of Soundings.—The chart will show how extensive the south bank of soundings is, both northeastward and southwestward of Bic and Bicquette Islands, and the assistance which the soundings on it may afford to vessels at night, or in fogs, will be evident.

There is anchorage on this bank in 10 or 12 fathoms, with good holding ground, all along the south coast from Bic Island to Green Island.

Caution.—The coast of the mainland between Bic Island and Razade Islets is high and rocky. With the exception of Alcide Rock, it is free from danger to small vessels, which may stand close in; but vessels of large draft should not stand in farther than 7 fathoms at low and 9 fathoms at high water, because of a long ridge of rocky ground, extending 5 miles NE. from the northeastern of Razade Islets, with 17 feet least water near its eastern end. To clear every part of this ridge, keep Basque Island its own breadth open northward of the northeastern of Razade Islets.

Razade Islets are two large rocks about ¼ mile long; they are low, bare of trees, and 1½ miles apart. The NE. islet is 1½ miles from the mainland to the southward. There is no passage for vessels between them and the south shore.

Basque Island, 5 miles SW. from the northeastern of Razade Islets, is 1½ miles long, parallel to the coast, and 400 yards wide. Its greatest height above the sea does not exceed 100 feet; it is rocky, partially wooded, with a house at the west extreme. There is no passage for ships between it and the south shore, from which it is distant 2 miles.

Near the SW. end of the island a sandy spit extends ¼ mile southward. Close off the end of this spit there is a long and narrow hole with 4 or 5 fathoms in it at low water, in which small craft may be secured.

Shoal water extends ½ mile northward of Basque Island, and there is a reef of rocks to the westward of its western point. On the western extremity of this reef, and about 1,200 yards from the island, is a round rock which shows at half tide.

Apple Island, SW. 2¾ miles from Basque Island, is formed by one principal and several smaller rocks, the whole covering a space one mile long parallel to the coast by 300 yards wide. It is 30 or 40 feet above the sea at high water, without any trees, and 2⅛ miles from the nearest point of mainland. There is no passage for ships between it and the south shore, but its north side is bold-to, there being 4 fathoms at the distance of 200 yards.

(H. O. Chart No. 1112.)

Green Island, at its northeastern end, has a long and narrow point of rocks, always above water, and extending more than ½ mile from the trees toward Apple Island, which lies 2¾ miles NE. from it. Half this distance toward Apple Island is occupied by reefs of slate which dry at low water. In the remainder there are a few feet of water, afford-

ing a passage for very small schooners, which run in between Green Island and the main at high water; a line of shoal water is continuous from each of these islands to the other, and it may be safely approached with care to 7 fathoms at low or 10 fathoms at high water, as may also the islands.

Light.—A polygonal tower, 56 feet high, and painted white, stands on the north point of Green Island, nearly 2 miles from the eastern extremity of the rocks, above water, off its east point. It exhibits, at an elevation of 47 feet above high water, a fixed white light, which can be seen 13 miles in clear weather. Behind the lighttower, at about ¼ mile, and bearing S. 43° E. (S. 23° E. mag.) from it, there is a white beacon for leading clear of the tail of Red Islet Reef, and southwestward of the lighthouse is a triangular beacon to mark the position of Red Islet Bank lightvessel.

Fog Signal.—A cotton powder cartridge is exploded every twenty minutes during fog and snowstorms.

Green Island Reef, which is extremely dangerous, extends from the lighthouse northward 1¼ miles, to the depth of three fathoms. From the NE. extremity it trends, with a serrated outline, E. by N., till it joins the shoal water connecting Green and Apple Islands. The NW. side is straight, running SSW. from its NE. extremity, to the shore close westward of the lighthouse, off which it extends only 400 yards WNW. Its shape is therefore irregularly triangular, and the rocks on it dry at low water, nearly ¾ mile out from the high-water mark.

On the eastern side, this reef may be safely approached to the depth of 7 or even 6 fathoms at low water, but on the north and west sides there is no bottom with the hand lead until close to it. Half a mile west of it there are between 20 and 30 fathoms water, and at one mile NW. of it no bottom, with 40 fathoms of line.

To avoid Green Island Reef in the daytime and clear weather, keep the summit of the high land southward of Cape Arignole (or the high land of Bic) open northward of Basque Island.

Anchorage.—There is excellent anchorage in westerly winds under Green Island Reef, and it is the general rendezvous of vessels waiting for the flood to beat through between Green Island and Red Islet. But as the first of the flood comes from the northward, and sets on the shoals, vessels had better not anchor with the light bearing westward of S. 29° W. (S. 49° W. mag.), or in less than 7 fathoms at low water. With that depth, on that bearing, they will be 2½ miles from the light, one mile from the eastern edge of the reef, and the same distance from the shoal water to the southward. If they wish still more room, they may choose their berth in 9, 10, or 11 fathoms, and will find a bottom of stiff mud in either depth.

Tides.—It is high water, full and change, at Green Island at 2h. 45m.; ordinary springs rise 16 feet, and neaps 9½ feet. At the anchorage northward of Green Island the first of the flood was observed to

come from the northward; the vessel then tended gradually round, with her head to the NE., east, and SE. at the end of the tide. The vessel continued to go round with the first of the ebb, which came from the southward off the shoals, to the SW., west, and NW., which latter point was reached at about 4 hours ebb; and she continued with her head in that direction, from which the stream came, until near the end of the tide. The vessel then began to tend again, with her head to the north and NE. as before, going completely round the compass in 12 hours. It was never entirely slack water, the stream continuing to run more or less during the whole time. The rate of the ebb was 3 knots, and that of the flood 2 knots. This occurred in quite a calm day.

Note.—The description of the river above Green Island is continued in Chapter X. The north shore of the gulf will now be described from Belle Isle Strait westward.

CHAPTER VIII.

REMARKS ON BELLE ISLE STRAIT—GULF OF ST. LAWRENCE, NORTH COAST—BELLE ISLE STRAIT TO CAPE WHITTLE.

(H. O. Chart No. 581ª.)

Belle Isle lies at the Atlantic entrance to the Strait of Belle Isle. It is about 9½ miles long, NE. and SW., and 3 miles wide, including Lark Island, close to its west side. It is composed of a range of hills, bare of trees, and which rise to the height of 680 feet above the sea. These hills are principally of granite, alternating with clay and slate, and their steep sides dip into the sea in every part, except at the NE. extreme of the island, where two low points converge so as to form a narrow creek, named Black Joke Cove, which shelters very small fishing vessels during the finest months of summer. Shelter may also be obtained in Lark Harbor, under Lark Island, and in Valley Cove at 2¼ miles SW. of that island; but none of these coves are considered safe early in spring or late in autumn, because of the heavy swell which rolls into them from the eastward.

The south side of Belle Isle affords no anchorage, and there is hardly a creek where a boat might find shelter.

A small rocky bank, with 5 fathoms least water, is reported to exist about 5 miles NW. by N. from the NE. extreme of Lark Island.

Rock.—A rock upon which the sea breaks heavily lies with the SW. extreme of Belle Isle bearing S. 31° E. (S. 5° W. mag.), distant ½ mile. It was estimated to have 9 feet water over it, and is probably identical with the dangers reported in 1881 by the steamer *Ontario*.

Lights.—The lighthouse erected on the south part of Belle Isle is a white circular tower, 59 feet high, and exhibits, at an elevation of 470 feet and between S. 76° W. (N. 68° W. mag.) and S. 70° E. (S. 34° E. mag.), a fixed white light, which is visible 28 miles.

In consequence of this light (from its great height) being frequently obscured by fog, another light is exhibited from a square white lighthouse, 31 feet high, situated below the old lighthouse.

This light is a fixed white light, elevated 137 feet, and should be visible 17 miles in all directions, except where intercepted by the high land of Belle Isle.

Fog Signal.—From a point near the upper lighthouse an explosive bomb, which will explode at a distance of about 500 feet in a southerly direction, high in the air, will be fired at intervals of twenty minutes during fog or snowstorms.

Vessels in the immediate vicinity may also hear a dull report, caused by the charge that throws the signal into the air preceding the loud report.

Provision Depot.—There is a depot of provisions at the lower lighthouse for shipwrecked mariners.

Northeast Ledge dries at low-water springs, and lies 1¼ miles N. by E. from the NE. point of Belle Isle; there is deep water in the channel between.

Strait of Belle Isle.—The eastern entrance of the Strait of Belle Isle, between York Point and Cape Bauld, is 26 miles wide, the latter point bearing from the former S. 43° E. (S. 7° E. mag.), but the narrowest part of the strait is southward of Amour Point, in Forteau Bay, where it is only 9¼ miles wide. The western entrance of the strait, between Greenly Island and Férolle Point, is nearly 21 miles wide, the point bearing from the island S. 11° E. (S. 24° W. mag.).

Outer Soundings.—During summer and autumn the route from Great Britain to Quebec through the Strait of Belle Isle is much frequented by steamers, and the bank of soundings lying eastward distant 28 miles from the north point of Belle Isle affords a valuable means of ascertaining the position of a vessel in foggy weather when approaching from the eastward.

The least water yet found on this bank is 86 fathoms, mud, with 105 to 181 fathoms, sand, between it and the bank which stretches eastward from Belle Isle.

The Soundings in the strait of Belle Isle are not so irregular but that they will afford assistance to a vessel at night, or during the fogs which so frequently prevail. The deepest water is on the Labrador side, as, for instance, from York Point to Red Bay, where, however, it is interrupted by the shallow water off Wreck Bay. It is also deep on that side, from Pinware to Forteau Bay, inclusive; but the line of deep water is not direct, nor continuous through the strait, and it is still more perplexing that there is as deep water within 2 miles of the dangerous Flower Ledges on the Newfoundland side, opposite Forteau Bay, as in any part of the strait. The depth of water varies in different parts from between 60 and 70 to 20 fathoms, and the nature of the bottom is as various as the depths, being sometimes of rock, and at others of sand, broken shell, pieces of coral, or gravel.

Tides and Currents.—The flood and ebb streams at Cape Bauld continue running NW. and SE. inshore 3 hours after high and low water; and at 6 to 7 miles NE. of the cape they continue running 5 hours after high and low water by the shore.

At Cape Norman the inshore streams run 2 hours after high and

low water by the shore, and in the center of the strait the stream runs 4 hours after high and low water.

Off Forteau and Sandy Bays the streams turn with the high and low water on shore, and turn quickly; in the center of the strait the stream runs one hour later. These streams, however, are not constant.

The flood comes from the northward along the coast of Labrador and also from the SE., from Cape Bauld to Cape Norman. The latter stream, there is reason to believe, is often turned off to the northward by Cape Norman, and the same thing takes place at Green Island, on the Newfoundland side, toward Greenly Island on the opposite side of the strait. There is, moreover, at times a stream running from the SW. for several days together along the west coast of Newfoundland. This stream occasionally sets from Férolle Point obliquely across the strait toward Forteau Bay. Sometimes, and especially with NE. winds, the current runs directly in an opposite direction along the west coast of Newfoundland from Férolle Point past Rich Point.

The current has the following characteristics in the summer season, as shown by observations throughout the months of July and September, 1894:

The current is fundamentally tidal in its nature, and under normal conditions turns regularly with the tide, and runs east and west with nearly equal velocities. The conditions are normal in moderate weather and during the prevalence of moderate westerly winds. At such times the current attains a velocity of about 2 knots per hour in each direction.

During heavy winds, especially when easterly or westerly in direction, the current which runs with the wind becomes stronger than the current against it; and eventually the current may become continuous in the same direction as the wind. It may thus run in the one direction for two or three days at a time. The greatest velocities of the current which were observed during heavy winds were $3\frac{2}{10}$ knots per hour from the east, and $2\frac{1}{2}$ knots per hour from the west.

There is little appreciable difference in the current at the opposite sides of the strait, except that toward the north side it may be a little stronger or more persistent in the one direction.

While normal conditions prevail the difference of flow in the two directions is in favor of a greater inward flow from the east. Also the actual flow throughout the year, when the influence of the wind is included, appears to be greater in the inward direction from the east than outward from the west.

The presence of icebergs in the strait and the temperature of the water have also a relation to the predominant direction of the current; but they can not be relied upon as affording an indication of its actual direction at the time.

From the above characteristics, it is clearly possible for a vessel to overrun her reckoning in either direction through the strait. Also, ves-

sels entering through the strait must not assume that the current is necessarily in their favor in making the run westward to round the eastern end of Anticosti, as the observations show that it is possible for the set in the strait itself, and also in the northeastern end of the Gulf of St. Lawrence, to be against them on that course.

Navigation of the Strait in Fogs.—From these remarks it will plainly appear that the navigation of the Strait of Belle Isle is attended with great danger in dark or foggy nights, during which no vessel should attempt to run through. On such occasions, therefore, it would be prudent to anchor in one of the bays on the north side of the strait, rather than to continue underway.

A sailing vessel bound in to the Gulf of St. Lawrence, and running with an easterly wind, will, however, find no place fit for that purpose until arriving at the indifferent anchorage of Pinware, for Red Bay can not be entered by a large vessel with an easterly wind.

Loup Bay is the first good anchorage under such circumstances, and there the vessel would be so far advanced in her passage through the strait that it would not be worth while to stop, since everything might be easily cleared in the remaining short distance. But with a SW. wind, at the approach of night, and appearance of fog, a vessel bound out through the strait to the eastward had better stand off and on under easy sail, tacking by the deep-sea lead from the Newfoundland side till morning, if not farther to the eastward than Férolle Point. If farther advanced, it would be better to make Forteau Bay before dark, and anchor there for the night. In light winds or calms, during dark nights or foggy weather, it is better to bring up with a stream anchor anywhere in the strait rather than to drive about with the tides, without knowing whither, but then a lookout must be kept for drifting icebergs.

Fogs occur with all southerly and easterly winds, and they are frequent likewise with SW. winds; it is only when the wind is from between the north and west that clear weather can be safely reckoned upon.

Ice.—The prevalent current from the northward comes from between Belle Isle and the coast of Labrador. It is often at the temperature of freezing point, bringing many icebergs into the strait and frequently carrying them as far as Natashquan, on the north shore of the Gulf of St. Lawrence. Some of these icebergs ground in deep water, whilst others are continually changing their positions. They are much more numerous in some seasons than in others; 200 icebergs and large pieces of ice were counted in the strait in the month of August one year, while there were not above half a dozen to be seen in the same month in the following season.

The strait is generally open to vessels from the latter part of June to the first part of November.

GULF OF ST. LAWRENCE.

QUEBEC.

(H. O. Chart No. 1105.)

General Observations.—The coast of the gulf, which will form the subject of this chapter, lies between Greenly Island and South Makers Ledge, near Cape Whittle, a distance of 128 miles.

The mariner is reminded that in shaping a course along the coast the variation of the compass alters half a point within the limits of this chapter, for which alteration due allowance should be made. Attention should also be given to the soundings.

There are several detached banks lying parallel to the coast at the distance of several miles. They are very irregular, and there is in general much deeper water between them and the north shore, and also southward for a great distance, or until the opposite coast of Newfoundland is approached.

Currents and Icebergs.—In navigating along this coast, the current in through the Strait of Belle Isle must be taken into consideration, and it should also be remembered that in addition to the permanent dangers of the coast drifting icebergs are frequently to be met with. There is a weak stream of flood from the eastward inshore and among the islands and an equally weak ebb stream in the contrary direction, but both are much influenced by the winds.

Aspect of Coast.—The coast between Greenly Island and Cape Whittle is exceedingly dangerous at night or in fogs, and even in daytime and fine weather it requires the intimate knowledge, possessed by the fishermen, of the position of every ledge or a good chart on a large scale to navigate along it with safety. The mainland and islands are of granitic rocks, bare of trees excepting in the heads of bays, where small spruce and birch trees are met with occasionally. When not entirely bare, the mainland and islands are covered with moss or scrubby spruce bushes, and there are many ponds of dark bog water frequented by waterfowl and flocks of the Labrador curlew. The mainland is broken into inlets and bays and fringed with islands, rocks, and ledges, which frequently rise abruptly to within a few feet of the surface from depths so great as to afford no warning by the lead. In some parts the islands and rocks are so numerous as to form a complete labyrinth, in which nothing but small egging schooners or shallops can find their way.

In general the mainland does not exceed the height of 500 feet above the level of the sea and is often very much lower, as are all the islands excepting Great and Little Mecattina. These two high islands, the High Land of Mecattina, 685 feet above the sea, and the Bradore Hills, are all very remarkable, and serve to point out to a vessel her position

from great distances at sea. Bradore Hills are three contiguous round-backed mountains situated inland 4 or 5 miles northeastward from the head of Bradore Bay. The NW. summit is the highest, being 1,264 feet above the sea, and the highest land on this coast.

Climate.—The climate is very severe, and the dangers are increased tenfold by the fogs which accompany the prevalent southerly winds. It is probable that the mean temperature of the year does not exceed the freezing point. The ice does not usually leave the coast before June, and young ice begins to form again in the pools and sheltered small bays in September, when frosts are very frequent at night. At midsummer only a very few of the earliest plants were found in flower, the grass had not sprung up, and the moss still retained the brown color of winter. Large masses of snow still occupied the ravines and hollows and the shaded northern sides of steep hills.

In the sheltered bays the temperature is much higher and the fogs less frequent than among the outer islands, whilst at the distance of 15 miles inland the water is said to be quite warm in summer and the country thickly wooded with spruce, juniper, birch, and poplar trees which grow in valleys, where the soil is of sandy clay, only the summits of the hills being of bare granite, like the coast.

Inhabitants and Productions.—There are a few Indians of the Montanes tribe, and a family or two of half-civilized Esquimaux occasionally visit the coast from the northward. There are deer (caribou), bear, wolves, foxes, martens, otter, beaver, and Canadian porcupines in the interior, most of which are hunted for their skins by the few inhabitants of the coast. The Canadian partridge and the ptarmigan, or willow grouse, are also plentiful.

The only permanent inhabitants are a few widely scattered families, residing at seal and salmon-fishing and fur-trading establishments, which are visited periodically by small schooners from Quebec. Seal and salmon are very plentiful. The establishments alluded to are at Bradore, Esquimaux Bay, St. Augustin Harbor, Little Fish Harbor, and Etamamu. These are the only places which could be relied on for much assistance by the crews of vessels which might be wrecked upon the coast. There is a family residing on the island between Bonne Esperance and Salmon Bay in summer, and in Old Fort Bay in winter, which might be added to the list. The remaining two or three families are very poor people, who seem just able to make an indifferent livelihood by hunting and fishing.

Codfishery.—Codfish are abundant on the coast, especially to the eastward of Mistanoque. The fishery for them is carried on not only by resident inhabitants, but by schooners which visit the coast every summer.

Greenly Island (Ile Verte) consists of two hillocks joined by a plateau between two coves, the northern being 84 feet high and the southern 63 feet high. The north shore is bold, but off the south extreme

are a rock that dries at low water and shoals that together extend ¼ mile in a SW. direction. A large fishing establishment is situated in the eastern cove. Greenly Island is the resort of myriads of puffin, which appear suddenly in June and disappear as suddenly in October.

Light—On the southwestern slope of the southern hillock on Greenly Island is an octagonal tower, 78 feet high, with keeper's dwelling attached, and the whole painted white. From this tower, at an elevation of 108 feet, is exhibited a revolving light, showing white for half a minute, then red for half a minute, and again white for half a minute; the light is then eclipsed for one and a half minutes, the revolution thus occupying three minutes. This light is exhibited from April 1 to December 15 of each year, and should be visible 15 miles in clear weather.

Fog Signal.—A horn, about 1,064 feet from the lighthouse, sounds blasts of ten seconds' duration, with an interval of eighty seconds between each blast, during foggy weather and in snowstorms.

Sandy Bay.—The coast from Grand or Long Point, about 1½ miles NNW. of Greenly Island, trends northward for ½ mile to another rocky point, beyond which is Sandy Bay, on the south side of which are a few houses and a small chapel, with a flagstaff near it.

Perroquet Bank, with 4¼ fathoms over it, lies S. 68° W. (N. 77° W. mag.) 1¼ miles from Grand Point.

Perroquet Island, 61 feet high, is of small extent, and is faced by cliff on the SW. side, which is fairly steep-to. The other sides are foul for a distance of 200 to 400 yards. Numerous puffin resort here during the summer months.

Bradore Bay and Harbor are formed by the shore trending northward from Sandy Bay, by the Island of Ledges and other islets and rocks. The bay is not difficult of access in moderate weather, but is not suitable for vessels of heavy draft, as the anchorage space is exposed to the heavy sea that rolls in with southerly winds. Except for vessels able to enter Frigate Harbor, or during strong easterly winds, the anchorage is inferior to that of Blanc Sablon to the eastward.

The land eastward of the shore line is, for some distance, flat and marshy, with several large ponds; beyond this it rises, in sandstone terraces, to a rocky flat-topped knoll, 297 feet above high water.

Two streams, separated by a bluff peninsula, run into the northern part of Bradore Bay, the western of which is marked by a waterfall, and at 2⅜ miles westward of the peninsula is a large waterfall that is conspicuous from seaward.

The land westward of the peninsula rises to a chain of bare stony hills nearly 500 feet in height, behind which are several ponds. Numerous islands and ledges front this part of the coast, between which and the Labrador shore there are narrow and shallow channels.

Island of Ledges (Basin Island) is about 54 feet high, and is separated from the Labrador shore by a channel nearly 1,200 yards wide. Off its eastern side there is a chain of small islands, which are steep-to

toward the channel, but between them and the large island there are depths from 6 feet to 3 fathoms water only. Numerous islets and ledges lie off the western and southern sides, making it dangerous to approach within a distance of 1¼ miles.

Several rocks and shoals lie between Island of Ledges and the Labrador coast to the northward, all of which break heavily in bad weather, and no vessel should attempt to enter the harbor north of this island under any circumstances.

Frigate Harbor lies at the NE. extreme of the Island of Ledges, and on its shores are a few houses and fishing stages. The water is sufficiently deep, but the anchorage space is very small.

The Basin lies southward of Frigate Harbor, and contains a fishing establishment connected with that at Blanc Sablon. This harbor is suitable for small vessels only.

Gull Rock, which dries at low water, lies nearly midway between the Labrador shore and the islets off the SE. extreme of the Island of Ledges. Shoal ground extends 100 yards southward from it, and there is a rock with 6 feet water over it at that extreme. A ledge with 3¾ fathoms water on it, and 250 yards in length, extends ¼ mile southward from Gull Rock, and East Rock, with 4½ fathoms water over it, lies almost south ½ mile from it. Greenly Island lighthouse, bearing S. 32° E. (S. 3° W. mag.), well open westward of Perroquet Island, leads southwestward of East Rock.

Bull Rock, on the western side of the channel to Bradore Bay, lies 360 yards from the SE. extreme of Island of Ledges, and is 3 feet above high water. From it a shoal extends southward 400 yards, with a depth of 16 feet at the extreme.

Directions.—Approaching this part of the coast of Labrador from the westward, Bradore Hills, several conspicuous summits attaining an elevation of 1,264 feet, will be easily recognized. When Greenly Island with its lighthouse becomes visible, steer for it until Perroquet Island is distinctly made out. Pass ¼ mile westward of it, and keeping Greenly Island bearing S. 32° E. (S. 3° W. mag.) well open of its west extreme, proceed toward Bull Rock, which is easily distinguished. Then pass eastward of the chain of islets off the east side of Island of Ledges, and if wishing to anchor in Frigate Harbor, stand in between Pigeon Islet, the rocky islet 19 feet high forming the northeasternmost extreme of the chain, and Green Island, the next one south. Large vessels, however, should pass northward of Pigeon Islet, taking care to avoid the shoal which extends nearly 200 yards northeastward of it, and anchor as convenient.

In bad southerly weather a heavy swell rolls in between Gull and Bull Rocks, and vessels would then find better shelter and an anchorage easier of access in Blanc Sablon Bay.

Tides.—It is high water, full and change, in Bradore Bay at 10h. 35m.; springs rise 4¾ feet, and neaps rise 2¾ feet.

Aspect of Coast.—The country separating Belles Amours, Middle Bay, and Five Leagues Harbor is very remarkable. Low granite, on which are ridges of bowlders, with coarse grass and moss, extends several miles seaward from the range of steep granite hills, 400 or 500 feet high, which trend westward from the head of Bradore Bay. This low country has a green and alluvial appearance from the sea; and it is not until a near approach to it that the shores are seen to be of rock and bowlders.

Belles Amours Point will be easily recognized, being a mound of bare granite, 60 or 70 feet high, at the SE. extremity of the low peninsula separating the harbor of the same name from Middle Bay.

Belles Amours Harbor.—Stony Point, which is low and green, and Flat Rocks, which lie 1¼ miles southeastward of it, form the east side of the channel between them and Belles Amours Point, leading northward to Belles Amours Harbor, in which a number of vessels may lie quite landlocked.

Shoal.—Nearly midway between Belles Amours Point and Flat Rocks lies a rocky patch with 13 feet least water. Between this patch and the point there are other patches with 3½ fathoms, which is as much water as can be counted on through the western passage.

Niobe Shoal.—A dangerous shoal lies about 400 yards to the southwestward of Flat Rocks, on the eastern side of the East Passage, into Belles Amours Harbor. There are 4½ fathoms on the edges of the shoal, with 15 and 11 feet within, and 17 fathoms outside this depth. From this position, the rock inside Harbor Point was touching the point.

The soundings are extremely irregular and the ground foul in the East Passage.

Harbor Point is about 1½ miles within Belles Amours Point, and on the west side is a bare granite hill, about 150 feet high, with several beacons of stones upon it, which are erected upon almost every hill, and are said to be for the guidance of travelers in winter. The shore between these points incloses a large and shallow pond, the center of which is within Pond Point. The shoal water extends off on this side 300 yards from the high-water mark. The north side of Harbor Point is of sand, extending (together with a flat which dries at low water) partly across the inner entrance of the harbor. Between this flat and the high and bold rocky shore to the northward the narrowest part of the entrance of the harbor is 200 yards wide, with 6 fathoms water in it, over muddy bottom. Northward of Harbor Point, about 160 yards, there is a small rock always above water; at 200 yards farther out in the same direction lies another small rock which dries only at low water. There is no passage for vessels of any size between these rocks and Harbor Point. The entrance is to the northward and westward round these rocks, and between them and the mainland to the northward. On the east side of the entrance the shoal water and large stones extend from Stony Point northward to the point of North Cove, which is only fit for boats. That side must therefore be avoided.

Water may be obtained in the NW. corner of Belles Amours Harbor, and also from a considerable stream at the head of North Cove, where there are a few trees; but wood for fuel is very scarce on this coast.

Directions.—To enter Belles Amours Harbor by the eastern passage, steer N. 48° W. (N. 13° W. mag.), so as to pass ½ mile to the westward of the Flat Rocks. Continue this course until the east side of Harbor Point is approached within 200 yards; then steer N. 35° W. (north mag.) till the sandy part of the point is opened out, or the vessel is abreast of the rock above water off it, when she must haul a little to the westward, so as to bring the east side of Harbor Point and Pond Point in one. Keep them in line, in order to round the north extreme of the flat, until Mark Point (the extreme on the west side within the harbor) comes on with Peak Point (a rocky point in Middle Bay), seen over the low land at the head of the harbor, and bearing S. 52° W. (S. 87° W. mag.). As soon as this mark comes on, haul sharp round to the westward, keeping at a less distance than 200 yards from the high north shore until the vessel is well within the sandy spit, when she may haul to the southward and anchor anywhere, the bottom being of mud and the depth from 5 to 7 fathoms.

To enter by the western passage, which is preferable with a westerly wind, approach Belles Amours Point on a bearing nothing to the eastward of N. 32° E. (N. 67° E. mag.), and take care not to shut in Stony Point behind it for fear of Middle Ledges. Pass Belles Amours Point at a distance of 400 yards, and go no nearer the shore on that side until past Pond Point; then proceed as before directed. As soon as the marks come on for hauling into the harbor to the westward, put the helm down and shoot the vessel in as far as she will go; then let go the anchor and warp in the remainder of the way. It is only with southeasterly winds that a vessel can sail in. The bottom is good for anchoring outside Harbor Point, but not outside Stony Point.

Tides.—It is high water, full and change, at Belles Amours Point at 9h; springs rise 4½ feet and neaps 2½ feet.

Middle Point, which has several rocks off it 200 yards westward and southward, lies WSW. rather more than 1½ miles from Belles Amours Point. The former is the SW. and the latter the SE. extreme of the peninsula of low land separating Middle Bay and Belles Amours Harbor.

Middle Ledges lie southwestward of Middle Point. Several of these ledges dry at low water, but the outermost, which is 1,200 yards off shore, has 15 feet least water on it. There is no safe passage between these and the shore.

Five Leagues Point, 1½ miles west from Middle Point, is the SW. extreme of another low but smaller peninsula, separating Five Leagues Harbor from Middle Bay. On this peninsula, ¾ mile N. by E. of the extremity of the point, there is a remarkable isolated and precipitous

hill nearly 200 feet high, which marks the position of Five Leagues Harbor from the westward.

Leagues Reef, off Five Leagues Point, is partly above water, and extends ¼ mile southward.

Barrier Reefs extend 1⅞ miles southwestward of the same point, but are not joined to it. The south extremes of Middle and Belles Amours Points in line, bearing N. 66° E. (S. 79° E. mag.), lead ¼ mile southward of Barrier Reefs.

Middle Bay is a fine open roadstead, free from all danger, more than one mile wide, and extends 2 miles to the northward. For the first mile in, the shore on either side should not be approached nearer than 300 yards, but farther in it is quite bold, excepting in the heads of the coves. The depth of water in this bay is from 4 to 13 fathoms, over sandy bottom. Middle Ledges and Barrier Reefs are the only dangers in the way of vessels approaching Middle Bay from the east or west.

Anchorage.—The usual anchorage in Middle Bay, in easterly winds, is outside of Isthmus Cove, in 10 fathoms, sand bottom, and off West Cove in westerly winds, and vessels shift from one to the other as the wind changes. As there are no islands off this bay, and as it is sufficiently roomy for large vessels to beat in and out, it affords a very convenient occasional stopping place for vessels. It is the only open roadstead on this coast.

Shallop Cove is on the east side of Middle Bay, ¾ mile within Middle Point; it is sheltered by two or three small islets close to the shore, and is only fit for boats.

Peak Point.—About the same distance farther in, on the same side of Middle Bay, is Peak Point, high and of granite. This point is forked, its south extremity is a ragged, isolated mound or peak, and off its west side, at the distance of 300 yards, there is a large rock above water.

Isthmus Cove, with a depth of 3 fathoms water, over mud bottom, is ESE. of Peak Point. It is a small place, in which two or three fishing vessels are occasionally moored, under a reef which extends from the south side of the cove northward toward Peak Point. The reef affords indifferent shelter with SW. winds, which blow right in with a heavy sea. The entrance between the reef and Peak Point is only 140 yards wide; neither is there much more room between the reef and the shore to the eastward.

To enter Isthmus Cove, Peak Point must be kept close aboard, and when the vessel is 100 yards past it to the eastward, haul her sharp round to the southward between the reef and the shore. The part of the cove which runs to the northward of Peak Point is quite shoal. From this cove to Belles Amours Harbor, across the low isthmus, the distance is less than ½ mile.

West Cove is one mile within the entrance on the west side of Middle Bay. Its head is separated by a low and swampy isthmus from

Five Leagues Harbor. In the mouth of this cove, in 4 fathoms, is the anchorage with westerly winds. A shoal with 3 fathoms water on it lies 300 yards southward of the north entrance point of West Cove.

Water may be obtained in Isthmus Cove, as well as in the head of Middle Bay, where there are a few small trees.

Five Leagues Harbor is altogether unfit for anything larger than a schooner of 100 tons; it is ½ mile deep, with 2¼ fathoms water, and is ¾ mile northwestward of Five Leagues Point. SW. winds roll in a considerable swell, and there would be no lying there if it were not for the indifferent shelter afforded by Barrier Reefs off its mouth. The channels leading in are about 600 yards wide, and on either side of Barrier Reefs, either from the southward through Eastern Entrance, between them and Five Leagues Point, or from the westward through Western Entrance, between them and the shore to the northward.

Directions.—The course into Five Leagues Harbor, through Eastern Entrance, is north (N. 35° E. mag.), passing 200 yards southwestward of Five Leagues Point and its reef. Two small rocks, which just cover at high water, lie southward of the South Point of the harbor, which is a rocky islet joined to the shore when the tide is out. The outermost of these rocks is 320 yards from the point. Leave them both to the NE., passing between them and the west point of the harbor, which is 400 yards from them. As soon as the vessel is past these rocks the harbor will open to the northeastward, and she must haul into it, passing midway between South Point and a large rock above water, 300 yards W. by N. from the point. Anchor in the middle, 200 yards within the entrance; for although there is water enough nearly to the head of the cove, and the anchorage is more secure farther in, yet it becomes too narrow for a stranger, and would require the vessel to be moored head and stern.

To enter Five Leagues Harbor by Western Entrance, being to the westward of Barrier Reefs, stand in to the northeastward till the harbor is seen to open, bearing nothing northward of N. 45° E. (N. 80° E. mag.). Steer directly for it, and as soon as the vessel is within the western of Barrier Reefs, two ledges will be seen just under water, and several small islets on the side of the mainland. The ledges will be nearly ¼ mile to the northwestward, or on the port hand, but the course will lead within 200 yards of Bis Islet, which is by itself, quite bold, ¼ mile off shore, about one mile from the entrance of the harbor, and opposite the center of the Barrier Reefs. Pass the west point of the harbor as close as is requisite, continue the course right in, and anchor as before directed.

There is also a channel ¼ mile wide between the two Barrier Reefs, but they overlap in such a way as to make it difficult for a stranger. The two reefs cover an extent of 1¼ miles in a NE. direction. There are parts of each of them that dry at low water, and the sea almost always breaks on them.

Salmon Bay.—Salmon Islet is WSW. 3¾ miles from Five Leagues Point, and lies close to the SE. extreme of Caribou Island, off which the shoal water extends nearly 800 yards eastward. Caribou Island is 220 feet above the sea, but it can not be distinguished from the mainland in a vessel off the coast. Between this island and the mainland eastward of it is the eastern entrance to Salmon Bay, 200 yards wide, but with a depth of only 6 feet in it at low water. The other entrance to this deep bay is from Bonne Esperance Bay round northward of Caribou Island.

There is plenty of water by the latter route, and also in the bay, which runs inland several miles NNE.; but as a vessel will be already in a harbor before she arrives at the navigable entrance of this bay, further remarks respecting it are not necessary.

Caution.—An inspection of the chart will show that soundings in moderate depths of water extend sufficiently far off shore everywhere between the Strait of Belle Isle and Salmon Bay, to warn a vessel of her approach to the coast at night or in foggy weather.

Esquimaux Islands.—The mainland has hitherto formed the coast line, but at Salmon Bay the islands commence, and continue 14 miles. They are of all shapes, sizes, and heights (less than 200 feet), and run in order westward, under the names of Esquimaux, Old Fort, and Dog Islands. They are bare of trees, excepting some of those which are far in near the mainland. Off these islands, lie many small rocks and ledges, the outermost of which are fully 4 miles from the mainland. To attempt to describe all of these islands, or all the channels between them, would be useless; and a good chart, upon a large scale, will be far more useful than any written description.

Whale Island, the southeasternmost of Esquimaux Islands, is the southernmost of all the islands; and, in consequence, shows as the extreme to vessels close in with the coast, either to the eastward or westward. It is about ¾ mile long and about ¼ mile broad. It does not exceed 100 feet in height in the highest part which is a round hill near the center of the island, on which there is a conical beacon, 30 feet high. (Blown down, 1897.)

All vessels bound to Bonne Esperance Harbor endeavor to make this island. Whale Reef, comprised of rocks, both above and under water, extends 600 yards off the south point of Whale Island; but off its north point the shoal water reaches only 70 yards. Southwest Ledge, with 9 feet water, lies S. 51° W. (S. 85° W. mag.), 700 yards from the SW. point; and there are several rocks, dry at low water, lying 200 yards off shore, on the east side of the same point.

Bonne Esperance Harbor.—From Salmon Islet, the south point of Whale Island bears S. 45° W. (S. 79° W. mag.) 4½ miles. Within this line, lie the islands which form Bonne Esperance Harbor. Being very steep, and of bare granite, the largest of these islands look much higher than they really are; an effect which is also owing to the con-

trast of the much lower islands westward of them. There are beacons, or piles of stones, upon almost every summit.

The Main Channel leading to this harbor is between Goddard and Beacon Islets; Goddard Islet being the westernmost of two low islets joined by a reef to the SW. extreme of Caribou Island.

Bold Rock, at the end of a reef extending 270 yards off the south point of Goddard Islet, is small, always above water, and quite bold. Goddard Rock, which is also small, and dries only at low water, bears S. 34° E. (south mag.) 700 yards from the same point. These are the only dangers on the eastern side of the channel. On the western side Beacon Islet, which is low, about 250 yards long, and with a pile of stones on its summit, will be seen bearing S. 38° W. (S. 72° W. mag.), nearly a mile from Goddard Islet. Tail Islet lies 600 yards to the south, and Link and another low islet to the northward of Beacon Islet, but they are out of the way. To the southwestward of Beacon Islet, and distant ¾ mile, is Red Head Island, from which Whale Island bears S. 32° W. (S. 66° W. mag.), and is distant nearly a mile. Fish Islet, a large, low rock, lies south of Red Head Island.

Within Red Head Island, and lying in a line to the northward, are Chain and Bonne Esperance Islands, the former being two peninsulas, joined together by a narrow stony isthmus, and the latter being 150 feet high and ¾ mile long. Lion Island is ¼ mile to the eastward of Bonne Esperance Island, and there is a low islet and a narrow and difficult 3-fathom channel between them. Off the east side of Lion Island, and at the distance of 100 yards, lies Whelp Rock, always above water. Between this rock on the west and Goddard and Caribou Islands on the east, may be termed the inner entrance from the Main Channel; it is 900 yards wide, and has from 10 to 13 fathoms water, over rock, sand, and mud bottom.

Western Side.—Watch Rock, small, and always shows, lies ¼ mile northeastward of Beacon Islet, and at the same distance northward of it and eastward of Link Islet lies Breaking Ledge, which just covers at high water. The only other dangers are two 4-fathom patches, the easternmost of which (Middle Patch) bears S. 30° E. (S. 4° W. mag.) ⅜ mile from Beacon Island, and the other (Whale Patch), N. 72° E. (S. 74° E. mag.) ¾ mile from the beacon on Whale Island. There is foul and rocky ground, with from 5 to 10 fathoms between these patches, which may be avoided by a vessel approaching the harbor from the westward, by not coming into a less depth than 10 fathoms until the leading marks for hauling into the harbor come on.

Wood and Water may be had in abundance from the mainland, but not from the islands.

Tides.—It is high water, full and change, at Bonne Esperance Harbor at 9h. 15m.; springs rise 5 feet, neaps 2½ feet.

Directions through Main Channel.—Being off the coast to the eastward, and with an easterly wind, stand in toward Caribou Island, the

position of which with respect to Whale Island has been pointed out. When at the distance of ½ mile from the south side of Caribou, the vessel will be in 10 fathoms water, and the south sides of Beacon and Red Head Isles and the north side of Fish Islet will be seen to come in line, bearing S. 60° W. (N. 86° W. mag.). Bear up upon this leading mark, or, if not sure of the island, steer S. 56° W. (west mag.) with the lead going and a good lookout for Goddard Rock. The depth will be about 9 fathoms at low water until the vessel is past that rock, when it will deepen suddenly into 15 or 19 fathoms, and she will then be in the channel.

The vessel must now haul in immediately N. 20° W. (N. 14° E. mag.), and Whelp Rock will be seen right ahead, and in line with the west side of House Island, which is low, has a house upon it, difficult to be seen, and lies close under the mainland at about a mile from Lion Island. Run in upon this mark or bearing, and when past Bold Rock, haul a little to the eastward, so as to give the Whelp a berth of 200 yards. As soon as the vessel is within this rock, bear up S. 77° W. (N. 69° W. mag.), and run along the inner sides of Lion and Bonne Esperance Islands, passing between the latter and Anchor Island into the harbor, between Bonne Esperance and Grand Islands, and where the depth is from 12 to 16 fathoms, over muddy bottom.

Being to the westward with a westerly wind, pass the south point of Whale Island at ½ mile, steering none to the northward of N. 45° E. (N. 79° E. mag.), to avoid the 4-fathom patches, until Whelp Rock and the west side of House Island are brought in line bearing N. 20° W. (N. 14° E. mag.); then haul in upon that bearing, and proceed as before, excepting in case of the wind not being free enough to allow of passing between Bonne Esperance and Anchor Islands. In this case, a vessel must go round to the northward of Anchor Island, and must not haul up higher than N. 61° W. (N. 27° W. mag.), nor close in the Whelp Rock with the SW. extreme of Goddard Island until she is past Anchor Reef, which covers at high water, and lies 400 yards to the northeastward of Anchor Island, and is the only detached danger within the bay.

Whelp Rock, in line with the west extreme of Goddard Island, clears the shoal water round this reef at the distance of 100 yards. As soon as Anchor Reef is passed, a vessel may haul to the wind, and minding that shoal water extends 300 yards northward of Grand Island (the high and large island next westward of Bonne Esperance Island), she may make a tack into the harbor or anchor anywhere in the bay, where, although the depth of water is inconveniently great, yet the bottom is everywhere of mud, and the shelter complete in all winds. In short, the whole of Bonne Esperance Bay may be considered as a harbor, in which there is room for a fleet of ships of large size.

Shallop Channel.—The outer channels into Bonne Esperance Harbor require only a brief notice. Shallop Channel, between Bonne

Esperance and Grand Islands, is very narrow, and has only 2 fathoms in it at low water. It may be approached from either side of Whale Island, passing Fish Islet, and then keeping the western sides of Red Head, Chain, and Bonne Esperance Islands close aboard into the harbor.

Esquimaux Channel leads direct to the eastern entrance of Esquimaux Bay; it should be approached through Whale Channel, between Whale and Tent Islands, the latter island being the next westward of the former. Whale Channel is ¾ mile wide, and has a depth of from 10 to 18 fathoms water.

The course through the center of Whale Channel to the entrance of Esquimaux Channel is N. 4° E. (N. 38° E. mag.). Esquimaux Channel is between Grand and Fair Islands on the east, and Spit and Stone Islands on the west; between the inner islands (Fair and Stone) is the narrowest part, only 150 yards wide, and with 5 fathoms water. In passing through this, the equally narrow entrance to Esquimaux Bay will be seen, and the vessel must stand close over to it before she hauls to the eastward through Northwest Channel into Bonne Esperance Bay. Then keeping within 200 yards of the main shore, to avoid the shoal which extends from Fair Island fully halfway across the channel, she should steer for the south side of the small and high Star Island, and passing close to it, continue her course toward Anchor Island till past the shoal, which extends 400 yards off Grand Island, when she may haul to southward into the harbor. Esquimaux Channel is the only other besides Main Channel which has water enough for large vessels, but it is too narrow for vessels of ordinary size, excepting in cases of emergency.

West Channel, lying between Spit and Stone Islands on the east, and Esquimaux Island proper on the west, has a bar with only 2 fathoms water across from Stone Island to a point on the western side of the east entrance to Esquimaux Bay.

Esquimaux Bay.—Esquimaux Island lies in the mouth of Esquimaux Bay. There are many islands outside of it, and it can not be distinguished from the mainland in a vessel off the coast.

The eastern entrance to Esquimaux Bay is by a very narrow channel between the island and mainland to the eastward. This channel continues for 1½ miles northward, and then opens into a wide space with two islets in it. But if the mainland to the eastward be followed, it will lead to the entrance of Esquimaux River, where a house and trading post will be seen on a sandy point, backed with spruce trees on the west side, and rather more than 2 miles from Esquimaux Island. The river is navigated by canoes for many miles inland, and abounds with salmon.

Only small schooners can pass through the narrow channel between Esquimaux Island and the main to the eastward, but there is water enough for larger vessels westward of the island. The chart must be

referred to for this route, for it would be quite impossible to convey any intelligible idea of such an intricate navigation through such a multitude of islands.

There is a channel with 3 fathoms water in the shallowest part, and in general with a great depth of water, between the islands and the main, from Bonne Esperance Bay to Mistanoque Harbor; but it can only be shown on a chart upon a large scale; no written description would be of any avail.

Old Fort Bay.—Fort Rocks are a number of low rocks extending nearly a mile southward from the south point of Old Fort Island, which is of a very moderate height, and about 1½ miles in diameter. From this island a number of smaller islands extend northward into the mouth of Esquimaux Bay. There are also a number of steep and high islands extending northwestward from Old Fort Island across the bay of the same name. There are deep-water channels leading to Old Fort Bay between the islands last mentioned, but too intricate for a written description to be useful.

Old Fort Channel leads in from sea between the Fort Rocks and Mermot Islet, and farther in between Old Fort Island and Channel Island, which last, together with Crumb Island to the northward, must be kept close aboard until a vessel is in the wide and open space within the islands and off the mouth of Old Fort Bay. This wide opening through the outer islands is the only navigable one besides Whale Channel. Through it vessels may run in between the islands in the way just mentioned, or westward between the Dog Islands and the main; but this must be left to the chart to explain. In some places between the islands there is more than 50 fathoms water, and the nearer the main the fewer the ledges.

Dog Islands.—Northwestward of Mermot Islet is the Eider Group, and westward of them the Dog Islands, surrounded by rocks and innumerable ledges. The southwesternmost of the Dog Islands are very low, but the highest islands next the main, although small, are of considerable elevation. There is good anchorage between them and the main, but it can only be got at easily by running down with a westerly wind from Shecatica Island, close along the mainland, and in the channel between the latter and the scattered rocks and ledges which lie off it, where there is very deep water the whole way.

Porpoise Rocks, the southernmost of which is 1¼ miles from the shore, are three small black rocks above water, lying S. 78° W. (N. 68° W. mag.), 4 miles from the outermost of Dog Islands, and an equal distance in the same direction to the Boulet. A sunken rock lies ¼ mile westward of the northernmost rock, and a shoal with 3½ fathoms water over it lies ¾ mile N. 42° E. (N. 76° E. mag.) from the southernmost rock

The Boulet, about 250 yards in diameter, is a smooth round islet, green at the top, and about 70 feet in height. Together with the open-

ing to Lobster Bay, which is N. 36° E. (N. 70° E. mag.) 1¼ miles from it, it serves to point out the position of a vessel off the coast. Crab Island is ½ mile WNW. from it, and Four Rocks (within which is Inner Islet) 3 miles WSW. These are the only islets between it and Shecatica Island; but there are many rocks and ledges between them, and also off the Boulet to seaward.

Peril Rock, which is very small, dries at half tide, and lies 1⅛ miles S. 12° E. (S. 22° W. mag.) from the Boulet, is the outermost and greatest danger off this part of the coast; the sea, however, almost always breaks upon it, and also upon the others which lie between it and Four Rocks. There is no warning by the hand lead in approaching any of these rocks.

Rocky Bay, one mile eastward of Lobster Bay, extends NNE. 1¾ miles, and is about 250 yards wide, between steep and high rocky shores. There are 39 fathoms water in its entrance, but the depth soon diminishes to 16 fathoms, and then shoals gradually to its head. One mile within the entrance, on the SE. side, there is a house and fish stage at a small cove in which small vessels anchor in 5 fathoms, mud bottom, well sheltered from all winds. A small stream enters the head of this bay.

Lobster Bay is a narrow inlet extending 4 miles N. by E., and quite open. It is about 400 yards wide, between high and steep rocky shores. In the entrance there is a depth of 35 fathoms water, diminishing to 14 fathoms halfway up; after which there is anchorage quite to the head, with muddy bottom everywhere, but it is completely exposed to SSW. winds. Several very small streams enter the head of the inlet. There are two small islets close off the east point of the entrance of Lobster Bay; a vessel must pass westward of them in going in.

Napetepee Bay is a straight and narrow inlet, very similar to Lobster Bay. Its entrance is abont 1¼ miles northward of the Four Rocks, which, together with the Inner Islet just within them, must be left to the eastward in approaching this bay. In entering Napetepee Bay a vessel must pass 200 yards westward of some rocks above water, lying just within the mouth of the bay. At 1½ miles, within the entrance, there is a small islet; pass westward of it, when the east shore must be kept close aboard until through the Narrows. Several small streams run into this bay, but the principal stream is on the east side, ¾ mile from its head, and is the outlet of a considerable lake, which can not easily be entered by boat excepting at high water. A river abounding with salmon enters this lake.

Directions.—The three bays just described have no dangers in them, but they are, nevertheless, by no means desirable places for vessels to go into, being so narrow and having such deep water. Besides, a sailing vessel can not get out of them without a northerly wind, which in the summer months seldom occurs. Lobster and Rocky Bays are preferable to Napetepee, and the safe and proper way of approaching them

is from the westward, with a westerly wind, passing inshore between Shecatica and the Four Rocks, and then eastward close along the mainland.

The Inner Channel, between the islets and the mainland, is not less than 600 yards wide, and the depth of water is from 33 to 48 fathoms, over muddy bottom. This deep-water channel, close along the mainland, free from all dangers, continues eastward all the way to the Dog Islands. Vessels might pass between the latter and the Porpoise Rocks in clear weather, when shoal water could be readily seen, and when there is a sea running heavy enough to break upon the ledges, but the other is the safer plan of proceeding.

Coast.—The NE. point of Shecatica Island lies west 1⅛ miles from Four Rocks. The mainland from Dog Islands to Shecatica Island is of steep granitic hills (not exceeding 300 feet in height), with deep water close into the rocks, and with only the few small islets and ledges off it which have been mentioned.

Shecatica and Mistanoque lie close to the mainland, and would be difficult to distinguish from it if it were not for the Boulet and the opening of Napetepee to the eastward, and the Shag Islet to the southwestward. Shecatica is the eastern, the smaller, and the higher island of the two, being ½ mile long and 150 feet high.

Mistanoque Island, separated from Shecatica by an unnavigable channel 300 yards wide, is nearly 1¼ miles long, parallel to the coast; broken into coves on the outside, and in the highest part 120 feet above the sea. It lies across the entrance to Mistanoque Bay, the mouth of which is about 300 yards wide, with a depth of 23 fathoms in the entrance, expands to the breadth of 550 yards within, and runs inland rather more than 3 miles northward. It is not until a vessel arrives within less than ½ mile of its head that the depth decreases so as to be convenient for anchoring. The bottom is everywhere of mud; there are no dangers, and wood and water are plentiful.

Mistanoque Harbor, directly opposite the mouth of the bay, is a small bay on the north side of Mistanoque Island, in which the depth is from 15 to 20 fathoms, mud bottom. Vessels may, however, anchor in less water a short distance eastward, between the island and the east point of the bay, where the depth is 12 fathoms, but the channel is there only 160 yards wide. Vessels must moor in any case.

Mistanoque Harbor, though small and with inconveniently deep water, is nevertheless a valuable harbor on a coast where good ports, fit for large vessels, are so scarce. The absence of dangers outside, the easy and immediate access, in either of the prevailing winds, in consequence of its having two entrances, are advantages possessed by none of the other small harbors to the westward, which may be equal to it in other respects.

Enter Island lies nearly ½ mile southwestward of Mistanoque Island, and 400 yards farther is Diver Island, from which a reef of rocks extends

270 yards southward. Both these islands are low. Northwest of them 800 yards lies a group of small islands. West Passage to Mistanoque Bay is between this group and Diver and Enter Islands.

Directions.—There is nothing immediately outside or off Shecatica, Mistanoque, Enter, or Diver Islands, so that no other directions seem necessary than to run through the center of either passage which may be preferred. South Passage, between Enter Island and the west shore of Mistanoque Island, is, however, the best channel, being 800 yards wide, with upward of 40 fathoms water in it, and bold to the rocks on either side. On arriving at West Passage, which is about 100 yards wide, with 9 fathoms water in it, give the NW. point of Mistanoque Island a berth of 100 yards or keep well over to the mainland side of the entrance; but as soon as the vessel has entered this narrow channel, keep Mistanoque Island aboard, because there is shoal water off the west side of the entrance of the bay to the distance of 60 yards.

