

No. 73

NEWFOUNDLAND
AND
THE LABRADOR COAST

THIRD EDITION

1909



HYDROGRAPHIC OFFICE

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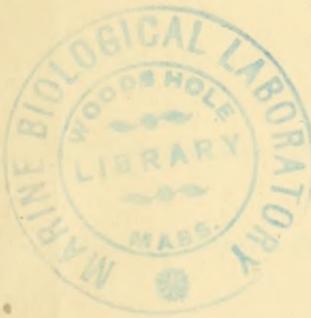
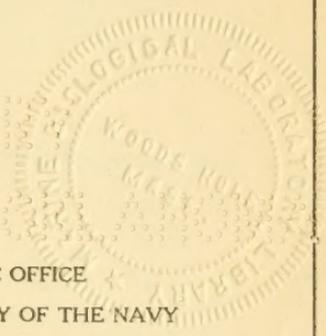
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THIRD EDITION

1909

NEWFOUNDLAND AND THE LABRADOR COAST

PUBLISHED BY THE HYDROGRAPHIC OFFICE
UNDER THE AUTHORITY OF THE SECRETARY OF THE NAVY



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1909



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NOTE.

This publication is a revision and extension of the second edition of the Sailing Directions of Newfoundland, and includes the latest available information from reliable sources. It cancels the previous editions, all supplements, and all Hydrographic Office notices to mariners which relate to Newfoundland and the Labrador coast up to and including number 18 of 1909.

Mariners are requested to notify the United States Hydrographic Office, directly or through one of its branch offices, of any new information obtained or of any errors or omissions discovered in the present edition.

The directions stated in this book are all reckoned from the true meridian. Definite directions, such as courses and bearings, are given to the nearest degree, from 0° to 360° , commencing at the North point, in accordance with the new system recently adopted by the United States Navy. The cardinal and intercardinal points of the compass, when employed, are used only as names to express general directions, such as the general trend of the land and the directions of winds and currents. Values of the variation of the compass may be obtained from the chart of the variation of the compass at the beginning of this book.

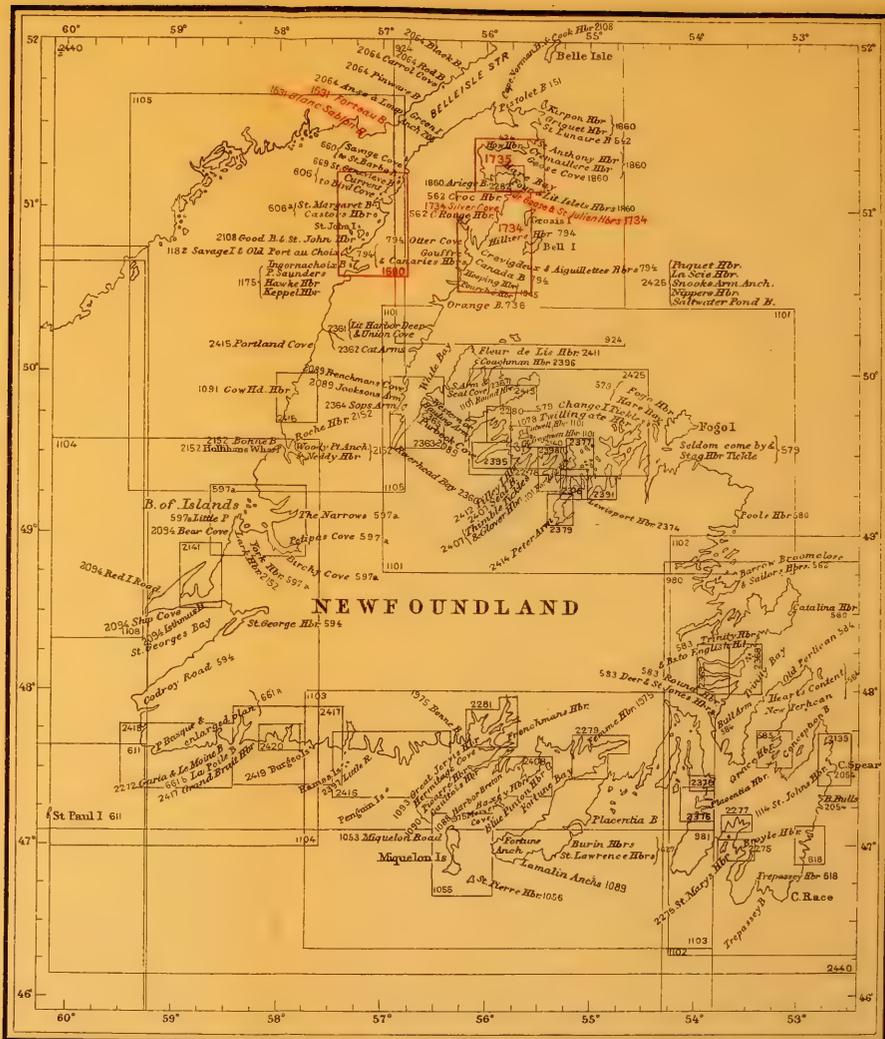
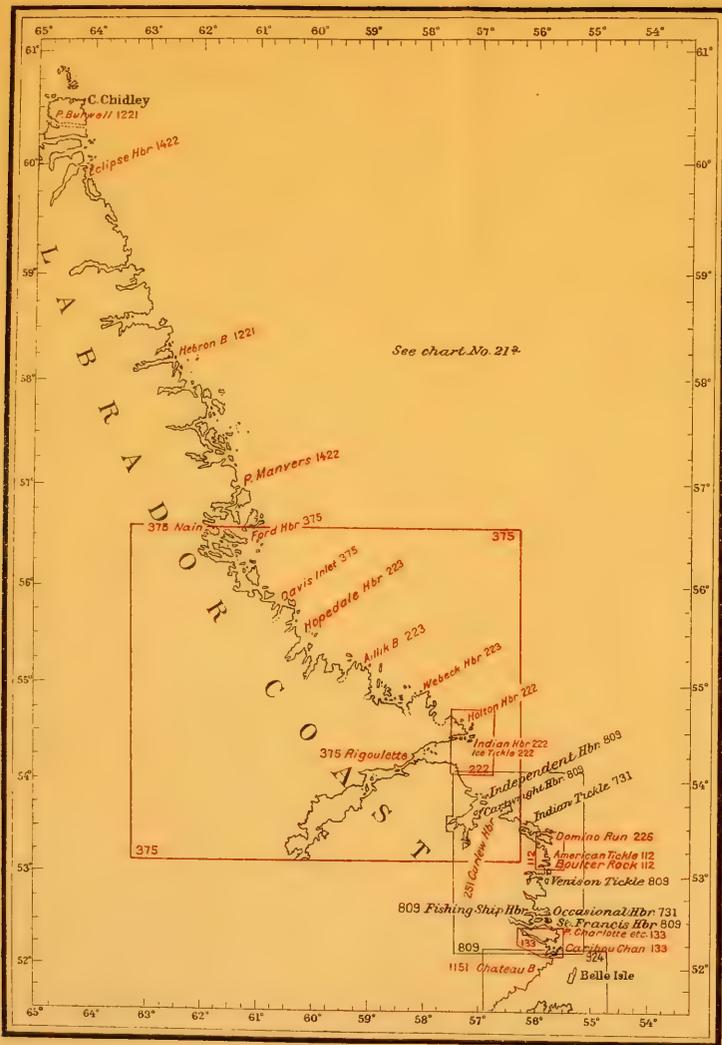
The directions of the winds refer to the points from which they blow; of the currents, the points toward which they set.

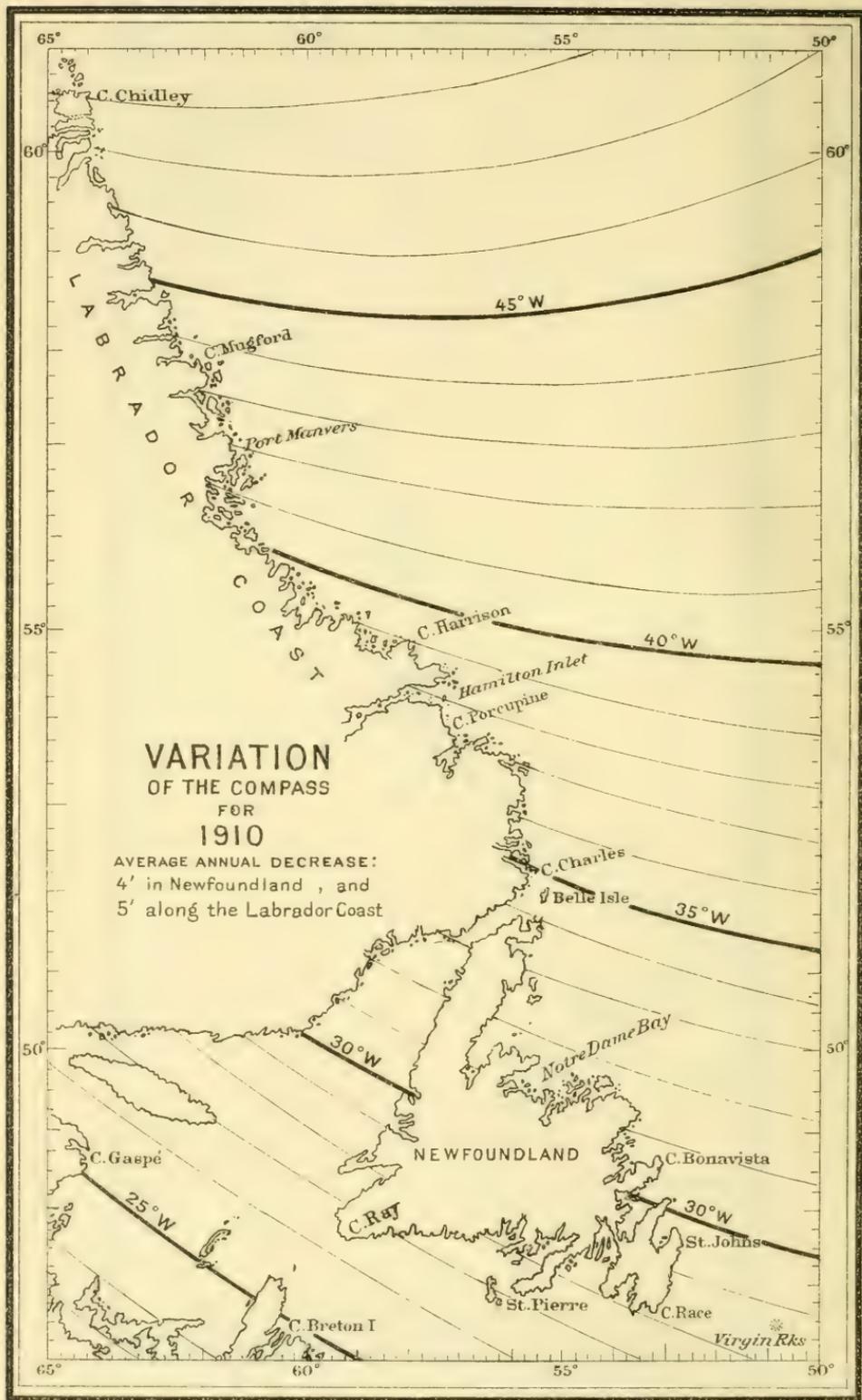
Distances are expressed in nautical miles, the mile being approximately 2,000 yards.

The soundings are referred to mean low water, unless otherwise stated.

The latest information as to lights should always be sought in the List of Lights of the World.







INFORMATION RELATING TO NAVIGATIONAL AIDS AND GENERAL NAVIGATION.

THE CORRECTION OF CHARTS, LIGHT LISTS, AND SAILING DIRECTIONS.

The following-named publications are issued by the United States Hydrographic Office as guides to navigation: Charts, Chart Catalogues, Sailing Directions, Light Lists, Tide Tables, Notices to Mariners, Pilot Charts, and Hydrographic Bulletins. Of these, the Notices to Mariners and the Hydrographic Bulletins are free to mariners and others interested in shipping. The Pilot Charts are free to contributors of professional information, but sold to the general public at 10 cents a copy. The other publications of the office are sold under the law at cost price.

The Charts, the Sailing Directions, and the Light Lists are all affected by continual changes and alterations, concerning which information is published weekly to all parts of the world in the Notices to Mariners.

The Charts should always be, so far as our knowledge permits, absolutely correct to date; and the Light Lists should be noted for the recent alterations and additions. The Sailing Directions, however, can not, from their nature, be so fully corrected, and in all cases where they differ from the charts, the charts must be taken as the guide.

Charts.—When issued from the Hydrographic Office, the charts have received all necessary corrections to date.

All small but important corrections that can be made by hand are given in the Notices to Mariners, and should at once be placed on the charts to which they refer.

Extensive corrections that can not be conveniently thus made are put upon the plates, and new copies are issued to the ships to replace the old, which are directed to be destroyed to prevent the possibility of their being used in the navigation of the ship.

The dates on which extensive corrections are made are noted on the chart on the right of the middle of the lower edge; those of the smaller corrections at the left lower corner.

In all cases of quotations of charts these dates of corrections should be given, as well as the number of the chart (found in the right lower corner), in order that the edition of the chart referred to may be known.

The Light Lists are corrected before issue, and all changes are published in the weekly Notices to Mariners.

The navigating officer should make notations in the Light Lists and paste in at the appropriate places slips from the Notices to Mariners.

The Light Lists should always be consulted as to the details of a light, as the description in the Sailing Directions may be obsolete, in consequence of changes since publication.

The Sailing Directions are corrected before issue, and subsequently should be kept corrected by means of the Notices to Mariners.

Supplements are published from time to time and contain all the information received up to date since the publication of the volume to which they refer, canceling all previous Notices to Mariners.

The existence of Supplements or Notices to Mariners is to be noted in the tabular form inside the cover of each volume.

To enable the books to be more conveniently corrected, Supplements and Notices to Mariners are printed on one side only, and two copies are issued to each ship—one to be cut and the slips pasted in at the appropriate places, the other to be retained intact for reference.

To make the notations and paste in the slips, as the Notices to Mariners are received, is one of the duties of the navigating officer demanding faithful attention.

It must, however, be understood that Sailing Directions will rarely be correct in all details, and that, as already stated, when differences exist, the chart, which should be corrected from the most recent information, should be taken as the guide, for which purpose, for ordinary navigation, it is sufficient.

The Tide Tables, which are published annually by the United States Coast and Geodetic Survey, give the predicted times and heights of the high and the low waters for every day in the year at 70 of the principal ports of the world, and, through the medium of these by means of tidal differences and ratios, at a very large number of subordinate ports. The Tables for the Atlantic and Pacific coast ports of the United States are also published separately.

It should be remembered that these tables aim to give the times of high and low water, and not the times of turning of the current or of slack water, which may be quite different.

Notice to Mariners, containing fresh information pertaining to all parts of the world, are published weekly and mailed to all United States ships in commission, Hydrographic branch offices and agen-

cies. United States consulates, and foreign hydrographic offices. Copies are furnished free by the main office or by any of the branch offices on application.

With each notice is sent also a separate sheet, giving the items relating to lights contained in the latest Notice, intended especially for use in correcting the Light Lists.

Pilot Charts of the North Atlantic and North Pacific oceans are published near the beginning of each month. These charts give the average conditions of wind and weather, barometer, percentage of fog and gales, and routes for steam and sailing vessels for the month of issue; ice and derelicts of the preceding month; ocean currents and magnetic variation for the year; storm tracks of preceding years; and much other useful information. They are furnished free only in exchange for marine data or observations.*

Hydrographic Bulletins, published weekly, are supplemental to the North Atlantic Pilot Chart and contain the latest news of wrecks and derelicts along the American coast and ocean routes, Arctic ice, reports of the use of oil to calm the sea, and other information for mariners. They are to be had free upon application.

THE USE OF CHARTS.

Accuracy of chart.—The value of a chart must manifestly depend upon the character and accuracy of the survey on which it is based, and the larger the scale of the chart the more important do these become.

To judge of a survey, its source and date, which are generally given in the title, are a good guide. Besides the changes that may have taken place since the date of the survey in waters where sand or mud prevails, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail; until a plan founded on such a survey is tested it should be regarded with caution. It may indeed be said that, except in well-frequented harbors and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of the survey, remembering, however, that the chart is not expected to show all soundings that were

* Pilot charts of the South Atlantic Ocean are to be published for each of the four seasons of the year, beginning with the quarter which comprises the months of June, July, and August, 1909. In their properties and aims and their mode of construction and issue they will be similar in all respects to the Pilot Charts of the North Atlantic and North Pacific oceans. Pilot Charts of the South Pacific and Indian oceans are also marked out for regular publication.

obtained. When the soundings are sparse or unevenly distributed it may be taken for granted that the survey was not in great detail.

Large or irregular blank spaces among soundings mean that no soundings were obtained in these spots. When the surrounding soundings are deep it may fairly be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch or pinnacle rock.

A wide berth should therefore be given to every rocky shore or patch, and instead of considering a coast to be clear, the contrary should be assumed.

Fathom curves a caution.—Except in plans of harbors that have been surveyed in detail, the 5-fathom curve on most charts may be considered as a danger line, or caution against unnecessarily approaching the shore or bank within that line on account of the possible existence of undiscovered inequalities of the bottom, which only an elaborate detailed survey could reveal. In general surveys of coasts, or of little-frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for so detailed a survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The 10-fathom curves on rock shores is another warning, especially for ships of heavy draft.

A useful danger line will be obtained by tracing out with a colored pencil or ink the line of depth next greater than the draft of the ship using the chart. For vessels drawing less than 18 feet the edge of the sanding serves as a well-marked danger line.

Charts on which no fathom curves are marked must especially be regarded with caution, as indicating that soundings were too scanty and the bottom too uneven to enable the lines to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed around, as it is doubtful how closely the spot may have been examined and whether the least depth has been found.

The chart on largest scale should always be used on account of its greater detail and the greater accuracy with which positions may be plotted on it.

Caution in using small-scale charts.—In approaching the land or dangerous banks regard must always be had to the scale of the chart used. A small error in laying down a position means only

yards on a large-scale chart, whereas on one of small scale the same amount of displacement means a large fraction of a mile.

Distortion of printed charts.—The paper on which charts are printed has to be damped. On drying distortion takes place from the inequalities of the paper, which greatly varies with different paper and the amount of the original damping, but it does not affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted on the chart, especially if the lines to objects be long. The larger the chart the greater the amount of this distortion.

Mercator's chart.—Observed bearings are not identical with those measured on the Mercator chart (excepting only the bearings North and South, and East and West on the equator) because the line of sight, except as affected by refraction, is a straight line, and lies in the plane of the great circle, while the straight line on the chart (except the meridian line) represents, not the arc of a great circle, but the loxodromic curve, which on the globe is a spiral terminating at the pole, or, if the direction be East and West, a circle of latitude.

The difference is not appreciable with near objects, and in ordinary navigation may be neglected. But in high latitudes, when the objects are very distant, and especially when lying near east or west, the bearings must be corrected for the convergence of the meridians in order to be accurately placed on the Mercator chart, which represents the meridians as parallel.

On the polyconic chart, since a straight line represents (within the limits of 15 or 20 degrees of longitude) the arc of a great circle or the shortest distance between two points, bearings on the chart are identical with observed bearings.

The Mercator projection is evidently unsuited to surveying, for which purpose the polyconic projection is used by the Hydrographic Office and the Coast and Geodetic Survey, and the gnomonic projection by the British service.

Notes on charts should always be read with care, as they may give important information that can not be graphically represented.

Buoys.—It is manifestly impossible to rely on buoys always maintaining their exact positions. Buoys should therefore be regarded as warnings, and not as infallible navigating marks, especially when in exposed places; and a ship's position should always, when possible, be checked by bearings or angles of fixed objects on shore.

Gas buoys.—The lights shown by gas buoys can not be implicitly relied on; the light may be altogether extinguished, or, if intermittent, the apparatus may get out of order.

Lights.—All the distances given in the light lists and on the charts for the visibility of lights are calculated for a height of 15

feet for the observer's eye. The effect of a greater or less height of eye can be ascertained by means of the table of distances of visibility due to the height, published in the light lists.

The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Refraction, too, may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light, the fact may be forgotten that aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the standard compass.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the ship is on the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

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 its order, as stated in the light lists, and in some cases by noting how much its visibility in clear weather falls short of the range corresponding to its height. Thus, a light standing 200 feet above the sea and recorded as visible only 10 miles in clear weather is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of sufficient power.

Fog signals.—Sound is conveyed in a very capricious way through the atmosphere. Apart from the influence of the wind large areas of silence have been found in different directions and at different distances from the origin of sound even in clear weather; therefore too much confidence should not be felt as to hearing a fog signal. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly toward the land and is not observed by the lighthouse people until upon them; a ship may have been for many hours in it and approaching the land in confidence, depending on the signal, which is not sounded. When sound travels against the wind it may be thrown upward. A man aloft might then hear it, though inaudible on deck.

Taken together, these facts should induce the utmost caution in closing the land in fogs. The lead is generally the only safe guide and should be faithfully used.

Tides.—A knowledge of the times of high and low water and of the amount of vertical rise and fall of the tide is of great importance in the case of vessels entering or leaving port, especially when the channel depths are less than or near their draft. Such knowledge is

also useful at times to vessels running close along a coast in enabling them to anticipate the effect of the tidal currents in setting them on or off shore. This is especially important in fog or thick weather.

The predicted times and heights of the high and low waters, or differences by which they may be readily obtained, are given in the tide tables for all the important ports of the world. The height at any intermediate time may be obtained by means of Table 2 for most of the principal tidal stations of the United States given in Table 1, and for the subordinate stations of Table 3 by multiplying its values by the ratio of mean ranges, provided the duration of rise and fall is sensibly the same at the subordinate as at the principal station. The intermediate height may also be obtained by plotting the predicted times and heights of high and low water and connecting the points by a curve. Such knowledge is often useful in crossing a bar or shallow flats.

Planes of reference.*—The plane of reference for soundings on Hydrographic Office charts made from United States Government surveys and on Coast and Geodetic Survey charts of the Atlantic coast of the United States is mean low water; on the Pacific coast of the United States as far as the strait of Fuca, it is the mean of the lower low waters; and from Puget sound to Alaska the Survey has adopted the harmonic or Indian tide plane, which is roughly that of the lowest low waters observed.

On most of the British Admiralty charts the plane of reference is the low water of ordinary springs; on French charts, the low water of equinoctial springs.

In the case of many charts compiled from old or various sources the plane of reference may be in doubt. In such cases, or whenever not stated on the chart, the assumption that the reference plane is mean low water gives the largest margin of safety.

Whichever plane of reference may be used for a chart, it must be remembered that there are times when the tide falls below it. Low water is lower than mean low water about half the time, and when a new or full moon occurs at perigee the low water is lower than the average low water of springs. At the equinoxes the spring range is also increased on the coasts of Europe, but in some other parts of the world, and especially in the Tropics, such periodic low tides may coincide more frequently with the solstices.

Wind or a high barometer may at times cause the water to fall below even a very low plane of reference.

* The distinction between "rise" and "range" of the tide should be understood. The former expression refers to the height attained above the datum plane for soundings, differing with the different planes of reference; the latter, to the difference of level between successive high and low waters.

On coasts where there is much diurnal inequality in the tides the amount of rise and fall can not be depended upon, and additional caution is necessary.

Mean sea level.—The important fact should be remembered that the depths at half tide are practically the same for all tides, whether neaps or springs. Half tide, therefore, corresponds with mean sea level. This makes a very exact plane of reference, easily found, to which it would be well to refer all high and low waters.

The tide tables give, in Table 3, for all the ports, the plane of reference to which tidal heights are referred and its distance below mean sea level.

If called on to take special soundings for the chart at a place where there is no tidal bench mark, mean sea level should be found and the plane for reductions established at the proper distance below it, as ascertained by the tide tables, or by observations, or in some cases, if the time be short, by estimation, the data used being made a part of the record.

Tidal streams.—In navigating coasts where the tidal range is considerable especial caution is necessary. It should be remembered that there are indrafts to all bays and bights, although the general run of the stream may be parallel with the shore.

The turn of the tidal stream off-shore is seldom coincident with the time of high and low water on the shore. In some channels the tidal stream may overrun the turn of the vertical movement of the tide by 3 hours, forming what is usually known as tide and half tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

The effect of the tidal wave in causing currents may be illustrated by two simple cases:

(1) Where there is a small tidal basin connected with the sea by a large opening.

(2) Where there is a large tidal basin connected with the sea by a small opening.

In the first case the velocity of the current in the opening will have its maximum value when the height of the tide within is changing most rapidly, i. e., at a time about midway between high and low water. The water in the basin keeps at approximately the same level as the water outside. The flood stream corresponds with the rising, and the ebb with the falling of the tide.

In the second case the velocity of the current in the opening will have its maximum value when it is high water or low water without, for then there is the greatest head of water for producing motion. The flood stream begins about three hours after low water, and the ebb stream about three hours after high water, slack water thus occurring about midway between the tides.

Along most shores not much affected by bays, tidal rivers, etc., the current usually turns soon after high water and low water.

The swiftest current in straight portions of tidal rivers is usually in the middle of the stream, but in curved portions the most rapid current is toward the outer edge of the curve, and here the water will be deepest. The pilot rule for best water is to follow the ebb tide reaches.

Countercurrents and eddies may occur near the shores of straits, especially in bights and near points. A knowledge of them is useful in order that they may be taken advantage of or avoided.

A swift current often occurs in a narrow passage connecting two large bodies of water, owing to their considerable difference of level at the same instant. The several passages between Vineyard sound and Buzzards bay are cases in point. In the Woods Hole passage the maximum strength of the tidal streams occurs near high and low water.

Tide rips are made by a rapid current setting over an irregular bottom, as at the edges of banks where the change of depth is considerable.

Current arrows on charts show only the most usual or the mean direction of a tidal stream or current; it must not be assumed that the direction of a stream will not vary from that indicated by the arrow. The rate, also, of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

FIXING POSITION.

Sextant method.—The most accurate method available to the navigator of fixing a position relative to the shore is by plotting with a protractor sextant angles between well-defined objects on the chart; this method, based on the “three-point problem” of geometry, should be in general use.

For its successful employment it is necessary: First, that the objects be well chosen; and, second, that the observer be skillful and rapid in his use of the sextant. The latter is only a matter of practice.

Near objects should be used either for bearings or angles for position in preference to distant ones, although the latter may be more prominent, as a small error in the bearing or angle or in laying it on the chart has a greater effect in misplacing the position the longer the line to be drawn.

On the other hand, distant objects should be used for direction because less affected by a small error or change of position.

The three-arm protractor (station pointer of the British service) consists of a graduated brass circle with one fixed and two movable radial arms, the three beveled edges of the arms, if produced, intersecting at the exact center of the instrument. The edge of the fixed arm marks the zero of the graduation which enables the movable arms to be set at any angles with the fixed arm.

To plot a position, the two angles observed between the three selected objects are set on the instrument, which is then moved over the chart until the three beveled edges pass respectively and simultaneously through the three objects. The center of the instrument will then mark the ship's position, which may be pricked on the chart or marked with a pencil point through the center hole.

The tracing-paper protractor, consisting of a graduated circle printed on tracing paper, is an excellent substitute for the brass instrument and in some cases preferable to it, as when, for instance, the objects angled on are so near the observer that they are more or less hidden by the circle of the instrument. The paper protractor also permits the laying down for simultaneous trial of a number of angles in cases of fixing important positions. Plain tracing paper may also be used if there are any suitable means of laying off the angles.

The value of a determination depends greatly on the relative positions of the objects observed. If the position sought lies on the circle passing through the three objects (in which case the sum of the observed angles equals the supplement of the angle at the middle object made by lines from the other two) it will be indeterminate, as it will plot all around the circle. An approach to this condition must be avoided. Near objects are better than distant ones, and, in general, up to 90° the larger the angles the better, remembering always that large as well as small angles may plot on or near the circle and hence be worthless. If the objects are well situated, even very small angles will give for navigating purposes a fair position, when that obtained by bearings of the same objects would be of little value.

Accuracy requires that the two angles be simultaneous. If under way and there is but one observer, the angle that changes less rapidly may be observed both before and after the other angle and the proper value obtained by interpolation.

A single angle and a range give in general an excellent fix, easily obtained and plotted.

Advantages of sextant method.—In war time, when the compass may be knocked away or rifle fire make it undesirable to expose the person more than necessary, a sextant offers great advantages, as angles can be obtained at any point where the objects are visible. This contingency makes it especially desirable that all navigating

officers of men-of-war should become expert in this method of fixing a ship's position.

In many narrow waters, also, where the objects may yet be at some distance, as in coral harbors or narrow passages among mud banks, navigation by sextant and protractor is invaluable, as a true position can in general be obtained only by its means. Positions by bearings are too rough to depend upon, and a small error in either taking or plotting a bearing might under such circumstances put the ship ashore.

In all cases where great accuracy of position is desired, such as the fixing of a rock or shoal or of fresh soundings or new buildings as additions to the chart, the sextant should invariably be used. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. If a round of angles can be taken, the observer's accuracy is also checked. In the case of ordinary soundings a third angle need be taken only occasionally; first, to check the general accuracy of the chart, as above stated; second, to make certain that the more important soundings, as at the end of a line, are correctly placed.

If communication can be had with the shore, positions may be fixed with great accuracy by occupying with theodolite or sextant two known points of the chart. The third angle of the triangle, that between the two points at the position sought, should be measured as a check.

The compass.—It is not intended that the use of the compass to fix the ship should be given up; in ordinary piloting the compass, with its companion, the alidade, may be more usefully employed for this purpose, although less accurate than the sextant.

If the accuracy of the chart be doubtful, the compass should be used in preference to the sextant.

In fixing by the compass it should always be remembered that the position by two bearings only, like that by two angles only, is liable to error. An error may be made in taking a bearing, or in applying to it the deviation, or in laying it on the chart. A third or check bearing should, therefore, be taken of some other object, especially when near the shore or dangers. A common intersection for the three lines assures accuracy.

Compass bearing and sextant angle.—When only two objects are visible, a compass bearing and a sextant angle may be used, and a better fix obtained than by two bearings.

Doubling the angle on the bow.—The method of fixing by doubling the angle on the bow is invaluable. The ordinary form of

it, the so-called "bow and beam bearing," the distance from the object at the latter position being the distance run between the times of taking the two bearings, gives the maximum of accuracy, and is an excellent fix for a departure, but does not insure safety, as the object observed and any dangers off it are abeam before the position is obtained.

By taking the bearings at two points and four points on the bow, a fair position is obtained before the object is passed, the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current. Taking afterwards the beam bearing gives, with slight additional trouble, the distance of the object when abeam: such beam bearings and distances, with the times, should be continuously recorded as fresh departures, the importance of which will be appreciated in cases of being suddenly shut in by fog.

A table of multipliers of the distance run in the interval between any two bearings of an object, the product being its distance at the time of the second bearing, is given in the light list and in Bowditch.

Danger angle.—The utility of the danger angle in passing outlying rocks or dangers should not be forgotten. In employing the horizontal danger angle, however, caution is necessary, as, should the chart be inaccurate, i. e., should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not, therefore, be employed when the survey is old or manifestly imperfect.

The vertical danger angle may be conveniently used when passing elevated points of known heights, such as lighthouses, cliffs, etc. The computation of the distance corresponding to the height of the object and its angular elevation requires for small distances merely the solution of a plane right triangle; the natural cotangent of the angle multiplied by the height in feet gives the distance in feet. The convenient use of this method, however, requires tables such as those published by Captain Lecky in his little book entitled "The Danger Angle and Offshore Distance Tables."

This book very usefully extends the vertical angle method to finding a ship's position at sea by observing the angular altitude of a peak of known height and its bearing. The tables give heights up to 18,000 feet and distances up to 110 miles. When the angles are not too large they should be observed "on and off the limb" and the index error of the sextant thus eliminated, in preference to correcting the single altitude for it. It must be remembered that in high latitudes the bearing of a distant object needs correction for the convergence of the meridians before being laid down on a mercator chart. The correction may be found by the following formula,

using the approximate position: The sine of the correction equals the product of the sine of half the difference of longitude by the sine of the middle latitude. It is applied on the equatorial side of the observed bearing, and its effect is always to increase the latitude of the observer.

Soundings taken at random are of little value in fixing or checking position, and may at times be misleading. In thick weather, when near or closing the land, soundings should be taken continuously and at regular intervals, and, with the character of the bottom, systematically recorded. By laying the soundings on tracing paper, according to the scale of the chart, along a line representing the track of the ship, and then moving the paper over the chart parallel with the course until the observed soundings agree with those of the chart, the ship's position will in general be quite well determined. This plan was suggested by Lord Kelvin, whose admirable sounding machine renders the operation of sounding possible in quite deep water without slowing down the ship and consequent loss of time.

Dumb compass.—All ships should be supplied with the means of taking accurate bearings both by day and by night. The standard compass is not always conveniently placed for the purpose; in such case some species of alidade or dumb compass is of great importance. The utility of such an instrument in ascertaining the change of bearing of an approaching ship's light should not be forgotten.