In entering from the eastward, East Passage between Shecatica Island and Four Rocks, which are quite bold, is more than one mile wide, with very deep water; but the NE. point of Shecatica Island must be given a berth of 200 yards until the channel between it and the main opens, bearing S. 78° W. (N. 68° W. mag.), for there are rocks off that point to the distance of 60 fathoms. The NW. point of Shecatica Island (on which there is the hut of a seal fisherman) must be kept close aboard, within the distance of 20 or 30 yards, for there is shoal water across a very small bay of the main opposite to it. The channel here being only 60 yards wide and having only 3 fathoms water in it, this East Passage is only fit for small vessels.

Tides.—It is high water, full and change, in Mistanoque Harbor at 10h. 30m.; springs rise 6 feet and neaps 3 feet.

Shag Islet, bearing S. 44° W. (S. 78° W. mag.), 7½ miles from Mistanoque, is the best guide for making the latter from the westward, as the Boulet is from the eastward. Shag Islet is small and high, with a round peaked hill looking green in the middle. There are many rocks off to the eastward of this islet, the outermost of which, distant from the islet 2 miles, is Shag Rock.

Coast.—The coast between Mistanoque and Cape Mecattina is broken into large bays and inlets, between large islands of moderate height above the sea, and partially covered with moss. Many smaller islands, islets, and rocks are interspersed, and outside all the coast is lined with small islets, rocks, or ledges, in groups, or scattered here and there. The greatest difficulty is to pass safely through between the last, for within the islands, in most of the channels and wide spaces between them, as well as in the bays of the mainland, there is a great depth of water, amounting in one or two places to 50 or 60 and often exceeding 30 fathoms. In these deep-water channels and bays, which are so intricate as to prevent any attempt at a written description, small rocks are not nearly so numerous as they are outside, and are for the most part above water.

From Shecatica Bay to Ha-Ha Bay the mainland does not appear, as

the islands, great and small, and of different heights above the sea, are so numerous and so near together that the coast can not be distinguished till a vessel is among them.

Cumberland Harbor, the entrance to which is between Cumberland Island on the east and Dukes Island on the west, is known by a high hill on the mainland about 10½ miles NNW. from the entrance. That hill is the highest in the neighborhood, and resembles a castle at the top, having steep cliffs like walls. The islands forming the harbor are of moderate height, the easternmost making in two round hills. This is an excellent harbor, the best and easiest of access on the coast. Good water can be had in plenty on the east side of the harbor, but for wood you must go up Shecatica Bay, which lies 3 or 4 miles northeastward of the harbor, and runs inland to the northward many miles.

Directions.—Cumberland Harbor should be approached from between Shag Rock and Three Rocks. There is no danger in the way but what appears above water, excepting a small rock lying S. 23° E. (S. 11° W. mag.), rather more than ½ mile from the west point of entrance, which is about 400 yards wide. As soon as the vessel is within its outer points, haul over to the west side, and run along it to the inner point on that side, which is N. 52° W. (N. 18° W. mag.) about ¾ mile from the outer east point of entrance. As soon as she arrives there she may haul to the eastward and anchor anywhere in from 7 to 20 fathoms of water over good ground.

Sandy Harbor, on the southern shore of Sandy Island, is a safe harbor, with good ground.

Water.—There is no wood to be had in Sandy Harbor, but plenty of water.

Directions.—On approaching Sandy Harbor there are two ledges under water to be avoided. The first of these bears S. 56° W. (west mag.) from Shag Rock, and S. 34° E. (south mag.) from Shag Island, being distant from the latter one mile. The second bears S. 43° E. (S. 9° E. mag.), nearly a mile from the east side of Egg Rocks, and S. 66° W. (N. 80° W. mag.) from the summit of Shag Island. A small reef with shoal water extends ¼ mile from Shag Island toward this ledge, leaving a deep channel between more than ¾ mile wide. The course through the center of this channel, direct for the SW. extreme of Duke Island, is N. 40° W. (N. 6° W. mag.).

To enter this harbor, pass to the eastward of Egg Rocks and keep the SW. extreme of Duke Island, which bears N. 10° E. (N. 44° E. mag.) more than ½ mile from Egg Rocks, aboard on going in. A small rock will then be seen above water to the northwestward, lying over toward the east side of the entrance of the harbor. Pass on either side of that rock, and then steer in for the harbor, there being nothing in the way but what appears.

Port St. Augustine is a little harbor in which small vessels may moor. It has a very narrow and intricate entrance, and is fit for small craft only. The approach to it is westward of St. Augustine Chain,

which is a chain of small islets, the outermost of which is a round smooth rock, with a high black rock ½ mile westward of it. Between these last-named rocks there is a ledge, which shows at one-third ebb. The passage is on either side of this ledge, and then northward along the west side of St. Augustine Chain, but it deserves no further description.

St. Augustine River.—The south extremity of St. Augustine Chain bears S. 56° W. (S. 89° W. mag.) about 7 miles from Shag Island. Between them lies Square Channel, the largest between the islands, toward the mainland. The channel is too intricate for description, but 15 miles up it in a WNW. direction is the entrance of St. Augustine River.

St. Augustine River is a stream of considerable length, and empties into a bay full of rocky islands. Its mouth is full of shifting sand banks. Schooners anchor in St. Augustine Harbor, outside the river, 3 miles below the Hudson Bay Company's post. The river is formed of two branches—the NW. branch and the NE., or main river, which receives the tributary river, Aux Mouches. At the latter end of June salmon ascend the main river to a distance of 80 miles above the first rapids. The Aux Mouches is also visited every fall by a large number of fish resorting thereto for the purpose of spawning. Both branches are easily ascended in flats or canoes, but the river sometimes falls very low in summer. There is plenty of wood at this river.

Eagle Harbor, in Long Island, has room and depth enough for large ships within, but the entrances are too narrow for anything but small vessels. The east passage, between the islets which form the harbor and Long Island, bears about N. 12° W. (N. 21° E. mag.) 2½ miles from Fox Islands, and is the best and deepest, but has only 3 fathoms water. This part of the coast is dangerous, being lined with small low islets and rocks, both above and under water, and nothing but a chart upon a large scale would enable anyone to find Eagle Harbor. The approach to it, however, is on either side of Fox Islands, which are SW. by W. about 14 miles from St. Augustine Chain.

Ha-Ha Bay.—Seal Point is the west entrance point of Ha-Ha Bay. The islands to the eastward contract the channel into this bay to the breadth of about ¼ mile, but there is plenty of water, and no danger but what appears above water. The best channel is close along the mainland, between Seal Point and Round Islet, leaving all the islets and rocks to the eastward. The bay runs in north about 8 miles, with a depth of water exceeding 60 fathoms in one part, and there are many good anchoring places, but it is entirely out of the way of vessels.

Fish Harbor.—At 4½ miles NE. ½ N. from Boule Islet, at the north extreme of Great Mecattina Island, is a small cove of the mainland running in to the southwestward, with an islet covered with wood, called Wood Island, lying off its entrance. There is a passage on either side of Wood Island, but that northward is the best, there being

a ledge in the bay southward of the island, part of which, however, always shows, and a rock with 2 feet least water, S. 62° E. (S. 29° W. mag.), nearly ⅛ mile from the east point of Wood Island. In the cove there are 7 or 8 fathoms, with good ground and room to moor. It is, however, only fit for small vessels. Both wood and water may be obtained. There is no danger but what appears in approaching this harbor from either side of Great Mecattina Island excepting the ledges which have been mentioned.

Great Mecattina Island, about 3½ miles long and 3 miles wide, is rather more than 2 miles from Red Point, the nearest part of the mainland to the westward. The central part of the island is the highest, and rises about 500 feet above the sea. The granitic hills of this island are fissured in a remarkable manner by empty basaltic dikes traversing the island, in a north and south direction, from one side to the other. These features, together with the position of the island, in relation to the High Land of Mecattina, 5 miles westward from it, distinguish this island from any other land in the gulf.

The Boule is a high and round islet, nearly joined to the NW. point of Great Mecattina Island. There is a small rock above water close off it westward, and about ½ mile in the same direction a patch of rocks with about 4 fathoms least water. Round Head, on the SW. side, is a high peninsula, connected to the island by a low isthmus. An islet and small rock, at ½ and one mile, respectively, lie off the SE. point of the island. Treble Hill Island lies ENE., about 3 miles from the center of the island; Flat Island lies SE. by E. ½ E., 3 miles from the SE. point, and the two Murr Islets lie S. by W., about 4 miles from the same point of the island. These islets are about ¼ mile apart, of considerable height, flat at the top, and precipitous all round. Treble Hill and Flat Islands are quite bold all round, and so also are Murr Islets, which swarm with sea fowl. Murr Rocks are two small and low rocks above water, lying about ½ mile SE. from the southern of Murr Islets. A ledge on which the sea generally breaks lies N. 22° E. (N. 55° E. mag.), more than ¼ mile from the eastern of Murr Rocks.

Beacon.—A beacon, pyramidal in shape, surmounted by a cone, with a vane, the whole 34 feet high, and painted white, has been erected on Flat Island.

Island Harbor is a cove one mile deep, and about 400 yards wide between Bluff Head, the high NE. point of Great Mecattina Island, and the Boule. This harbor is sheltered from easterly winds by a cluster of small islets and rocks, lying off its mouth, and leaving a safe passage on either side of them. If the east passage is used, keep Bluff Head aboard, and if the west passage, pass between the cluster just mentioned and a small rock by itself, lying ¼ mile west of it and 200 yards from the shore of the Great Mecattina. The anchorage is near the head of the cove in from 14 to 20 fathoms water over good ground, and both wood and water may be had.

Mecattina Harbor is a small but safe harbor between Mecattina Island and the mainland, being only about 56 yards wide in the western entrance, and about 130 yards wide within. In a vessel of any size it is therefore necessary to moor head and stern and with hawsers to the shore. The depth within is 6 and 7 fathoms over good ground, but only 3 fathoms at low water can be carried in through either entrance.

In the small bay between Mutton and Mecattina Islands, wherein is the western entrance, there is no anchorage in consequence of the great depth of water; but there is no danger in the way, and it is only necessary to keep in the middle to pass safely through the narrow western entrance. The eastern entrance is rendered difficult by a reef of rocks under water running across it northward from the north part of the island, and should only be attempted in fine weather, unless by those who are well acquainted with the place. Strangers in fine weather may anchor outside, between the east end of the island and the main, and send a boat in to examine the channel.

Wood and Water may be obtained in Mecattina Harbor.

Gull Islet lies N. 67° E. (S. 80° E. mag.), nearly a mile from the NE. end of Mecattina Island, and there is no danger between them; but if a vessel approaching Mecattina Harbor from the eastward wishes to pass between Gull Islet and the main, she must keep either the one or the other aboard, in order to avoid the ledge, with 3 feet least water, which lies nearly halfway between them.

Portage Bay, on the east side of Cape Mecattina, runs in about 1¼ miles to the northward, between steep and high hills, fissured like Great Mecattina Island, and there is a rapid river at its head. The deep water, with space for a vessel to anchor, extends only about 400 yards within the entrance, and there is a snug cove on the east side for small vessels.

Portage Harbor is formed by a small and moderately high islet in the mouth of Portage Bay, lying over toward the east side. In this harbor vessels of considerable size might find shelter in time of need, although it is inconveniently small for general use, like most of the harbors on this coast.

Directions.—The passage into Portage Harbor, eastward of the islet, is fit only for very small vessels. The western entrance is about 200 yards wide, and has from 6 to 8 fathoms in it. There is still more water within, over muddy bottom. But approaching this harbor in a vessel of large draft, there are two ledges with 15 feet least water to be avoided. They lie in the line from the south extreme of Cape Mecattina to the western entrance of Mecattina Harbor. The northernmost of these ledges bears S. 28° E. (S. 5°.W. mag.), about 800 yards from the west end of Mutton Island, and the other N. 22° E. (N. 55° E. mag.), ½ mile from the southernmost Seal Rock, which lies near the shore on the east side of Cape Mecattina, and about ¾ mile north from its south extremity. Shoal water extends about 200 yards off the Seal Rocks eastward, but Mutton Island is quite bold.

Cape Mecattina is a long and remarkable promontory of the mainland, and of moderate height for some distance from its extremity; but about 3 miles northward it rises to the height of 685 feet. The highest part of what is named the High Land of Mecattina, which rises directly in rear of Mecattina Harbor, can not be less than 700 feet above the sea, and is the highest land upon this coast from Bradore Bay westward to the vicinity of Mingan Islands. The granite of this promontory is traversed, from SW. to NE., by those enormous basaltic dikes which have been mentioned as occurring in Great Mecattina Island. They cut completely through the promontory into Portage Bay, ascending again on the eastern side of the latter, till they are lost to view beyond the summits of the hills. In Dyke Island several of them are empty as low down as the surface of the sea, dividing the island by immense open fissures in such a way as to distinguish it from all others in the neighborhood. There is a small islet less than 200 yards from the end of the point with no channel between. Entrance Island, about 400 yards in diameter, lies nearly 400 yards farther out. Dyke Island is 400 yards farther off in the same direction, and is composed of two islands at high water, but there is no passage even for a boat between. It is about 1,600 yards long, 800 yards wide, and about 150 feet high above the sea. At a mile from the south point of Dyke Island lie the two Outer Rocks. They are above water, and there are several rocks and ledges, and no safe passages between them and the island.

All these islands and rocks lie nearly in a line SE. by E. from the SE. extreme of the promontory, from which Outer Rocks are distant $2\frac{1}{3}$ miles. The northern of Murr Islets, which is the nearer of the two, is $2\frac{1}{2}$ miles from Outer Rocks, and there is a clear and deep channel between, the depth of water exceeding 80 fathoms. Vessels bound to Mecattina Harbor either pass by this channel or through between the islands, for there is a safe passage on either side of Entrance Island. The channel between Entrance and Dyke Islands is the best, and has 13 fathoms water in it. The shoal water extends about 100 yards off the east side of the former of these islands, but the latter is quite bold.

The Coast from Cape Mecattina to Cape Whittle is as dangerous as can well be imagined to a stranger falling in with it at night or in thick weather, and even to those who are quite acquainted with it the navigation is not without much difficulty. There have been instances of vessels, after beating about the gulf with adverse winds and bad weather, in the fall of the year, being wrecked upon it, as was clearly indicated by the quantity of wreck almost everywhere to be found on the islands.

The distance from Cape Mecattina to Cape Whittle is 55 miles, but the line between them passes 7 or 8 miles within the outer islands and rocks, so that it would be necessary to steer S. 47° W. (S. 79° W. mag.) from Murr Rocks to pass outside St. Mary Reefs, which are the outer dangers off the coast.

The depth of water immediately off, and even within, the outer islands and rocks is in general very great, often exceeding 70 or 80

fathoms, so that there is no warning by the lead; but at 12 or 15 miles off shore there are occasional banks of sand and gravel, with from 30 to 50 fathoms water. The outer islands are entirely bare of wood, but there are more trees on the mainland than in parts farther NE., indicating a slight improvement in the climate to the southwestward.

Little Mecattina Island is nearly 7½ miles long and about 3 miles wide. De Salaberry Bay, on its west side, cuts it nearly in two parts. All outside the narrow isthmus, namely, two-thirds of the island, is high and remarkable land, which can be seen from a great distance out at sea long after the other islands have disappeared below the horizon. The highest hill on the island is about 570 feet above the sea. The part of the island within the isthmus is a low and mossy swamp, resting on sand, with isolated ridges and mounds of granite piercing through it here and there. Within the island, to the north and west, are extensive flats of sand, with bowlder stones and small rocky islets.

Little Mecattina River discharges its waters through these flats by several shallow channels, the largest of which flows into Aylmer Sound to the westward, and the shallowest into the Bay of Rocks to the eastward of the island. The latter channel has only 3 feet in it at low water, so that it is possible to wade across it and from the island to the main when the tide is out. Little Meccattina Island, having thus no channel between it and the main for vessels, and scarcely even for boats at low water, may be considered as forming the SW. side of a large bay. The promontory of Mecattina forms the NE. side of this bay, which is filled with islands and rocks innumerable, among which no vessel could find her way, and where it is possible to lose oneself for a time in a boat.

Fin Rocks lie nearly 250 yards off Whale Head, the south extreme of Gore Islands, and bearing N. 54° E. (N. 86° E. mag.) 5½ miles from Antrobus Point, a small peninsula at the east extreme of Little Mecattina Island. Westward of Fin Rocks, at 2 and 3 miles, respectively, lie Herriot Isles and Single Rock, with two or three sunken rocks close to it. Between these and Little Mecattina Island there is a large open bay, the head of which is called the Bay of Rocks. Antrobus Point is the SW. point of this bay, and has a ledge off it 200 yards to the southward, which is the only danger off the south side of Little Mecattina Island.

Little Mecattina Cove, on the east side of Little Mecattina Island, about ¾ mile northward of Antrobus Point, is ⅔ mile long, and from 140 to 280 yards wide, between high, bold, and precipitous rocks. It has 10 fathoms water in the entrance, and there are 17 fathoms over mud bottom within. It is open to the NNE., but as the islands are only distant 3 miles in that direction, there is no doubt that a vessel well moored would be quite safe in it. The SE. point of entrance is called Cove Point, and is quite bold.

Water may be obtained at the head of the cove.

Hare Harbor, also on the east side of Little Mecattina Island, has depth and room enough for large vessels, but has several rocks and ledges in it, which render it difficult for strangers. As it opens to the southeastward, the prevailing winds are favorable for sailing in, and are generally accompanied with a smooth sea in the entrance. It is only when the wind is well to the southward that there is any swell, and even then it never rolls into the harbor so as to affect a vessel.

Directions.—To enter Hare Harbor, steer N. 3° E., (N. 35° E. mag.), so as to pass Antrobus Point and Cove Point at ¼ mile. When the vessel has run ¾ mile past Cove Point, she will be close to the easternmost of the two Cat Rocks, which are above water, about 400 yards apart. At 300 yards northward of the easternmost rock, lies Staff Islet, about 150 yards in diameter, off which there is a rocky patch dry at low water, about 200 yards to the eastward. This can always be seen from the rigging, but there is also a ledge, with 2 fathoms least water, 320 yards N. 34° E. (N. 66° E. mag.) from the NE. extreme of the islet. On this ledge the SE. extreme of Eden Islands and the small and high Nob Islet are in line, the latter bearing from the former N. 22° E. (N. 54° E. mag.) 1⅛ miles. These are the only dangers on the port hand, or on the side of Little Mecattina Island; and to the eastward the nearest dangers will be more than a mile from the course.

When the vessel has run on the N. 3° E. (N. 35° E. mag.) course one mile past Cove Point, Staff Island will be abeam on the port hand, and ought not to be nearer than ¼ mile. From this position the entrance of the harbor will be seen bearing N. 39° W. (N. 7° W. mag.) one mile. It can not be mistaken, because there is no other channel through which a person can see clear into the harbor from that position. The entrance, about 340 yards wide, and with 20 fathoms water in it, is between Daly and Price Islands, and the only other channel is between the latter and Eden Islands. Care must be taken not to take that channel by mistake, for a vessel would hardly get safely in that way, because of the numerous ledges. Daly Island, forming the west side of the entrance, lies close to the shore, with only a boat channel between, which can not be seen through from outside.

When the entrance bears N. 55° W. (N. 23° W. mag.), haul directly in for it, leaving Eden Islands, and also Price Island, to the eastward, giving the south extreme of the latter a berth of not less than 60 yards. Daly Island, on the port hand, or to the westward, is quite bold. About 340 yards within the entrance on the east, or Price Island side, the small Watch Rock will be seen above water, and farther in a very small islet. This last is Bold Islet, about ⅛ mile within the entrance, 160 yards W. by S. from the north end of Price Island, and quite bold. On the west side, bearing N. 32° W. (north mag.) 400 yards from the east extreme of Daly Island, lies Safe Rock, very small, above water, and quite safe on its east side.

Nearly midway between Safe Rock and Bold Islet lies Rag Ledge,

which just dries at low water. This is the principal danger in the way, but it can almost always be seen from the rigging, and there is a clear channel on either side of it, 300 yards wide, and with from 12 to 15 fathoms water in it. The western channel, however, is the best; and the course from the center of the entrance to it, so as to pass within 100 yards of Safe Rock, is N. 36° W. (N. 4° W. mag.) ⅛ mile.

When within these dangers the anchorage must be chosen by the lead, for there are several patches of rock with from 4 to 6 fathoms, although the bottom is in general of mud, with from 9 to 14 fathoms water. In doing this, however, there is one more danger to be avoided, Foul Rock, a 2-fathom patch, lying N. 32° W. (north mag.) 1,200 yards from the SW. point of Price Island. Until within this rock, therefore, a vessel should keep more than halfway over from the islands forming the east side of the harbor, toward its western shore. She may if requisite run in nearly ½ mile farther than this patch, and anchor eastward of Cluster Point, which consists of some low small islets and rocks extending from Little Mecattina Island, this position being the most secure in the harbor.

With an Easterly Wind.—When bound for Hare Harbor with an easterly wind, steer S. 58° W. (west mag.), so as to pass ½ mile southward of Fin Rocks. Having run 2¼ miles upon this course after Fin Rocks were abeam, Scale Rock (a 2-fathom ledge) will be 800 yards to the northward, and Tail Rocks, off Herriot Isles, will be distant ¾ mile. When the vessel has run one mile farther on the same course, Single Rock will be seen, small and just above water, ¾ mile on the starboard beam, provided there has been no tide or current. At any rate, the rock will be seen, which has no other above water near it, being ⅔ mile southwestward of the nearest of the rocks off Herriot Isles.

There is nothing in the way westward of the line from Single Rock to Eden Islands, excepting Cat Rocks, above water, and Staff Island and its ledges lying close to the shore of Little Mecattina Island. On the contrary, there is a fine open bay, with plenty of room for large vessels to beat, and a depth in many places exceeding 50 fathoms. Single Rock, however, must not be approached nearer than ¼ mile, because of three sunken rocks around it at the distance of 300 yards, and with 6 feet, 2 and 3 fathoms of water upon them, respectively. As soon as Single Rock is made out, and is brought abeam steering S. 58° W. (west mag.), haul in to the northwestward by degrees, so as to place the vessel ½ mile westward of the rock, when the entrance of the harbor will bear N. 55° W. (N. 23° W. mag.) with nothing in the way; and the vessel may be steered directly for it, and proceed as before directed.

Rocks.—All the bay within, or northeastward of Eden Islands, as well as eastward of the line from them to Single Rock, is dangerous, being full of sunken rocks and shoal rocky patches, springing up through great depths of water.

Supplies.—There is a good watering place in the small cove on the

west side of Hare Harbor, and wood may also be obtained in various places. There is usually a couple of men either in the entrance of Little Mecattina River or near Little Mecattina Cove, but they do not remain during the winter. There are plenty of blue and cloud berries, etc., on the hills of Little Mecattina Island.

(H. O. Chart No. 1108.)

Aylmer Sound.—The SE. shore of Little Mecattina Island, extending from Antrobus Point 3 miles SW. to Cape Mackinnon, the SE. point of Aylmer Sound, is high and bold, with remarkable beaches of white bowlder stones occasionally. There is a long cove close to the eastward of Cape Mackinnon, but it is of no use to vessels. Aylmer Sound is formed by Little Mecattina Island on the east and Harrington Islands, together with the mainland, on the west, and is navigable about 4 miles N. by W. from Cape Mackinnon. Cape Airy, the south extreme of Harrington Islands, is SW. 5 miles from Cape Mackinnon; but farther in, that is, from Paynter Islands to Craig Point, the breadth is only 2 miles, and so it continues as far as it is navigable. Paynter Islands are small and are 4 miles northward of Cape Airy, close to the mainland.

Aid and Close Islets.—There is no danger on the west side of Aylmer Sound but what appears and is close to the shore; but on the east side there are two small islets, the outermost of which, Aid Islet, bears N. 70° W. (N. 38° W. mag.), and is a little less than a mile from Cape Mackinnon, and is 800 yards off shore. The other, Close Islet, lies about halfway between the cape and Aid Islet, and about 200 yards off shore.

Spray Reef, small, awash at low water, and bold all round, is WSW. 1½ miles from Cape Mackinnon. This is the only danger in the entrance of the sound that can not always be seen, and vessels had better pass to the westward of it because the passage between it and Aid Islet has not been sounded.

Doyle Islands are four in number, but they appear from sea as two only. The two westernmost islands are very low, and close together, being joined at low water. The two easternmost are of moderate height, and also close together. Their east point bears N. 10° W. (N. 22° E. mag.) 2 miles from Craig Point, which is the SW. extreme of Little Mecattina Island, one mile from Cape Mackinnon. There are several small rocks and ledges in the channel between these islands, and also between them and Crescent Point WNW. of them; so that the only safe passage is eastward of the islands, and between them and the ledges which lie across the mouth of De Salaberry Bay. This passage is ½ mile wide, with 18 to 23 fathoms water in it, the east side of the islands being quite bold.

Lou Road.—From the north point of the easternmost of Doyle Islands, Boot Point (the south entrance point of Louisa Harbor) bears

N. 13° E. (N. 45° E. mag.), and is distant 1,200 yards. Within or to the northward of Doyle Islands, between them and Louisa Harbor, there is a fine roomy roadstead, named Lou Road, in which vessels may choose their anchorage in from 12 to 4 fathoms over muddy bottom, the soundings decreasing gradually westward from the line joining the easternmost of Doyle Islands and Boot Point, over to Crescent Point, a distance of about one mile. This roadstead is bounded on the north by banks of sand and stones dry at low water, which extend across from Dickson Islands, forming the NW. side of Louisa Harbor to Crescent Point. It is through these banks that Little Mecattina River discharges most of its waters.

Louisa Harbor is about 400 yards wide at the entrance. The points of entrance are quite bold, and the best anchorage is 300 yards within them, in 4 fathoms, and in the southern part of the harbor. The harbor is open to the southward.

Directions.—The only directions for sailing into Louisa Harbor, or into Lou Road between it and the Doyle Islands, are to keep the eastern side of the latter aboard, to avoid the ledges lying across the entrance of De Salaberry Bay. When once inside of the island there is nothing in the way, so that a vessel may either anchor in the road or run into the harbor as convenient. In the sound outside of the Doyle Islands the only thing to be guarded against is Spray Reef. There are irregular soundings with as little as 11 fathoms over rocky bottom here and there, but in general the depth is from 19 to 23 fathoms, with rock, sand, and mud bottom. The ground can not be trusted until within Doyle Islands.

Harrington Islands extend northward 4 miles, from Cape Airy to the mainland, there being no channel within them. They are high islands, the highest being estimated at 350 feet above the sea. Between the outer and largest islands there is indifferent anchorage and deep water, but the channels leading to it are narrow, and too intricate for any directions to avail. It is a very dangerous place, and useless, excepting to small vessels intimately acquainted with the coast.

Black Reef, bearing from Cape Airy S. 16° E. (S. 16° W. mag.), 2 miles, is composed of low black rocks above water, about 300 yards in diameter, bold, but with very irregular soundings around it, varying from 6 to 70 fathoms over rocky bottom.

Major Reef, awash at low water and very small, bears S. 70° W. (N. 78° W. mag.), 1½ miles from Cape Airy.

Netagamu Islands, WSW., 4½ miles from Cape Airy, are small, with a remarkable mound on the largest of them. Between them and the Harrington Islands there is a bay of the mainland with clay cliffs and sandy beach at its head and innumerable small rocks across its mouth.

Netagamu River.—The entrance to this river is 1¾ miles NW. from Netagamu Islands, and may be known by the sandy beach, backed with

a thick growth of spruce trees, on either side of the entrance. It is a large stream with deep water in the narrow entrance, and also within close up to the falls, which descend perpendicularly 50 feet, on either side of an island, and into a basin ½ mile wide. These falls, which are 1½ miles from the entrance, can be partly seen from the sea when they bear N. 23° E. (N. 55° E. mag.). A semicircular bar of sand, dry at low water, with the exception of a narrow channel with 3 feet water in it, extends one mile out from the entrance, and is extremely dangerous to boats because of the heavy surf. The current in this river is rapid, and the bottom of the channel is rock, but small schooners may be secured on the eastern side, one mile within the entrance, where there are two huts, the temporary residence of salmon fishermen during the season. The hills of the mainland, 4 or 5 miles westward of this river, are rather higher than is usual on this coast, rising to the height of 400 or 500 feet above the sea.

St. Mary Islands lie 6 miles off the mainland, and their NE. extreme bears S. 37° W. (S. 68° W. mag.), 10 miles from Cape Airy. There are two of those islands so close together that they may be considered as one narrow island about 3 miles long. Their height is 200 feet above the sea; they are of bare steep granite, and bold all round.

Cliff Islands lie ⅔ mile W. by N. from the SW. point of St. Mary Islands. There is a ledge which shows south of them. Cliff Islands are one round and steep island ½ mile in diameter, with several small islets and rocks close southwestward of it, and deep water between them all. Between these and Boat Islands there is a safe channel ½ mile wide.

Boat Islands, a cluster of small islands close together, lie WSW. 2½ miles from the SW. point of St. Mary Islands. They occupy a space of 1¾ miles in a SW. direction by about ¾ mile wide.

Middle Islands are a chain of islands, nearly joined at low water, with several small islets adjacent. The westernmost island is 2¼ miles long and 150 feet high. The whole group covers a space of 3½ miles in a SW. direction, by about one mile wide. There is a good anchorage in 10 or 12 fathoms between the westernmost island and two smaller islands northward of it; but it is too small for large vessels and too intricate for description, and can only be approached from the eastward.

Middle Islands lie 1½ miles from the main, and there is no safe channel between, in consequence of the numerous islets and rocks. Between these islands and Boat Islands there is a safe channel, nearly one mile wide. In all these channels the soundings are irregular and the ground foul. In some places there are only 15, whilst in others there are 40 or 50 fathoms water.

Tender Reef, small and awash at low water, lies N. 50° W. (N. 19° W. mag.) nearly one mile from the northernmost of St. Mary Reefs, and S. 41° W. (S. 72° W. mag.) 1¾ miles from the SW. extreme of Boat Islands.

St. Mary Reefs, the most dangerous off the coast, are four ledges just under water, on some of which the sea always breaks. From the northernmost to the southernmost ledge the distance is one mile, and the latter lies S. 40° N. (S. 71° W. mag.) 2¾ miles from the SW. of the Boat Islands.

Southwest Islands are a group of small islets, of which the westernmost is high and round. There is a patch of 12 fathoms lying 2 miles southeastward of St. Mary Reefs, and another of 8 fathoms nearly as far southwestward of them.

Channels.—There are irregular soundings and deep water around and between all these rocks and islets, but no warning by the hand lead. There is a clear channel between Tender Reef and Southwest Islands, and also between St. Mary Reefs and Boat Islands; at least there is nothing with so little water as 3 fathoms, since the sea often breaks in that depth, and it must have been seen.

Watagheistic Island and Sound.—Watagheistic Island is a large and hilly island 3 miles long by more than 1½ miles wide. It is much broken into coves, and lies in the mouth of a large bay of the mainland, from which it is difficult to distinguish, in a vessel at sea. Watagheistic Sound is a secure harbor between the harbor and the mainland. The eastern entrance is narrow and intricate, but the western entrance is ½ mile wide; and although there are several rocks and ledges in it, yet it may be safely sailed through, with proper care and the assistance of the chart. Between the east end of Watagheistic Island and Cliff Islands are many islets, rocks, and reefs, which it would be useless to enumerate, so that it will be sufficient to remark that Cove Island, which is the largest of them, is ½ mile in diameter, and surrounded with rocks and ledges. It is NW. 4 miles from the north point of St. Mary Islands, and there are thickly scattered rocks, both above and under water, all the way from it to Netagamu Islands, 6½ miles northeastward.

Caution.—If it were not that cases sometimes occur in which a secure anchorage is indispensable to the safety of a vessel, directions would not be given for Watagheistic Sound, which can not be reached without passing through 7 miles of dangerous navigation. The following brief directions are given, with the caution that their use must be accompanied with a good lookout from the rigging, for it is impossible to be certain that every ledge has been found in such a place.

Directions for Northern Entrance.—Being to the southwestward with a westerly wind, a vessel may either pass between Tender Reef and Southwest Islands, and farther eastward between Middle and Boat Islands, or she may run down outside St. Mary Reefs, and then haul in to the northward between Boat and Cliff Islands, which is the safer route, and the one for which the following directions are given: Being then in mid-channel between Boat and Cliff Islands, steer N. 21° W. (N. 10° E. mag.), and that course will lead close to Bold Rock, N. 57° E.

(N. 88° E. mag.), ½ mile from the NE. point of Middle Islands. Center Reef, which always shows, bears N. 46° E. (N. 77° E. mag.), 1½ miles from Bold Rock, and there is a clear channel between them, but not between Bold Rock and Middle Islands.

If the vessel passes eastward of Bold Rock at about ¼ mile, as soon as she has passed that rock alter course to N. 44° W. (N. 13° W. mag.), and when she has run 2¾ miles she will be midway between Black Ledge and Bare Rocks, the latter bearing from the former N. 37° E. (N. 68° E. mag.), 1½ miles. Do not go near this ledge, which has not been sounded off. Alter course now to N. 5° W. (N. 26° E. mag.), passing westward of all the islets to the northwestward of Cove Island, and when the vessel has run 1¾ miles, Beacon Islet will be seen (close to the SE. extreme of Watagheistic Island, and with a smaller islet ¼ mile westward of it) ¼ mile ahead. Run past this islet sufficiently far to avoid a reef and 3-fathom patch, which together extend 800 yards NNE. off it; then haul in N. 54° W. (N. 23° W. mag.), giving the islet a berth of full ½ mile, when the depths will be 10 or 12 fathoms.

When the vessel has run ½ mile from the time Beacon Islet was abeam, a deep bay will be observed in the NE. side of Watagheistic Island. Steer for the narrow channel between the north entrance point of this bay and two small islets which lie nearly 300 yards NNE. of it. As soon as she arrives at these islets, another deep cove will be seen in Watagheistic Island, with an islet nearly filling up its mouth. Steer to pass close eastward of this islet, and then westward for the channel between Watagheistic Island and the islands to the northeastward which extend across to the mainland in that direction, with the exception of a very narrow 3-fathom channel. Keep in the middle of the channel, inclining toward the west or the Watagheistic Island side. The channel is at first only about 170 yards wide, but it soon expands to 320 yards, with a depth of 15 fathoms in the middle over mud bottom, where the vessel may anchor in great security. After she has passed the reef off Beacon Island there is nothing in the way by this route, the islands being quite bold.

If wishing to run through into Upper Sound, beware of a reef which lies across the mouth of the channel at the distance of 300 yards. As there is no safe channel northeastward of Cove Island, a vessel can not approach this anchorage with an easterly wind without first beating up along the SE. side of Watagheistic Island, after she has passed between Bare Rocks and Black Ledge, so that in that case the southern entrance to Watagheistic Sound is to be preferred.

Directions for Southern Entrance.—With an easterly wind, a vessel may either sail in from sea through the same channel as before, or eastward of St. Mary Islands, which is quite safe. Being to the eastward, steer for the NE. point of St. Mary Islands, which may be passed at the distance of 400 yards, and then, bringing it astern, steer from it S. 88° W. (N. 61° W. mag.), and Center Reef, which must be looked out

for, will be abeam at ¼ mile to the northward when 2¾ miles has been run from the NE. point of St. Mary Islands. The reef is bold all round, and it may be passed on either side at 400 yards, but southward of it is to be preferred.

Continue the S. 88° W. (N. 61° W. mag.) course for one mile past the reef, then haul up N. 47° W. (N. 16° W. mag.); and when the vessel has run 3 miles Seal Islands, forming the north point of Boussier Bay (full of islands), will bear S. 59° W. (west mag.), distant ⅜ mile. The channel to the westward between Watagheistic Island and the mainland will now be open, and two small islets will be seen, nearly in its center in line, bearing S. 77° W. (N. 72° W. mag.). The nearest of these islets will be distant about 1¼ miles. They are ¼ mile from each other, and quite bold; but bear in mind that exactly in the line from the one islet to the other, and 700 yards N. 77° E. (S. 72° E. mag.) from the eastern of them, is Kettle Rock, very small, and just covered at low water. This rock lies exactly in a line from Seal Islands to the point of a shoal cove of Watagheistic Island, which is open to the westward; there is a rock awash 160 yards southward of the west entrance point of this cove. The channels on either side of Kettle Rock, which is quite bold, are each ¼ mile wide, and have from 20 to 26 fathoms water in them. Having brought the islets in line, the vessel has only to avoid Kettle Rock, running in S. 77° W. (N. 72° W. mag.) on either side of it, and the two islets westward of it, and then hauling up to the northward under the SW. end of Watagheistic Island, where she may anchor in from 17 to 20 fathoms over mud bottom, with plenty of room, no dangers anywhere near her, and well sheltered from all winds.

From both the anchorages a vessel with the chart may sail into Upper Sound northward of Watagheistic Island, which is navigable throughout for large vessels, with a convenient depth of water, and good ground for anchoring.

Wood and Water may be had there in abundance; and in Hamelle Harbor, at the northeastern extremity of the sound, a hunter and salmon fisher resides, and there is another in Boussier Bay.

Anchorage.—There is no good anchorage on the route to, or outside either entrance to, Watagheistic Sound, the soundings being irregular, with deep water and generally foul ground. The breakers on every side, on so many rocks and ledges, make the place look, as it really is, extremely dangerous.

Etamamu River.—Between Middle Islands and Wapitagun, the mainland is broken into coves, and lined with islets and rocks innumerable, among which nothing but a very small vessel, well acquainted with the coast, could find her way. There is nothing there worthy of notice, excepting Etamamu River, which enters a bay open to the southward full of islets and rocks. The river, consisting of a succession of rapids, is generally narrow; it, however, widens in several places, forming lakes, with still, deep water.

Trading Post.—At the mouth of this river there is a trading and salmon-fishery post, at which two men reside all the year.

South Makers Ledge is a small rock which is never entirely covered when the sea is smooth. Its whole extent, above and under water, is 250 yards east and west by 100 yards north and south, and there is no danger near it excepting a patch of 4 fathoms, bearing from it S. 66° E. (S. 35° E. mag.), and distant 400 yards. The soundings are very irregular round this ledge. It bears from Cape Whittle S. 78° E. (S. 47° E. mag.) 6½ miles.

Cormorant Rocks lie directly between Cape Whittle and South Makers Ledge, leaving a channel between those rocks and the ledge nearly 2¾ miles wide. There is no danger excepting the claws of Cormorant Rocks, one of which, with 4 fathoms, stretches 750 yards S. 27° E. (S. 4° W. mag.) from the southeasternmost Cormorant Rock; another, N. 34° E. (N. 65° E. mag.) from Nest Rock and S. 78° E. (S. 47° E. mag.) from Slime Rock (the NE. Cormorant), ¾ mile from each, with only 2 fathoms, and a 2-fathom patch which bears N. 7° E. (N. 38° E. mag.) ¼ mile from Slime Rock. There is no channel between Cormorant Rocks, or between them and Lake Island.

Wapitagun Harbor.—Mistassini, or the Great Stone, is a remarkable block of granite lying on the SE. extreme of the Outer Wapitagun Islands. It resembles a mortar, especially when seen from the SW., and has been called The Gun by the fishermen. It serves as an excellent guide to East Passage into Wapitagun Harbor, the entrance to which is ¾ mile northeastward of it, and N. 22° W. (N. 9° E. mag.) 3½ miles from South Makers Ledge. Outer Wapitagun Islands, which are of bare granite, about 70 or 80 feet high, are so close together and so overlap that they appear like one island. They completely shelter the harbor, which is a long and narrow channel running NE. and SW. between them and Wapitagun Island, which is next northward of them. West Passage of the harbor is 2 miles southwestward from the Mistassini, and N. 60° W. (N. 29° W. mag.) 4 miles from South Makers Ledge.

It is about 160 yards wide, and there are parts of the channel, between islets within East Passage, which are not more than 120 yards wide. The harbor is nowhere more than 280 yards wide, excepting where there are small bays; so that although the depth of water is more than sufficient for large vessels, yet the navigation is so intricate that this harbor is not fit for those of a greater burden than 150 or 200 tons.

Water.—There is water to be had on Lake and Wapitagun Islands; but for wood the boats must proceed through the islands to the mainland, northward from the harbor about 3 miles.

Directions.—The position of East Passage into Wapitagun Harbor, between Outer Wapitagun Islands and others to the northeastward, has been pointed out, and in approaching it from the southward with an easterly wind there is nothing in the way. There is a rock and ledge which show on the west side of the entrance. Keep, therefore,

the eastern side aboard, steering in N. 66° W. (N. 35° W. mag.). Three small islets will be seen ⅓ mile within the entrance, and northward of them a cove in Wapitagun Island extending westward round a steep rocky point, which has a small sunken rock close off it to the eastward. There is safe anchorage in 2½ fathoms in this cove, but if wishing to run into the harbor, leave all three islets to the southward, passing close to them, and then bear up southwestward, between them and the steep rocky point of the cove just mentioned. This is the safer passage; the other, southward of all three islets, is only 60 yards wide, and has, besides, a ledge in the way, which can only be avoided by having a trusty person in the rigging, which is necessary at all times, in entering this and similar harbors.

To enter Wapitagun Harbor by West Passage, and with a westerly wind, attend to the following directions, remembering that a lookout for the ledges from the rigging is absolutely necessary, even with the best of charts: Run down between Cormorant Rocks and South Makers Ledge, and then haul in N. 31° W. (north mag.), so as to pass at least ½ mile eastward of the easternmost of Cormorant Rocks, which will be readily known from Nest Rock, covered with birds and stained white by them, being about 240 yards westward of it. Look out now for the small Two-fathom Ledge, which lies 800 yards NNE. of this rock, which leave also to the westward; and having passed it, haul up westward a little, so as to pass not less than 600 yards eastward of Slime Rock (the northeasternmost of Cormorant Rocks), in order to avoid the other Two-fathom Ledge, which bears from it N. 8° E. (N. 39° E. mag.) ¼ mile.

Having passed close eastward of this ledge, steer directly for the islet in the channel, between the SW. extreme of Outer Wapitagun Islands and Cormorant Point, taking care not to haul up higher than N. 60° W. (N. 29° W. mag.), to insure passing eastward of Long Ledge, which lies midway between Slime Rock and Cormorant Point, and on the line joining the SW. end of the islet steered for, and the high east end of Lake Island, which, therefore, must not be opened westward of the islet. Having passed Long Ledge, bring the west end of the islet to bear N. 31° W. (north mag.), and steer for it, looking out for the 7-foot ledge, lying 300 yards southward from the SW. extreme of Outer Wapitagun Islands, which should not be approached nearer than 400 yards until the ledge is passed.

The patch which lies 240 yards SSW. of the islet is quite bold, and will be avoided if the islet be not brought to bear eastward of N. 31° W. (north mag.). When the vessel arrives within 400 yards of the islet, and the harbor begins to appear open to the northeastward, bear up quickly for the entrance, leaving the islet northward of the vessel. When once within the entrances, the rocks are bold and the water smooth, and an anchorage may be chosen anywhere, the general depths being from 16 to 20 fathoms. The best berth, however, is in a small

bay on the south side of the harbor, 1,200 yards within West Passage, in 7 fathoms. The bottom within the harbor is everywhere of mud, but outside it is all rocky, with irregular soundings.

Tides.—It is high water, full and change, in Wapitagun Harbor at 10h. 30m.; ordinary springs rise 5 feet, neaps 3 feet. The flood from the eastward and ebb from the westward usually run past the entrances of the harbor, at a rate varying from ½ to one mile; but both streams are much influenced by the winds.

CHAPTER IX.

GULF OF ST. LAWRENCE, NORTH SHORE, CAPE WHITTLE TO POINT DES MONTS.

QUEBEC.

(H. O. Chart No. 1108.)

Aspect of Coast.—From Cape Whittle, Natashquan Point is 62 miles nearly west. With the exception of the first 13 miles eastward of Natashquan Point, where the shore is of sand, this coast is of granite, which rises into steep hills and ridges, with rounded summits, having between them morasses and stagnant ponds. The mainland is seldom higher than 200 feet, even at the heads of the bays, and it diminishes in height toward the sea, as do also the innumerable small islands, islets, and rocks which fringe the coast, and which in some parts extend fully 5 miles from the nearest point of the mainland. The islands are bare of wood, and so, also, is the main, excepting up the bays or where sandy tracks occur, which are always covered with a thick growth of spruce, with occasional birch and poplar.

Seen from the distance of 12 or 15 miles, this coast presents an outline so little diversified that it is nearly impossible to distinguish one part of it from another; and it is only when a vessel approaches within 3 or 4 miles of the outer rocks that its broken and dangerous nature becomes apparent.

Soundings.—The outer rocks, both above and under water, are so bold that there is no warning from the use of the hand lead; but there are soundings with the deep-sea lead in moderate, but irregular, depths off every part of this coast. These deep-water soundings are too irregular to admit of a concise description; the chart, therefore, must be referred to with the remark that they are sufficient to warn a vessel of her approach toward danger at night or in fogs, since these depths do not amount to 50 fathoms at any less distance than [illegible] miles from the outer rocks.

Tides.—The tides are weak, irregular, and influenced both in their strength and direction by the winds.

Whittle Rocks are the outermost of the many small rocks above and under water lying off to the southward and westward of Cape Whittle; they are two half-tide rocks, and are 2¾ miles from the cape.

All these rocks are steep, with from 20 to 40 fathoms water between them; small fishing and egging schooners find their way among them, being guided by the eye.

Wolf Bay, the first inlet westward of Cape Whittle, is 6 or 7 miles deep. There is plenty of water in its intricate channels, and few dangers that do not show, but a number of rocks and ledges extend across its mouth from Cape Whittle to Wolf Island, and are so scattered about that directions would not be of the least use.

Wolf Island may be easily recognized, being higher and larger than the outer islands usually are off this part of the coast. It is about ¾ mile long, and appears as two hills, which are about 150 feet high.

Outer Islet is small, low, and lies about one mile southward of Wolf Island. It is the outermost of a chain of islands which extends 4 or 5 miles from the point of the mainland, dividing Wolf and Coacoacho Bays. It lies 7 miles W. by S. from Cape Whittle.

Beacon.—A conical beacon, 30 feet high and painted white, has been erected on this islet.

Coacoacho Bay is the only place affording anchorage to large vessels upon this part of the coast. It is not at all difficult of entrance, although the number of islets and rocks in every direction makes it appear so. There is an excellent harbor in the head of the bay, called the Basin, and another, formed by an arm running into it, and named Tertiary Shell Bay, is equally safe. Farther out than these harbors the bay is more than ½ mile wide, and quite sufficiently sheltered from the sea for the safety of any vessel with good anchors and cables.

Grange Rock is the southeasternmost of three dangerous ledges lying off the entrance to Coacoacho Bay. It is the shallowest part of a narrow ridge of rocks about ¾ mile long in a SW. direction, and is only shown by breakers when there is a heavy sea running. From the least water on it, 15 feet, Outer Islet lies 1 1/10 miles N. 3° E. (N. 34° E. mag.); and from its southwestern end, in 3 fathoms, the same islet bears N. 7° E. (N. 38° E. mag.) 1½ miles.

South Breaker, which also shows only in heavy weather, lies S. 75° W. (N. 74° W. mag.) 2 miles from Outer Islet and N. 67° W. (N. 36° W. mag.) 2 miles from Grange Rock. It has less than 12 feet of water on it, and is near the northeastern end of a ridge of rocks, which extends from it ⅝ mile SSW., with 16 feet water near its outer extremity.

Southwest Breaker, with only 3 feet water on it, lies N. 62° W. (N. 31° W. mag.) 2¼ miles from South Breaker, and S. 59° W. (west mag.) 2½ miles from Audubon Point. There are clear channels between these ledges.

Directions.—To enter Coacoacho Bay by the most direct channel between Grange Rock and South Breaker, proceed as follows: Being not less than 3 miles from Outer Islet, bring it to bear between N. 18° E. (N. 49° E. mag.) and N. 52° E. (N. 83° E. mag.), and steer for it until the vessel is within Grange Rock and South Breaker, or until Outer Islet is distant not more than one mile, when the rocks which lie about ½ mile northward of the islet will be plainly seen. Pass westward of those rocks, at ⅓ mile, and when abreast of them, a chain of low rocks

which project SW. from Emery Island will be seen right ahead. Bring the point of this chain to bear N. 7° E. (N. 38° E. mag.), when it will appear in line with the extreme point of the mainland on the NW. side near the head of the bay.

Steer in upon this leading mark or bearing until the vessel is past some rocks which lie about ½ mile from the east side of the Audubon Islets. These rocks, which are dry at low water and can always be seen, must be left on the port hand. When up to the Emery Rocks the bay will be seen open right ahead and clear of danger, excepting Milne Reef, which is partly dry in low tides, and extends nearly ¾ mile out from the low rocks, its outer end lying nearly in a line from Tertiary Point to Crocodile Islet on the west side of the bay. To pass to the westward of it, keep Audubon Point shut in behind Milne Point and Crocodile Islet. The best berth is on the western side of the bay, ½ mile within Crocodile Islet, in 9 fathoms mud.

In running for Coacoacho Bay from the westward, a vessel may either pass between Southwest and South Breakers by bringing the inner or NE. end of Wolf Island to bear N. 58° E. (N. 89° E. mag.), and steering for it; or by bringing Outer Islet to bear nothing eastward of N. 52° E. (N. 85° E. mag.), and running toward it, until she is within less than one mile, when she may haul in for Emery Rocks, as before directed.

Tertiary Shell Bay has nothing in the way excepting a small rock above water ¼ mile within the entrance, which must be left on the starboard hand. This bay is not more than 200 yards wide ½ mile from the entrance, but it becomes wider within, with from 5 to 11 fathoms water over mud bottom, and is there quite landlocked.

Basin.—In running in for the Basin, keep the NW. side of the bay aboard until the vessel is within ½ mile of the island in the head of the bay; then sheer over to the eastward, toward that island, to avoid a shoal of bowlder stones which extend nearly 400 yards off the west side of the bay. The channel between this shoal and the island is only 200 yards wide, but deep enough for large vessels. Give the island a berth of 100 yards, leaving it to the eastward. As soon as she is past the inner end of the island, haul to the westward into the mouth of a small bay, and the water will soon shoal to 8 fathoms, muddy bottom, where she must anchor, and will be quite sheltered from every wind.

Coacoacho River flows through a wide and shallow channel full of bowlders, and discharges the waters of a large lake, to which boats can ascend with the tide. Its shores are wooded with spruce trees, and water may be obtained near the western side of the entrance.

Tides.—There is very little stream of tide in Coacoacho Bay, but a weak and irregular stream of flood and ebb sets through and between the islands. It is high water, full and change, at 10h. 30m.; ordinary springs rise 5 feet, and neaps 3 feet.

Olomanosheebo River.—The coast, for the first 12 miles westward

of Coacoacho, is formed of innumerable islets and rocks to Olomanosheebo, or Paint River, which is called also by the Canadians "La Romaine." This is a considerable river, falling 20 feet over granite into the head of a bay 4 miles deep, but so shoal that boats can scarcely enter it at low water. There is a trading post of the Hudson Bay Company on the east side near the falls, neither of which can be seen from the sea, being hidden by the islands; but the place may be known by the low sandy cliffs, thickly wooded with spruce trees, on either side of the entrance of the bay. The tide flows 2 miles up the river.

Treble Islet and Loon Rocks lie to the southwestward, the latter at the distance of 6 miles from the above bay. Loon Rocks, which can always be seen, are 3 miles from the nearest point of the mainland, and are the outermost danger off this part of the coast.

Washsheecootai Bay, 10 miles westward of Olomanosheebo River, is 2½ miles wide, and has off its entrance several rocky small ledges which make it difficult of entrance. Cloudberry Point is the west entrance point of this bay, and is formed by the mainland. The east entrance point of the bay is formed by small rocks and islets. At 3 miles within Cloudberry Point the bay contracts to a very narrow inlet, having several rocks and islets in it, and from 4 to 2½ fathoms water over muddy bottom for the first 4 miles up; after which it becomes shallow for 4 miles farther, to the falls of a considerable river, where there is a trading post and salmon fishery of the Hudson Bay Company.