Sumner's method.—Among astronomical methods of fixing a ship's position the great utility of Sumner's method should be well understood, and this method should be in constant use. The Sumner line—that is, the line drawn through the two positions obtained by working the chronometer observation for longitude with two assumed latitudes, or by drawing through the position obtained with one latitude a line at right angles to the bearing of the body as obtained from the azimuth tables—gives at times invaluable information, as the ship must be somewhere on that line provided the chronometer is correct. If directed toward the coast, it marks the bearing of a definite point; if parallel with the coast the distance of the latter is shown. Thus the direction of the line may often be usefully taken as a course. A sounding at the same time with the observation may often give an approximate position on the line. A very accurate position can be obtained by observing two or more stars at morning or evening twilight, at which time the horizon is well defined. The Sumner lines thus obtained will, if the bearings of the stars differ three points or more, give an excellent result. A star or planet at twilight and the sun afterwards or before may be combined; also two observations of the sun with sufficient interval to admit of a considerable change of bearing. In these cases one of the lines must be moved for the run

of the ship. The moon is often visible during the day and in combination with the sun gives an excellent fix.

The morning and evening twilight observations, besides their great accuracy, possess the additional advantage of greatly extending the ship's reliable reckoning beyond the limits of the ordinary day navigation and correspondingly restricting the dead-reckoning uncertainties of the night. An early morning fix in particular is often of great value.

Observations of the stars at night require the use of the star telescope in order to define the horizon. Though the same degree of accuracy as at twilight can not be expected, night observations are a very valuable dependence and should be assiduously practiced.

Piloting.—The navigator, in making his plan for entering a strange port, should give very careful previous study to the chart and should carefully select what appear to be the most suitable marks for use, also providing himself with substitutes, to use in case those selected as most suitable should prove unreliable in not being recognized with absolute certainty. It must be remembered that buoys seen at a distance in approaching a channel are often difficult to place or identify, because all may appear equally distant, though in reality far apart. Ranges should be noted, if possible, and the lines drawn, both for leading through the best water in channels and also for guarding against particular dangers; for the latter purpose safety bearings should in all cases be laid down where no suitable ranges appear to offer. The courses to be steered in entering should also be laid down and distances marked thereon. If intending to use the sextant and danger angle in passing dangers, and especially in passing between dangers, the danger circles should be plotted and regular courses planned, rather than to run haphazard by the indications of the angle alone, with the possible trouble to be apprehended from wild steering at critical points.

The alidade or dumb compass should invariably be mounted in entering or leaving port and kept faithfully set to the magnetic direction of the ship's head, changing promptly with every change of course, so that the observed bearings may be magnetic, and therefore ready for the chart without the necessity of waiting to apply corrections. The chart should be on the bridge in readiness for reference or use in plotting positions.

The ship's position should not be allowed to be in doubt at any time, even in entering ports considered safe and easy of access, and should be constantly checked, continuing to use for this purpose those marks concerning which there can be no doubt until others gradually and unmistakably declare themselves.

The ship should ordinarily steer exact courses and follow an exact line, as planned from the chart, changing course at precise points,

and, where the distances are considerable, her position on the line should be checked at frequent intervals, with recordings of time and patent log. This is desirable even where it may seem unnecessary for safety, because if running by the eye alone and the ship's exact position be suddenly required, as in a sudden fog or squall, fixing at that particular moment may be attended with difficulty.

The habit of running exact courses with precise changes of course will be found most useful when it is desired to enter port or pass through inclosed waters during fog by means of the buoys; here safety demands that the buoys be made successively, to do which requires, if the fog be dense, very accurate courses and careful attention to the times, the patent log, and the set of the current; failure to make a buoy as expected leaves as a rule no safe alternative but to anchor at once, with perhaps a consequent serious loss of time.

It is a useful point to remember that in passing between dangers where there are no suitable leading marks, as, for instance, between two islands or an island and the main shore, with dangers extending from both, a mid-channel course may be steered by the eye alone with great accuracy, as the eye is able to estimate very closely the direction midway between visible objects.

In piloting among coral reefs or banks, a time should be chosen when the sun will be astern, conning the vessel from aloft or from an elevated position forward. The line of demarcation between the deep water and the edges of the shoals, which generally show as green patches, is indicated with surprising clearness. This method is of frequent application in the numerous passages of the Florida keys.

Changes of course should in general be made by exact amounts, naming the new course or the amount of the change desired, rather than by ordering the helm to be put over and then steadying when on the desired heading, with the possibility of the attention being diverted and so of forgetting in the meantime, as may happen, that the ship is still swinging. The helmsman, knowing just what is desired and the amount of the change to be made, is thus enabled to act more intelligently and to avoid wild steering, which in narrow channels is a very positive source of danger.

Coast piloting involves the same principles and requires that the ship's position be continuously determined or checked as the landmarks are passed. On well-surveyed coasts there is a great advantage in keeping near the land, thus holding on to the marks and the soundings, and thereby knowing at all times the position, rather than keeping offshore and losing the marks, with the necessity of again making the land from vague positions, and perhaps the added inconvenience of fog or bad weather, involving a serious loss of time and fuel.

The route should be planned for normal conditions of weather, with suitable variations where necessary in case of fog or bad weather or making points at night, the courses and distances, in case of regular runs over the same route, being entered in a notebook for ready reference, as well as laid down on the chart. The danger circles for either the horizontal or the vertical danger angles should be plotted, wherever the method can be usefully employed, and the angles marked thereon; many a mile may thus be saved in rounding dangerous points, with no sacrifice in safety. Ranges should also be marked in, where useful for position or for safety, and also to use in checking the deviation of the compass by comparing, in crossing, the compass bearing of the range with its magnetic bearing, as given by the chart.

Changes of course will in general be made with mark or object abeam, the position (a new "departure") being then, as a rule, best and most easily obtained. The alidade, kept set to the ship's magnetic heading, should be at all times in readiness for use, and the chart where it may be readily consulted by the officer of the watch. The sextant should also be kept conveniently at hand.

A continuous record of the progress of the ship should be kept by the officer of the watch, the time and patent log reading of all changes of course and of all bearings, especially the two and four point bearings, with distance of object when abeam, being noted in a book kept in the pilot house for this especial purpose. The ship's reckoning is thus continuously cared for as a matter of routine and without the presence or particular order of the captain or navigating officer. The value of thus keeping the reckoning always fresh and exact will be especially appreciated in cases of sudden fog or when making points at night.

Where the coastwise trip must be made against a strong head wind, it is desirable, with trustworthy charts, to skirt the shore as closely as possible in order to avoid the heavier seas and adverse current that prevail farther out. In some cases, with small ships, a passage can be made only in this way. The important saving of coal and of time, which is even more precious, thus effected by skillful coast piloting makes this subject one of prime importance to the navigator.

Change in the variation of the compass.—The gradual change in the variation must not be forgotten in laying down on the chart courses and positions by bearings. The magnetic compasses placed on the charts for the purpose of facilitating the plotting become in time slightly in error, and in some cases, such as with small scales or when the lines are long, the displacement of position from neglect of this change may be of importance. The date of the variation and

the annual change, as given on the compass rose, facilitate corrections when the change has been considerable. The compasses are reengraved when the error amounts to a degree. More frequent alterations on one spot in a copper plate would not be practicable.

The geographical change in the variation is in some parts of the world so rapid as to need careful consideration, requiring a frequent change of the course. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles.

Local magnetic disturbance of the compass on board ship.—The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship. Observation shows that disturbance of the compass in a ship afloat is experienced in only a few places on the globe.

Magnetic laws do not permit of the supposition that the visible land causes such disturbance, because the effect of a magnetic force diminishes so rapidly with distance that it would require a local center of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow and the force strong, the compass may be temporarily deflected when passing over such a spot; but the area of disturbance will be small unless there are many centers near together.

The law which has hitherto been found to hold good as regards local magnetic disturbance is that north of the magnetic equator the north end of the compass needle is attracted and south of the magnetic equator repelled by any center of disturbance.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance the position should be fixed, and the facts, as far as they can be ascertained, reported.

Use of oil for modifying the effect of breaking waves.—Many experiences of late years have shown that the utility of oil for this purpose is undoubted and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil skillfully applied may prevent much damage both to ships (especially of the smaller classes) and to boats by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:

1. On free waves, i. e., waves in deep water, the effect is greatest.
2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances, but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, either when running, or lying-to, or in wearing.

6. No experiences are related of its use when hoisting a boat at sea or in a seaway, but it is highly probable that much time would be saved and injury to the boat avoided by its use on such occasions.

7. In cold water the oil, being thickened by the lower temperature and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. For a ship at sea the best method of application appears to be to hang over the side, in such a manner as to be in the water, small canvas bags, capable of holding from 1 to 2 gallons of oil, the bags being pricked with a sail needle to facilitate leakage of the oil.

The positions of these bags should vary with the circumstances. Running before the wind, they should be hung on either bow—e. g., from the cathead—and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying-to, the weather bow, and another position farther aft, seem the best places from which to hang the bags, using sufficient line to permit them to draw to windward while the ship drifts.

9. Crossing a bar with a flood tide, to pour oil overboard and allow it to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect can not be so much trusted.

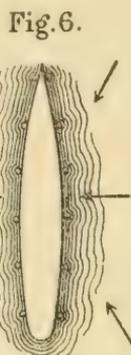
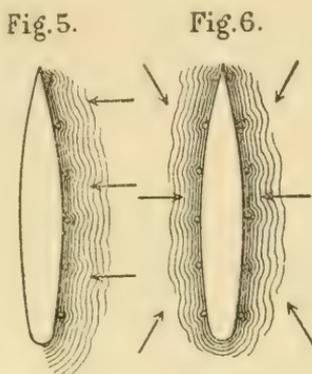
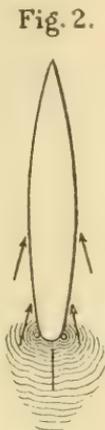
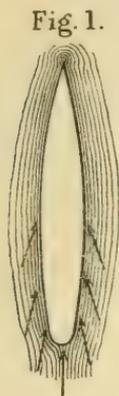
On a bar, with the ebb tide running, it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil can be diffused well ahead of the boat and the bag readily hauled on board for refilling, if necessary.

ILLUSTRATIONS AND BRIEF RULES.

[In the illustrative figures, the flowing lines represent the spreading oil and the arrows denote the direction of the wind and sea.]

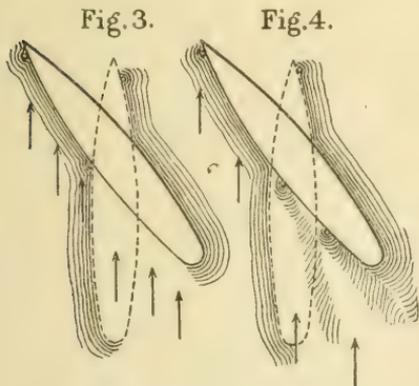


Scudding before a gale, Figure 1, distribute oil from the bow by means of oil bags or through waste pipes; it will thus spread aft and give protection both from quartering and following seas.

If distributed only astern, Figure 2, there will be no protection from the quartering sea.

Lying-to, Figure 5, a vessel can be brought closer to the wind by using one or two oil bags forward, to windward. With a high beam sea, use oil bags along the weather side at intervals of 40 or 50 feet.

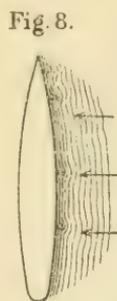
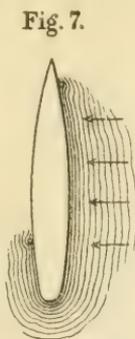
In a heavy cross sea, Figure 6, as in the center of a hurricane, or after the center has passed, oil bags should be hung out at regular intervals along both sides.



Running before a gale, yawing badly, and threatening to broach-to, Figures 3 and 4, oil should be distributed from the bow and abaft the beam, on both sides.

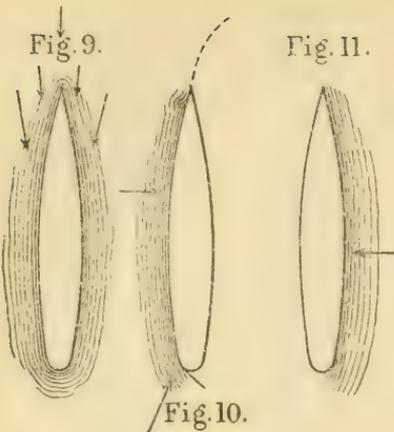
In Figure 3, for instance, where it is only distributed at the bow, the weather quarter is left unprotected when the ship yaws.

In Figure 4, however, with oil bags abaft the beam as well as forward, the quarter is protected.



Drifting in the trough of a heavy sea, Figures 7 and 8, use oil from waste pipes forward and bags on weather side, as in Figure 8.

These answer the purpose very much better than one bag at weather bow and one at lee quarter, although this has been tried with some success. See Figure 7.

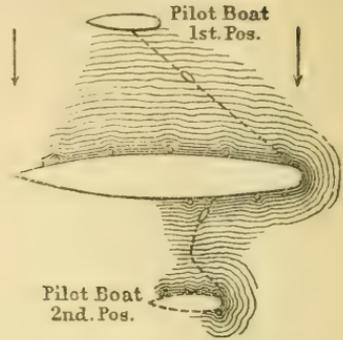


Steaming into a heavy head sea, Figure 9, use oil through forward closet pipes. Oil bags would be tossed back on deck.

Lying-to, to tack or wear, Figure 10, use oil from weather bow.

Cracking on, with high wind abeam and heavy sea, Figure 11, use oil from waste pipes, weather bow.

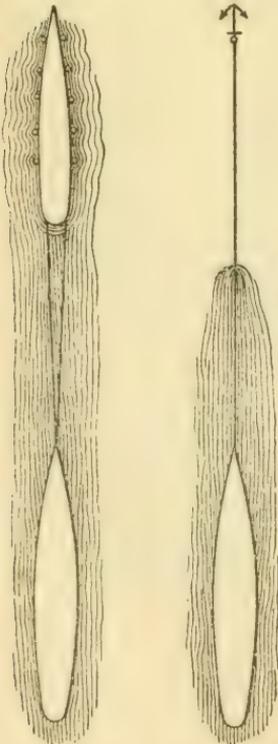
Fig. 12.



A vessel hove-to for a pilot, Figure 12, should distribute oil from the weather side and lee quarter. The pilot boat runs up to windward and lowers a boat, which pulls down to leeward and around the vessel's stern. The pilot boat runs down to leeward, gets out oil bags to windward and on her lee quarter, and the boat pulls back around her stern, protected by the oil. The vessels drift to leeward and leave an oil slick to windward, between the two.

Fig. 13.

Fig. 14.



Towing a vessel in a heavy sea, oil is of the greatest service and may prevent parting the hawser. Distribute from the towing vessel, forward on both sides, Figure 13. If used only aft, the tow alone gets the benefit.

At anchor in an open roadstead, use oil in bags from jib boom, or haul them out ahead of the vessel by means of an endless rope rove through a tail block secured to the anchor chain, Figure 14.

CHAPTER I.

NEWFOUNDLAND AND LABRADOR; GENERAL DESCRIPTION, PHYSICAL FEATURES, GEOLOGY, MINES, AGRICULTURE, FISHERIES, EXPORTS—COMMUNICATIONS—CLIMATE—WINDS—FOG—CURRENTS—TIDES—TIDAL STREAMS—TEMPERATURE OF THE SEA—ICE—SIGNALS RESPECTING ICE—BUOYS—SIGNAL STATIONS—COAL—DOCKS—REPAIRS—SHIPWRECKS—STANDARD TIME—PASAGES AND GENERAL DIRECTIONS—MAGNETIC VARIATION—DEVIATION OF THE COMPASS—LOCAL MAGNETIC DISTURBANCES.

Newfoundland is an island of the British Empire situated at the mouth of the gulf of St. Lawrence, between the parallels of $46^{\circ} 35'$ and $51^{\circ} 40'$ north latitude, and the meridians of $52^{\circ} 35'$ and $59^{\circ} 25'$ west longitude. In the colony is included the eastern part of the peninsula of Labrador from Blanc Sablon to cape Chidley.

History.—The island of Newfoundland, said to have been known to the Norsemen at a very early date, was inhabited by a numerous and powerful Indian race named Beothiks, now extinct; but the first authentic account of its discovery was in 1497, when John Cabot, who was seeking a northwestern route to China and the Spice islands, sighted the land (probably about cape Bonavista). As early as 1500 it was frequented by Portuguese, Spanish, and French fishermen; but no serious attempt at colonization appears to have been made until the 5th of August, 1583, when Sir Humphrey Gilbert took possession of the island in the name of Queen Elizabeth.

After 1623, when Lord Baltimore, who a few years later left to establish Baltimore, founded a colony in the island, the east coast was gradually settled by the English; French settlers occupying the southern coasts and making Placentia their capital. By the treaty of Utrecht in 1713, subsequently ratified by the treaty of Paris, Newfoundland was acknowledged to belong to Great Britain, and the French retained only the small islands of St. Pierre and Miquelon, with the right to cure fish on that portion of the Newfoundland coast extending from cape Ray, along the west, north, and east coasts, to cape St. John. By the Anglo-French convention of 1904, France renounced her exclusive fishing rights, but retained

the right to fish on the coast from cape Ray, round the northern end of the island, to cape St. John for all sorts of fish, including bait and crustacea.

Under the provisions of the treaty of 1818, the inhabitants of the United States have, in common with British subjects, the liberty to take fish of every kind on that part of the southern coast of Newfoundland which extends from cape Ray to Ramea islands, on the western and northern coast of Newfoundland, from cape Ray to Kirpon islands, on the shores of the Magdalen islands, and also on the coasts, bays, harbors, and creeks from Mount Joli, on the southern coast of Quebec, to and through the strait of Belleisle and thence northward indefinitely along the coast, without prejudice, however, to any of the exclusive rights of the Hudson Bay Company. United States fishermen have also the right to dry and cure fish in any of the unsettled bays, harbors, and creeks of the southern part of Newfoundland, above described, and of the coast of Labrador.

Physical features.—Newfoundland is somewhat of a triangular form (the apex being at cape Bauld, the base between capes Race and Ray). and has an estimated area of 42,200 square miles, with a greatest length of 420 miles. Its coasts are indented with deep bays and harbors, many of which are very fine and nearly all of which afford shelter to vessels during summer. The surface of the island is wild and rugged, and the coast, being steep, sterile, rocky, and often denuded of vegetation, or covered only with small trees, has an aspect far from prepossessing. The land near the sea is generally hilly, the ranges having a northeast and southwest trend; this is also the case in the bays, rivers, valleys, and larger lakes, and is probably due to glacial action. The interior proper is an elevated undulating plateau, traversed by ranges of low hills, the surface being diversified by valleys, woods, marshes, and large lakes, locally known as ponds, which completely intersect the country from bay of Exploits, Hall and White bays, on the northeastern, to St. George bay, on the western, and Despair bay on the southern side. Some excellent timber, of large size, is found on the west coast and on some few other parts of the island; but as a rule it is only at the heads of bays and in sheltered places that trees attain sufficient size to make spars for even small vessels, and a mast for a large schooner can generally be obtained only at a long distance from the sea.

Inland of the coast ranges of hills the country generally seems to consist of as much water as land, so numerous are the ponds. From the e. streamlets run down every ravine, and through the larger valleys run rivulets in which trout can generally be obtained.

Lakes.—The lakes or ponds form a remarkable physical feature of the island, and occupy about one third of its area. The principal lakes are Grand pond, the largest, which is 56 miles long, 5 miles

broad, about 60 fathoms deep, with an area of some 192 square miles, and only 50 feet above sea level; Indian lake, which is 37 miles long, with an area of 64 square miles; Gander lake, which is 33 miles long, with an area of 33 square miles; and Deer pond, which is 15 miles long, with an area of 34 square miles.

Rivers.—The rivers of Newfoundland are numerous, and though the majority are small, yet some attain considerable size. The largest are Exploits, Humber, Gander, and Terra Nova. Exploits river, which rises near the southern end of Long range, is 200 miles in length, drains an area of 3,000 to 4,000 square miles, and falls into Exploits bay on the east coast. The main branch of the Humber river rises 20 miles inland from Bonne bay, is about 130 miles in length, drains about 2,000 square miles, and falls into Humber arm on the west coast. Gander river, 100 miles in length, flows through Gander lake, and with its tributaries drains an area of nearly 4,000 square miles; it falls into Hamilton sound.

Geology.—All the great ancient rock systems, between the Lower Laurentian and the coal measures inclusively, are more or less represented at some part of Newfoundland. The principal mountain ranges appear to be Lower Laurentian coming to the surface through more recent deposits, most of which are nearly parallel to each other in a general north-northeast and south-southwest direction. The same formation also prevails on the western part of the south coast. The coal measures occupy a large extent of the valley within St. George bay, the region of Grand pond. In the peninsula of Avalon, the crystalline rocks of the Laurentian period are succeeded by slates and conglomerates that stretch also into Bonavista bay. Veins of white quartz are everywhere abundant in this system, and are often impregnated with ores of copper, lead, or iron, and sometimes with all together.

On the east coast, hummocks of granite protrude and are locally known as "tolts;" and this coast is marked by large and deep striae, radiating apparently from some point in the interior. Erratic boulders cover nearly all the principal headlands, and are distributed in great numbers about the coast ranges of hills.

Fauna.—The animals indigenous to Newfoundland are caribou or American reindeer, wolves, black bears, foxes, beavers, otters, Arctic hares, weasels, etc. Amongst the birds are eagles, hawks, owls, woodpeckers, swallows, and ptarmigan, which are abundant. The great auk, now extinct, was once found in large numbers around the island. The little auk, guillemot, and razor bill are still abundant.

For willow grouse, locally named partridge, and other varieties of grouse and eggs of same, close time begins January 12 and ends September 15; birds, however, may be sold up to January 22, provided they are shot in season. For curlew, plover, snipe, or other

wild or migratory birds, or eggs of same, close time is from January 12 to August 20. Wild geese may be shot or their eggs taken at any time.

The close time for caribou is from February 15 to September 15; for otter and beaver from April 1 to October 1; for rabbits and hares from March 1 to September 15; for salmon from September 11 to April 30. Trout, landlocked salmon, and other fresh-water fish are not to be taken in any lake, river, or stream from September 15 to December 31.

License is required by nonresidents to shoot deer (fee \$100), and only five stags and three does can be killed by each sportsman.

Licenses are granted by justices of the peace and custom-house officers.

The best time for shooting caribou is from the middle of September to the end of October.

Minerals.—Copper is largely worked at Tilt and Betts coves and Little bay, in Notre Dame bay, and lead at la Manche in Placentia bay. Deposits of lead ore and asbestos fields, in the peninsula of Port au Port are now being worked. Iron pyrites are shipped from a mine on Pilley island, Notre Dame bay. Large quantities of hematite iron ore are exported from Bell island, Conception bay. The carboniferous district of Newfoundland is on the west coast, near St. George bay and Grand lake. Gypsum and marbles of various shades of color are found in considerable quantities at Codroy, St. George bay, and Bay of Islands. At Random and near Thorburn lake are two large granite quarries.

Agriculture is pursued with fair success on the west coast, where grass and cereals of the first quality are produced. Potatoes of fine quality are also grown. A large tract of fertile soil lies near Gander bay, as well as in Exploits valley and Red Indian lake district on the east coast, and there is good land in the vicinity of Goose bay and Clode sound at the head of Bonavista bay. It is estimated that in the whole island about 7,000 square miles, or 4,480,000 acres, are available for settlement either as arable or grazing land.

Population.—The vicinity of the coast of Newfoundland is the only portion of the island yet inhabited, and there are but few settlers on the western side of the island, two-thirds of the population being found on the peninsula of Avalon. The census taken in 1901 showed a population of 220,984, including 3,947 who inhabit the dependency of Labrador. Of the population in Newfoundland in 1901, 98,000 were engaged in the fisheries, 2,475 were farmers, 3,111 mechanics, and 1,576 miners. The population of the chief towns were: St. John's, 29,594; Harbor Grace, 5,184; Carbonear, 5,703; Twillingate (Toulinguet), 3,542; and Bonavista, 3,696.

Orthography.—Many of the place names in Newfoundland were originally French, but, owing to the pronunciation of the fishermen, they have become so corrupted as to be difficult of recognition as such. For instance, anse à Loup is known to the fishermen as “Lancy Loo;” anse Éclair as “Lancy Clair,” and Peignoir as “Pinware.”

Fisheries.—The cod fisheries of Newfoundland are more valuable than those of any other country, and the fishing grounds would appear capable of yielding an almost inexhaustible supply, but of late years, owing to reckless and destructive fishing and the introduction of engines of such a character as to destroy gravid and even immature fish, there has been a perceptible decline in the yearly catch. The comparatively modern implements used are cod traps, large seine nets, small mesh nets, bultows, or long lines, and jiggers. The fishermen have been informed of the destructive nature of many of their appliances, and rules have been drawn up for their guidance.

Cod appear off the coasts of Newfoundland in April, and the fishing season lasts until October, when these fish take their departure. It is not known where they go from October until April, but they have reappeared with the utmost regularity for some four hundred years and more. Probably their movements have something to do with the productiveness or scarcity of food.

There are three distinct branches of the cod fishery, viz, the Bank fishery, the Coast fishery, and the Labrador fishery. The Bank fishery is carried on by schooners sailing from the southern ports and bays of Newfoundland, and by schooners sailing from ports in the United States, chiefly from Gloucester, and from France. The Coast fishery is carried on by small schooners and boats, plying from virtually every bay, cove, or creek in Newfoundland, the men using both hook and line and also cod traps. The Labrador fishery is carried on by schooners sailing from the bays in the eastern coast of Newfoundland.

All schooners, not coasters, do the actual fishing from dories, using bultows.

NOTE.—Bultows are locally called trawls, but they have no resemblance to what are known as trawls in the North sea; they are more like what is known in England as trots.

The number of Newfoundland craft and men employed in the different branches is roughly as follows:

In the Bank fishery, 89 schooners or grand bankers, carrying from 16 to 20 men each. (There are also about 100 French bankers and a great many United States and Canadian schooners engaged in this branch.)

In the Coast fishery, 500 schooners or small bankers, carrying 7 men each, and about 25,000 boats of various sizes and descriptions, carrying from 1 to 5 men each.

In the Labrador fishery, 2,000 small schooners, carrying from 7 to 9 men each, as well as women and girls for packing. (There are a few United States schooners engaged in this branch.)

Thus there are about 98,000 seafaring people in Newfoundland engaged in the cod fishery; and there must also be about 100,000 men and women employed in drying, curing, packing, etc., which makes a total of some 198,000 people, whose living depends upon the cod, out of a population of about 220,000.

The principal countries to which cod are exported are the United Kingdom, Portugal, the United States, Brazil, Canada, Italy, Spain, British West Indies, and Holland.

In 1907 the value of the export of dried codfish from Newfoundland amounted to \$7,873,172, and that of cod oil to \$358,713.

Bait fishes.—Although the cod fishery is the mainstay of Newfoundland, the bait fishes—the spring herring, the caplin, the squid, and even the whelk—without which it could not be carried on, are of primary importance.

The spring herring appear on the west coast, near and in bay St. George, about the time of the full moon nearest the 10th of May. The autumn herring appear in October in the bay of Islands, and apparently remain in that neighborhood until the following June. They reach Fortune bay, on the south coast, in December. Caplin arrive toward the middle of June and stay only a month. Some authorities say that they arrive when the moon is at its full. Squid arrive late in July or early in August and take the place of caplin as bait. The whelk (periwinkle) is the last of the bait fishes.

Cod are caught also without bait by means of cod traps, and by jigging. Cod traps, which were introduced some twenty-five years ago, are set along the coasts under certain regulations and are considered to be a successful method of taking fish, but jigging is resorted to only when there is no bait.

In 1906 a French steam trawler obtained the first great success that has rewarded efforts in this method of fishing off the coast of Newfoundland by catching 3,000 quintals (cwt.) of fish on the banks. Since then several steam trawlers have entered the industry.

Seal fishery.—The seal fishery, which is next in importance and value to the cod fishery, commences on March 12. This is the day named by law for leaving St. Johns, but the law is made to apply only to the steamers, the sailing fleet being allowed to leave on March 1. This fishery is prosecuted in March and April, the sealing fleet seeking the seal-bearing ice immediately upon leaving port, and the young seals, born on the ice between the 15th and 20th of February, are, on account of their rapid growth, in the best condition about the 16th of March, when they have grown to a marketable size, viz, 40 to

50 pounds, and when they are easily killed by a blow on the nose; but by the 1st of April they begin to take to the water and are not so easily taken. No seals are allowed to be killed before the 14th of March or after the 20th of April. When the sealing vessels have obtained full cargoes, they return to port, discharge, and start again for a second and occasionally even a third trip.

The seals taken off the coasts of Newfoundland are the harp seal and the hood seal, which come down on the Arctic floe at the beginning of March, riding the floe for the purpose of whelping.

Sealers reckon that six young seals or "cats" weigh from 2 to 3 quintals. An old seal weighs $2\frac{1}{2}$ to 3 quintals, and an old square flipper sometimes as much as 8 quintals.

In 1907 the value of sealskins exported from Newfoundland amounted to \$194,300, and that of seal oil to \$447,967. In 1906, 22 steamers, built for encountering Arctic ice, manned by 3,684 men, brought in 245,051 seals of a gross weight of 5,870 tons; this was considered only an average fishery. A point of marked interest in the season of 1906 was the success of a steel sealer, which was able to pierce the ice more rapidly and easily than the wooden vessels hitherto employed, and in four days killed 30,193 seals.

The wise rule of fixing the date of departure of the sealing vessels seems to have had a good effect on the catch; but as mother seals bear only one whelp a year it is difficult to see how the enormous slaughter can be continued without sensibly diminishing the number of seals; however, there is very little sign of this at present. In 1906, 25 steam sealers took 341,836 seals, of the value of \$607,544.

Herring fishery.—Herrings resort to the shallow reaches in the great bays around the island, and are generally found within 3 miles of the shore. The principal herring fisheries are at Fortune, Placentia, and St. George bays, bay of Islands and Labrador (see page 36), the two latter being the most valuable. Fortune bay is a winter herring fishery, commencing early in December; St. George bay is a spring fishery. The value of herrings exported from Newfoundland in 1907 amounted to \$406,363.

During the season of 1907-8, 50 United States vessels, 7 of which made two trips, engaged in the herring fishery at the bay of Islands. In addition to these, 5 Canadian vessels were chartered by American fishermen. The catch of the American fleet, including that of the Canadian chartered vessels, was 46,877 barrels of salted herring, valued at \$176,789, and 31,015 barrels of frozen herring, valued at \$217,000.

Six British vessels, not chartered, landed at Boston and Gloucester 5,834 barrels of salted herring, valued at \$21,878, and 1,875 barrels of frozen herring, valued at \$12,938.

Salmon fishery.—The amount of preserved salmon exported is at present small, owing to the fish having been almost exterminated; but now there are wardens on the principal rivers, the fish are preserved during the spawning season, pollution and the use of illegal engines are prohibited, so that the rivers may be restored to their old prolific state.

Lobster fishery.—The lobsters caught are now so small that it requires more than double the number to fill a case than it did a few years ago; this appears to indicate that there is overfishing on the same grounds year after year, especially if the slow growth of the lobster is taken into consideration.

The value of tinned lobsters exported in 1907 was \$383,767.

Whale fishery.—During 1905, 19 whale factories were in operation and secured 892 whales. The catches in 1906 and 1907 appear to be very small, and several of the companies have found that the whale fishery does not pay and have accordingly sold their factories and whalers.

Schooners.—The fishing schooners, engaged chiefly in the cod fishery, have their names painted on the bow and stern, but carry only a private house flag, the national flag being seldom displayed. Many of the newer schooners hailing from Gloucester are beautiful vessels, looking more like private yachts than like fishing vessels. The dories are not marked.

Trade.—In 1907 the value of the total exports from the colony amounted to \$12,101,161, and that of the imports to \$10,426,040. The chief exports are fish, sealskins, oil, iron, and copper ore; and the chief imports are flour, textiles, woolens and cottons, coal, hardware, cutlery, salt pork, molasses, machinery, and tea; these are obtained mainly from Canada, the United Kingdom, and the United States.

In 1907, 1,834,452 tons of shipping entered and cleared at Newfoundland ports. At the end of that year 3,241 sailing vessels of 129,876 tons and 67 steam vessels of 12,352 tons were registered in Newfoundland.

Labrador, or that part of the Labrador peninsula lying between Blanc Sablon and cape Chidley and eastward of the Canadian provinces of Quebec and Ungava is, by letters patent of March 28, 1876, included in the colony of Newfoundland. Labrador, discovered by the Norsemen, and (in 1497) by Cabot, was early frequented by Basque, and subsequently by Breton, fishermen. In 1501, Corte Real named it Terra Labrador (cultivable land), to distinguish it from Greenland, which he named Terra Verde. It became British territory on the conquest of Canada (1759). The area of the dependency of Labrador included in the colony of Newfoundland is about 120,000 square miles, with a coast line of some 650 miles.