A rock, with 6 feet water on it, lies S. 79° E. (S. 49° E. mag.) $1\frac{7}{10}$ miles from Cloudberry Point. A conical beacon, 25 feet high, has been erected on an island at the head of Washsheecootai Bay, which bearing N. 14° E. (N. 44° E. mag.) leads into the bay clear of all shoals and westward of the before-mentioned rock.

A rock is reported as lying 1¼ miles S. 8° W. (S. 38° W. mag.) of Cloudberry Point.

This inlet is completely open to winds from southward and westward, and affords scarcely any shelter for the first 5 miles within Cloudberry Point. Vessels of considerable burden might find shelter in it in time of need, but it is too intricate a place for the general purposes of navigation, or for any written directions to be of avail.

Musquarro River, where there is a Hudson Bay Company trading and fishing post, is 3 miles within the west point of a bay full of small islets and rocks. This river becomes rapid a short distance within the entrance, and is useless excepting to boats or very small schooners. It will be known by the houses which are on the east side of the entrance, and also by a remarkable red and precipitous ridge of granite, about 200 feet high and about 2 miles westward of the river.

Kegashka Bay.—There are several low bare rocks and ledges which always show ½ mile off Curlew Point, which is 4½ miles westward of Musquarro River and is the east entrance point of Kegashka Bay.

This bay, between Curlew and Kegashka Points, is 3 miles wide and

1½ miles deep. In the western half of the bay there are several small islets, too wide apart to afford much shelter from the sea. It is only in the NW. corner of the bay, within Kegashka Point, that a vessel can be secure from southerly winds. There is room there for several small schooners, but for only one vessel of any size, and she must be moored with open hawse to the eastward, with a third anchor on shore to the SW., so as to be able to haul in close under the point when it blows hard from the southward. The depth of water within the islets is from 4 to 6 fathoms over fine sandy bottom.

Kegashka Point is formed by an island separated from a rocky peninsula by a very narrow channel, dry at low water. Both the island and peninsula are distinguished by being partly covered with spruce trees. There are also a few spruce trees on an islet, ¾ mile westward of the point; and as no other islands on this part of the coast are wooded, the bay may be recognized by that circumstance. There is a fine sandy beach and low sandy cliffs in the NW. corner of the bay, and there are also similar cliffs for about a mile westward of the isthmus above mentioned. This sandy tract is densely wooded with dwarf spruce, another circumstance which serves to distingnish this bay and is the origin of its name, which signifies impenetrable woods. Green Island is of low granite, covered with grass, and is the outermost and largest islet sheltering the bay, being about 600 yards in diameter, and ¾ mile eastward of Kegashka Point. There are several small islets and rocks within, and also eastward of Green Island, and one small and low black islet between it and the inner part of Kegashka Point.

Wood and Water may be obtained without difficulty in the western part of Kegashka Bay, where there were several Canadian families, consisting in all of 50 persons, in the year 1868. Their houses are visible from the sea. They have gardens and keep sheep and cattle, and they also prosecute the fisheries and winter hunting.

Directions.—The safest channel into Kegashka Bay is between the low Black Islet and Kegashka Point, and is 340 yards wide; it carries 7 fathoms water, and is quite clear. When coming from the westward, give the south extremity of Kegashka Point a berth of ¼ mile, or go no nearer than the depth of 8 fathoms; then run along the east side of the point, which is quite bold, leaving all the islets on the starboard hand. A distance of ¾ mile on a N. 9° E. (N. 39° E. mag.) course will lead to the narrow channel before mentioned, between Black Islet and the inner end of Kegashka Point. Haul round the latter to the northwestward, at the distance of 100 yards, and when within it not more than the same distance, anchor in 5 fathoms, and secure the vessel by mooring.

When approaching Kegashka Bay from the eastward, give the low and small islets off Curlew Point a berth of 1½ miles to avoid the ledges off them, which dry at low water; then steer so as to pass outside of Green Island, going no nearer than 200 yards. Continue on that course

till the inner or NE. extremity of Kegashka Point bears N. 30° W. (north mag.), which will be rather more than 3¼ miles from the ledges off Curlew Point; then haul in, and pass between the point and the westernmost islet, as before directed, giving the south side of that islet a berth of at least 200 yards.

Kegashka Bay has this advantage, that there are no ledges or other dangers off its entrance; so that a vessel is no sooner outside Kegashka Point than she has a clear sea before her.

Kegashka River, affording shelter only for boats, is 3 miles westward of Kegashka Bay. It has falls 40 feet high and a fishing station of the Hudson Bay Company one mile within its entrance; neither the falls nor the house can be seen from the sea.

Natashquan Point.—At 2½ miles westward of Kegashka River, fine sandy beaches, in front of sandy cliffs, 70 or 80 feet high, and a country thickly wooded with spruce trees, commence and continue 13½ miles to Natashquan Point. It is a sandy promontory, the most southern point on the north coast of the gulf to the eastward of the Seven Islands.

Natashquan Cod Banks.—Parallel to the coast from Musquarro Point to Natashquan Point, and at distances varying from 6 to 11 miles, there are banks of sand, gravel, and broken shell, on which the depth of water is between 24 and 40 fathoms. Codfish are often caught in abundance upon these banks.

Caution.—Ruisseau Rock lies 8 miles S. 72° W. (N. 78° W. mag.) from Kegashka Point. It has only 2 feet water on it, and lies in line between Natashquan and Kegashka Points, and nearly 1½ miles southward from the entrance of a small stream named Long River. A vessel will avoid it by not going nearer to the shore than the depth of 17 fathoms.

Another rocky shoal with 24 feet least water is reported to lie about 2 miles S. 7° W. (S. 37° W. mag.), from the SW. extreme of Curlew Point.

Cod Bank, a small shoal with little more than 4 fathoms on it at low water, over gravel bottom, lies about a mile southward of Natashquan Point.

(H. O. Chart No. 1109.)

Aspect of Coast.—From the south extreme of Natashquan Point to Collins Shoal, the outer danger off St. Genevieve Island, the easternmost of Mingan Islands, the distance is 52 miles. The coast included in this distance is low near the sea, rising a short distance back into mounds and ridges, but nowhere exceeding 400 feet in height. It is composed of primary rocks, with the exception of a sandy tract at Agwanus and Nabesippi Rivers. The sandy tracts are always thickly wooded with spruce trees, and the country generally is here less bare than it is farther eastward.

The coast is broken into numerous coves and small bays, affording shelter everywhere to boats, and occasionally to very small schooners.

The small and bare islets and rocks are innumerable along it, but nowhere extend farther out from the points of the mainland than 2 miles.

When there is a heavy sea running, all these dangers show, or they can be seen from the masthead in clear weather; but under other circumstances, the depth of 20 fathoms is as near to them as a vessel ought to approach, that depth being in many places not more than one mile from the outer ledges.

The banks of sand, gravel, and broken shell, which extend off this coast for many miles, and the deep-water channel between them and Anticosti, have been already mentioned on page 22; and the soundings upon them are too irregular to admit of any other than the general description there given of them. Reference must be made to the charts, in which the various depths and nature of the bottom are given in such a way as can not fail to be of great assistance to vessels navigating this channel.

Currents and Tides.—The current down along the coast in westerly winds seldom exceeds ½ knot, and is usually much less; so that a vessel can always make way to windward in moderate weather.

In shore there are weak tidal streams too irregular to be depended upon. It is, however, important to remark that the flood draws strongly into Natashquan River and the bay off Little Natashquan River, while the ebb sets strongly off Natashquan Point to the SE. and causes a very heavy sea upon the banks off it, in southerly winds.

On approaching St. Genevieve, a strong indraught of the flood toward the channel, between that island and the main, will be experienced, and the ebb will be found setting strongly out in the contrary direction; that is, to the SE. The rate of these streams seldom exceeds a mile per hour.

(H. O. Chart, No. 1108.)

Natashquan River enters the sea on the west side of the Natashquan Point, and 3 miles northwestward from its south extremity. The mouth of the river, between low sandy points, is fully one mile wide, but nearly the whole of this space is occupied by a low sandy island, having narrow channels on either side of it. The northern channel is nearly dry at times, but the southern one has a depth of 6 feet at low water, and from 9 to 11 feet at high water, according to neap and spring tides. There is the same depth within, and small schooners may lie alongside the steep sandy bank, where the houses of the Hudson Bay Company's post stand, on the south side of the river, ½ mile within the entrance. The bar of sand, on which there is usually a heavy surf, extends out ¾ mile, and is exceedingly steep to seaward, where 20 fathoms will be found within ¼ mile. Codfish are taken in great numbers off this bar in the month of June, and the river abounds with salmon.

Above the trading post the river is full of sand banks, dry at low water, and only navigable for boats for a few miles to the first rapids.

The sandy beach continues northward for 3½ miles from the entrance, terminating at the mouth of a small stream, named Little Natashquan River, which admits boats only at high water, and which is close eastward of the harbor of the same name.

Little Natashquan Harbor, formed by a number of islets and rocks, is only fit for vessels not exceeding 100 tons. The entrances, of which there are two, formed by a reef of rocks in the center, are not more than 180 yards wide between reefs, the extent of which under water can not be seen, because the water is discolored by the dark streams of the neighboring rivers.

The depth that can be carried in at low water by the best channel is 3 fathoms, and 5 fathoms by that which is between the central reef and the islets on the east side. The space within the reefs where small vessels can ride in from 3 to 5 fathoms, over sand and mud bottom, is only ¼ mile in diameter. The anchorage is protected by the main and islets from all winds excepting the SSW., in which direction there are reefs of rocks, some parts of which are always above water. In a strong SW. wind, some sea comes over these reefs at high water, but never enough to endanger a vessel during the summer months. There are several rocky patches, with from 2¼ to 3 fathoms off the harbor's mouth; these, with the want of space to work in, and the difficulty of getting out with the prevailing southerly winds of summer, render this place of little use for the purposes of navigation; but it is a valuable harbor for the fishermen, whose schooners of from 30 to 100 tons are well suited to the size and nature of the place, which is contiguous to excellent fishing ground, and affords every facility for drying fish. The harbor should not be entered by a stranger without a pilot.

Population.—There were 365 inhabitants resident in this locality in 1891. The majority of the people live on the eastern side of Little Natashquan River, where there is also a Roman Catholic church. There is an establishment on the north shore of the harbor.

Tides.—It is high water, full and change, in Little Natashquan Harbor at 11h.; springs rise 5 feet, and neaps 3 feet.

Directions.—The entrance of Little Natashquan Harbor lies 4 miles NNW. from the southern entrance of Natashquan River, and a vessel being off the bar of that river in 20 fathoms, should steer N. 3° E. (N. 33° E. mag.) nearly parallel to the sandy beach. When she has run rather more than 3 miles, and has decreased her depth to 12 fathoms, she will be about ½ mile from, and will see, the islets and rocks which, commencing at the termination of the sandy beach, lie off the entrance of Little Natashquan River, and form the east side of the entrance to the harbor. The westernmost of the islets is much larger than those which lie farther SE. between it and the termination of the sandy beach. Bring the SW. point of that island to bear N. 3° E. (N. 33° E. mag.) in 12 fathoms water, and the southeasternmost of the rocks at the termination of the sandy beach will bear N. 53° E. (N. 83° E. mag.).

From this position, by ascending the rigging for the purpose, the reef

will be made out on the west side of the harbor, which extends rather more than ½ mile southward from a rather high and round-backed islet of gray granite, with a wooden cross upon it, which can be seen 2 miles. This islet, named Beacon Islet, will bear N. 14° W. (N. 16° E. mag.) from the position above indicated, and Central Reef, some part of which is always above water, will be seen between it and the islets and the point of the main, which, together, form the east side of the harbor. Steer N. 14° W. (N. 16° E. mag.) for Beacon Islet, until abreast of the outer part of the reef to the westward, which will be distant a little more than 200 yards, and the vessel will be in about 7 fathoms water.

Alter the course now sufficiently to the eastward to pass on that side of Central Reef which may be preferred, giving its rocks above water a berth of 200 yards, if the west channel is taken. Central Reef is quite bold to the southward, and also on its east side, so that it may be approached within 40 yards when entering by the east channel; but bear in mind, in hauling round its north and NE. ends, that it extends 140 yards under water from the rocks, which always show, toward the center of the harbor. The best berth to anchor in is nearly in the center of the harbor, in 4 fathoms, sand and mud bottom.

Sphinx Rock, with 9 feet on it at low water, lies with the beacon on Beacon Islet bearing N. 30° W. (north mag.).

H. M. S. *Niobe* in 1869 touched on a rock with 15 feet water on it, which may be considered as an extension of Central Reef; it lies about 120 yards from the north rock (above water) of Central Reef, in a NW. direction, and on the direct line between that rock and the south end of Beacon Island; 18 and 20 feet were found close to the rock.

(H. O. Chart No. 1109.)

Washtawooka Bay, 5 miles westward of Little Natashquan, is full of small islets, rocks, and ledges, affording shelter to shallops and boats. It is an intricate and dangerous place, and may be known by Shag Islet, a large black rock lying off it, and farther out than the rest, being 1½ miles S. 55° E. (S. 25° E. mag.) from the projecting point of the main.

Agwanus River, 10 miles westward of Little Natashquan Harbor, is a large stream, having rapids and falls 1½ miles from the entrance, which is narrow, and has only 6 feet in it at low water. There is no bar, but many small rocks, both above and under water, extend 1½ miles off its mouth, and render the approach extremely dangerous. The east entrance point is of rock, the other of sand, and there is a small islet ¾ mile from the mouth of the river. From 9 to 12 feet can be carried up to this islet, above which the river expands into a basin, ½ mile wide, and carrying 5 fathoms close up to the foot of the rapids. There is a sandy beach for 1¼ miles eastward of this river, and also westward of it to Nabesippi River.

Nabesippi River, 5 miles from Agwanus River, enters the sea at the extremity of a sandy point. It is much smaller than Agwanus River,

tends rather
-backed islet
seen 2 miles.
16° E. mag.)
art of which
lets and the
the harbor.
reast of the
tant a little
homs water.
on that side
above water
tral Reef is
that it may
hannel; but
t it extends
toward the
early in the

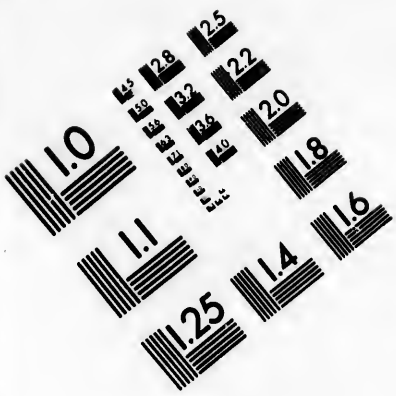
e beacon on

water on it,
it lies about
ef, in a NW.
e south end
ock.

quan, is full
hallops and
e known by
ut than the
ecting point

an Harbor,
e entrance,
There is no
, extend 1½
dangerous.
d there is a
12 feet can
nto a basin,
the rapids.
r, and also

e sea at the
nus River,



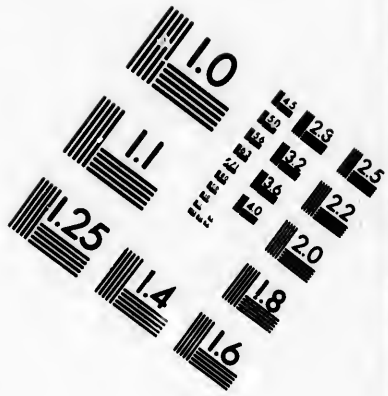
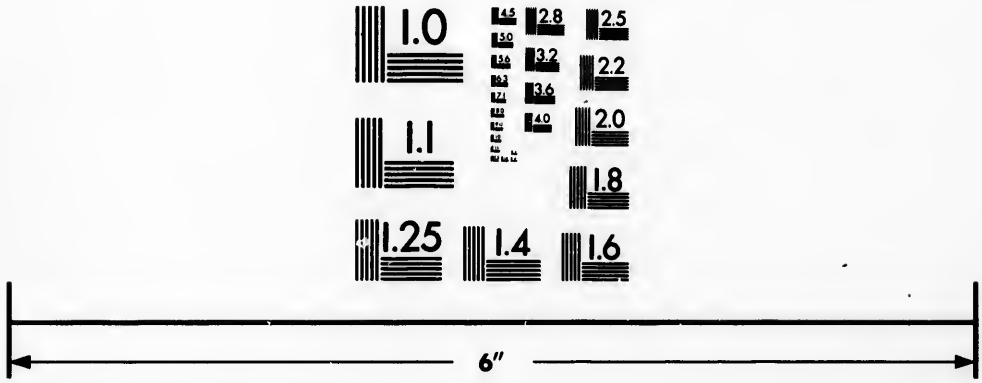
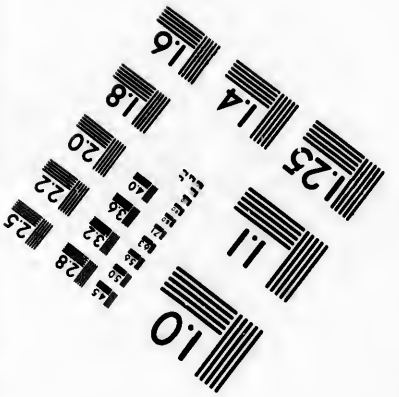
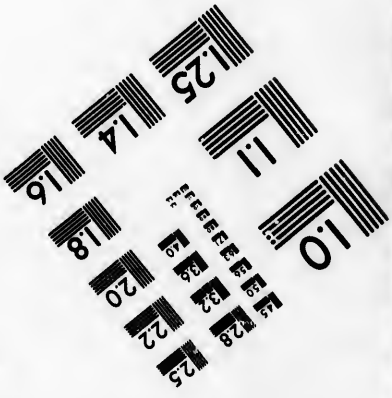


IMAGE EVALUATION
TEST TARGET (MT-3)







Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

and will only admit boats in fine weather. On the west bank, a short distance within the entrance, stands a house and store, the trading post of the Hudson Bay Company, which can be readily seen from the sea.

Pashasheeboo, Mushkoniatawee, and Washatnagunashka are small bays, full of small islets and rocks, which render their entrances so difficult and dangerous that directions would not be of the least avail. They are occasionally, but not often, entered by small coasting schooners intimately acquainted with the coast, and none but those who know every rock and ledge could either distinguish them or take a vessel in. The first named is open to the southward. The second, less intricate than the other two, is 400 yards wide, with 5 fathoms water in the entrance and within; it is open to southerly winds, but is, nevertheless, tolerably secure for small craft, which may lie close to the rocks. The third is 1¼ miles wide, with a chain of rocks above and under water across its mouth, not large enough or close enough to afford much shelter, yet too close and too numerous for a vessel to find her way through without great difficulty and danger. There is a depth of 3 fathoms in the entrance, and 4 and 5 fathoms within.

Watcheeshoo, 18 miles west of the Nabesippi River, is a hill of granite, 127 feet high, and bare of trees. It is a peninsula, but appears like an islet, higher than the rest, when seen in a vessel from a distance. There is a fishing post of the Hudson Bay Company in a cove among the rocks, to the westward of it. Watcheeshoo and Saddle Hill, which is 374 feet high above the sea, serve to point out to a vessel her position off the coast. The latter is 6 miles inland from the former in a northerly direction.

Quetachoo-Manicousagon and Peashtebai are two contiguous bays, 4 miles westward of Watcheeshoo. The first, which is the easternmost, is 2½ miles wide, and carries from 3 to 14 fathoms water, but so full of rocks and ledges as to be useless, excepting to the smallest schooners; it is open to the southwestward. The other is a much smaller bay, capable of affording shelter only to boats, and open to the southward.

Appeetetat Bay is full of rocks; of no use to vessels, because of the ledges under water off its entrance, and also within.

The Mingan Islands are estimated nowhere to attain an elevation exceeding 300 feet above the sea, and are in general much lower. They possess very little soil, but nevertheless are thickly wooded with spruce, birch, and poplar on the side toward the mainland; though toward the sea barren tracts often occur, composed either of bare limestone, or of banks and ridges of limestone gravel.

The Coast of the mainland, from Mingan River to St. John River, is of sand and clay, low and thickly wooded, and with a fine sandy beach. Farther eastward the shore is sometimes of granite, and at others of limestone, the latter rock lying immediately over the former. Mount

St. John, 1,416 feet high, is the highest point of the mainland in this neighborhood. There are other hills rising 1,000 feet above the sea, about 18 miles farther eastward, but 6 or 7 miles back from the sea, and nearly opposite Quarry Island. With these exceptions, the main is low, and it is particularly so abreast the eastern islands, where the hills are far back in the country.

Wood and Water can readily be obtained from the principal of Mingan Islands; wild berries are abundant in their season, and so are different kinds of wild fowl; quadrupeds are scarce, but there are plenty of seal upon the limestone reefs, and a few codfish off the coast.

Tides.—The tides are not strong among Mingan Islands, never exceeding one knot, except in very narrow channels. They are often rendered irregular by the winds, but in fine settled weather there is a constant alternation of the streams of flood and ebb between the islands and the main, and also within the distance of 2 or 3 miles from the southern shores of the islands.

St. Genevieve Island, the easternmost, is about 5 miles in circumference. Its NE. point is a bluff headland, the termination in that direction of the highest part of the island, which is about 200 feet above the sea, and slopes irregularly down to the southward.

Mount St. Genevieve, 332 feet above high water, is an isolated table hill on the mainland, about one mile inward and 2¼ miles from the NE. point of the island. This mountain and the high NE. point of the island distinctly point out from the sea the position of the channel between the island and the main.

Saints and Bowen Rocks are two patches of rocks which render it necessary to approach St. Genevieve Island with caution.

Saints Rocks are two low and bare rocks, lying rather more than ½ mile southward of St. Genevieve. There is a channel with 5 fathoms water, but with foul ground, between them and the island; and reefs under water extend from each of them fully 600 yards.

The NW. Bowen Rock, with 3 feet least water, lies $\frac{1}{10}$ miles N. 78° E. (S. 73° E. mag.) from East Saint, and with the south side of the latter in line with the center of West Saint.

The SE. Bowen Rock, with 6 feet least water, lies S. 68° E. (S. 39° E. mag.) ⅔ mile from the NW. Bowen Rock and S. 87° E. (S. 58° E. mag.) 1⅔ miles from East Saint, which is just open northward of West Saint.

These very dangerous rocks lie nearly in a line from the SE. point of St. Genevieve Island, at the distances of 1⅛ and 2 miles, respectively. There is deep water between and close to them, and also for rather more than one mile southward of them and Saints Rocks. The soundings are here extremely irregular, varying from 4 to 6 fathoms, rock, to 43 fathoms, sand, sometimes in a single cast of the lead. The whole of this dangerous part should be avoided by vessels.

Hunting Island, the next westward of St. Genevieve Island, is low, thickly wooded, broken into many coves, and is fringed with small

islets and rocks on all sides, except toward the mainland. Wood and Gun Islands lie 1½ miles off the SW. point, leaving no passage between, and having reefs extending from them 600 yards southward. They are both low, and the latter is bare of trees, but covered with grass and peat, in which innumerable puffins burrow and rear their young.

Garde Rock, always above water, lies rather more than one mile southward of the middle of the southern coast of Hunting Island; it would be highly imprudent for any ship to attempt a passage between it and the island, as there are many ledges scattered along the southern side of the island, and Garde Rock is itself the termination of a long ridge of sunken rocks. The southeastern end of the island is likewise beset with several reefs, some of which extend ¾ mile southward.

Collins Shoal, a small patch of rocks, with 12 feet least water, lies 2¾ miles from the SE. point of Hunting Island. From this dangerous shoal the east point of St. Genevieve Island is just open eastward of West Saint, bearing N. 9° E. (N. 38° E. mag.), and the north point of Wood Island is in line with the south side of Garde Rock, bearing N. 73° W. (N. 44° W. mag.).

Caution.—Between Collins Shoal and the reefs off the SE. point of Hunting Island the soundings are irregular, from 4 to 17 fathoms over rocky bottom, and vessels should not pass between them.

St. Genevieve and Betchewun Harbors.—The first of these harbors is between St. Genevieve Island and the mainland, and the second between Hunting Island and the main. Both are excellent harbors, not difficult of access or egress with the assistance of the chart, and are fit for large vessels.

Wood and Water may be obtained, the latter from small streams, either on the main or on the islands.

Directions.—There are two channels leading to these harbors, namely, East and Saints Channels. East Channel is the best with easterly winds, and may be used with moderate westerly winds during the flood tide by vessels not too large to work in such narrow channels, but they must be careful in their boards to the northward, especially in that toward Ledge Point.

By East Channel.—To enter by the East Channel, bring the NE. point of St. Genevieve in line with Indian Point (a low wooded point of the main, forming the east point of Pillage Bay), bearing N. 61° W. (N. 32° W. mag.). Run in with this mark on, and it will lead ½ mile northeastward of the Bowen Rocks.

When the SE. point of St. Genevieve and the West Saint come in line, steer a little to the northward, so as not to go too near a flat shoal which extends nearly 600 yards from the NE. side of St. Genevieve. Give the NE. point of St. Genevieve a berth of 200 yards. Anchor in 10 fathoms, mud bottom, halfway between it and Anchor Island, close off the NW. point of St. Genevieve.

Caution.—The distance across from the NE. point of St. Genevieve

to the main is about a mile, but the navigable breadth of the entrance is reduced to ½ mile by the rocks and shoal water off Ledge Point. The shoal water extends from Ledge Point, directly across Pillage Bay, to Partridge Point, and a vessel must not approach these shoals nearer than 7 fathoms.

Betchewun Harbor.—If wishing to proceed to Betchewun Harbor, pass to the northward of Anchor Island, which is quite bold on that side. The north point of Hunting Island is a cliffy mound, with a cove on its eastern side. It is quite bold, and a vessel must pass close to it to avoid the shoal off Partridge Point, which extends ¼ mile southward, and diminishes the navigable breadth of the entrance to 700 yards. When in the entrance, a low islet will be seen in the center of the harbor; steer for it and anchor with it bearing S. 69° W. (N. 82° W. mag.) and distant ⅓ mile. The depth of water in the harbor is from 9 to 18 fathoms, over mud bottom.

By Saints Channel.—To enter these harbors by Saints Channel, bring the west points of St. Genevieve and Anchor Islands in line, bearing N. 28° W. (N. 1° E. mag.), at not less than 5 miles from the former, to be sure that the vessel is outside of Collins Shoal. Run in upon this leading mark until the north sides of the two Saints come in line, bearing N. 74° E. (S. 77° E. mag.). The east sides of Mount Partridge and of Hunting Island (or rather, of an island joined to it at low water) will come in one at the same time, bearing N. 60° W. (N. 31° W. mag.); Steer upon this last-named leading mark (to avoid a reef which extends 550 yards from the SW. point of St. Genevieve) until the east side of Mount St. Genevieve, seen over the sandy SE. point of Anchor Island, comes in line with west point of St. Genevieve Island, bearing north (N. 29° E. mag.). Thence by steering N. 31° W. (N. 2° W. mag.) it will lead in through the center of the channel between St. Genevieve and Hunting Islands, and the vessel may either proceed to St. Genevieve or Betchewun Harbors.

The directions just given for Saints Channel will lead a vessel in between the dangers off St. Genevieve and Hunting Islands in not less than 20 fathoms water, and she will not have a less depth until she is in as far as Anchor Island. The breadth of the channel between the shoal water off Saints Rocks and the shoals off the SE. point of Hunting Island is nearly one mile. It diminishes to ½ mile between the reef off the SW. point of St. Genevieve Island and the east end of Hunting Island, which is the narrowest part of the channel. Within this narrowest part, the ground becomes good for anchoring, as it is everywhere between St. Genevieve and Betchewun Harbors. Indeed, so little sea comes in that the whole space may be considered as a harbor capable of holding a great number of vessels of large draft.

There is an inner harbor at Betchewun, westward of Low Islet, but from thence there is no channel, excepting for boats, to pass out to the westward between Hunting Island and the main.

Tides.—It is high water, full and change, in Betchewun Harbor at 11h. 30m.; ordinary springs rise 5 feet, and neaps 3 feet.

The tidal streams between St. Genevieve and Hunting Islands and the mainland are much influenced by the winds; but their rates seldom amount to one knot at any time, and are usually much less, excepting through the shallow and narrow channel at the west end of Betchewun Harbor, where there is at times a complete rapid.

Charles Island, the next westward of Hunting Island, is 3 miles long, parallel to the coast, and 1½ miles wide. It is about 200 feet high, bold, and free from shoals; but at ¾ mile SSE. from its east point there is a patch of rocky ground on which no less than 5 fathoms have been found, but which had better be avoided by vessels of large draft.

Puffin Bay.—The east point of Charles Island is west nearly 2¼ miles from the west point of Gun Island, off the SW. extreme of Hunting Island. The former of these points is quite bold, and so is the latter to the NW., but a reef extends 400 yards SSW. from it. Between them is the entrance to Puffin Bay, which is open to southerly winds. Within the east point of Charles Island, and midway toward Shoal Cove, there is good anchorage in 7 fathoms, mud bottom, at 400 yards from the island; but SE. winds send in a considerable swell. In the NE. corner of this bay is the narrow entrance (between shoals off Ragg Point and Hunting Island) to Ragg Bay, which has tolerable anchorage in its NW. part, but has very deep water on the side toward Hunting Island, and is separated from the western part of Betchewun Harbor by the shoal and narrow channel for boats between the island and the main.

Charles Harbor, between Charles Island and the main, though very narrow, is quite secure, and deep enough for large vessels, but its entrances are only 160 yards wide. Within, the harbor expands to ¼ mile wide by ¾ mile in length, parallel to the shore. Both entrances have a depth of 7 fathoms, but a vessel must pass over 4 fathoms if she enters from the eastward, through Puffin Bay. The depth within the harbor is from 4 to 6½ fathoms, with mud bottom.

Tides.—Strong winds occasionally cause the tides to run at the rate of 2 knots in the entrances of the harbor, but in general there is only a weak stream with either tide.

Trilobite Bay.—Whale Island, lying ¼ mile from the east side of Ammonite Point, and with shoal water between, is ¾ mile westward of Charles Island. Both islands are bold and cliffy, and Trilobite Bay is between, with excellent anchorage, well sheltered from all but southerly winds. The only danger to be avoided when working into this bay is Ammonite Reef off Ammonite Point, which includes a small islet, and extends ½ mile off shore to the southward. The mark to clear this reef when running along the coast is to keep Gun Island open southward of Charles Island, and when hauling in from the westward into Trilobite Bay keep the NW. point of Charles Island well open southward of Whale Island.

Directions.--To enter Charles Harbor from Puffin Bay, bring the NE. point of Charles Island, which is high and cliffy, to bear N. 75° W. (N. 46° W. mag.), then steer for it and give it a berth of about 300 yards as the vessel hauls round it to the westward into the harbor.

To enter from Trilobite Bay, give the NW. point of Charles Island a berth of between 120 and 280 yards as the vessel hauls round it into the harbor. All the way from the eastern narrow entrance into Charles Harbor there is a broad zone of shoal water, which curves round parallel to the mainland till it joins Whale Island, and nearly fills up all the NW. part of Trilobite Bay, rendering the entrance of the harbor too narrow for convenient or general use.

Clearwater Point, 2 miles westward of Ammonite Point, is low, and the shoal water does not extend more than ¼ mile off it to the southward.

The Coast between Clearwater and Esquimaux Points forms a large bay, along which there are high and conspicuous cliffs of sand and clay that distinguish this part of the coast to a vessel at sea. Shoal water extends a considerable distance from the shore all round this bay, and abreast Sea Cow Island the 3-fathom line of soundings is a mile out from the sandy beach.

Clearwater Shoals.—1½ miles S. 65° W. (N. 86° W. mag.) from Clearwater Point lies a rocky 3-fathom shoal, and there are three others with 2 to 3 fathoms lying to the northward of the first, and in a line from the point, toward Walrus Island, the outer and westernmost of them being rather more than 2 miles from the point. To pass outside these shoals, at the distance of ½ mile, keep the south points of Gull and Fright Islands in one, bearing N. 83° W. (N. 54° W. mag.)

Sea Cow and Walrus Islands lie about 4 miles west from Clearwater Point. They are steep and precipitous, excepting to the southward, in which direction the reef off Sea Cow Island extends ¾ mile, and that of Walrus Island 400 yards.

Sea Cow Channel.—There is a clear channel named Walrus westward of Sea Cow and Walrus Islands, and also between them and the Clearwater Shoals. This latter channel, named Sea Cow, is 1⅓ miles wide, and, although not as good as the Walrus, may be used in proceeding to Esquimaux Harbor from the eastward by running upon the leading mark which has been given for clearing the shoals to the westward of Clearwater Point, until the NE. extremes of Esquimaux and Walrus Islands come in one. Then steer for the NE. side of Sea Cow Island and haul round it at not less than 400 yards to the northwestward for the east entrance of the harbor.

Green Island, small, low, and covered with grass, with reefs stretching north and south nearly 600 yards, but bold to the east and west, lies nearly one mile west from Walrus Island and ⅓ mile east from Esquimaux Island.

Gull Island lies SW. by W. one mile from Green Island, which it

resembles, excepting that it is rather smaller. It is ½ mile southward of the SE. point of Esquimaux Island, but there is no passage for ships between them. The south point of Gull Island is bold, and may safely be passed at 400 yards.

Esquimaux Island, 2¾ miles long, parallel to the coast, and 1¾ miles wide, is 200 or 250 feet high toward its north side, sloping to the southward. From its SW. point a shoal extends toward Fright Island, which also has a shoal stretching toward Esquimaux Island. The channel between these, leading northward toward Esquimaux Harbor, is nearly 800 yards wide, with deep water, but as there are no leading marks for it, and the reefs on either side are extremely dangerous, it can not be recommended.

Fright Island is nearly one mile from the SW. point of Esquimaux Island, and about ⅝ mile long, in a northerly direction; it is bold to the southward, on which side vessels may pass at 200 yards, but reefs extend 600 yards off it to the eastward, and also off its NE. and NW. points.

Quin Island lies a short ½ mile north from Fright Island; it is nearly 1¼ miles long, in a northerly direction, and its shores are bold, with the exception of Quin Reef, extending ½ mile west from its north point.

Fright Channel is deep, but only 400 yards wide between Quin Island and the reefs off Fright Island. It can not be recommended, but might be used in case of necessity by hauling up to the east of Niapisca Island till the south end of Quin Island comes in one with the south side of the cove in Esquimaux Island, bearing N. 85° E. (S. 66° E. mag.), then steering so as to pass close round the south point of Quin Island, which is quite bold.

Quin Channel is the best for vessels approaching Esquimaux Harbor from the westward. The depth in this channel is from 5 to 7 fathoms, over rocky, gravelly, and sandy bottom. The shoal water extends only to the distance of 200 yards from the island, but off Pointe des Morts, and the small islets to the westward of it, the reefs extend 400 yards southward.

Esquimaux Harbor lies between Esquimaux Island and the mainland. Esquimaux Point, having the entrance of a small river on its west side, consists of sand, and is quite bold to the southward, although shoals extend from it across the bays on either side. The north and NE. points of Esquimaux Island are also bold, and may be passed at the distance of 140 yards by large vessels. The depth within this secure harbor is from 5 to 15 fathoms, over a sandy bottom. The space in which vessels may anchor is nearly 1½ miles long, and the average breadth is 800 yards.

Water.—Supplies of good water may be procured from the river as Esquimaux Point, or from small streams on the island, and wood it plentiful.

Directions.—Brief directions have been already given for Sea Cow, Fright, and Quin Channels, leading to Esquimaux Harbor. The best channels from the eastward and westward will now be described.

By Walrus Channel.—Walrus Channel, between Walrus and Green Islands, is the best with easterly winds. It is ¾ mile wide, with 8 fathoms least water, and it is only necessary to give either island a berth of 400 yards to be clear of all dangers. Being 2 or 3 miles outside of these islands, bring the NE. point of Esquimaux Island to appear about halfway between the two islands above mentioned as forming the channel, and it will bear about N. 29° W. (north mag.). Steer for it, and, giving it a berth of 200 yards, haul round it to the northwestward into the harbor, and anchor in the depth and position which have been recommended.

By Niapisca Channel.—Niapisca Channel is the best with westerly winds. Passing in to the northward, between Niapisca and Fright Islands, it leads to the entrance of Quin Channel, and thence eastward to the harbor. The dangers to be avoided in this channel, besides the reefs off Fright and Quin Islands, are the reefs of flat limestone extending ½ mile out from the south and SE. points of Niapisca Island. Between those points a remarkable group of flowerpot rocks will be seen standing on the limestone just above high-water mark. From the east point of the island, which is the south point of a bay, another reef extends ½ mile NE. by N., but there is ample space between these reefs and Fright Island, the channel being over one mile wide in the narrowest part, with 30 to 40 fathoms water.

In running for this channel from the westward, the leading mark for clearing the south reef of Niapisca Island by more than 400 yards is the NW. point of Fright Island in line with the SE. end of Quin Island. Do not, therefore, open those islands clear of each other until Moniac Island (2½ miles NNW. from Niapisca Island) is brought in sight to the eastward of Niapisca Island. Having done so, haul in through the channel, steering N. 3° W. (N. 26° E. mag.), and when Moutange Island (next westward of Moniac Island) opens northward of Niapisca Island, the vessel will be clear of the reef off the east point.

Haul up now, if necessary, to clear Quin Reef, until the north point of Esquimaux Island is not only open northward of Quin Island, but also till the north point of Sea Cow Island is open northward of Esquimaux Island. Run in between Quin Island and the main, with the last-named marks just open, and they will lead about 400 yards past the north point of Quin Island.

It must be borne in mind that the mark for the shoals off Pointe des Morts, and the small islets westward of it, is the north and NE. points of Esquimaux Island in line, bearing S. 74° E. (S. 45° E. mag.); if a vessel opens them before she is as far eastward as Quin Island she will be ashore.

Having passed Quin Island, continue the course toward the north

point of Esquimaux Island, and haul round it southeastward into Esquimaux Harbor.

Tides.—It is high water, full and change, in Esquimaux Harbor at about 0h. 30m., and the rise at springs is 6 feet, and at neaps 3½ feet.

The tides usually run at the rate of about one knot through Esquimaux Harbor, the flood coming round Clear Water Point from the eastward, and passing to the westward between Quin Island and the main. The ebb flows in the contrary direction.

The flood also draws in between Fright and Niapisca Islands, and the ebb sets out through the same channel. But these streams are much influenced, both in their rate and duration, by the winds, and the ebb is much accelerated by westerly winds in Esquimaux Harbor, running there at times fully 2 knots.

Niapisca Island, rather more than 2 miles long, NNW. and SSE., is only partially wooded, and has three principal hills, not exceeding 200 feet high.

Quarry Island, nearly 2½ miles long, parallel to the coast, and about the same height as Niapisca Island, is separated from the latter by a channel nearly 800 yards wide, with a small islet in it, but no safe passage for shipping, because of a shoal in the bay to the southward, and of a reef which stretches beyond the small islet. Other reefs also extend ⅛ mile from the west side of Niapisca Island, and from the south and SE. side of Quarry Island.

Quarry Cove is on the north side of Quarry Island, and ⅜ mile northwestward of the east end of the island. It is about ¼ mile wide and 800 yards deep, with 22 fathoms water in the entrance, shoaling gradually to 5 fathoms with mud bottom close to its head. The islands and shoals along the mainland are only 3 miles northward of this cove, which thus becomes completely landlocked though a very small harbor. No other directions are requisite than keeping the west side nearest on board in entering, and to anchor near the center in 9 or 10 fathoms.

Water.—Good water may be obtained from a small stream in the SW. corner of Quarry Cove.

Quarry Channel.—There is a clear channel between Quarry and Large Islands, which is the next westward. The only directions necessary are to bring the channel to bear N. 8° W. (N. 21° E. mag.), and then run in, keeping in its center until ⅜ mile within the SW. point of Quarry Island, after which that island may be kept close aboard, as the remainder of the channel, 1¼ miles, is quite bold on that side, while the shoal water extends 300 yards from Large Island. The flood runs slowly in through this channel, and the ebb as slowly out.

Large Island is thickly wooded, and its highest part about 200 feet above the sea. Reefs of flat limestone extend off its south and SW. points nearly ¾ mile, and the mark for the south point of these reefs, in 2 fathoms, is the south points of Niapisca and Fright Islands in one.

On its west side, a mile to the northward of its SW. point, there are many flowerpot and arched rocks, standing on the flat limestone above the present high-water mark.

Middle Reef lies just within the line joining the south points of Large and Mingan Islands and 2 miles westward of the former. A part of this reef is always above water, but it is not 60 yards in diameter, though the shoal around it is ½ mile long and ¼ mile wide. From the NE. side of this reef, in 4 fathoms, the east sides of the two Birch Islands are in one.

Large Channel, between Middle Reef and Large Island, should be used by a vessel proceeding to Mingan Harbor with an easterly wind, and in doing so the only thing necessary to be observed is that the reefs extend westward off the shore of Large Island, from 400 to 600 yards, as far in as the Flowerpot Columns, after which the island becomes bold. There is little or no warning by the lead on the Large Island side, but Middle Reef may be approached to the depth of 13 fathoms, which, on the east side, is more than ½ mile from it.

Farther in, Birch Islands form the west side of this channel, at nearly 2 miles from Large Island. The east side of Outer Birch Island is quite bold, and the shoal water extends only 300 yards off the east end of Inner Birch Island.

The channel between the two Birch Islands is 600 yards wide, but the ground is all foul, and not more than 4 fathoms could be carried through by a stranger.

Outer Birch Island is about one mile in diameter and about 300 feet in height, and it has a remarkable flowerpot rock on its SW. point.

Inner Birch Island is rather larger. Its NW. point is long and low, extending ½ mile westward from the body of the island, with a curve to the SW. Off this point there is a reef extending ½ mile westward, and having 12 fathoms within the distance of 200 yards from the extreme.

Hulk Rock.—At ½ mile SW. from the same point there is a small low islet, close to the south point of which stands a very remarkable rock, named Hulk Rock, from its resemblance to the hulk of a wrecked vessel. The reef, of flat limestone, dry at low water, which connects this islet and rock to the low west point of Inner Birch Island, extends 600 yards SW. from the rock, and also 400 yards westward.

Middle Reef Channel, between Outer Birch Island and Middle Reef, is almost one mile wide, with a depth of 30 fathoms, and the shoal water extends only 300 yards from the SE. point of the former; but there is a dangerous reef off the SW. side of Outer Birch Island, extending ⅔ mile from the shore.

Tides.—The flood stream sets out to the SW. between Birch Islands, and also between them and Middle Reef.

Birch Channel, between Birch Islands and Mingan Island, is the best by which to proceed to Mingan Harbor with westerly winds. It is 3 miles wide, and all deep water.

Mingan Island, 4½ miles to the westward of the Outer Birch Island, is about 100 feet in height and bare of trees. The shoal water does not extend above 600 yards off its south point, but to the SW. and west the reefs, including the islets, run out nearly 1,200 yards. The island is bold on its north and east sides.

Mingan Patch lies S. 11° W. (S. 40° W. mag.), 3¼ miles from the south point of Mingan Island, and with the SE. point of the Outer Birch touching the north point of Large Island; it is a patch of rocky ground with 9 fathoms water on it, yet there is a heavy swell upon it at times.

The Perroquets, the westernmost of Mingan Islands, are four small islets, low, and bare of trees. The northwesternmost is higher than the others, surrounded by cliffs, and has a superstratum of peat on its flat summit, in which great numbers of puffins burrow and rear their young.

The two easternmost of these islets have a reef of flat limestone extending ¾ mile southward. There is also a shoal ⅛ mile northward of them, and a narrow channel between them and the other two, but of no use to vessels. The northwesternmost islet has shoal water off it to the distance of ¼ mile, both eastward and westward, but a vessel may pass northward of it, at 400 yards, in 14 or 15 fathoms water.

Light.—On the summit of the northwesternmost of the Perroquets stands a square lighthouse, painted white, and 55 feet high, with dwelling attached, from which is exhibited at an elevation of 87 feet a revolving white light every thirty seconds, and visible 15 miles.

The light is obscured by Mingan Island between the bearings of S. 89° W. (N. 62° W. mag.), and N. 69° W. (N. 40° W. mag.).

Perroquet Channel, between the Perroquets and Mingan Island, is 1½ miles wide, and with depths varying from 30 to 40 fathoms in the center. Both the flood and ebb set out through the channel, the former to the SW. and the latter to the southward.

Mingan Channel.—All the islands just described, from Niapisca Island, are bold and free from danger on their north sides, so that Mingan Channel, which lies between them and the main, is safe throughout.

Moniac Island, on the mainland side of this channel, is less than ½ mile in diameter, and lies nearly abreast Niapisca Island, from which it is distant about 2½ miles. Moutange Island, 1½ miles farther westward, is about 1¼ miles in diameter, and off a bay full of small islets, and in which there are several small rivers. It is directly abreast Quarry Island, at the distance of 2¼ miles. These islands, Moniac and Moutange, are ¾ mile from the nearest point of the main, but shoals within and between them are nearly dry at low water.

The shoals do not project above 600 yards southward of these islands, but there is rocky ground, with irregular soundings between 4 and 10 fathoms out to the distance of a mile to the southward of them both,

so that a vessel beating in the Mingan Channel had better not stand over to the northward beyond 1¼ miles from the northern shores of the outer islands, or into less than 10 fathoms.

Long Point, NNW. of Mingan Island, and on which is a fishing establishment, consists of sand, and there is a fine beach from thence eastward as far as Mingan Harbor, inclusive. A sandy shoal extends off the shore, immediately westward of Long Point, to within one mile of the Perroquets. There is often a great ripple off this shoal, caused by the flood stream being turned off by Long Point toward the SW. This channel may be conveniently used in going to Mingan Harbor with a northerly wind.

Sand Lark Reef, lying 3¼ miles westward of Moutange Island, and rather more than a mile from the mainland, is small and low, but always above water. There is a clear channel with deep water on all sides of it, but there is a rocky patch, with 5 fathoms water, 1½ miles from it, on a line toward the south side of Moutange Island. This shoal water has not been particularly examined, and should therefore be avoided.

Harbor Island is of limestone, about 100 feet in height, bold toward Mingan Harbor, but shelving and shoal to the southward ¼ mile from shore. The length of the island is 2 miles, its greatest breadth does not amount to ½ mile, and it is thickly wooded.

Mingan River.—The mainland recedes from the island in the eastern part of the harbor, which would, in consequence, be exposed to easterly winds if it were not for a sandy shoal, dry at low water, which extends 400 yards out from the entrance of the Mingan River. This river is only capable of admitting boats at high water, and its mouth is opposite the east end of the island.

Mingan Harbor.—The eastern entrance between the sandy shoal and the island is 400 yards wide, the western entrance between the mainland and the island is nearly as wide, the whole breadth in both entrances being in deep water. The space within, in which vessels may anchor in safety, is about a mile long by rather more than ¼ mile wide, with plenty of water for large vessels, over a bottom of fine sand.

Directions.—In approaching Mingan Harbor from the eastward, bring the north or inner side of Harbor Island to bear N. 72° W. (N. 43° W. mag.), and the houses of the Hudson Bay Company's post ought then to appear open fully their own breadth to the northward of the island. Steer for those houses so open, leaving the east end of the island 300 yards to the southward, and taking care to keep Sandy Point, at the western entrance of the harbor, shut in behind the north side of the island, for when they are in one the vessel will be on shore on the sandy shoal off Mingan River. After the east end of the island is passed, run along its north side at the distance of 200 yards, and choose a berth anywhere near the center of the harbor, in from 9 to 13 fathoms, sand bottom.

When running for the harbor from the westward, run in toward the sandy beach of the mainland at ¾ mile westward of the island until Sandy Point comes in one with the face of the clay cliffs to the eastward of the Hudson Bay Company's houses, bearing N. 71° E. (S. 80° E. mag.), or until the depth is 11 fathoms. Run upon this mark along the beach and give Sandy Point a berth of 100 yards as the vessel passes into the harbor, and choose a berth as before directed.

Mingan Harbor is quite secure in all winds, and, like Esquimaux Harbor, it has this great advantage, that vessels can enter or leave it either with easterly or westerly winds.

Tides.—It is high water, full and change, in Mingan Harbor at 1h. 16m.; springs rise 6 feet, and neaps 4 feet.

Soundings.—The banks of soundings, which extend off Mingan Islands toward Anticosti, have been already mentioned on page 22, and it is only necessary to add that their southern edge, in 50 fathoms water, is no less than 5 miles from the islands, and that the banks become wider, or extend farther off, to the westward. There is much greater depth of water in some of the channels between the islands than there is on these banks, as will be seen by the chart.

Coast.—From Long Point a broad beach of fine sand reaches to St. John River, and the chart will show that an irregular band of shoal water lies outside of this beach, at a distance of ¾ mile.

(H. O. Chart, No. 1110.)

St. John River.—This large stream empties on the northern shore of the gulf, at 6½ miles NW. by W. from the Perroquets. It is occasionally frequented by fishing schooners early in the season, and the boats of the *Gulnare* ascended it 6 miles, following the winding of its channels, with a depth varying from one to 3 fathoms at low water. The tide flows no farther than the distance just mentioned, where the river becomes too rapid to be navigated by other than canoes or flat-bottomed boats. The course of the river, for several miles up from the entrance, is between high cliffs of stratified sand and gravel over clay, with small sandy islands occasionally. The country, on either side, is covered with a thick growth of small spruce trees. At the entrance, between the clay cliffs on the west and a sandy point on the east side, the river is 260 yards wide. The breadth increases to nearly ½ mile immediately within the entrance, and then decreases again gradually, being nowhere less than 200 yards wide in the first 6 miles.

There were two log houses on the west bank, ½ mile within the entrance, where a party of men occasionally resided to fish for salmon; and vessels may lie close to them in 2 fathoms at low water.

Bar.—An extensive bar of sand, ½ mile out from the entrance, shifts with every gale of wind, and has seldom more than 3 or 4 feet over it at low water; at high water there are 7 or 10 feet on the bar, according as it may be neap or spring tide. Southerly and westerly winds cause so heavy a surf as to render the bar impassable.

Anchorage.—There is good anchorage outside the bar, which may be safely approached by the lead, the soundings decreasing gradually from 20 to 3 fathoms over sand and clay bottom, the greater depth being at 2½ miles and the lesser at ¾ mile from the mouth of the river.

Tides.—It is high water, full and change, at the entrance of St. John River at 1h. 20m.; ordinary springs rise 7 feet, and neaps 4 feet.

Aspect of Coast.—The coast between Magpie and Trout Rivers is composed of primary rock rising immediately from the sea in steep, although often rounded, hills, which are either bare or partially wooded with small trees of the pine species. The hills in front, or next to the sea, seldom exceed 200 or 300 feet in height; but others, a short distance back from the shore, form a range of greater elevation, varying from 500 to 700 feet, and nowhere exceeding 1,000 feet.

The appearance of this coast from a vessel is slightly undulating, bold, and unbroken, presenting features so little diversified that it is very difficult to make out one part of it from another at 6 or 8 miles off shore; but upon a nearer approach, the mouths of the rivers, taken in connection with the features of the neighboring land, will in general supply distinguishing characters, by which the situation of a vessel may be ascertained.

Local Magnetic Disturbance of the Compass.—The black oxide of iron, besides being a constituent mineral in the granitic rocks of this coast, is found abundantly in nests and veins, particularly in the vicinity of Sawbill River. Its magnetic action on the needles of compasses on shore is such as to cause the variation obtained by them to vary from 14° to 29° west. While sounding in the boats a similar disturbing influence on the compass has been sensibly felt, but diminishing or increasing as the water deepened or shoaled. In the *Gulnare*, at 2 or 3 miles from the shore, or within the contour line of 50 fathoms, the error from this cause never exceeded half a point, and at 5 or 6 miles it became insensible.

Caution.—This coast is not by any means so bold as it appears from a distance, for there are many rocks along it both above and under water, several of which are very dangerous, and nearly a mile from the shore. Strangers should not approach the shore between Magpie and Bason Rivers nearer than the depth of 20 fathoms. Still greater caution becomes necessary between the last-named river and St. Charles Point, where 40 fathoms is as near as a large ship can approach with prudence, for that depth in several places will be found within a mile of the rocks.

Mount St. John, an isolated saddle-backed hill, 1,416 feet above the sea, is N. by E. 11 miles from the entrance of the St. John River.

Coast.—Between St. John and Magpie Rivers the coast consists of white cliffs with a superstratum of sand, which is fast consolidating into sandstone by means of the red oxide of iron furnished by numerous small streams.

Magpie Bay is 8 miles wide between St. John River and Magpie Point. There is good anchorage, with winds off the land, in the bay, and vessels may stand in to 7 fathoms at low water in every part of it, but southerly and westerly winds roll in a very heavy sea.

Magpie River, the entrance to which is nearly in the center of Magpie Bay and 5 miles WNW. from St. John River, is a large and rapid stream, with several rocks above and under water off its east entrance point and ⅛ mile off shore.

The entrance of this river, between steep rocks, is only 60 feet wide, and the ebb tide rushes out of it in a torrent 5 fathoms deep. At 300 yards within this narrow entrance the river falls about 30 feet over granitic rocks. There are from 7 to 9 feet at low water over the bar outside. The river is of no use either to vessels or boats.

A rock with 3 fathoms water on it is reported to lie one mile from Magpie River.

Rather more than ¾ mile westward of Magpie River, and nearly ¼ mile off shore on the west side of Magpie Bay, there is a rocky shoal on which the sea almost always breaks at low water.

Ridge Point lies 3½ miles W. by S. from Magpie Point.

Four-fathoms Ridge, a long and narrow ridge of rocky ground, with from 4 to 6 fathoms at low water, extends 4½ miles westward from Ridge Point across a rocky bay, wherein there is one large and several small rocks above water. The western side of this rocky ground is nearly one mile southward of Thunder Point. There is a very heavy sea upon this ridge at times, and it then becomes dangerous to large ships. There are 20 fathoms water close outside it in some parts, and 30 fathoms is quite near enough to its west end.

Sawbill River, in the bay between Sheldrake and Ore Points, may be distinguished by the clay cliffs immediately within the entrance and by the peculiar hills on either side of it, which are barren and of gray feldspar, thickly studded with small round mounds.

This river affords shelter to boats and small coasting craft, but it can only be entered in very fine weather in consequence of the heavy surf. It has scarcely any bar, but the entrance, at the western extremity of a long and narrow spit of sand which extends across the mouth of the river, is very narrow, with depths of from 4 to 11 feet in it, according to low or high water, in ordinary spring tides. At high water neaps there is seldom more than 9 feet. The same depth continues only for a very short distance within the entrance.

Cod Bank, of sand, gravel, and broken shell, on which codfish abound, lies 9 miles SE. from the entrance of Sawbill River, and the depth is upward of 60 fathoms between it and the shore.

Shallop River, 7½ miles farther westward, affords shelter only to boats, and can only be entered when there is no surf. There are several rocks, both above and under water, off this river, and also off Sandy River, a small stream about 2½ miles farther westward The outermost of these rocks lies fully ½ mile from shore.

Manitou River, 4½ miles west of Shallop River, is the largest on this coast, excepting the St. John and Moisie Rivers, and may be readily distinguished from a vessel several miles off the coast by two remarkable patches of clay cliff, one of which is close eastward and the other about one mile westward of its entrance.

Directions.—To enter this river keep close along the rocky west side of Manitou Point, leaving on the port side the sandy spit close within it, which stretches out from the sandy west point of the entrance. The channel is always in this position, but it is more or less deep and wide, according to the season and the winds which may have recently prevailed. In general, the channel is about 60 yards wide, with a depth of 5 feet in it at low water and 12 feet in spring tides. Strong southerly and westerly winds cause a heavy surf and render the entrance impracticable. A short distance within the entrance there are 9 feet at low water, deepening gradually to 5 fathoms at the first rapid, one mile up the river.

Water will be found at a small stream on the western shore a short distance within the entrance.

Anchorage.—There is good anchorage off Manitou River. Vessels may safely anchor in fine weather with the wind off shore, having the entrance of the river bearing N. 21° E. (N. 49° E. mag.) 1½ miles, where they will have 15 fathoms over mud bottom and be more than one mile distant from Manitou Point, the nearest point of the shore.

Small vessels may anchor farther inshore westward of the bar, and in the bay between Manitou and Buchan Points; for the soundings decrease regularly in toward the shore, with sand and clay bottom, and there is no other danger but a small rocky shoal which bears S. 65° E. (S. 37° E. mag.) nearly a mile from Buchan Point, and is about ¾ mile off shore.

Buchan, Fall, and Hotteurs Rivers fall in cascades into the sea or close to it, and thus serve to point out to a vessel her position off the coast; and there is, moreover, a remarkable white patch close to the westward of Buchan River.

Bason River, 10¾ miles west of Manitou River, has a spit of large stones extending about 300 yards out from its east point of entrance. The entrance is very narrow, with a varying depth, which is less or more according to the prevalence or infrequency of the SW. winds; but there is in general enough water for very small coasting craft or large boats. There are rapids ¼ mile within the entrance.

Cape Cormorant, 1¼ miles to the westward of Bason River, is a small peninsula, on the inner side of which there are two huts of a trading post always occupied, and which can not easily be seen from the sea.

Blaskowitz Point lies 5¾ miles westward from Cape Cormorant. Between them are Cormorant Islets, joined to the shore at low water, and not readily distinguishable from the mainland.

Cormorant Reef, which is small and dangerous, lies off Cormorant Islets, and about a mile from the shore. It has 12 feet least water and bears S. 68° W. (N. 85° W. mag.) 3 miles from Cape Cormorant. When on the inner edge of the reef, Blaskowitz and St. Charles Points are in line, bearing S. 84° W. (N. 69° W. mag.), so that vessels approaching this part of the coast should keep the latter point well open.

The Coast between Cape Cormorant and St. Charles Point is broken into coves, two of which are nearly a mile deep, full of rocks, and afford shelter only to boats. The shore is here fringed with rocks both above and under water, and should not therefore be made too free with.

St. Charles Point will readily be known by the cove on its eastern side, and by the trending of the land on the west side northwestward toward Trout River.

St. Charles Reef, lying off St. Charles Point, is extremely dangerous, being so bold that there is no warning by the hand lead, and very little with the deep-sea lead. It is composed of a great number of rocks near to each other, but having a considerable depth of water between them. Some of them always show, but the outermost patches are always covered. The last lie rather more than ¾ mile southward from the southern extreme of St. Charles Point; and the reef continues to the first cove, 1½ miles northwestward of the point, but does not there extend so far off shore as off the point itself.

Caution.—Vessels beating to the westward should take care not to be becalmed westward of St. Charles Reef, lest the heavy swell from the SW., so frequent on this coast, should heave them toward the reef, for the water is too deep to anchor until close to the breakers.

Moisie Bay intervenes between St. Charles Point and Moisie River. Trout River, a small stream, is in the center of this bay and 6½ miles NW. from St. Charles Point. Here the rocky shores terminate and the bold sandy beach, which extends 6½ miles SW. to the Moisie River, commences.

Seal House Cove, on the east side of Moisie Bay and 2½ miles from St. Charles Point, affords shelter only to boats. There are two log houses there, which are occasionally occupied as a fishing and trading post.

The granitic hills, which leave the shore at Trout River, continue inland until they join the ridges in rear of Seven Islands Bay. Between the hills and the sea there is an extensive tract of low sandy country, thickly wooded.

Moisie River empties on the east side of Moisie Point, which is the southern extremity of the sandy country just mentioned. It is larger than St. John River, discharging a great quantity of water in the spring after the melting of the winter snows, and bringing down from the interior great quantities of sand, which so obstruct its wide and shallow channel in the first 2½ miles from the sea that boats can not ascend at low water.

The river becomes shallow immediately within the entrance, expanding into a wide place full of sand bars at low water. In the above named distance from the sea, the breadth of the river decreases from 2½ miles to ½ mile, and at the end of that distance the sand bars cease. The river has then a clear channel, with a depth of 9 feet water, between steep sandy shores or cliffs for one mile farther, where its breadth is ¼ mile. The traders report that flat-bottomed boats can ascend 18 or 20 miles to the first rapids, following the stream. The bar, which is of sand, dry at half tide, extends nearly ½ mile southwestward from the long, low, and narrow east entrance point, and nearly parallel to the east side of the west entrance point.

The entrance of the river between this bar and the west point is from the SSW., and continues for the distance of 1,200 yards with a breadth of ¼ mile, and a depth varying with the seasons and the winds which prevail; those from the southward and eastward having a tendency to block up the channel. It is supposed that there is seldom a less depth than 9 feet at low water, the same as inside, close under the west entrance point, which is the only place where a small vessel can find shelter, close to two log houses occasionally employed as a salmon fishery by the people of the Hudson Bay Company. The shelter here is extremely imperfect in gales of wind from the southward and eastward, which send in so heavy a sea that, after breaking completely over the bar and across the entrance, it still retains power enough to seriously affect a small vessel.

Tides.—At the entrance of Moisie River it is high water, full and change, at 1h. 30 m.; ordinary springs rise from 5 to 8 feet.

Moisie Shoal.—Although the bar of the Moisie River is so bold that there are 50 fathoms water at the distance of ⅜ mile from it to the SE., yet the shallow water continues from it 3½ miles southwestward past Moisie Point, in such a manner as to form an extensive triangular sandy shoal with from 1½ to 3 fathoms on it at low water.

Moisie Rock, near the south extremity of Moisie Shoal, and with 3 feet least water, lies 2¾ miles S. 53° W. (S. 80° W. mag.) from Moisie Point, and nearly 1¾ miles from the shore. This is an extremely dangerous shoal, being as bold as a wall. There are 25 fathoms water alongside its southern edge, and upwards of 30 fathoms at 400 yards off. It can generally be seen in fine weather from the change in the color of the water, and from heavy breakers when there is much sea running.

There is no close leading mark for avoiding this shoal so that the only direction that can be given to a vessel standing toward it is to tack when the northern side of Manowin Island comes in line with the southern point of Great Boule Island; she will then be one mile from the edge of the shoal, and in upwards of 30 fathoms water.

East Rocks, which are low, bare of trees, and always above water, lie in Boule Bay between Moisie Shoal and Boule Islands. Vessels

ought not to stand into this embayed place, since there is generally a heavy southerly swell rolling in, which would render it difficult to beat out.

Seven Islands are high and steep, of primary rocks, very thinly wooded, and can be made out from a distance of about 20 miles, being unlike anything else in the gulf. The easternmost of these are Great and Little Boule Islands, the former of which is the highest of all, its summit being 695 feet above high water. Next, westward, and parallel to these two, are Little and Great Basque Islands; the first named being the outer island. Great Basque Island is 500 feet high. Manowin and Carousel Islands lie SW. of Basque Islands; Manowin Island is 457 feet high; Carousel Island, the southernmost, is much lower. West Rocks lie between Manowin Island and the peninsula which forms the west entrance point of Seven Islands Bay. They are too small and low to appear as the seventh island; but the peninsula has that appearance when seen at a distance from sea, being higher than any of the islands, and 737 feet above high water.

Light.—The lighthouse on Carousel Island, a square building 39 feet high, with dwelling attached, is painted white, with one red horizontal band. At an elevation of 190 feet a fixed white light is exhibited, which should be visible 20 miles.

Caution.—The narrow passes between the Boule Islands, the Basque Islands, between Manowin and Carousel Islands, and between Manowin Island and West Rocks, require no further notice than to remark that the tide sets strongly toward and through them, the flood to the west and the ebb to the eastward, a circumstance that should be attended to when becalmed at night, or when tacking in their entrances. The first and last of these channels have water enough for large ships; but the one is subject to sudden and baffling flaws of wind round Boule Islands, and the other is rendered intricate by rocks which nearly cover at high water.

Seven Islands Bay.—The relative situations of Seven Islands, their size, and the breadth of the channels between them, will be best seen from the charts. They are so placed as to completely shelter the bay within them, which is $2\frac{3}{4}$ miles wide at the entrance, between Chassé Point, the east end of the peninsula, and Sandy Point, which is opposite the northern end of Great Basque Island. From the entrance Seven Islands Bay extends about 6 miles northward and westward, being so nearly landlocked as to resemble a lake, sufficiently extensive for large fleets to lie in safety. The bottom is of clay, and there are no shoals, excepting the mud banks, which fill up the northern part of the bay.

A fine, broad, bold, sandy beach extends 3 miles northwestward from the east entrance point of the bay to the entrance of the principal river, near which stands the Hudson Bay Company's trading post. The houses at this post can not be seen from the outer parts of the bay,

but there is a wooden store on the beach, off which vessels usually anchor.

Water can be obtained from this river at high tide.

Anchorage.—The best berth for a vessel of large draft is with Sandy Point and the north side of Little Boule Island in line, and Chassé Point in line with the west side of the West Rocks. The NW. extremity of the sandy beach near the entrance of the river will then be about north; the vessel will be in 9 fathoms at low water, over clay bottom, nearly one mile from the sandy beach to the eastward, and nearly ¾ mile from the 3-fathom edge of the shoals, which occupy the northern part of the bay. Smaller vessels may lie closer to the shore, in 6 fathoms at low water, which is as near as any vessel ought to anchor.

In this anchorage there is a considerable swell with a strong southerly wind, but never enough to endanger a vessel, although sufficient to prevent boats from landing. Those that may wish to lie quite smoothly may anchor in the SW. part of the bay, in 13 fathoms, soft clay bottom, where they will be quite landlocked.

Channels into Seven Islands Bay.—There are three channels leading into Seven Islands Bay, namely, East, Middle, and West Channels.

East Channel, between Great Basque Island and Sandy Point, may be approached from between Boule Islands and East Rocks or from between Boule and Basque Islands, both routes being entirely free from danger. It is seldom used, having a rock in its center, which is covered only in high tides. A reef, with from 6 to 9 feet of water, extends ¼ mile eastward of this rock. The passage on either side of it is wide and has from 13 to 15 fathoms. Vessels should only attempt it with a fair wind, and should keep within 200 yards of Basque Island, or as near to Sandy Point; the latter is preferable.

Middle Channel (which is also the principal and best) is upward of 1¾ miles wide, and so free from danger that a vessel of the largest draft may approach the shore within 100 yards in every part, excepting at Chassé Point, where a reef runs out 250 yards from the shore. This channel, between Basque Islands on the east and Carousel, Manowin, West Rocks, and the peninsula on the west, is preferable in every wind, excepting the north and NW., with which, to save beating (since they blow out of the bay), it might be desirable to enter by the West Channel.

West Channel, between the West Rocks and Croix Point, at the southern extremity of the peninsula, is ¾ mile wide and quite free from danger. There are two or three rocks lying 200 yards to the northward of West Rocks, but they always show, excepting in very high tides and the smoothest sea.

Caution.—The ebb tide is turned off by Croix Point toward West Rocks, a circumstance which must be attended to in taking this channel with a scant northerly wind.

Anchorage.—The water is too deep for anchorage in any of these

channels and the bottom generally rocky, excepting to the eastward and northward of Boule Islands. The ground is not fit for anchoring until well into the bay. The water is extremely deep outside of these islands, and they are so bold that a vessel may stand in close to their rocky shores.

Tides.—It is high water, full and change, in Seven Islands Bay, at 1h. 40m.; springs rise 9 feet, and neaps 5 feet.

The rate of the stream of the tides in the bay and in the principal channels between Seven Islands seldom amounts to one knot; but in the narrow channels between Boule Islands, Basque Islands, and in East and West Channels it may amount to 2 knots in spring tides, or even more in the narrowest of these channels when accelerated by strong winds. The flood coming along from the eastward strikes Boule Islands, and passes between them, and also between the two Basque Islands. It is turned off by Great Boule Island toward Carousel Island and West Channel; but the greater part of the stream which passes within Boule Islands enters the bay by East Channel, between Great Basque Island and the mainland. There is very little flood in Middle Channel, excepting an eddy outward stream close along the shores of the peninsula, and the narrow stream from between Basque Islands, which sets across toward West Channel.

The ebb sets fairly out of the bay, part of it by East Channel and part of it by Middle Channel, where it meets the stream through West Channel, which turns it to the eastward, past the southern points of Basque and Boule Islands.

Winds.—In fine nights the winds are almost always light and baffling between Seven Islands, particularly if the wind be from the westward in the offing. At such times there is generally a northerly land wind in Seven Islands Bay, but it does not often reach far out among the islands in the early part of the night, although it often does toward the morning.

Aspect of Coast.—The coast between Seven Islands and Point de Monts is less bold in appearance, being less elevated, than that eastward of Seven Islands. The hills are, for the most part, far back in the country, and the shores are of very moderate height above the sea. The country near the sea is formed of small and low granitic hills, partially wooded with spruce trees. Marshes and ponds are frequent between the hills, sandy beaches occur occasionally, and the sandy tracts in rear of them are always the most densely wooded parts.

This coast is much more bold than its appearance would promise, and although the water is deep off every point of it, yet in general, and with few exceptions, there are sufficient soundings with the deep-sea lead to give warning to a vessel of her approach to the shore.

From Carousel Island across St. Margaret Bay to St. Margaret Point, a distance of 14 miles, there is deep water all the way.

St. Margaret River empties nearly in the center of St. Margaret

Bay, being 6 miles from Croix Point. Although a large stream, it affords shelter to boats only. A bar of sand extends ¾ mile from the entrance, and has several small channels through it, with only 3 feet at low water. Immediately within the entrance, which is 350 yards wide, there are 6 feet water, and only 3 feet can be carried up to the low falls, which are over granitic rocks, 3¼ miles from the entrance. Below the falls the river flows between cliffs of sand and clay, and is full of sand bars, dry at low water. The water deepens gradually outside the bar, with sandy bottom, to 18 fathoms at the distance of one mile from the 3-fathom line of soundings. There is a sandy beach for a considerable distance on either side of the mouth of the river.

St. Margaret Point is rocky, of moderate height, and has a round hill a short distance within its extremity. There are several rocks, which cover at high water, and which extend nearly ⅛ mile off this point. These rocks are extremely bold, and there is no bottom with the hand lead close outside of them, and no bottom with 70 fathoms of line at a less distance than 2 miles.

The Coast between St. Margaret Point and Great Cawee Island is low, and fringed with small islets and rocks close to the shore, which may with prudence be closely approached by the lead, but the depth of 20 fathoms is near enough to it for a stranger. Rock River and many other small streams empty into the bay between these points. The deep-sea soundings are very irregular off this section of the coast, for in some parts there are not more than 50 fathoms 4 or 5 miles off shore; whereas, in others, as off May Islets, 6 miles northward of Cawee Islands, no bottom will be found with 60 fathoms within 2 miles of the rocks.

Cawee Islands are two small and hilly islands of gray granite, and nearly bare of trees. Great Cawee Island, which is the larger, the higher, and the northeastern of the two, is about ¾ mile in diameter, and about 250 feet high. Little Cawee Island, lying a mile farther southwestward, is composed of two islets, which occupy a length of ½ mile parallel to the coast. It has several rocks above water close off it to the SW., and a reef 250 yards northwestward of its west point.

Water.—There is neither wood nor water on Cawee Islands, but both may be obtained from the opposite mainland.

Cawee Rock, small, round, and high, and ¼ mile southward of the south point of Great Cawee, is so bold that a large ship might lie alongside of it.

Great Cawee Cove, on the north side of Great Cawee Island, is secure for boats, with plenty of water, but too small and narrow in the entrance for vessels.

Great Cawee Shoal lies off the mouth of Great Cawee Cove, 400 yards to the northward. The least water on it is 15 feet.

Cawee Ledge.—Half a mile north from this shoal is a small round ledge, awash at low water, and ⅛ mile from the mainland. From it the

south side of the large rocks, between Great Cawee and the main, is in line with the point of the main to the westward.

Large Rocks, 400 yards from Great Cawee Island, between it and the main, are two large rocks close together; they lie 300 yards from the mainland, and have a reef extending 400 yards SW. from their SW. point. Nearly ½ mile NE. by N. from these rocks, and at the same distance from the main, there is a small rock which always shows.

Anchorage.—There is anchorage in the mouth of the bay on the inner or NW. side of Great Cawee Island, in 7 fathoms, muddy bottom, at 200 yards from the island. The shelter is complete with winds from SW. by W. round northerly to NNE., and tolerably so with all easterly winds, although some swell rolls round the island; but the SW. winds blow right in, and send in a very heavy sea.

Directions.—To run into this anchorage from the northeastward, steer N. 71° W. (N. 45° W. mag.) past the NE. side of Great Cawee Island, going no nearer than ½ mile (to avoid the shoal off the mouth of the cove), until the point of the mainland to the westward opens clear of the north side of the island. Then steer for the point of the mainland, keeping it midway between the north side of the island and the Large Rocks. Having arrived between the rocks and the island, haul into the mouth of the small bay, which will be seen on the NW. side of the latter, and anchor in 7 fathoms at low water. There are 12 or 13 fathoms in the middle of the channel, and upward of 9 fathoms can be carried through.

In running for this anchorage from the southwestward, a vessel may pass between Little Cawee Island and the main, by keeping in mid-channel; but the better and safer way is to run between Little and Great Cawee Islands, hauling close round the west point of the latter into the anchorage. By this route there is nothing in the way, excepting Cawee Rock, which can always be seen.

From the foregoing description it will be seen that this is a very dangerous and intricate place; and the anchorage between Great Cawee Island and the main is too small for large vessels, the channel being only 400 yards wide. Still this anchorage, although too small for an occasional place of shelter, excepting for small vessels, may, nevertheless, be of great use as a place of refuge for a vessel in distress from loss of masts or other cause, for the ground is so good that a vessel well moored there might be able to ride out any gale which occurs during the summer months.

Tides.—It is high water, full and change, at Cawee Islands at 1h. 50m.; springs rise 9 feet, and neaps 5 feet. The tides run fair between the islands and the mainland at a rate which seldom exceeds 1½ knots and which is in general much less.

Sproule Point, ¾ mile westward from Little Cawee Island, is the eastern point of Lobster Bay. A reef extends off its south side 200 yards toward Little Cawee, but the principal reef off it runs out ½ mile to the southward.

Lobster Bay is between Sproule Point and Crooked Islands, which are a group of small islets and rocks running out from the shore 3 miles westward of Sproule Point. All the northern part or head of Lobster Bay is occupied by an extensive flat of sand and bowlders, dry at low water, and on which lobsters abound; but it is an excellent open roadstead, with plenty of room for large ships.

Crooked Islands are bold to the southward and eastward, leaving the mouth of the bay clear of all danger across the reef off Sproule Point. Vessels may anchor midway between the reef and the islands, choosing their depth from 5 to 12 fathoms, according as they may wish to lie, at ½ mile or one mile from the 3-fathom edge of the flats in the head of the bay. The bottom is fine sand over clay, and the shelter from northerly and westerly winds; but winds from east, round south to SSW., blow right in, with a heavy sea and thick weather.

Pentecost River enters the sea on the SW. side of a rocky point 1½ miles southwestward of Crooked Islands. The opposite entrance point is of sand. Alluvial Hill is a remarkable round and wooded eminence 2 miles SSW. from the mouth of the river. The first reach of the river is toward this hill, leaving a very narrow sandy ridge between it and the sea. Steep cliffs of sand and clay form the banks for 2½ miles, to which distance only it is navigable for boats. The entrance of the river is only 30 yards wide, with a depth of 7 feet at low water, and there are 9 feet within for a short distance. At high water from 12 to 16 feet can be carried in, so that this river is capable of affording shelter to coasting schooners as well as boats; but it would be very difficult to take a sailing vessel in through so narrow an entrance, and could never be done on the ebb tide, which runs out with great rapidity.

A fine bold, sandy beach extends 7 miles south from this river to English Point.

English Point, 1½ miles northward from North Reef of Egg Island, has a shoal of large stones extending ⅓ mile off it. On the SW. side this shoal may be approached to the depth of 6 fathoms at low water, but on the SE. and east it is very bold, there being 15 fathoms at the distance of ⅓ mile.

Egg Island lies 14 miles SSW. from the south point of Great Cawee Island. It is low, narrow, and of granitic rocks, without trees, and ¾ mile long. North Reef, always above water, lies 800 yards north from the island. It is a low, narrow, black reef, which is 600 yards long, in the same direction, bold toward the mainland and also toward English Point. A reef under water extends ¼ mile south from these rocks, leaving only a very narrow 3-fathom channel between them and the island.

Northeast Reef extends 1,200 yards from the NE. point of Egg Island, and is the greatest danger between Seven Islands and Point de Monts. Some of the rocks upon it show in low tides, and the sea generally breaks on them at low water. This reef prevents the swell from rolling

in between North Reef and Egg Island, and thus assists in sheltering the anchorage.

Light.—On Egg Island is built an octagonal lighthouse, 48 feet high, surmounting the keeper's dwelling. It is painted white, with one red vertical stripe, and exhibits, at an elevation of 74 feet, a revolving white light every minute and a half, which should be visible 15 miles. The lighthouse is 200 yards from the south end of the island.

Water.—There is no water on Egg Island, but it may readily be obtained from small streams on either side of Roadstead Point.

Anchorage.—Egg Island, with its rocks and reefs, forms a natural breakwater 1⅛ miles long, which inclines slightly toward the shore at its northern end in such a manner as, with the shoal off English Point, to shelter the anchorage from NE. winds. The northern end of this breakwater is nearly ¾ mile from the mainland, and the southern end more than one mile; but extensive flats extend from the main and diminish the navigable breadth of the channel to about ⅛ mile in the narrowest part, which is nearly opposite the northern end of Egg Island. The best anchorage is, however, south of this narrow part, where the breadth from the 3-fathom edge of the shoal off the main to Egg Island is 1,200 yards.

All along the inner sides of Egg Island and of North Reef, except near their northern end, the water is deep, there being from 17 to 24 fathoms at low tide close to them. The soundings decrease gradually toward the mainland, and the best depth to anchor in is 9 or 10 fathoms, according to the time of tide. The bottom is of clay in the deep water toward the island, and of sand from the depth of 9 fathoms toward the mainland. There is little danger of dragging an anchor up hill toward the main, but, with violent squalls off the land, vessels should have a good scope of cable out, for should the anchor start they might be on the rocks before they could bring up again.

In order to have as much room as possible, with a moderate depth of water, vessels should not anchor northward of a line joining Roadstead Point and the center of Egg Island. The best position is with the south end of Egg Island bearing S. 59° E. (S. 34° E. mag.) and the inner side of North Reef N. 20° E. (N. 45° E. mag.). English Point will then be open half a point westward of the latter. In this anchorage vessels will lie sheltered from NE., round by north, to SW. by the mainland, and from ESE. to NE. by the island, with its rocks and reefs. The winds from the remaining points, namely, those between SW. and SE., seldom blow strong, and even with them a vessel may find some shelter by shifting her berth to the eastward, where she will find 7 fathoms over sandy bottom.

The anchorage at Egg Island is too small to be a favorite resort for large vessels, but in time of need, or as a place of refuge in case of distress, it would be found of great value on a coast so destitute of good harbors.

Directions are unnecessary for running into this anchorage from the southward, since the south end of Egg Island is quite bold. But if it be intended to run between the island and the main, stand in to the northward to 8 or 9 fathoms, or until English Point is open half a point to the northward of the North Reef, then steer for English Point, giving the inner side of the North Reef a berth of 200 yards until the vessel has passed the North Reef a full ¼ mile. She will then be in about 7 fathoms at low water, and may haul out to sea, taking care to avoid Northeast Reef.

Tides.—It is high water, full and change, at Egg Island at 2 h.; springs rise 11 feet, and neaps 6 feet.

The rate of the tides between Egg Island and the main is from a half to one knot, and part of the stream of ebb sets toward and out through the narrow and dangerous 3-fathom channel between the island and North Reef. Part of the stream of flood comes in through the same channel.

Calumet River is a small stream 2½ miles southwestward of Egg Island; along the shore for one mile southward of its entrance there are reefs of large stones extending out 1,200 yards from high-water mark, and having 15 fathoms off them at ½ mile to seaward. Southward of these rocks, as far as Trinity Bay, the coast is free from danger, and may be approached with safety if due caution be used. There are 20 fathoms at from ½ to one mile off shore.

Caribou Point, 8½ miles southward from Egg Island, is a small rocky peninsula, having sandy coves on either side of its isthmus, in which pilot boats find shelter.

Trinity Bay, 5 miles southward of Caribou Point, is 2 miles wide and nearly one mile deep, with a fine sandy beach extending from its south point to Trinity River, which is a small and rapid stream, abounding with trout and salmon, where water can be had only at high water, because of the large stones about its entrance. The south point of the bay is rocky, and off the NE. point there are two low black rocks. The depth of water between these points is from 5 to 7 fathoms at low water over sandy bottom.

Anchorage.—This bay affords excellent anchorage, in a moderate depth of water, with good ground and plenty of room to weigh in any wind. It is a valuable stopping place in westerly winds for vessels bound up the St. Lawrence to wait their opportunity to proceed round Point de Monts and up the estuary.

Directions.—In running along the land for Trinity Bay, either from the NE. or SW., come no nearer than the depth of 15 fathoms until the bay opens; then haul in and anchor in 7 fathoms at low water, with the lighthouse on Point de Monts (seen just within a small rock about 1½ miles southwestward of the bay) bearing S. 35° W. (S. 60° W. mag.), and the outer of the two rocks off the NE. point of the bay N. 15° E. (N. 40° E. mag.). The vessel will be then rather more than ¾ mile from

the south point of the bay. Vessels of large draft may anchor farther out and in deeper water, if more convenient, and small schooners in 3 fathoms, close under the south point.

Point de Monts.—The south extremity of the point is 6¼ miles SW. from the south point of Trinity Bay.

A ledge of rocks with 9 or 10 feet least water lies ESE. from the extremity of the point and ½ mile off shore. Another rock with 2 fathoms on it lies south ½ mile from the lighthouse, and there is a third, with a little more water and nearly as far off, east from the lighthouse. These dangers should be carefully guarded against in making the light in thick weather, or when keeping close to the land with a northerly wind, and the depth of 15 fathoms is quite near enough to them for a large vessel at any time, being no more than 400 yards from the first and about twice that distance from the two last of them.

Light.—The lighthouse stands low down and close to the sea, at 5 miles southwestward from Trinity Bay and NE. rather more than 1¼ miles from the south extremity of Point de Monts. The lighthouse is 90 feet high, circular in shape, and painted white, with two red horizontal bands, and exhibits at an elevation of 93 feet a fixed white light, which is visible 15 miles. The light can not be seen when bearing southward of N. 70° E. (S. 85° E. mag.), as it is shut in by higher land.

Fog Signal.—During fogs and snowstorms a cotton-powder cartridge is exploded every twenty minutes.

Signals.—There is a telegraph and signal station at this lighthouse.

The extreme of the land to the northeastward near Caribou Point bears N. 30° E. (N. 55° E. mag.) from the light, which can be seen over the point, and that bearing continued will pass little more than 2½ miles outside of Egg Island at the distance of 20 miles from the light.

Caution.—Vessels being to the eastward in a dark night, when the land can not be seen, had better tack; when Point de Monts light bears S. 44° W. (S. 69° W. mag.) will be near enough, if they be as near to it as Trinity Bay. They may, however, stand in nearer, using due caution by the lead. Vessels westward of the light should tack as soon as it bears N. 60° E. (N. 85° E. mag.), for, as previously remarked, it can not be seen to the southward of N. 70° E. (S. 85° E. mag.), in consequence of the high land which interposes.

When the light disappears, a vessel off Goodbout River will be only one mile from the bar.

CHAPTER X.

ST. LAWRENCE RIVER, NORTH SHORE—POINT DE MONTS TO SAGUENAY RIVER AND THE SAGUENAY RIVER.

QUEBEC.

(H. O. Chart No. 1111.)

Aspect of Coast.—The land, which on the eastern side of Point de Monts is rather low, begins to rise immediately from that point to the westward; and granitic hills, very sparingly wooded and in no part above 1,000 feet in height, form the north coast of the estuary as far as St. Giles Point, distant 30½ miles west of Point de Monts. The section of coast just indicated is as bold as any in the St. Lawrence, there being little or no warning by the lead; neither is there any good anchorage sufficiently roomy for the occasional use of shipping.

St. Augustine Cove, 1½ miles westward of Point de Monts, affords shelter only to boats.

Goodbout River, 8½ miles westward from Point de Monts, enters the sea at the extremity of a sandy point, and has a bar of sand, which extends nearly ½ mile from the eastern entrance point, dries in great part at low water, and is bold to seaward. There is usually at low water not more than 4 or 5 feet over this bar, on which a heavy surf very frequently breaks, and the river is only of use to boats because of the difficult and narrow entrance, although there are 15 or 16 feet of water over the bar at high water springs. There is a trading and salmon-fishing post of the Hudson Bay Company at this river, and the houses can readily be seen.

Tides.—It is high water, full and change, at Goodbout River at 1h. 52m.; springs rise 11 feet, neaps 6 feet.

Anchorage.—It is possible to anchor on either side of the bar off Goodbout River, but the anchorages are too near to the shore to be of general use. The anchorage westward of the bar may occasionally be useful, in easterly winds, to small vessels. They should anchor about midway between the bar and the first rocky point westward of it, at or about one mile westward of the bar.

At this anchorage, which is only safe in summer, the bottom is of coarse sand. The tides are weak and irregular, rendering it difficult to keep the anchor clear in calm weather; they also frequently set toward the shore, coming in with long ripplings parallel to the coast.

Directions.—To run for this anchorage, observe that the rocky point just mentioned and the east entrance point of St. Nicholas Harbor in

line, bearing N. 87° W. (N. 63° W. mag.), just clears the bar; therefore keep the last-named point in sight until the houses at Goodbout River bear N. 20° E. (N. 44° E. mag.), and then the bar will have been passed. After which run in and bring the points in line, running for them until the vessel is judged to be in the position above mentioned, or until the east extremity of the high clay and wooded banks on the west side of the river, where it turns inland, and which can be seen over the sandy beach, bears N. 9° E. (N. 33° E. mag.). The depth will be 6 or 7 fathoms at low water; toward the shore 3½ fathoms at the distance of 100 yards; then 3 fathoms for nearly 400 yards farther in; and thence shoal to the beach, about ¾ mile from the vessel. To seaward the water deepens rapidly to 30 fathoms at ⅓ mile.

St. Nicholas Harbor lies 3 miles northeastward from Cape St. Nicholas, which is a high bare point of granite, bearing S. 79° W. (N. 77° W. mag.), 17 miles from Point de Monts. This harbor is a narrow inlet, between granitic hills from 500 to 700 feet in height, extending 1⅓ miles WNW., and is so secure that a vessel might be laid on shore and repaired as if she were in a dock; on the SW. side a vessel may lay alongside of the rocks as alongside a wharf. There is as much as 9½ fathoms at low water in the deepest part of the harbor, and the bottom is of mud.

The breadth of the harbor within, nowhere exceeds 380 yards, and at the entrance is only 150 yards. The shoals on the east side of the entrance dry out so far as to leave a channel between them and Cross Point only 60 yards wide, and with a depth of 5 feet at low water spring tides.

The depth that can be carried in at high water is from 12 to 17 feet, according as it may be neap or spring tides. The bottom in the entrance is of sand with some few large stones upon it, which can be seen and avoided if the tide be not high enough to pass over them. The entrance is in the center of a small bay, ¾ mile wide and rather more than ¼ mile deep to the rocky point on the west side of the entrance to the harbor, which will be readily seen projecting out into the bay, and is named Cross Point, from a small wooden cross upon it. An extensive shoal of sand and bowlders, which dry at half tide, extends from the east point of the bay nearly 700 yards to the SW. and continues northward at the entrance of the harbor. This shoal can always be seen, is quite bold, and completely shuts out the sea from the harbor in southerly and easterly winds. The shoals on the west side extend across a small bay on the SW. side of Cross Point and continue off shore for 200 yards.

The Anchorage between these shoals, in the bay off the harbor's mouth, is only 600 yards wide, and consequently too small to be considered a roadstead for large vessels, but the ground is good and the depth convenient for anchoring preparatory to warping into the harbor.

Water.—There are several small streams on the eastern side of St.

Nicholas Harbor where water can be obtained; and it can also be had at high water from the two small rivers at the head of the inlet.

Tides.—It is high water, full and change, in St. Nicholas Harbor, at 1h. 55m.; springs rise 12 feet, neaps 7 feet.

Caution.—Southeast winds blow right into St. Nicholas Harbor, and are consequently the most favorable for running in; but with a strong wind in that direction, and at high water, when the shoals are covered, there is generally some sea outside the narrow entrance. A SW. wind is the safest for running in, for the entrance and bay outside are then quite smooth; but this wind will seldom take a vessel completely in; it will usually only enable her to shoot so far within Cross Point that a line may be sent ashore, or a kedge ahead, for the purpose of warping in the remainder of the way, which may be quickly done if due preparation has been made beforehand.

The entrance should be attempted in the last quarter flood; then if the vessel touches the ground she will receive no damage, and there will be time for her to warp in before the tide begins to fall.

Directions.—A vessel wishing to enter St. Nicholas Harbor, and being off the mouth of the bay, should bring the end of Cross Point to bear N. 3° W. (N. 21° E. mag.), then steer so nearly for it as to leave it not more than 50 yards nor less than 30 yards on the port hand. If the wind will allow, continue to run in at the same distance from the shore on the west side until the water deepens.

The shoal water commences at Cross Point and continues for 400 yards, and the channel is rendered narrow by shoals off the eastern side for an equal distance farther up the harbor. In order to have as much room as possible, a vessel should anchor farther in than the three large rocks which will be seen on the northeastern side of the harbor. To run out again, wait for a NW. wind, or take advantage of the land wind in the early part of the morning, which often occurs in fine weather when westerly winds prevail, or, lastly, warp out in a light breeze or calm to the entrance of the bay outside, and to a position from which sail can be made.

St. Pancras Cove, 9 miles from Cape St. Nicholas, being only about 320 yards wide, between steep rocks, and open to the southward, with very deep water, is of no use to vessels. The depth is 32 fathoms in its entrance, shoaling gradually to 17 fathoms within ¼ mile of its head. The sea is never heavy in it, and a vessel might run in there in time of need. It affords shelter to boats.

English Bay, between St. Pancras Point and St. Giles Point, affords no good anchorage, in consequence of the great depth of water; a heavy sea rolls into it in easterly winds, and its shores are high and rocky. A vessel might anchor close to the shore on its west side, in 16 or 17 fathoms at low water, and be well sheltered from all but easterly winds; but she would be in great danger if a strong wind from that quarter came in, since there would be no possibility of weathering the eastern side of Manicouagan Shoal during the flood tide.

Manicouagan River.—St. Giles Point, the northern entrance point to Manicouagan River, is high and rocky, like the coast to the eastward; while Manicouagan Point is low and thickly wooded, with a broad sandy beach, like the rest of the coast westward to Outarde Bay. This complete change in the character of the coast points out to a vessel her approach toward the dangerous Manicouagan Shoal.

Manicouagan River flows out through narrow channels, between shoals that dry at low water, in Manicouagan Bay, and over a bar which extends from St. Giles Point to the NE. end of Manicouagan Shoal. Six miles west from St. Giles Point the shallow channels between the shoals unite in the inner entrance of the river, which is there narrow and 4 fathoms deep. The falls, where the river discharges a great body of water down a narrow and sloping channel between steep granite rocks, are 3 miles farther up in a NW. direction, and a boat may approach close to them.

Anchorage.—The principal channel is on the north side of the entrance, and Manicouagan Hole is a deep place in it, 1¾ miles long, from ½ to ¼ mile wide, and with a depth from 3 to 5 fathoms at low water, and muddy bottom. This large hole is close to St. Giles Point, and extends 1¼ miles within it. Although this place appears completely open to easterly winds, no swell of consequence rolls into it, and a vessel well moored on its north side within St. Giles Point would probably be in safety. But to get in there it is necessary to pass over the bar which extends 2 miles eastward from St. Giles Point. It has 7 feet over it at low, and from 14 to 19 feet at high water, according as it may be neap or spring tides. The outside of the bar is extremely bold, there being 30 fathoms, sandy bottom, close to it, and 50 fathoms, mud bottom, at the distance of one mile. The bar then sweeps round till it joins Manicouagan Shoal, which is dry at low water for nearly 5 miles, NE. by E. from the northern end of Manicouagan Peninsula.

This is altogether too wild and dangerous a place to be of general use to vessels; but as, nevertheless, it might prove of use in time of need, the following brief directions are given for entering it.

Directions.—With St. Giles Point bearing S. 55° W. (S. 78° W. mag.) and St. Pancras Point bearing N. 23° W. (north mag.), steer directly for St. Giles Point, and when the head of English Bay bears N. 23° W. (north mag.) the vessel will be close to the bar. Continue to run over the bar on the same course, S. 55° W. (S. 78° W. mag.), until the points on the west side of English Bay bear N. 7° W. (N. 16° E. mag.). She will then be within one mile of St. Giles Point, and must keep away a couple of points to the southward along the southern edge of the shoal, which dries at low water off that point, until the points on the north side of Manicouagan Bay are open out south of St. Giles Point; then haul up again so as to pass that point at 200 yards, and anchor ½ mile within it, in 3 or 4 fathoms at low water.

Tides.—The ebb runs out over Manicouagan Bar to the eastward at

the rate of about 1½ knots, and the flood is nearly as strong. It is high water, full and change, at 2h. 15m.; springs rise 12 feet and neaps 7 feet.

Signals.—There is a telegraph and signal station on Manicouagan Point.

Manicouagan Shoal is of sand, with many large bowlders scattered about its eastern and southern parts, and probably deposited there by the ice. The easternmost point of this dangerous and extensive shoal is 2½ miles N. 88° E. (S. 69° E. mag.) from St. Giles Point, and 5¼ miles N. 55° E. (N. 78° E. mag.) from the NE. end of Manicouagan Peninsula.

The bearing of S. 9° W. (S. 32° W. mag.) from St. Pancras Cove passes along the eastern side of the shoal, which is so bold that there are 60 fathoms of water at a little more than 1¼ miles, and 40 fathoms at half that distance from the breakers. On this side the shoal dries nearly out to its edge in low tides. The south point of the shoal extends 2½ miles southward of Manicouagan Point, and here only is there any sufficient warning by the deep-sea lead. With Manicouagan Point on any bearing from N. 23° W. (north mag.) to N. 57° W. (N. 34° W. mag.), 60 fathoms over a bottom of very fine sand will be found at 3½ miles from the 3-fathom line, to which the water shoals gradually, till close to it, where there is 17 fathoms. The shoal dries out at low tides in this part, and also farther westward, from one to 1½ miles from the beach.

The shoal continues from its south point 16 miles westward, the outline of its edge corresponding to the shape of the sandy shore as far as Outarde Point, off which it extends 1½ miles southward, and, filling up all the eastern part of Outarde Bay, stretches out its western point fully 3½ miles SW. from Outarde Point.

Tidal Streams.—There is often a heavy sea, particularly in a weather tide, off Manicouagan Shoal. The tidal streams are tolerably regular, and not very strong along the shoal; the rate of either stream does not exceed 2 knots at any time, and is usually much less. But great ripplings are met with occasionally, both near the shoals and in the offing, where they are caused, as in other parts of the estuary, by the unequal velocities or the opposing directions of the streams, as will be readily imagined when it is remembered that the current is always down on the south side, slack in the middle, and up during the flood on the north side of the estuary. These ripplings are very common off the eastern and southern parts of Manicouagan Shoal, where they were observed to move much faster than the streams of the tides. They often give to the tides the appearance of a rapidity which does not exist.

Outarde Point is 11 miles westward of the south extremity of Manicouagan Point, and the shore between them is of low sandy cliffs, with a sandy beach.

Outarde River empties northward of Outarde Point. This river can be ascended by boats to the falls, over granite rocks, which are 7

miles NE. by N. from the point. These falls are only 1⅜ miles from Manicouagan River. The two rivers, therefore, form the low sandy country between Outarde and Manicouagan Points into a great peninsula.

The entrance to Outarde River is by several intricate and narrow channels through the western part of Manicouagan Shoal, and as there is only 2 or 3 feet of water through these channels at low tide, for 4 or 5 miles, the place is useless to vessels and therefore requires no further description.

The water of this river holds a white earth suspended, and frequently covers the whole surface of Outarde Bay, floating on the heavier sea water beneath, and giving the whole bay the appearance of being shoal. A vessel sailing through this superstratum of fresh water displaces it, and leaves a blue streak in her wake.

Outarde Bay, between Outarde and Bersimis Points, has three small rocky islands in it, which appear as two from seaward, and serve to distinguish the bay to strangers; they are far within the edge of the shoals, which extend quite round the bay.

Anchorage.—Good anchorage will be found on the west side of Outarde Bay in 14 fathoms at low water, over muddy bottom, with Bersimis Point bearing S. 9° W. (S. 32° W. mag.), 3¼ miles. Manicouagan Point will then be open southward of Outarde Point, the south side of which will bear N. 61° E. (N. 84° E. mag.), and the vessel will be nearly ½ mile from the 3-fathom edge of the shoal on the west side of the bay; small vessels may lie closer, in 7 fathoms.

Directions.—In standing in for this anchorage with a westerly wind beware of the bar of Bersimis River, which is extremely steep. If the first rocky point can be made out to the northward of the river, and which bears from its entrance north (N. 23° E. mag.) 4½ miles, take care that it does not bear to the eastward of N. 25° W. (N. 2° W. mag.), and the vessel will clear the bar. When it is passed she may haul in to the northward into soundings, going no nearer than 10 fathoms. The anchorage, which is not generally known, is excellent in westerly gales, and may occasionally be very useful to vessels bound up the St. Lawrence. The tides are not so strong as has been supposed, the ebb seldom exceeding the rate of 2 knots, and the flood being much weaker. The direction of these streams is reversed by the effect of Outarde River.

Bersimis River enters the sea northward of the south extremity of Bersimis Point. The wide mouth of the river is closed by sands dry at low water, with the exception of a very narrow channel. The river within, for the first 3 miles, is wide and full of sand shoals.

Lights.—Two leading lights are exhibited from masts erected on the northern side of the entrance to Bersimis River. Both are fixed white lights, visible through a small arc on each side of their line of direction, and should be visible 5 miles. The outer light is elevated 30 feet and the inner 40 feet, respectively. The masts are painted white, and each

is surmounted by a diamond. The outer mast is 20 feet and the inner 30 feet high, and when in line bear N. 65° W. (N. 43° W. mag.) from seaward, and lead in 4 feet at low water over the bar.

The Bar is of sand, which dries in parts at low water, and shifts frequently, being completely exposed to southerly and easterly gales; it extends nearly 1¼ miles eastward of the south entrance point. Directions for entering the river are therefore useless; but it may be as well to remark that within the bar the channel is always close to the south entrance point, and keeps on that side through the wide part within, with a depth of 9 feet at low water.

Two can buoys and one spar buoy, all painted black, for the convenience of vessels to be laden at this river are placed at its mouth by the owners of the sawmill at Bersimis Point. They have no fixed position but are moved as necessary to mark the channel.

Vessels anchor in Outarde Bay to load, the anchorage being marked by a can buoy. Small vessels are taken into Bersimis River by local pilots to load at the mill wharves.

The river discharges a great volume of water, especially in the spring of the year, and the water 2 miles within its entrance is fresh enough for drinking, when the tide is out. The river is navigable to the falls, which are 30 or 40 feet high, and over granite rocks. These falls are nearly 40 miles distant by following the windings of the river. The banks of the river are high and precipitous, being either of granite or cliffs of sand and gravel over clay. There is good timber to be met with occasionally. The breadth of the river varies from 200 to 600 yards, and its depth is usually from 2 to 5 fathoms; there is a place in which the depth amounts to 12 fathoms; but a depth of 2 fathoms is as much as could be carried up the foot of the falls.

The stream of the flood tide is felt 10 miles up the river; and 6 miles up, the channel is contracted by shoals of sand and bowlders to the breadth of 100 yards for the distance of one mile. Through this narrow part the ebb runs 4 knots; above it the rate of the stream is from one to 2½ knots. Boats could row up this river to the foot of the falls and a steamer could ascend it with ease, but the winds are generally too light and baffling between its high banks for a sailing vessel.

Tides.—It is high water, full and change, at Bersimis River at 2h.; springs rise 12 feet, neaps 7 feet.

Bersimis Point is low, of sand, wooded with spruce trees, and difficult to be seen at night. On its east side the low south point of the river extends 2 miles from the trees and the bar 1¼ miles farther; and to the southward the sand shoal extends ¾ mile from the sandy beach, yet it is so bold that the lead affords no warning, there being 60 fathoms muddy bottom at one mile from the edge of the shoal. On the east and SW. sides of the point the shoals are equally steep so that this point is very dangerous, especially to vessels beating at night or in foggy weather. There is a tug at Bersimis Point for the use of vessels to be laden there.

Coast.—Mille Vaches Point lies SW. 29 miles from the south extremity of Bersimis Point. In all this distance, if the extreme points be excepted, vessels will find by reference to the chart that the soundings off the shore afford some warning, although there are parts where great caution is necessary.

Tides.—The tides are regular, but the flood stream is rather stronger than the ebb within 6 miles from the shore, where the rate of either seldom exceeds 1½ knots, and is often much less.

Jeremy Island.—From Bersimis Point a low and sandy shore continues 5½ miles westward to Jeremy Island, which is very small, rocky, and close to the coast. There is a trading post of the Hudson Bay Company on the main, the buildings of which can usually be seen; but if not, its position will always be known by some patches of white sand and clay cliffs, which are close eastward of the island. Vessels may stand in by the lead, and anchor off this place; but it is a bad anchorage, and the shoal water extends a mile out from the shore.

Cape Colombier.—From Jeremy Island a rocky and broken shore extends SW. 5 miles to Cape Colombier, which is a rocky peninsula, with a small islet on its west side.

Gulnare Shoal is a narrow ridge of granite rock, nearly 2 miles long, parallel to the shore, and having from 2 to 3 fathoms over it at low water. The inner or north side of Laval Island nearly in line with Orient Point, the east point of Laval Bay, bearing S. 72° W. (N. 86° W. mag.) leads 400 yards southward of this shoal in 20 fathoms water. It is very dangerous, there being 23 fathoms close to the SW. end and also along its southern side. There are 4 or 5 fathoms between it and the shore.

Wild Fowl Reef, 4 miles SW. from Cape Colombier is a large bed of rocks, extending ⅔ mile from the shore between Plongeur Bay and Laval Bay. There are 9 fathoms water at ⅓ mile outside this reef.

Plongeur Bay, between Wild Fowl Reef and Cape Colombier, may be known by a round and rocky peninsula on its west side. The inner part of this bay is full of rocks dry at low water, and the whole bay is shoal out to the line joining Wild Fowl Reef and Cape Colombier.

Caution.—Vessels should be careful in standing toward the part of this coast from Wild Fowl Reef to Gulnare Shoal inclusive; the depth of 30 fathoms is quite clear enough, as will be seen by the soundings on the chart. But southwestward of the reef, until within 2 miles of Portneuf, they may stand in to 6 fathoms at low water with safety.

Laval Bay, 4 miles westward of Wild Fowl Reef, will be known by the rocky island in its mouth, and by the clay cliffs which commence 1½ miles south of it, and continue to within the same distance of Portneuf.

This bay within the island is all dry at low water. Vessels may safely stand in toward it, the water shoaling gradually from 10 fathoms, which is 2½ miles from the shore. There is good anchorage in 6 or 7 fathoms, over clay bottom, off the clay cliffs above mentioned.

Portneuf is 8½ miles south of Laval Bay. At this point there is an establishment belonging to the Hudson Bay Company. It stands upon a steep sandy bank, is 4 miles northward of Mille Vaches Point, and there are several buildings, which can readily be seen by a vessel off the coast.

A low and narrow sandy peninsula, with a clump of pine or spruce trees upon it, extends nearly 2 miles south from the sand and clay cliffs on the north side of Portneuf, the west extreme being nearly ¾ mile SE. from the church.

Light.—From a pier at Portneuf on the west extreme of the peninsula a fixed white light is exhibited, at an elevation of 40 feet, which should be visible 11 miles. The lighthouse is a square wooden building, 38 feet high, and is painted white, with two red vertical stripes.