The peninsula of Labrador, extending from lat. 50° N. to lat. 63° N., and from long. 55° W. to long. 80° W., embraces an area of about 511,000 square miles.

There were 3,947 permanent inhabitants (some 1,700 Eskimo, the remainder of British descent) in the dependency in 1901, occupied in fishing and in trapping, but the population is greatly increased in summer by fishermen and sportsmen, and it may then be considered to be in round numbers from 20,000 to 25,000.

Physical features and geology.—The peninsula of Labrador, though when seen from seaward presents a very barren and desolate aspect, is really, a little way inland, a well-wooded country, and its forests, fisheries, and minerals will be valuable. The peninsula is a very ancient plateau, formed largely of crystalline schists and gneisses, associated with granite and other igneous rocks, all of archæan age. It has large areas of nonfossiliferous stratified limestones, cherts, shales, and iron ores. It is a plateau which ascends somewhat abruptly within a few miles of the coast to heights of 500–2,000 feet. The interior is undulating, and traversed by ridges of low rounded hills seldom rising more than 500 feet above the general level. The depressions between these ridges are occupied by numerous lakes, many of great size.

The east coast of Labrador is composed of Laurentian gneiss, with intrusive granite and many quartz veins, the formation generally being Laurentian, having resting on it at various points lower Silurian beds while over the country are gneiss ranges of mountains and gneiss boulders.

It is indented by deep irregular bays and fringed with rocky islets, while long and narrow fiords penetrate inland. The coast is bleak, but the shores of the bays and rivers are well wooded, and in some cases densely so, the timber being high and sound. The northern limit of trees near the coast is about latitude 58° north. Copper and lead ores exist on the coast: also gold and mica. The hills fall steeply to the sea, often in precipitous cliffs, and terminate in rugged rocky points, the single remarkable exception being the strand on each side of cape Porcupine, which is the only sandy beach of any extent on the whole coast northward as far as Nain.

Rivers.—The Atlantic coast range throws most of the drainage northward into Ungava bay, and excepting the Hamilton, Nasquapee, and Kenamou rivers, only small streams fall into the Atlantic.

Ashwanipi or Hamilton river, supposed to be the largest in Labrador, drains a vast interior plateau; it rises northward of Seven islands bay, in the gulf of St. Lawrence, and falls into Hamilton inlet, which also receives the waters of Kenamou river, and Nasquapee or Northwest river. Eagle, West, and East rivers, abounding

with salmon and trout, fall into Sandwich bay, while Koksoak or Big river, Whale river, and Kangerthialuksoak or George river have their outlets in Ungava bay.

Lakes.—The whole country is covered with innumerable lakes, ponds, and pools, from the deep mountain tarns on the summit of watersheds to the broad shallow lakes and pools spread over the surface below. The almost universal shallowness of these lakes is a singular feature.

Fisheries.—The fisheries of Labrador are at present its most valuable resources, and form practically the only industry of the white population scattered along its coast, as well as of a large proportion of the inhabitants of Newfoundland.

The cod fishery is carried on extensively from July to October. In July about 20,000 people leave their homes on the east coast of Newfoundland and proceed with their families in small craft to the Labrador coast for the season. On this coast there are huts and fishing stages at almost every bay, cove, and harbor where some of these people live, while others, in their vessels, follow the fish to the northward. The principal fishing stations are at Battle and St. Charles harbors. The fishery is carried on in small brigs and schooners, generally of 30 to 100 tons, and in boats. When the vessels return to Newfoundland they generally leave behind a few persons, who winter up the bays of the mainland to hunt for furs, and to be ready for the seal fishery at the breaking up of the ice in spring. The boats are hauled up on the rocks, or taken into coves of the mainland, where they are covered over with spruce branches and secured for the winter.

Fish caught by boats at the settlements are cured there, and in many cases exported in English schooners direct to foreign markets. Those taken by the vessels at sea are cleaned and packed in salt, to be cured at one of the southern settlements or in Newfoundland.

Northward to Aillik the fish are caught with baited hooks, while farther northward they are jigged with two hooks fastened to a metal imitation of a caplin.

The cod fishery is now carried on along the entire Atlantic coast and in the eastern part of Ungava bay, where excellent catches have been made since 1893.

The herring fishery begins in September and is prosecuted principally from Assizes harbor, which is crowded with vessels at that time. A plentiful catch of herrings sometimes compensates for a bad cod fishery. The herrings are packed in barrels and exported direct to Canadian markets by steamers owned in Newfoundland.

The salmon fishery on the Atlantic coast is very small.

The fisheries of Hudson bay and of the interior of Labrador are wholly undeveloped, but both the bay and the large lakes of the inte-

rior are well stocked with excellent fish, including trout, white fish, sturgeon, and cod.

See Newfoundland fisheries above.

Government.—The government of Newfoundland, which, of course, includes the dependency of Labrador, as previously described, is administered by a governor, named by the crown, assisted by an executive council, usually not exceeding seven members.

The law-making branch of the government is composed of a legislative council of 15 members and a house of assembly of 36 representatives.

The judicial branch consists of a supreme court.

Communications.—The Allan and Furness lines of steamships run direct between St. Johns and Liverpool on alternate weeks. From February to April, inclusive, the Allan mail steamship does not call at St. Johns, but proceeds to and from Halifax, whence communication is maintained by a local steam vessel plying fortnightly to St. Johns. The Allan line employ for their fortnightly service to St. Johns, except from February to April, three steamers, which make the passage from Glasgow in seven to nine days. These vessels run from Glasgow to Liverpool, thence to St. Johns, Halifax, and Philadelphia.

The Furness line also employs three steamers. These vessels run from Liverpool to St. Johns and Halifax throughout the year, sailing every fortnight from Liverpool and St. Johns.

There is weekly communication between St. Johns and Montreal, Pictou, Charlottetown, and Sydney (Cape Breton) by steamers of the Black Diamond line, and between St. Johns and New York and Halifax every week by steamers of the Red Lion line.

Steamers of the Black Diamond line run direct to Canada once a week from about May 1 to December 5; there are two steamers running, but they carry no mails, and only one carries passengers.

Steamers of the Red Lion line run from New York to Halifax and St. Johns once a week; they arrive at St. Johns and New York on Thursdays and sail on Saturdays; they bring mails from New York and Halifax, but do not take them to those places.

Bay and coastal steamers, 1908—Placentia bay.—The steamship Argyle leaves Placentia every Monday afternoon after the arrival of the mails from St. Johns, and proceeds to the following places on the North Side of the bay: Red island, Ship harbor, Indian harbor, Rams island, Rose-au-Rue, Harbor Buffett, Haystack, Brewley, North harbor, Sound island, Black river, Woody island, Barren island, Tacks beach, Burgeo, St. Leonards, Valen island, and Mersheen.

Mails close for the above places on Monday morning at 7.30 o'clock.

Leaving Placentia every Wednesday afternoon after the arrival of the mail train from St. Johns, the steamer calls at the following places: Presque, Paradise, Petit Fort, St. Josephs, Oderin, Baine harbor, Flat islands, Marystown, Beau Bois, Fox cove, Burin, Great Burin, Epworth, St. Lawrence, Lawn, Lords cove, and Lamaline.

Mails close for the above places every Wednesday morning at 7.30 o'clock.

Trinity bay.—The steamship Ethic, on Trinity bay, leaves Clarenville every Monday (except in January, February, March, and April), and calls at the following places: Hickmans harbor, Lady cove, Hearts Content, Hants harbor, Old Perlican, Trinity, Salmon cove, Catalina, Bay-de-Vere, Western bay, and Carbonear.

Mails for the above places close every Saturday evening at 9.30 o'clock.

Leaving Clarenville every Friday (except in four winter months), the Ethic calls at the following places: Ladys cove, Hickmans harbor, Fox harbor, Deer harbor, Britannia cove, Thoroughfare, Irelands Eye, British harbor, Bonaventure, Trinity, Salmon cove, Catalina, Bay-de-Verde, Western bay, and Carbonear.

Mails for the above places are closed every Thursday afternoon at 4 o'clock. A mail to connect with the steamer at Carbonear is also dispatched on Tuesday and Saturday mornings at 7.30 o'clock.

Bonavista bay.—The steamship Dundee leaves Port Blandford every Monday and Friday (except in January, February, March, and April) for the following places: Charlottetown, Bunyan cove (alternately), Musgrave town, Brooklyn, James town, Sweet bay, Southern bay, Indian arm, Plate cove, Open Hall, Keels, Kings cove, Bonavista, Salvage, Flat island, St. Brendans, Gooseberry islands, Fair islands, Greenspond, Pools island, and Wesleyville.

Mails close for the above places every Saturday evening at 9.30 o'clock and every Thursday afternoon at 4.30 o'clock, and for Bonavista (proper) and Kings cove every alternate Tuesday morning at 7.30 o'clock via train to Carbonear and Trinity bay steamer.

Fogo district.—The steamship Annie leaves Fogo on Tuesdays, after arrival of steamship Clyde, for Barr'd islands, Joe Batts arm, Little Fogo, Tilting, Seldom-come-by, Indian island, Dog bay, Victoria cove, Gander bay, Fredericton, Rocky bay, Ladle cove, Musgrave harbor, Wadhams, Cat harbor, Newtown, and Wesleyville.

Notre Dame bay.—The steamship Clyde leaves Lewisport for the south side of the bay every Monday (except in four winter months), calling at the following places: Campbelltown, Kite cove, Botwoodville, Exploits, Moretons harbor, Tizzards harbor, Twillingate, Herring neck, Little Beaver cove and Beaverton (alternately), Dog bay, Change islands, and Fogo.

Mails for the above places are closed Saturday evenings at 9.30 o'clock.

Leaving Lewisport every Friday, the Clyde will proceed to the following places on the north side of the bay: Exploits, Fortune harbor, New Bay head, Leading Tickle, Triton, Pilleys island, Springdale, Boot harbor, Wellmans cove (S. C. I.), Wards harbor, Little Bay islands, Little bay, Three Arms, Jacksons cove and South West arm alternately, North West arm, Nippers harbor, Snooks arm, Tilt cove, and Shoe cove.

Mails for the above places are closed every Thursday afternoon at 4.30 o'clock.

Labrador service.—The steamship Virginia Lake performs this service fortnightly, making 10 trips, commencing the service about June 15, sailing from St. Johns, and calls at the following places going and returning: Harbor Grace, Catalina, Kings cove, Twillingate, Tilt cove, Battle harbor, Spear harbor, Francis harbor, Fishing Ships harbor, Ship harbor, Square island, Dead island, Snug harbor, Venison island, Hawks harbor, Bolsters rock, Comfort bight (alternately), Frenchmans island, Punch bowl, Sandy island, Batteau, Domino, Black island (coming south only), Indian Tickle, Black Tickle, Grady, Long island, Cartwright (calling one way only), Packs harbor, Rigolet (calling one way only), Indian harbor, Smoky Tickle, White Bears, Horse harbor, Emily harbor, Holton, Cape Harrison, Ragged island, Long Tickle, Maccovick islands, Turnavick East, Turnavick West, Winsor harbor, Hopedale, Double island, Fannys harbor, Spracklin island, and Nain (alternately).

Strait of Belleisle and White Bay service.—The steamship Home, leaving Riverhead, Humbermouth, Bay of Islands, every Wednesday, except four winter months, calls at the following ports going and returning: York harbor, Lark harbor, Trout river, Bonne bay, Cow head, port Saunders, Bartletts harbor, Brig bay, Currant island, Salmon river, Bonne Esperance, Middle bay, Isle-aux-Bois, Blanc Sablon, Bradore, Flowers cove, Forteau, Lance-au-Loup, West St. Modest, Red bay, Henley, and Chateau (alternately), Chimney Tickle, cape Charles, and Battle harbor.

Mails for the above are closed every Tuesday afternoon at 4 o'clock, unless it is ascertained that a later train will connect with the steamer.

Northern coast service.—The steamship Portia performs this service, leaving St. Johns every alternate Wednesday, except during the four winter months, calling at the following-named places: Bay-de-Verde or Old Perlican, Trinity, Catalina, Bonavista, Kings cove, Salvage, Greenspond, Pools island, Musgrave harbor, Seldom-come-by, Fogo, Herring neck, Twillingate, Moretons harbor, Exploits, Fortune harbor, Leading Tickle, Pilleys island, Little Bay islands, Little bay, Nippers harbor, Tilt cove, La Scie, Baie Verte, Coachmans cove, Western cove, Jacksons arm, Harbor deep, Englee, Conche, St. Julians, St. Anthony, and Griguet.

Mails for the above-named places are closed at the general post-office every alternate Wednesday morning at 9 o'clock.

South and west coast service.—The Southwest coast service is performed by the steamship *Prospero*, leaving St. Johns every alternate Wednesday and calling at the following-named places: Cape Broyle, Ferryland, Renew's, and Fermeuse (alternately), Trepassey, St. Marys, Salmonier, Placentia, Mortier bay, Burin, St. Lawrence, Lamalin, Fortune, Grand bank, Belleoram, St. Jacques, Harbor Breton, Hermitage, Gaultois, Pushthrough, cape la Hune, Ramea, Burgeo, La Poile, Rose Blanche, Channel (port-aux-Basques), bay St. George (Sandy Point, monthly), Port-au-Port (monthly), Bay of Islands (Curling), Bonne bay (Curzon village).

South Coast Service.—The steamship *Glencoe* performs this service, leaving Placentia every Saturday evening after arrival of mail train from St. Johns and calling at the following-named places: Burin and St. Lawrence (alternately), Fortune, Grand Bank, Belleoram, St. Jacques, Harbor Breton, Hermitage, Pushthrough, Balena, Rencontre (each alternate trip), Ramea, Burgeo, Grand Bruit (each alternate trip), La Poile, Rose Blanche, and Channel (port-aux-Basques).

Mails for the above places are closed every Saturday morning at 7.30 o'clock. A supplementary mail is also dispatched to connect with this steamer at port-aux-Basques by the Sunday express, and is closed at the general post-office every Saturday evening at 9.30 o'clock, unless it would expedite delivery to hold it back for dispatch by the coastal steamer from St. Johns.

Mail Sailing Packet Service.—Fortune bay.—A mail packet will leave St. Jacques weekly after the arrival of the mail from St. Johns, calling at the following-named places going and returning: Belleoram, Pools cove, bay du Nord, bay d'Est, Lally cove, Rencontre, Fortune bay, Stones cove, Andersons cove, English Harbor east, Terenceville, Harbor Mille, Little Bay east, Fox cove, and bay L'Argent.

Harbor Briton, Sagona, and Brunette.—Packet leaves Harbor Briton fortnightly, calling at Brunette and Sagona islands.

Garnish and Belleoram.—A mail packet leaves Garnish fortnightly after the arrival of the mails per courier overland from Burin, calling at English Harbor west, Point Enragee, St. Jacques, and Belleoram.

Hermitage bay.—A packet leaves Pushthrough weekly after the arrival of mails from St. Johns, calling at the following-named places: Great Jervois, bay d'Est, bay du Nord, McCallum bay, Little bay, Round harbor, Gaultois, Hermitage, Grole, and Pass island.

By Wagon.—Mails for Ferryland district, Kilbride, Goulds, and Petty harbor are closed every Monday at 7 a. m., and on Tuesday

and Thursday at 6.30 p. m., during summer. Mails close on Monday and Thursday at 6.30 p. m., during winter.

The steamer Bruce, of the Reid-Newfoundland Company, leaves port-aux-Basques every Monday, Wednesday, and Friday after the arrival of the mail train from St. Johns, and, after a passage of six hours in duration, connects with the Intercontinental Railroad at Sydney, Cape Breton island. The same steamer leaves Sydney on the arrival of the mail by the Intercolonial Railroad every Tuesday, Thursday, and Saturday and connects with the train for St. Johns at port-aux-Basques. This train connects at Bay of Islands with the steamer which leaves there every Wednesday for Bonne bay and other ports on the west coast.

Railroads.—The Newfoundland railroad extends from St. Johns to harbor Grace and Carbonear in Conception bay, a distance of 91 miles via Whitbourne junction; and from the latter station, which is $57\frac{1}{2}$ miles from St. Johns, there is a branch, 27 miles in length, to Placentia bay.

The Northern and Western railroad, from Whitbourne, passes up the narrow neck of land, separating Trinity and Placentia bays, traverses Terra Nova, Gambo, and Gander valleys, and entering Exploits valley at Norris arm, crosses Exploits river at 10 miles from its mouth. It then passes the northeastern end of Grand pond, and skirts the southern side of Deer pond and the southern shore of Humber arm, as far as Birchy cove; thence it strikes inland toward and along the eastern side of St. George bay, at the back of Anguille range and down the valley of Codroy river to port aux Basque, distant $550\frac{1}{2}$ statute miles from St. Johns.

There are also branches to Brigus, Tilton, and Burnt bay.

In 1905 there were in operation in Newfoundland 638 miles of public railroad of 3 feet 6 inches gauge, and 21 miles of private line.

Telegraph.—In 1905 there were 2,079 miles of telegraph lines in the island, and 275 miles for telephone. All the principal ports are connected by land lines with St. Johns.

Cable communication.—There are four submarine cables between Ireland and Hearts Content, Newfoundland; one between France and St. Pierre island; three between Newfoundland and Cape Breton island, one between port aux Basques and Canso, and one between Belle isle and Chateau bay.

The Anglo-American Cable Company has 48 stations in Newfoundland. The head office is at Hearts Content, where the ends of six cables are brought up; four of the cables are from Valencia, Ireland; one from New York, and one from North Sydney, Cape Breton island. The cable in communication with the United States touches at St. Pierre. This company is in connection with the Western Union Telegraph Company of the United States.

The office of the Great Northwestern Telegraph Company, of Canada, and postal system of the United Kingdom at Hearts Content is exceedingly well fitted with all the latest instruments, and is in a very efficient condition.

The Newfoundland postal telegraph follows the railroad from St. Johns to port aux Basques. It also runs from Bay of Islands to Bonne bay, and from Grand lake to Tilt cove, as well as direct to Canada. The head office is at Canso, Nova Scotia. One cable at Clarendville connects Bonavista bay; one at Come-by-chance connects stations in Placentia bay, and one in Gambo connects Notre Dame bay. This company is in connection with the Commercial Cable Company, Commercial Pacific, German Atlantic, Postal Telegraph Cable Company of the United States of America, Canadian Pacific Railway telegraphs, Halifax and Bermuda Cable, and Direct West India Cable Company.

Marconi wireless telegraph stations have been established by the government of Canada at the following places as aids to navigation, and are operated for the Department of Marine and Fisheries by the Marconi Wireless Telegraph Company (Limited):

Cape Race lighthouse, call letter CE; cape Ray lighthouse, call letter CR; Rich point lighthouse, call letter TC; Amour point lighthouse, call letter PR; and about 50 yards northward of the old lighthouse, at the southern end of Belle isle, call letter BL.

Vessels fitted with Marconi apparatus passing these stations can communicate with them, and messages are forwarded to their destinations at commercial rates.

There are also wireless telegraph stations of the government of Newfoundland at Battle harbor, Venison tickle, American tickle, and Domino harbor.

Roads.—In 1905 about 750 miles of postal roads and 1,700 miles of district roads were maintained in Newfoundland.

Climate—Newfoundland.—The climate of the east coast of Newfoundland is influenced by the cold Arctic current, but the Gulf stream, although causing fog, modifies its effect, and the climate generally is more temperate than that of the adjacent continent; in winter the thermometer seldom falls below zero, and in summer it rarely rises above 80° Fahrenheit. The arrival of spring is uncertain and tardy, and its duration is very short; summer begins almost immediately, and vegetation advances rapidly. Summer is always delightful, and autumn, also fine, frequently reaches to November, while winter, setting in about the beginning of December, lasts until the middle of April, with snow lying almost continuously during that period. The salubrity of the climate is evidenced by the robust and healthy appearance of the inhabitants. Open fireplaces are sufficient to warm the houses and free exercise in the open air is attainable at all seasons.

There is nothing in the climate to interfere with vegetation or agriculture. Flowering plants and ferns grow in great variety, and wild grasses and clover luxuriantly. Garden vegetables and berries are abundant.

On the west coast the climate is much more genial than on the south and east coasts, and the vegetation is more abundant. In the interior the summer temperature is higher than that on the coasts. The average rainfall is 58.3 inches.

Labrador.—The climate ranges from cold temperate on the southern coasts to Arctic at Hudson strait, and is generally so rigorous that it is very doubtful if the country is fit for agriculture northward of latitude 51° north, except on low grounds near the coast. There are two seasons in the interior: winter begins early in October, with the freezing of the small lakes, and lasts till the middle of June, when the ice on rivers and lakes melts and summer comes on suddenly. The lower temperature of the interior appears to range from 50° to 60° below zero; it is slightly higher on the coast. The mean summer temperature in the interior is about 55° , with frosts every month in the northern portion. On the Atlantic coast the climate is extremely severe, the mean temperature of the year being below freezing point. At Chateau bay on the 25th of July, 1836, the earliest plants were springing up, and the grass was only just beginning to give a shade of green in sheltered spots between the hills. The temperature of the sea outside the bay was 32° and the air 43° in the warmest part of the day.

On the outer coast vegetables only are raised with great difficulty, and rarely reach maturity, but at the heads of the deep inlets, vegetables, flowers, and even cereals are grown. Snow fell in Indian harbor in July, August, and September, 1875. When the wind is from seaward the temperature falls considerably during summer. Large patches of snow, about 5 feet deep, were lying in the valleys along the whole coast in the middle of July, 1875, and some of them had not disappeared when the first large fall of snow occurred in September. The mean temperature of the air for the coast between cape Porcupine and Nain was about 46° in July, 50° in August, and 44° in September.

See meteorological table, page 49.

Winds—Newfoundland coast.—Westerly winds prevail throughout the year, but frequent and rapid changes, both in direction and force, are experienced on all parts of the Newfoundland coast. Westerly winds generally decrease in force at sunset, but when they continue steadily until midnight the wind often changes to north-northeast the following morning. Winds between west and north are generally accompanied by clear weather.

Easterly winds are generally succeeded by southeasterly, which are accompanied by heavy rain.

A southeasterly gale in summer usually blows itself out in that direction, but in autumn the wind veers suddenly to southwest and then to northwest, with undiminished force; these rapid changes should be prepared for.

At the entrances of most of the harbors the wind is generally variable in direction, with frequent squalls, which at times are so heavy that great caution is necessary when approaching in a vessel under sail.

In Belleisle strait the normal direction of the wind is either easterly or westerly through the strait, notwithstanding the direction of the wind outside. From June to September, 1898, the prevailing direction of the wind was westerly. In September strong northerly and northwesterly winds were frequent with clear weather. From December to February winds between north and west prevail; they are squally and accompanied by snow; the changes to northeast or east, with more snow, or to southwest or south, with rain, are usually short. The following remarks will explain these changes.

Meteorologically considered, the region under discussion occupies a unique position. In the first place, it lies immediately to the southwest of the area of constant low barometric pressure, which extends from Baffin bay on the west to Iceland on the east; in the second place, it lies immediately in the path followed by the centers of those temporary moving barometric depressions which originate in the interior of the North American continent and travel eastward with an irregular velocity until they either disappear by filling up or lose their identity by coming within the limits of the permanent low. As a consequence of the first condition, the barometric gradient or slope over the region being to the northeastward, the prevailing direction of the wind is to the west of northwest. As a consequence of the second condition, these prevailing winds are subject to constant interruption by the wind systems proper to the approach and passage of each of these temporary areas of low pressure, the wind at any station in advance of such an area invariably going to south or southeast, shifting to westward as the cyclonic center passes, the shifts taking place through the north (backing) if the point of observation lies to the north (left hand) of the storm track, through the south (veering) if it lies to the south (right hand) of this track.

Along the coast of Newfoundland, the prevailing winds are thus from the westward, subject to interruption with the approach of each of these occasional low areas; and as these occur during the winter (November to April) with far greater frequency than during the summer (May to October), the winds of the latter season are the more uniform, both in force and direction.

The following table, compiled from the Monthly Weather Review of the Dominion Meteorological Service, gives for the months of January and July the average percentage of winds coming from each point of the compass at several stations throughout the island:

		No. of years.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.
St. Johns.....	(January..)	5	23	18	7	8	14	5	16	10	0
	(July.....)	5	9	10	5	7	24	13	30	2	0
Channel.....	(January..)	3	10	6	8	15	6	5	23	23	3
	(July.....)	(4)	2	3	10	42	6	7	22	6	4
Cape Norman.....	(January..)	3	4	31	4	7	2	10	5	33	0
	(July.....)	3	5	11	6	13	8	3	11	43	0
Point Rich.....	(January..)	1	35	32	2	1	2	3	6	18	0
	(July.....)	1	9	21	6	4	4	8	48	1	0
Belle isle.....	(January..)	(1)	5	9	14	21	5	16	14	16	0
	(July.....)	(1)	6	0	22	25	5	12	26	4	0

The order of the weather changes during the approach of one of these barometric depressions is almost invariable. After a period of stationary barometer, accompanied by light winds, the mercury starts to fall, the wind goes to the eastward with rain or snow, and a period of thick, foggy weather sets in. About the time of lowest barometer the southeast wind shifts to the southwest and then to the northwest, blowing with storm force. The former shift is sometimes sudden, the first squall often coming with extra violence, and ship-masters lying off the coast should exercise corresponding watchfulness. The rise of the barometer is accompanied by overcast, squally weather and storm winds from southwest to northwest, moderating and clearing about the time the mercury attains its highest point.

The following extract from the log of the St. Georgios I. off Cape Race, November 30–December 3, 1898, will serve to exemplify the character of the weather changes in the southern semicircle of one of these eastward-moving depressions. The Beaufort weather notation is employed throughout:

Date (1898).	Hour.	Barometer.	Wind.		Temperature of air.	Weather.
			Direction.	Force.		
		<i>Inches.</i>			°	
November 30.....	4 p. m.	29.54	South-southeast.....	7	50	o
	8 p. m.	29.30	South-southeast.....	8	48	r
	12 p. m.	29.10	South-southeast.....	7	48	r
	4 a. m.	28.99	South-southeast.....	7	48	r
	8 a. m.	28.87	South-southeast.....	5	48	r
	9 a. m.	28.71				
December 1.....	Noon.	29.10	West-southwest.....	9	48	r
	8 p. m.	29.22	West-southwest.....	10	46	o
	4 a. m.	29.58	West-southwest.....	10	46	oq
December 2.....	Noon.	29.69	West.....	10	46	oq
	8 p. m.	29.81	West.....	10	48	oq
December 3.....	4 a. m.	30.24	West-northwest.....	8	43	b
	Noon.	30.28	Northwest.....	5	46	b

The easterly winds proper to the forward half of these depressions are accompanied by rain (or snow), which is liable to continue for twelve hours succeeding the time of lowest barometer. The north-west winds bring clear weather.

On the east coast of Labrador westerly winds prevail during the navigable season (July to November); consequently the sea is then generally smooth, but easterly winds are preceded or followed by a heavy swell. Westerly winds generally hull at night, and strong breezes from any direction rarely last more than 12 hours before September, when easterly gales occasionally continue for two or three days.

Strong northeasterly breezes often come suddenly without warning, lowering the temperature 5° to 10° : they generally last a short time, but are occasionally the prelude to easterly wind and fog. On dark days, with light breezes, ripples on the sea or fog rising to the north-eastward sometimes foretell the approach of these squalls, which are known to fishermen as northeast flurries.

Thunderstorms occur at about the end of August or the early part of September, but warning is given of their approach by heavy clouds to the westward.

Gales are stated to be frequent and very violent: they generally commence at northeast, veer gradually to southeast, and thence rapidly through south, to west or northwest, in which direction they moderate. Occasionally they subside in the same direction at which they commenced.

In Eclipse harbor, in July, a violent gale lasted 3 days; commencing at southeast, it backed through north, to southwest; the gale extended some distance southward.

Calms are of short duration, seldom lasting more than a day.

See meteorological table, page 49.

Fog.—The air which lies over the Gulf stream, warm and moist, being mixed by varying winds with the cold atmosphere over the Arctic current, is chilled, and its moisture sometimes changes into rain or snow, but more frequently into the dense fog so constant on the Great bank, and on the south and southeast coasts of Newfoundland.

Fog occurs on the coasts of Newfoundland and coast of Labrador throughout the year, but is most frequent during June and July; it is more prevalent on the south and east coasts than elsewhere, and seldom extends far inland. It almost constantly prevails with easterly winds; but it is not so frequent and is of short duration with westerly winds.

There is said to be frequently a narrow passage of clear atmosphere between the fog bank and the land.

Fog with easterly winds extends high above the sea, and can not be seen from the masthead of a vessel; occasionally the land or other objects can be distinguished at the distance of $\frac{1}{2}$ mile in daylight. Fog in calms, especially after strong winds, is frequently so dense as to conceal a vessel within hail, but it is usually not of much height, so that objects at a distance of 50 yards, obscured from a person on deck, can be seen from some 50 feet up the rigging. Such fog occasionally lasts ten days.

On the south coast fog is prevalent, especially between cape Race and St. Pierre island; during June and July it is frequently of long duration, the weather being clear only during northwesterly to northerly winds. During southwesterly winds fog is generally very dense on the eastern side of Placentia bay, especially about the headland of cape St. Mary.

On the east coast between cape Race and St. Johns harbor, fog generally clears as soon as the wind draws offshore; it is less frequent at St. Johns than farther south. In the vicinity of Trinity bay, fog prevails both with easterly and southwesterly winds. Northward of cape Bonavista, fog is not so frequent as on other portions of this coast.

The fog on the south and east coasts of Newfoundland is of all kinds, from a dry fog to a wet drizzle, and there may be any sort of weather during fog. It may vary from calm to a whole gale, or from a clear sky overhead, with the sun breaking through at noon, to heavy rain, but these changes have no marked effect on the fog. Rain makes the most difference, as it partly clears the air and extends the view.

On the west coast there is not much fog in June and July.

In the strait of Belleisle dense fog prevails during summer, and sometimes lasts for several days at a time. From June to September, 1898, thick fog was prevalent with either easterly or westerly winds. With westerly winds the fog commences to the westward and rolls gradually along the coast of Labrador, frequently extending only a short distance from it, so that toward the coast of Newfoundland it may then be clear. With easterly winds the fog is more general on both sides of the strait; it almost invariably clears first on the coast of Newfoundland. During a period of forty days in July and August, when simultaneous observations were made on both sides of the strait, fog, mist, etc., occurred on 60 per cent of the days on the Labrador side and on 40 per cent on the Newfoundland side. In September strong northerly and northwesterly winds were frequent with clear weather, and fog occurred only on about eight days. The fog clings closely to the water and the shore line; the summits of the Labrador hills may sometimes, though rarely, be seen over it from the masthead.

On the east coast of Labrador fog is not so frequent as on the coasts of Newfoundland. It prevails with winds from northeast, through east, to south, but is unusual with the wind from any other direction; it presents the same characteristics as those previously described. The dry dense fog with a southwesterly wind seldom extends northward of cape St. Lewis, where, when the wind is from that direction, the weather is clear, though a stream of thick fog may then issue from the strait of Belleisle.

Caution. When land is visible in foggy weather, estimations of distance are usually in excess of the correct distance. No reliance should be placed upon a position assumed from the distance at which the sound of surf breaking on a rocky shore was heard, but where steep cliffs form a characteristic of the coast, the proximity of a steamer to them may be detected by the echo of the whistle, although this can not be depended on: the only safe guide is the constant use of the lead.

Fog signals.—It has been clearly established—

- (1) That fog signals sounded through the air are heard at greatly varying distances.
- (2) That under certain conditions of atmosphere, when a fog signal is a combination of high and low tones, one of the notes may be inaudible.
- (3) That there are occasionally areas around a fog signal in which it is inaudible. Under certain conditions of the atmosphere the sound may be lost at a very short distance from the station, and these conditions may vary within very short intervals of time.
- (4) That a fog may exist at a short distance from a station and not be observable from it, so that the signal is not sounded.
- (5) That some fog signals can not be started at a moment's notice, although every endeavor is made to sound them as quickly as possible after signs of fog have been observed.

Mariners are therefore warned that the lead should never be neglected. Particular attention should also be given as to placing look-out men in positions where the noises of the ship are least likely to interfere with the hearing of the sound of a fog signal, as experience shows that although such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may also be heard from aloft, though not from deck.

It should also be noticed that distances from a fog signal should not be judged by the power of the sound. (See Meteorological table, p. 49.)

METEOROLOGICAL TABLE COMPILED FROM 8 TO 45 YEARS' OBSERVATIONS.