Signals.—There is a telegraph and signal station at this lighthouse.

Portneuf River is entered from the southward, between the sandy peninsula and the post on the mainland, but is so shallow that a boat can not enter it at low water. At the junction of the peninsula with the sand and clay cliffs the river turns abruptly inland; its sandy channel is too shallow for a boat at low water below that turn, and rapids commence at 1½ miles above it. From 7 to 12 feet water may be carried in it at high water between the peninsula and the mainland, according as it may be neap or spring tides, and a small vessel may lie safely aground on the sand.

Tides.—It is high water, full and change, at Portneuf, at 2h. 10m.; springs rise 14 feet, neaps 8½ feet.

Portneuf Sands are exceedingly steep on every bearing southward of ENE. from Portneuf, and eastward of SSE. from Mille Vaches Point. Off Portneuf they extend ¾ mile out from the sandy peninsula. The eastern patch of these shoals, with 3¾ fathoms least water, which is dangerous for a vessel of heavy draft, lies 1¾ miles N. 56° E. (N. 78° E. mag.) from the southwestern end of the sand and clay cliffs at the entrance of Portneuf River.

Midway between Portneuf and Mille Vaches Point is the widest part of these sands, which there extend 1¾ miles from the beach. There are from 20 to 30 fathoms close along their edge, and from 40 to 50 fathoms at the distance of one mile.

Mille Vaches Point is low, sandy, and wooded with spruce trees. As the dangers on either side are so bold, and as the course of a vessel running up the estuary must ever be more or less uncertain in consequence of the set of the tides and currents, the pass between this point and Bicquette Island is justly considered dangerous to a vessel running up in dark nights or foggy weather.

Mille Vaches Bay, on the SW. side of Mille Vaches Point, is very large, with several small rivers, which descend by falls or rapids down the granitic shores. The principal of these rivers is Saut de Mouton, 4¼ miles WSW. from the point, which has a fall of 80 feet, visible from

a vessel when abreast of it. All the interior of this bay is occupied by shoals of sand, mud, and large bowlders, which dry at low water.

Anchorage.—There is anchorage in Mille Vaches Bay in 15 fathoms, sand and mud bottom, with the south extremity of Mille Vaches Point in line with the inner or north side of the pine trees on the peninsula of Portneuf, bearing N. 34° E. (N. 56° E. mag.) 2 or 3 miles from the point, and ⅞ mile from the shoals. The shelter is from SW. by S., round north, to NE. by N. The ground is good, and there is not much tide.

Escoumains Islets are two large rocks, which have three small ones nearly one mile southward of them, and are nearly 12 miles SW. from Mille Vaches Point. The coast southwestward from these islets to Little Bergeron Cove, a distance of 16 miles, consists of granite rock, steep and bold, and free from all danger, excepting a flat which occupies a bay on the SW. side of Cape Bondesir, but which does not extend above ¼ mile outside of a line joining the points of the bay, and is consequently very little in the way of vessels. There are upward of 50 fathoms water close to the rocks along this part of the coast.

Escoumains River is 5 miles southwestward of Escoumains Islets and is a considerable stream.

A settlement with a population of 667 in 1891, and having a sawmill and a church, is on the north side of the entrance.

A small bank with 7 fathoms water on it lies off the south entrance point, on which vessels anchor to load.

Tides.—The tidal streams are regular, increasing in strength as the comparatively narrow pass on either side of Red Islet is approached. The flood is the stronger stream of the two, the ebb being deflected over toward the southern shore by the stream out of Saguenay River. The flood does not extend above 5 or 6 miles off the north shore below Bergeron Coves, and the closer to that shore the stronger is the stream. Its rate at Mille Vaches Point, where it does not extend far off shore, is from 1½ to 2 knots; and off Bergeron Coves from 2 to 3 knots, in spring tides.

Great and Little Bergeron Coves are two small bays separated by a point. They are both full of large bowlders, which dry at low water, and have small streams at their heads. Little Bergeron Cove is the southwestern, and is 6 miles northeastward of the entrance to Saguenay River.

SAGUENAY RIVER.

(H. O. Chart No. 1112.)

For the first 50 miles up from its confluence with the St. Lawrence the Saguenay is from ⅔ mile to 2 miles wide, filling up a deep transverse valley through mountains of syenitic granite and gneiss. These mountains rise everywhere more or less abruptly from the water, forming, in some parts, precipitous headlands more than 1,000 feet in height. The

granitic hills are in general quite barren, but the valleys through which the rapid tributary streams descend are filled with a deep deposit of sand and clay, and are thickly wooded. At Ha Ha Bay and at Chicoutimi there are considerable tracts of good land, as there are also around Lake St. John. This country is being rapidly settled.

Within the same part of the Saguenay the water is almost as deep as the mountains are high. Between the shoals at the entrance of the river there is a bar across, on which, however, there are from 18 to 20 fathoms water, but immediately within that the depth increases to upward of 100 fathoms; and farther up for many miles it is fully 145 fathoms deep in the center of the channel, decreasing to 100 fathoms on either side, often within less than as many feet of the precipitous shores. It is this enormous depth, its mountainous shores, and its impetuous stream, that have rendered the Saguenay so celebrated, and that entitle it to be classed among the most remarkable features in the geography of Canada. The bed of the Saguenay for many miles is sunk more than 100 fathoms below that of the St. Lawrence at their point of junction. There are anchorages occasionally, but they are some miles apart, and there is none, of course, in the great depths between them. In the case of a vessel becalmed, however, there would be little or no danger, since there are no shoals in the channel, when once within the entrance, and a boat ahead would serve to keep her clear of the shore. In some parts, perhaps, but not often, a line might be made fast to the rocks.

The Saguenay is navigable for large vessels nearly to Roches Point, 57 miles from the St. Lawrence; and schooners, with the assistance of the flood tide, can ascend to Chicoutimi, 8 miles farther. Just above Roches Point the river becomes suddenly very shoal, there being only 7 feet water in its narrow and intricate channels, and among shoals composed of large bowlders. Above this shallowest part, where at low water there is a complete rapid, the depth varies from 2 to 8 fathoms, but between shoals of large stones, and the river contracts to little more than ¼ mile in width, retaining that breadth nearly to the rapids, 6 miles above Chicoutimi, where the tide ends.

The Saguenay discharges the water of Lake St. John, contributing to the St. Lawrence a quantity of water only inferior to that which is supplied by the Ottawa.

Tides and Currents.—It is high water, full and change, at Tadousac, at the entrance of the Saguenay, at 2h. 45m., and the rise in ordinary springs is 17 feet, and in neaps 10 feet. At Chicoutimi it is high water at 4h. 11m., and the rise in ordinary spring and neap tides is 12 and 8 feet.

The flood tide is extremely weak and of short duration; above St. Marguerite River it is almost imperceptible, excepting a weak stream which may be found running up close to the shores. The water, however, has often been observed to be flowing up at the depth of several

fathoms, while it was stationary or descending on the surface. The tide flows to the foot of the Terres Rompues Rapid, about 6 miles above Chicoutimi, and about 71 miles from the St. Lawrence. The stream of the ebb tide is very strong, varying from 3 to 5 knots, according to the breadth of the river. It is strongest in the mouth of the river, where it sometimes runs at the rate of 7 knots, and sets strongly over Lark Islet Spit and the SW. extremity of Vaches Point.

The meeting of the spring ebb tides down the Saguenay and the St. Lawrence causes breaking and whirling eddies and ripplings, so strong as to interfere with the steerage of a vessel unless she has a commanding breeze. These streams, opposed to a heavy easterly gale, cause an exceedingly high, cross, and breaking sea. On the flood tide at such times there is not more sea there than in other parts of the river.

Capt. O. Tramblay, in a report to the Government of the Dominion of Canada, 1875, made the following remarks on the currents in Saguenay River:

From the entrance of Chicoutimi River to Roches Point the current is steady and even, in some parts setting on the shoals, but without any undercurrent.

From Roches Point to St. Jean Bay, 36 miles to the eastward, the surface current is not strong at any time. In many parts there is a strong and variable undercurrent, especially during springs, strong with the flood, but scarcely perceptible during the ebb. This undercurrent, acting on vessels drawing from 10 to 25 feet, sometimes renders them unmanageable even when assisted by a tug.

At spring tides a large body of water passes over the Chicoutimi Shoals (at a very rapid rate during ebb tides), and falling suddenly into deep water, seems to strike downward at once, leaving but a slight current on the surface.

The strong flood tides over the bar at the entrance of Saguenay River falling suddenly into deep water may also contribute to a certain extent to check the strength of the surface current of the river.

Communication.—There is steam communication three times a week during the summer from Quebec, the vessels calling at Tadousac, Chicoutimi, Ha Ha Bay, St. Jean Bay, and again at Tadousac in the order given.

Entrance of the Saguenay.—This river enters the St. Lawrence opposite Red Islet and Green Island, as see pages 321, 322, wherein are described its entrance points (Lark Point and Vaches Point), Lark Islet, and the reefs off them, together with the leading marks and buoys for clearing them, as far as required for the guidance of vessels passing up or down the St. Lawrence; also the anchorages of Moulin Baude and of Basque Road; these anchorages will be of great use to vessels frequenting the Saguenay.

Referring to the chart for the shape of the extensive reefs on either side, it will be seen that the entrance channel between Prince Shoal,

Bar Reef, and Lark Islet Spit on the one side, and Vaches Patch and Reef on the other, is ¾ mile wide, with deep water and very irregular soundings. The shallowest part is between Bar Reef and Vaches Patch, where there is as little as 11 fathoms. Immediately within it the depth increases, and off Tadousac exceeds 80 fathoms. It is ¾ mile wide from Ilot Point, the NW. point of Tadousac Harbor, marked by a beacon, across to Noire Point. This point has a curious white mark on the south side, and there are two lighthouses, now disused. These buildings in line lead close north of Prince Shoal.

Buoys.—The entrance of the Saguenay is buoyed as follows: On the eastern side of the entrance, on Vaches Patch, a red and black buoy lies in 2¼ fathoms on the south side of the patch, and on Prince Shoal a red and black buoy. Westward of the entrance a red buoy on the outer or southernmost extreme of Lark Reef is moored in 4½ fathoms.

St. Catherine Bay is on the southern side of the entrance of the Saguenay, between Lark Islet and Noire Point, in which vessels may anchor, in 20 or 30 fathoms of water, out of the strength of the tides, but exposed to considerable swell in easterly winds. On the NW. side of this bay there are several large iron rings in the steep granite shore, which were probably used for mooring or heaving down vessels.

Tadousac Harbor is on the northern side of the entrance of the Saguenay and one mile within Vaches Point. It is a bay between Rouge and Ilot Points, with a sandy beach at its head, and rather more than ½ mile wide and ⅛ mile deep. The anchorage is in from 7 to 18 fathoms, clay bottom. Vessels ought always to moor and have a heavy anchor close inshore, for the gusts from the NW. are at times exceedingly powerful, and should the anchor start there would be little chance of bringing up again before the vessel had dragged her anchor down hill into deep water. Besides, although vessels are here completely out of the regular streams of the tides, yet eddies often set into the bay, causing a vessel to swing round several times in a tide, so that it would be almost impossible to keep a clear anchor.

The shelter is rendered complete in every direction by either land or reefs, excepting SE., and there Red Islet, with the south coast beyond it at no great distance, prevents any sea of consequence even to a boat from ever entering the harbor.

Tadousac is now a thriving village, with two churches, an old one, on the site of the oldest church in Canada, near the beach, and a large modern church with a spire a short distance northeastward. A conspicuous hotel, painted white, stands close inshore of the NW. extreme of the beach.

Tadousac is situated on a semicircular terrace of sand and clay, at the head of the bay, and backed by steep, high, and rugged hills of granite. It was formerly the principal of those posts for trading with the Indians which were known by the name of the "King's Posts," and were, in 1829, leased to the Hudson Bay Company.

In 1887 twelve vessels loaded at Tadousac. Supplies in small quantities may be obtained here.

L'Anse à l'Eau, the small cove next west of Tadousac, has a wharf on the north shore where the steamers from Quebec lie, and it is the seat of a fish hatchery. The telegraph cable that crosses the Saguenay is landed in this cove.

Directions.—The buoys placed at the entrance of the Saguenay will be found of great assistance to a vessel beating into the river, there being no clearing mark for the reefs on the SW. side of the entrance; and if buoys were added to Bar Reef and Lark Islet Spit, vessels might beat in and out at all times with safety. On the NE. or Vaches Point side observe that Ilot and La Boule Points in line, bearing N. 79° W. (N. 59° W. mag.), pass over the SW. side of Vaches Point Reef, and must be kept open to clear it; La Boule Point being a high and round-backed hill, forming a steep headland 4 miles above Tadousac, and the extreme point seen on the same side of the river.

Winds from SW., round south to NE. will enable a vessel to enter the Saguenay on the flood tide. The first, which is the prevailing summer wind, will not carry her far up, since she will be becalmed under the mountainous shores; but the NE. wind, or wind up the St. Lawrence, draws also up the Saguenay, and is the only wind which can be depended on for running a vessel up to the anchorages above Tadousac. The NW. wind often blows down the river in furious squalls, especially in the fall of the year.

Being bound to the Saguenay, approach the entrance early on the flood with a breeze which can be depended on, and plenty of daylight to reach the anchorage off Tadousac. Remember that the ebb sets like a rapid over Lark Islet and Vaches Point Reefs, and that it is dangerous to be becalmed just within either of them, because the water is so deep that it is difficult to anchor. If night be coming on, or the tide or the wind be unfavorable, anchor off Moulin Baude or in Basque Road, according to circumstances, and wait for an opportunity for running in, unless a vessel has a pilot sufficiently skillful to beat her in with safety.

Whether the entrance is approached from the SW. or NE., in either case bring Brandy Pots open east of White Islet, bearing S. 14° W. (S. 34° W. mag.). Run upon this mark (and it will lead well clear of Vaches Patch, Prince Shoal, and Lark Reefs) until La Boule Point appears just open southwestward of Ilot Point, bearing N. 77° W. (N. 57° W. mag.). Haul in now for the last-named leading mark, keeping the SW. extreme of La Boule Point just open, and it will lead in clear of all danger. As soon as the vessel is as far in as Rouge Point she may haul into the harbor, choosing her berth at pleasure, but letting go the outer anchor in 16 fathoms and the inner one close to the low-water mark; or she may lay it and secure it within the low-water mark, if that should be preferred as the safer plan. The marks above given

are often difficult to distinguish, but the buoys, supposing them to be securely moored, have rendered them no longer absolutely necessary, since there can be no difficulty with a fair wind in running with their assistance through a channel ¾ mile wide.

ANCHORAGES IN THE SAGUENAY.

Barque Cove, rather more than a mile above Tadousac, and on the same side of the river, is 400 yards deep. A vessel or two might be moored in it.

St. Etienne Bay and River are 10½ miles up the Saguenay, and on its western shore. The bay is a mile wide, and forms a harbor where a number of vessels may ride in from 10 to 30 fathoms, clay bottom, along the edge of the bank which dries out ¼ mile from the shore.

St. Louis Isle, 16 miles up the river, forms an excellent anchorage, either under its east end or between it and the south shore, the depth of water being from 10 to 30 fathoms, sand and mud bottom.

St. Barthelemi Isle, a mile higher up, and on the opposite side of the river, lies close to the mouth of the Cacard River. A vessel or two might be secured there, the place being small, and the depth of water from 6 to 20 fathoms.

St. Jean, on the southern shore, and 23 miles up the Saguenay, is a large bay with a small islet off its NW. point. It is 1¾ miles wide and 1½ miles deep. The St. Jean River and several small streams enter at its head. Off these streams, and along the edge of the bank which dries out ¼ mile from the shore, there is good anchorage for many vessels, in from 8 to 40 fathoms, mud bottom. A small village, with a pier and a church, stands on the south shore, and there is a prominent waterfall on the west side of this bay.

Light.—From a mast 11 feet in height erected at the extreme of the pier in St. Jean Bay is exhibited, at an elevation of 16 feet, a fixed white light. It is visible 8 miles.

Éternité Cove, on the same side as St. Jean Bay, and 6 miles higher up the river, is ½ mile wide and 1¼ miles deep, with a river of the same name at its head. At the head of this cove vessels may lie securely in from 8 to 30 fathoms, mud bottom, and as securely landlocked as if they were in a small lake surrounded with mountains.

Cape L'Éternité is the south entrance point, and Cape à la Trinité the north entrance point of Éternité Cove. The latter resembles three steps when seen from up or down the river. On the lowest is an image of the Virgin, 32 feet high, and about 400 feet above high water, and on the next above is a cross at an elevation of about 700 feet.

La Niche, a curious hole in the cliffs, lies on the west shore, about 2 miles NW. of Cape à la Trinité.

Descente des Femmes is a cove 700 yards long, with a depth of 20 fathoms at its entrance, decreasing to 5 fathoms near its head. Several vessels might lie moored in it in great security. It is 42 miles up the

river, and on its northern shore. There are houses round this cove, and round those on either side of it.

The Saguenay turns suddenly to the northward 5 miles above this cove, between Cape East and Cape West, but the previous direction of the river is continued 6 or 7 miles beyond the point last named to the head of Ha Ha Bay, 55 miles from the entrance of the river.

Ha Ha Bay is 6 miles deep and from 1¼ to 2¾ miles wide, the widest part being at its head, where four considerable streams fall into it. The best anchorage is on either side of a small islet joined to the shore at low water in the SW. corner of the bay, and from 7 to 30 fathoms, clay bottom. There is room for any number of vessels, but they are rather exposed in easterly winds.

This bay is now fairly well settled, and is cultivated from Fort Point westward and northward to the northern cove at the head. St. Alexis, a considerable village, containing a church with a spire, and a sawmill, is on the shores of La Grande Baie, the SW. arm; and St. Alphonse, which has also a church with a spire, is on the NW. arm of the bay. There is a wharf at St. Alphonse to which the steamers moor.

In 1891 there were 1,689 residents at St. Alexis and 1,476 at St. Alphonse.

Light.—From a mast 28 feet high erected at the extreme of the wharf at St. Alphonse, and at an elevation of 34 feet, is exhibited a fixed white light.

Petites Isles, on the northern shore of the river, 52 miles from its entrance, and 4½ miles above Cape East, are three small rocky islets joined to the shore at low water. The bay on the east side of them forms a small but secure anchorage. The depth of the water is from 6 to 17 fathoms, mud bottom. The Saguenay, which is here nearly 2 miles wide and with a depth of 65 fathoms, is contracted to ¾ mile by a high rocky point projecting from its northern shore at the distance of 2 miles westward, but expands again nearly to the same breadth in the next 3 miles, which is the distance from the high point just mentioned to Roches Point. On the north side of the river, from the high point to within one mile of Roches Point, there is good anchorage in any depth to 20 fathoms.

Roches Point is 57 miles from the entrance of the river, and here the navigation ends for shipping, but continues for vessels of small draft to Chicoutimi, 7 miles farther. The river is still 1¼ miles wide at Roches Point, but contracts rapidly above it, assuming at the same time the usual character of a river, such as mud banks on either side dry at low water, shoals of large bowlder stones, drift trees, etc. The water also becomes fresh when the tide is out.

Chicoutimi is a large village, with a population of 2,277 in 1891, containing a large cathedral with a spire, a marine hospital, in front of which is a large obelisk, a convent, courthouse, hotel, and many other prominent buildings, as well as a wharf. Both sides of the river

are cultivated for some distance from the village, and farmhouses are scattered among the fields.

About 20 vessels are laden here annually. They lie off Moulin River or below the shoals, as only 7 feet water can be carried to Chicoutimi at low water.

There are two first-class tugs of over 300 tons and a small one of 21 tons to tow vessels when necessary.

Buoys are laid down to assist vessels in navigating from Roches Point to Chicoutimi.

Lights.—There are five sets of leading lights to guide the local steamers to Chicoutimi, and there is a fixed light at the wharf, which shows red down the river and white abreast the wharf.

Chicoutimi River is on the south side of the Saguenay and one mile above the village. This river is the largest tributary to the Saguenay. It falls 40 or 50 feet, through a narrow, rocky, and rugged channel, only a short distance within its entrance.

From Lake St. John to within 6 or 7 miles of this village the Saguenay is said to be so full of heavy rapids as to be exceedingly dangerous to canoes, therefore the longer and more circuitous route up the Chicoutimi, through Lake Kenogam, and down the Metabetshuan River is preferred. At the mouth of this last-named river, on the south shore of Lake St. John, stands another of the "King's Posts," leased by the Hudson Bay Company. It was established first by the Jesuit missionaries in the sixteenth century, and traces of their cultivation still remain.

Directions.—No directions are necessary for ascending the Saguenay to the anchorages, since there is not a single rock or shoal in the way from Tadousac to the anchorage below Roches Point.

CHAPTER XI.

ST. LAWRENCE RIVER—GREEN ISLAND AND RED ISLET TO SOUTH TRAVERSE AND COUDRES ISLAND.

QUEBEC.

(H. O. Chart No. 1112.)

General Remarks.—The estuary of the St. Lawrence has been considered to terminate, and the river to commence, at Green Island, not with any pretension to geographical accuracy of definition, but because the adoption of such a division, at a part where the navigable channel becomes divided, contracted, and difficult, naturally and conveniently separates the sailing directions into parts corresponding with that distinctive change in the nature of the navigation. The preceding chapters were intended, with the aid of the charts, to enable the seaman to navigate his vessel as high up the St. Lawrence as Green Island.

This chapter commences at what may be considered the first difficult pass ascending the St. Lawrence—the difficulty arising not only from the dangerous reefs off Green Island, Red Islet, and Saguenay River, but also from the great velocity and transverse direction of the tidal streams.

All light buoys in the St. Lawrence River are withdrawn earlier in the autumn and replaced later in the spring than the ordinary wooden buoys. Wooden buoys mark the positions of the light buoys until the end of the season.

Some remarks and directions have already been given respecting the passage on either side of Red Islet and its reef, Green Island Lighthouse and Reef, and the anchorage under the latter (pp. 216 and 217).

The whole distance from the lighthouse on Green Island to the lightvessel at South Traverse is 54 miles. For the first 30 miles of that distance the river is divided into two channels (north and south) on either side of Red Islet, White Islet, and Hare Island, with the reefs and banks attached to them, or bearing their names; all of which, lying in the same direction form a narrow but not continued ridge of graywacke and slate rocks, nearly in the middle of the river. In the remainder of the distance, the river is unobstructed by detached shoals from the SW. end of Hare Island Bank, to the NE. end of Middle Ground of South Traverse. The shoals just mentioned were supposed to be connected together by English Bank, which, however, terminates off Murray Bay, 7 or 8 miles westward of Hare Island Bank. The

islands above mentioned, with their reefs, banks, and anchorages, will be first described, and afterwards the mainland, and the channels on either side of them.

(H. O. Chart No. 1490.)

Red Islet, W. by N. 5½ miles from the lighthouse on Green Island, is small, low, and of shingle partially covered with grass and resting on slate rock.

Light.—The light tower on the center of Red Islet is a circular gray stone tower 64 feet high. It exhibits, at an elevation of 68 feet, a flashing white light showing three flashes, with intervals of ten seconds between their points of greatest brilliancy, followed by an interval of thirty seconds, during the greater part of which the light is totally eclipsed, thus completing the revolution in fifty seconds; it should be visible 12 miles.

Red Islet Bank.—Red Islet is quite bold at its SW. end, but a rocky bank or reef, nearly dry in some parts at low water, extends 2½ miles northeastward and is 1½ miles wide. There is good warning by the lead in approaching this bank from the northeastward, but vessels should be cautious in approaching it from the northward, because the water is deep and the ebb stream sets strongly upon it on that side. In fine summer weather vessels becalmed or bound up, and wishing to wait for the tide, may safely anchor east and SE. of this bank in 10 fathoms at low water, where they will have good ground and find the strength of the ebb much broken by the bank. In case of need, they may also anchor in the same depth 400 yards from the south side of the islet, but the ebb stream runs there at the rate of 6½ knots an hour.

Marks.—The lighthouse and beacons on Green Island are all white, and the southeastern beacon, when in line with the lighthouse bearing S. 43° E. (S. 23° E. mag.), leads northeastward of Red Islet Bank. White Islet, kept twice its own breadth open northward of Hare Island, S. 33° W. (S. 53° W. mag.), will lead to the southeastward; but as these marks are distant and may not always be plainly distinguished, the lead should never be neglected nor the vessel taken nearer than the depth of 9 fathoms at low water. A red buoy marks the SE. extreme of the bank. There are no marks for leading northwestward of this bank, nor do the soundings there afford sufficient warning for the safety of a vessel.

Lightvessel.—A lightvessel is moored near the NE. end of Red Islet Bank and exhibits 2 fixed white lights, one on the foremast, 34 feet high, the other on the mainmast, 22 feet high. The lights should be visible 11 miles.

The lightvessel is painted red, with the words Red Island lightship in white on her sides, and is moored in 10 fathoms in a northeasterly direction from Red Islet. This vessel is withdrawn annually on November 15.

Fog Signal.—During thick or foggy weather and snowstorms a

steam whistle is sounded from the lightvessel ten seconds in every minute, or with an interval of fifty seconds between each blast.

White Islet, lying nearly 10 miles SSW. ½ W. from Red Islet, is small, 38 feet high, and wooded. It presents the appearance of a clump of trees on Hare Island North Reef. There are other small accumulations of bowlders that never cover, but White Islet is the only conspicuous object on the reef.

White Islet Reef is composed of a narrow ridge of slate with numerous bowlders on and skirting it, and extends 3 miles northeastward of White Islet. The flood stream sets very strongly on and over the NE. extreme of this reef. Vessels in that neighborhood should therefore guard against this dangerous stream.

At night or in foggy weather vessels should not approach this reef nearer than a depth of 10 fathoms at low water.

Lightvessel.—A lightvessel, with two masts, is moored in 8 fathoms water off the NE. extreme of White Islet Reef, and is painted red, with the words White Island Reef in white letters on the sides.

From each masthead is exhibited a fixed white light, that on the foremast at an elevation of 24 feet and the one on the mainmast at 27 feet, respectively. Both should be visible 10 miles. Withdrawn November 15 each year.

Fog Signal.—In thick or foggy weather and during snowstorms a steam whistle on board the lightvessel will be sounded as follows: A blast of eight seconds, silence eight seconds, a blast of eight seconds, followed by silence for two minutes and twenty seconds.

Hare Island is nearly joined to White Islet at low water when the passage between is not available even for boats. It rises apparently in an inclined plane from both ends to a summit 323 feet high. There are a few houses on the eastern shore at 1½ miles from the NE. extreme, and a solitary house stands 2 miles farther SW.

An isolated reef, 2 feet high, lies 600 yards SSE. of the NE. extreme of Hare Island, and a small wooded islet is joined at low water to the SW. extreme.

Beacons.—A diamond-shaped and a pyramidal beacon stand close west of the eastern houses, and at one mile from the SW. extreme there are two pyramidal and one diamond beacon.

Brandy Pots are three islands joined together at low water, but separated from Hare Island by a channel ⅓ mile wide with a reef nearly in the middle, and through which no greater depth than 9 feet will be found at low water, though there is a curious deep hole at the SW. entrance.

The westernmost island is the largest. It attains an elevation of 170 feet in a wooded conical summit and falls in cliffs to the northward. The easternmost islet is small and wooded and about 30 feet high. The southernmost islet is white and almost bare of trees. Its south extreme has deep water close to.

Light.—From a square building, 39 feet high and painted white, situated close to the SE. extreme of the southernmost of Brandy Pots, and at an elevation of 57 feet, is exhibited a fixed white light, which should be visible 10 miles.

Brandy Pots Bank extends on each side of Brandy Pots. An isolated rock with 12 feet water on it lies 1½ miles S. 28° W. (S. 48° W. mag.) from Brandy Pots lighthouse and 1,600 yards from the nearest point of Hare Island.

A shoal with 18 feet water over it lies 3½ miles S. 30° W. (S. 50° W. mag.) from Brandy Pots lighthouse; a rock with 16 feet water over it, ⅛ mile southwestward of the shoal, and a bank with 17 feet water on it lies 900 yards S. 72° E. (S. 52° E. mag.) from the SW. point of Hare Island.

Anchorage.—Small vessels seek shelter on either side of Brandy Pots, according to the wind, in depths from 13 to 16 feet water.

Large vessels anchor as convenient in Brandy Pots Channel or Hare Island Channel south of Middle Ground. The holding ground is good throughout.

The tidal streams are not so strong in the Southern Channel.

The bank northeastward of Brandy Pots has extended and the whole of Pilgrim Islands must be kept well open of Brandy Pots to clear the outer depth of 17 feet.

Hare Island South Reef.—The nearest portion of the reef that dries at low water is 1½ miles SW. of Hare Island, the channel between having no greater depth than 18 feet at low water. The streams sweep through this channel with a velocity of 4 to 5 knots at spring tides, eddying with strong swirls on the ebb.

The local steamers use this channel in going to and from Murray Bay and Rivière du Loup.

On this reef are four islets. The two northeasternmost covered with grass with a few small bushes 6 feet above high water, and the southwesternmost a sand bank covered with grass and 4 feet high. The largest is between these and has some spruce trees on the summit, the highest of which is 22 feet above high water.

Buoy.—A red buoy is moored in 19 feet water at the northeastern extremity of the shoal water extending from Hare Island South Reef, with the summit of White Islet in line with the south extreme of Hare Island, and with the northern pyramidal beacon in line with the diamond beacon of the group near the southwestern extreme of Hare Island.

Hare Island Bank extends 6 miles southwestward of South Reef, and the extreme is marked by a red buoy moored in 4 fathoms water with the west sides of Hare Island and Reef in line and the two beacons at the NE. end of Grande Island Kamouraska, both now painted white, in line.

Barrett Ledges are two small rocks with deep water between and

around them. The northeastern has 7 feet water over it and is $2\frac{1}{10}$ miles N. 73° E. (S. 87° E. mag.) from Brandy Pots lighthouse, and the western, with 12 feet water over it, lies 800 yards S. 48° W. (S. 68° W. mag.) from the eastern rock.

The highest hill over St. André, open of Great Pilgrim Island, bearing S. 19° W. (S. 39° W. mag.) leads close east, and Hare Island Summit, in line with the NE. extreme of Brandy Pots, bearing S. 73° W. (N. 87° W. mag.), leads north of these ledges.

Buoys.—A buoy checkered black and white is moored close NE. of the eastern rock, and shows an intermittent white gas light, the period of occultation being about six seconds.

A can buoy, checkered black and white, is moored close east of the western rock.

Marmen Rock, with 7 feet water over it, is a little more than $1\frac{1}{2}$ miles S. 73° E. (S. 53° E. mag.) from Brandy Pots lighthouse. Middle Shoal, with 9 feet water on it, lies 300 yards SW. by S. of Marmen Rock, and Demers Rock, with 11 feet water over it, lies 700 yards southwestward of Middle Shoal, and nearly $1\frac{1}{2}$ miles S. 56° E. (S. 36° E. mag.) from Brandy Pots lighthouse. The apparent easternmost summit on the south shore of the river in line with the north extreme of Cacouna Island, bearing N. 49° E. (N. 69° E. mag.), leads close SE. of these banks.

Buoys.—A can buoy, painted black, is moored close northward of Marmen Rock, and a buoy, painted red, is moored close southward of Demers Rock.

Middle Bank extends southwestward from Middle Ground to Hare Island Bank with no greater depth than 27 feet. A patch, with 17 feet water on it, lies on this bank at 2 miles S. 89° E. (S. 69° E. mag.) from the SW. extreme of Hare Island, and a shoal, with 18 feet water over it, lies 800 yards northeastward of that patch, with the SW. extreme of White Islet in line with the north extreme of Brandy Pots.

Buoy.—A can buoy, painted red and black in horizontal bands, is moored in 25 feet water southward of these shoals, with the two pyramidal beacons in line, and White Islet showing about mid-channel between Brandy Pots and Hare Island.

Mark.—The best mark for crossing Middle Bank, in 27 feet water, is to keep the NE. extreme of Hare Island in line with the east extreme of Brandy Pots, bearing N. 9° W. (N. 11° E. mag.).

SOUTH SHORE—BELOW THE TRAVERSE.

Green Island and Reef.—See pages 216 and 217.

Green Island is of graywacke and slate rock; wooded, and rising to about 250 feet above the sea. The channel between the island and the mainland is $\frac{3}{4}$ mile wide in the narrowest part, and dries at low water, with the exception of a very narrow channel for boats.

The island extends 5 miles SW. from the lighthouse, with bold and

rocky shores. Its SW. point is low and bare, and has a dangerous reef extending from it one mile southwestward. The NW. side of this reef is so bold that there is no warning by the lead. At night, vessels should come no nearer to it on that side than 25 fathoms water, nor bring the light to bear northward of N. 47° E. (N. 67° E. mag.), until the NE. end of Cacouna Island bears S. 43° E. (S. 23° E. mag.), which bearing leads to the westward.

Tides.—The flood stream sets strongly over the tail of this reef toward Cacouna Island and the ebb the contrary. There is generally a great rippling off the end of the reef caused by the meeting of the flood tides from either side of Green Island.

Green Island Light.—See page 217.

Anchorage.—Midway between the SW. end of Green Island Reef and Cacouna Rock there is good anchorage and shelter from easterly winds, in 6 fathoms, muddy bottom, but there might be delay and difficulty in getting out when the wind changed to the westward, on which account it is seldom used.

Cacouna Island is separated from the mainland only at very high tides, and there is a causeway to it that rarely or ever covers.

The island is generally wooded, over gray rock, and is faced by cliffs on the north side; it is 281 feet high, and is conspicuous from its isolated position and greater elevation than the adjacent coast.

Cacouna Rock, 25 feet high, is joined to the north extreme of Cacouna Island by a reef of slate that dries at low water. A depth of 6 fathoms water will be found at 200 yards from the SW. point of the island.

Cacouna, a village with a population of 899 in 1891, is on the mainland SE. of Cacouna Island. It is one of the most frequented summer resorts of the Province of Quebec, has a large parish church with a spire, a small Episcopal church with a spire, and a Presbyterian church with a belfry; the last named is not visible from seaward.

A large hotel, with three projecting wings and painted white, stands near the edge of the cliff that rises close southwestward of the pyramidal beacon which stands below the church, and about $\frac{3}{4}$ mile distant from the latter. Numerous villas of the summer residents and houses of the stationary population line the road for some distance southwestward of the hotel.

The post and telegraph office stands opposite the church.

Percée Rocks are in two parts that together extend $1\frac{2}{10}$ miles parallel to, and distant nearly one mile from, the south shore of the river. The northeastern part is $1\frac{8}{10}$ miles from Cacouna Island and is a small round rock 9 inches above high water. The southwestern part is one foot high, long and narrow. A tortuous channel with $3\frac{1}{2}$ fathoms water in it lies between the reef and the shore. At night vessels should not approach these rocks to a less depth than 8 fathoms.

Rivière du Loup, the entrance to which is $5\frac{1}{2}$ miles southwestward

of Cacouna Island, is a considerable stream, and has a depth of 2 feet in the entrance at low water, but dries across at a short distance within the inner end of the pier. A depth of about 10 feet may be found at high water to the mills near the bridge at the head, a distance of 1⅛ miles. Water can be procured with considerable difficulty near the bridge.

A pier extends about 1,600 feet from the north entrance point of the river, with a crosshead, alongside which there is a depth of 16 feet at low water. A small hotel and telegraph office stand at the inner end of the pier, and a flagstaff on the point.

A railway in connection with the Intercolonial system extends to the end of the pier.

Light.—From a square lighthouse, 35 feet high, and painted white, at the end of the pier at Rivière du Loup Point is exhibited, at an elevation of 36 feet, a fixed white light that should be visible 11 miles.

Signals.—This is a telegraph and signal station.

Anchorage.—The anchorage off Rivière du Loup is very good; depths from 4 to 5 fathoms may be found as convenient, the former at 400 yards from the pier. The deepest water will be found with the courthouse in line with Rivière du Loup Point. The holding ground is very good in this vicinity.

Tides.—It is high water, full and change, at Rivière du Loup Pier at 3h. 10m.; springs rise 16¼ feet; neaps rise 10½ feet, and neaps range 7 feet.

Fraserville is a small town close inshore of the entrance to the river, with a population of 4,175 in 1891. There is a prominent stone church with a spire, and about 250 yards westward of the church is the courthouse, a conspicuous square stone building. There is also a small Protestant church with a square tower, but it is rarely visible from seaward. There are both post and telegraph offices in Fraserville.

Rivière du Loup Village lies south of Fraserville, and is the seat of the engineering works of the Intercolonial Railway, which are grouped about the railway station.

Supplies of any kind may be obtained here. Coal can be procured from the Intercolonial Railway, and can be taken in from trucks at the end of the pier. About 1,600 tons are kept stored at Rivière du Loup, and about the same quantity both at St. Flavie and St. Charles Junction, but any quantity can be had from the Pictou collieries in 50 hours, or from Springhill in 39 hours.

Aspect of Coast.—The land in this neighborhood consists of a series of ridges parallel to the shore, and separated by valleys under cultivation. From the valley next south of the ridge that terminates in Rivière du Loup Point rises a remarkable isolated hill 280 feet high that from the westward appears as a sharp cone. The coast ridges, all of which are faced by cliff on the river side, extend to Notre Dame du Portage, the westernmost being surmounted by a flagstaff and a summer

house at 186 feet above high water. Behind these ridges the main hills are almost flat in outline, and slope gradually seaward from elevations of 400 to 550 feet high.

Notre Dame du Portage adjoins the parish of Rivière du Loup. The parish church with a spire stands close to the shore at 5 miles southwestward of Rivière du Loup Point.

Loup Bank extends southwestward from the entrance to the river and shallows gradually westward. The lighthouse at Rivière du Loup Point well open of the isolated conical hill bearing N. 61° E. (N. 81° E. mag.), leads NW. of the depth of 18 feet on this bank, and of Pilgrim Shoal.

Pilgrim Shoal extends 4½ miles in a direction parallel to the south shore, from which it is distant 3¼ miles. The least depth found was 13 feet near the SW. extreme, but the general depth is from 16 to 18 feet. The channel between it and Loup Bank has only 19 feet water in it, and is 400 yards wide at the narrowest part. From the NE. extreme of the shoal the SW. extreme of Great Pilgrim Island is in line with the NE. extreme of Middle Pilgrim Island, and the trees near the NE. extreme of Hare Island are well open east of Brandy Pots. The mark for clearing Loup Bank leads north, and Green Island well open of Cacouna Rock bearing N. 38° E. (N. 58° E. mag.) leads west of this shoal, as also the north extremes of Grande and Burnt Islands, Kamouraska, in line bearing S. 31° W. (S. 51° W. mag.). The SW. extreme of Pilgrim Shoal lies 2¼ miles N. 16° E. (N. 36° E. mag.) from Pilgrim Island lighthouse.

Buoy.—A buoy, painted black, is moored in 5 fathoms water at 1,100 yards north of the SW. extreme of Pilgrim Shoal, and exhibits an intermittent white gas light, the period of occultation being about six seconds.

Pilgrim Islands are a group situated 7½ miles SW. of Rivière du Loup Point.

Great Pilgrim Island, the easternmost, is of bare gray rock, partially covered with turf, and with small wood in the hollows between the hills. It is surmounted over each extreme by a round hill, the eastern 218 feet and the western 223 feet, respectively, above high water, while between these is a smaller summit faced by gray cliffs.

Middle Pilgrim Island is partially wooded, and attains an elevation of 181 feet, and the other smaller islands present generally the same characteristics.

Long Pilgrim Island is the southwesternmost, and is surmounted over the NE. extreme by a partially wooded hill, 128 feet high, from which it extends in a narrow ridge faced by gray cliff for 3 miles nearly, to the small bare islet 10 feet high at the SW. extreme. At high water there is a gap at 1,700 yards from the SW. extreme, through which boats may pass when the water is smooth.

Light.—At 1⅛ miles from the SW. extreme of Long Pilgrim Island,

and on the summit of the ridge, is a square lighthouse, 30 feet high, and painted white, with the tower rising from the center of the building, from which, at an elevation of 180 feet, is shown a fixed white light that should be visible 12 miles.

Anchorage.—There is anchorage for small vessels in westerly winds under Long Pilgrim Island and off Great Pilgrim Island in 15 feet water.

Village.—The church of St. André, a stone building with a spire, stands on the mainland southeastward of Pilgrim Islands. A small village surrounds the church, at the east end of which is a large factory.

St. André Point, a round island, 126 feet high, is joined to the mainland by a grassy flat, 350 yards wide, that covers only at high water.

Several remarkable hills fringe the coast in this locality, the highest attaining an elevation of 630 feet in a conical summit, with another north of it 565 feet above high water.

St. André Bank extends from Pilgrim to Kamouraska Islands, and in many places dries out more than one mile from the shore. Its northern edge is very steep, but there is an excellent mark for it, namely, the SE. sides of Grande and Burnt Islands in line, bearing S. 31° W. (S. 51° W. mag.), which leads along it at the distance of from 300 to 400 yards from the 3-fathom line of soundings.

Kamouraska Islands lie nearly 6 miles southwestward of Pilgrim Islands, and 2½ miles from the mainland, to which they are joined by shoals that dry at low water. Grande Island is the northeasternmost, and, together with Burnt Island, extends about 2 miles along the northern edge of the bank.

These islands are long and narrow ridges of graywacke and are bold to the westward, there being 20 fathoms water close to them. Crow Island lies about ¾ mile south of Burnt Island, and there are besides two small and bare rocky islets northeastward of Crow Island, and within Burnt Island. Crow Island is about ¾ mile from the shore at the church and town of Kamouraska, and carts can cross to it at low water. There is a wharf and good landing near the church, and water may be obtained at any time of tide when there is depth enough for boats over the shoals, but there is no water on the islands.

Light.—A lighthouse is built 240 yards from the NE. end of Grande Island, and exhibits, at an elevation of 109 feet, a revolving white light every half minute. The light should be visible 18 miles. The lighthouse is a square building with dwelling attached, painted white, and 39 feet high.

Beacons.—On the northeastern end of Grande Island there are two white beacons. When in line, bearing S. 23° E. (S. 3° E. mag.), they form a cross mark for the red buoy on the SW. end of Hare Island Bank in 4 fathoms.

Kamouraska Bay, which is immediately southward of the town, is well sheltered, and small vessels may safely lie aground and winter there, on a mud bottom, which dries at low water. Vessels in distress, when they have lost their anchors, may be saved by running them in at high water between the reef off Cape Diable and Crow Island, leaving the latter from ¼ to ½ mile to the northeastward in passing, and when within the reef hauling into the bay to the SW. In high spring tides 13 or 14 feet of water will be found over the mud, but in neap tides there is seldom more than 9 or 10 feet.

Anchorage.—There is good anchorage off Kamouraska with the prevailing winds up and down the river, but exposed to westerly winds. The best berth to anchor in is where the church of Kamouraska is just open of Crow Island, bearing S. 67° E. (S. 47° E. mag.), and Grande Island just open northward of Burnt Island, bearing N. 40° E. (N. 60° E. mag.), in 7 fathoms, over stiff mud. Large vessels wishing for more room may anchor farther out anywhere to the westward.

Cape Diable lies 3 miles SW. by S. from Crow Island, across the Kamouraska Bay. From it, reefs of slate extend northward, more than midway to Crow Island, and northwestward ⅔ mile, in which last direction the distance out to the 3-fathom edge of the bank is nearly 1¼ miles.

Orignaux Point is a low point 7¾ miles SW. from Cape Diable, extending from some low hillocks. A pier extends 1,200 feet from the point, with a crosshead, alongside which there is a depth of 11 feet at low water. A large hotel and some smaller houses stand on the hillocks close south of the pier.

Light.—From a square lighthouse 28 feet high, and painted white, built at the end of the pier, at Orignaux Point, and at an elevation of 34 feet, is exhibited a fixed white light that should be visible 10 miles. This locality is in the parish of St. Denis, and is frequently designated by the name of the parish.

Fog Signal.—A hand horn answers signals from vessels.

Anchorage.—There is good anchorage at a little more than one mile from the pier in 5 to 6 fathoms water, and as close in as convenient, a depth of 18 feet being found 700 yards from the pier.

Vessels loading timber from Rivière Ouelle generally anchor here.

From this point the edge of the shoal water extends SW. by S., gradually increasing its distance from the shore.

Tides.—It is high water, full and change, at Orignaux Point at 3h. 47m.; springs rise 17½ feet, neaps rise 13 feet, and neaps range 9¾ feet.

(H. O. Chart No. 1491.)

Rivière Ouelle is just southward of Ouelle Point, the westernmost prominent projection on the shore in this neighborhood. The point slopes gradually from a height of 108 feet, the westernmost summit of a partially wooded ridge that extends some distance inland. A depth

of 12 feet will be found in Rivière Ouelle at high water as far as the wharf which is on the south side of the river at 1½ miles from the point.

The best channel is south of a small islet about midway to the wharf. A church with a spire stands close east of the bridge that spans the river at 2 miles from Ouelle Point.

St. Anne de la Pocatière is the parish next south of Rivière Ouelle. A conspicuous church with a spire and a large college surrounded by a village stand on the slope of Mont St. Anne, a prominent round hill 395 feet high. Several conspicuous isolated hills lie southward of Mont St. Anne, and Mont Boutot, a remarkable truncated cone 708 feet above high water, lies 2½ miles eastward of St. Anne.

St. Roch des Aulnets (or Aulnais) is a small village southwestward of St Anne de la Pocatière, and has a church with two small spires, which stands close to the shore. Houses are situated along the road between all these villages.

Beacons.—A pyramidal beacon is built close to the church, and a similar one on an elevation a little more than ½ mile southeastward.

Another of the same shape stands just south of the edge of the cliff at 1½ miles southwestward of the church, and inland from it, another one shaped like a diamond.

Coast.—The coast from St. Roch des Aulnets to St. Jean Port Joli is generally bordered by small cliff, the end of slopes from wooded hills that rise to heights of 320 and 290 feet above high water.

Shoals of St. Anne extend from the shore of that parish, and are dangerous, particularly at night and with the first of the flood stream which sets directly on to the shoulder of the bank at the buoy, and obliquely to the westward.

The water shoals very rapidly for the greater part of the length of the shoals, the distance between depths of 5 and 3 fathoms being less than 200 yards, and to 6 feet less than 800 yards.

Buoy.—A black buoy is moored off St. Anne Shoals in 30 feet water.

Mark.—Cape Diable well open of the lighthouse on Origuaux Point bearing N. 56° E. (N. 75° E. mag.) leads NW. of St. Anne Shoals from Ouelle Point southwestward.

Anchorage.—All along the edge of the bank, from Kamouraska Islands to St. Anne buoy, there is excellent anchorage in from 7 to 10 fathoms, stiff mud bottom.

The shoals trend 6 miles SW. from St. Anne buoy to the lower light-vessel at South Traverse, which is moored on the outer point of St. Roch Shoals.

English Bank extends about 16 miles northeastward from Middle Ground with a general breadth of one mile. The least depth found was 6 fathoms, and 6 to 6¼ fathoms may be met with at any part of the ridge of the bank as far east as Origuaux Point, where the survey terminated in 1887. It affords good anchorage, and is much used by vessels, while beating in the river, to await a favorable tide.

SOUTH CHANNEL, BELOW THE TRAVERSE.

(H. O. Charts Nos. 1490 and 1491.)

General Observations.—South Channel is justly preferred for the common purposes of navigation. In that part of it which is below the Traverse the tides are not so strong nor the water so inconveniently deep as they are in the corresponding part of the North Channel below Coudres Island. Moreover, it possesses good anchorage almost in every part, and water enough for vessels of large draft at all times of the tide.

Vessels of large draft should not pass west of Middle Bank, as not more than 21 feet can be secured at low water in crossing Middle Bank to the main channel, but such vessels should pass eastward of Barrett Ledges, Middle Shoal, and Middle Bank, where the channel is direct. With the assistance of the buoys in this channel, large vessels may beat up or down with safety.

Directions from Green Island and Red Islet to Brandy Pots.—Steamers of all descriptions proceeding to Quebec may pass between Bic Island and the south shore of the St. Lawrence, keeping rather nearer the island and guarding against the shoal off Barnaby Island. The two pairs of beacons marking the position of Alcide Rock should not be brought in line to avoid that danger, after passing which, a course should be steered to pass between Red Islet Bank and Green Island. The High Land of Bic must be kept well open north of Basque Island to avoid Green Island Reef, until the eastern beacon on Green Island is in line with the lighthouse, when a course should be steered to pass west of Barrett Ledge. The highest hill of St André, open of Great Pilgrim Island, bearing S. 19° W. (S. 39° W. mag.), leads close east of these shoals, and Hare Island well open south of White Island, leads eastward of Hare Island North Reef, while the south extreme of Green Island open north of Cacouna Rock will lead west of Percée Rocks. Bring the north extreme of Burnt Island (Kamouraska) just in sight north of Grande Island, bearing S. 31° W. (S. 51° W. mag.) before the isolated conical hill eastward of Rivière du Loup Point is nearly in line with the lighthouse on that point, bearing N. 61° E. (N. 81° E. mag.), to clear Pilgrim Shoal. The light buoy off the latter having been passed, a course should be steered to pass west of Kamouraska Islands and Orignaux Point lighthouse, giving the latter and the shoals off Ouelle Point a good berth. Cape Diable must be kept well open of Orignaux Point lighthouse, bearing N. 56° E. (N. 75° E. mag.) to clear St. Anne Shoals until the Traverse lightvessels come in line bearing S. 28° W. (S. 47° W. mag.), when they should be steered for and left to the westward. After passing Upper Traverse lightvessel, it should be brought in line with Lower Traverse lightvessel, bearing N. 28° E. (N. 47° E. mag.), and this line followed to clear St. Roch Shoals. When the buoy marking their west extreme has been passed, steer west of Channel Patch taking care to open the

highest part of Goose Island Reef south of Stone Pillar lighthouse, bearing S. 37° W. (S. 56° W. mag.) before the beacon at St. Jean Port Joli is nearly in line with the east extreme of the church. A course should then be shaped eastward of South Rock lighthouse when Crane Island should be brought well open of Goose Island Reef, bearing S. 46° W. (S. 65° W. mag.) to clear the shoals between South Rock and Goose Island Reef, and that mark should be opened gradually so as to pass 700 yards southeastward of Goose Island Reef. For continuation, see page 337.

At night, when the land can not be seen plainly, it is more prudent to pass NW. of Bicquette Island, keeping sufficiently far off to clear Northwest Reef, when a course should be steered to pass between Red Islet Bank and Green Island. Frequent bearings of the light in this locality and continuous soundings should be taken to insure clearing Green Island Reef. When past Green Island the lighthouse on that island should be just shut in with the west extreme bearing N. 36° E. (N. 56° E. mag.), and should be kept so until Barrett Ledge light buoy is passed, when a course should be steered for the light buoy on Pilgrim Shoal and the directions followed as in daylight. Careful bearings and soundings should be taken to ascertain the vessel's position, particularly in the neighborhood of St. Anne Shoals, with the beginning of the flood stream.

NORTH SHORE—BELOW COUDRES ISLAND.

(H. O. Chart No. 1112.)

Aspect of Coast.—The northern shore of the St. Lawrence from Saguenay River to Coudres Island is bold and mountainous. The granitic hills in most parts rise immediately from the river, forming steep or precipitous headlands. Near the entrance of the Saguenay these hills are not above 1,000 feet high, but those of Eboulements attain an elevation of 2,551 feet above high water.

At page 301 the coast of the estuary was described up to Little Bergeron Cove. The description of the coast from that point westward will now be given.

Vaches Point, the east entrance point of Saguenay River, lies 6½ miles NW. by W. from Red Islet lighthouse. Saguenay Cliffs, the high clay cliffs, and the hills covered with sand at this point are easily recognized.