Place—St. Johns, Newfoundland. Obs. Δ Lat. $47^{\circ} 34' N.$, Long. $52^{\circ} 41' W.$

Month.	Barometer, reduced to 32° and sea level.		Temperature.		Relative humidity.			Precipitation.		Wind.										Barometer.		Temperature.			
	Mean height.	Extremes.	Mean.		Tends, 0 to 10, amount.	Total fall.	No. of days.	Max. fall in 24 hours.	Fore—Beaufort scale.	Max. force—Beaufort scale.	Number of days from—										Max.	Min.	Max.	Min.	
			Mean daily	Range.							North-east.	South-east.	South-west.	North-west.	Calm.	No. of days gales.	No. of days fogs.	Max.	Min.						
Inns.	Inns.	°	°	%	Inns.	Inns.	Inns.	Inns.	Inns.	North.	North-east.	South-east.	South-west.	North-west.	Calm.	No. of days gales.	No. of days fogs.	Inns.	Inns.	°	°	°	°		
January	29.87	29.87	23.8	32.2	81	5.57	81	2.44	6	5	5	1	4	3	4	1	6	2	30.67	28.64	59	-19	78		
February	29.85	29.85	23.6	31.7	83	4.63	17	3.30	8	4	4	6	4	4	1	6	3	3	30.71	28.35	63	-21	84		
March	29.83	29.83	28.2	34.9	84	4.74	17	1.82	8	6	3	1	6	5	6	4	4	4	30.83	28.96	60	-14	74		
April	29.81	29.81	28.2	34.9	82	3.81	16	2.16	9	6	3	2	4	4	6	2	6	4	30.57	28.96	71	-1	72		
May	29.96	29.96	43.6	52.9	78	3.61	15	1.20	7	5	4	2	4	4	7	1	6	6	30.63	29.10	81	19	62		
June	29.94	29.94	43.6	51.9	75	3.55	14	1.80	7	4	4	3	4	5	2	3	4	4	30.44	29.09	86	21	65		
July	29.95	29.95	49.9	60.1	73	4.01	13	1.95	1	3	3	2	5	5	2	1	4	4	30.45	29.06	88	30	58		
August	29.97	29.97	50.9	62.7	76	3.88	13	1.30	1	4	4	2	5	5	1	1	4	4	30.32	28.33	92	31	51		
September	29.96	29.96	45.5	53.2	79	4.91	17	2.35	1	7	6	3	5	4	3	2	3	3	30.46	28.78	84	25	59		
October	29.93	29.93	37.1	44.6	83	4.01	17	2.03	1	7	6	3	4	5	3	1	3	4	30.59	28.74	81	16	63		
November	29.87	29.87	28.8	36.3	80	3.44	15	2.36	2	8	0	3	4	5	3	1	4	4	30.69	28.82	68	5	63		
December	29.86	29.86	28.8	36.3	82	3.44	20	2.40	2	8	5	2	4	4	4	1	5	2	30.62	28.60	65	-4	69		
Means and totals	29.92	29.92	40.9	49.4	79	53.35	191	3.30	2	9	59	33	25	51	52	78	35	10	30.83	28.35	92	-21	113		
Years' observations.	40	10	45	30	22	29	10	8	10	8	25	25	78	35	10	46	48	10	10	10	92	-21	45		

METEOROLOGICAL TABLE COMPILED FROM 7 TO 15 YEARS' OBSERVATIONS.

Place.—*Belleisle. Obs. Δ Lat. 51° 53' N., Long. 55° 22' W.*

Month.	Barometer, reduced to 32° and sea level.		Temperature.		Rain.		Wind.										Barometer.		Temperature.					
	Mean height.		Mean daily range.		Total fall.		Number of days from—										Absolute.		Absolute.					
	Incs.	Extremes	Max.	Min.	Incs.	No. of days.	North.	North-east.	East.	South-east.	South.	South-west.	West.	North-west.	Calm.	No. of days gales.	No. of days fogs.	Max.	Min.	Max.	Min.	Range.		
January	29.80	2.07	13.2	10.0	4.7	0.48	2	6	3	2	1	3	6	7	0	20	5	30.57	28.50	40	-27	67		
February	29.78	1.97	12.7	8.0	20.1	0.11	4	4	3	3	4	3	4	3	0	15	6	30.57	28.60	39	-26	65		
March	29.82	1.98	19.4	9.6	25.5	2.46	5	11	3	3	7	4	0	13	0	19	9	30.54	28.56	40	-18	58		
April	29.95	1.68	27.7	9.1	32.9	2.91	6	4	3	3	7	4	0	16	0	13	6	30.50	28.91	56	-10	66		
May	29.97	1.57	34.9	8.8	40.1	2.91	9	4	4	3	2	2	7	4	0	13	10	30.32	28.95	59	12	47		
June	29.97	1.48	43.4	9.7	48.8	4.40	12	4	5	5	2	1	7	1	0	10	13	30.39	29.11	69	22	47		
July	29.95	1.33	50.3	10.8	56.0	7.06	14	3	3	2	3	1	3	1	0	8	19	30.57	29.24	70	32	38		
August	29.98	1.32	52.2	10.7	58.4	5.26	11	3	3	4	3	4	2	0	7	15	30.50	29.18	71	31	40			
September	29.91	1.78	46.2	10.0	51.8	5.72	14	4	2	2	2	4	10	4	0	11	12	30.56	28.78	68	29	39		
October	29.91	1.81	37.9	7.6	41.8	5.26	9	4	2	2	3	1	4	8	5	15	13	30.58	28.77	57	17	40		
November	29.85	1.68	27.1	8.2	31.2	1.70	4	4	2	2	2	2	6	7	0	17	10	30.50	28.88	48	-6	54		
December	29.79	1.58	15.5	8.6	21.8	1.36	4	4	3	3	2	1	3	7	0	16	3	30.53	28.95	40	-21	61		
Means and totals	29.80	2.09	31.7	9.2	36.9	38.63	92	4	11	55	44	35	39	22	34	86	121	30.59	28.50	71	-27	98		
Years' observations	8		8		7		8										15		15		15		15	

Submarine bells.—These may be placed in the following positions: (1) Light-vessels, (2) buoys, where they are worked by the motion of the sea, and (3) on the sea bottom, where they are controlled electrically from shore stations. Their effective range far exceeds that of aerial sound signals, having been known to exceed 15 miles; and their bearing can be determined with sufficient accuracy for safe navigation in a fog, if a vessel is equipped with telephonic receivers. Even should a vessel not be so equipped, the submarine bell can be heard from below the water line for distances that are well outside the range of aerial fog signals, though its bearing can not then be so well determined.

Currents—Gulf stream.—The Gulf stream, after running northward and northeastward off the coast of the United States, turns more decidedly to the eastward between the parallels of 35° and 40° N. latitude, and passes southward of the Great bank of Newfoundland during winter, but extends over the southern end of that bank during summer. It thus has an oscillatory motion, and it spreads out into streaks, which sway about in their course and are of warm and colder water, so that it is impossible to assign any definite limits to its margins.

The rate of the Gulf stream southward of the Great Bank of Newfoundland is very variable, but it generally is from 10 to 35 miles a day.

Arctic current.—The cold Arctic or Labrador current sets southward from the Arctic ocean and Baffin bay and passes through Davis strait and along the coast of Labrador and the east coast of Newfoundland. It is very much influenced near the land by the winds and reaches its greatest rate after those from the northward.

A cold current also sets southwestward along the east coast of Greenland, and abreast Labrador these currents appear to extend eastward to longitude 40° W. The line of meeting of the southgoing currents with the northern edge of the Gulf stream is nearly always marked by rips.

Northward of 50° N. latitude detailed information on currents is very scanty. The movement of the water appears to be principally due to wind and to be very slight, except the currents along the east coasts of Greenland and Labrador, which are known to be practically permanent and of considerable strength.

In the offing of the coast of Labrador the average rate of the current is said to be about 6 miles a day, but off some of the headlands its rate reaches 2 miles an hour and possibly more. The Arctic current does not attain any great rate within some 25 miles from the coast between cape Bonavista and Cape Spear: it appears to skirt the northern side of Fogo islands and extends out to Funk island, thence turning southward; it often binds the field ice into Notre Dame and Bonavista bays and the mouth of Trinity bay.

A current, setting southeastward, splits about 2 miles off Fogo head, the main branch running close along the northern coast of Fogo island, and amongst the rocks and islands around it, from $\frac{1}{2}$ to $1\frac{1}{2}$ miles an hour. It is much influenced by wind, being accelerated by northerly and retarded by southerly winds, while before easterly gales it sometimes runs northwestward. This current, after passing Round head, takes the direction of the coast and is influenced by the tidal stream, the ebb accelerating and the flood retarding it, and occasionally, at springs, stopping its southerly course entirely.

The western branch of this current runs between Change and Fogo islands at the rate of about $\frac{1}{2}$ mile an hour, but is lost before arriving at Stag Harbor tuckle.

For about 30 to 40 miles off the coast between cape Spear and cape Race, the current sets very constantly southward, with a greatest observed rate of $1\frac{1}{10}$ miles an hour. It occupies the gully or deep channel over Great bank southeastward of the coast. It is not unusual, however, for this current to be so disturbed as to set southeastward, or even to be reversed on the surface. When such disturbance occurs it is usually for a short time immediately before a gale comes on.

When the current sets strongly southward along the coast between cape St. Francis and cape Race a strong eddy runs northward for about one mile offshore southward of cape Spear. This should be remembered by ships bound to St. Johns.

On the south coast of Newfoundland.—The Arctic current southeastward of cape Race usually turns west-southwestward, occasionally at a rate of nearly 1 mile an hour; but it may be reversed or set in other directions in unsettled weather; near the shore, in moderate weather, its direction changes with the wind.

Westward of cape Race, the current frequently sets northwestward, at the rate of about one mile an hour in the offing, but it is variable in rate and direction, and affected greatly by the prevailing wind. It generally runs in upon the eastern side of the great bays indenting the south coast of Newfoundland, and out on their western side. In the offing it is influenced by the winds, and near the shore by the tidal streams.

It was found, between May and September, 1903, that at a distance of over 5 miles from the land no current at any time exceeded 1 mile an hour in any direction. Within about 5 miles from the land the current was chiefly tidal and set in two opposite directions alternately, but the farther from the land the greater the tendency for the direction of the current to veer through a complete circle. The water sets northwestward on the whole along the south coast from cape Race toward Placentia bay; that is to say, when a long average is taken, the set is more frequently in that direction than in any other.

The water makes inwards at certain times of the tide on the eastern side of St. Marys bay, and inwards as a whole on the eastern side of Placentia bay; the rate of these indrafts does not exceed 1 mile an hour at a distance of 5 miles from the land, but close to the headlands the rate of the streams may be greater.

On the south coast of Newfoundland, between St. Pierre island and cape Ray, the current usually sets northwestward and passes round cape Ray into the gulf, but it is not constant.

Many wrecks have occurred in fog, on the southeast and south coasts of Newfoundland, owing to the indraught, or to the current temporarily setting northeastward.

On the eastern edge of the Great bank the currents are very variable.

On the Great bank the ordinary set of the current is southwestward, but it is by no means unusual for the current to set northeastward, and sometimes it is very variable.

During south to southwesterly winds there may be a strong northerly set; this may be still stronger during and after northeasterly winds.

A southerly current has at times been experienced on the above banks, but it is exceptional.

Caution.—Mariners approaching Newfoundland in thick weather should use the lead and proceed with caution, as it is impossible to foretell what current they may have experienced or be experiencing.

Sailing vessels should keep a good offing on the south coast of Newfoundland, as the wind often falls light near it, and the drift of the sea and current are nearly toward the land, especially near Placentia and St. Mary's bays.

In Cabot strait.—In ordinary weather the northwest current is felt for a width of 10 to 15 miles from cape Ray, or even farther. In August at 13 miles westward of that cape its rate varied from $\frac{1}{2}$ mile to $1\frac{1}{2}$ miles an hour; but this current is by no means constant.

On the western side of Cabot strait to about 12 miles eastward of St. Paul island, there is a fairly constant current setting between south and southeast; its rate is usually from $\frac{1}{2}$ mile to $1\frac{1}{2}$ miles an hour, but after a strong northwesterly wind it has reached a rate of $2\frac{1}{4}$ miles. It may, also, be checked or reversed for a few days at a time by strong southeasterly winds. Its greatest rate is off cape North, where it may be as much as 2 miles an hour in ordinary weather. Sometimes it extends nearly across the strait.

This current continues to be felt along the eastern coast of cape Breton island, sometimes as far as Scatari island. It is probably affected by the tidal streams, accelerated by the ebb, and retarded by the flood.

In the middle of Cabot strait the current is variable and usually weak.

On the west coast of Newfoundland.—The rate of the current in most of the open area of the gulf of St. Lawrence seldom exceeds 1 mile an hour: its direction, therefore, is very variable, being easily affected by strong winds, and on this account it is necessary to exercise caution in navigation.

Generally on the west coast of Newfoundland, the current sets northeastward; it is scarcely appreciable from cape St. George to bay of Islands, but thence to Rich point it may be considered constant, with a rate of about 1 mile an hour: it is stronger near this land than farther out, and in the vicinity of bays and inlets the current is deflected by the inset and outset of the tidal streams. It is stronger than usual before a southwesterly wind commences, but a strong northeasterly wind causes it to slacken and even turn southwestward.

In the area between a line drawn from Rich point northward to Eskimo islands and the western end of Belleisle strait, the currents are variable and uncertain, being intermediate between the above current and the tidal streams of the strait. In the western part of this area the rate is usually less than 1 mile and rarely over $1\frac{1}{2}$ miles, but towards the entrance of the strait it increases. A current sometimes sets southeastward from the vicinity of Greenly island and sets strongly on shore about Flower cove.

In Belleisle strait.—The movement of the water in Belleisle strait is tidal (see p. 55), but a strong wind through the strait either way makes a drift, which causes the opposing tidal stream to slacken, and eventually overcomes it altogether: a continuous current then runs in the direction towards which the wind is blowing, but its rate increases or decreases according as the tidal stream is with it or against it. This appears to take place earlier on the Labrador side of the strait than on the Newfoundland side, which is more under tidal influence. (See also p. 641.)

The general Arctic current setting southward past the Atlantic mouth of the strait is influenced by the tidal inflow and outflow of the strait itself: the greater inflow towards the strait takes place on the northern side of the entrance and the greater outflow on the southern side.

Tides.—The range of spring tides on the coasts of Newfoundland, and also on the coast of Labrador northward to Eclipse harbor, near cape Chidley, is from 4 to 7 feet.

Tidal streams.—On the south coast of Newfoundland the tidal streams are very variable, changing with the locality and influenced generally, both in direction and rate, by the prevailing winds of several preceding days. Between St. Lawrence and Lamalin har-

bors the flood generally runs southwestward; on the southern side of Fortune bay, eastward; and on the northern side of the same bay, westward. Between cape la Hune and cape Ray the flood runs westward irregularly, and continues 2 to 3 hours after high water on the shore. At cape Ray this stream is very variable, generally setting into the gulf of St. Lawrence, and sometimes attaining a rate of 2 knots an hour within a short distance of the cape.

Between St. Pierre and cape Ray the tidal streams are felt from 10 to 15 miles off the coast, and westward of Penguin islands the flood runs west-northwestward, and the ebb east-southeastward.

While the stream inshore is running in one direction, it sometimes happens that it is going in the opposite direction at 5 to 6 miles from the land. Vessels beating into the gulf of St. Lawrence would do well to try both streams before making a long stretch seaward.

On the west coast the flood stream runs generally southwestward and the ebb northeastward.

On the east coast the flood stream sets northeastward and retards the current usually setting southwestward, the ebb stream setting southwestward accelerates it.

In Belleisle strait.—When uninfluenced by wind the stream in the strait runs east and west for nearly equal periods, and turns regularly in accordance with the rise and fall of the tide. (See p. 641.) On the whole the westerly, or inward, flow seems to be slightly greater than the outward flow.

It appears, as yet, impossible to predict with accuracy the direction of the streams in the strait, but under normal conditions the westerly stream begins about 4 hours before high water at Forteau bay, and the easterly stream about 2½ hours after high water there; the streams turn in the direction of the hands of a watch. The ordinary rate during the strength of the streams is 1 to 2 knots an hour, but the greatest rates observed have been, of the westerly stream, 3¼ knots, and of the easterly 2½ knots. Both their rates and directions are greatly affected by any strong winds blowing at the time, or just previously.

On the Labrador side the westerly stream predominates, especially towards the eastern end of the strait and near the shore, where it is so strong at times as to prevent fishermen hauling their nets.

On the Newfoundland side towards cape Norman, the reverse appears to be the case. Certainly there is more slack water in that locality than on the Labrador coast. The easterly stream runs round cape Norman with considerable strength, while the westerly stream is comparatively weak. The streams do not always run fairly through the strait, and with both the easterly and the westerly there is an indraft towards Cook and Pistolet bays.

East coast of Labrador.—Near this coast, as a rule, the flood stream runs northward and the ebb southward, following the coast line and rarely attaining a rate of $\frac{1}{2}$ knot an hour.

Temperature of the sea.—The temperature of the water from off St. Johns to the mouth of Placentia bay at the depth of 30 fathoms is practically at freezing point. It varied only from $30\frac{1}{2}^{\circ}$ to 34° Fahrenheit, and there was no change from one month to another between May and September, 1903. The water of the Arctic current becomes quite as warm on the surface as the surface water elsewhere in this region. The general increase in the surface temperature along the south coast from Trepassey to St. Pierre was from $36\frac{1}{2}^{\circ}$ in May to 50° in September; and the surface temperature of the Arctic current rose from an average of $34\frac{1}{2}^{\circ}$ at the end of May to 50° at the middle of August. It has been observed that during strong winds, especially when offshore, the surface water is driven out to the offing and the cold water comes to the surface from underneath.

In the navigable season the surface temperature of the southeasterly current in Cabot strait is from 55° to 65° , and the water has a distinctly brown color. At that time this outgoing current is much warmer than the ingoing current on the opposite side of the strait, although it is not so at all other times of the year. The color of the water in the strait, except that of the southeasterly current, is the milky green of ordinary sea water.

In the gulf of St. Lawrence the surface temperature in summer usually ranges from about 50° to 65° . This temperature gradually falls below the surface until, at a depth of 40 to 50 fathoms, it is 31° to 34° , or practically at the freezing point. In parts of the gulf where there is deeper water the water at greater depths is appreciably warmer, rising to 38° and 41° in depths of 100 to 200 fathoms.

In Belleisle strait the surface temperature is relatively lower than that in the gulf, and it is very cold. On the Newfoundland side it seldom falls below 50° during the navigable season. It is generally warmer on this side than on the northern side, and a difference of as much as 20° has been observed. When flowing inward the average temperature of the water from top to bottom is under 45° in September. The temperature of the sea in the strait does not afford any definite indication either of the direction of the stream or of the proximity of ice.

In August, 1898, at about 4 miles southward of Black bay, a heavy tide rip extended across the strait northwestward and southeastward; the temperatures of the surface water on either side of the rip within about a cable of each other were 35° on its eastern side and 48° on its western side. Eastward of the rip the stream was running weakly westward, and westward of it at the rate of 2 knots eastward. One

hour afterwards at 5 miles to the westward the temperature was 58° , and it continued between 58° and 60° for 100 miles down the west coast of Newfoundland. The water in the strait is very clear.

Ice.—Vessels crossing the Atlantic from Europe to Newfoundland and the Gulf of St. Lawrence, and to New York, are liable to encounter icebergs or extensive fields of solid compact ice, which are carried southward by the Arctic current, and probably also by the current setting southwestward and southward between Iceland and Greenland. B. A. Chart No. 2058 shows the usual limits within which both field ice and icebergs may be met with, and where it should be looked out for at all seasons, but especially from April to August, both inclusive. It must, however, be borne in mind that in some years ice has been met outside the limits given on this chart. Icebergs have been seen throughout the year northward of the parallel of 43° north latitude, but not often so far south after August.

The southern and eastern limits of field ice are about latitude 42° north and longitude 45° west, but icebergs have been met much farther from Newfoundland; in April, May, and June they have been seen as far south as latitude 39° north, and as far east as longitude $38^{\circ} 30'$ west, whilst in July and August their limits appear to be about latitude 41° north, and longitude 38° west. Heavy floes covering extensive areas and three icebergs were seen at 120 miles off St. Johns in January, 1905. There are exceptional instances on record of icebergs having been seen within 60 miles of Corvo island, and an iceberg has been met with in latitude $36^{\circ} 10'$ north, longitude 39° west.

It is impossible to give, within the outer limits named, any idea of where ice may be expected, and no rule can be laid down to insure safe navigation, as the position and quantity of ice differ greatly in different seasons.

On the Great bank of Newfoundland bergs often move southward or southeastward; those that drift westward of cape Race usually pass between Green and St. Pierre banks. The Virgin rocks are generally surrounded by ice until the middle of April or beginning of May.

The North Atlantic icebergs are sometimes over 200 feet in height and of considerable extent.

The ice formed in the Arctic, borne southward by the current from Baffin bay, blocks the harbors along the coast of Labrador, and the east coast of Newfoundland, commencing at the northern part of Labrador in October, and reaching cape Race about the end of January. The west and south coasts of Newfoundland are not affected by this drift ice, excepting that some small portion passes into and blocks the strait of Belleisle; and that a prevalence of easterly wind between December and May sometimes carries this ice westward of cape Race

along the south coast of Newfoundland. It occasionally reaches St. Pierre, but no ice was sighted from that island after the middle of April during the seven years 1889-1895. With easterly winds the field ice and icebergs may block the harbors on the east coast of Newfoundland until June or even July, but they are usually open in May; in fact, icebergs, not only those derived from Baffin bay, but also those from eastward of Greenland, may be met with at all seasons of the year. Six icebergs were passed at 15 miles eastward of cape Bauld at the beginning of August, 1905.

The first of the floating ice to make its appearance upon the coast is what is known as the "white" or "northern slob." This white slob is the surface ice which is formed to the north and east of Labrador during the early winter months, and is crushed up by the wind and sea and built upon as it journeys south. It is usually found in masses several miles in extent and varying from 3 to 10 feet in thickness.

The main body of the slob is brought down from the north by the Labrador current and continues along the coast, filling the harbors and bays of Newfoundland as it advances. From the lookout of Aillik, on the coast of Labrador, in latitude 55° , the northern slob is observed each year about the 10th of December as a narrow stream, 5 to 8 miles in width, moving southward. This body gradually widens until January, and it may then be 12 to 15 miles in width. About the first or second week in January the sheet ice begins to take the place of the slob and continues to flow southward in the same manner. It is more dense and solid than the slob, but not so thick, except in places where rafting has taken place, and here it may stand from 5 to 20 feet above the water. Isolated bergs are also seen about this time.

The arrival of the slob at St. Johns may be expected from January 15 to February 1. It is often seen 5 to 15 miles distant, drifting to the south, for days before it closes in to the shore or obstructs navigation, and vessels ill adapted for contending with ice have frequently reached St. Johns by rounding the southern tail and approaching cape Race from the southwest. The breadth of the early slob passing cape Spear varies in January from 40 to 60 miles, but it rapidly increases. For February the average is 80 to 130 miles. This, however, is far exceeded in seasons of heavy sheds, when a breadth of 250 to 300 miles is often attained, carrying the ice as far east as 45° west. This extreme breadth is, however, by no means uniform, as the ice, having little depth, is blown along by the wind, and the eastern edge of the main body is deeply indented by bays and prolonged by capes. The main body of the ice itself is intersected by leads and open areas, and is compact or loose according to the direction of the wind, easterly winds (northeast to south-southeast) serving to unite the ice and to

drive it in a solid mass upon the Newfoundland coast, filling Notre Dame, Bonavista, and Trinity bays so that no water can be seen: westerly winds, especially southwesterly, serving to disperse it, a single night of the latter wind often emptying the bays and carrying the stream out of sight to seaward. Between the end of March and the middle of April during ordinary years the ice swings off to the eastward, owing to the failure of accessions from the north and the increasing prevalence of westerly winds. After this date strings of field ice may at times be seen making their way down the coast, occasionally in May and rarely in June. These, however, are for the most part derived from Trinity bay and Bonavista bay, and are not part of the regular northern stream.

The drift of the ice southward from the Arctic has been traced by actual experience. On October 14, 1871, Captain Tyson and a party of nineteen others were separated from the U. S. S. *Polaris* in latitude 77° or 78° north, just south of Littleton island. Unable to regain their ship, the whole party remained on the floe and accomplished one of the most wonderful journeys on record. After a drift of over 1500 miles, fraught with danger and privation, they were finally rescued April 30, 1872, by the sealing steamer *Tigress*, near the strait of Belleisle, in latitude $53^{\circ} 35'$ north, and carried safely into port. No better example than this could be given of the drift from the Arctic basin, illustrating, as it does, not only the journey to the southward, but also the many vicissitudes to which the ice is subjected before reaching a low latitude.

The fields of ice encountered to the eastward of the Great bank are generally detached masses, due either to a temporary diversion of the stream or to the separation of fields of limited area from the main body, the primary cause in both cases being the prevalence of heavy westerly gales. During February these detached fields are reported most frequently north of the 45th parallel, and between the meridians of 46° and 49° . The quantity of this early ice depends, to a large extent, upon the character of the early winter months in the higher latitudes in which the slob is formed. If November and December are mild, the quantity will be slight; the quantity of bergs, or true Greenland ice, reported during the following spring and summer is, on the other hand, quite independent of the severity of the winter.

The destruction or wasting away of the slob and field ice in short periods is very remarkable; and it appears to melt away very rapidly after April. A vessel may be beset in the evening, and by morning all the ice will have disappeared. The ice in strings forms an excellent shelter for vessels hove to in a gale, and is constantly used for this purpose, but these breakwaters may be crushed up and destroyed in a single night.

After the month of May, heavy bodies of northern or Arctic ice are seen moving to the southward every year, sometimes as late as the end of August. It is variable in quantity and breadth, but forms a constant obstruction from Indian tickle, on the coast of Labrador, to the Fogo islands. The stream generally breaks in July.

The bergs which follow the slob and field ice are detached portions of the true polar ice, which is formed upon the land, and carried down to the sea by glacial action. The glaciers perform for these frigid regions the same function as that performed by the rivers of the temperate latitudes by serving to distribute the excess precipitation. From the frozen interior of the Arctic continent these rivers of ice make their way through valley and gorge to the shores of the ocean, and even beyond; the face of the glacier being thrust forward into the sea by the enormous pressure in the rear until the buoyant effect of the water upon the submerged portion is sufficient to detach it from the main body, and the huge fragment becomes a floating island or mountain of ice, which is borne away by the prevailing currents.

The thawing process alone, occasioned by the increased temperature of air and water during the polar summer, would scarcely suffice to reduce these enormous masses of ice to the size usually observed. Their disintegration is brought about ordinarily from within. Even in its original condition the surface of the glacier ice is wrinkled with chasm and crevasse, penetrating more or less deeply into its interior. The deepest of these depressions collect the water due to the melting of the upper part of the berg until they overflow; a fall in temperature occurs, the surface of this water, and later its entire volume, is converted into ice, and by the tremendous expansive force of this change the mass of the berg is shattered.

Once beyond the limits of the polar regions, the process of dissolution is rapid. The berg, always heated upon its southern side, is in unstable equilibrium, and by reason of its frequent topplings, constantly exposes a new surface to the action of the sun's rays. Under these conditions its ultimate annihilation is a matter of a comparatively short time.

The icebergs seen off the Great bank are of such extent and occur in such numbers as to constitute, with their attendant fogs, the most dangerous of all the obstacles with which the navigator of the North Atlantic has to contend. Their frequency in different years varies in a wholly inexplicable manner, certain seasons being notable for their extraordinary abundance, while in others the number observed is far below the average. June is the month during which they are most numerous along the transatlantic route.

The phenomena of the drifting of the bergs to the limits mentioned above have been attributed to the warm waters of the Gulf stream

overrunning the cold Arctic current, while the latter, retaining its progress and direction as a submarine current, transports the deeply immersed ice islands into and across the Gulf stream.

The season during which vessels are liable to encounter ice on the voyage between the Channel and the gulf of St. Lawrence and the northern ports of the United States thus extends from February to August, the reports reaching a maximum frequency during June and July. Isolated bergs, however, may be sighted at any time, and consequently a good lookout is always necessary.

Vessels bound to the gulf of St. Lawrence or Halifax either endeavor to make cape Race by passing north of the Virgin rocks, or, in order to avoid the ice, cross the Great bank on the parallel of 44° north, hauling up on their proper course when past longitude 55° west, as heavy ice is seldom seen to the westward of that meridian.

The vicinity of St. Pierre, Miquelon, is generally free from ice after the middle of April, and sometimes during the whole year.

On the Atlantic coast of Labrador the larger bays freeze solid between December 1st and 15th, and these coasts remain icebound until late in June.

Every sheltered harbor in Labrador and Newfoundland is liable to be frozen over each winter; the harbors farthest northward being blocked earlier and opened later than those to the southward. The usual time of freezing is, in Labrador, November, and in the south of Newfoundland the middle of January; whilst the time of the ice breaking up is, in Labrador, the end of June, and in the south of Newfoundland the middle of April. Intermediate ports vary in time according to position. The times of freezing and opening vary greatly in different years, depending on the severity or comparative mildness of the winter.

Mention is made in this book, in the description of each particular place, of the dates observed of the earliest and latest closings and openings of each port. St. Johns harbor is, however, not often frozen over in winter and is accessible at all seasons, except when the prevalence of easterly winds, in early spring, drives heavy field ice upon the coast; and at times (even as late as August) when icebergs drift into the narrows and render the passage dangerous.

Cabot strait is never frozen completely over, but vessels, not specially built to encounter ice, can not navigate it safely between January and April inclusive, on account of the heavy drift ice which blocks the strait, more especially when the ice forms the Bridge. Sealing steamers attempt it at all times, but are occasionally fast in the ice for days together; there is often difficulty in getting through the inner part of the strait.

The Bridge.—Nearly every year, in the spring, or from about the middle of April to the middle of May, a great rush of ice out of the

gulf of St. Lawrence causes a block between St. Paul island and cape Ray; this block, which sometimes lasts for three weeks and completely prevents the passage of ships, is known as the "Bridge." It is recorded that 300 vessels have at one time been detained by this obstacle, and many wrecks have occurred in consequence, on the coast of Newfoundland.

Ice from the gulf is generally met with in Cabot strait early in January; at this time it is thin, but it increases gradually to as much as 4 feet in thickness: occasionally small bergs, some 18 feet in height, are seen, although a large berg is seldom visible; ice may be said to flow through till May, or even till the beginning of June, according to the season.

A prevalence of northwesterly and northerly winds drives the ice toward the strait and along the west coast of Cape Breton island, when incoming vessels meet no ice except southwestward of St. Paul island. A southwesterly gale occasionally takes the ice out between the Magdalen islands and Cape Breton island, when it meets the main body flowing past Bird rocks, and closes the strait between St. Paul island and cape Anguille. Winds between northeast and south open the Newfoundland coast; and the strait often clears quickly with winds between northwest and northeast, so that in about thirty-six hours very little ice may be visible from cape Ray, but quantities of ice pass through for many days after navigation is open, particularly with northerly winds.

The ice usually passes out of the strait in the direction of Banquereau bank, the eastern edge extending halfway between Seatari and St. Pierre island. Its path broadens when through the strait, and is principally governed by the winds, but under the influence of the current alone the ice drifts southwestward, and in latitude 45° north may be from 10 to 75 miles in width. Much of this is very heavy, and prevents the passage through it of all vessels not specially built to encounter ice. The coast between cape North and Scatari often holds the ice, during easterly winds, until late in May.

Gulf of St. Lawrence and west coast of Newfoundland.—During spring and autumn the navigation of the gulf is rendered difficult by ice, and navigation is entirely closed during the winter. In spring, generally until May, and sometimes early in June, parts of the gulf are usually covered with drift ice, and vessels are sometimes beset in it for many days; if unprepared for meeting ice they often suffer from it and are occasionally lost, but serious accidents from this cause do not frequently occur, as the ice is then generally more or less in a melting state from the effect of the sun and warmer winds. In autumn, accidents from ice seldom happen, except when winter commences unusually early, or when vessels have lingered imprudently late.

The ice forms in the gulf early in December, and being joined by that from the river, is carried by the current toward Cabot strait. The ice in the gulf forms rapidly during the cold season; it is usually in sheets a mile or two in length with passages between them, although sometimes during a prevalence of southwesterly winds it may form an unbroken sheet for a few days, extending many miles, or even from Cow head to Great Mekattina island. In the eastern part of the gulf ice may be met with as late as the beginning of June.

A portion of the ice setting eastward through the gulf appears to split on cape St. George; the main part passes into St. George bay and toward Cabot strait; the other part generally sets east-northeastward, especially in March and April.

The ice, which usually enters the gulf through Belleisle strait early in January, can not at present be traced; it may arrive off Bonne bay during January or February, or it may be driven on to the northern shore of the gulf. Icebergs are rarely found westward of Greenly island, although some have been seen off Natashkwan point. One iceberg and two pieces of ice were seen, at the end of July, 1905, west-southwestward, 27 miles from Rich point. Northwesterly winds close the west coast of Newfoundland, while southwesterly winds open a lane of water inshore. The gulf ice usually clears off the west coast of Newfoundland during the first half of May, but it may remain much later.

Small vessels from the harbors on the northern shore of the gulf and the western harbors of Newfoundland, as well as steamers specially constructed for ice navigation, prosecute the seal fishery in the gulf in March and April.

Belleisle strait.—Thin sheet ice makes its appearance in the strait between the 15th and 25th of December, and at about the beginning of the year ice, several miles in extent and 3 to 10 feet in thickness, passes between the coast of Labrador and Belle isle and drifts into the strait.

Icebergs do not arrive in any great number until after the commencement of April, but from that time until September (or even October) they are numerous and sometimes very large. The greater number of the bergs enter between Belle isle and Labrador and pass slowly through the strait, frequently grounding and breaking up, the broken ice drifting toward the northern shore. It is stated that no bergs ever come ashore on the Newfoundland side. In 1898 many bergs were from 150 to 200 feet in height, and some 500 to 600 feet in breadth. Some of the bergs ground, while others change their positions; no berg drawing more than 30 fathoms of water can reach the western end of the strait without breaking up, and only the smaller bergs pass through; these are occasionally seen as far west as Greenly island, and as far south as Rich point. The bergs are

much more numerous in some seasons than in others; 200 bergs and large pieces of ice were counted in the strait in August of one year, whilst only half a dozen could be seen in the following August. With westerly winds the strait is often clear of bergs. The bergs are a considerable source of danger to shipping during the prevalent thick fogs; in 1898 the bergs kept chiefly on the northern shore of the strait and could generally be avoided by keeping on the opposite side.

After May strings of heavy ice drift in with easterly winds and cause great obstruction, but with light winds these strings do not enter the strait, which may be clear and remain so after April. Between about the 10th and end of June these strings of heavy ice usually fail. (See also pp. 641, 642.)

The first steamers enter the strait between the 7th of June and the 25th of July, and the last pass outward between the 11th and the 26th of November.

In 1899 the first steamer passed westward through the strait on the 22d of June; later than this a number of steamers attempted to pass through, but were compelled, owing to the amount of field ice encountered, to bear up for cape Race and pass southward of Newfoundland.

The ice met with in the gulf of St. Lawrence and its approaches is of three kinds: (1) Berg ice, or the true icebergs, which come into the gulf through Belleisle strait. Berg ice is also found on the southern coast of Newfoundland, nearly as far west as Cabot strait. (2) Flat or pan ice, forming fields or in broken pieces, usually not more than 6 feet thick, but sometimes reaching 10 feet. This jams or shoves along the shore between islands, and may form masses 20 or more feet in thickness, but it can never be mistaken for berg ice. In this flat ice a distinction is sometimes made between northern ice, which finds its way through Belleisle strait, and gulf ice, which is formed in the gulf itself. (3) River ice from the river St. Lawrence and its estuary; this is flat ice, and off the Gaspé coast it can readily be distinguished from the gulf ice.

Caution.—The proximity of ice is indicated by the following signs, and if only one of them is observed caution should be used. Both by day and at night the ice blink is almost always visible on the sky toward the ice. Ice blink is a bright yellowish-white light near the horizon, reflected from the snow-covered ice, and seen before the ice itself is visible. The absence of a swell or motion in a fresh breeze is a sign that there is land or ice on the weather side.

The temperature may fall as ice is approached, if the ice be to windward, but not otherwise, and only at an inconsiderable distance from it. The fall of the temperature of the sea is sometimes a sign either of a cold current or of the proximity of ice, and although the temperature of the sea has been known even to rise close to ice, fre-

quent observations of the temperature both of the air and sea should be taken and considered.

The appearance of herds of seals, or flocks of birds, far from land is a sign of ice.

The ice cracking, or pieces of it falling into the sea, makes a noise like breakers, or a distant discharge of guns, which may often be heard from a short distance.

No rule can be laid down for safe navigation: everything depends on the vigilance, skill, and caution of the navigator. Vessels should pass to windward of icebergs to avoid the loose ice floating to leeward.

Ice terms.—**Field ice** is a large area of unavigable flat ice, the extent of which may not be visible from the masthead.

Floe ice consists of several pieces of field ice frozen or pressed together.

Land ice is field or floe ice attached to the shore since the winter.

Hummocky ice is formed by the edges of ice floes meeting in strong breezes, when they are pushed up and formed into pyramids, which are then named hummocks, and it is of these that the high mounds of ice met with in the gulf of St. Lawrence are generally composed.

Pack ice is a large collection of pieces of ice from broken-up floes or icebergs which have to a certain extent closed together again. The pack is said to be open when it presents leads or lanes of water between the pieces of ice, forming more or less navigable channels, and close when it is not possible to navigate through the pack.

Drift ice is unattached pieces of floating ice, easily navigable.

Brash or Sludge ice is a collection of very small pieces of broken-up ice, through which a ship can easily force her way.

Pancake ice is newly frozen ice of insufficient thickness to prevent navigation, and is sometimes separated into pieces of a form suggestive of the name.

Bay ice is newly frozen ice sufficiently thick to prevent navigation.

Iceberg is floating ice formed on shore and detached from its parent glacier.

Floeberg is a thick piece of salt water ice presenting the appearance of a small iceberg.

A lead or lane is a navigable channel in pack or other ice.

Open water is free navigable water adjacent to ice incumbered water.

Ice foot is the ice frozen to the shore, which does not rise and fall with the tide.

Signals respecting ice.—Information as to ice, wind, temperature, and weather indications can be obtained by communicating with the marine signal stations at cape Race; Galantry head, St. Pierre

island; cape Ray; St. Paul island; Belle isle; Chateau bay; and Amour point.

Information as to the weather, wind, and the movement and condition of the ice in the gulf of St. Lawrence is specially supplied to the signal stations at cape Race, Galantry head, and cape Ray, during April and May, for the guidance of any vessel asking for it.

Buoyage.—The buoyage of the waters of Newfoundland is the same as that for the waters 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 of the channel are painted black and, if numbered, marked with odd numbers, and must be left on the port hand.

Numbers when used are in consecutive order from seaward.

Buoys painted red and black in horizontal bands mark middle-grounds and are left on either hand.

Buoys painted white and black in vertical stripes mark mid-channel or the fairway and may be passed on either hand. These buoys are not often used.

Pillar, light, bell, and whistling buoys mark special positions, a detailed description of which is given when the mark is first established.

Conical buoys, when used, are always on the starboard side of the channel; conical top marks on starboard-hand buoys and cylindrical top marks on port-hand buoys, otherwise the shapes of buoys have no special significance at present.

The rule for coloring buoys applies also to beacons and other day-marks, so far as it is practicable to carry it out.

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.

Wreck-marking vessels exhibit:

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; the ordinary riding light is not shown.

Mariners must pass on that side of a wreck-marking vessel on which the two balls or the two lights are shown.

It is sometimes necessary to temporarily withdraw the buoys in the harbors of Newfoundland on account of ice.

Signal stations.—There are signal and telegraph stations at cape Race, cape Ray, St. Paul island, southern end of Belle isle, Chateau bay, and Amour point. The station at cape Race belongs to

Lloyd's, and the other stations are included in Lloyd's system. Orders forwarded to Lloyd's can be notified to vessels by means of these stations, and vessels signaling to the stations are reported to Lloyd's for insertion in Lloyd's list, etc.

There is also a signal and telegraph station on Galantry head, St. Pierre island.

All inward-bound vessels making their official numbers to any of these stations are reported immediately, and all reports are promptly posted on the bulletin board of the Great Northwestern Telegraph Company's office, Quebec, and on that of the Board of Trade, Montreal. These reports are repeated to the pilot station at Father point, so that pilots may be aware of the locality of inward-bound vessels.

The international code of signals is used for communicating with these stations.

Certain lighthouse stations are also supplied with the international code of signals. (See body of book.)

Marconi wireless telegraph stations.—(See p. 42.)

Telegraph cables. (See p. 41.)

Coal.—Cape Breton coal can be obtained in considerable quantities at St. Johns and port aux Basques in amounts of about 350 to 500 tons at St. Pierre and Bonne bay; and usually in amounts of 50 tons at Twillingate (Toulinguet) and Fogo. Very limited quantities (some 20 tons, and even this supply uncertain) can easily be obtained at Placentia, Burnt islands, Tilt cove, Little bay, Pilley island harbor, Harbor Grace and Belle isle in Conception bay, Trinity in Trinity bay, and at Greens pond and Bonavista in Bonavista bay; also at Salmon river, Blanc Sablon, Battle harbor, and Gready, in Labrador. The only Welsh coal to be got in Newfoundland is at St. Johns; its price is about \$10 a ton, and that of Cape Breton coal \$6 to \$7.50 a ton.

Coal can be sent to any of the above ports from St. Johns, and is sometimes sent to places along the coast between cape Race and St. Johns.

Docks.—There is a dry dock and a floating dock at St. Johns, and there are marine railways at Harbor Grace and St. Pierre.

Repairs to hull and machinery can be executed at St. Johns. (See p. 608.)

Shipwrecks on coasts of Newfoundland.—A wreck chart and pamphlet, published in 1904, show that between the years 1811 and 1900, 524 vessels were wrecked on the coasts of Newfoundland. Of these wrecks, 2 occurred from 1811 to 1820; 1 from 1821 to 1830; 6 from 1831 to 1840; 18 from 1841 to 1850; 40 from 1851 to 1860; 49 from 1861 to 1870; 76 from 1871 to 1880; 123 from 1881 to 1890; and 116 from 1891 to 1900. There were in addition 93 wrecks which are not classed under any particular years.

As the total number of ships employed on these coasts in each year is unknown, the proper percentage of casualties can not be ascertained, and any conclusion that can be drawn from the above list is necessarily incomplete, but it appears, on the surface, that, notwithstanding the introduction of steam, lighthouses, lights, fog signals, etc., and the better knowledge which is now possessed of the coasts of Newfoundland, with the rocks and shoals off them, from the surveys which have been in progress for many years, the number of casualties has not decreased, but has steadily risen. Why this should be is not easy to determine, but it is probable that a considerable proportion of these wrecks is due to the less careful navigation of the present day, especially in fog, owing to the desire of owners and passengers to keep time punctually, which can not be done without greatly increasing the risk of loss. It is significant that, during the period from 1881 to 1901, 83 wrecks took place within the small stretch of coast extending from 30 miles westward to 30 miles northward of cape Race.

Standard time.—No time has been adopted as a standard for Newfoundland, but the mean time of St. Johns is used for railway and telegraphic purposes. This time is 3 h. 30 m. slow of mean time at Greenwich.

Passages and general directions—Steamers—Across Atlantic.—With a view to reducing the risks of collision and to the avoidance of ice, the steamers of the principal trans-Atlantic steamship companies now take the following routes between the British Isles and the English Channel and New York, Philadelphia, and Boston. These routes have the advantages that, in the event of a vessel breaking down, assistance is likely to be at hand; and possibly that sailing vessels will either endeavor as much as possible to avoid their tracks, or at any rate keep a strict lookout when in their vicinity.

EASTBOUND.

At all seasons of the year from New York or Philadelphia steer from the lightships to cross the meridian of 70° west, nothing to the northward of lat. $40^{\circ} 10'$ north.

From January 15 to August 23, both inclusive, steer a course from lat. $40^{\circ} 10'$ north, long. 70° west, by rhumb line to cross the meridian of 47° west, in lat. 41° north, and thence on Great Circle course (nothing to the northward) to Fastnet rock or Bishop rock. If from Boston steer directly for lat. 41° north, long. 47° west, and thence as above directed.

From August 24 to January 14, both inclusive, steer from lat. $40^{\circ} 10'$ north, long. 70° west, to cross the meridian 60° west in lat. 42° north, thence by rhumb line to lat. $46^{\circ} 30'$ north, long. 45° west.

and thence on Great Circle course (nothing to the northward) to Fastnet rock or Bishop rock, always keeping southward of the latitude of Bishop rock when bound to the English channel.

If from Boston steer directly for lat. 42° north, long. 60° west, and thence as above.

NOTE.—Occasionally ice extends over a larger area than usual, and owing to its presence on the above routes it is necessary temporarily to modify them. Thus in 1903, 1904, and 1905 from about early in April to mid-June or early in July, westward-bound vessels crossed the meridian of 47° west, in lat. 41° north; and eastward-bound vessels crossed the same meridian in lat. 40° 10' north.

Notice is given of any change in the routes, which is previously agreed to by the various steamship companies concerned.

JANUARY 15 TO AUGUST 23, BOTH DAYS INCLUSIVE.

Courses (true) and distances (in nautical miles): Sandy Hook light-vessel to 70° west (in 40° 10' north), 95° 50', 177 miles; to cross the meridian of 47° west in 41° north, 87° 17', 1,055 miles, from this last position nothing north of the Great Circle to Fastnet, when bound to the Irish channel, and nothing north of the Great Circle to Bishops rock, when bound to the English channel.

Great Circle to Fastnet.

Distance on Great Circle, 1,651 miles. Total distance, Sandy Hook light-vessel to Fastnet, 2,883 miles.

Longitude.....	47° 00' W	45° 00' W	40° 00' W	35° 00' W	30° 00' W
Latitude.....	41° 00' N	42° 02' N	44° 16' N	46° 10' N	47° 45' N
Course.....	55° 13'	56° 32'	59° 58'	63° 31'	67° 10'
Longitude.....	25° 00' W	20° 06' W	15° 00' W	10° 00' W	9° 36' W
Latitude.....	49° 02' N	50° 00' N	50° 46' N	51° 18' N	51° 20' N
Course.....	70° 54'	74° 43'	78° 34'	82° 27'	82° 46'

Great Circle to Bishops rock.

Distance on Great Circle, 1,764 miles. Total distance, Sandy Hook light-vessel to Bishops rock, 2,996 miles.

Longitude.....	47° 00' W	45° 00' W	40° 00' W	35° 00' W	30° 00' W
Latitude.....	41° 00' N	41° 53' N	43° 52' N	45° 31' N	46° 50' N
Course.....	58° 41'	60° 01'	63° 25'	66° 56'	70° 33'
Longitude.....	25° 00' W	20° 00' W	15° 00' W	10° 00' W	6° 27' W
Latitude.....	47° 54' N	48° 45' N	49° 28' N	49° 42' N	49° 50' N
Course.....	74° 14'	77° 58'	81° 44'	85° 33'	88° 15'

AUGUST 24 TO JANUARY 14, BOTH DAYS INCLUSIVE.

Courses (true) and distances (in nautical miles): Sandy Hook light-vessel to 70° west (in 40° 10' north), 95° 50', 177 miles; to cross the meridian of 60° west in latitude 42° north, 76° 23', 467 miles;

thence by rhumb line to cross the meridian of 45° west in latitude $46^{\circ} 30'$ north, $67^{\circ} 19'$, 700 miles: from this last position nothing north of the Great Circle to Fastnet, when bound to the Irish channel, and as near as possible to, but nothing north of, the Great Circle to Bishops rock, always keeping south of the latitude of Bishops rock when bound to the English channel.

Great Circle to Fastnet.

Distance on Great Circle, 1,411 miles. Total distance, Sandy Hook light-vessel to Fastnet, 2,755 miles.

Longitude.....	45° 00' W	40° 00' W	35° 00' W	30° 00' W	25° 00' W
Latitude.....	46° 30' N	47° 57' N	49° 07' N	50° 01' N	50° 41' N
Course.....	65° 06'	68° 46'	72° 31'	76° 19'	80° 11'
Longitude.....	20° 00' W	15° 00' W	10° 00' W	9° 36' W	
Latitude.....	51° 06' N	51° 22' N	51° 20' N	51° 20' N	
Course.....	84° 03'	87° 57'	91° 52'	92° 10'	

Great Circle to Bishops rock.

Distance on the Track, 1,540 miles. Total distance, Sandy Hook light-vessel to Bishops rock, 2,884 miles.

Longitude.....	45° 00' W	40° 00' W	35° 00' W	30° 00' W	25° 00' W
Latitude.....	46° 30' N	47° 44' N	48° 42' N	49° 24' N	49° 50' N
Course.....	68° 17'	71° 56'	75° 40'	79° 27'	90°
Longitude.....	20° 00' W	15° 00' W	10° 00' W	6° 27' W	
Latitude.....	49° 50' N	49° 50' N	49° 50' N	49° 50' N	
Course.....	90°	90°	90°	90°	

WESTBOUND.

From January 15 to August 14, both days inclusive, steer from Fastnet or Bishops rock, on Great Circle course, but nothing to the southward, to cross the meridian of 47° west in latitude 42° , thence by either rhumb line or Great Circle, or even north of the Great Circle if an easterly current is encountered, to a position south of Nantucket light-vessel; thence to Fire Island light-vessel when bound for New York, or to Five Fathom Bank south light-vessel when bound for Philadelphia, or direct to Boston if bound there.

From August 15 to January 14, both days inclusive, steer from Fastnet or Bishops rock on Great Circle course, but nothing to the southward, to cross the meridian of 49° west in latitude 46° ; thence by rhumb line to cross the meridian of 60° west in latitude 43° ; thence also by rhumb line to a position south of Nantucket light-vessel; thence to Fire Island light-vessel when bound for New York, or to Five Fathom Bank south light-vessel when bound for Philadelphia, or direct to Boston when bound there.

JANUARY 15 TO AUGUST 14, BOTH DAYS, INCLUSIVE.

Great Circle from Fastnet.

Distance on Great Circle, 1,618 miles.

Longitude.....	9° 36' W	10° 00' W	15° 00' W	20° 00' W	25° 00' W
Latitude.....	51° 20' N	51° 19' N	50° 53' N	50° 14' N	49° 20' N
Course.....	264° 24'	264° 16'	260° 22'	256° 31'	252° 41'
Longitude.....	30° 00' W	35° 00' W	40° 00' W	45° 00' W	47° 00' W
Latitude.....	48° 12' N	46° 46' N	45° 02' N	42° 56' N	42° 00' N
Course.....	248° 56'	245° 15'	241° 39'	238° 11'	236° 50'

Great Circle from Bishops rock.

Distance on Great Circle, 1,733 miles.

Longitude.....	6° 27' W	10° 00' W	15° 00' W	20° 00' W	25° 00' W
Latitude.....	49° 50' N	49° 48' N	49° 35' N	49° 03' N	48° 20' N
Course.....	270° 00'	267° 18'	263° 29'	259° 42'	255° 56'
Longitude.....	30° 00' W	35° 00' W	40° 00' W	45° 00' W	47° 00' W
Latitude.....	47° 22' N	46° 06' N	44° 38' N	42° 59' N	42° 00' N
Course.....	252° 14'	248° 35'	245° 02'	241° 34'	240° 13'

Thence 265° 22', 1,028 miles, to a point south of Nantucket light-vessel; thence 266° 51', 164 miles, to Fire Island light-vessel; thence 270°, 30 miles, to Sandy Hook light-vessel. Total distance, Fastnet to Sandy Hook light-vessel, 2,840 miles. Bishops rock to Sandy Hook light-vessel, 2,955 miles.

AUGUST 15 TO JANUARY 14, BOTH DAYS, INCLUSIVE.

Great Circle from Fastnet.

Distance on Great Circle, 1,574 miles.

Longitude.....	9° 36' W	10° 00' W	15° 00' W	20° 00' W	25° 00' W
Latitude.....	51° 20' N	51° 22' N	51° 26' N	51° 20' N	50° 59' N
Course.....	273° 56'	273° 37'	269° 43'	265° 12'	261° 55'
Longitude.....	30° 00' W	35° 00' W	40° 00' W	45° 00' W	49° 00' W
Latitude.....	50° 26' N	49° 38' N	48° 35' N	47° 16' N	46° 00' N
Course.....	258° 02'	254° 12'	250° 25'	246° 43'	243° 48'

Great Circle from Bishops rock.

Distance on Great Circle, 1,703 miles.

Longitude.....	6° 27' W	10° 00' W	15° 00' W	20° 00' W	25° 00' W
Latitude.....	49° 50' N	50° 08' N	50° 19' N	50° 21' N	50° 11' N
Course.....	278° 49'	276° 06'	272° 16'	268° 24'	264° 34'
Longitude.....	30° 00' W	35° 00' W	40° 00' W	45° 00' W	49° 00' W
Latitude.....	49° 46' N	49° 08' N	48° 15' N	47° 07' N	46° 00' N
Course.....	260° 44'	256° 56'	253° 10'	249° 28'	246° 34'

Thence by rhumb line 249° 08', 505 miles, to cross the meridian of 60° west in latitude 43° north; thence also by rhumb line. 251° 41', 455 miles, to a point south of Nantucket light-vessel; thence 266° 51', 164 miles, to Fire Island light-vessel; thence 270°, 30 miles, to Sandy

Hook light-vessel. Total distance. Fastnet to Sandy Hook light-vessel, 2,728 miles; Bishops rock to Sandy Hook light-vessel, 2,857 miles.

Auxiliary steamers may follow the routes given for full-powered steamers or the directions for sailing vessels which are given below.

To and from Newfoundland, etc.—Steamers between the British isles and any part of Newfoundland follow the great circle track; and this route is also taken to and from Belleisle strait, which is much frequented from about June to November by vessels bound to or from the river St. Lawrence.

Those bound westward of cape Race pass southeastward of that cape, making it if the weather is clear, and thence steer for a position southward of St. Pierre island. While on the Great bank of Newfoundland during fog, or when there is uncertainty regarding the position, soundings should be frequently obtained, and an indraft toward the south coast of Newfoundland guarded against.

In making the passage between cape Race and Cape Breton island attention is called to the set of the currents (see pp. 52, 54) and to the necessity of sounding in fog.

The edges of the deep-water channel running through the banks into Cabot strait are especially good guides. In fog cape Pine should not be approached to less than 40 fathoms, nor cape St. Mary to less than 50 fathoms. There is deep water of 100 to 142 fathoms in the approach to Placentia bay.

Cabot strait.—Steamers proceeding from the eastward through Cabot strait, in the spring and with clear weather, should pass the signal station on Galantry head, St. Pierre island, within signal distance, and obtain information as to the state of the ice; or, failing this, obtain the information either from the signal station on cape Ray or that on St. Paul island. After the ice has disappeared, generally about the end of May, keep farther off Galantry head, to avoid the dense fog that prevails in that locality during June and July, and beware of the strong current that occasionally sets into the bays on the south coast of Newfoundland; in fact, during this period it is better to be nearer St. Paul island than cape Ray.

Belleisle strait. From the eastward make Belle isle or its lights, and then keep in the fairway of the strait. From the westward make Greenly island or its light, and then keep in the fairway. For general directions, navigating the strait in thick weather, etc., see p. 643.

Steamers from the north of Ireland intending to pass through the strait of Belleisle cross the meridians of 20° and 30° west in about latitude $56^{\circ} 30'$ north; the meridian of 40° in about 55° north; and that of 50° in $53^{\circ} 30'$ north. If bound to St. Johns, or south of Newfoundland, the same meridians are crossed as follows: 20° west in

about latitude 55° north; 30° west in $53^{\circ} 40'$ north; 40° west in about $51^{\circ} 30'$ north; and 50° west in 48° north.

Caution.—From the character of the streams in Belleisle strait, a vessel passing through it in either direction may overrun her reckoning, or the contrary.

Sailing vessels' routes—British isles to and from Newfoundland.—There are two routes, the northern and the southern. The northern route should, as a rule, be taken only in autumn, when it is free from ice. When clear of the English channel stand northward and cross the meridian of 30° west longitude in about latitude 55° north: then steer, according to destination, for the strait of Belleisle, for St. Johns, or to pass a convenient distance southward of cape Race.

In this route, although heavy weather is frequently experienced, the winds are generally favorable, and the Arctic current assists in the latter part of the voyage.

In thick weather the thermometer may be useful, as the temperature of the water falls on the banks of Newfoundland.

In spring the best route to follow on leaving the English channel is to make a little northing, so as to cross the meridian of 18° west in lat. 50° north, and thence direct if bound to the northern ports of Newfoundland; but if bound to the southern part of the island or to the gulf of St. Lawrence, steer so as to strike the Great bank between the parallels of 45° and 46° north, keeping a good lookout for ice when nearing the ice limits. At this season of the year a lane of water is often found between the ice and the east coast of Newfoundland, extending from cape Race to Bay Bulls, at which latter anchorage a vessel may await in safety a clear passage to St. Johns harbor round cape Spear. Vessels from ports on the east coast of England or Scotland with a westerly wind go northward and round the Orkney islands; those from Liverpool or the Clyde pass northward of Ireland.

Formerly the New York packet ships, when making their winter voyage from Liverpool, kept in high latitudes until nearing Newfoundland. This they did for the twofold object of avoiding the tempestuous weather so generally experienced to the southward, and of obtaining fairer winds. The voyage by this route is shortened in distance; and, although bad weather must be expected, it is not so violent as farther south; besides which the easterly currents are avoided.

The southern route.—After clearing the channel, and if the wind permits, steer to pass midway between Madeira and the Azores, or if the wind does not favor, pass nearer Madeira, into the northeast trade wind. When well in the trade run westward until in about 45° to 48° west longitude, then haul gradually up for cape Race or Cabot strait.

The routes from Newfoundland to the British isles are direct by the great circle, care being taken to avoid ice.

To the gulf of St. Lawrence through Cabot strait, after passing southward of the Virgin rocks and St. Pierre island, endeavor to make St. Paul island (see p. 263) which, being of considerable elevation, bold all round, and well lighted, may be made both at night and by day; with proper caution it may be steered for even in fog, unless it is very thick.

Between cape Race and Cabot strait give the south coast of Newfoundland a wide berth, attend to the set of the current (see pp. 52, 54), and take frequent soundings on the banks, the usual state of weather being fog.

Caution.—In approaching St. Paul island from the eastward with northerly winds, the prevailing south-southeasterly current which at times sets toward Cape Breton island, should be guarded against by sounding on the bank extending off the eastern coast of Cape Breton island.

The south coast of Newfoundland, eastward of cape Ray, is broken, rocky, and dangerous; there is often a strong indraft toward the land, and the tidal streams are influenced by the winds; while southerly and easterly winds, and often also southwesterly winds, bring a thick fog, which is most dense near the lee shore. This coast therefore should not be approached, excepting with a decided northerly wind and clear weather.

NOTE.—With southwesterly winds, while the weather is foggy eastward of the meridian of Flint island, Cape Breton island, it is frequently clear for some miles off the land westward of it.

Magnetic variation.—The magnetic variation changes rapidly from place to place on the coasts of Newfoundland and Labrador. This change, which is shown by the crowding together of the lines of equal magnetic variation on the charts, amounts to 1° in about 45 miles in the vicinity of cape Race, in about 37 to 32 miles on the west coast of Newfoundland, and in about 32 miles near cape Chidley. Great attention is therefore necessary to the course steered by compass.

Observations obtained during recent years show that the secular change in the magnetic variation is in some cases very different from what was anticipated. The results of these observations have been embodied in the chart of the variation of the compass at the beginning of this volume and in H. O. chart No. 2406, curves of equal magnetic variation for 1910, and these charts should be consulted on all occasions when deciding on the variation to be allowed in shaping course, etc.

The **deviation** of the compass should be ascertained when approaching Newfoundland, as the large angle of magnetic dip and the small horizontal force in this region may cause the deviation to be

different from that determined in other places. This applies both to corrected and uncorrected compasses, the change in a corrected compass being largely dependent on the suitability of the correctors, viz. magnets or soft iron, and in an uncorrected compass on the suitability of its position relative to the surrounding iron, especially vertical iron.

Local magnetic disturbance.—In many parts of Newfoundland and Labrador local magnetic disturbances affect magnetic compasses on shore. Although it is not possible that these disturbing forces can extend to vessels navigating off the coasts, yet they may extend to vessels at anchor near the shore and areas of disturbance may also exist in places at the bottom of the sea capable of producing small disturbances in compasses of vessels when in shallow water. Actual experiences of this kind have occurred, but they are not common. In water exceeding 50 fathoms in depth no effect has been observed.

In view of these facts, the method of fixing position by sextant and station pointer is preferable to the method by bearings.

CHAPTER II.

BANKS OF NEWFOUNDLAND AND NOVA SCOTIA BANKS.

Flemish cap, the eastern of the Newfoundland banks, extends within the 100-fathom line, about 50 miles north and south and 25 miles east and west. The least depth yet found on the bank is 58 fathoms, near its southern end in latitude $46^{\circ} 53' N.$, longitude $44^{\circ} 38' W.$, the bottom being sand, mud, pebbles, and large stones. It has only been partly examined. There is deep water between the Flemish cap and Great bank.

Great bank of Newfoundland.—This bank extends between the parallels of $48^{\circ} 35'$ and $42^{\circ} 54' N.$ latitude on the meridian of $50^{\circ} W.$ longitude, and between the meridians of $47^{\circ} 35'$ and $57^{\circ} 20' W.$ longitude on the parallel of the Virgin rocks, $46^{\circ} 25' N.$ latitude; this includes St. Pierre and Green banks, which are in reality a portion of the Great bank.

The form of the Great bank is irregular, but from its eastern limit on the parallel of $46^{\circ} 25' N.$ latitude its edge trends southwestward for about 230 miles, and the water on the bank near this edge decreases in depth, so that on the parallel of $44^{\circ} N.$ there is a depth of only 22 fathoms. On the parallel of $42^{\circ} 54' N.$ and meridian of $50^{\circ} W.$ the bank falls into deep water, and its 60-fathom edge trends northwestward.

The general depth of water on the Great bank, westward to longitude $52^{\circ} W.$, varies from 30 to 45 fathoms, and the bottom is usually sand, gravel, or broken shells. The only known shoals are the Virgin rocks and banks and the Eastern shoals.

Westward of longitude $52^{\circ} W.$, the depth on the shoaler parts of the bank varies from 20 to 50 fathoms, but these shoal parts are separated by channels of deeper water, in one of which, extending southward from Placentia bay, there is a depth of 142 fathoms.

Southeastward of Ballard bank, near cape Race, there is a channel about 20 miles wide and 80 to 100 fathoms deep.

Birds.—Approach to the Great bank of Newfoundland is generally indicated by an increasing number of sea fowl around the vessel. The Great Shearwater, well known to fishermen by the name of

Hagdown, is seen all across the Atlantic, but on the banks they, as well as divers and other sea fowl, become very numerous.

Reported shoal.—A sounding of 8 fathoms was reported in 1874 to have been obtained in latitude $46^{\circ} 12' N.$, longitude $49^{\circ} 35' W.$, approximately.

Eastern shoals, a group of banks, with depths of 7 to 30 fathoms over them, situated about east by south 107 miles from cape Race, are the eastern shoals on the Great bank. The shoals extend about 4 miles north and south, with a breadth of 2 miles; those with depths of 13 fathoms or less break in heavy weather, and a strong breeze causes a confused sea in this locality.

Nine fathom bank, 300 yards across within the depth of 20 fathoms and with a least depth of 9 fathoms, is situated near the middle of the Eastern shoals, in latitude $46^{\circ} 26' 45'' N.$ and longitude $50^{\circ} 28' 10'' W.$

Bogy ledge, the shoalest of four banks, occupying a space 1,200 yards long and 575 yards wide, has a depth of 12 fathoms water on its shoalest part, which is situated northeast $1\frac{1}{2}$ miles from Nine fathom bank.

Saunders shoal, about 300 yards across, with 11 fathoms least water, is situated southeast by east $\frac{1}{2}$ mile from Nine fathom bank. Close southwestward of Saunders shoal is a patch of 7 fathoms, which is said to be the least depth on the Eastern shoals.

Emmeline shoal, of 12 fathoms, is 2 miles north of Nine fathom bank, and the Gilley shoals, of 13 and 12 fathoms, are about a mile south of the bank.

Virgin rocks is the name given to a rocky bank with 3 to 30 fathoms water over it, extending about 9 miles north and south and 2 miles east and west at its broadest part. On this bank is prosecuted the most important hook and line fishery of the banks of Newfoundland.

Main ledge, the largest of the shoaler parts of the bank, is 1,400 yards long and 1,100 yards wide, with depths of less than 20 fathoms. The shoalest spot, a small pinnacle rock with 3 fathoms water over it, on which the sea breaks in heavy weather, is in latitude $46^{\circ} 27' N.$, longitude $50^{\circ} 47' 45'' W.$ From this pinnacle a rock, with 4 fathoms water over it, lies 200 yards north-northwestward, and a rock, with $5\frac{1}{2}$ fathoms water, $\frac{1}{4}$ mile southwestward. These three rocks are small shoals rising above the general depth of 8 to 10 fathoms between them.

South shoal is 1,200 yards long north-northeast and south-southwest and 700 yards wide, with depths of less than 20 fathoms. The least water on the shoal is $4\frac{3}{4}$ fathoms, rock, situated south-southeast, distant $1\frac{3}{16}$ miles from Main ledge; two other rocks, with 5 fathoms least water, lie within 300 yards northwestward from this rock. Two

small rocks, with 9 and 10 fathoms over them respectively, lie near the northern and eastern edges of the bank.

This shoal, though with deeper water, is reported by the fishermen to be more dangerous than Main ledge; the larger area of uneven ground causes the sea to rise more readily, and break more heavily, than on the small pinnacles of Main ledge.

Main ledge and South shoal are the only dangers of the Virgin rocks in ordinary bad weather, but there are several others that break in heavy gales, and the uneven ground, with the tidal streams running over it, produces a confused sea even in strong breezes.