Moulin Baude Anchorage, in 7 fathoms, mud, is 3 miles NE. by E. from Saguenay Cliffs, and Red Islet and the SW. end of Green Island are in line. The vessel will here be 800 yards from the 3-fathom line of soundings and nearly one mile off shore. The water becomes deep immediately outside this anchorage, which is of use to vessels coming up under the north shore with a scant NW. wind, at the end of the flood and close of the day, and wishing to wait for the next flood, or for daylight; also for vessels waiting for a wind to enter the Saguenay.

(H. O. Chart. No. 1490.)

Vaches Patch, with 13 feet water over it, lies 1¾ miles S. 77° E. (S. 57° E. mag.) from Vaches Point, and is a continuation of Vaches Point Reef, which dries out ½ mile from Vaches Point.

Buoy.—A buoy, painted red and black in horizontal bands, is moored southward of the patch.

Prince Shoal is a narrow ridge of stones and bowlders with 17 feet least water. It extends ¾ mile SE. by E. from what was considered to be the outer patch at the time of the Admiralty survey of 1829. This shoal, which is marked by a red and black buoy, lies 2¾ miles S. 88° E. (S. 68° E. mag.) from Lark Islet lighthouse, and is reported to have much less water.

Lark Point, the southwestern entrance point of the Saguenay, is 2½ miles from Vaches Point, and is also of clay cliffs, but much lower than those of Vaches Point.

Lark Islet is composed of shingle and bowlders, is small and low, and lies one mile NE. by E. from Lark Point, and is joined to it by sand and bowlders dry at low water.

Light.—On the center of Lark Islet is a square building, 40 feet high, painted white, which exhibits, at an elevation of 40 feet, a fixed white light visible 10 miles.

Fog Signal.—During thick weather, fogs, or snowstorms, a fog horn will give blasts of eight seconds' duration every half minute. The building is painted gray, with a brown roof.

Lark Reef is of sand and bowlders, dry at low water nearly out to the edge of the shoal water, which extends 3½ miles SE. from Lark Point. Lark Patch, near the southern end of this reef, never covers, and outside of it, in 4½ fathoms water, lies a buoy painted red. Between this extensive reef and Vaches Point Reef, including Bar Reef and Prince Shoal, is the entrance of Saguenay River, the navigation of which has been described in the previous chapter.

The mark for leading SE. of all these reefs, including Prince Shoal, is Brandy Pots open of White Islets, bearing S. 15° W. (S. 35° W. mag.). Running on this mark, a vessel will pass about ¼ mile outside Prince Shoal and Lark Reef, and will clear the Rocky Patches which lie 1½ miles eastward of Vaches Patch red and black buoy. The least water found during the survey on these Rocky Patches was 7½ fathoms, but they may be extending eastward, and the depth over them be decreasing, as was found in 1859 to be the case with Lark and Bar Reefs, and the outer patch which is now Prince Shoal.

Canard River is a small stream, at the western termination of the clay cliffs, 2¼ miles SW. from Lark Point, and can only be approached in a boat near high water.

Échafaud Islet is a small steep and rocky islet, lying off the mouth of a cove full of rocks 5 miles SW. of Lark Point. Lark Reef termi-

nates close southward of Échafaud Islet, after having trended for 5 miles SW. by W. from its SE. extreme.

Cape Basque, the first mountainous headland SW. of the Saguenay, lies 6½ miles from Lark Point. It is quite bold, having 20 fathoms close to it.

Basque Road, between Cape Basque and Lark Reef, is a good anchorage, well sheltered by the reef from easterly winds, and by the mainland from all northerly and westerly winds as far southward as SSW. There is plenty of room for many vessels, but the best berth is with Échafaud Islet bearing N. 88° W. (N. 68° W. mag) and distant rather less than one mile, where the vessel will be in 10 or 11 fathoms, with clay bottom, and nearly ½ mile from the 3-fathom line. Vessels may anchor farther out in 13 fathoms; but the farther out the stronger the stream. At the anchorage recommended the tidal streams are not strong, and the holding ground is everywhere good. There is no anchorage on the north shore SW. of this to Murray Bay, a distance of 28 miles.

Cape Dogs, 5½ miles southward of Cape Basque, is quite bold, high, precipitous, and of bare granite. Midway between these capes is the Bay of Rocks, having an island and many large rocks in it, as its name implies, and affording shelter only to boats.

Cape Salmon is high and bold, like Cape Dogs, from which it is 9¾ miles. SSW. Between these capes are Shettle Port, Black River, and Port Parsley, at 2½, 4¾, and 7½ miles, respectively, from Cape Dogs. They are merely places for boats.

Light.—On the NE. extremity of Cape Salmon, locally known as Pointe des Roches, is a white, square lighthouse with red lantern. The tower rises from the SE. face of the dwelling. The light is revolving white every fifteen seconds, elevated 77 feet, and visible 14 miles. Height of tower, 46 feet.

Fog Signal.—A steam horn gives blasts of eight seconds with silent intervals of twenty-two seconds.

Cape Eagle is 5¼ miles SW. from Cape Salmon, and of the same bold, high, and precipitous character. The bay between these capes is one mile deep, but affords no anchorage for shipping in consequence of the great depth of water. In it is Port Salmon, a small cove which large boats can enter at high water, about 1½ miles westward of Cape Salmon. The settlements on the north shore spread to the eastward of this place, and they are continuous from it all along the coast to Quebec.

Light.—On outer end of pier, at east end of Cape Eagle, a fixed white light is shown from a mast. It is elevated 38 feet and visible 6 miles.

(H. O. Chart No. 1491.)

Murray Bay, 6½ miles SW. by W. from Cape Eagle, is about 1½ miles wide and nearly as deep; but it is all dry at low water, excepting

the shallow channels leading to the river at its head. The river flowing down a beautiful valley from two or three small lakes among the hills, is rapid and unnavigable. There is a church and village round the head of the bay, and the settlements extend some miles back from the St. Lawrence. There are grist and saw mills on the river. At the latter deals are made, and are, for the most part, shipped to Quebec in small schooners, which lie aground near, or in the entrance of, the river. Occasionally, however, vessels anchor off and take in cargoes of lumber. A pier has been constructed here, having 18 feet of water at its end in the lowest tides.

A shoal, said to be extending, lies ½ mile NE. of the pier at Pointe au Pic, and the extreme is marked by a red can buoy in 2½ fathoms water at 850 yards northeastward from the lighthouse. Beween the buoy and the pier there is a shoal with 5 feet on it at low water. St. Irénée church well open of Cape Sain leads SE. of this shoal, and vessels approaching the pier should keep its NE. side hidden by the SE. front.

Slight shocks of earthquakes are not infrequent at Murray Bay, and also at Eboulements, St. Paul Bay, and the neighborhood.

Light.—At Pointe au Pic, the SW. entrance point, from a lantern on the roof of the freight shed on the wharf, is exhibited, at an elevation of 30 feet, a fixed white light that should be visible 10 miles. The roof of the building, which is 27 feet high, is red and the lantern white.

Anchorage.—The anchorage off Murray Bay is close under the high rocky shore, a little eastward of the bay, with Pointe Heu bearing S. 80° W. (N. 80° W. mag.) 800 yards. The bottom is of clay, good for holding, and the depth 10 or 12 fathoms at about 600 yards from shore, but not above ¼ mile from the edge of the shoal water. Vessels here will be out of the strength of the tides, well sheltered from the prevailing winds, and in safety if well moored, although inconveniently near the shore except in the case of a vessel taking in her cargo. It is possible to anchor a little farther out in 15 or 16 fathoms, but the tidal streams are there very strong.

Directions.—In running up from the northeastward to anchor in Murray Bay, give the shore a berth of ⅛ mile, in order to avoid the shoal water which extends nearly ¼ mile off shore midway between Cape Eagle and the anchorage. In running down from the southwestward, keep Cape Sain, the first point westward of Pointe au Pic, just open southward of the latter, in order to clear the edge of the shoal water which fills Murray Bay; and when the church bears N. 65° W. (N. 45° W. mag.), a vessel may haul in toward the anchorage.

Goose Cape is the extreme of a small wooded bluff, the spur of higher coast ranges. It is bold, and landing may be effected in a small cove west of the lighthouse in ordinary weather. The ebb stream sweeps by this point with great velocity.

Light.—From a square building 42 feet high, with dwelling attached

and painted white, on Goose Cape, is exhibited, at an elevation of 53 feet, a fixed white light that should be visible 12 miles.

Cape Martin, the east point of Eboulements Bay, is a conspicuous sharp projecting cliff. Above it stands the church of Notre Dame des Eboulements at an elevation of 1,186 feet above high water, in the center of the village.

The country in this neighborhood is well cultivated, even on the steep slopes of the ranges that dominate this section of the river. Mount Eboulements, highest, is 2,551 feet above high water, and is surrounded by small conical hills.

A shoal lies in the bay between Goose Cape and Cape Martin with 6 feet of water over it at 800 yards from the shore.

Anchorage.—The anchorage between Goose Cape and Cape Martin is good and well sheltered from easterly winds.

Vessels wishing to anchor should not do so until the west extreme of the beach of shingle that extends westward from Goose Cape bears N. 04° W. (N. 45° W. mag.), when good anchorage may be had in 7 to 8 fathoms. The streams, however, are irregular here and occasionally strong. When at anchor too far out in 8½ fathoms, with only a neap tide, the strength of which was, however, aided by an easterly wind, the first of the flood was observed coming round Goose Cape with a great rippling. At first it set slanting on the shore at the rate of 5 knots, but soon decreased to 3½ knots. About one hour from its commencement the stream increased again to 4½ knots, and after continuing at that rate only for a short time, decreased to 2½ knots, which rate it retained for the remainder of the tide, setting fairly along shore. Farther out—that is, in 10 fathoms—the ebb also will be found strong as well as the flood.

Cape St. Joseph in line with Cape Martin bearing S. 71° W. (west mag.) leads close south of the depth of 18 feet at low water in this anchorage.

Cape St. Joseph may readily be recognized by the sand cliffs facing it, and by a pier extending from the middle of the promontory with a depth of 9½ feet at the extreme at low water.

Light.—From a mast 19 feet high, with a shed at the base, at the extremity of the pier at Cape St. Joseph, and at an elevation of 23 feet, is shown a fixed white light that should be visible 5 miles.

A conspicuous landslip is close to the shore at 1½ miles westward of Cape St. Joseph.

The shore dries at low water for a considerable distance eastward and westward of Cape St. Joseph, but all danger will be avoided by keeping the landslip open of the pier at Cape St. Joseph bearing S. 86° W. (N. 75° W. mag.) until Goose Cape is in line with Cape Martin bearing N. 64° E. (N. 83° E. mag.).

This latter mark will lead in mid-channel to St. Paul Bay.

NORTH CHANNEL—BELOW COUDRES ISLAND.

(H. O. Chart No. 1112.)

General Observations.—The channel northward of Red Islet and its bank, and between the latter and the shoals off Saguenay River, is 2⅓ miles wide, between the 3-fathom lines, and the water is very deep. Farther southwestward, North Channel is much wider, being nowhere less than 3½ miles in breadth.

North Channel from Red Islet to Coudres Island has a depth of water usually exceeding 30 and sometimes 50 fathoms. It therefore affords no anchorage except those described in the last section. A vessel, however, might anchor on the NW. side of Hare Island Bank, and English Bank is common to both channels, but it is only in fine weather that vessels could ride in such exposed situations.

It is this want of good and convenient anchorages which renders this part of North Channel unfit for general use. In South Channel a vessel above Cacouna can anchor almost anywhere or at any time when it may become necessary; but in North Channel, in the event of its falling calm, she would be left at the mercy of the strong tides, and might be in danger of being set on shore if she were in the neighborhood of Red Islet or the shoals off the Saguenay. In other respects North Channel is a fine, wide, and straight channel, free from detached shoals, but with easterly winds and thick weather, or at night, this channel should never be attempted. Besides, the meeting of the ebb streams down the St. Lawrence and out of the Saguenay, at the rate of 5 or 6 knots, and their opposition to the heavy swell up the estuary in NE. gales, causes a very heavy, breaking sea, which it would be difficult to distinguish from shoal water.

However, supposing the circumstances such as to render it desirable for a vessel to take North Channel, attend to the following directions:

Open the half of Cacouna Island westward of Red Islet, and then steer so as to open Brandy Pots southward of White Islet about the breadth of the latter and bearing S. 15° W. (S. 35° W. mag.). Take care to open Brandy Pots as directed, because the line of those islands and White Islet touching passes nearly over Rocky Patches (depth, 7½ fathoms) which it is as well to avoid, in case there may be less water there. The cross mark for these Rocky Patches is Red Islet in line with the SW. end of Green Island. Vessels proceeding against the ebb stream will find no difficulty, with the assistance of the charts, in passing these patches.

Having opened Brandy Pots southward of White Islet, keep them so, as the vessel runs toward them, until Green Island lighthouse is well open southward of Red Islet, or until past the black and white buoy on Lark Reef, when she may steer directly up the middle of the channel between Hare Island and the north shore. In the event of the wind and tide falling, anchorage will be found on Hare Island Bank, English

Bank, Murray Bay, and westward of Goose Cape. For directions for North Channel from Coudres Island to Quebec, see page 359.

Tides.—The principal stream of flood ascends along the northern side of the estuary. One part of this stream sets from below Bergeron Coves toward and over the tail of Red Islet Bank, which it curves round to the southward, and then passes into North Channel between Red Islet and Hare Island North Reef. At the same time an inferior stream of flood ascends along the south shore close outside Razade, Basque, Apple, and Green Islands, and inside of them also after the shoals are covered. When these two streams of flood meet the last of the ebb, and afterwards each other, between Green Island and Red Islet, they cause high breaking ripplings, which can be heard at a great distance on a still night, and which appear like broken water on a shoal. Each of these two streams of flood is strongest near its own side, and there is consequently little or no flood in mid-channel, particularly in neap tides and westerly winds.

Westward of Cacouna Island the flood in South Channel sets fairly up the river on either side of Barrett Ledges, Middle Shoal, and Middle Bank, but the strongest part of it passes up the deep water northward of these shoals, between them and Brandy Pots and Hare Island, and at the rate of 2½ or 3 knots in spring tides. On arriving at Hare Island Bank, a great part of this stream passes into North Channel between that bank and Hare Island, the rest over the tail of the bank into South Channel. The flood sets fairly up South Channel, and between Pilgrim Islands and Hare Island Bank, but becomes very weak above them, especially in neap tides, until abreast Orignaux Point, whence it gradually increases in strength, being aided by a branch of the northern stream from between English and Hare Island Banks, until it attains its full rate of 7½ knots in South Traverse.

To return again to the principal stream of flood, another part of it passes between Red Islet Bank and the shoals off the Saguenay, while a third part ascends that river 70 miles to the rapids. When the flood first makes, it meets the ebb down the channel northward of Hare Island and causes a tremendous rippling, extending from Lark Reef to Red Islet. Above that islet the stream of flood, after sweeping round westward past Rocky Bay, pursues a tolerably fair course up North Channel as high as Cape Eagle, off which it divides, the southern part proceeding southward of English Bank, on its way to South Traverse, while the northern part passes between English Bank and the north shore up to Goose Cape.

Off Goose Cape this northern part of the stream of flood again divides; one, the lesser and weaker part, passing southward of Coudres Island, throws off at the first of the tide branches to the southward, which pass over the western part of English Bank, on either side of Middle Ground, and between the latter and the shoals eastward of the reefs off Seal Islands, into South Channel. This seems to arise from the

flood being earlier in North than in South Channel, and hence the first of the flood comes from the north at South Traverse, and sets for about one hour on St. Anne and St. Roch Shoals. The other and principal part passes between Coudres Island and the north shore, where it attains the rate of 5 knots in spring tides.

Little need be added respecting the ebb stream beyond what has already been said in the course of this chapter. It may, however, be remarked, generally, that the direction of the ebb stream is always nearly the contrary to that of the flood, excepting between Red Islet and Green Island and eastward of the former. The principal part of the ebb down North Channel, being turned to the SE. by Lark Reef, comes through between Hare Island North Reef and Red Islet, setting over toward the east end of Green Island at the rate of 5 or 6 knots in spring tides. The ebb out of Saguenay River is equally strong, and sets over toward the east end of Red Islet Bank, whence, curving to the eastward, it unites with the St. Lawrence ebb, from which it can be readily distinguished by the dark color of its water, and both together set down the estuary, as has been explained in other parts of these directions.

It may be useful to remark here that the flood and ebb are less unequal in duration in North than in South Channel, and that in both channels the streams of flood and ebb upon an average continue three-fourths and one hour, respectively, after it is high and low water by the shore.

The times of the high and low water by the shore do not seem to be much affected by winds; but the amount of the rise and fall of the tides and the duration of the streams are considerably affected by strong winds; nevertheless, as an approximation near enough for practical purposes, we may state that when the stream of flood makes in mid-channel the tide has risen by the shore, at Brandy Pots 1¼ feet and at South Traverse 2½ feet; and also that when the stream of ebb makes, the tide has fallen about 2 feet by the shore. But as it is of importance to know the proportional amount of the rise and fall of the tides for any part of their whole duration, when a large vessel is to be taken over certain shallow parts of the river above South Traverse, this subject will be noticed again in the following chapter.

CHAPTER XII.

ST. LAWRENCE RIVER, SOUTH, MIDDLE, AND NORTH CHANNELS, TO QUEBEC.

QUEBEC.

(H. O. Chart No. 1112.)

Note.—The vessel has now arrived at the most difficult part of the navigation of the St. Lawrence, where the river becomes divided into three channels by shoals and islands. The eastern entrances of all three of these channels are rendered more or less difficult, either by their narrowness, the want of good anchorage in them, or by the strength of the tides.

South Channel lies along the southern shore, and between it and the shoals and islands occupying the central part of the river from the South Traverse to Quebec. This channel is the one generally used; it is buoyed, and is preferable to the others for the general purposes of navigation, having excellent anchorage and moderate tides in every part, excepting for a few miles in the Traverse. The channel between Beaujeu Bank and Crane Island has also been buoyed for the use of large vessels, for not more than 17 feet at low water can be carried through eastward of that bank, where nearly all vessels used formerly to pass.

Middle Channel lies between the shoals and islands which form the western side of the South Channel and the long line of shoals and reefs which extend from Coudres Island to Reaux Island. In one part of it, near the northeastern entrance of the Middle Traverse, there are not more than 2½ fathoms at low water. Having passed this shallow part, there is both room and water enough for vessels of large draft, until they arrive at the group of islands between Crane Island and Orleans Island, where the Middle Channel communicates with South Channel by various narrow passages between the islands. There is plenty of water in most of these passages at all times, but the streams set strongly through them and they are too intricate and difficult for general navigation. The other and better channels will always be preferred for general use; nevertheless, Middle Channel ought to be known to the pilots in common with every other channel in the river.

North Channel stretches along the high northern shore of the river, inside Coudres Island, and of the line of shoals which extend from the latter to Neptune Rock and Burnt Cape Ledge, and from thence through North Traverse between the shoals which reach from Burnt Cape Ledge

nearly to Reaux Island, and those which lie off the NE. end of Orleans Island. From North Traverse this channel continues between Reaux and Madame Islands on the one side and Orleans Island on the other till it unites with South Channel opposite St. Vallier.

This channel was formerly in general use, but it is now little known to the majority of the pilots. It is broader than South Channel, but the streams are much stronger, and the Narrows at its southwestern end have a depth of only 24 feet at low water; while, with the exception of the contracted passage westward of Beaujeu Bank, there are not less than 28 feet in South Channel.

Starting with the beginning of a fair tide, a steamer may, however, gain one hour in the passage from Green Island to Quebec by taking North rather than South Channel.

The anchorage generally in North Channel is not good, the bottom being foul from St. Paul Bay southward to Cape Maillard, also because of the strength of the tidal streams. Vessels may, however, anchor on the western edge of the bank, eastward of this channel, in a depth of about 10 fathoms.

Between Coudres Island and the northern shore of the river there is anchorage only in Prairie and St. Paul Bays, both of which afford security under all conditions of wind and weather, but with northerly winds heavy squalls sweep down from the north shore hills.

Above Coudres Island there is a fine straight channel from 1¼ to 2½ miles wide, entirely free from danger. The water is not inconveniently deep, nowhere exceeding 18 fathoms at low water in mid-channel. It is generally about 11 or 12 fathoms, shoaling toward the sides of the channel, so as to afford good anchorage out of the strength of the tides. There is, however, much more tide and more sea in this long and open reach than in the corresponding parts of South Channel; and in the fall of the year the NW. squalls off the mountains are heavy and frequent. Altogether, South Channel is preferable for the general purposes of navigation, yet North Channel is good, and frequently remains free from ice some time after South Channel becomes unnavigable in the fall of the year.

Orleans Channel has a good passage for small vessels, but is not available for those of large draft. It is marked by red buoys on the northern side and by black buoys on the southern side.

SOUTH CHANNEL, THROUGH THE SOUTH TRAVERSE TO CRANE ISLAND.

(H. O. Charts Nos. 1491 and 1492.)

South Channel.—The southern shore of the St. Lawrence River, from St. Roch Point to St. Thomas, is low and composed of slate; inland it rises gradually in a series of ridges to a long wooded range, which is 4½ miles from the river, and attains an elevation of 1,220 feet. The houses are almost continuous on this shore, with villages near the churches.

Supplies in small quantities may generally be obtained at the villages, with the exception of coal.

Churches.—The churches at St. Jean, St. Eugène, St. Ignace, St. Thomas, and Berthier have each one spire; those at St. Roch and L'Islet have each two spires.

Piers.—The pier at St. Jean has a depth of 3 feet at low water at its outer end; at L'Islet the pier is 1,200 feet long, with a depth of 7 feet at low water close to its outer end; a wooden frame beacon, painted black, stands on the extremity of this pier. A small pier has been erected at Anse à Giles, 3½ miles southwestward from L'Islet, and another 1¼ miles southwestward of Cape St. Ignace, but both dry at about half tide. There is also a wharf on the eastern side of Cape St. Ignace, but it can only be approached at or near high water.

Railway and Telegraph.—St. Jean Port Joli, L'Islet, St. Ignace, and St. Thomas are connected with Quebec and Halifax by the Intercolonial railway, which runs along the right bank of the St. Lawrence about one mile inland from these villages. The railway stations are also connected with all parts of Canada and the United States by telegraph.

Shoals.—The northern edge of the shoal ground off St. Jean Port Joli is only ½ mile southeastward of Channel Patch.

Two shoals, with depths of 4 and 7 feet over them, reported to have been formed since L'Islet Pier was built, lie in the line of that pier, 300 and 600 yards respectively from its outer end. Other shoals, with depths of 6 feet, lie SW. of the extremity of L'Islet Pier.

Trois Saumons River, nearly 4 miles southwestward of St. Jean Port Joli, has a large sawmill near its mouth. This river, and also the stream at Port Joli, one mile northeastward, will admit small craft at about half tide.

L'Islet.—A conspicuous cross is erected on a cliff, 59 feet high, one mile northeastward of L'Islet church.

The telegraph and signal station at L'Islet is 300 yards northeastward of the church and close westward of the convent, which is a square stone building surmounted by a turret.

St. Ignace.—The church is 6¼ miles southwestward from L'Islet, and nearly ¾ mile southeastward of Cape St. Ignace, which is a conical rocky mound, 52 feet high, covered with small bushes.

St. Thomas.—Two rivers unite and discharge their waters here, Bras St. Nicholas flowing from the eastward, and Rivière du Sud from the southward. The combined streams fall, in a cascade about 30 feet high, to a small bight, ¼ mile eastward of the church. A sawmill is in operation on the eastern side of the falls. St. Thomas church is on the left bank of Rivière du Sud, 5¼ miles southwestward from St. Ignace.

The channel from St. Thomas to the St. Lawrence River trends northeasterly in one bend, and is generally marked by cask buoys. It nearly dries at low water.

The high-water bank near St. Thomas has receded considerably

since the survey of 1827, about 600 feet apparently having been washed away, and each year more is broken away by ice and sea. The low-water line, however, is nearly the same as at that date, except that bowlders are now visible, at low water, beyond the northeastern extreme of St. Thomas Bank.

Light.—From a mast 25 feet high, with a brown shed at the base, built on the outer end of the Government pier, at the west entrance point of Rivière du Sud is exhibited, at an elevation of 30 feet, a fixed light showing red in the channel to the river and white in all other directions seaward, that should be visible 6 miles.

St. Roch Shoals join those of St. Anne and continue westward in South Bank, which extends a considerable distance from the shore from St. Roch to St. Thomas. South Traverse lightvessels in line, bearing S. 27° W. (S. 46° W. mag.), lead westward of these shoals.

Buoys.—A buoy, painted black, is moored in 28 feet water, 2⅓ miles N. 46° E. (N. 65° E. mag.) from Lower Traverse lightvessel, close westward of a shoal with 16 feet water on it lying off the northwestern angle of St. Roch Shoals, and the black buoy marking the SW. angle of these shoals is now moored close westward of a rock with 24 feet water over it, with St. Roch church bearing N. 78° E. (S. 83° E. mag.) and St. Jean Port Joli church S. 17° E. (S. 2° W. mag.).

Lights.—Lower Traverse lightvessel, with two masts, is moored in 24 feet water at the NE. angle of the northernmost of St. Roch Shoals. It is painted red, with the words Lower Traverse in white letters on the sides. From the foremast a fixed white light is shown at an elevation of 25 feet, and from the mainmast a fixed white light at 31 feet, also a fixed red light from a stay between the two at 49 feet, respectively, above the water.

These lights should be seen 9 miles.

Fog Signal.—A whistle is sounded for twelve seconds of every minute in thick weather, fogs, or snowstorms.

In case the vessel should be out of position the ball at the mainmast-head will be taken down and one white light only will be shown at night.

Upper Traverse lightvessel has two masts and is moored in 25 feet water off the northernmost of St. Roch Shoals. It is painted red, with the words Upper Traverse in white letters on each side. From each of the mastheads is exhibited a fixed white light at elevations of 25 and 31 feet, respectively, which should be seen 6 miles.

Should this vessel be out of position, the light on the foremast only will be shown at night, and in day the ball at the foremasthead will be taken down.

Fog Signal.—A bell is sounded in thick weather, fogs, or snowstorms.

Buoy.—A black buoy is moored, in 24 feet water, between the light-vessels and NW. of St. Roch Shoals at 1,100 yards from Lower Traverse lightvessel, with the two beacons near the church in line.

South Traverse is a passage ¼ mile wide, between St. Roch Shoals, on the eastern side of which are moored the lightvessels and buoy.

The tidal streams run through the channel with great velocity, attaining 8 knots an hour in spring tides with the ebb and 7½ knots with the flood.

Middle Ground forms the NW. side of this channel and is marked by three red buoys.

Buoys.—The northeasternmost is an intermittent light buoy in 31 feet, the middle a can buoy in 19 feet, close westward of Lower Traverse lightvessel, and the southwesternmost a can buoy in 28 feet northwestward of Upper Traverse lightvessel, and with the western beacons at St. Roch in line.

With strong winds the two southwestern buoys are often difficult to distinguish except by the ripple near them, as they are nearly dragged under water by the velocity of the stream.

Channel Patch, marked by a bell and light buoy checkered black and white, and showing an intermittent white gas light, the period of occultation being about six seconds, lies directly in the way of vessels; from the patch, Stone Pillar bears S. 35° W. (S. 54° W. mag.) 2½ miles nearly, with its north extreme just shutting in the highest part of Goose Island Reef, and a sugarloaf-shaped beacon near St. Jean Port Joli church is just opened eastward of the church, bearing S. 60° E. (S. 41° E. mag.). This buoy alters its position about 200 yards with the tides, and is frequently adrift. The least depth that could be found on Channel Patch in 1886 was 21 feet, although three examinations were made of the locality at slack water; probably a bowlder has been carried away from the summit, as the depth recorded in 1827 was only 18 feet.

Several shoals with depths of 15 to 18 feet over them lie between Stone Pillar and Channel Patch. They may all be avoided by keeping the highest part of Goose Island Reef just open of Stone Pillar, bearing S. 38° W. (S. 57° W. mag.). This mark must only be kept on while a vessel is southward and westward of Channel Patch.

Vessels should not proceed northward of Channel Patch, several shoals having been found between it and Stone Pillar.

Seal Islands consist of a long reef of slate, which is covered at high water, with the exception of three islets, each of which is 6 feet above high water. There are three houses on the easternmost islet, with a cross and two high bushes near them; on the westernmost islet a conspicuous spruce tree is surrounded by low bushes.

The Pillars are two small and steep islets of graywacke, named Wood Pillar and Stone Pillar.

The former is 600 yards long and 81 feet above high water. The beacon on this islet is not painted, and being partially obscured by trees, can only be seen from a short distance. A shoal extends from the NE. point of Goose Island to Wood Pillar, and continues 2½ miles farther NE.

Stone Pillar lies 1½ miles eastward of Wood Pillar, and is quite bare. Shoals with depths from 2½ to 3½ fathoms water on them extend in a line from Stone Pillar to Channel Patch, and this passage should not be attempted. Middle Rock, between the pillars, dries 17 feet at low water, and is joined to Wood Pillar by a shoal.

Light.—The lighthouse erected upon Stone Pillar is a circular building of gray stone, 52 feet high, and stands about 100 yards from its south point. It exhibits, at an elevation of 83 feet, a revolving white light every half minute, and should be visible 14 miles.

Algernon or **South Rock** is steep-to on all sides but the northeastern, from which shoal water extends 300 yards to a depth of 18 feet. A rock, with a depth of 18 feet over it, lies N. 34° E. (N. 53° E. mag.) 700 yards, and a shoal with 26 feet water, N. 37° E. (N. 56° E. mag.) ¾ mile, respectively, from South Rock. The highest part of Goose Island Reef just open of South Rock lighthouse, bearing S. 43° W. (S. 62° W. mag.) leads southward of these shoals, and the whole of Crane Island well open of Goose Island Reef, bearing S. 47° W. (S. 66° W. mag.) leads southward of South Rock, and of the shoals between it and Goose Island Reef.

Light.—On Algernon or South Rock is a square, white lighthouse, 32 feet high, exhibiting, at an elevation of 36 feet, a fixed white light, which should be visible 6 miles.

Goose Island Reef, 2 miles southwestward of Stone Pillar, consists of a ledge of rock, 1⅜ miles in length, trending with the direction of the river. Several small heads are visible at all times of tide. The highest part, a rugged conical mound 29 feet high, is near the southwestern extreme of the reef, and is occasionally surmounted by a beacon. An isolated rock, which dries 2 feet at low water, lies nearly ½ mile N. 38° E. (N. 57° E. mag.) from the NE. extreme of Goose Island Reef. There are five shoal spots between Stone Pillar and Goose Island Reef, with depths of 16, 11, 12, 13, and 18 feet on them, and bearing S. 49° W. (S. 68° W. mag.), distant one mile; S. 52° W. (S. 71° W. mag.), 1½ miles; S. 40° W. (S. 59° W. mag.), 1$\frac{3}{10}$ miles; S. 38° W. (S. 57° W. mag.), 1½ miles, and S. 32° W. (S. 51° W. mag.), distant 1⅞ miles, respectively, from Stone Pillar lighthouse. Several small detached rocks lie off the southeastern side of Goose Island Reef, but they do not extend more than 200 yards from it. A rock with a depth of 8 feet is midway between the southwestern extreme of Goose Island Reef and Goose Island.

A long spit, with shoals on it varying in depth from 9 to 11 feet, extends for nearly 1½ miles from the southwestern extreme of Goose Island Reef. Stone Pillar lighthouse, open southward of the highest part of that reef, bearing N. 38° E. (N. 57° E. mag.), leads close eastward of this spit, and the deepest water in the channel will be found by passing about 800 yards southeastward of Goose Island Reef and the above spit.

Goose Island is composed of wooded hilly ground, divided by a

valley into north and south ranges. Near the southwestern extreme are two round summits, elevated 203 feet above high water. A chain of hillocks that from a distance appear like islands, and on which are several conspicuous houses, with barns near, extends southwestward from the northern range. From an elevation of 168 feet the northern range falls in cliffy banks, and at its northeastern extreme is a large white barn, which is very conspicuous from all northerly directions. A large sugarloaf beacon, painted red, stands on a small detached islet close southward of the northeastern extreme of Goose Island.

The meadows of Goose Island, extending 4½ miles southwestward from its SW. extreme, connect it with Crane Island. The meadows are only just above high water of ordinary spring tides and are intersected by numerous streams, that have cut deep channels in the mud and are impassable between half flood and half ebb. After the harvest the meadows are covered with haystacks, which, from a distance, resemble small houses and are erected on framework to prevent the loss that would otherwise be occasioned by exceptionally high tides.

Several rocks lie off the southeastern shore of Goose Island, all of which cover at high water, except Rocher aux Grêlons (formerly miscalled Chapel Rock), which is 4 feet above high water and on the outer edge of the shore that dries at low water, and Hospital Rock, which is 10 feet high. Chapel Rock is on the meadows, and is named from a church which formerly stood there, the foundations of which are still to be seen.

Beacon.—A wooden pyramidal beacon, painted white, and about 30 feet high, stands on the southern shore of Goose Island meadows at a little more than 2 miles southwestward of Hospital Rock.

Dunscombe Rock, 1,700 yards S. by E. from Hospital Rock, has 14 feet least water, with 5 fathoms close to. From the rock Mount Tourmente appears in line over summit of Onion Island, bearing S. 83° W. (N. 78° W. mag.), and the north side of Wood Pillar touching the south side of Goose Island.

Crane Island rises to an elevation of 132 feet, and is generally flat in outline. The lower part of the land is cultivated, but the summit and southwestern slope are wooded. Macpherson (now Le Moine) house and the barns near are conspicuous objects at the northeastern extreme of the island, and numerous beacons are erected on the southeastern shore. On the northwestern side there is an almost continuous line of houses, with a church built of bricks and surmounted by a spire in the middle of them. This church can rarely be seen from South Channel.

Light.—On the south side of Crane Island, at the end of a pier, about $1\frac{1}{10}$ miles eastward of Pointe aux Pins, the southwestern extreme, is an octagonal lighthouse, 48 feet high, painted white, which exhibits, at an elevation of 48 feet, an intermittent white light, showing bright

for twenty-six seconds and being obscured for four seconds in every half minute, visible 12 miles.

Prohibited Anchorage.—On Crane Island, about ¾ mile SW. of Le Moine house, are two white sugarloaf beacons, and two white sugarloaf beacons are situated about ¼ mile NE. of the same house. These mark a space within which no ships are allowed to anchor, as the entrances to the channels north and south of Beaujeu Bank are here much contracted. Between these beacons two diamond-shaped beacons have been erected, which in line led to the white light buoy at the southwestern end of the Beaujeu Bank.

Beaujeu Bank is a narrow shoal of sand and gravel over slate, and has not more than 10 feet at low water over some parts of it. Its SW. end approaches to within ¾ mile of Crane Island.

Light Buoys.—The northeastern extreme of Beaujeu Bank is marked by a light buoy painted red and black in horizontal stripes, and showing a pink light, moored with L'Islet church, bearing N. 70° E. (N. 89° E. mag.), distant 4 miles, and St. Ignace church, S. 4° E. (S. 15° W. mag.), and the southwestern extreme by a white pillar buoy surmounted by a bell and light showing an intermittent light, moored with Crane Island lighthouse, bearing S. 47° W. (S. 66° W. mag.), distant 2 miles.

Buoys.—A buoy painted red is moored in 24 feet on the northwestern side of Beaujeu Channel, nearly a mile southwestward of the light buoy at the northeastern extreme of Beaujeu Bank; and another buoy painted red is moored in the same depth 200 yards westward of the light buoy at the southwestern extreme of that bank, and on the western side of the narrow channel westward of Beaujeu Bank.

Channel SE. of Beaujeu Bank.—The depth in this channel is irregular, varying from 5 fathoms to 17 feet, and there is one rocky patch of 17 feet in the way, and difficult to avoid, so that the latter depth is all that could be carried through there without buoys at low spring tides unless the vessel were conducted by an unusually skillful pilot, in which case 3¼ fathoms might be reckoned upon. The channel is ½ to ¾ mile wide.

Beaujeu Channel, NW. of Beaujeu Bank, is ¼ to ½ mile wide, and has from 4¼ to 9 fathoms water, the shoalest and narrowest part being near the SW. end of the bank.

Farther southwestward the SE. side of Crane Island is so bold that it may be approached to the distance of 400 yards. A buoy, painted black, marks a shoal with a depth of 16 feet on the southern side of the channel abreast Crane Island lighthouse. Two sugarloaf-shaped beacons at the SW. end of Crane Island are used as a cross mark to lay this buoy.

St. Thomas Bank is that part of South Bank which extends rather more than 2 miles off shore at the village of St. Thomas. It consists of sand, mud, and stones, and is dry at low water nearly to its northern edge, which is very steep. The apparent northern extreme of the range

of hills on the southern shore, just open southward of Crane Island lighthouse bearing, N. 51° E. (N. 70° E. mag.), will lead northwestward of St. Thomas Bank in the deepest water. A black buoy is moored on the NW. extreme of the bank, in 3 fathoms, from which Haystack Island appears in line with the SW. extreme of Crane Island; and the red sugarloaf beacon and the white diamond beacon on the south side of Crane Island are also in line.

Tides.—The rise and fall of the tide, for every hour after low and high water, will be seen in the table at page 362, and from it the depth of water at any time, over any shallow part of the river, may easily be deduced. Moreover, large ships should not run through South Traverse at night, if the weather be bad and so dark that the buoys and the land can not be seen; for, although the bearings of the lights and the lead might enable a skillful and experienced pilot to take such ships safely through on the last half of the stream of flood, yet it would be a heavy charge and attended with some risk. It is desirable for vessels in general coming up the river, even with a fair wind, to pass South Traverse on the flood tide; for the ebb is so strong between the buoys that little progress will be made against it, even with a strong breeze.

Directions for South Traverse.—Cape Diable should be kept open of Orignaux Point lighthouse bearing N. 56° E. (N. 75° E. mag.) until the lightvessels come in line bearing S. 28° W. (S. 47° W. mag.), when they may be steered for. The first of the flood will set to the southward, toward St. Roch Shoals, and the ebb in the contrary direction; the mariner must therefore be guided by the bearing of the lightvessel, but more especially by the soundings in the chart.

Keep the southeastern side of the channel aboard, but do not go into less than from 7 to 10 fathoms water according to the time of tide, until up to Lower Traverse lightvessel, lest the ship get into the shallow inlet in St. Roch Shoals, which runs in southward of the lightvessel. In passing the lightvessel, steer S. 41° W. (S. 60° W. mag.), leaving her to the southward and at a short distance. Run past her about ¼ mile, and then steer S. 28° W. (S. 47° W. mag.) for 2½ miles, or as may be requisite from wind and tide, to pass about 300 yards northwestward of Upper Traverse lightvessel—leaving the three red buoys of the Middle Ground on the starboard hand—whence the course to Stone Pillar is S. 24° W. (S. 43° W. mag.). But here, too, the course alone must not be trusted, for there is no calculating exactly the set of the tides. Generally, a vessel will have to steer a little to the southward of S. 24° W. (S. 43° W. mag.) with the flood-stream, to keep along the edge of South Bank, and with the ebb a little to the westward; but the lead, buoys, and lightvessels are the only sure guides.

Having passed Upper Traverse lightvessel, take now 6 fathoms at low water, or a depth corresponding to it at other times of the tide, as a guide along the edge of South Bank, keeping Lower Traverse lightvessel and Upper Traverse lightvessel in line, bearing N. 28° E. (N. 47°

E. mag.) until past the black buoy on the SW. point of St. Roch Shoals, and taking care not to cross to the northwestward of the line of deep water (9 to 13 fathoms) which extends southwestward from the Narrows all through South Traverse. The patches off St. Jean Port Joli church will be avoided by passing 500 yards northwestward of the black buoy on them, or by not going southeastward into less water than has been directed, if the buoy can not be seen. If the checkered black and white bell and gas light buoy on Channel Patch can be seen, pass 200 yards southeastward of it; if not seen, run along the edge of South Bank in the depth before directed until St. Jean Port Joli church bears S. 40° E. (S. 21° E. mag.); then open the highest part of Goose Island Reef only just sufficiently to be seen in line with the south side of Stone Pillar bearing S. 38° W. (S. 57° W. mag.), and run upon that leading mark until St. Jean Port Joli church bears S. 56° E. (S. 37° E. mag.), when the vessel will be about 300 yards southward of Channel Patch, and should sheer again to the southward and follow the edge of South Bank in the same depth as before. After passing South Rock, Crane Island should be brought well open of Goose Island Reef, bearing S. 47° W. (S. 66° W. mag.) to clear the shoals between them, and the vessel may open that mark gradually so as to pass 700 yards southeastward of Goose Island Reef.

To pass East of Beaujeu Bank proceed as follows, remembering that there is not more than 17 feet at low water: As soon as the vessel is 1½ or 2 miles past Goose Island Reef, steer so as to bring Stone Pillar its own breadth open southward of Goose Island Reef, bearing N. 32° E. (N. 51° E. mag.). Run from those marks, steering about S. 32° W. (S. 51° W. mag.), or so as to keep them open as just described, and they will lead 400 yards southeastward of the northeastern light buoy of Beaujeu Bank. Continue the same course, and when St. Vallier Point opens southward of Crane Island about a quarter of a point, bearing S. 52° W. (S. 71° W. mag.), haul up for St. Vallier Point, which will lead about 800 yards southward of the southwestern white light buoy of Beaujeu Bank. Then keep away to the southward, and run along the southern shore of Crane Island at the distance of about 600 yards, so as to pass northwestward of the black buoy on the patch lying 1,200 yards from Crane Island lighthouse, or in from 7 to 10 fathoms water, according to the time of tide.

To pass Westward of Beaujeu Bank.—When Hospital Rock bears N. 52° W. (N. 33° W. mag.) bring Stone Pillar lighthouse just open southward of the southern extreme of the highest part of Goose Island Reef, bearing N. 38° E. (N. 57° E. mag.), leading between the light buoy at the northeastern end of Beaujeu Bank and the red buoy off Goose Island, also close to the white light buoy marking the southwestern end of Beaujeu Bank. Leave the white light buoy on the port hand, bringing the beacon on Goose Island Meadows in line with the middle of La Grosse Montagne (the westernmost hill of Goose Island),

bearing N. 8° E. (N. 27° E. mag.), to pass between that buoy and the red buoy to the southwestward. When Channel Rock is visible, the beacon should be its own height eastward of the rock when this leading mark is on. For continuation, see page 353.

If, after passing the red buoy on the shoal off Goose Island, the upper buoys should not be immediately seen, continue to run from and upon the mark above given, taking care not to open out the south side of Stone Pillar southward of Goose Island Reef, and as soon as the buoys can be seen steer to pass between them, and proceed as already directed.

At Night, Beaujeu Bank must be passed by the lead, aided by the light buoys, along the edge of South Bank, or southeastern side of the channel, keeping in 3 fathoms at low water or a depth corresponding to it at other times of the tide, till Crane Island light bears S. 56° W. (S. 75° W. mag.), when the vessel must be hauled up for the SW. end of Crane Island.

Anchorage in South Traverse.—Vessels may anchor off the shoals of St. Anne in 6 fathoms low water up to within a mile or two of the lightvessel. The ground is better, and there is less tide than on the tail of the Middle Ground; but the latter is the better position for weighing with the first of the flood in northerly winds. Vessels do occasionally anchor for a tide, in fine weather, on the edge of the bank of St. Roch, between the two lightvessels; but this can not be recommended, for the ebb tide runs there at the rate of 8 knots, and the ground is not to be depended on; hence, if the anchor once started, it would be difficult to bring up again, and there would be great danger of losing the anchor. Should the wind begin to fail, or the flood be done, it would be better to run down below Lower Traverse lightvessel, if an anchorage 2 or 3 miles above Upper Traverse lightvessel can not be gained.

Vessels often anchor off the black buoy on the SW. point of St. Roch Shoal in 6 or 7 fathoms in good ground, but the anchorage is not reckoned very good until arriving above St. Jean church. All along the edge of the south bank, from opposite the Pillars to Crane Island, the holding ground is a stiff clay, and so good that it is sometimes difficult to weigh anchor. Off Crane Island, a mile above Beaujeu Bank in 6 or 7 fathoms at low water, there is excellent anchorage in westerly winds; and under the SW. end of the island, in 5 fathoms, there is equally good anchorage with the winds from eastward. Vessels bound down, and meeting a strong easterly wind anywhere above the lightvessel, had better run back to the anchorage.

Tides.—The flood begins much earlier in the North Channel than in the South, and the first of the stream therefore comes from the northward, setting at first about south upon the shoals of St. Anne and St. Roch, but inclining gradually more to the westward, until at a quarter-flood it sets fair to the SW. by S. between the buoys of South Traverse. After half-flood it sets SW., and toward the end of the tide

still more to the westward; perhaps because, the time of high water being somewhat earlier in the North Channel, the water has begun to fall before the flood has quite ceased in the south.

The ebb stream sets nearly in the contrary direction to the flood, as just stated, the first of the ebb setting off from the shoals of St. Anne and St. Roch, through the channels to the westward of the Middle Ground and over the tail of the latter to the northward.

Above the Pillars both tides set fairly up and down the river.

In the Narrows of the South Traverse the rate of the ebb is from 7 to 8 knots, and that of the flood from 6 to 7½ knots. The rates of the flood and ebb tides decrease gradually as we proceed to the westward until off the Pillars; the ebb stream, southward of the Pillars, attains a velocity of 5¼ knots per hour at spring tides; and of 4½ knots past Channel Patch decreasing to 3 knots at Crane Island, while the flood stream runs about one knot an hour less at the respective localities.

SOUTH CHANNEL, ABOVE CRANE ISLAND—SOUTH SHORE, ST. THOMAS TO LEVIS POINT.

(H. O. Chart No. 1492.)

St. Thomas Point is low and lies 3 miles west of the entrance of the Rivière du Sud, and the church and village of St. Thomas on its west bank.

Wye Rock, with a depth of one foot over it at low water, is about 400 yards long in the direction of the river, and 100 yards broad; it is separated from St. Thomas Bank by a channel nearly ½ mile wide, but, with depths greater than 3 fathoms, only 200 yards wide.

Buoy.—A buoy, painted black, is moored in 5¾ fathoms northwestward of Wye Rock, and ¾ mile northward of St. Thomas Point.

The mark for leading westward of St. Thomas Bank also leads in the deepest water in South Channel northward of Wye Rock; the chapel near the summit of Cape Tourmente in line with the flagstaff on Grosse Isle, bearing N. 39° W. (N. 21° W. mag.), leads northeastward of Wye Rock in 15 feet water; and the same chapel, in line with the western wharf on Grosse Isle, bearing N. 34° W. (N. 16° W. mag.), leads southwestward of that rock. The Seminaire is now rarely visible from South Channel, except when the sun is shining on it.

Trou de Berthier.—The church at Berthier has a single spire and is about ¼ mile southward of Trou de Berthier, which latter has a wharf at Verte Point, its eastern entrance point, with a depth of 14 feet close to its outer end at low water. The former site of the church at this place is now occupied by a large house with a flagstaff near it.

Rocks.—Two rocks, with depths of one foot and 6 feet over them, lie 800 yards off the shore between Berthier East Point and Berthier wharf. From the one-foot rock, Bellechasse lighthouse bears S. 65° W. (S. 83° W. mag.), distant 1½ miles; from the other rock, Bellechasse

light bears S. 66° W. (S. 84° W. mag.), distant 1¼ miles. These rocks are heads of a narrow ledge with depths of 9 to 17 feet over it, running parallel to the shore, and with its northeastern extreme bearing N. 49° E. (N. 67° E. mag.) ¼ mile from the one-foot rock. Bellechasse light, kept bearing southward of S. 55° W. (S. 73° W. mag.) leads northward of all the above shoal water.

Bellechasse Island, composed of three principal and several small rocks joined together at low water, is 600 yards long parallel to the shore, from which it is ½ mile. Not more than 3 fathoms water will be found in the channel between it and the main.

Light.—From a square building, 40 feet high, and painted white, on the easternmost summit of Bellechasse Island, is exhibited, at an elevation of 54 feet, a fixed white light that should be visible 12 miles.

Pointed Rock, with 6 feet water on it, lies 250 yards northward of the center of the island. A rock that dries 2 feet at low water lies 200 yards southwestward, and a shoal with 12 feet over it lies 400 yards westward, respectively, from the SW. extreme of Bellechasse Island.

St. Vallier Point is the base of a wooded bluff 128 feet high, and is the first prominent point on the south shore above the Traverses. The village and church of St. Vallier stand in the bay next westward of St. Vallier Point. A beacon is built on the shore north of the church, which in line with the latter leads to the buoy off Madame Reef.

St. Vallier Bank fills the whole bay between St. Vallier and St. Michel Points, and extends nearly ¾ mile NNE. from St. Michel Point.

A Shoal, with 15 feet water over it, lies ½ mile N. 16° E. (N. 34° E. mag.) from St. Vallier Point, and is the northern of two banks.

A rock with 12 feet water on it lies nearly 1½ miles westward from St. Vallier Point.

The end of the pier at Berthier East Point shut in with the SW. extreme at Bellechasse Island, bearing N. 73° E. (S. 89° E. mag.), leads north.

St. Michel Point is low; reefs of slate extend eastward, with shoal water in continuation, but there is deep water ¼ mile north of them.

St. Michel Village is about 1½ miles southwestward of the point, and contains a church with a spire. A modern chapel with a fine spire stands on a wooded bluff close west of the village. A pier extends from the shore near the village, but is almost dry at low water. Several rocks lie off the end of the pier.

Beaumont Reefs comprise a line of bowlders, the east extreme of which dries 4 feet at low water, and numerous bowlders extending 800 yards from the shore, gradually decreasing that distance to Durantaye Point.

Buoy.—A buoy, painted black, is moored in 18 feet water close north of the east extreme of the reef, about ¾ mile from the shore and 1,400 yards from the pier at St. Laurent.

Marks.—The church at St. Joseph de Levis must be kept well open

of Martinière Point, bearing S. 77° W. (N. 85° W. mag.), until St. Michel Point is open of Durantaye Point, bearing N. 64° E. (N. 82° E. mag.).

Beaumont church, which has a spire, stands on a cliff south of the reef. A waterfall runs over the cliff at one mile westward of the church and close to a ruined mill at the base. Westward of this mill the water is deep close to the low-water line, which, however, is 400 yards from the high-water mark.

Martinière Point is at the base of a small wooded hillock. A diamond-shaped beacon stands close to the point.

St. Joseph church at Levis is a conspicuous building with a spire. A large college and convent, each surmounted by a statue, stand close to the church.

Levis Point Shoal extends in an eastérly direction from the shore at ⅛ mile northeastward of Levis Point, and irregular ground continues the shoal for over ½ mile from the shore to the depth of 5 fathoms. A small fall in the land, one mile westward of Durantaye Point, in line with the south extreme of Orleans Island, bearing N. 80° E. (S. 82° E. mag.), leads north; and the spire of St. John church at Quebec, in line with the SW. extreme of the immigration offices on Commissioners wharf, bearing S. 56° W. (S. 74° W. mag.), leads west of this shoal.

SOUTH CHANNEL, ABOVE CRANE ISLAND—ISLANDS AND SHOALS FORMING ITS NORTHERN SIDE.

(H. O. Chart No. 1492.)

The islands in order westward of Crane Island are Haystack, Mill, Race, Margaret, Cliff Islands, and Grosse Isle. The highest is Grosse Isle, which is 214 feet above high water.

Between these islands there are narrow and intricate passes, leading into Middle Traverse, and with water enough for vessels of large draft; but they are of little or no use for the common purposes of navigation.

Westward of Grosse Isle are Reaux and Madame Islands, of slate rock, low, wooded, and connected by reefs of slate nearly dry at low water. Extending from almost all these islands there are reefs of slate rock, thinly covered with sand and mud, and bounding South Channel on its northern side for nearly 14 miles southwestward of Crane Island.

Crane Island Spit has 5 feet water over the shallowest part, and extends SW. by W., with less depths than 18 feet, 1¾ miles from Pointe aux Pins. The western extreme of this spit is marked by a red buoy, moored with two beacons on the southern shore of Crane Island in line. The eastern of these beacons, painted red, is 250 yards westward of Crane Island wharf, and the western, painted white, 200 yards farther westward. These beacons in line, bearing N. 64° E. (N. 83° E. mag.), lead, in not less than 24 feet water, southward of Crane Island Spit, but with that depth only as far westward as the above red buoy. The SE. extreme of Crow Island in line with the western extreme of

Middle Island, bearing N. 19° E. (N. 38° E. mag.), leads northwestward of this buoy and the spit.