Prairie shoal lies north $2\frac{1}{2}$ miles from the shoalest part of Main ledge, is about 800 yards long and 400 yards broad within the depth of 20 fathoms, has 9 fathoms least water over it, and breaks in bad weather. Between Prairie shoal and Main ledge, at distances of about 1,600 yards and $1\frac{1}{4}$ miles from the ledge, lie Northwest shoal and Maloney ledge, with 11 and 14 fathoms least water on them, respectively.

Ice.—The Virgin rocks are usually surrounded by ice until the middle of April or beginning of May.

Tidal streams.—In the immediate neighborhood of the Virgin rocks and Eastern shoals, the tidal stream attains a rate of $\frac{3}{4}$ knot an hour, but a few miles away from them there is no sensible stream.

Woolfall bank.—It was reported in June, 1900, that a sounding of 9 fathoms, bottom fine brown sand and small stones, had been obtained on Great bank in latitude $46^{\circ} 59' 00''$ N., longitude $51^{\circ} 30' 30''$ W. This shoal has since been unsuccessfully searched for, and its existence is doubtful.

Green banks.—A part of the Great bank to the southwestward of cape Race is known as Green banks; on these banks there is a general depth of 40 to 50 fathoms, stony bottom, but there is deeper water in the gullies around them, and between the two parts composing Green banks.

The deep water gully between Green banks and St. Pierre bank is 14 miles wide with depths of 70 to 90 fathoms; it may assist in verifying the position.

St. Pierre bank is the western part of the Great bank; from its southern end in latitude 45° N., longitude $55^{\circ} 50'$ W., the western edge of the bank trends about northwest for 120 miles to its northern end in latitude $46^{\circ} 40'$ N., longitude $57^{\circ} 20'$ W.

The soundings on this bank vary from 19 to 45 fathoms; generally the bottom is sand and broken shells.

A shoal with 15 fathoms on it was reported on June 11, 1906, by the chief officer of the Danish steamer Nordboen. He obtained the sounding of 15 fathoms on St. Pierre bank, in (approximately) latitude $46^{\circ} 36'$ N., longitude $56^{\circ} 43'$ W. Ten minutes later a second

cast of the lead gave a sounding of 16 fathoms. The position was from dead reckoning, and the vessel was enveloped in dense fog with high and irregular sea.

Burgoe bank, northwestward of St. Pierre bank and separated from it by a channel 20 miles wide, is about 14 miles across northwest and southeast and 10 miles in greatest breadth, within depths of 50 fathoms. The least depth of 27 fathoms on the bank is situated in latitude $47^{\circ} 10' N.$, longitude $57^{\circ} 49' W.$

Reported shoal.—A shoal with 17 fathoms water over it was reported in 1885 to exist in latitude $46^{\circ} 53' N.$, longitude $58^{\circ} 19' W.$, but it was searched for unsuccessfully in a surveying vessel in 1891.

Deep channel.—A channel, about 60 miles in breadth, with general depths of over 200 fathoms, mud bottom, lies between St. Pierre bank, of the Great bank of Newfoundland, and Banquereau and Misaine banks, of the Nova Scotia banks; and this channel continues northward through Cabot strait into the gulf of St. Lawrence.

Nova Scotia banks.—These banks are all fully described in H. O. Publication No. 99, Bay of Fundy and southeast coast of Nova Scotia. They are described here simply because vessels bound from the southward to Newfoundland must cross them or pass between some of them. Of these banks, the principal in extent and most important in position are the Banquereau and Sable Island banks, the former being the easternmost of what may be correctly designated the Nova Scotia banks.

Banquereau bank, with 15 to 50 fathoms, is an extensive plateau of sand, gravel, and shell, and is distinguished from contiguous banks by numerous flat sea eggs without prickles, which are found on the bottom. It extends from about latitude $44^{\circ} 30' N.$, longitude $57^{\circ} 15' W.$, in a westerly direction 120 miles to the meridian of $60^{\circ} W.$ 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 bank by another gully of deep water 9 miles across at its narrowest part, and 75 to 340 fathoms deep.

On referring to the chart it will be seen that its shoalest part, with 15 fathoms, in latitude $44^{\circ} 35' N.$ and longitude $57^{\circ} 54' W.$, is the apex of a ridge (having less than 30 fathoms) upward of 40 miles in length northeast and southwest, and that relatively with the dangers off 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, in the same parallel, the long and 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 the meridian of Sable island.

Soundings obtained by the French cruiser *Naiade* in 1894 indicate that Banquereau bank extends more to the eastward than is indicated on the charts. This vessel, a half hour after not having found bottom in 109 fathoms, obtained a sounding of $40\frac{1}{2}$ fathoms in latitude $44^{\circ} 43' 00''$ N., longitude $57^{\circ} 18' 15''$ W. From the above position the *Naiade* stood west at a speed of 6 to $6\frac{1}{2}$ knots, sounding every half hour, and obtained soundings of 32, $28\frac{1}{2}$, 29, $24\frac{1}{2}$, 16, 20, and 20 fathoms.

In 1904 the cable steamer *Mackay-Bennett* obtained a sounding of 29 fathoms in approximately latitude $44^{\circ} 43' 45''$ N., longitude $57^{\circ} 25' 00''$ W.

Misaine and Canso banks.—Misaine bank lies to the northward of Banquereau bank, between the latter and Scatari island, and between its northwestern edge, with 60 fathoms, and a similar depth on the outer edge of a bank extending from the shores of Cape Breton island, there is a deep gully 25 miles wide, with from 70 to 162 fathoms. The least water yet found on Misaine bank is 36 fathoms, on its southeastern side, 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 latitude $45^{\circ} 28'$ N., longitude $58^{\circ} 10'$ W., and its western extremity is connected with Canso bank by the 60-fathom line.

The northwestern end of Canso bank lies about 16 miles south-eastward of cape Canso, and its eastern side is separated from Misaine bank by a space about 17 miles across, in which are depths of 54 to 79 fathoms, and some patches of 46 to 49 fathoms.

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 100 to 180 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.

Middle ground, about 30 miles to the northward of the western end of Sable island, has as little as 10 fathoms, this depth being found at the extreme southeastern end of the bank; there is also a depth of 14 fathoms toward the northwestern extreme. The bank is about 40 miles in length northwest and southeast, with depths varying from 10 to 30 fathoms, and is separated from the western end of Banquereau bank by a gully 5 miles across, with 100 fathoms. Its northern end extends to within 35 miles of cape Canso, the distance between being occupied principally by a submarine valley, having in one locality a depth of 140 fathoms.

If, in foggy weather, soundings should be struck within the 30-fathom line they will impart confidence in making the coast of Nova Scotia, as the middle of the bank is in about the same parallel as the entrance of Halifax harbor.

Sable Island bank, surrounding Sable island and lying between the meridians of 59° W. and 62° W., is about 140 miles long, in an east by north and west by south direction, and about 60 miles wide, its southern extremity being in latitude $43^{\circ} 10'$ N.

The depths on the bank vary from 10 to 50 fathoms, sand, the shoalest part of the bank lying northwestward of Sable island.

A rocky ledge about 250 feet long and 50 feet wide, with a least depth of $2\frac{1}{2}$ fathoms, lies about 21 miles to the northwestward of the western light on Sable island. As the position of this shoal is uncertain, great caution should be used when in this vicinity.

Emerald bank, about 9 miles westward of the western extremity of Sable island bank, is irregular in form and about 25 miles long north-northwest and south-southeast, and 20 miles wide within the 50-fathom limit. The bank has a general depth of from 40 to 45 fathoms, its least depth, 38 fathoms, being at the northeastern end.

Sambro banks lie with their northeastern end situated about 43 miles southeast by south from Sambro island lighthouse and about 14 miles nearly west-northwest from the northwestern end of Emerald bank; thence the banks within the 60-fathom line extend about 15 miles southwestward; but the western limit is not clearly ascertained. The general depth upon the banks is from 53 to 57 fathoms, sand and gravel, the least known depth being 49 fathoms. A gully about 5 miles wide penetrates from the westward between Sambro banks and the Sambro ledges, the gully having depths from 100 to 112 fathoms.

La Have bank.—The northeastern shoal plateau of this bank, with from 45 to 50 fathoms, sand and stone, is 30 miles in length, north and south, by 18 miles broad, the northern end being about east nearly 60 miles from Baccaro point. Another bank, with 45 to 50 fathoms, exists, 20 miles to the westward of the southern end of the above, from which it is separated only by a shallow gully with from 50 to 60 fathoms.

Roseway bank.—The shoalest part of this bank, with from 31 to 40 fathoms, stone and pebbles, is about 11 miles in length, and its center is on the same parallel as Cape Sable lighthouse and the northern end of La Have bank. Between the 60-fathom lines of La Have and Roseway banks there is a deep channel, with from 70 to 100 fathoms, whilst inshore Roseway bank is connected by a narrow neck with the 60-fathom line of the bank extending along the coast.

Browns bank, within the 50-fathom line, is 55 miles in length, with an average breadth of 15 miles. It lies to the westward of, but

contiguous to, La Have bank, and with it forms an almost continuous bank, following the line of coast off cape Sable at the distance of 50 miles offshore.

Near the western extremity of Browns bank is a sandy rise about 10 miles long north and south, with from 14 to 30 fathoms, the former depth having been obtained in latitude $42^{\circ} 47' N.$, longitude $66^{\circ} 12' W.$ This depth lies about 44 miles south-southwest of cape Sable.

Outside the 50-fathom line of Browns bank there is a deep-water channel 25 miles wide, separating it from the 60-fathom line at the northeastern extremity of Georges shoal, off the Massachusetts coast.

Inside Browns bank there is a narrow deep-water channel with above 60 fathoms, dividing it from the same depth on the edge of the shore bank, which follows, about 30 miles off, the line of coast from cape Sable to Bryer island, abreast which the deep water approaches within 5 miles of the shore.

There are many inequalities on the main shore bank off the southwestern coast of Nova Scotia which it would be useless to describe in detail in these directions, inasmuch as they are clearly delineated on the chart; and by studying this, the navigator will have a comprehensive idea, not only of the positions of, and depths upon, the various small patches, but also of the relative positions of the larger banks.

Caution.—The bottom in the approach to Halifax is very uneven, and soundings over this area have not yet been obtained in sufficient detail to justify much confidence being placed in a position assumed from depths alone.

Fish.—The banks off Newfoundland and Nova Scotia abound in cod and other fish, and during the summer large fleets of fishing vessels anchor upon them. The ordinary track of the mail steamers is left open, but northward and southward of this track there are numerous American, French, and British colonial vessels engaged in the cod fishery.

Although these banks have been frequented by fishermen for over 300 years, the fish show no diminution in number.

Bank eastward of Newfoundland and strait of Belleisle.—A bank, with generally less than 200 fathoms over it, extends about 100 to 150 miles eastward of Newfoundland and Labrador between the Great bank and about latitude $53^{\circ} N.$, although a considerable area with depths of 220 to 270 fathoms stretches south-southeastward from a position eastward some 70 miles from the northern point of Belleisle.

The bank of soundings, on which the least depth of water yet found is 86 fathoms, mud, lying about 28 miles eastward of the northern

point of Belle isle, affords a valuable guide when approaching the strait of Belleisle from the eastward in foggy weather.

Westward of this bank, and between it and the bank, on which the depths are less than 100 fathoms, stretching eastward some 8 miles from Belle isle, the depths are from 101 to 208 fathoms, sand.

Tooker bank.—A series of small banks lies between latitude $51^{\circ} 43\frac{1}{2}'$ and $51^{\circ} 47' N.$, and longitude $54^{\circ} 57\frac{1}{2}'$ and $55^{\circ} 0' W.$ The largest of these banks within the 50-fathom line is about 1 mile long north-northeast and south-southwest, and $\frac{1}{2}$ mile wide, with a least depth of 14 fathoms; the position of this depth bears 70° , distant $17\frac{4}{10}$ miles from Cape Bauld lighthouse. Other heads of 32 to 50 fathoms lie northward and northwestward of this bank, being apparently the summits of a very uneven ridge. Westward of these banks is a large gully, about 90 to 110 fathoms deep, from which the soundings gradually decrease to the depth of 60 fathoms, and thence more suddenly toward the land.

CHAPTER III.

NEWFOUNDLAND, SOUTH COAST—CAPE RACE TO CREW POINT.

Cape Race, the southeastern end of Newfoundland, has a barren appearance, and is faced by cliffs from 100 to 200 feet high, formed of slate in nearly vertical strata. The land rises from the cape gradually, and between 10 and 12 miles to the northeastward are the Red hills, a rocky range, 710 feet high. Close southeastward of the cape lies a detached wedge-shaped rock, 40 feet high.

In moderate weather landing is effected in coves eastward and westward of the lighthouse, but the usual landing is in Cape cove, about $\frac{1}{2}$ mile northward.

Cape Race is bare of trees and has a brown and desolate appearance, but in sheltered hollows and along the courses of the rivulets there is a stunted growth of spruce, fir, and alder. The rocks are of the Silurian system, and are thinly covered with peat and bog.

Light.—A cylindrical tower, 100 feet high, painted red and white in broad vertical stripes, and surmounted by a red circular lantern, on cape Race, exhibits, at 165 feet above high water, a flashing white light, showing 1 short flash of 0.2 second duration, every 5 seconds, and visible in clear weather a distance of 19 miles.

In front of this lighthouse stands an old lighthouse painted in a similar manner.

The keeper's house, close to the old lighthouse, is a square, white building with a red roof.

Fog signal.—A diaphone trumpet, situated in a red building with a high chimney, southward of the old lighthouse and connected with it by a covered way, is operated by compressed air, and sounds, during thick or foggy weather, two blasts of 5 seconds duration every minute, thus: Blast, 5 seconds; silent interval, 15 seconds; blast, 5 seconds; silent interval, 35 seconds.

This lighthouse and fog signal are maintained by the government of the Dominion of Canada.

Signal, telegraph, and ice reporting station.—There is a Lloyd's signal station at cape Race, situated between the lighthouse and the fog-signal house; it is connected by telegraph with St. Johns,

to which place vessels passing are reported. Information as to ice, wind, temperature, and also weather forecasts can be obtained, during April and May, by communicating with the signal station.

A wireless telegraph station has been established by the government of Canada at cape Race lighthouse, which is operated for the Marine and Fisheries Department of the Dominion by the Marconi Wireless Telegraph Company (Limited). The call letters of the station are C E. See page 42.

Tides.—It is high water, full and change, at cape Race at 7h. 0m.; springs rise $6\frac{1}{2}$ feet, neaps 5 feet.

Caution—Currents.—As fog is exceedingly prevalent off the south coast of Newfoundland, especially during June and July, it is necessary to guard against the set of the current and the indraft into the deep bays. See pages 52, 54.

Soundings.—When in the vicinity of capes Race and Pine, obtain frequent soundings, which will be regular and of moderate depth.

From the eastward, after crossing the Great bank, the water deepens to about 100 fathoms; it then shoals on Ballard bank, and after again deepening to 40 fathoms, shoals gradually to the shore.

From the westward in thick weather do not close capes Pine and Race to depths less than 30 fathoms.

Ice.—There may be icebergs off this coast at nearly all seasons. In March, April, May, June, and sometimes July, field ice is often encountered, either on the banks or nearer to Newfoundland. See pages 57–61.

The earliest recorded time of the arrival of northern ice at cape Race is January 17, and the latest April 12, the average time being about the first week in February. The time of the clearance of the ice varies from February 25 to June 7, the average time being about the middle of April.

Ballard bank, situated about 7 miles east-southeastward of cape Race, is $13\frac{1}{4}$ miles in length, parallel to the coast, with a greatest breadth of $4\frac{1}{2}$ miles within the 30-fathom line.

The general depths on the northeastern part of the bank, where the sea breaks in heavy gales, are from 13 to 28 fathoms, except on Tommy and Garrett rocks: on the southwestern part of the bank the depths are from 19 to 29 fathoms.

Tommy rock is small, with 9 fathoms water over it: it lies at the northern end of Ballard bank, with Cape Race lighthouse bearing 245° , distant 11 miles.

Garrett rock, which is the shoalest part of Ballard bank, is small, has 8 fathoms water over it, and lies with Cape Race lighthouse, bearing 261° , distant 9 miles.

A small bank, with 13 fathoms over it, lies with Cape Race lighthouse, bearing 269° , distant $8\frac{3}{4}$ miles.

Patch.—A patch of 12 fathoms lies about north, $1\frac{1}{2}$ miles from the northern end of Ballard bank, with Cape Race lighthouse bearing 237° .

Soundings.—A gully, some 20 miles in width, with soundings of 50 to 110 fathoms, extends southwestward on the eastern side of Ballard bank, between that bank and the northern end of the Great bank. Inshore of the bank the depths increase to from 42 to 43 fathoms, and then decreases to the land.

Cripple rock, bearing 221° distant, $1\frac{1}{2}$ miles from Cape Race, has $4\frac{1}{2}$ fathoms water on it; it is a small pinnacle upon which the sea seldom breaks.

Clearing marks.—Cape Ballard, open southeastward of Cape Race, bearing 33° , leads southward; and Cape Pine, open southward of Mistaken point, bearing 269° , leads southward of Cripple rock.

Shoals.—A patch, with 7 fathoms water over it, bears 207° , $2\frac{2}{10}$ miles from Cape Race lighthouse; a patch of 8 fathoms lies $3\frac{1}{2}$ miles and a patch of 7 fathoms at $4\frac{1}{10}$ miles, both bearing 223° from the lighthouse.

During heavy weather the sea probably breaks on these shoals.

Directions.—In approaching Cape Race from the eastward, after crossing Great bank the water gradually deepens to 90 and 100 fathoms, after which, on Ballard bank, it rapidly shoals to about 25 and 15 fathoms.

After crossing this bank the water again deepens to 40 fathoms and then shoals gradually to the shore, which is generally bold, so that 7 fathoms water is often found at a distance of 200 yards from the cliffs.

Coming from the westward in thick weather, the soundings are so regular that a depth of 30 fathoms may be easily maintained, and both Cape Pine and Cape Race rounded with safety. As the soundings after passing Cape Race deepen, a cast of 60 to 80 fathoms will show the navigator that he has rounded this cape, and, with attention to the lead, a course may be steered to the northeastward with confidence.

Pig bank, on which the depths are 17 to 20 fathoms, extends about $2\frac{1}{2}$ miles northeast and southwest, with a width of rather less than a mile. The eastern end of the bank bears 185° , distant $4\frac{1}{2}$ miles from Cape Race. There are depths of 21 to 26 fathoms around the bank.

Mistaken point, 4 miles west-southwestward of Cape Race, is a green hummock 100 feet high, rising from slate cliffs: on this point is a cairn which is a good mark in foggy weather: but it has not been repaired in some years and may be difficult to make out.

Between Mistaken point and Cape Race is Shingle head, with slate cliffs 100 feet high.

In June and July, the caplin season, a large number of boats are engaged in fishing off this coast.

Horseshoe rock, a patch $\frac{1}{2}$ mile long northeast and southwest and about 800 yards wide, situated with Mistaken point bearing 67° , distant $6\frac{6}{10}$ miles, and with cape Pine lighthouse bearing 283° , distant $9\frac{6}{10}$ miles, has 12 to 19 fathoms water over it.

Nickerson bank is a rocky patch, extending about 1,600 yards north-northwest and south-southeast, with a width of 1,400 yards, within the 20-fathom contour line. On it are two heads of $10\frac{1}{2}$ and 12 fathoms, 150 yards apart, with 13 fathoms between. The bank is fairly steep-to.

In heavy weather the sea probably breaks on the $10\frac{1}{2}$ -fathom head, which lies with cape Race lighthouse bearing 40° , distant $17\frac{6}{10}$ miles and with a long swell from the westward there is a decided lift over the shoalest part of the bank.

It is stated that there are other patches of 11 and 12 fathoms between Nickerson bank and Lamb rock (about 28 miles to the westward).

Freshwater point, west by north 2 miles from Mistaken point, is low, with the land rising in its rear; in the cove northward of the point there is a waterfall 100 feet high.

Current.—In calm weather and after easterly or southeasterly winds the current sets westward round Freshwater point, while it usually sets eastward during and after southwesterly or westerly winds.

Trepassey bay, 12 miles wide at its entrance between Freshwater point and cape Pine, extends 4 miles inland; and within it are Portugal cove, Biscay and Mutton bays, and Trepassey harbor, the last three being at the head of the bay. Between Freshwater point and Portugal cove, $4\frac{1}{2}$ miles north-northwestward, the cliffs are from 100 to 200 feet high and the shore rocky and difficult of access.

Caution.—Many wrecks have occurred upon this shore in foggy weather, caused by the indraft, which sometimes runs 2 miles an hour on the eastern side of this bay. Sailing vessels should keep a good offing, as the wind often falls light near the shore, and the current and drift of the sea are nearly always toward the land.

Portugal cove is rocky and dangerous. On its eastern side a few families live, who farm as well as fish, and have a good stock of cows, horses, and sheep.

Cape Mutton, a round hill 330 feet high, divides Biscay and Mutton bays, both of which should be avoided by sailing vessels. Biscay bay is $\frac{3}{4}$ mile wide and 2 miles long, and at its head is a stream abounding with trout and salmon. With offshore winds, steamers anchor in the middle of the bay in 5 fathoms water, sand bottom.

Powles peninsula, $2\frac{1}{2}$ miles long north-northeastward and south-southwestward and 800 to 1,000 yards wide, forms the western side of Mutton bay and the eastern side of Trepassey harbor; it is connected to the mainland by a narrow shingle beach. Powles head, the southern end of the peninsula, rises to the height of 120 feet, while the land on the western shore of the harbor rises to heights of 400 and 500 feet.

Light.—A square white lighthouse, with sloping sides 30 feet high, on the southern end of Powles head, exhibits, at 101 feet above high water, an intermittent white light, thus: light, 1 second; eclipse, 1 second, which should be seen, in clear weather, a distance of 14 miles.

The keeper's dwelling is attached to the lighthouse and painted white.

Fog signal.—A diaphone trumpet, operated by compressed air, from a white building situated southeastward of the lighthouse on Powles head, sounds, during thick or foggy weather, blasts of 5 seconds duration, separated by silent intervals of 112 seconds.

Signals.—The lighthouse is supplied with the International code of signals.

Shoals.—Shoal ground extends 300 yards southward of Powles head and 800 yards southward from the point northeastward of it.

Trepassey harbor extends about 5 miles in a northeast by north direction, with a general width of 600 yards to $\frac{1}{2}$ mile. A bank with 3 to 5 fathoms water on it stretches off the western shore and leaves a narrow channel, with 5 to 6 fathoms water in it, off Powles peninsula. The northeastern part of this bank is called Meadow bank and has depths of 3 to 12 feet water on it; Meadow spit at the northeastern end of Meadow bank dries for nearly 300 yards offshore.

Savadown rock, with 6 feet water on it, lies about 1,200 yards northeastward of the western point of Powles peninsula, and bears 264° from the first gravel beach, 1 mile northeast from Powles head, and 160 yards offshore.

Emerald shoal, about 700 yards south-southeastward of Daniel point (which divides the northern end of the harbor into two parts), and 270 yards off the eastern shore, has a depth of 11 feet over it at low water—springs, mud, sand, and stones bottom, and 2 to 4 fathoms around it.

Anchorage.—The usual anchorage, in 5 fathoms water, mud bottom, 600 yards north-northeastward of Beach point, is sheltered; but the best anchorage is completely landlocked in 7 fathoms water, mud bottom, above Meadow point.

Pilots.—Fishing boats from Trepassey are nearly always to be found in the offing, and the fishermen are generally qualified to act as pilots.

Directions.—Vessels bound into Trepassey harbor in thick weather should try to make the land on the western side of Trepassey bay, about Baker head, which is bold and lies about 3 miles southwest from the entrance to Trepassey harbor.

From off Baker head, a precipitous bluff 360 feet high, steer toward the entrance of the harbor and keep in the fairway. Sims point, at the southeastern side of entrance to the northeastern arm of harbor, open of Beach point, the northern end of Powles peninsula bearing 28° , clears Savadown rock, and Baker head, the outer extreme of land on the west shore, open of Skinner rocks, also on west shore, bearing 218° , clears Meadow bank.

When about 600 yards above Beach point, anchor in 5 fathoms water, with Beach point and Powles head in line, bearing 207° , or proceed to the anchorage northward of Meadow point, passing between Meadow spit and Emerald shoal, with Daniel point bearing about 354° .

Ice.—During winter, if the ice is heavy on the east coast, blocking access to St. Johns and the eastern harbors, Trepassey harbor may be safely entered, as it is only occasionally blocked by field ice, which arrives about May 1 and leaves about May 10. Winds from north-northeast clear the bay of ice; winds southward of east fill the bay with ice; and southerly winds pack it. The last vessel generally leaves the bay about the end of September.

Tides.—It is high water, full and change, in Trepassey harbor at 7h. 0m.; springs rise $6\frac{1}{2}$ feet, neaps 5 feet. The rate of the tidal stream is only $\frac{1}{2}$ mile an hour.

Trepassey village, with its neat Roman Catholic chapel, is on northern part of Powles peninsula and extends over to the mainland on the eastern side of the harbor, and it may be seen from Mutton bay and from seaward over the shingle beach. There is good sea trout fishing at Trepassey.

Communication.—A steamer from St. Johns calls here weekly from early in May until December. There is telegraphic communication with and a road leading to St. Johns, distant 70 miles. There is a weekly mail service to and from St. Johns by road.

Water can be obtained from a stream near Meadow spit.

The shore of Trepassey bay from the entrance of the harbor to Baker head, a distance of about 3 miles southwestward, is covered with brushwood. Baker head is a precipitous bluff, 360 feet high, whence the shore to Cape Pine, southwestward, distant 4 miles, is barren.

Cape Pine is composed of slate cliffs 200 feet high: on its southwestern side the land is not so steep, but the coast in this vicinity is all fringed with slate rocks in nearly vertical strata. The cape is bare of trees and the land rising at the back is rocky and barren. In

moderate weather boats can land in Arnold cove, about $\frac{3}{4}$ mile westward of the cape, or in a cove 600 yards northeastward. There is a good road from the lighthouse to Meadow bank on the northwestern side of Trepassey harbor.

Light.—A cylindrical lighthouse, 56 feet high and painted red and white in horizontal bands, on cape Pine, exhibits, at 314 feet above high water, a white fixed light, which should be seen between the bearings 230° and 106° , through 0° , a distance in clear weather of 24 miles. Cape Freels, situated westward 1 mile from cape Pine, being low, the light is seen over it, and is not obscured by the intervening land until on a bearing 106° . The keeper's dwelling is connected to the lighthouse by a covered way.

Signals.—The lighthouse is supplied with the International code of signals.

Henry rock, situated with Cape Pine lighthouse bearing 11° , distant $2\frac{1}{16}$ miles, is a small patch with 8 fathoms water over it.

Freels rock, lying 235° , distant 3 miles from Cape Pine lighthouse, is small, with 3 fathoms water on it; there is a clear channel between the rock and the cape, with 9 to 12 fathoms water.

Clearing marks.—Powles head lighthouse, well open southward of Cape Pine lighthouse, bearing 48° , leads southeastward of Freels rock, and Gull island point, open of St. Shots Western head, bearing 346° , leads westward of it.

St. Shots cove, west northwestward 3 miles from cape Pine, formed between Eastern and Western heads, is quite open; a few families reside on its eastern shore, and they are always ready to assist shipwrecked mariners.

Caution.—Many shipwrecks have taken place in the vicinity of St. Shots cove, principally on Eastern head, from which a ledge of slate rocks extends south-southwestward 200 yards. In most cases these wrecks have occurred during foggy weather from neglect to use the lead, and want of attention to the currents. (See pages 52, 54.)

St. Marys bay.—The entrance to St. Marys bay is about 20 miles wide between Western head of St. Shots cove and Lance point, the southern end of the headland separating St. Marys and Placentia bays; the bay runs in north-northeastward about 25 miles and contains several good harbors and numerous coves between headlands.

Both the eastern and western shores of the bay are generally bold and backed by hills from 120 to 500 feet high.

Salmonier river, Colinet, and North harbors are at the head of the bay, where fog is much less frequent and the climate is much finer than at the entrance.

The land, when brought under cultivation, is well adapted for pasture or for the growth of potatoes and the hardier cereals.

Ice.—Southerly and southwesterly winds fill the bay with ice, but northeasterly winds clear it, driving the ice to the westward.

Holyrood bay.—Gull island point is $\frac{1}{2}$ miles northward of Western head of St. Shots cove, and between it and cape English, $5\frac{1}{4}$ miles farther northward, is Holyrood bay, which, being open and exposed to the sea, affords no safe anchorage. Behind the long gravel beach which forms the shore of this bay is Holyrood pond, a body of fresh water 11 miles long and 1 mile wide. A few fishermen reside at the northwestern end of the beach. During spring, when the water rises from the melting of snow, the beach is broken through, and during summer the channel becomes deep enough to permit the entrance of small fishing boats, but in autumn heavy seas usually close it again, so that during winter the pond has no outlet. It is deep, and abounds with codfish, trout, and salmon; and at the head of the pond there is a good brook for trout.

Cape English, a precipitous bluff 330 feet high, appears from the southwestward like an island.

Bank rock, bearing 352° , distant 5 miles from cape English, is small, with 4 fathoms water over it.

Greet rock, with $4\frac{1}{2}$ fathoms of water over it, lies near the northeastern end of a narrow bank, $1\frac{3}{10}$ miles in length, and running parallel to the shore at $\frac{3}{4}$ mile from it. From the rock Lahaye point lighthouse bears 30° , distant $1\frac{6}{10}$ miles.

Clearing marks.—Shag rock, at the southern end of Holyrood bay, well open of cape English, bearing 169° , leads westward of Bank rock; and Lizzy Point, in St. Marys harbor, in line with Doubleroad point, bearing 55° , leads northward of it and Greet rock.

If the clearing marks are obscured, do not approach the vicinity of Bank and Greet rocks to a depth less than 40 fathoms in a ship of heavy draft.

Woody Cove rock, with 4 fathoms of water over it, lies near the northeastern extreme of the narrow bank mentioned above; from it Lahaye Point lighthouse bears 29° , distant $1\frac{2}{3}$ miles.

Lahaye point is situated 7 miles north-northeastward of English cape; a stony shoal, upon which the sea breaks heavily, extends southwestward 800 yards from the point.

Light.—A circular lighthouse, 28 feet high and painted with three red and three white horizontal bands, on Lahaye point, exhibits, at 63 feet above high water, a fixed white light, which should be seen in clear weather a distance of 9 miles.

The red and white bands are continued around a flat-roofed store in rear of the lighthouse.

St. Marys harbor.—The entrance of St. Marys harbor between Lahaye point and Frapeau point, $2\frac{1}{4}$ miles north by west, is about $1\frac{1}{2}$

miles wide, and the harbor extends eastward and northeastward about $6\frac{1}{2}$ miles, gradually narrowing to its head.

The inhabitants, numbering 518, are mostly employed in the fisheries. The land, where cleared of stones, bears good crops of oats, potatoes, and hay; it is cultivated in small patches, and cattle and sheep have fair pasture.

Anchorage.—There is fair anchorage in 6 fathoms of water, sandy bottom, abreast the village on the southern side of the harbor, with the Roman Catholic church bearing 185° , but occasionally a heavy ground swell is experienced here. The best shelter is 2 miles farther up in 7 fathoms water, mud bottom.

Shoals.—Coalpit shoal, with 3 fathoms water over it, rocky bottom, lies eastward of the lower anchorage and 600 yards from Coalpit point. Paddock shoal, with 4 feet water over it, rocky bottom, lies north-northwestward of Northeast beach, near the head of the harbor.

Ice.—The ice in St. Marys harbor is generally thin, and it is seldom so thick as to interfere with anchorage; the harbor is often accessible when an anchorage can not be obtained in Trepassey. Winds southward of east fill the harbor with ice, and southerly winds pack it; northeasterly winds clear it.

Tides.—It is high water, full and change, in St. Marys harbor 7h. 40m.; springs rise $7\frac{1}{2}$ feet, neaps 5 feet.

Communication.—A steamer from St. Johns calls at St. Marys harbor weekly from early in May until December.

Supplies.—Good water can be obtained at the head of the harbor, and small supplies of milk, eggs, and butter at the village.

Mal bay, northwestward of St. Marys harbor, extends 3 miles north-northeastward, and has no safe anchorage except close to its head, in 6 fathoms of water, sand bottom.

Shoal bay, separated from Mal bay by Frapeau point, is open to the prevailing winds, and should not be entered.

Great Colinet island.—Shoal Bay point separates Shoal bay from Colinet passage, and Great Colinet island lies on the western side of the passage. This island is $4\frac{1}{10}$ miles long, 1 mile broad, and attains a height of 333 feet. At the northern end of the island a limited anchorage, called Mother Hicks cove, affords shelter from southerly winds.

Little Colinet island, $1\frac{1}{10}$ miles north-northeastward of Great Colinet island, with a deep channel between, is 1 mile long, $\frac{1}{2}$ mile broad, and 235 feet high. In both Great and Little Colinet islands bare hills rise from rocky cliffs, around which there is deep water.

Colinet passage is 1 mile wide in its narrowest part and clear of dangers except for a rock lying nearly 800 yards north-northwestward of Shoal Bay point and 200 yards offshore; Mussel Pond point, open of Admirals beach, bearing 33° , leads northwestward of this

rock. Anchorage sheltered from southwesterly winds has been obtained under the lee of Admirals Beach spit.

Salmonier river entrance, about northeast, 6 miles from Little Colinet island, is 1,400 yards wide; within the entrance the river narrows gradually, and at the distance of 6 miles receives the waters of a shallow stream.

A shoal sand spit extends 200 yards from Cox point, above the curved gravel beach on the northern side; to clear it keep the southern entrance point open until Little harbor valley bears 106° .

Shoal water extends from the sandy beach in front of Little harbor, and Bluff head just open of Cross point, bearing 39° , clears it. Little harbor is the outlet of a fine run of fresh water and affords, within the sandy beach, safe winter shelter for fishing craft.

Anchorage.—A Roman Catholic church stands on the southern shore of the river at $1\frac{3}{4}$ miles from the entrance; off it there is anchorage in 8 fathoms water, mud bottom; there is also anchorage in 6 fathoms above the sand spit extending from Cox point.

Tides.—It is high water, full and change, in Salmonier river at 7h. 40m.; springs rise $7\frac{1}{2}$ feet, neaps 5 feet.

Haricot bay is northwestward of Salmonier river and separated from it by Haricot point. The bay has deep water, but no safe anchorage.

Pinchgut tickle is a shallow channel, westward of Haricot bay. It lies between Pinchgut island and the mainland.

Pinchgut island, lying between Colinet harbor and Pinchgut tickle, is 3 miles long north and south, with a greatest breadth of $\frac{1}{2}$ mile.

Colinet harbor entrance lies north-northeast, distant 6 miles from Little Colinet island, and it is 1 mile wide between Pinchgut island and Johns pond. The harbor extends north-northeastward about 5 miles, and gradually narrows to its head. Good water may be taken from a river at the head of the harbor.

A few settlers reside at Johns pond, on the western side of the entrance, where there is a fair anchorage for small vessels, which is more convenient for the fisheries than is the harbor.

Shoals.—Johns shoal extends nearly 600 yards eastward from the beach of Johns pond. Shoal water extends nearly $\frac{1}{4}$ mile around Pinchgut point, which is the southern point of Pinchgut island. Back shoal extends nearly 600 yards from Pinchgut island, southwestward of Back point, the northwestern point of the island.

Directions.—Little Colinet island open of Bushy head, bearing 206° , clears Johns shoal; after passing this shoal keep toward the western shore, and in depths of not less than 7 fathoms. Davis point, on the western shore toward the head of the harbor, open eastward of Half island, bearing about 28° , clears Back shoal. Anchor abreast

Half island in 7 fathoms water, mud bottom; this position is the best anchorage in Colinet harbor.

Tides.—It is high water, full and change, in Colinet harbor at 8h. 0m.; springs rose $7\frac{1}{2}$ feet, neaps 5 feet.

North harbor.—The entrance to North harbor is 2 miles north of Little Colinet island. The harbor, which extends north-north-eastward about 5 miles, is clear of shoals, except near the shore, but it is open to the prevailing southwesterly winds, and therefore can not be recommended as a secure anchorage for vessels of any size.

Anchorage.—Small craft anchor in safety in 3 fathoms water, mud, about 4 miles within the entrance, under shelter of a beach on the northern side.

Tides.—It is high water, full and change, in North harbor at 8h. 0m.; springs rise $7\frac{1}{2}$ feet, neaps 5 feet.

Cape Dog, rising 330 feet above the sea, with perpendicular cliffs of slate, lies on the western side of North Harbor entrance.

The shore from cape Dog to Lance point, the southwestern entrance point of St. Marys bay, is slightly indented by several coves.

Branch cove, the most important of these coves, situated 7 miles northeastward of Lance point, is the outlet of a little river; in moderate weather fishing boats cross over the river bar at high water and lie secure.

Branch head, the southern point of the cove, is a steep bluff 260 feet high, and close off it are the Hares ears, two rocks 40 feet high.

Rocks.—The following rocks lie off the western shore of St. Marys bay:

Daly rock, with Maggoty point bearing 278° , distant 1 mile, has a depth of 5 fathoms over it.

Red Head rock, bearing 143° , distant 2 miles from Red head, has 4 fathoms water over it.

Beckford shoal, bearing 70° , distant $2\frac{4}{10}$ miles from the Hares ears, has 7 fathoms water.

Mussel rock, bearing 148° , distant $1\frac{1}{2}$ miles from the Hares ears, has 6 fathoms water over it and is dangerous in a heavy sea.

Red Cove rock, bearing 168° , nearly 2 miles distant from the Hares ears, has 3 fathoms water on it.

Lance point, the southwestern point of St. Marys bay, is low, but the land 1 mile to the northward rises to the height of 200 feet. Shoal water extends southward 400 yards from the point.

Lance rock, bearing 188° , $1\frac{1}{2}$ miles from Lance point, has 12 feet water over it.

Delaney rocks are two rocks of small extent, with depths of $2\frac{1}{2}$ and 3 fathoms, respectively, over them, lying westward of Lance point and northeast and southwest from each other, 300 yards apart. From

the northeastern and shoaler rock Lance point bears 84° , distant $1\frac{1}{10}$ miles.

Bull and Cow, bearing 242° , $1\frac{3}{4}$ miles from Lance point, are black slate rocks, 30 feet high.

The Sunker, a rock nearly awash at low water, bears 185° , distant 800 yards from Bull islet, which is situated close off Bull Island point, and 279° , 2 miles from Lance point.

The coast from Bull Island point trends west-northwestward for $3\frac{3}{4}$ miles to cape St. Mary, forming between two bays which are exposed to the sea.

Cape St. Mary, from a little distance, has the appearance of high table land, at the western extremity of which is the lighthouse.

Light.—A cylindrical red lighthouse, 40 feet high, with dwellings, painted white with red roofs, on each side, all connected by a covered way, stands near the edge of a cliff, 300 feet high, at cape St. Mary, and exhibits, at 390 feet above high water, a revolving light showing red and white alternately at intervals of one minute, which should be seen in clear weather a distance of 23 miles.

The nearest landing place to the lighthouse is at Brierly cove, about 1 mile to the northward.

Signals.—The lighthouse is supplied with the International code of signals.

Tides.—It is high water, full and change, at cape St. Mary at 8h. 30m.; springs rise 7 feet, neaps 5 feet.

Lamb rock, situated in latitude $46^\circ 28' 05''$ north and longitude $54^\circ 01' 30''$ west, and bearing 246° , distant $22\frac{1}{2}$ miles from cape Pine, is a pinnacle, with a depth of 33 feet over it, on a plateau about 200 yards in extent within the depth of 10 fathoms, and 400 yards in extent within the depth of 30 fathoms. With a heavy swell the sea breaks on this rock, and it should always be given a wide berth.

Caution.—This rock lies in the track of shipping passing along the south coast of Newfoundland.

St. Mary cays are two small rocks, 120 yards apart, west by north and east by south and always showing, being nearly awash at high water, bearing 189° , distant $6\frac{1}{2}$ miles from cape St. Mary lighthouse. The sea generally breaks upon the rocks, and the water is shoal around them over an area about 800 yards across. A patch of 6 fathoms bears 89° , 1 mile from St. Mary cays.

The 30-fathoms contour line of soundings is less than 1 mile from St. Mary cays; it is therefore not safe to approach the cape to a less depth than 35 fathoms in foggy weather.

False cay, a rock bearing 185° , distant $5\frac{1}{4}$ miles from cape St. Mary lighthouse, and 53° , $1\frac{1}{4}$ miles from St. Mary cays, has 12 feet water over it.

Placentia bay.—Burin Island lighthouse bears 286° , distant $40\frac{1}{2}$ miles from cape St. Mary lighthouse, and between them is the entrance to Placentia bay, which extends north-northeastward about 60 miles, and contains numerous bays, harbors, and islands.

Fog.—During southwesterly winds the fog is generally very dense on the southeastern side of Placentia bay, especially about the headland of cape St. Mary.

Ice.—Placentia bay is sometimes partly filled with ice early in February, but it is seldom completely filled before the middle of that month; and south to southwesterly winds are necessary to drive the ice in. Soon after the ice from the eastward has rounded cape St. Mary, the strong tidal stream on the eastern shore carries it as far as Ram islands; heavy ice and small icebergs are occasionally carried up to Come by Chance point. The bay is sometimes frozen over.

The southeastern shore of Placentia bay trends north-northeastward from cape St. Mary for 26 miles to the entrance of Placentia harbor. The land is from 150 to 500 feet in height, and the headlands are steep with coves between, affording shelter to a few scattered fishing stations. The land when cultivated yields good crops of potatoes, oats, and hay.

Rocks.—Several rocks lie off the southeastern shore of the bay, which therefore should not be approached to a less depth than 40 fathoms, except in clear weather.

Perch rock bears 320° , distant $5\frac{3}{4}$ miles from cape St. Mary lighthouse, and has 15 feet water over it.

Clearing mark.—Bull and Cow rocks open of cape St. Mary, bearing 123° , leads southwestward of the rock.

Nest rock bears 24° , distant 1 mile from Perch rock, and has 9 feet of water over it; the sea generally breaks on this rock.

Curslet rock bears 231° , distant $1\frac{3}{4}$ miles from Bremé point, and has 12 feet water over it.

Patrick rock bears 283° , distant $1\frac{1}{2}$ miles from the mouth of the river at Patrick cove, and has 9 feet water over it.

Goose shoal bears 315° , distant $\frac{3}{4}$ mile from Goose cove, and has $4\frac{3}{4}$ fathoms water over it.

Girdle rock bears 195° , distant 1 mile from Virgin rocks, and is covered only at very high tides.

False Girdle bears 146° , distant about $\frac{1}{2}$ mile from Girdle rock, and has 6 feet water over it.

South rock bears 173° , distant nearly $\frac{3}{4}$ mile from Girdle rock, and has 9 feet water over it.

Virgin rocks, three black rocks above water, one of which is 18 feet high, lie $1\frac{1}{2}$ miles from the shore, and bear 216° , distant $6\frac{1}{4}$ miles from Verde Point lighthouse.

Gibraltar rock, with 5 feet water over it, bears 249°, distant 1½ miles from Verde Point lighthouse. The channel between this rock and the shore is clear, but there is a patch of 5 fathoms at 1300 yards east-southeastward of the rock.

Clearing mark.—Castle hill, in line with Verde point extreme, bearing 69°, leads close northward of Gibraltar rock.

Verde point, north-northeastward 26 miles from cape St. Mary, is the southwestern entrance point of Placentia road; a stony shoal extends north-northeastward nearly ½ mile from the point.

Light.—A light tower rising above a flat-roofed dwelling, painted white and altogether 44 feet high, on Verde point, exhibits at 98 feet above high water, an intermittent white light, thus: light, 2 seconds; eclipse, 1 second, which should be seen a distance in clear weather of 11 miles.

Placentia road.—Crèveccœur point lies northeastward 1½ miles from Verde point, and Placentia road, extending east-southeastward about 1½ miles from between them, affords indifferent anchorage in depth of less than 5 fathoms, sand and gravel bottom. The roadstead is open to winds from west-southwest to north-northwest, which send in a heavy sea, and no vessel should remain at this anchorage when the wind veers from south-southwest to west-southwest, or west, especially if the barometer is low.

Privéccœur shoal, a patch of 2¾ fathoms least water, lies in the fairway with Crèveccœur point bearing 83°, distant ½ mile.

Shoal.—A 3-fathom patch lies in the roadstead, with Verde Point lighthouse bearing 243°, distant 1 mile.

Leading mark.—The northern house on Town point, open southward of Castle hill, bearing 89°, leads nearly in midchannel between Privéccœur and Verde Point shoals. See also page 99.

Telegraph cables.—Six telegraph cables are landed at Fresh-water cove, on the northern side of Placentia road.

In order to avoid fouling these cables, vessels should not anchor within ¼ mile of the northern side of the roadstead till eastward of the line of the cable hut bearing 359°.

Ice.—Placentia road is filled with drift ice by southwesterly to northwesterly winds, but northeasterly winds clear the road; and anchorage can generally be obtained, by vessels drawing 12 feet water, in the northeast arm, where the ice is kept open by the current. The northeast arm occasionally freezes between January 6 and February 10, and the ice breaks up between the end of March and April 7; although in severe winters it has not broken up before May 1.

Placentia harbor is entered from the eastern end of Placentia road by a channel, 65 yards in width between the low entrance points, and only 10 feet deep at low water. At the time of Cook's Survey (1765), there was a depth of 20 feet at low water in the channel.

The harbor may be recognized by the hills in the vicinity which are rounded and detached and are higher than the table-land of cape St. Mary.

The northeast arm of the harbor extends about $1\frac{1}{2}$ miles in an east-northeasterly direction, with a general width of 575 yards and depths of $3\frac{1}{2}$ to 5 fathoms: it then turns eastward for a further distance of about 3 miles.

The southeast arm is entered from the northeast arm by a narrow channel passing on the eastern side of the town; it is navigable only for boats.

Anchorage.—Within the channel the northeast arm of the harbor affords sheltered anchorage in 5 fathoms water, mud bottom. The best berths are on the northern side, being more out of the whirl and eddy of the tidal streams.

Directions.—The rate of the tidal streams, which run about 4 knots, and the absence of good leading marks, render the aid of a pilot necessary to enter the harbor.

Tides and tidal streams.—It is high water, full and change, in Placentia harbor at 8h. 30m.: springs rise 7 feet, neaps 5 feet.

Placentia town, which is small, but was formerly a place of some importance, stands partly on the eastern side of an extensive shingle beach of southeast arm and partly on the shore of northeast arm; it has four hotels and a large Roman Catholic church; the population is about 563.

There is a fair road to St. John's, and two ferryboats convey passengers to and fro between the two parts of the town. During July the arms of the sea abound in sea trout, and there are numerous streams and small lakes affording excellent trout fishing. Deer can generally be obtained in the vicinity during the season.

Communication.—There is railway communication with St. John's, distant $84\frac{1}{2}$ miles, via Placentia junction and Whitbourne, the railway wharf being close southward of Castle hill. A steamer runs fortnightly to Halifax, via Bras d'Or lake, Cape Breton island; a steamer runs weekly to St. Johns; and the Placentia bay steamer leaves twice a week during the navigable season. There is telegraphic communication over the Anglo-American Telegraph Company's wires. See also pages 37, 38.

Supplies.—Mutton can be purchased here in moderate quantities, and good water can be procured about 1 mile up the northeast arm.

The shore of Placentia bay from Crèveceur point trends north-northwestward for 1,500 yards to Moll point, forming a bight between; then about north for nearly 1 mile to Shalloway point; whence, forming a bight, it continues in the same direction for 2 miles to Latine point. Signal hill, within Crèveceur point, is 377 feet high.

Shalloway point is a low projection faced by a sand cliff 30 feet high, within which are several houses; it is the southern extreme of Marquise, the shingle beach that divides Sandy cove from the sea.

Moll rock bears 266° , distant 1,500 yards from Shalloway point, and has 6 feet water over it.

Leading mark.—Dixon point, south-southwestward of Placentia town, in line with Crève-cœur point, bearing 115° , leads $\frac{3}{4}$ mile southwestward of Moll rock, and nearly 400 yards northeastward of Privé-cœur shoal.

The Deadman, a rock awash at low water, bears 351° , distant $1\frac{1}{10}$ miles from Shalloway point.

Little Placentia peninsula, rising 75 feet above high water, is formed of gravel deposit covered with marsh and faced by sand cliffs 30 to 40 feet high. These slope to a low point at the north and rise again to Latine point, the northwestern point of the peninsula, 38 feet high, on which is a flagstaff. The peninsula is 2 miles long north and south, expanding from the narrow neck of Marquise to $1\frac{1}{2}$ miles in width at the northern end. On this northern end is a beach of shingle, 5 feet above high water, surrounding a pond, the entrance to which is gradually silting up. There is no passage at low water even for a boat.

Light.—A square tower with sloping sides, 30 feet high, and painted red and white in horizontal bands, on Latine point, exhibits at 42 feet above high water a fixed red light that should be seen in clear weather a distance of 10 miles.

Two white buildings with black roofs are situated near the lighthouse.

The exact position of the lighthouse is not given, but it has been placed on the chart with the flag-staff on the point bearing 45° , distant 375 yards.

Shoals.—Two patches of $2\frac{3}{4}$ and 3 fathoms water bear 8° , distant 600 yards and $\frac{1}{2}$ mile, respectively, from Latine point, and shoal water extends from the point to a depth of 3 fathoms for $\frac{1}{2}$ mile, and to a depth of 5 fathoms for $\frac{3}{4}$ mile. White point, bearing 124° just open of Isaac point, leads clear in $5\frac{1}{2}$ fathoms.

The Pond.—Close eastward of Latine point is The Pond, about 800 yards in length and 400 yards in breadth, with $3\frac{1}{4}$ fathoms water in places; there is no passage into it.

Roche point is the extremity of a shingle spit, 9 feet high, forming a basin between it and The Pond, sheltered by a bar. This basin forms a shelter for the fishing fleet of the neighborhood, and is entered on a course of 140° , keeping the western side of Roche point close aboard, and looking out for the shoal which continues about 200 yards in the direction of Roche point. Houses line the shore within the basin, and a Roman Catholic church, with a scaffold

belfry near it, shows conspicuously. The 5-fathom line of soundings is $\frac{1}{2}$ mile to the northward of Roche point.

Virgin point, the northeastern point of Little Placentia peninsula and the turning point into the harbor, has shoal water extending 200 yards to the eastward.

Little Placentia harbor, on the southeastern side of the peninsula, extends about southwest by west $1\frac{8}{10}$ miles, with a width of 1,400 yards at its entrance, decreasing to 300 yards at its head. A shoal stretches southward 600 yards from the northern side of the harbor at 800 yards within the entrance.

Anchorage.—There is anchorage in Sandy cove, at the head of the harbor, in 12 fathoms water, mud bottom; and off Cooper cove, which lies westward of the shoal on the northern side of the harbor, in the same depth. See preceding paragraph.

Directions.—To enter Little Placentia harbor, keep White point, on the north side of Placentia sound, just open of Isaac point, bearing 124° , until Black head, the southeastern extreme of Little Placentia peninsula, is just open of Lowroom point, its eastern extreme, bearing 215° , when alter course to 195° , keeping Long harbor head open northwestward of Isaac point, bearing 16° , until Shalloway point is just shut in with the bluff on Marquise, bearing 232° . This range leads up the harbor, and to the anchorage either in Cooper cove, with the western house bearing northward of 279° , or in Sandy cove on the range.

Ice.—Little Placentia harbor, from Sandy cove to Cairn head, sometimes freezes early in February, but only in severe winters, which occur about every six to eight years, and the ice breaks up about April 1; northern ice generally arrives in March and remains three to four weeks.

Tides. It is high water, full and change, in Little Placentia harbor, at 7h. 58m.; springs rise 7 feet, neaps $4\frac{1}{4}$ feet.

Placentia sound stretches, with one bend, east-southeastward nearly 3 miles.

Isaac heads, two remarkable conical hills, 320 and 427 feet high, form the northeastern entrance point of the sound. The shores fall steeply from wooded hills, and are bold until within $\frac{1}{2}$ mile of the head. Southerly to westerly winds always draw down Little Placentia harbor, and blow with heavy squalls under Isaac heads; even when the wind is light outside, boats should always reef with these winds when approaching Isaac point.

Shoals.—Two shoals, which are the only dangers, are situated in mid-channel southeastward of Isaac heads; the outer, with 3 fathoms water over it, bears 176° distant 1,200 yards from Isaac point; and the inner occupies a space 400 yards long northeast and southwest, and 250 yards wide, on which the least depth is 6 feet, bearing 143° , $\frac{2}{3}$ mile, from Isaac point.

Leading marks.—Fox island, shut in completely with Isaac point, bearing 316° , leads eastward; Long harbor head, open northwestward of Isaac point, bearing 13° , leads 300 yards northwestward; and Sugarloaf, over the first gap in the hills eastward of the Neck of Isaac, and bearing 41° , leads southward of these shoals. To proceed up Placentia sound it is necessary only to observe these leading marks and then keep in mid-channel.

Fox harbor, a mile eastward of Isaac heads, by which it is sheltered, is a shallow basin with houses on the surrounding shores: there are depths of 2 to $2\frac{3}{4}$ fathoms inside, but the entrance between shoals stretching from both shores has only 5 feet in it at low water. Samson point, a low hummock, 45 feet high, under a flat hill 350 feet above high water, is the turning point into the harbor from Placentia sound. Off the point lies Shag rock, 5 feet high.

Ice.—Placentia sound freezes early in February from White point to Coxhill point, and the ice breaks up about April 1.

Ship harbor extends northeastward $4\frac{1}{2}$ miles from Isaac point. It is clear of shoals except close to the shore and within 500 yards of the head.

Northeast cove, the eastern part of Ship harbor at 3 miles from Isaac point, is open to seaward and affords no shelter. It is separated from the main part of the harbor by Sugarloaf point.

Conway cove is on the northwestern side of Ship harbor, and from this cove to the head of the harbor there is anchorage as convenient for vessels.

Two remarkable hills lie on the eastern side of Ship harbor: Sharp peak, 836 feet high, over the head of the harbor, and Sugarloaf, 803 feet high, and faced by shingle débris, sloping to Northeast cove.

Ice.—Ship harbor freezes early in February from the point of Conway cove to Sugarloaf point, and the ice breaks up about April 1.

Fox island lies northward, distant $2\frac{3}{10}$ miles from Latine point: it is 250 feet high, and is partly wooded, the southern part being bare from the summit. Shoal water extends 200 yards from its eastern point.

Moratties are shoal banks extending westward, nearly 2 miles from Ship Harbor point, but there is a channel, with 21 to 27 feet water in it, between Ship Harbor point and the banks. The western patch, with 3 feet least water, bears 109° , distant $\frac{9}{10}$ mile from the western point of Fox island, and is 400 yards long. The eastern patch, 1,600 yards long east and west, is separated by a channel 300 yards wide from the western patch and by a channel 900 yards wide from the shoal water off Ship Harbor point.

Leading marks.—Northeast cove open southward of Sparrow point (the western entrance point of Ship harbor), bearing 84° , leads 150 yards southward of these shoals.

A landslip under Broad cove head, on the southwestern side of Placentia sound, in line with Isaac point, bearing 189° ; or a round hill over Bald Head bay, just open northward of Long Harbor head, bearing 15° , leads between Moratties and Ship Harbor point in $4\frac{1}{2}$ fathoms water.

The only directions necessary for Ship harbor are to observe these clearing marks and then keep in mid-channel to Northeast cove or Cooper cove.

Ship Harbor point is a shingle spit, 6 feet above high water, stretching off the slopes of two cliff-faced hills, 310 and 260 feet high, that mark the northwestern point of Ship harbor.

A bay, 1,300 yards deep, lies between Ship Harbor point and Long Harbor head, divided into two parts (Big Seal cove and Little Seal cove) by a projecting steep point, the slope of a round hill, with numerous boulders at the summit, 500 feet above high water. The south cove, Big Seal, is shallow to the line of the points, but the north has anchorage with shelter from offshore winds in 10 fathoms, taking care to avoid the rocky points off Long Harbor head.

Long Harbor head is a steep, tree-covered point, sloping from two table-topped hills about 300 and 250 feet high. Shoal ground extends 300 yards from this point.

Long harbor runs east-northeastward 7 miles from Long Harbor head. The shores of this harbor are bold-to; but Tim Barrett rock, which dries 1 foot at low water, lies 350 yards off the south shore at $2\frac{3}{4}$ miles within the entrance.

Ice.—In severe winters Long harbor freezes early in February and the ice breaks up toward the end of April. Northern ice arrives only occasionally, about the end of February, leaving toward the end of April.

Crawley island, lying off a projection that divides Long harbor into two arms, Long harbor and St. Croix bay, is 191 feet high. The southeastern point of the island is a shingle spit that extends under water a short distance, and off the western side of the island are some low islets.

Anchorage.—**Civil East cove**, the channel between Crawley island and the mainland, is shallow at its western end, so that only boats can pass at low water; but just inside the eastern entrance there is good anchorage for small vessels in $4\frac{3}{4}$ fathoms water, mud bottom, or just outside for large vessels in 10 fathoms.

St. Croix bay, extending 2 miles northward of Crawley island, is clear of shoals except close to the shore, and affords good anchorage

in 11 fathoms of water, at from $\frac{3}{4}$ mile to within 400 yards of the head. Tom Power lookout, a remarkable conical hill, 562 feet high, is on the northwestern slope. St. Croix point, the northwestern entrance point of this bay, slopes gradually from Tom Power lookout, terminating in an islet about 40 feet high, and a rock that covers 2 feet, close off it.

A shoal with 12 feet of water over it lies 200 yards, and a rocky patch with $3\frac{1}{2}$ fathoms of water over it, lies 700 yards southward from the point.

Shag rocks are two islets in the entrance to Long harbor. The western islet is a flat grass-covered ridge 39 feet high, faced by dark cliffs, with a gap through it near the middle. A reef, awash at high water, lies about 100 yards off the southern end of this islet. The eastern islet, 60 feet high, is wooded and has a double top.

A rock, with 1 foot water on it, lies 140 yards from the western end of these islets; a patch of $3\frac{3}{4}$ fathoms lies north-northeastward about 600 yards, and a rock, on which the depth is 6 feet, bears 59° distant 400 yards, from the eastern end of these islets.

Fish rock, 10 feet high, bears 331° distant $1\frac{7}{10}$ miles from the western point of Fox island, and a rock, with 10 feet of water on it, lies east-southeastward 200 yards from Fish rock.

Ram islands, a group of islands and rocks nearly 3 miles long northward and southward, and lying north-northeastward, distant 2 miles from Fox island, are divided into two parts, the southern known as the Upper Rams, and the northern as the Lower Rams.

The Upper Rams are four in number, namely, Merchant, Burke, Hole-in-the-wall, and King islands.

Merchant island, the southern, is conical, 310 feet above high water, and has a large patch of white moss at the summit that makes it conspicuous from the southward. Off the southwestern end is an islet called Shag rock, low and steep-to. Off the northwestern point is a small island 14 feet above high water, joined by shoal water to Merchant island; and in the channel between Merchant and Burke islands, about 100 yards from the east point of Merchant island, is a rock, with 5 feet water on it.

The channel between Merchant and Burke islands is 400 yards wide, and is clear in the middle; but in addition to the rock mentioned above, there is a shoal, with 6 feet of water, 100 yards from the southwestern extreme of Burke island.

Burke island is composed of a group of conical hills, sloping steeply to the sea, and to a valley in the center of the island. The two highest are over the south shore, 303 and 285 feet above high water. Little Burke island lies off the northeastern end; it has a square top, 42 feet above high water, and a spur rock extending west

from it. There are only $3\frac{1}{2}$ fathoms in the narrow channel between Burke and Little Burke islands.

King island is $\frac{1}{2}$ mile long, and is narrow, consisting of several hummocks joined by shingle beaches. It is off the north end of Merchant island, separated by a channel nearly 200 yards wide, with only 3 feet in it at low water.

Hole-in-the-wall island, so called from a hole in the cliffs on the eastern side, consists of two portions, the northern of bare rock almost joined to the southern, which is a double mound 130 feet high, with a narrow neck between.

The channel between the two latter islands is 150 yards wide, and has $4\frac{1}{2}$ fathoms water in it.

Dangers.—West of these islands is a cluster of rocks and shoals extending westward $1\frac{3}{4}$ miles, through which no vessel should attempt to pass.

Rowland rock, awash at high water and steep-to all around, is the outer of the group, and bears 303° , distant $1\frac{3}{4}$ miles from the southwestern point of Hole-in-the-wall island. Shoal ground, with uneven bottom, extends south-southeastward from Rowland rock, terminating at $\frac{3}{4}$ mile distance in a rocky patch with 16 feet of water on it. This shoal ground is steep-to on its eastern and western sides.

Clearing marks.—Tom Walsh lookout (the first high hill on the southern shore of Long harbor, eastward of Long Harbor head) open northeastward of Merchant island, bearing 109° , leads northeastward of the shoals, and the southern shore of Long harbor open southward of Ram islands, bearing 75° , leads southward of them.

Red island shoal, an isolated ledge with 4 feet water over it, and deep water at 100 yards around, lies in the fairway of Placentia bay, with Fish rock, bearing 131° , distant nearly 2 miles, and Rowland rock, bearing 68° , distant $1\frac{1}{2}$ miles; it breaks only in heavy weather.

Clearing marks.—Fish rock, well open eastward of Fox island, and bearing 127° , leads southwestward; and Tom Power lookout shut in with the Lower Rams, bearing 74° , leads northward of this shoal.

The Lower Rams are a group of low islets and rocks, which should not be approached nearer than a quarter of a mile: the highest is about 60 feet high. Harbor island, the largest, near the southern end of the group, is so called from an inlet on its northern side, which nearly dries at low water, and where fishing craft shelter.

Between these islands and the mainland are several banks with $7\frac{1}{2}$ and 8 fathoms, but there are no dangers except the following:

A shoal, with $4\frac{1}{2}$ fathoms water, bears 86° distant 1,600 yards from Gull island, the eastern of the Lower Rams.

Communication.—The steamer from Placentia calls at Ram islands weekly.

The coast north of St. Croix point consists of two deep bays.

Cove nan droich clochan, or cove of the three stones, extends nearly 1 mile north-northeastward from St. Croix point, and it is clear to within 200 yards from the shore.

Bald Head bay lies north-northeastward of Cove nan droich clochan, and is clear to within 200 yards of its head. The dividing point between these bays is foul at the distance of 200 yards.

Bald head, a conical mound 120 feet high, is the western end of the north shore of the bay, and is steep-to. This head is the termination of a long mossy slope, at the inshore end of which is a curious pinnacle. Off the northern extreme of the head is a small island separated by a narrow channel from the mainland.

Moany cove, northeastward of Bald head, is 400 yards deep, with a shingle beach at the head. Small vessels anchor with offshore winds in good holding ground near the western shore in 6 fathoms water, sand bottom.

Brine islands, a cluster of a great many islets and rocks, are separated from Bald head by a channel $\frac{1}{2}$ mile wide. Woody island, the highest of the cluster, is 115 feet high. The only easy passage through these islands is between Woody island and the next island northwestward; it should be taken in mid-channel.

Dick Burns rock lies southwestward, 400 yards from Woody island, and has $4\frac{1}{2}$ fathoms water over it.

Hog Rock, bearing 121°, distant 400 yards from the southwestern end of Woody island, covers 5 feet, and is the only danger in the fairway, the other rocks being above water.

Blue Shag island, 33 feet high, is the northern Brine island: it is named from the peculiar bluish gray color of the rock, and in that respect is unlike any other in the locality.

Isaac rock, bearing 336°, distant 1,200 yards from Blue Shag island, with 4 fathoms of water over it, is the only danger northward of Brine islands. There are several fishing banks northward and westward of Isaac rock, but none are dangerous.

Hammer rocks, bearing 38°, distant 700 yards from Blue Shag island, are a group the outer of which just covers at high water: the group is steep-to on its northern and eastern sides.

The coast from Moany cove to Kamishgut consists of a series of coves and heads with few prominent features.

Corbin head, a wedge-shaped hummock 70 feet high, is situated north-northeastward $1\frac{1}{2}$ miles from Bald head; and Corbin shoal, with 16 feet water over it, bears 274°, distant 700 yards from it.

Trinny Cove head, 1 mile north-northeast from Corbin head, is separated from the main ranges by a deep valley, drained by a considerable stream that empties into Trinny cove, south of the head, through a sandy beach with an islet off it. There is enough water

for boats to enter at high tide, and shelter is sometimes sought here while obtaining wood or from stress of weather.

Hiram rock, 4 feet above high water, lies off this head.

Red Cove head, north-northeastward $3\frac{1}{2}$ miles from Bald head, forms the southern side of Red cove, and the entrance to Famishgut. A rock, with 10 feet water over it, lies 100 yards off the western point of the cove.

Famishgut extends north-northeastward $1\frac{3}{4}$ miles from Red Cove head. A rock, with 3 feet of water over it, lies 200 yards off the northwestern shore, and $\frac{1}{2}$ mile from the black islet off the northwestern head.

Leading mark.—Trinny cove (Grassy island open of this black islet leads just southward of this rock, the only shoal in the anchorage.

At the head is a pond into which boats pass at high water for shelter from onshore winds. The northwestern entrance point is foul for 150 yards off it.

Famishgut island, about 50 feet high, lies 300 yards off the northwestern head. A shoal, with 12 feet of water on it, bears 290° , distant 870 yards from the western point of the island.

Anchorage.—There is anchorage, with shelter from winds between south by west and west, off a cove on the southeastern shore in 8 fathoms water, mud bottom.

Water may be taken from a stream flowing from a lake into this cove.

Tides.—It is high water, full and change, in Famishgut at 8h. 4m.; springs rise 7 feet, neaps $4\frac{1}{4}$ feet.