A bank, having several shoals with 20 to 23 feet water on them, joins Crane Island Spit to the bank extending southwestward from Margaret Tail.

Margaret Tail, extending 1¼ miles SW. from Margaret and Cliff Islands, which are nearly joined at low water, is a dangerous shoal, the slate being awash in some parts of it in low tides.

Light Buoy.—A light buoy, painted yellow and showing a pink light, is moored in 4¼ fathoms, 400 yards southwestward of a 20-foot patch, at the southwestern extreme of Margaret Tail. Vessels entering the quarantine ground should leave this light buoy on the starboard hand. If from any cause this buoy is removed, it will be replaced by a yellow can buoy. The church on Crane Island in line with the southern extreme of Haystack Island, bearing N. 51° E. (N. 70° E. mag.), leads southward of Margaret Tail and the above buoy, but in a least depth of 22 feet only. The northwestern extreme of Two Heads Island in line with the western extreme of Cliff Island, bearing N. 21° E. (N. 40° E. mag.), leads westward of Margaret Tail, and between it and Grosse Isle Patch; and when the north extreme of Margaret Island is open north of Cliff Island, or the buoy on Grosse Isle Patch passed, the anchorage between Grosse Isle Patch and Grosse Isle may be rounded into and the anchor let go.

Grosse Isle Patch is a rocky shoal, 1,200 yards long, in a SW. direction, and with 7 feet least water; it lies west of Margaret Tail, and the channel between them is ¼ mile wide, with a depth of 5½ fathoms.

Buoys.—A buoy painted black and white in vertical stripes, and in 4 fathoms water, marks the NE. end of the patch.

The rock, with 7 feet water, southward of Grosse Isle, and lying NW. distant nearly 600 yards from the above buoy, is also marked by a buoy, painted black and white in vertical stripes.

A Rock with 15 feet water over it lies westward of Grosse Isle Patch, and with the outer end of Grosse Isle West wharf bearing N. 15° E. (N. 34° E. mag.), distant 1,200 yards. The new Episcopal church at Grosse Isle in line with the inner end of the west wharf, bearing N. 2° W. (N. 17° E. mag.), leads in 3¾ fathoms between this rock and the western extreme of Grosse Isle Patch; and the summit of Margaret Island in line with the northern extreme of Cliff Island, bearing N. 52° E. (N. 71° E. mag.), leads northwestward of Grosse Isle Patch to the quarantine anchorage. A good cross mark for that anchorage is to have the Episcopal church just open eastward of the western wharf. The whole of Race Island a little open of Margaret Island, bearing N. 51° E (N. 70° E. mag.), leads in 23 feet southward of Grosse Isle Patch.

Quarantine Anchorage.—Vessels generally lie between Grosse Isle

Patch and Grosse Isle, to be near the establishment; but the anchorage farther eastward in quarantine passage northward of Margaret Island is by far preferable. All merchant vessels, as the law now stands, are obliged to communicate with the quarantine authorities at Rimouski or Grosse Isle, from whence, after examination, they are allowed to proceed to Quebec, if not detained at the quarantine anchorage. These vessels, if necessary, anchor outside Grosse Isle Patch, and westward of Margaret Tail, choosing their berth in 5 fathoms, where there is one of the best roadsteads for riding out an easterly gale in the river.

The inner anchorage at Grosse Isle is not otherwise useful than as a place for vessels to ride quarantine; but the anchorage outside Grosse Isle Patch is a convenient place for which vessels, on the approach of a strong easterly wind, may bear up, when there is not tide enough for them to reach the anchorage under Crane Island, 4 miles farther eastward.

Grosse Isle may be readily recognized by the number of buildings forming the quarantine establishment. Two piers are built on the southern shore, one near the western extreme the other near the middle of the island. The hospital, a conspicuous brick building, stands near the eastern extreme and the superintendent's house is immediately behind the flagstaff. The churches visible from South Channel are the Episcopal church a brown wooden building with a low tower, standing on an eminence immediately northeastward of the western wharf; and the Roman Catholic church, with a small spire, near the middle of the southern shore, and visible only from the eastward and westward, being hidden from the southward by a rocky mound in front of it.

Gross Isle Tail is now joined by a bar, having no more than 16 feet over it at low water, to the banks of Madame Island. Two shoals with 11 feet of water on them lie on the bar about midway between Grosse Isle Tail and the Banks of Madame Island. For crossing the bar the best mark is the western fall of the hill over Cape Tourmente in line with the small rock near the northeastern extreme of Reaux Island, bearing N. 27° W. (N. 8° W. mag.).

Banks of Madam Island, in their eastern part, extend $1\frac{3}{5}$ miles southward of Reaux Island, and from their SE. extreme, in $2\frac{1}{2}$ fathoms, the south side of Two Heads Island is just open to the southward of Grosse Isle. The mark for clearing the southern side of these banks, as well as Grosse Isle Tail and Grosse Isle Patch, is Race Island kept just open south of Margaret Island.

Madame Reef dries $7\frac{1}{2}$ feet at low water, and is the extreme of a shoal extending $2\frac{1}{4}$ miles southwestward from the southwestern extreme of Madame Island.

Light Buoy.—A light buoy, painted red, moored in $4\frac{3}{4}$ fathoms, and showing a fixed white light, marks the southwestern edge of Madame

Reef. From this buoy Bellechasse lighthouse is almost east, distant 3⅛ miles.

Berthier church open south of Bellechasse Island, bearing S. 88° E. (S. 70° E. mag.), leads south, and Cape Tourmente chapel in line with the NE. extreme of Orleans Island, bearing N. 22° E. (N. 40° E. mag.), leads north of this reef.

Orleans Island, dividing the St. Lawrence River into two channels, is usually well cultivated on the slopes and in the valleys between the hills. The summits are generally wooded, and attain an elevation of 550 feet at 3 miles from the SW. extreme. Near the NE. extreme the land is wooded to the shore, and rises gradually from a hillock 210 feet high over that extreme to about 500 feet in the summit over St. Famille.

The south shore is bordered generally by a small cliff, which increases in height toward the SW. extreme of the island and at the mouths of the rivers. On the north coast the cliff is at some distance from the shore, the intermediate space being flat and cultivated. The south shore is bordered by bare flat rock that extends generally about 200 yards from the high-water mark, while the north shore is fringed by a mud flat on which a coarse grass grows, and which is indented by numerous creeks. These are impassable at about half tide, and are used by bateaux for loading and discharging cargoes.

St. François, the northeasternmost church, has a spire, and stands on the slope of the hill at 1½ miles from the east extreme.

Lights.—Two lighthouses are erected at St. François, the southwestern in a field ½ mile southward, and the northeastern at high-water mark ¼ mile eastward, respectively, of the church. Both are square buildings, painted white, the former being 30 feet and the latter 28 feet high.

From the southwestern lighthouse at an elevation of 77 feet, and from the northeastern at an elevation of 30 feet, respectively, are exhibited fixed white lights. The upper light should be visible 14 miles and the lower 10 miles. Beacons stand close to each of these lighthouses which, in line, bearing S. 40° W. (S. 58° W. mag.), lead close southward of Traverse Spit in 2 fathoms, but over the shoal just west of the checkered buoy.

Bellefine River empties at 2¼ miles SW. of St. François into a small pool that affords good shelter to boats and small craft. Boats can enter about one hour before or after low water and small craft according to their draft.

There is good anchorage for vessels off Bellefine River in 5½ to 6 fathoms, with mud bottom.

St. Jean is a long straggling village having a church with a spire, which stands close to the edge of the water.

A pier, with 9 feet water at the extreme, extends from this village at ⅓ mile SW. of the church.

Light.—From a square lighthouse 30 feet high, and painted white, at the extreme of the pier at St. Jean, and at an elevation of 30 feet, is exhibited a fixed white light that should be visible 10 miles.

La Fleur River is entered at 1½ miles, and Maheux River at 2¾ miles, respectively, westward of the pier at St. Jean.

These rivers run through deep ravines and generally afford shelter to small craft which lie aground at low water within their entrances.

The anchorage is good off these rivers; but parallel to the shore, and generally at 600 yards from the low-water line, is a rocky ledge with depths from 5½ to 7 fathoms over it. Vessels should anchor between this ledge and Orleans Island.

St. Laurent is the village next SW. of St. Jean, though the houses are nearly continuous from one to the other. A church with a spire is built close to the shore and a convent just east of the church.

A pier extends from the shore near the church with 13 feet water at the outward extreme.

Light.—From an octagonal lighthouse, 40 feet high, and painted white, and at 40 feet above high water, is shown a fixed white light that should be visible 11 miles. The lighthouse is 22 yards from the extremity of the pier.

St. Patrick Hole is off the mouth of St. Patrick River, a small stream ending in a ravine which is faced by cliffs on both sides.

Good anchorage may be had here in 8 to 9 fathoms.

Miranda Rocks consist of several rocky patches that completely fill the westernmost cove on the south shore of Orleans Island. The chimney of the lunatic asylum at Beauport, well open of the wharf at the SW. extreme of Orleans Island bearing N. 86° W. (N. 68° W. mag.), or St. Laurent lighthouse open of the south extreme of Orleans Island bearing N. 78° E. (S. 84° E. mag.), leads south of these rocks.

The SW. end of Orleans Island is marked by a large hotel and a wharf from which a steam ferry plies regularly to Quebec.

St. Petronille, a conspicuous church with a spire, dominates the western point, and an Episcopal church with a small spire stands between it and the hotel.

Anchorage.—Vessels anchor anywhere clear of the shoals, but many of them wait a favorable wind south of the SW. extreme of Orleans Island.

With a strong westerly wind and ebb stream good anchors and chains are required.

(H. O. Chart No. 1207.)

Quebec Harbor is defined by the act of incorporation to comprise the St. Lawrence River and its navigable tributaries between St. Patrick Hole and Cape Rouge, both inclusive. It affords excellent anchorage over the greater part of this area and is generally free from danger. Levis Point Shoal has been already described.

Beauport is a large village north of Quebec, to which it is nearly joined by houses. Fronting the village and extending to Princess Louise Basin is a flat of slate covered with mud and sawdust that extends in some parts ⅔ mile from the shore, and is fringed by shoal water for a futher distance of ⅓ mile to the depth of 8 fathoms.

A buoy, painted red, is moored in about 6 fathoms water off this shoal at 7,000 yards northward of Princess Louise Basin, and another buoy, painted red, is moored in 27 feet water, with Beauport church bearing N. 15° W. (N. 3° E. mag.) and the flagstaff at the lunatic asylum N. 74° W. (N. 56° W. mag.).

No clearing mark could be found for the whole length of this shoal, but for different parts only. L'Ange Gardien lights in line bearing N. 25° E. (N. 43° E. mag.), lead between it and shoals off Orleans Island. The spire of St. John church in line with the north extreme of the northern immigration offices at Princess Louise Basin, bearing S. 48° W. (S. 66° W. mag.), will clear the SE. extreme, and the SE. extreme of the Parliament house at Quebec in line with the north extreme of the immigration offices on Commissioners wharf, bearing S. 39° W. (S. 57° W. mag.), will lead clear till Beauport church bears N. 40° W. (N. 22° W. mag.), when vessels must haul to the eastward to get the other marks on.

The water in the middle of the river, south of this bank, is very deep, and anchorage there should be avoided if possible.

The lunatic asylum, a large collection of buildings, stands almost midway between Beauport church and Quebec. It may be recognized by a flagstaff rising from the middle of a mansard roof and by a large black chimney. The falls of Montmorency are a short distance NE. of Beauport.

Prohibited Anchorage.—Within the following area, covering the ferry and electric cables at Quebec, in the St. Lawrence River, anchorage is prohited:

The northern limit of this area is a line drawn from the SE. corner of Crawfords wharf, across the river in a S. 75° E. (S. 57° E. mag.) direction, to the SW. corner of Barras wharf.

The southern limit of the area is a line drawn from the center of Champlain Market Hall, across the river in a S. 75° E. (S. 57° E. mag.) direction, to the NW. corner of Simpsons wharf.

Anchorage.—The deepest water is near the south shore of the river, opposite Quebec, where there is a depth of 30 fathoms. This depth decreases soutwestward, till between Hadlow and Wolfe Coves no greater depth than 15 fathoms will be found. This is the best part of the river for anchorage, as a bank with less than 10 fathoms water on it extends midway across the river from the north shore, the outer edge being 700 yards from La Mouche Bank.

The narrow channel westward of Diamond Harbor, between La Mouche Bank and the shore of Quebec, has from 20 to 12 feet water in

it, the deepest water being generally at the booms which are laid between the blocks for vessels to load.

Spar buoys painted red, mark the north side of La Mouche Bank, and are laid generally in a depth of 9 feet at low water, and at the eastern end both sides of the deepest water in this channel are similarly marked.

Pointe au Pavillon, the apparent north extreme of Orleans Island, in line with the north extreme of Levis Point, bearing N. 39° E. (N. 57° E. mag.) leads south of La Mouche Bank.

Southward of the Grand Trunk Railway wharf at Levis, which is marked with the name of the company, the shore dries at low water nearly to the extreme of the long wharves that are built off it. Off Hadlow Cove the outer part is composed of large bowlders.

A shoal bank extends from the mouth of the Echemin River.

Levis is a town of considerable importance, with a great number of prominent buildings, the most conspicuous of which are the college, the Church of Notre Dame, and the Hospital of St. Joseph de la Délivrance, surmounted by a statue and a spire. The termini of the Intercolonial and Grand Trunk railways are on this shore, to which communication by steam ferry is had with Quebec.

Quebec consists of two parts, the upper town, built on the ridge, which forms the north side of the river, and the lower town, which stands on the plateau between the base of that ridge and St. Charles River and embraces the parishes of St. Roch and St. Sauveur.

The highest point is the Citadel, which is 340 feet above high water, and the most prominent buildings on approaching it from the eastward are Laval university, Parliament house, and St. John church. The customhouse, a stone building with a dome surmounted by a flagstaff, stands at the NE. extreme of the city.

The United States is represented by a consul and vice-consul.

Princess Louise Basin comprises a wet dock and tidal basin at the northeastern extreme of Quebec, which were opened to shipping in May, 1890. The tidal basin has an area of about 20 acres, with a quay frontage of 2,860 feet. Immediately along the face of the quay wall the depth is 24 feet, but at 10 feet from the wall a depth of 26 feet at low water spring tides may be obtained. The entrance to the tidal basin is 200 feet wide. The inner or wet dock has an area of about 40 acres, with a general depth of 27 feet water and a quay frontage of 3,700 feet. Vessels wishing to enter the wet dock can do so twice in each twenty-four hours at each time of high water. Lines of railway extend to these docks for transmission of freight to all parts of Canada.

Lights.—The following leading lights are exhibited to guide vessels to the Commissioners' wharf at Princess Louise Basin:

The front light is a fixed red electric light, 43 feet above high water, and visible 8 miles. It is shown from a mast above a small square brown tower erected on the NE. angle of Princess Louise Basin embankment, near the immigration offices.

The two back lights are fixed red electric lights, placed vertically 16

feet apart. The upper light is elevated 112 feet, the lower one 96 feet, and they should be visible 8 miles in and through a small arc on each side of the direction of the leading lights in line. They are shown from posts erected on the battery at the bottom of Ste. Famille street, and bear about 965 yards S. 50° W. (S. 68° W. mag.) from the front light.

Docks.—At Levis Point is a stone graving dock 484 feet long, 73½ feet wide at the floor, and with a depth of 25 feet water over the sills at high water of ordinary spring tides.

Davie and Russell floating docks and patent slips are also at Levis, and are of various sizes.

The largest vessel hitherto taken by the floating docks was 1,600 register tons, while the patent slip takes only vessels under 400 tons and drawing less than 9 feet water.

In Wolfe Cove the Roche stone graving dock is being constructed. It is intended to be 375 feet long, 51 feet wide, and to have a depth of 16 feet over the sill at high water. There are also Roche floating docks in Wolfe Cove similar to those at Levis.

Pilotage is compulsory for merchant vessels in the St. Lawrence River. The limits under control of the Quebec pilotage commissioners are from an imaginary line drawn from the eastern anchorge off Barnaby Island to the eastern anchorage ground under Cape Columbia on the north shore of the river as the eastern limit, to the basin of Portneuf, between Quebec and Montreal, inclusive, while the Montreal commissioners control the pilotage from Portneuf to the boundary line between Quebec and Ontario.

The eastern cruising ground of the pilots is in the neighborhood of Bic Island, and, as a rule, in bad weather one or more pilot schooners will be found at anchor under the lee of that island.

The flag shown by these vessels is a red and a white horizontal band, the white uppermost, and at night one white light on the middle stay just before the mainmast; but they fire flash lights at least every quarter of an hour. During fogs a patent bellows horn is sounded. The charges were originally fixed according to the season, the lowest charge being from May 1 to November 10, from $4.32 to $6.72 per foot of draft for pilotage from the eastern limit to Quebec, two-thirds of these sums from Brandy Pots, one-third from St. Roch des Aulnets, and one-quarter from the west extreme of Crane Island. By another enactment the charges may be raised until each pilot can receive $600 per annum.

Tugs may be obtained by telegram from any of the telegraph and signal stations. There are 12 first-class and 30 smaller tugs at Quebec, 3 at Chicoutimi, one at Batiscan, one at Bersimis, 3 at Sorel, and one at Three Rivers. The charges are fixed by agreement, although a nominal tariff is in existence.

Tides.—It is high water, full and change, at Quebec at 6h. 49m.; springs rise 18 feet, neaps rise 12½ feet, and neaps range 10 feet. The

flood stream begins at 1h. 8m. after low water, and runs 4h. 56m., while the ebb begins at 1h. 3m. after high water, and runs 7h. 27m. by the mean of 90 observations of each tide.

The highest tides occur before noon from the spring to the autumnal equinox, and in the afternoon during the remainder of the year. The greatest semidiurnal inequality observed was 4 feet in September, 1888, but the average difference between morning and afternoon heights of of high water is about 2½ feet. The inequality in the time of high water is not so marked; the most regular was observed in June, 1888, when the evening tides were found to be twenty-four minutes earlier than the morning tides. There is very little inequality in the height of low water, but that in the time is most marked, a difference of one hour having been observed in June, 1888. The average difference was half an hour. The highest tides observed were during the freshets at the end of May or early in June, and at the autumnal equinoctial tides, October 8, 1897. The former rose 2½ feet and the latter 2 feet above the ordinary spring tide.

As a rule, tides rise higher with strong NE. winds and fall lower with SW. winds.

The tidal streams run generally in the direction of the river, the ebb stream being strongest on the south shore and the flood on the north shore. There is a tendency in the flood stream to set vessels toward the shoal off Beauport, which should be guarded against. The velocity of the ebb was found to attain 4½ knots off Levis Point, and the flood 3½ knots off the Citadel. Close to the shore the stream turns about twenty minutes after high and low water, the flood making first on the north shore and the ebb on the south shore.

The highest of the spring tides generally took place on the second or third morning after the change of moon, and the lowest tide occurred at one tide, either before or after the highest. These remarks apply generally to St. Lawrence River.

The following table will show the tidal data of the places where observations were taken:

Place.	High water, full and change.	Springs rise.	Neaps.		Semidiurnal inequality.				Flood stream after low water.	Ebb stream after high water.	Duration of—	
			Rise.	Range.	Greatest in height of high water.	Average.	Greatest in time of low water.	Average.			Flood.	Ebb.
	h. m.	Ft.	Ft.	Ft.	Ft.	Ft.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
Rivière du Loup	8 10	16½	10½	7	3½	2½	0 32	0 15	0 46	0 29	6 5	6 20
Orignaux Point	3 47	17½	13	9½	3½	2½	.....	.....	0 30	1 10	5 56	6 27
St. Paul Bay	4 23	18½	13	10	4	3½	.....	.....	.....	.....	.....	.....
St. Jean Port Joli	4 58	17½	13	9½	5½	3½	0 52	0 27	.....	.....	5 53	6 30
L'Islet	5 11	18	13½	10½	.....	.....	.....	.....	0 20	0 31	5 31	6 51
Grosse Isle	5 21	18	14	11	.....	.....	.....	.....	0 57	1 5	5 9	7 12
Berthier	5 40	17½	14	11	3½	2½	0 52	0 32	1 10	1 7	5 6	7 19
St. Laurent	6 20	17½	14½	11	5½	3½	0 40	0 30	0 55	1 10	4 58	7 26
Quebec	6 49	18	12½	10	4	2½	1 0	0 30	1 8	1 3	4 56	7 27
St. Anne de Beaupré	6 2	17½	12½	9½	3	1½	0 55	0 30	0 43	1 0	5 9	7 13

At the Lower Traverse lightvessel the ebb stream begins at 1h. 33m. after high water at Orignaux Point and runs 6h. 42m., while the flood stream begins at 0h. 44m. after low water at Orignaux Point and runs 5h. 43m.

At the Upper Traverse lightvessel the ebb stream begins at 1h. 29m. after high water at Orignaux Point and runs seven hours, while the flood stream begins at 2h. 3m. after low water at Orignaux Point and runs 5h. 25m.

The times of these changes vary considerably, however, and apparently without law.

Ice.—The river seldom, if ever, freezes across below Quebec, but is almost filled with ice that fluctuates with wind and tide from shore to shore, the ebb tide and westerly winds carrying it to the south and the converse with the flood stream.

The average of fifty-eight years' observations, from 1830 to 1887, shows the first arrival of steamers from Montreal to have occurred on April 27, the first arrival from sea on April 28, and the last departure for sea on November 27. The ferry steamers cross from Quebec to Levis till near the end of January and would occasionally run all the winter, but are compelled to lay up so that the ice may consolidate across the river. The bridge thus formed breaks up late in March or early in April, though in 1890 it remained till April 24.

Supplies.—Provisions of all kinds can be obtained at Quebec. Water may be obtained by boat, from the hydrants in the city, or from the river. The best place for watering is said to be at the north side of Madame Reef, the impurities of the river having principally subsided before the stream reaches that locality.

Coal can be obtained either by lighters alongside the vessels or at the wharves. The greater quantity is brought from Scotland, but Welsh and Nova Scotian coal can be obtained, and anthracite from Pennsylvania. About 6,000 tons are generally stored at the various coal depots. The depths alongside the wharves range from 19 to 30 feet, but any vessel can lie close to the wharves, regulating the distance according to draft. The deepest water is alongside the wharves of the Montreal Ocean Steamship Company, known generally as the Allan Line.

Wood can be bought without difficulty, and is generally stored in large quantities near the Canadian Pacific Railway station in the lower town. Bateaux are continuously employed in carrying wood from the numerous localities on the north shore of the river where it is cut.

Repairs.—Vessels can be repaired in the various docks and slips. The largest foundry is that of Carrière et Laine, at Levis, where boilers of any size may be repaired or made, but there is no machinery capable of making large forgings, which, however, are done at New Glasgow, in Nova Scotia, and are forwarded by rail to Quebec. There are no sheers in Quebec, and the cranes are only capable of unloading vessels. There are no conveniences for heaving down, but every facility for docking.

Quarantine.—Vessels having infectious disease on board are inspected at Rimouski and proceed to the quarantine hospital at Grosse Isle, or, failing inspection at Rimouski, proceed direct to Grosse Isle, where there is a large quarantine establishment with all the necessary appliances for disinfection, a resident physician and a staff of interpreters. There is a depth of 15 feet at low water alongside the western wharf and of 11 feet at the eastern pier at Grosse Isle.

There is no sailors' home at Quebec, but the control of shipping for seamen is under the direction of the marine department. Seamen who are sick are sent to the Jeffrey Hale hospital or to the Hotel Dieu, under the auspices of the Roman Catholic church.

The currency of the Dominion of Canada is expressed by law in dollars and cents, £1 sterling being equivalent to $4.866.

The population of Quebec in 1891 was 63,090.

All management of the harbor is vested in the harbor commission.

Communication.—Steamers communicate continuously with the United Kingdom. The Allan Line sends a steamer every week to Liverpool, via Moville, to Glasgow, and to London, respectively, nearly every week.

The Dominion Line sends a steamer weekly to Liverpool and fortnightly to Bristol, and additional freight steamers occasionally.

Steamers of the Bossière Line run to Havre fortnightly, and there are two or three other lines that run regularly to Liverpool or London, the principal being the Donaldson and Furness Lines.

A steamer runs fortnightly from Quebec to Charlottetown and Pictou, calling at the principal ports in the gulf on the way.

A small steamer carries the mails to the Labrador as far as Esquimaux Point, calling at Rimouski and occasionally at Anticosti, sailing every alternate Saturday. Local steamers run daily to and from Montreal to Saguenay River about four times a week in summer, to the near villages twice a week, to St. Anne de Beaupré daily, and there are ferries that run to Orleans Island and to New Liverpool several times in the day.

There is communication by rail to all parts of Canada and the United States, and to the maritime provinces. A new railway has been built to Lake St. John, and one is in process of construction to Chicoutimi by the coast.

Telegraphic communication can be had from Quebec to any part of the world where there is a telegraph station, the office at that place belonging to the Great Northwestern Company of Canada.

Time Signal.—A time signal is established at the Citadel. The signal is made once daily except on Sunday, and is a ball which is hoisted half way up its mast at a quarter of an hour before and to the masthead at five minutes before the signal. This ball is dropped at 1h. mean time of the seventy-fifth meridian, equivalent to 6h. Greenwich mean time. It is proposed to erect a time signal at the customhouse for the convenience of vessels in Louise Basin.

Storm Signals.—Storm warnings are also shown from the Citadel by the direction of the Government observer, who is instructed from the central meteorological office at Toronto. They consist of a cone and a cylinder. For a moderate gale—that is, with a velocity of from 30 to 40 miles an hour from an easterly direction—the cone is hoisted with the apex down, and for a moderate gale from westward, with the apex up. For a fresh or heavy gale, winds exceeding 40 miles an hour from the eastward, the cylinder is hoisted above the cone, and for a similar gale from the westward the cylinder is shown below the cone.

The night signals for easterly gales are two white lights suspended vertically, and for westerly gales two white lights hanging horizontally.

Weather.—Snow generally begins to fall in the beginning of October, and the hills become white in November, and continue so till May. Patches of snow remain in the valleys till June.

The winds blow generally up or down the river, the prevailing winds being from SW. in the proportion of 199 westerly to 157 easterly winds. Fogs prevail principally in the months of July and August, and smoke is very common in August and September, but there is no month in which immunity from fog may be expected. The average height of the barometer for the year is 29.971 inches, the highest in January, 30.042 inches, and the lowest in June, 29.885 inches. The mean temperature is 38.3°; the highest, 96.0°, occurring in August, and the lowest, −30.5°, in December and January.

(H. O. Chart No. 1492.)

Directions from Crane Island to Quebec.—There is so little difficulty in the navigation from Crane Island to Quebec that scarcely any further directions will be requisite beyond that which may be gathered from the foregoing description and remarks, read with reference to the charts, which they are intended to accompany and explain.

With a fair wind, vessels run up at night without hesitation, unless it be too dark to see the land, and even beat up in fine weather. With a fair wind, and with the assistance of the charts and these directions, a large vessel might be taken up through this part of the river, even at night. With the land in sight and the lead going there can not be any difficulty. As soon as it is ascertained beyond doubt that the vessel is above the red light buoy on the SW. end of Madame Reef, haul gradually over toward Orleans Island sufficiently to avoid St. Vallier Bank and the reef off St. Michel Point, and then steer for St. Laurent and keep it aboard to avoid Beaumont Reefs. Under the circumstances which we are supposing, of a night not too dark to distinguish objects, the light at St. Laurent will be seen, which has deep water at 200 yards distant, but off the point to the eastward the shoal water extends nearly 400 yards from the high-water mark, the edge of the shoal being very bold. Give the lighthouse a berth of at least 200 yards, or do not go nearer than the depth of 10 fathoms. If the black buoy on Beau-

mont Reefs can be seen, all difficulty will be removed, since the channel northward of it is clear and more than ½ mile wide.

The shore of Orleans Island should be kept aboard after passing St. Laurent. If it be blowing fresh from the eastward, it will be advisable to bring up off Patrick Hole till daylight, or under the west end of Orleans Island, rather than risk running among the crowd of shipping in the night. When St. Joseph church, on Levis Point, bears about S. 44° E. (S. 26° E. mag.), it will be in line with the mound or small hillock at the water's edge; the vessel will be then off the NW. extreme of Levis Point Shoal. Southward of the shoal Levis Point becomes quite bold. Go no nearer to that shoal or to Beauport Shoals than the depth of 10 fathoms, and that with caution, for they are very steep.

Anchorage.—Besides the best places for riding with easterly winds, there is anchorage almost everywhere between Crane Island and Quebec. The best ground for holding is generally on the northern side of the channel, and one of the best places in strong westerly winds is under St. Jean Point, Orleans Island.

NORTH CHANNEL, NORTH TRAVERSE, AND ORLEANS CHANNEL.

(H. O. Charts Nos. 1491 and 1492.)

North Channel.—The northern shore of the river southwestward of St. Paul Bay falls steeply from the summits of high wooded hills that attain an elevation of 2,650 feet, close westward of Petite Rivière. At 1½ miles southwestward from Cape la Baie, a small strip of low flat land, lying between the foot of the hills and high-water mark, commences and extends southward to Grande Point, a distance of 5 miles. Numerous houses, forming a parish of Petite Rivière, are built on this flat, and among them is a church, with a single spire, dedicated to St. François Xavier. Several valleys indent the hills, the most marked being about 2 miles northward of Petite Rivière church.

The entrance to North Channel, between the reef which extends one mile NE. from the NE. end of Coudres Island, and the shoals which stretch across Eboulements Bay, is 1½ miles wide. The narrowest part of the channel between Coudres Island and the main is one mile wide, between Prairie Shoal off the west point of Prairie Bay and the opposite side near Cape Corbeau. The leading mark for this part of the passage, as well as for clearing the shoal on the west side of Cape St. Joseph, on the mainland side, is Cape Martin and Goose Cape in line. There is a large settlement at Eboulements, both on the high grounds around the church of Notre Dame and also on the shores of the bay. Small craft lie aground on the mud in this bay within the large bowlders on the edge of the shoals.

St. Paul Bay between Cape Corbeau and Cape La Baie dries nearly to the line of these points, and there is no passage into either of the

rivers at the head at low water. The point in the middle of the bay, separating the mouths of the rivers, is wooded and has a conspicuous sand hill 30 feet high. The village of St. Pierre is near the bridge which crosses Rivière du Gouffre, the eastern stream at about one mile from the entrance, and has a church with two spires which is seen occasionally from the channel.

The ebb stream sweeps round this bay with a velocity of 7½ knots at spring tides, and makes a dangerous ripple for boats. There is a small space between the northern edge of the stream and the shoal water of the bay, where small vessels will find secure anchorage in 5 fathoms water at about ¼ mile northward from the lighthouse, and about 200 yards from the depth of 18 feet at low water.

Light.—From a square lighthouse, 30 feet high and painted white, built on a block in the middle of St. Paul Bay, is exhibited, at a height of 33 feet, a fixed white light that should be seen 10 miles.

On the block and close to the lighthouse are two red storehouses.

Fog Signal.—A hand horn answers signals from vessels.

La Baie Bank.—A plateau of rock, covered with mud and bowlders, extends 1,200 yards from Cape La Baie, and fringes the shore generally for about ¾ mile as far south as Petite Rivière. Southward of the church the plateau gradually decreases its distance from the shore to Saut au Cochon, where the water is deep within a short distance of the coast. Cape Gribanne open south of Cape Maillard, bearing S. 31° W. (S. 50° W. mag.), leads east of this shoal eastward of the church at Petite Rivière.

A buoy, painted red, is moored in 4 fathoms water, close eastward of Claude Shoal, the highest accumulation of bowlders off Cape La Baie.

La Petite Butte Ronde, a conical wooded hill, 774 feet high, rises above Cape Maillard, and is conspicuous from the northeastward or southwestward. Two small shingle beaches, named Petit Abatis and L'Abatis, are southwestward of Cape Maillard, and on L'Abatis, which is 1½ miles from that cape, there are several conspicuous houses. At Saut au Cochon there is another group of houses, a small church, a disused mill, and a wharf which marks the limit of the low-water line. From Cape La Baie southward to Saut au Cochon, the flat which dries at low water extends about ¾ mile from high-water mark, and the water deepens to 5 fathoms above 400 yards beyond the edge. Southward of Saut au Cochon the low-water line extends only a short distance from high-water mark. The first notch in the hills northward of Mount Eboulements in line with the northern extreme of Coudres Island, bearing N. 34° E. (N. 53° E. mag.), leads in upward of 5 fathoms eastward of the shoal water off the northern shore.

Longue Point, a rocky ledge, extends southeastward from the shore at 800 yards northward of Cape Gribanne, with depths of 8, 12, and 21 feet, at distances of 600, 800 and 1,000 yards, respectively, from the shore. The houses at L'Abatis well open of the wharf at Saut au

Cochon, bearing N. 23° E. (N. 42° E. mag.), leads close southeastward of this ledge, in about 7 fathoms. A buoy, painted red, is moored in 5 fathoms water close SE. of this ledge.

Landing may be effected in boats after half flood at L'Abatis, Petit Abatis, and Grande Pointe, and generally along the coast of Petite Rivière; but care must be taken in approaching the shore to avoid the bowlders that stand above the general level of the flat ground between high and low water marks. Petit Débarquement is the best landing place, on either side of a small mound joined to the main by a sandy beach at one mile northward of Cape Gribanne.

Cape Brulé—Lights.—On the edge of the cliff at Cape Brulé stands a square lighthouse, 34 feet high and painted white, from which, at an elevation of 148 feet, is exhibited a fixed white light. Northward of this lighthouse are two open framework structures, the eastern 34 feet and the western 24 feet high, both painted white, from each of which is exhibited a fixed white light 158 feet and 128 feet, respectively, above high water. These lights are 110 yards S. 14° W. (S. 33° W. mag.) and N. 14° E. (N. 33° E. mag.) from each other. All these lights should be visible 15 miles, and are known locally as those of Montée du Lac.

Coudres Island is surmounted by wooded hills 390 feet above high water that slope steeply to the north shore. A cultivated valley lies south of these hills and separates them from a ridge 62 feet high, and faced by cliff that extends generally along the south shore. A round stone mill stands near the middle, and numerous houses are built on this ridge.

The SW. points are at the base of bold bluffs, and a mound 90 feet high known as la Butt à Gaillard rises north of le Havre, the northern cove at the SW. extreme. The extreme SW. point slopes from a wooded hillock 40 feet high, and the NE. point from a similar mound 63 feet high, both of which appear as islands from a short distance. Cape Branche, the western extreme, is under a steep wooded bluff 180 feet high.

A new church with two spires dedicated to St. Louis has been built on the north shore of L'Anse, the southern cove at the SW. extreme.

Coudres Island is surrounded by reefs, on several of which are large rows of stakes with nets affixed to catch the marsouin, or whitefish, which frequent this part of the St. Lawrence River in the early part of the summer.

Prairie Bay, on the NW. side of Coudres Island, is comprised between Cap à L'Aigle and Prairie Point, and is one of the best sheltered anchorages in the river. Vessels may anchor in 10 fathoms, or less as convenient, ¾ mile from the shore. The shore dries at low water 300 yards from the high-water mark, and depths less than 5 fathoms extend 600 yards further. The tidal streams decrease in strength as the shore is approached.

Light.—From a mast, 35 feet high, at the end of a small pier at Cap à L'Aigle, the eastern entrance point of Prairie Bay, and at 38 feet

above high water, is exhibited a fixed white light that should be visible 6 miles.

Prairie Shoal extends ¾ mile westward of Prairie Point, and terminates in numerous bowlders that dry at low water.

A buoy, painted black, is moored in 13 feet water off this shoal. The church of Notre Dame des Eboulements open north of the inner end of the pier at Cape St. Joseph, bearing N. 50° E. (N. 69° E. mag.), leads close NW., and L'Islet d'en Haut, at the west extreme of Coudres Island, open west of Cape Branche, bearing S. 14° E. (S. 5° W. mag.), leads west of this shoal.

When approaching Prairie Bay from the southward, vessels should not turn in until the two points on the NE. side of St. Paul Bay are in line, bearing N. 67° W. (N. 48° W. mag.), when the vessel may steer for the anchorage.

Anchorage.—Goose Cape shelters Prairie Bay from easterly gales and prevents any sea of consequence from rolling in, so that this anchorage is quite safe in all winds, the ground, of clay, being good for holding, and the tides easy if the vessel be not anchored too far out. There is room for many vessels, the space to anchor in being almost one mile long and about ¼ mile wide, reckoning from 3-fathom mark to 10 fathoms, beyond which the water deepens rapidly and the streams are of great strength. The best berth is in 6 fathoms, near the center of the bay, where the tides are not nearly so strong as at Quebec, and where the surveying vessel *Gulnare* rode out a gale from the eastward (so heavy as to do great damage to the shipping off that city) with ease and safety. Ships meeting with an easterly wind below South Traverse will find this a good anchorage to run for and should proceed as follows:

Directions.—Being below Middle Ground, stand over toward Eboulements, going no nearer to the reef off the NE. end of Coudres Island than the depth of 10 fathoms. Having passed the reef and opened out the channel, bear up along the shore of Coudres Island, passing close to Cap à L'Aigle into the anchorage. Approaching this anchorage from the southwestward, bring the leading marks on for clearing Prairie Shoal, namely, the church of Notre Dame des Eboulements, open north of the inner end of the pier at Cape St. Joseph bearing N. 50° E. (N. 69° E. mag.). Run upon these marks until St. Pierre church is shut in behind the NE. side of St. Paul Bay, or the points on the NE. side of that bay are in line, when the vessel may haul to the southeastward into the anchorage. The anchorage under Coudres Island in easterly winds is very good, the best position being in 7 fathoms, with the south point of Coudres Island bearing about N. 65° E. (N. 84° E. mag.).

Tides.—In Prairie Bay the flood stream by the shore is longer than the ebb, the water flowing for 6h. 20m., and ebbing only 6h. 0m., which is contrary to the observations taken in every other part of the river. The stream of flood at the anchorage in 6 fathoms is stronger than that of the ebb, and about 4 knots in spring tides. The stream of

the ebb is turned off in great measure by Prairie Shoal. Its rate for the first two hours of the tide is about 2 knots. It then slacks for about five minutes so completely that a vessel will swing to the wind. After this the stream becomes stronger and regular during the remainder of the tide, its rate being about 3½ knots in spring tides. Vessels should moor at Prairie Bay, or at least have a kedge out to insure keeping a clear anchor.

Coudres Bank extends southwestward from Coudres Island and shoals rapidly within the depth of 5 fathoms. There is good anchorage on the west side of it in 7 to 8 fathoms. The landslip near Cape St. Joseph open of Cape Brauche, bearing N. 26° E. (N. 45° E. mag.), will lead west of this bank till abreast Cape Maillard. Vessels anchoring may swing into this line, but not farther north than the SW. extreme of Coudres Island bearing S. 41° E. (S. 22° E. mag.).

Neptune Rock (Rocher de Saut au Cochon) lies nearly 15 miles from Coudres Island, and about 1,200 yards southeastward of the edge of Coudres shoals. It has two heads both of which are one foot above high water spring tides.

Burnt Cape Ledge is an extensive chain of graywacke and slate rocks. The western extreme is an islet 12 feet above high water, and on the reef eastward of this islet a hut has been built, the roof of which is 8 feet above high water. The SW. end is nearly abreast Cape Brulé, from which it is distant 1¾ miles.

Brulé Bank is a sand flat which dries 5 feet at low water and lies westward of Burnt Cape Ledge, to which it is joined by shoal water. The channel between this bank and the north shore is 1,200 yards wide, and has from 7 to 10 fathoms water in it. This is the only channel, but between the northeastern part of Brulé Bank and Burnt Cape Ledge is Brulé Cul de Sac, an inlet in the banks, which must be avoided by keeping the north shore aboard, after arriving off the eastern part of the ledge. The black buoy marking the northeastern extreme of Brulé Bank is moored in 4 fathoms, with Cape Brulé principal lighthouse bearing S. 60° W. (S. 79° W. mag.), distant 1$\frac{8}{10}$ miles.

The depth of 18 feet at the northeastern end of Brulé Bank is on the line of the western end of Two Heads Island in line with the southwestern end of Burnt Cape Ledge, bearing S. 28° E. (S. 9° E. mag.).

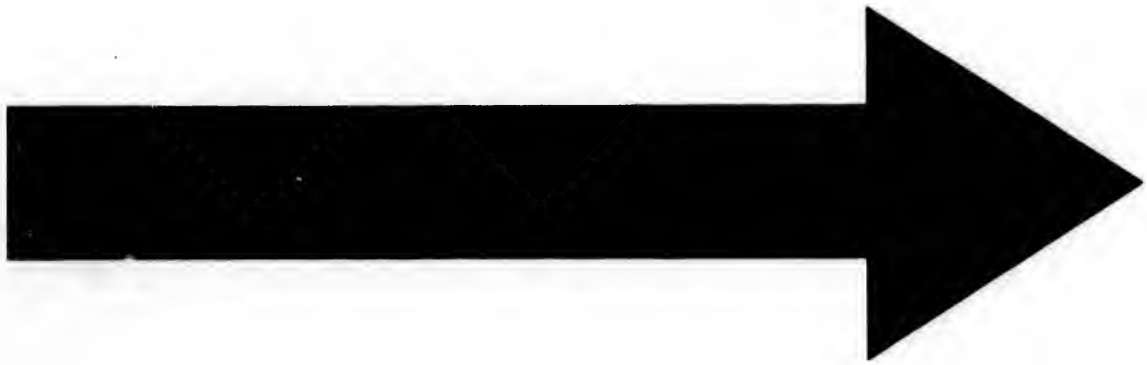
Eastern Narrows of North Traverse, between the SW. extreme of Brulé Bank and the NE. extreme of Traverse Spit, lie 1½ miles south from Cape Tourmente. Great part of Traverse Spit, as well as of Brulé Bank, dries soon after half ebb, and thereby greatly lessens the difficulty of the passage. This shoal lies on an extensive reef of slate extending from the NE. end of Orleans Island. The passage is only 300 yards wide with depths greater than 3 fathoms, and Traverse Spit is apparently extending northeastward. A black buoy marks the eastern side of the Narrows, at the southwestern extreme of Brulé Bank in 18 feet water, and a red buoy is moored at the northeastern end of

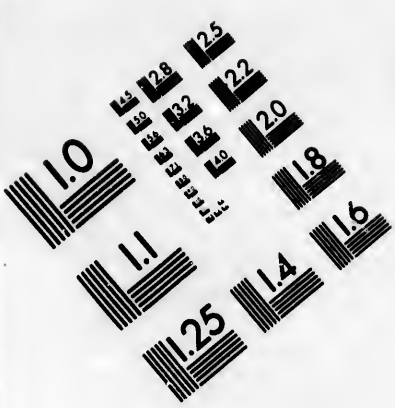
Shoal. Its rate for
It then slacks for
l swing to the wind.
r during the remain-
ring tides. Vessels
kedge out to insure

Coudres Island and
here is good anchor-
landslip near Cape
E. (N. 45° E. mag.),
ard. Vessels anchor-
north than the SW.
2° E. mag.).
s nearly 15 miles from
tward of the edge of
h are one foot above

graywacke and slate
bove high water, and
en built, the roof of
nd is nearly abreast

at low water and lies
oined by shoal water.
shore is 1,200 yards
This is the only chan-
Bank and Burnt Cape
anks, which must be
arriving off the east-
ing the northeastern
with Cape Brulé prin-
ag.), distant $1\frac{8}{10}$ miles.
f Brulé Bank is on the
n line with the south
° E. (S. 9° E. mag.).
en the SW. extreme of
Spit, lie $1\frac{1}{2}$ miles south
se Spit, as well as of
eby greatly lessens the
extensive reef of slate
The passage is only
oms, and Traverse Spit
black buoy marks the
extreme of Brulé Bank
the northeastern end of





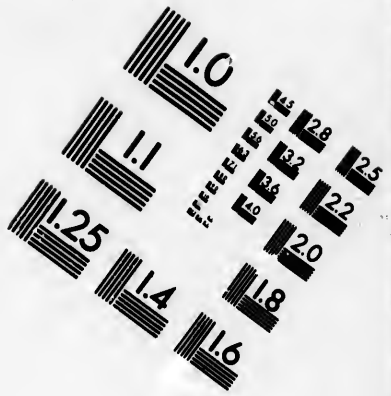
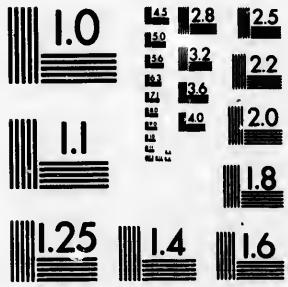
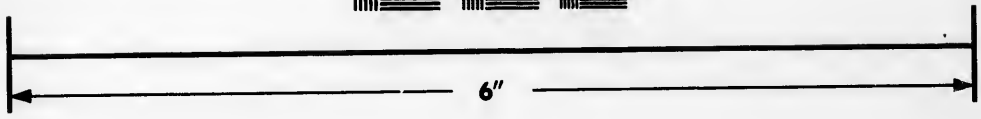
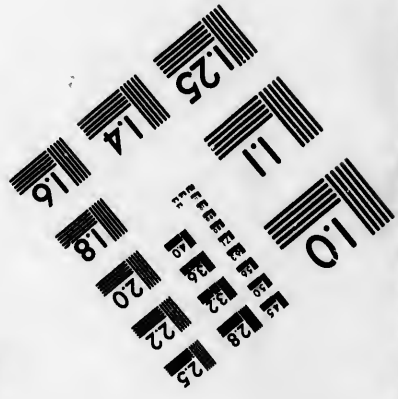


IMAGE EVALUATION
TEST TARGET (MT-3)







Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Traverse Spit, and on the western side of Eastern Narrows. The lights at St. François in line lead between Brulé Bank and Traverse Spit. This alignment passes over the north end of West Sand in 2 fathoms.

Western Narrows are only 300 yards wide with depths over 18 feet, and are comprised between West Sand and Traverse Spit. West Sand has extended eastward a considerable distance since the survey of 1827, and at its northeastern extreme is a shoal with a depth of 12 feet. A buoy checkered black and white is moored in 28 feet water close northeastward of this shoal. The southern and eastern extremes of Orleans Island just open of each other, bearing S. 35° W. (S. 54° W. mag.), leads northwestward; and the islet at the SW. extreme of Goose Isle in line with the eastern extreme of Reaux Island, bearing S. 72° E. (S. 53° E. mag.), leads close northeastward of West Sand.

Cape Tourmente marks the western extreme of the steep fall to the river. It is surmounted by a densely wooded hill 1,874 feet high, on the slope of which and at an elevation of 1,692 feet above high water is a small chapel, the spire of which can generally be seen from the river.

Directions for North Channel.—To sail up North Channel by attention to the leading marks given in page 354, there will be no difficulty in passing between Coudres Island and the main. When St. Pierre church opens out westward of the northeastern side of St. Paul Bay, a vessel will be up to the north extreme of Prairie Shoal, and when L'Islet d'en Haut, the small islet at the SW. end of Coudres Island opens westward of Cape Branche, she will be past it, and may haul to the SW. up the channel.

If wishing to keep Coudres Island aboard, give Cape Branche a berth of ½ mile in passing, or go no nearer than 10 fathoms water, and that with due caution, for the bank will be found extremely steep-to until the vessel is abreast the SW. end of the island. After passing Coudres Island she may approach the edge of the bank to 7 fathoms, as far up as Neptune Rock.

If desirous of keeping the mainland aboard, keep the extremes of the capes to the southward open southward of Cape Maillard, in order to clear the shoal off Cape La Baie, and also as far westward as Petite Rivière. Farther southward, as off Cape Maillard, where the shoal extends nearly ¾ mile off shore, the first notch in the hills north of Mount Eboulements must be kept in line with Cape Branche bearing N. 34° E. (N. 53° E. mag.), till she is past Saut au Cochon, after which the shore becomes quite bold.

After passing Saut au Cochon the houses at L'Abatis must be kept well open of the wharf at Saut au Cochon, bearing N. 23° E. (N. 42° E. mag.), to clear Longue Point, after which the northern shore should be kept well on board until abreast Cape Brulé. The leading lighthouses on that cape (the northernmost and the easternmost of the three) must then be brought in line, bearing N. 14° E. (N. 33° E. mag.),

and kept so through Eastern Narrows, between the buoys there and until St. François beacons or lighthouses are in line, bearing S. 40° W. (S. 58° W. mag.). Then steer for those lighthouses with the upper one slightly open southward of the lower one, and before the islet at the western extreme of Grosse Isle is in line with the eastern extreme of Reaux Island, bearing S. 72° E. (S. 54° E. mag.), the southeastern extremes of Orleans Island must be brought nearly in line, bearing S. 35° W. (S. 53° W. mag.), to pass between West Sand and Traverse Spit. When St. Vallier church opens westward of Madame Island, haul a little to the southward and keep ¼ mile from Orleans Island farther on.

Tides.—The streams set fairly through North Traverse, attaining a rate of 3½ to 4 knots at spring tides. These streams increase in strength in North Channel farther northeastward, attaining their greatest velocity between Coudres Island and St. Paul Bay, where a rate of 7½ knots was found with the ebb tide and of about 6 knots during the flood stream. In strong breezes opposed to these streams there is a high breaking sea that is very dangerous for boats.

Besides Western Narrows there is an inferior channel, named West Sand Passage, between West and Center Sands, as wide as Western Narrows, but it has only 3¼ fathoms water in it.

Orleans Channel is suitable only for vessels drawing 15 feet or less water, as there are several shoals nearly in mid-channel with that depth, and it should not therefore be attempted for the first time without a local pilot.

Lights.—The following lights have been erected to facilitate the navigation of this channel.

St. Anne de Beaupré.—From a mast 20 feet high, at the south extreme of the wharf at St. Anne de Beaupré, is exhibited, at 25 feet above high water, a fixed red light that should be visible 5 miles. At the base of the mast is a wooden shed, painted white, with a red roof. This light is temporarily discontinued.

St. Famille.—From a square l[illegible]ouse, 21 feet high and painted white, standing a short distance w[illegible]rd of the church at St. Famille, and at an elevation of 245 feet, is exhibited a fixed white light that should be visible 16 miles.

At the base of the cliff, below this light and 2,671 feet S. 52° W. (S. 70° W. mag.) from it and near a stone mill, is a mast 50 feet high, from which a fixed white light is shown at 50 feet above high water, that should be visible 12 miles.

St. Pierre Point.—On this point, and close to the high-water mark, is a square lighthouse, 23 feet high and painted white, from which a fixed white light is shown at 20 feet above high water.

At 539 feet S. 40° W. (S. 58° W. mag.) from this lighthouse is a mast 50 feet high, from which a fixed white light is shown at 50 feet above high water.

These lights should be visible 9 and 12 miles, respectively.

L'Ange Gardien.—Two square wooden lighthouses, 21 and 23 feet high and painted white, show fixed white lights at elevations of 33 and 20 feet, respectively, and are visible 11 and 9 miles. The back light is 1,420 feet N. 25° E. (N. 43° E. mag.) from front light.

Buoys.—The following buoys are described in the order they should be seen when approaching from the eastward. A red buoy is moored at the SE. extreme of Seminaire Spit, and a black buoy at the north extreme of Traverse Spit.

A black buoy marks the NE. extreme of the shoal which lies in mid-channel south of St. Anne River. A black buoy is moored at the south extreme of the bowlders that dry at low water on the shore SE. of Les Islets. A red buoy is moored at the SE. extreme of Les Islets, the bank of bowlders that dries at low water eastward of St. Pierre Point, and another red buoy south of the east extreme; while a third red buoy is moored to show the limit of the shoals extending westward from Les Islets. A black buoy marks the NW. limit of the bowlders off Pointe au Pavillon, but not of the shoal lying eastward of it.

A red buoy is moored off the east extreme of the sand bank that extends from the north shore off Beauport.

Directions.—Having passed Cape Brulé, a course should be steered to pass between the red buoy off Seminaire Spit and the black buoy off Traverse Spit, until the apparent NW. extreme of Orleans Island west of the pier at the north end of the island is in line with the end of that pier, bearing S. 62° W. (S. 80° W. mag.). Continue on this mark until the church at St. Anne de Beaupré is in line with the sharp peak on the west summit of the ridge westward of Rivière aux Chiens, bearing S. 77° W. (N. 85° W. mag.), when that mark must be followed to pass between the mid-channel bank off St. Anne River and the north shore.

The course must be changed when Chateau Richer church is in line with the north fall of the hills over L'Ange Gardien, bearing S. 55° W. (S. 73° W. mag.), and this mark followed till the Parliament house at Quebec is in line with the Pointe au Pavillon, bearing S. 44° W. (S. 62° W. mag.). This line will lead in mid-channel between the shoals until the lights at St. Pierre are in line, bearing S. 40° W. (S. 58° W. mag.), when they must be steered for until the lights at St. Famille are in line, bearing N. 52° E. (N. 70° E. mag.). Keep these lights in line astern until Beauport church south spire is midway between the extremes of the two westernmost of Hall's wharves at Montmorency Falls, bearing S. 55° W. (S. 73° W. mag.). This mark will lead north of the shoal lately found to extend northwestward from Pointe au Pavillon, and should be followed until L'Ange Gardien lights are in line, bearing N. 25° E. (N. 43° E. mag.) nearly, when the latter lights should be kept in line astern until the basin of Quebec is reached.

The tidal streams run generally in the line of the channel, and attain a velocity of 3 to 4 knots at spring tides.

Tides.—The following table has been formed from the mean of the

observations of several spring tides. The neap tides rise and fall nearly at the same rate as in ordinary spring tides—so nearly that any difference that there may be is far exceeded by the action of strong winds; but, as in neap tides, the whole rise and fall is not so great as in the ordinary springs shown in the following table, therefore the proportionate part of the rise and fall for every hour after low and high water will also be less, and an allowance must be made accordingly.

Table showing approximately the height of the tide at every hour after low and high water in ordinary spring tides.

Place.	Hours after low water.	Flood tide. Height.	Hours after high water.	Ebb tide. Height.
	h. m.	*ft. in.*	*h. m.*	*ft. in.*
Quebec*	0 0	0 0 l. w.	0 0	17 6 h. w.
	1 0	5 6	1 0	15 0
	2 0	10 6	2 0	11 4
	3 0	14 9	3 0	8 0
	4 0	16 3	4 0	5 10
	4 45	17 6 h. w.	5 0	3 4
			6 0	1 6
			7 0	0 2
			7 35	0 0 l. w.
St. Roch des Aulnets	0 0	0 0 l. w.	0 0	17 0 h. w.
	1 0	2 0	1 0	14 9
	2 0	5 3	2 0	11 0
	3 0	9 6	3 0	8 6
	4 0	13 6	4 0	5 6
	5 0	16 3	5 0	3 0
	5 35	17 0 h. w.	6 0	1 6
			6 50	0 0 l. w.
Brandy Pots	0 0	0 0 l. w.	0 0	17 0 h. w.
	1 0	1 3	1 0	15 0
	2 0	4 7	2 0	12 0
	3 0	9 5	3 0	8 6
	4 0	13 8	4 0	5 6
	5 0	16 0	5 0	3 0
	5 50	17 0 h. w.	6 0	1 0
			6 34	0 0 l. w.
Tadousac, entrance of Saguenay River	0 0	0 0 l. w.	0 0	17 0 h. w.
	1 0	1 3	1 0	15 0
	2 0	4 6	2 0	12 0
	3 0	8 0	3 0	8 0
	4 0	12 0	4 0	4 0
	5 0	15 6	5 0	1 0
	6 8	17 0 h. w.	6 16	0 0

*The tides of Grosse Isle were observed to rise and fall nearly in the same manner, excepting that the rise after low water was not quite so rapid.

The use of the table will appear evident from a consideration of what has been said in page 337, but to render it still plainer we will suppose a case. A ship bound up the river, and drawing 23 feet water, weighs from off St. Anne buoy just as the stream of flood begins to make; and it is judged from an estimation of her rate of sailing, in addition to that of the stream of flood, that she will be up to Channel Patch in 1¼ hours, and at Beaujeu Bank in 3 hours. Will she have water enough to pass over Channel Patch, and afterwards to the southward of Beaujeu Bank, and how much at each place? Now, the stream of ebb at St. Roch (see p. 340) runs down 1¼ hours after low water by the shore, but it is not low water until about a quarter of an hour later at the Pillars. The flood had therefore been rising about one hour there when the ship weighed. The tide will therefore

have been rising 2¼ hours when she arrives at Channel Patch, which may be considered the same as the Pillars. Referring to the foregoing table, it will be found that the rise from low water answering to 2¼ hours is about one fathom, which, being added to 3½ fathoms, the depth (shown on the plan) over Channel Patch at low water, gives 4½ fathoms as the depth over it at the time when the ship is expected to pass, which is only 4 feet to spare.

Again, it is not low water at Crane Island, near Beaujeu Bank, until 40m.—say three-quarters of an hour, later than at St. Roch; the tide had therefore only risen half an hour at Beaujeu Bank when the ship weighed; which, being added to 3 hours, the time she expects to be going there, will give 3½ hours flood at the time of her arrival. Now, for 3½ hours after low water the table gives about 2 fathoms rise, there will therefore be 5 fathoms to the southward of Beaujeu Bank at 3½ hours flood in ordinary spring tides, to which the table is adapted, and consequently water enough for large ships.

CHAPTER XIII.

ST. LAWRENCE RIVER, ABOVE QUEBEC.

QUEBEC.

(H. O. Chart No. 1360.)

Sault Pass.—Just above the entrance of the Chaudière River (which is on the southern shore, 5 miles above Quebec), the St. Lawrence is rather less than 800 yards wide, between steep, high, and partially wooded banks, composed of graywacké and slate rocks; the channel of the river is still farther reduced at low water by rocky shoals, which dry out from the shore on either side. The breadth of the stream is then only 550 yards, but the depth is nearly 30 fathoms, and the rate of the stream of ebb about 6 knots. This narrow pass is called the Sault; and it is here that the drift ice packs and forms an ice bridge, over which a sleigh road is formed almost every winter.

Anchorage.—At Carouge Point (Cap Rouge), on the northern shore, and about 8 miles above Quebec, there is an excellent anchorage; and the river here begins to expand into a magnificent reach, from 2 to 2½ miles wide, which extends westward as far as the eye can reach. The high and steep banks on either side form occasionally precipitous headlands.

Tremble Shoals.—The navigation of the river is devoid of all difficulty as far as the dangerous shoals of Pointe aux Trembles on the northern shore, and 18 or 19 miles above Quebec. These shoals extend westward for many miles up the river, leaving a channel between them and the southern shore in some places only 800 yards wide. Still there are no difficulties in the navigation that may not be easily overcome, even in large ships, as high as Portneuf, which is on the northern shore, and 32 miles above Quebec.

Richelieu Rapids.—The first great difficulty in the navigation is Richelieu Rapids, which commences just above Portneuf, and extends nearly to Grondines, 41 miles above Quebec. In the narrowest part of Richelieu Rapids the channel at low water is between extensive shoals of immense bowlder stones, and only 460 yards wide. There is water enough for any vessel, but there is only about one hour of very weak stream of flood, while the ebb runs in spring tides at the rate of fully 7 knots; this is, therefore, a difficult and dangerous pass. The steamers regulate the time of their departure from Quebec so as to arrive at the foot of Richelieu Rapids with the flood tide.

No greater depth than 22 feet water can be counted on between St. Croix and Richelieu Rapids. Two beacons have been erected on Platon Point to indicate the middle of the ship channel at the Barre à Boulard, Richelieu Rapids.

The two lighthouses at Portneuf, on the northern shore of the river, in line lead up Richelieu Rapids, through the middle of the channel, to abreast Richelieu Islet, on which is shown a fixed white light; after which the two lights at Platon Point, on the southern shore, 1½ miles below Richelieu Islet, kept in line, lead through the remainder of the channel.

Lights.—Between Quebec and Lake St. Peter the following lights are exhibited, namely—

Southwest side of the channel:

St. Antoine. Two fixed white lights, visible 10 miles.

Trembles Shoal. A light and bell buoy, painted red, with Trembles Shoal in white, and showing at an elevation of 14 feet above the water an intermittent white light, is moored off the SE. extreme, visible 8 miles.

Paget Bank. A similar buoy, with the words St. Croix, is moored off the west extreme.

St. Croix. A fixed white light, visible 6 miles.

Platon Point. Two fixed white leading lights, visible 12 miles. These lights in line, N. 58° E. (N. 74° E. mag.), lead up Richelieu Rapids.

Richelieu Island. A fixed white light, visible 6 miles. This light and the two leading lights on Platon Point are very nearly on the same line of bearing, namely, N. 58° E. (N. 74° E. mag.).

Lotbinière. Two fixed white lights, visible 10 and 8 miles, bearing S. 43° W. (S. 59° W. mag.), lead through Richelieu Channel.

Langlais Point. A fixed white light, visible 5 miles. To show off Batture des Grondines, and to avoid Batture Gordi...

St. Emélie. Two leading lights, to be exhibited when new channel is completed. The rear light tower is 3,000 feet, S. 86° E. (S. 70° E. mag.), from front light tower.

Cape Charles. Two fixed white leading lights, N. 80° W. (N. 64° W. mag.) and S. 80° E. (S. 64° E. mag.) of each other, visible 6 miles.

St. Pierre des Becquets. A fixed white light, visible 5 miles.

Port St. Francis. Two fixed white leading lights, visible 4 miles. These lights in line, bearing N. 62° E. (N. 76° E. mag.), lead through a newly dredged channel.

North side of the channel:

Portneuf. Two fixed white leading lights, visible 5 miles. These lights in line, N. 29° E. (N. 45° E. mag.), lead up Richelieu Channel to the light on Richelieu Island.

Grondines. Two fixed white leading lights, N. 52° E. (N. 68° E. mag.) and S. 52° W (S. 68° W. mag.) of each other, visible 5 miles.

Batiscan. Two fixed white leading lights, visible 4 miles. These

lights in line, S. 61° W. (S. 77° W. mag.), will lead from their point of intersection with Grondines Upper Range lights through the wide part of the channel clear of St. Anne Shoals.

Citrouille Point. A fixed white light, visible 11 miles.

Champlain Lower Range lights. Two fixed white leading lights, visible 6 miles. These lights are in line N. 40° E. (N. 56° E. mag.), lead through Bécancour Traverse.

Cape Madeleine. Two pairs of fixed white leading lights. Lower lights 2½ miles below the cape, in line bearing N. 42° E. (N. 58° E. mag.), visible 6 miles. Upper lights 2 miles below the cape, in line N. 70° E. (N. 86° E. mag.), visible 6 miles.

Point du Lac. A fixed white light, visible 12 miles. In line with East lightship S. 55° W. (S. 70° W. mag.), shows center of dredged channel from Middle Traverse up to White Buoy Bend.

Tides.—At Portneuf the spring tides rise 14 feet, while at Grondines they only rise 9 feet; there is, therefore, a great difference in the rise of the tides at the foot and head of Richelieu Rapids—namely, 5 feet in 9 miles—so that it seems that the descent in the bed of the St. Lawrence is there very considerable.

The navigation above Richelieu Rapids continues more or less difficult, and is so embarrassed by shoals and large bowlders that at Livreur Point (opposite St. Anne River, and 47 or 48 miles above Quebec) the ship channel is reduced to the breadth of 360 yards.

The villages of Champlain and Gentilly are opposite to each other and 58 miles from Quebec, the former being on the northern and the latter on the southern shore. They may be said to mark the extent of the stream of flood tide, which was not observed above Gentilly Shoals, where the ordinary springs, unless assisted by an easterly gale, do not rise above 2 or 3 feet. Here also a considerable change takes place in the character of the country, for the high banks, which had continued to form the southern shore of the river all the way from opposite Quebec, turn back into the country, and the shores on both sides become low and of an alluvial appearance.

At the town of Three Rivers, 68 miles above Quebec, the ordinary spring tides rise one foot, and it is high water, full and change, at 11½ h. In the spring and fall, easterly gales often occur with the spring tides and cause them to rise, it is said, one or 2 feet higher.

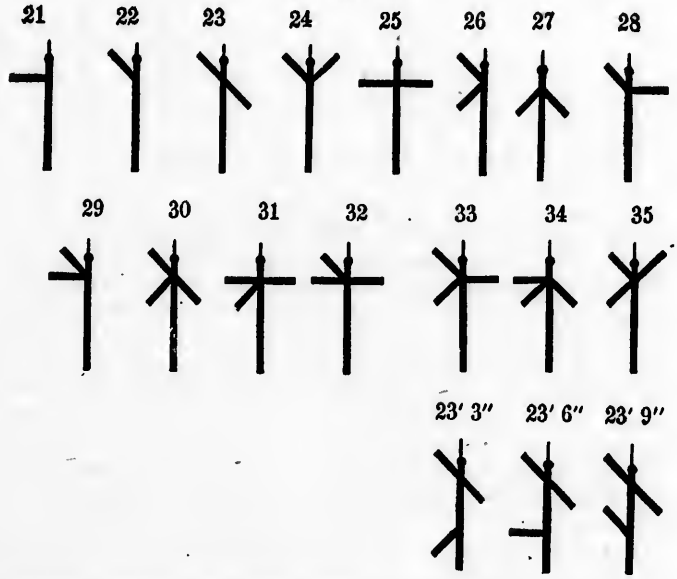
At Point du Lac, at the lower entrance of Lake St. Peter and 75 miles from Quebec, the neap tides are almost imperceptible, and the spring tides, unless assisted by an easterly gale, do not rise above 3 or 4 inches. The effect of the tides may be said to be lost in Lake St. Peter, since no alternate rise and fall of the water that could be attributed to their influence was observed among the islands at its head. It would be possible to take large vessels to the lower entrance of Lake St. Peter, since 4 fathoms could be carried up by buoying the channel.

Lake St. Peter.—The distance up this lake from Point du Lac to the islands is about 18 miles, of which about 4 miles are over a flat of sand and clay, through which a ship channel 300 feet wide and 27½ feet deep has been dredged.

The channel above Lake St. Peter is often narrow and difficult for sailing vessels, and the current, the average rate of which does not exceed 2 or 3 knots, is in some narrow places of considerably greater strength. At St. Mary Rapid, just below the city of Montreal, the rate of the current amounts to 7 knots. The whole river, as well as Lake St. Peter, is now so well buoyed and lighted that sailing vessels are towed night and day without stopping, except in fogs, through the narrowest parts of the channel, and the whole distance (about 138 miles) from Quebec to Montreal is often accomplished in twenty-four hours, by leaving Quebec so as to arrive at Richelieu Rapids with the flood stream.

Code of Semaphore Signals, showing depth of water in feet in Cap à la Roche New Channel.

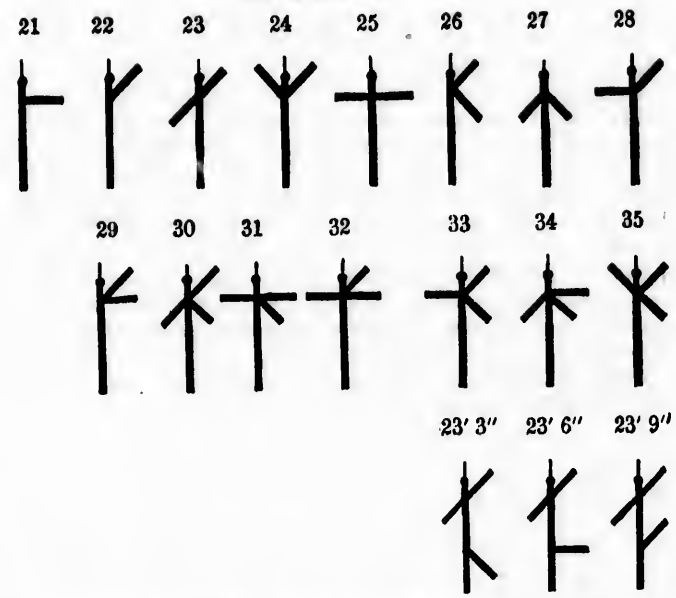
Looking downstream.



The lower arm indicates inches to be added to the feet shown by the upper arm.

Ball at head of flag pole indicates rising tide.

Looking upstream.



The lower arm indicates inches to be added to the feet shown by the upper arm.

Ball at head of flag pole indicates rising tide.

The depth of water in the center of the old or north channel at Cap à la Roche is 6 feet less than in the new or south channel.

Lightvessels and Lights.—The dredged channel through Lake St. Peter is marked by three lightvessels, namely: East lightvessel, No. 3, in latitude 46° 15′ 55″ north, longitude 72° 42′ 15″ west; Center lightvessel, No. 2, in latitude 46° 11′ 35″ north, longitude 72° 53′ 20″ west; West lightvessel, No. 1, in latitude 46° 9′ 37″ north, longitude 72° 56′ 45″ west. Each exhibits a fixed white light, visible 9 miles in clear weather. The channel of Lake St. Peter is also marked by two fixed white leading lights shown from Ile aux Raisins. These lights in line S. 10° W. (S. 25° W. mag.) lead through the channel above the West lightvessel.

St. Francis River. Two fixed lights, the outer white and the inner red, and each visible 4 miles, when in line, lead into St. Francis River.

Lights are shown at the following places between Lake St. Peter and Montreal, namely:

Stone Island, or Ile à la Pierre. One fixed white light, visible 12 miles.

Ile de Grace. One fixed white light, visible 8 miles.

Sorel. Two fixed red leading lights. Two beacons are erected to lead to the entrance of Richelieu River.

Richelieu River.
- North Halfway Point. Two fixed white lights, visible 3 miles.
- St. Valentine. Two fixed white leading lights, visible 2 miles and one mile.
- Lacolle. Two fixed white leading lights, visible 6 and 4 miles.
- Ash Island. One fixed white light, visible 4 miles.
- Bloody Island. One fixed white light, visible 4 miles.

La Valtrie. Two fixed white leading lights, visible 10 and 8 miles.

Traverse (2½ miles above Contrecœur). Two fixed white leading lights, visible 11 and 13 miles.

Ile aux Prunes. One fixed white light, visible 10 miles.

Repentigny. Two fixed white leading lights, visible 4 miles.

Ile à la Bague. One fixed white light, visible 4 miles.

Ile St. Thérèse. Two pairs of fixed white leading lights, visible 12 and 10 miles (lower), 6 miles (upper).

Pointe aux Trembles. Two fixed white leading lights, visible 4 miles.

Montreal Harbor is the terminus of the ocean navigation of the St. Lawrence River, and is capable of sheltering a large number of vessels.

The channel leading to it from Quebec has been dredged, so that in the part of the river affected by tides the least depth is 22 feet at low water, but in the part of the river above tidal influence the least depth is 27½ feet at low water of 10½ feet on the flats of Lake St. Peter, which occurs in autumn. Only a portion of the excavation at Cap à la Roche now remains to be done to give a depth of 27½ feet at all stages of the tide between Montreal and Cape Charles. Below the latter point it has been ascertained that a few places will require dredging to enable deep-draft vessels to pass at low water.

Immediately above Montreal the navigation is closed by the commencement of Lachine Rapids. At ¾ mile south of the harbor is the Victoria tubular bridge, which crosses the river. It is 6,600 feet long, and rests on piers 35 feet above the ordinary level of the river. Extensive alterations are in course of being made, which will largely increase the wharfage of the harbor and furnish shelter for vessels in winter.

Directions.—As pilotage is compulsory for merchant vessels, and continuous alterations are made in buoys to suit the newly dredged channel, it would be useless to give instructions for the navigation of the channel to Montreal. Numerous lighthouses, lightvessels, and buoys mark the course.

Pilotage.—The tariff is, for each vessel in tow of a steamer, $2, for steamers $2.50, for sailing vessels upward, $4.20, and downward $2.80, respectively, for each foot of draft of water, while $5 are charged for moving a vessel from one wharf to another, or from the harbor into

Lachine Canal. Proportionate amounts are charged for pilotage to Portneuf, Three Rivers, and Sorel.

Wintering.—Great damage is sometimes done at Montreal from the ice taking the ground and damming back the water so as to overflow the wharves and storehouses in the lower parts of the city, and thus exposing them to the pressure of the drift ice. Hence it is that vessels can not winter at Montreal, except in the canals, and that the steamers are sent either to Sorel, at the entrance of the Richelieu River, or to Boucherville Islands, those being the only places where they or other large vessels can be safe from the ice, although there are many places where Durham boats and other small river craft may be secured. There is no doubt but that large stones are moved by the ice, and that the depth of water over shoals will vary in consequence; but, from all that can be gathered, there has been no material change in the main channels of the river for many years. The islands and flats of Lake St. Peter are doubtless extending eastward or down the lake, but without as yet affecting the depth of water in the channel.

Time Signal.—A time signal is established on the tower of the harbor commissioners' building. The signal is made once daily, except on Sunday, during the season of navigation; and is a ball, which is hoisted close up as preparatory about five minutes before signal, and dropped at noon mean time of the seventy-fifth meridian, equivalent to 5h. Greenwich mean time.

There is no seaman's hospital at Montreal, but the sick are sent either to the general hospital or to Notre Dame.

Montreal is the largest city in Canada, and the advantages of its situation make it one of the great centers of trade on the American continent. It contains factories of all kinds, several shipbuilding establishments, and machine shops for construction of steam engines and boilers. Supplies of all kinds may be procured for vessels.

In 1891 the census showed the population to be 216,650, of whom the greater number are of French descent.

The United States is represented by a consul-general and vice-consul-general.

Wharfage.—Along the bank of the river is an extensive line of quays and warehouses, which are in course of extension. There are about $4\frac{1}{2}$ statute miles of wharfage for vessels of $27\frac{1}{2}$ feet draft, and over a mile for drafts of 10 feet. And in addition, the basins of Lachine Canal afford to vessels of 18 feet draft a wharfage of $\frac{2}{3}$ mile, and for vessels of 12 feet draft $2\frac{2}{3}$ miles. This wharfage is afforded by the locks described hereafter.

Docks.—There are two docks, but only one is suitable for seagoing vessels; that is 300 feet long, 45 feet broad, and has a depth of 10 feet water over the sills. There are two machine establishments connected with the dry docks, and several smaller ones along the river front.

Navigation opens about April 23 and closes December 16. The first steamer from the eastward arrives about May 2 and the last one leaves about November 23.

ST. LAWRENCE RIVER ABOVE MONTREAL.

General Remarks.—Under ordinary conditions, vessels drawing 9 feet water can with safety be brought from Montreal to Ogdensburg during the season of navigation (May to November, inclusive). Occasionally, however, the water falls to a level rendering it impracticable to run the river below Ogdensburg when drawing more than 8 feet 6 inches. This low water usually occurs during the fall, but it is not of regular yearly happening.

The dimensions of the Morrisburg Lock No. 23 are such that propellers 185 feet long, 25 to 30 feet beam, and paddle boats 180 feet long, 42 feet beam, neither drawing over 9 feet, can pass. This is the smallest lock in the system and determines the size of the largest vessel that can pass through; it is also the governing point for loading.

The distance from Montreal to Ogdensburg is 119 miles, of which $75\frac{3}{8}$ is river and $43\frac{5}{8}$ canal navigation.

The average time required to make the passage between Montreal and Ogdensburg is, going up, 8 days; going down, 6 days; both estimates include the time in dock necessary to place the pontoons in position.

The cost of pontooning, towing, and piloting from point to point, going up, is $400 for the smallest vessel that requires pontooning, and from that up to $1,200 for vessels of 500 tons.

Steamers going through will shorten the passage by turning over the propeller, although this is not required. In any event the supply of coal need not exceed that required for three days' full steaming. The company assumes no liability whatever for the safety of the vessels while in their hands, but they propose to furnish powerful tugs and competent pilots, and to exercise every possible precaution.

The facilities for coaling at Ogdensburg are good; Reynoldsville soft coal averages about $4.25 per ton of 2,000 pounds, and the best grades of anthracite average from $5.50 to $5.75 per short ton. There is an ample water front of 13 feet depth alongside the storehouses, and coal will be furnished there or from a scow in the stream.

Sea stores and vessels' supplies can be had in Ogdensburg, and there is ample service in the way of repairs to machinery.

The pontoons used are simply water-tight wooden tanks about 40 feet long, fitted roughly on the inner sides to the ship's shape; one is placed under each quarter while the ship is in dock, and the two are secured in place by the chains passing around the outer sides and under the keel of the ship. The ship's lower chains are then secured to the forward top ends of the pontoons, passed through the hawse pipes,

taken to the capstan, and hove well taut to prevent the pontoons from sagging astern. The joint capacity of the pontoons is 140 tons net.

The lock chambers of the St. Lawrence Canals are now being enlarged from their present dimensions of 200 feet by 45 feet, with 9 feet water on the sills. Several of these lock chambers are already completed.

Starting from Montreal the first canal reaches Lachine, extending from Montreal to the village of Lachine, overcoming the St. Louis Rapids, the first series of rapids which bar the ascent of the St. Lawrence. This canal is 8½ statute miles in length.

The Beauharnois Canal commences on the south side of the St. Lawrence, 15 miles from the head of the Lachine. It connects Lakes St. Louis and St. Francis, and passes three rapids known as the Cascades, the Cedars, and the Coteau. The length of this canal is 11¼ statute miles.

From the head of the Beauharnois Canal to the foot of the Cornwall, the next in order, there is a navigable stretch through Lake St. Francis of nearly 33 miles, at the end of which are the Long Sault Rapids, beyond which extends the Cornwall Canal, 11½ statute miles long.

Five miles from the head of the Cornwall, Farran Point Rapid is overcome by a canal ¾ mile long. Ten miles beyond this the Rapide Plat Canal, 4 statute miles long, enables vessels to avoid the Plat Rapids. Five miles further the ascending vessel reaches the Galop Canal, 7⅝ statute miles in length.

As before stated, under ordinary circumstances vessels drawing 9 feet can be brought from Montreal to Ogdensburg, but during a low river, usually occurring in the fall, only 8½ feet can be carried between these points.

Canals of Canada in the tributary waters of the Great Lakes.

No.	Name of canal.	Waters connected.	Terminal points.	Length of canals.	Height of bridges.	Locks.				
						Number.	Length.	Width.	Depth.	Lockage.
				Statute miles.	*Feet.*		*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	Lachine *a*	St. Lawrence River	Montreal-Lachine	8.50		5	270	45	14	45
2	Soulanges *b*	do	Cascades Point-McDonald	14		4	270	45	14	82.5
			Poir "							
3	Beauharnois	do	Melochville-Valleyfield	11.25		9	200	45	9	82.5
4	Cornwall	do	Cornwall-Dickinson Landing	11.5		6 *c*	270	45	14	48
5	Farrans Point	do	Farrans Point-Point Avoyon	.75		1	200	45	9	4
6	Ranide Plat	do	Rapide Plat-Flagge Bay	4		2	270	45	14	11.5
7	Galops	do	Iroquois-Galops Rapid	7.625		2 *c*	270	45	14	15.5
8	St. Onra Lock	Richelieu River	St. Onra	.125		1	200	45	7	5
9	Chambly	do	Chambly Basin-St. John	12		9	118	22.5	7	74
10	St. Annes Lock	Ottawa River	St. Annes	.125		1	200	45	9	3
11	Carillon	do	Carillon	.75		2	200	45	9	16
12	Grenville	do	Grenville	5.75		5	200	45	9	43.75
13	Rideau *d*	Ottawa River and Lake Ontario (via Rideau River and Lakes).	Ottawa-Kingston	Navigable waters 126.75.		(35 up. 14 d'n.	134	33	5	(292.25 rise. (165.50 fall.
14	(Perth Branch of Rideau). Murray *a*	Lake Rideau. Lake Ontario and Bay of Quinté.	Beveridges Bay-Perth. Presqu' Ile Harbor-Bay of Quinté.	6 5.18		2 0	134	32	5.6	26
15	Welland	Lake Ontario and Lake Erie.	Port Dalhousie-Port Colborne.	26.75		26 *c*	270	45	14 *e*	326.75
16	Sault Ste. Marie	St. Marys River	Sault Ste. Marie	3.4 including approaches.		1	900	60	20.25	18

a Only 12 feet can be carried between locks.
b Under construction.
c One guard lock.
d Only 4½ feet can be carried between locks.
e Subject to fluctuation in the Summit Level, by reason of high winds on Lake Erie.

Nos. 1 to 7 are collectively known as the "St. Lawrence River System."
Nos. 8 and 9 as the "Richelieu and Lake Champlain System."
Nos. 10, 11, 12, and 13, as the "Montreal, Ottawa, and Kingston Route."

Nos. 5, 6, and 7 are also known as the Williamsburg Canals.
The smallest dimensions are given for locks. Tolls, 2½ cents for registered ton.
All Canadian canals are closed on Sunday from 6 a. m. to 9 p. m.

INDEX.

H.

M.

N.

LIST OF HYDROGRAPHIC OFFICE PUBLICATIONS, ETC.

No.	Title of book.	Price.
	NORTH ATLANTIC OCEAN.	
22	General Examination of the Atlantic Ocean. By Capt. Charles Philippe De Kerhallet, I. F. N. Translated by Capt. R. H. Wyman, U. S. N. 8vo. 1870. Hydrographic Office	$2.00
	Supplement No. 1. 1886. Hydrographic Office	.10
45	General Directions for the Atlantic Ocean. From the French of F. Labrosse. Second edition. Translated by Lieut. Commander J. B. Coghlan, U. S. N. 8vo. 1873. Hydrographic Office	2.00
99	Nova Scotia, Bay of Fundy, and South Shore of Gulf of St. Lawrence to Miramichi Bay. Second edition. Compiled by R. C. Ray, U. S. N. 8vo. 1897. Hydrographic Office	.....
100	Gulf and River St. Lawrence and Cape Breton Island, including Cape Breton, Magdalen, and Anticosti Islands. Second edition. Compiled by R. C. Ray, U. S. N. 8vo. 1897. Hydrographic Office	.....
104	The Depths that Can be Carried into the Harbors and Anchorages on the Atlantic and Gulf Coasts of the United States. Prepared by Gustave Herrle. (Pamphlet.) 1893. Hydrographic Office	.25
86	The Navigation of the Gulf of Mexico and the Caribbean Sea. Vol. I. The West India Islands, including the Bahama Banks and Islands, and the Bermuda Islands. Third edition. Compiled by R. C. Ray, U. S. N. 8vo. 1892. Hydrographic Office	1.50
	Supplement. Third edition. 1896. Hydrographic Office	.20
64	The Navigation of the Gulf of Mexico and the Caribbean Sea. Vol. II. The Coast of the Mainland from Key West, Florida, U. S., to the Orinoco River, Venezuela, with the Adjacent Islands, Cays, and Banks. Third edition. Revised by R. C. Ray, U. S. N. 8vo. 1896. Hydrographic Office	1.50
	Supplement. 1897. Hydrographic Office	.20
73	Newfoundland and Labrador. Compiled by Lieut. W. W. Gillpatrick and Ensign John Gibson, U. S. N. 8vo. 1884. Hydrographic Office	1.00
78	Newfoundland and Labrador. Supplement. 8vo. 1886. Compiled by Lieut. R. G. Davenport and Ensign John Gibson, U. S. N. Hydrographic Office	.60
	Supplement No. 2. 1891. Hydrographic Office	.20
	Supplement No. 3. 1895. Hydrographic Office	.20
23	Winds, Currents, and Navigation of the Gulf of Cadiz, the Western Coast of the Spanish Peninsula, and the Strait of Gibraltar, by Capt. R. H. Wyman, U. S. N. 8vo. 1870. Hydrographic Office	1.00
25	General Examination of the Mediterranean Sea. By Capt. A. Le Gras, I. F. N. Translated by Capt. R. H. Wyman, U. S. N. 8vo. 1870. Hydrographic Office	2.00
102	The Azores, Madeiras, Salvages, Canaries, and Cape Verde Islands. Second edition. Revised by R. C. Ray, U. S. N. 8vo. 1892. Hydrographic Office	.80
	Supplement. 1895. Hydrographic Office	.10
105	West Coast of Africa. From Cape Spartel to Cape Agulhas, including the Islands in Bight of Biafra, Ascension, St. Helena, Tristan da Cunha, and Gough Islands. Second edition. Compiled by R. C. Ray, U. S. N. 8vo. 1893. Hydrographic Office	1.50
	Supplement. Second edition. 1897. Hydrographic Office	.20

No.	Title of book.	Price.
	NORTH ATLANTIC OCEAN—Continued.	
15	Memoir of the Dangers and Ice in the North Atlantic. (Pamphlet.) 1868. Bureau of Navigation	$0.20
93	Ice and Ice Movements in North Atlantic Ocean. By Ensign Hugh Rodman, U.S.N. (Pamphlet.) 1890. Hydrographic Office	.20
	SOUTH ATLANTIC OCEAN.	
88	East Coast of South America. From the Orinoco River to Cape Virgins, including Falkland, South Georgia, Sandwich, and South Shetland Islands. Second edition. Compiled by R. C. Ray, U. S. N. 8vo. 1894. Hydrographic Office	1.50
	Supplement. 1895. Hydrographic Office	.10
54	Navigation of the Strait of Magellan. Translated from the French by Commodore J. C. P. de Krafft and Commander William Gibson, U. S. N. (Pamphlet.) 1883. Hydrographic Office	.20
55	Remarks by Capt. M. A. Lefèvre, of the French Navy, on the voyage of the Vaudreuil through Patagonian Channels and Magellan Strait. Translated by Lieut. George M. Totten, U.S.N. (Pamphlet.) 1874. Hydrographic Office	.20
	PACIFIC OCEAN.	
5	General Examination of the Pacific Ocean. By Capt. Charles Philippe De Kerhallet, F. I. N. Translated under the direction of Commodore Charles Henry Davis, U.S.N. 8vo. 1867	1.50
	Supplement No. 1. 1886. Hydrographic Office	.10
58	The Navigation of the Pacific Ocean. Translated from the French of Mons. F. Labrosse, by Lieut. J. W. Miller, U. S. N. 8vo. 1874. Hydrographic Office. Republished 1893	1.50
80	The West Coast of South America, including Magellan Strait, Tierra del Fuego, and the Outlying Islands. Second edition. Compiled by R. C. Ray, U. S. N. 8vo. 1896. Hydrographic Office	1.20
84	West Coast of Mexico and Central America, from the United States to Panama, including the Gulfs of California and Panama. Second edition. Compiled by R. C. Ray, U.S.N. 8vo. 1893. Hydrographic Office	1.50
	Supplement. 1896. Hydrographic Office	.10
96	The Coast of British Columbia. From Juan de Fuca Strait to Portland Canal, including Vancouver and Queen Charlotte Islands. Compiled by R. C. Ray, U. S. N. 8vo. 1891. Hydrographic Office	1.50
	Supplement. Third edition. 1895. Hydrographic Office	.20
	Supplement No. 2. 1897. Hydrographic Office	.10
41	List of Reported Dangers in the North Pacific Ocean. 8vo. 1871. Hydrographic Office	1.00
	Supplement No. 2. 1891. Hydrographic Office	.15
41 *b*	Supplement to Reported Dangers in the North Pacific Ocean. Compiled and arranged by Commander William Gibson, U.S.N. 8vo. 1880. Hydrographic Office	1.00
41 *a*	List of Reported Dangers in the South Pacific Ocean. Compiled and arranged by Lieut. J. E. Pillsbury, U.S.N. 8vo. 1879. Hydrographic Office	1.00
	Supplement. 1891. Hydrographic Office	.15
92	Ice and Ice Movements in Bering Sea and the Arctic Basin. By Ensign E. Simpson, U.S.N. (Pamphlet.) 1890. Hydrographic Office	.20
20	Supplement No. 2 to Directory for Bering Sea and Coast of Alaska. 1895. Hydrographic Office	.20

No.	Title of book.	Price.
	INDIAN OCEAN.	
85	Sailing Directions of the Indian Ocean, the Winds, Monsoons, Currents, and Passages, including also the Java Sea, Sulu Sea, Arafura Sea, and the Philippine Islands. Compiled by Lieut. F. E. Sawyer, U. S. N. 8vo. 1887. Hydrographic Office	$1.00
	Revised Supplement. 1894. Hydrographic Office	.20
24	General Examination of Indian Ocean, with Directions for the Navigation of Torres Straits, etc. By Capt. Charles Philippe De Kerhallet, I. F. N. Translated by Capt. R. H. Wyman, U. S. N. 8vo. 1870. Hydrographic Office	2.00
	LAKES.	
108	Sailing directions for the Great Lakes and Connecting Waters. Second edition. Revised by R. C. Ray, U. S. N. 8vo. 1896. Hydrographic Office	1.00
	Supplement. 1897. Hydrographic Office	.20
108 Part III. Supp.	Sailing Directions for North Channel of Lake Huron and Georgian Bay. Prepared by Lieut. D. H. Mahan, U. S. N., assisted by R. C. Ray, U. S. N. 8vo. 1895. Hydrographic Office	1.00
	LIGHT LISTS.	
30	List of Lights (No. 1) of North and South America (excepting the United States), including the West Indies and Pacific Islands. Compiled by Boynton Leach. 4to. 1896. Hydrographic Office	.25
31	List of Lights (No. 2) of South and East Coasts of Africa and the East Indies, including the East India Islands, China, Japan, Australia, Tasmania, and New Zealand. Compiled by Boynton Leach. 4to. 1896. Hydrographic Office	.25
32	List of Lights (No. 3) of the West Coasts of Africa, Europe, and the Mediterranean Sea, including the Adriatic, the Black Sea, and the Sea of Azof. Compiled by Boynton Leach. 4to. 1897. Hydrographic Office	.25
	NAVIGATION BOOKS.	
72	List of Geographical Positions. By Lieut. Commander F. M. Green, U. S. N. 4to. 1883. Bureau of Navigation	.75
9	The New American Practical Navigator. By Nathaniel Bowditch, LL. D. 8vo. Edition of 1896. Bureau of Navigation	2.25
13	Bowditch's Useful Tables. 8vo. Edition of 1896. Bureau of Navigation	1.25
17	Projection Tables. 8vo. 1869. Bureau of Navigation	1.50
71	Azimuth Tables for parallels of latitude between 61° N. and 61° S. By Lieuts. Seaton Schroeder and W. H. H. Southerland, U. S. N. 4to. Edition of 1897. Hydrographic Office	4.25
106	Azimuth Tables for parallels of latitude between 40° N. and 50° N. For the Great Lakes. 4to. 1894. Hydrographic Office	.50
	Supplement to 106. Equation of Time for the years 1894, 1895, 1896, and 1897	.10
66	Arctic Azimuth Tables for parallels of latitude between 70° and 80°. Prepared by Lieuts. Seaton Schroeder and Richard Wainwright, U. S. N. 12mo. 1881. Hydrographic Office	.80
57	Tables for Finding the Distance of an Object by two Bearings. (Pamphlet.) 1874. Hydrographic Office	.20
90	The Development of Great Circle Sailing. By G. W. Littlehales. 8vo. 1889. Hydrographic Office	1.00

No.	Title of book.	Price.
	NAVIGATION BOOKS—Continued.	
91	Table of Meridional Parts for the Terrestrial Spheroids, Compression $\frac{1}{299.15}$. By G. W. Littlehales and J. S. Siebert. 8vo. 1889. Hydrographic Office	$1.20
109	Contributions to Terrestrial Magnetism—The Variation of the Compass. Compiled by Lieut. Chauncey Thomas, U. S. N. 8vo. 1894. Hydrographic Office	1.00
109a	Contributions to Terrestrial Magnetism—The Variation of the Compass. Compiled by G. W. Littlehales, C. E. 8vo. 1895. Hydrographic Office	1.00
114	Contributions to Terrestrial Magnetism—The Magnetic Dip or Inclination. As Observed at Thirty Maritime Stations. Together with an Investigation of the Secular Change in the Direction of a Fully Suspended Magnetic Needle at Twenty-nine Stations. By G. W. Littlehales, C. E. 8vo. 1897. Hydrographic Office	.....
111	Tables showing the Local Mean Time of the Sun's Visible Rising and Setting for Each Degree of Latitude between 60° N. and 60° S., and for Each Degree of the Sun's Declination. Prepared by Ensign George Wood Logan, U. S. N. 4to. 1896. Hydrographic Office	.30
	METEOROLOGICAL.	
77	Practical Hints in regard to West India Hurricanes. By Lieut. G. L. Dyer, U. S. N. 1887. (Pamphlet.) Hydrographic Office	.10
—	Nautical Monograph No. 5. The Great Storm off the Atlantic Coast of the United States, March 11-14, 1888. By Everett Hayden, U. S. N. 1888. Hydrographic Office	(*)
112	Illustrative Cloud Forms for the Guidance of Observers in the Classification of Clouds. Prepared by Capt. C. D. Sigsbee, U. S. N., Hydrographer. 12mo—4to. 1897. Hydrographic Office	1.00
113	The Treatment of Marine Meteorological Data, with Special Reference to the Work of the United States Hydrographic Office. Prepared by Mr. James Page. (Pamphlet.) 1897. Hydrographic Office	(*)
	SURVEYS.	
101	The Methods and Results of the Survey of the West Coast of Lower California by the Officers of the U. S. S. *Ranger* during the Season of 1889-90. By Lieut. O. W. Lowry, U. S. N., and G. W. Littlehales. 8vo. 1892. Hydrographic Office	(*)
	SIGNALS.	
87	International Signal Code. Revised and Corrected to 1894, including the Semaphore and Storm-signal Service of the Maritime Countries, the Life-Saving Service and Time-Ball System of the United States. 8vo. 1894. Bureau of Navigation	3.00
	MISCELLANEOUS PUBLICATIONS.	
110	The Gulf Stream. By Lieut. Commander John E. Pillsbury, U. S. N. (Pamphlet.) 1894. Hydrographic Office	.10
65	Report on the Telegraphic Determination of Differences of Longitude in the West Indies and Central America. By Lieut. Commander F. M. Green, U. S N. 4to. 1883. Bureau of Navigation	(*)

* Not for sale.

No.	Title of book.	Price.
	MISCELLANEOUS PUBLICATIONS—Continued.	
97	Report on the Telegraphic Determination of Longitudes in Mexico, Central America, the West Indies, and on the North Coast of South America, with the Latitudes of the Several Stations. By Lieuts. J. A. Norris and Charles Laird, U. S. N. To which is appended a Report on Magnetic Observations in Mexico and the West Indies. By Lieut. Charles Laird and Ensigns J. H. L. Holcombe and L. M. Garrett, U. S. N. 4to. 1891. Bureau of Navigation	(*)
94	Report of the International Meteorologic Congress at Paris, 1889. By Lieut. Aaron Ward, U. S. N. (Pamphlet.) 1890.	$0.20
95	The Average Form of Isolated Submarine Peaks, and the Interval which should obtain Between Deep-Sea Soundings taken to Disclose the Character of the Bottom of the Ocean. By G. W. Littlehales. 8vo. 1890. Hydrographic Office	.70
98	Report on Uniform System for Spelling Foreign Geographic Names. By Lieut. C. M. McCarteney, U. S. N., Boynton Leach, and Gustave Herrle. (Pamphlet.) 1891. Hydrographic Office	(*)
103	Submarine Cables; Instruments and Implements Employed in Cable Surveys; Theory of Cable Laying; Specifications and Costs; Submarine Cable Systems of the World. Prepared by G. W. Littlehales. 8vo. 1892. Hydrographic Office	1.00
107	Wrecks and Derelicts in the North Atlantic Ocean. 1887 to 1893, inclusive. 4to. 1894. Hydrographic Office	(*)

*Not for sale.

ETC.

	Price.
nued.	
gitudes in the North he Several d, U. S. N. rvations in Laird and S. N. 4to.	(*)
at Paris, et.) 1890.. he Interval s taken to Ocean. By fice	$0.20
	.70
Geographic , Boynton .. Hydro-	(*)
nployed in ations and repared by fice	1.00
n. 1887 to	(*)

AGENTS FOR THE SALE OF HYDROGRAPHIC OFFICE CHARTS, SAILING DIRECTIONS, ETC.

AGENTS IN UNITED STATES.

Alexandria, Va.—R. Bell's Sons, South Fairfax street.
Apalachicola, Fla.—J. E. Grady.
Astoria, Oreg.—Griffen & Reed.
Baltimore, Md.—F. J. Sloane & Co., corner Pratt street and Spear's wharf.
M. V. O'Neal, 502 East Pratt street.
Bangor, Me.—Snow & Nealley Company.
Bar Harbor, Me.—Albert W. Bee.
Bath, Me.—Charles A. Harriman.
Block Island.—C. C. Ball.
Boston, Mass.—Charles C. Hutchinson, 152 State street.
L. Prang & Co., 286 Roxbury street.
Samuel Thaxter & Son, 125 State street.
Boothbay Harbor, Me.—William O. McCobb.
Buffalo, N. Y.—Matthews, Northrup & Co., 179-183 Washington street.
Charleston, S. C.—James Allen & Co., 285 King street.
Chicago, Ill.—George Carpenter & Co., 202-208 South Water street.
H. Channon Company, 24 and 26 Market street.
Rand, McNally & Co., 166 and 168 Adams street.
The Western News Company, 204-206 Madison street.
Cleveland, Ohio.—Burrows Brothers Company, 23 Euclid avenue.
The Marine Record Publishing Company, Western Reserve Building.
The Marine Review, 516 Perry Payne Building.
Detroit, Mich.—H. D. Edwards & Co., 16-24 Woodward avenue.
J. W. Westcott, foot Woodward avenue.
Duluth, Minn.—A. Hirsch.
Eastport, Me.—C. H. Cummings.
East Tawas, Mich.—Howard C. Bristol, United States signal observer.
Erie, Pa.—William J. Sell, 830 State street.
Eureka, Humboldt County, Cal.—James E. Matthews.
Fernandina, Fla.—J. W. Howell, customhouse.
Galveston, Tex.—Charles F. Trube, 2415 Market street.
Gloucester, Mass.—P. A. Chisolm, 161 Main street.
Jacksonville, Fla.—The H. & W. B. Drew Company.
Keywest, Fla.—Alfred Brost, office of lighthouse inspector.
H. B. Boyer, weather observer.
Los Angeles, Cal.—Stoll & Thayer Company, 139 South Spring street.
Marquette, Mich.—A. O. Kruger.
Millbridge, Me.—N. C. Wallace.
Milwaukee, Wis.—Joys Bros. & Co., 205 East Water street.

Mobile, Ala.—Costello & Bates Company, 24 Front street.
E. O. Zadek Jewelry Company.
New Bedford, Mass.—C. R. Sherman & Son.
New London, Conn.—Axel F. Anderson, 57 Bank street.
New Orleans, La.—Frigerio & Schully, 411 Royal street.
L. Frigerio (widow), 1019 Canal street.
Woodward, Wight & Co., 406–418 Canal street.
Newport, R. I.—J. M. K. Southwick, 185 Thames street.
New York City.—E. Steiger & Co., 25 Park place.
John Bliss & Co., 128 Front street.
Michael Rupp & Co., 39 South street.
R. Merrill's Sons, 110 Wall street.
Thomas Manning, 45 Broadway.
T. S. & J. D. Negus, 140 Water street.
New Whatcom, Wash.—Charles M. Sherman.
Norfolk, Va.—C. F. Greenwood & Bro., 158 Main street.
Vickery & Co., 124 Main street.
Ogdensburg, N. Y.—George Hall Coal Company.
Oswego, N. Y.—John S. Parsons, corner West Cayuga and Water streets.
Palmbeach, Fla.—E. M. Brelsford.
Pascagoula, Miss.—James I. Friar.
Pensacola, Fla.—Henry Horsler & Co., 706 and 708 South Palafox street.
McKenzie Oerting & Co., 599 South Palafox street.
Philadelphia, Pa.—Riggs & Bro., 221 Walnut street.
Portland, Me.—William Senter & Co., 51 Exchange street.
Portland, Oreg.—J. K. Gill & Co., Third and Alder streets, Masonic Temple.
Port Huron, Mich.—Kendall Marine Reporting Company.
Port Townsend, Wash.—Waterman & Katz.
W. J. Fritz, 320 Water street.
Providence, R. I.—George A. Stockwell, 12 Board of Trade Building, Market square.
Punta Gorda, Fla.—K. B. Harvey.
Rockland, Me.—Spear, May & Stover, 408 Main street.
Sag Harbor, N. Y.—Charles Philip Cook.
San Diego, Cal.—E. M. Burbeck, corner Fifth and D streets.
San Francisco, Cal.—Dillon & Co., 310 California street.
Louis Weule, 418 Battery street.
S. S. Arnheim, 8 Stuart street.
San Pedro, Cal.—W. L. Banning.
Santa Barbara, Cal.—H. A. C. McPhail.
Sault Ste. Marie, Mich.—P. M. Church & Co.
Savannah, Ga.—J. P. Johnson, customhouse.
Seattle, Wash.—G. Beninghausen, First avenue south and Washington street.
Lowman & Hanford.
Sitka, Alaska.—Edward De Groff.
Stonington, Conn.—James H. Stivers, 72 Water street.
Sturgeon Bay, Wis.—Frank Long.
Tacoma, Wash.—Vaughan & Morrill.
Tampa, Fla.—Babbitt & Co., Franklin street.
Tarpon Springs, Fla.—C. D. Webster, 83 and 85 Tarpon avenue.
Titusville, Fla.—Robert Ranson.
Tremont, Me.—Frank McMullen.
Vineyard Haven, Mass.—E. St. Croix Oliver.
Waldoboro, Me.—George Bliss.

Washington, D. C.—J. J. Chapman, 608 Thirteenth street.
W. H. Lowdermilk & Co., 1424 F street NW.
William Ballantyne & Son, 428 Seventh street.
Brentano's, 1015 Pennsylvania avenue.
West Superior, Wis.—Charles S. Barker.
Wheeling, W. Va.—Frank Stanton.
Wilmington, N. C.—Godfrey Hart, 24 South Front street.
W. N. Harriss, with George Harriss & Co., North Water street.

AGENTS IN FOREIGN PORTS.

Callao, Peru.—John Newton, 2 Calle de la Constitucion.
Glasgow, Scotland.—Alexander Dobbie & Son, 18 Clyde place.
Guaymas, Mexico.—Conrad Eimbeck, C. E.
Halifax, Nova Scotia.—Robert H. Cogswell.
Hamburg, Germany.—Eckardt & Messtorff.
Hamilton, Ontario.—Hunter & Grant.
Habana, Cuba.—Edwin W. Wilson, 41 and 43 Obispo street.
Havre, France.—V. & M. Lepetit, 15 Rue de Paris.
Honolulu, Hawaiian Islands.—Frank S. Dodge.
Hongkong, China.—Charles Gaupp & Co.
Kingston, Jamaica.—James Gall.
Liverpool, England.—Philip, Son & Nephew, 41 to 51 South Castle street.
Manila, Philippine Islands.—Russell L. Webb.
Montevideo, Uruguay.—T. Bottini & Co., Calle Rompla, 95-97.
Montreal, Canada.—Hearn & Harrison, 1640 Notre Dame street.
Nassau, Bahamas.—T. Darling & Co.
Para, Brazil.—At the consulate.
Pernambuco, Brazil.—Arthur B. Dallas.
Port Hawkesbury, C. B. I., Nova Scotia.—Alexander Bain.
Port of Spain, Trinidad, West Indies.—John A. Donnatien.
St. Helena Island.—At the consulate.
St. John, New Brunswick.—J. & A. McMillan.
St. Johns, Newfoundland.—Garrett Byrne.
St. Thomas, West Indies.—J. P. Thorsen.
Turks Island.—E. J. D. Astwood.
Vancouver, British Columbia.—Albert Ufford, 58 Cordova street.
Victoria, British Columbia.—T. N. Hibben & Co., 69 Government street.
Zanzibar, East Africa.—Dorsey Mohun, United States consulate.