Trinny Cove islands front the shore of Placentia bay between Bald head and Famishgut, and lie westward from Famishgut; the rock and shoals about the islands are very numerous, and there is no passage among them. The northern and most conspicuous, Grassy island, is flat and covered with grass. Toward the southern end of the group is Stone island, an isolated white rock, 30 feet high, 200 yards square, lying $1\frac{1}{2}$ miles northward of Brine islands.

A patch of 11 feet lies with the northeastern point of Trinny cove bearing about 82° , distant $1\frac{5}{10}$ miles.

The bank on which these islands and shoals lie falls suddenly on its western side, the depth increasing from 30 to 60 fathoms in $\frac{1}{4}$ mile.

Directions.—Keep Fox island open westward of Ram islands, bearing 182° to pass westward of all these shoals; in foggy weather, do not stand in to a depth less than 60 fathoms. It is not advisable to take the passage eastward of the group without local knowledge.

The shore of the bay from Famishgut point trends north-northeastward, with deep coves and wooded hummocks 300 to 395 feet high, backed by the conspicuous and serrated ranges, Kite and Doe hills.

The Tickles, at $1\frac{1}{2}$ miles from Famishgut point, are a cluster of rocky islets sheltering a space large enough for a few fishing boats, which enter between the two northern rocks.

Burnt head, 2 miles from Famishgut point, is a flat-topped, isolated range, with a peak at each end 180 feet high. Burnt Head sunker, 300 yards off Burnt Head point, covers 4 feet at high water, and is bold-to on its western side. A shoal with 12 feet of water bears 8° distant 300 yards from it.

Shag roost, 1,400 yards from Burnt Head, is a small conical islet, 66 feet high, and from its white color shows plainly against the land.

Winging rock, bearing 261° , distant $\frac{1}{4}$ mile from Shag roost, is 3 feet high, and steep-to on its western side.

Rocks and shoals.—A group of rocks, that cover, extend westward $1\frac{3}{4}$ miles and southward from Winging rock.

There is no passage through the group and vessels must keep westward of it.

Tom Sheaves rock, with 3 fathoms water, is the southwestern of these dangers, and bears 329° , distant $1\frac{1}{2}$ miles from Famishgut island.

Big sunker, which covers 1 foot at high water, is the western, bearing 346° , distant 2 miles from Famishgut island. A shoal with 7 feet of water bears 312° , distant $\frac{1}{4}$ mile from Big sunker, and sunken rocks extend southward from the latter 600 yards.

Northwest rock covers 4 feet at high water, and is the northwestern extreme of a line of shoals surrounding Big sunker; it bears 8° , distant $\frac{3}{4}$ mile from Big sunker.

Middle rock, the northeastern of these shoals, bearing 264° , distant 550 yards from Northwest rock, covers 2 feet at high water, and is steep-to on the north side.

Little Pinchgut, north-northeastward 1 mile from Shag roost, is fronted by barren rocks and shoals, but affords good shelter for small coasting craft.

A narrow passage leads between the shoals to the anchorage in 4 to 6 fathoms water, but its navigation requires local knowledge.

Tides.—It is high water, full and change, in Little Pinchgut harbor at 7h. 51m.; springs rise 7 feet, neaps 5 feet.

Great Pinchgut, a bay encumbered with shoals and affording no shelter, lies northward of Little Pinchgut. Pinchgut point, the western point of the bay, is a long, narrow, sloping point, terminating in a small islet 37 feet high. A rock, awash at high water, lies close northward of the islet; and a shoal extends 600 yards south-southwest.

The shore northward of Pinchgut point is rugged and shoal, with rocks off all the points and should not be approached within 400 yards distance.

Little Harbor island, situated northwestward, 1 mile from Pinchgut point, is 43 feet high and flat-topped; low rocks extend west-southwestward for $\frac{1}{2}$ mile from the island, the western being awash at high water.

Large vessels should not pass between Little Harbor island and the mainland.

Allen shoal, bearing 225° , distant 1,200 yards from Little Harbor island, has 10 feet water over it and is steep-to except on the southern side.

Big sunker, a rocky patch 300 yards across, with three heads, the shoalest with 1 foot of water on it, lies 800 yards northwest by west from Little Harbor island. Between this shoal and Brennan point on the mainland are two shoals of 4 fathoms of water.

Brennan point, nearly $1\frac{1}{2}$ miles from Pinchgut point, is the turning point of land under the high range over Great Pinchgut, the summit of which, 675 feet high, makes as a square hummock from the southward, while the coast range is flat. Off the point there is a group of low rocks, the northern of which is 4 feet high.

Little harbor, suitable only for small craft, is situated northeastward $1\frac{1}{2}$ miles from Brennan point. The passage into the harbor is 50 yards wide; but only 12 feet can be carried in at low water, and mid-channel must be kept to clear rocks on either hand. Anchorage may be had between the first fishing stages or immediately they are passed, for the water shoals suddenly at the inner stages.

Salls island, 29 feet high, lies northward 1,200 yards from Little harbor and close to the mainland. An islet 8 feet high, with a rocky spit westward of it, lies close westward of Salls island.

Sly boots, a rock with 5 feet of water over it, bears 240° , distant 1,050 yards from Salls island.

Clearing mark.—The summit of Butler head, open westward of Woody island, bearing 355° , leads nearly 100 yards westward of this rock.

Little Harbor head, 750 yards from Salls island, is a point sloping from a round wooded hillock 125 feet high, and is bold-to all around.

Island Cove head, 3 miles northward of Little Harbor island, is a perpendicular cliff 75 feet high, backed by a wooded hummock that is conspicuous from the southward.

La Manche, a cove $\frac{3}{4}$ mile deep and $\frac{1}{2}$ mile broad, lies north-northeastward of Island Cove head. The land in this locality consists of high barren ranges, the culminating point, over the head of La Manche, being surmounted by a cairn 615 feet above the sea.

On the peninsula forming the western shore, the hills are 230 feet high in the background, gradually decreasing in height, in a series of hummocks to the point. Intersecting these hills are numerous

valleys, down many of which streamlets run from ponds situated between the hills.

There are lead mines on the eastern shore of La Manche, and the buildings show out prominently from the westward; the ore is of very fine quality, producing 82 per cent of metallic lead and a percentage of silver. A wharf has been erected in a small cove below the mines where small vessels can load, but the cove affords no shelter from onshore winds.

Anchorage may be obtained in 6 to 7 fathoms water, gravel bottom, and fair holding ground, sheltered from winds from west-northwest, through north and east, to south-southeast.

La Manche head is a wooded head, forming the west point of entrance. Some low rocks lie off it, steep-to on the western side, and about 200 yards from the shore.

A rock that covers 5 feet lies 100 yards off the western shore, $\frac{1}{4}$ mile from La Manche head.

Woody island, 92 feet high, is the southern of a group of islets and rocks lying off the peninsula northwestward of La Manche, and which divides that cove from Little Southern harbor.

Grassy island, 65 feet high, is the northern of the group and is faced by block cliffs; a rock, with 3 feet of water over it, bears 15° , distant 100 yards from the island.

Between the group and the land are numerous sunken rocks and shoals, leaving no passage.

Winging rocks, bearing 330, distant 800 yards from Grassy island, are two barren rocks, the southern 30 feet, and the northern 5 feet, high. Sunken rocks lie between them; and a shoal, with 7 feet water over it, 100 yards north-northeastward of the northern rock.

Little Southern Harbor entrance is between Grassy island and Winging rocks and the harbor extends northward $1\frac{1}{4}$ miles. Rocks that cover extend 200 yards off that part of the peninsula forming the southeastern entrance point, and a rock that breaks lies 150 yards off the northwestern entrance point, leaving a passage 100 yards wide between them. The northwestern point slopes from Butler head, a round wooded summit faced on the northern side by steep cliffs, and 201 feet high. Both sides of the harbor have detached rocks off them, but they may be approached to within 200 yards, and the head of the harbor shoals 300 yards from high-water mark.

Anchorage may be obtained anywhere within the line of the points, but the best holding ground is in 7 fathoms water, gravel bottom, just beyond a deep cove on the northwestern shore.

Tides.—It is high water, full and change, in Little Southern harbor at 9h. 30m.; springs rise approximately 8 feet.

Great Southern harbor is entered northward of Butler head, and is separated from the head of Little Southern harbor by an

isthmus 200 yards broad, nearly covered by a pond. The harbor extends northward $3\frac{1}{4}$ miles from Butler head and contains some islands; the shores are steep-to, sloping from wooded ranges; and at the head is Big pond faced by a shingle beach, with a narrow channel passable by boats into the pond.

Duck island, 56 feet high, lies nearly $\frac{3}{4}$ mile northward from Butler head, which is on the western side of the peninsula forming the northwestern side of Little Southern harbor. A rock, that covers 6 feet, with another sunken rock close-to, bears 189° , distant nearly 400 yards from Seal islet (43 feet high), in the passage between Duck island and the mainland, and 400 yards from the latter. Duck island therefore should be closed when taking this channel.

Anchorage may be obtained at the head of Great Southern harbor in 5 to 9 fathoms water, but it is completely open and the holding ground is bad. The best berth is in $5\frac{1}{2}$ fathoms, southward of Tommy Sharp rock, an islet 6 feet high, joined to the peninsula on the northwestern side of the harbor.

Goose island, 81 feet high, is a square grass-topped rock, faced by black cliffs, and separated by a channel, a little more than 200 yards wide and with $3\frac{3}{4}$ fathoms water, from the peninsula dividing Great Southern harbor from Arnold cove.

Arnold cove, which is just westward of Great Southern harbor, contains good anchorage, in $3\frac{1}{2}$ to 5 fathoms water, for small vessels, sheltered from all winds: and for large vessels, in 5 to 7 fathoms, with shelter from all except southerly to westerly winds. The eastern shore is rugged, sloping from a wooded cone 130 feet high; the western shore is fringed by rocks that extend 200 yards from it.

Round rock, 6 feet high, and the furthest rock off-shore, bears 94° , distant 400 yards from Adams head.

Adams head, 104 feet high, is a flat-topped barren mound near the southwestern end of the northwestern shore of Arnold cove, with Adams house, a two-storied dwelling, at its base; this house is conspicuous from all parts of the head of Placentia bay.

Bordeaux island, 138 feet high, wooded and bluff, is separated from the mainland by Bordeaux gut, a narrow passage with water enough for fishing boats at low water. A remarkable quartz vein runs down the cliffs near the southwestern point of the island.

Come by Chance bay, the entrance of which is 2 miles northward from Bordeaux island, affords anchorage in depths of 16 fathoms and less, the former depth being 1 mile within the entrance to the bay.

Jonathan lookout, a conspicuous isolated cone, 712 feet high, bears 3° , distant $5\frac{1}{2}$ miles from Come by Chance point, the western entrance point of Come by Chance bay.

Powder horn, a hill 1,045 feet high, bears 105° , distant $1\frac{3}{4}$ miles, from Jonathan lookout; and from it the range gradually decreases in height to the marsh bordering on North harbor.

The shore.—Rocks extend a short distance from Come by Chance point. The shore then trends north-northwestward, with several rocks near it, round Hollett's cove, which is 600 yards wide, and 400 yards deep. A reef that dries at low water, with sunken rocks at its end, extends 250 yards south-southeastward from the southwestern entrance point of this cove.

Southern head, a wooded promontory 125 feet high, projects a short distance from the shore line, at $\frac{3}{4}$ mile northwestward of Come by Chance point. The shore from this to North harbor is fringed by small islets and sunken rocks and must not be approached nearer than 300 yards.

North harbor.—South point of North harbor is situated $1\frac{3}{4}$ miles northwest from Come by Chance point; the harbor extends $4\frac{1}{2}$ miles northward, and is nearly 1 mile wide at the entrance.

Rocks, that almost cover at high water, lie close to the eastern shore 800 yards northward of South point.

Emberley point, 700 yards farther northward, has a white house on it.

A cove to the eastward of Emberley point, surrounded by rocks that extend 200 yards from the beach, affords good anchorage in a general depth of $5\frac{1}{2}$ fathoms, except with winds from south-southwest to west-southwest.

Small the Maid island, 2 miles within the entrance of the harbor and off the northern entrance point of this cove, is 70 feet high and composed of gray rocks covered by wood, and sunken rocks extend south-southwestward 300 yards from it. Northward of this island shoal water extends 200 yards from the shore and several rocks, some of which cover, lie within that distance. The highest of these, Charley rock, is 9 feet above high water, and lies nearly midway between the island and the head of the harbor.

The west shore of North harbor may be approached to 100 yards, except in the coves.

Jigging cove lies on the western shore, nearly 2 miles from the entrance, and is shallow to the mouth.

Goose island, about 40 feet high, wooded and flat, forms the north entrance point of Jigging cove, and separates it from Goose cove, also shallow to the line of the outer points. A rock lies a short distance from the south extreme of Goose island.

Anchorage.—Large vessels anchor anywhere within the entrance of North harbor, but the water shoals rapidly from 10 to 5 fathoms off Molasses point, southeastward of Goose island.

North Harbor point, the west entrance point of North harbor, terminates on the eastern side in a small, nearly detached, rocky peninsula, 31 feet high, off the southern extreme of which lies a sunken rock.

North Harbor rock, with 6 fathoms water on it, bears 236° , distant 600 yards, from North Harbor point.

Baker cove, situated north-northwestward of North Harbor point, is nearly $\frac{3}{4}$ mile wide, $\frac{1}{2}$ mile deep, and affords anchorage with offshore winds in $4\frac{1}{2}$ to 9 fathoms water, sand bottom. Rocks that cover extend a short distance from the eastern entrance point of the cove, and shoal water extends a short distance from the shore and 100 yards from Baker point, which is a wooded bluff about 120 feet high, projecting 600 yards from the coast northwestward of the cove.

At the head of Baker cove are two beaches of reddish shingle, separated by red cliff, facing a small wooded hillock.

Coast.—The coast from Baker cove trends northwestward for $1\frac{1}{2}$ miles to Placentia Man's point, with slight indentations, thence with a slight change in direction, more to the northward, for 2 miles, to a low wooded promontory faced by shale cliffs, from the foot of which the shore dries a short distance.

A few houses are built on the coast between Baker cove and Placentia Man's point.

Communication. There is a telegraph station of the Anglo-American Telegraph Company on the southern entrance point of Black river. The steamer from Placentia calls here weekly.

Black river, from which the station derives its name, is entered at $\frac{1}{2}$ mile northward of the point on which the station stands, and may be approached to 200 yards by vessels drawing 12 feet water.

Ice.—Black river is generally frozen toward the latter end of January and clear by the middle of April.

Vicuna island, 30 feet high, lies 600 yards west-southwestward from the station point; it is about 200 yards in diameter, and covered with grass over gray rock. Martin Morrissey rocks, a small group about 200 yards in diameter, the highest of the group being only 6 feet high, are nearly joined to the western extreme of Vicuna island.

A rock 4 feet high is situated 200 yards south of Martin Morrissey rocks, and 100 yards farther in the same direction lies a rock that dries 4 feet at low water.

A rock that dries 6 feet bears 262° , distant $\frac{1}{4}$ mile from Vicuna island, and a rock, with 3 feet water, lies between that island and the station point, 200 yards from the latter.

Mouse island is small, covered with grass, and 26 feet high; it is $\frac{1}{2}$ mile northwestward from Vicuna island.

Pipers hole is entered through a channel 400 yards wide, lying 400 yards westward from Mouse island, and extends in a northwesterly direction 4 miles to the freshwater brook at the head.

At 2 miles within the entrance is a sharp bend, 150 yards wide, round cape Pine, through which the tide runs about 3 knots an hour at springs. The arm then expands into a shallow basin, 1 mile long and $\frac{1}{2}$ mile wide, the greater part of which dries at low water. In it are some islands, Birchy island, the highest, being 62 feet high and covered with wood. From the upper part of this basin a narrow stream extends to the head, the northern bend being nearly filled with bowlders.

Southwest of the entrance to Pipers hole are Rocky cove, a small curve in the coast lined with bowlders, and Cock and Hen cove. Shoal water extends a considerable distance off this cove.

Desolate point is the extreme of an isolated hill, 200 feet high, covered with moss, that forms the turning point into the Sound from Pipers hole. Bittern cove, a slight indentation with a shingle beach, is south of this hill. From this point the coast trends in a nearly straight line south by west for a distance of 6 miles, the northern part sloping from high hills, and the coast line of rocks being occasionally varied by small beaches of shingle.

Toby lookout is the highest of the hills immediately bordering on the coast, and attains an elevation of 1,026 feet. This range recedes from the coast in a westerly direction, and becomes barren in the interior.

White hills, another bare range, the highest of which is 1,185 feet above high water, are situated $2\frac{3}{4}$ miles inland, and connected with the western part of the range from Toby lookout. As this range recedes from the coast lower, wooded, and mossy hills fringe the shore.

Anchorage may be obtained at the head of Placentia bay, north-westward of Placentia Man's point, but large vessels should not bring Bloody point, the northwestern end of Sound island, to bear southward of 241° , as the water shoals rapidly from 14 to $3\frac{3}{4}$ fathoms.

Sound island has the shape of an irregular rectangle, $3\frac{3}{4}$ miles long and $2\frac{1}{4}$ miles broad. Its characteristic features are long hills 460 to 360 feet high, covered with white moss, with patches of small wood in the valleys. A sharp peak, 381 feet high, rises near the northern extreme, and the summit, when seen from the western part of the sound, appears an inclined plane, with a steep fall to the western shore of the island. The eastern shore is formed of shale cliffs, the débris from which has accumulated at the base, and prevents landing, except in fine weather.

Catens cove, a small bight in the middle of this shore, is nearly filled with rocks. Net rock, 3 feet above high water, and bold-to on the east side, is north of this cove. To clear the rocks in Catens cove, keep Brimstone point open southeastward of Net rock.

Some white cliffs are near the southern extreme. Woody Island shoal, with $5\frac{1}{2}$ fathoms water, extends 1,300 yards southeast by east from the southeastern extreme of the island.

The south shore curves around Muddy hole, a shallow cove, and thence with a broad sweep to Upper Sandy point, the southwestern extreme of the island, which projects 600 yards from the line of coast, and is surmounted by a hill 118 feet high, covered with yellow moss. This hill, being lighter in color than the mainland, can generally be seen when open of Woody island. The western shore of Sound island is almost straight northward and southward and is bordered by a beach of shingle in front of the steep slopes from the summit. Bloody point, at the northwestern extreme, is steep-to and surmounted by a dark wooded hill.

Jeffrey cove, the northwestern of three on the northeastern side of Sound island, is 1,800 yards wide and 600 yards deep, and has a few houses at the head. A rock, with 7 feet water over it, lies in the middle of the cove, nearly between the line of its outer points; and a shoal, with $3\frac{3}{4}$ fathoms water, lies 200 yards northeastward of the rock. Bitten Cove beach open northeastward of Bloody point, bearing 299° , leads eastward of this shoal.

Maggotty cove is separated from Jeffrey cove by Shepherd point, from which a sunken rock lies 150 yards southeastward. This cove is surrounded by houses and affords good anchorage for a few small vessels in 5 to 12 fathoms of water.

New town, southeastward of Maggotty cove, has a church, which is a plain white wooden building, and several two-storied white houses. A rock that dries 4 feet lies in the middle of the bight off New town, between the line of the outer points, and 150 yards from the shore.

Irish town, southeastward of New town, consists of a few houses built near the head of a cove, which is 1,400 yards wide and 600 yards deep, with bold shores, except off Brimstone point, southeastward of the cove from which rocks extend 150 yards.

Communication.—The steamer from Placentia calls at Sound island weekly.

The sound, between Sound, Woody, and Barren islands on the eastern side, and the mainland on the western, is 500 yards wide at the narrowest part; it is clear in mid-channel between Sound island and the mainland and the eastern shore may be neared to 100 yards.

A few rocks lie off the mainland, but none so far as 200 yards distant.

The channel between Sound and Woody islands, $\frac{1}{2}$ mile wide, is clear, and affords excellent anchorage in 7 to 19 fathoms. Anchorage

may also be had in different parts of the Sound according to the length of the vessel.

Woody islands consist of two large and some small islands. Woody island, the largest, is 2 miles long and nearly 1 mile wide, and is surmounted by wooded hills, the highest being 327 feet high. Hardy rocks are a small cluster situated south-southwestward $\frac{3}{4}$ mile from the northeastern end of Woody island; the highest is 7 feet high, and they are steep-to on the southeastern side.

A rock, that dries 5 feet, lies a short distance from the southwestern end of Woody island.

Creve islets, which are nearly joined to each other and to Woody island at low water, lie off the western coast, and shelter a small cove almost filled with rocks, known as Woody Island harbor; but there is scarcely swinging room for even a very short vessel. A settlement is situated here, with a church and schoolhouse.

The largest of Creve islets is partially wooded and grassy, 25 feet high, and lies 600 yards from the mainland. There is deep water 200 yards distant from the west side.

Anchorage.—There is anchorage for small vessels southwestward of Creve islets, in 8 fathoms water.

Tides.—It is high water, full and change, at Woody island at 8h. 9m.; springs rise 7 feet, neaps $4\frac{1}{2}$ feet.

Communication.—The steamer from Placentia calls at Woody island weekly.

Little Woody island, 183 feet high, is situated 500 yards south-southwestward of Woody island, to which it is joined at its northwestern end by a bar with 1 to 3 feet over it at low water. It is about $\frac{1}{2}$ mile long, $\frac{1}{4}$ mile wide, and is partly wooded over gray rock, the summit 183 feet above high water, falling in a steep bluff to the southeastern extreme. Several pinnacle rocks are joined to the shores, and a sand pit, that covers at high water, extends 200 yards from the northwestern extreme. The other sides are steep-to.

Shag rock, a small pinnacle 15 feet high, lying in mid-channel, between the western end of Woody island and the mainland, has a shoal extending from its southwestern side.

Sugarloaf island, 101 feet high, is situated $\frac{1}{2}$ mile from the southwestern end of Woody island; it should not be closed to less than 200 yards.

La Plante sunker, awash at low water, lies at the end of a bank extending 650 yards south-southwestward from Sugarloaf island. Shag rock, open northwestward of that island, bearing 36° , leads northwestward; and open southeastward, bearing 15° , leads southeastward of this rock.

La Plante is a shallow indentation on the mainland, 1 mile southwestward of Sugarloaf island. This cove nearly dries at low water.

but after half flood boats can enter and obtain water. An islet 27 feet high and covered with grass is situated close off the north entrance point.

Barren island, situated $1\frac{1}{4}$ miles southwestward of Little Woody island, is separated from the mainland by a channel 700 yards wide. It is in the shape of an irregular triangle, the apex being at the south-western extreme, and the island being nearly 4 miles long and $1\frac{3}{4}$ miles wide at the northeastern side.

Two peninsulas extend from its southeastern side: the northeastern forms Barren Island harbor and the northeastern part of Western cove, being connected to Barren island by a beach of shingle between the heads of these coves. Western Cove head, the other peninsula, is joined to the island by a low marshy neck. The island contains three principal hills, the highest of which, near the middle of the island, is 490 feet high.

The southwestern point of Barren island terminates in a small islet, 29 feet high, and surmounted by a conspicuous single tree.

Barren Island harbor, 900 yards long and 150 yards broad, affords shelter to small vessels from all but easterly winds. The anchorage is in 6 to 8 fathoms water, and the shores are bold-to; but the southeastern entrance point must not be rounded closely. A considerable settlement lines the shores, and an old wooden church, with a belfry near, stands on a mound northwestward of the head.

Western cove is situated on the southeastern side of Barren island, being formed by the two peninsulas mentioned above, the entrance between them being $\frac{3}{4}$ mile wide. Western Cove head rises to a sharp peak 223 feet high, is covered with an alternation of wood and grass, and its outer coast is marked by brown landslips. Several round wooded hills lie south of the summit.

James point, the northeastern entrance point, is bold-to, but from West point a bank extends 400 yards. A shoal, with 3 fathoms water over it, bears 107° a little more than 200 yards from West point. The beach at the southwestern head of the cove, open northward of West point, bearing 258° , leads northwestward; and the church in Barren Island harbor, shut in with the southeastern shore of Western cove, bearing 30° , leads southeastward of this shoal.

The northern part of the cove is $\frac{1}{2}$ mile deep and $\frac{1}{3}$ mile wide at the entrance, but narrows to the beach, which is 250 yards broad at the head. From the beach shoal ground extends 250 yards, but south of that the depth ranges from 10 to 16 fathoms in the middle of the cove.

The southern part is 750 yards deep, 400 yards wide at the entrance, and terminates at the head in a shingle beach 200 yards wide.

Glindon cove, a small bight on the shore northwestward of the entrance to Western cove, has a few houses round it: there are also a

few houses round Western cove. Glindon rock, a small bare rock 3 feet above high water, lies close to the shore, south of Glindon cove.

Anchorage.—There is anchorage in either arm of the cove, according to the direction of the wind, in 12 to 16 fathoms water, in the northeastern part, or in 20 fathoms in the southwestern part.

Duck rocks, a ledge of dark, sharp rocks, extend from the southwestern end of Western Cove head. The highest is 61 feet high, has a hole through it; the outer is a small gray rock 12 feet high, and steep-to.

Back cove, close northwestward of Duck rocks, is nearly filled with Back Cove islets, a castellated group, reddish in color, the highest of which is 75 feet above high water.

Communication.—The steamer from Placentia calls at Barren island weekly.

Green island, 850 yards southwestward of Barren island, is 55 feet high and covered with grass over dark gray rock. It is 150 yards in diameter, and has no danger beyond 100 yards from it except on the western side.

Green island rock, with 8 feet water over it, is at the end of a bank extending northwestward 300 yards from Green island and falling suddenly to deep water.

Gulch, a basin 1,200 yards long, and 300 yards broad, on the coast of the mainland westward of Barren island, and nearly $3\frac{1}{2}$ miles south-southwestward of La Plante, has an entrance only a few yards wide, and is filled with large rocks, which leave no passage, even for a boat, at low water springs.

Ship island lies one mile southwestward of the southern end of Barren island; its summit, situated near the middle of its northwestern side, is 248 feet high, round, and covered with wood. A few white patches mark the cliffs near its northern end. The shores are generally bold, with small cliffs, but a rock, awash at low water, lies 200 yards from the middle of the eastern side of the island. The eastern end of Burgeo island, open of the southeastern part of Ship island, and bearing 204° , leads eastward of this rock.

Shag rock, $\frac{1}{4}$ mile west-southwestward of the southwestern end of Ship island, is 12 feet high, 150 yards in extent, and steep-to. A shoal, with $5\frac{1}{2}$ fathoms and possibly less water on it, lies south-southeastward a little more than 200 yards from Shag rock.

Bell island, 143 feet high, is situated 800 yards south-southwestward of Ship island; and a remarkable rock, from which the island takes its name, about 20 feet high, shaped like an inverted bell, lies close to its southwestern end.

A rock, awash at low water, lies about 100 yards east-southeastward of the island; a second rock lies close northward of this one.

Great Sandy Harbor entrance, not quite 200 yards wide, situated $1\frac{1}{2}$ miles northwestward of Bell island, has only $2\frac{1}{2}$ fathoms; rocks lie close to either shore, and the harbor is generally very shallow.

The approach to Great Sandy harbor may be readily distinguished by the offlying islands and by a wooded hill with a bare top 256 feet above high water, which lies northeast of the entrance. Close south of the hill is a wooded islet 53 feet high, and south of the islet is a bare rock 6 feet above high water. The west side of the entrance is formed by a wooded peninsula nearly a mile long and 180 feet high. Near the north extreme is a bluff point with a small bight in it.

The harbor is entered through a channel not quite 200 yards wide, between the base of the hill and the bluff point just described. Immediately within the entrance an arm extends northeast for 450 yards, and is 250 yards broad, with $3\frac{1}{2}$ fathoms in the middle, but only $2\frac{1}{2}$ fathoms in the entrance.

The main harbor trends southwest for 800 yards, with a breadth of 350 yards, then bends sharply to the northwest, in which direction it extends $1\frac{1}{2}$ miles, expanding to 1,300 yards wide for nearly $\frac{3}{4}$ mile, when the basin contracts to the entrance of a stream 100 yards wide. Nearly the whole of this basin dries at low water, leaving a narrow passage, for boats only, close to the shore; in the first bend not more than 6 feet can be carried. The hills surrounding the harbor are partly wooded and slope gradually to the southwestern arm.

Civil East cove is a slight curve in the southeastern coast of the peninsula, protected by Civil East island and affording shelter to small fishing craft in $2\frac{1}{2}$ fathoms. A few houses stand on the shore, surrounded by small patches of cultivation. A rock with 6 feet of water on it lies midway between the island and the mainland.

Civil East island is about 40 feet high, flat, and partly wooded. It is 400 yards long, and a rock awash at low water lies close to the southwestern extreme.

Anchorage may be had, with good holding ground, on a plateau of sand lying between Civil East cove and the entrance to Great Sandy harbor, in from $4\frac{3}{4}$ to 6 fathoms, with shelter from all but southerly to southwesterly winds.

Tides.—It is high water, full and change, in Great Sandy harbor at 8h. 9m.; springs rise $6\frac{3}{4}$ feet; neaps rise 5 feet.

Great Coat island, 45 feet high and 100 yards in diameter, round and wooded, lies 250 yards southwestward of the southern entrance to Civil East cove. There is a clear passage west of it, but a rock that dries lies a short distance from the southwestern end.

Little Sandy harbor, one mile southwestward of Great Sandy harbor, is entered through a channel 200 yards wide, south of Great Coat island, between the cliffy southwestern extreme of the peninsula dividing it from Great Sandy harbor and Stearin rock, a flat bare

islet 5 feet above high water. Within the entrance the harbor expands to a basin 600 yards in diameter, with $5\frac{1}{4}$ fathoms in the middle, decreasing gradually in depth to the shore, except in the southwestern corner. From this side a small arm extends to the westward and is shallow to the entrance. A wooded islet about 40 feet high nearly joins Stearin rock to the south side of the entrance.

Water may be procured from a brook at the head of the western arm, but the approach is made difficult at low water by bowlders lying off it.

Nan point, 1,200 yards southeastward of the entrance to Little Sandy harbor, is a small, sharp projection, steep-to. The intervening coast consists of two small coves, with shingle beaches, between otherwise rocky shores.

Anchorage.—There is anchorage for large vessels, in 6 to 7 fathoms of water, but open to southerly winds, at 400 yards off the coast between Little Sandy harbor and Nan point.

Castle islet, a small square rock 13 feet high, lies close to the shore off the north entrance point of Davis cove.

Little Burgeo island, 250 yards southeastward of Castle islet and $1\frac{1}{2}$ miles southwestward of Bell island, is 900 yards long, 600 yards broad, and 227 feet high. It is flat in outline, faced by steep cliffs, and has a small cove on the southern side. There is barely passage for a boat between this island and the main at low water.

A shoal, with 12 feet of water, lies 100 yards from the northeastern end.

Davis cove is entered south of Calls point, 1,000 yards southwest from Castle islet. A rock that dries 4 feet lies 100 yards south of the point. The cove is 600 yards wide and 200 yards deep and affords good shelter to fishing craft with offshore winds.

Water may be obtained from a large stream at the head.

Coast.—The coast, which is wooded over brown cliffs, curves generally to the southwestward from Davis cove for a little more than a mile to Butts hole, a small cove with a few houses round it, and a rock that dries 6 feet at low water in the middle of it. A conspicuous waterfall is situated on the south side of this cove.

Parfrey point is $\frac{1}{2}$ mile from Butts hole, and is a small projection, 105 feet high, faced by gray cliffs. Parfrey shoal, with $4\frac{1}{2}$ fathoms water on it, bears 163° , distant 267 yards from this point.

Burgeo island, 1,200 yards south-southwestward of Little Burgeo island, and separated from the mainland by a clear channel 700 yards wide, rises to a remarkable sharp peak 416 feet high, and two smaller peaks to the southward of it, named Hare's ears, about 350 feet high. The island is $1\frac{1}{10}$ miles long and $\frac{1}{2}$ mile broad. The east shore is steep-to, but a rock with 5 feet of water on it lies 100 yards from the southern extreme. A cove 400 yards deep is situated on the west

shore of the island, just below the summit; off the north entrance point of the cove is a small islet with a sunken rock near it.

Cross rocks, 12 feet high, bear 284° , distant nearly 200 yards from the northern entrance point of this cove and they are surrounded by sunken rocks. A shoal with 15 feet water on it bears 191° , distant 100 yards from these rocks, and a bank, with less than 10 fathoms, extends 250 yards farther in the same direction.

The coast of Burgeo island, near its northern end, curves into a small cove, surrounded by a beach of shingle, between low points of cliffs, and fronted by Vigors island. The wharf, stores, houses, and flagstaff of a small trading establishment stand on the shores of this cove, and there is good anchorage for small vessels off the wharf in 14 fathoms water.

Vigors island, with a flat, wooded summit about 120 feet high, falls in steep cliffs on all sides but the north, where a grassy point, fringed by bowlders and shoal water, extends 100 yards. Vigors island should not be approached nearer than 200 yards on the north side. The channel between the northeastern end of this island and Burgeo island is not quite 200 yards wide; on its eastern side is a square islet, off which lies a sunken rock.

Communication.—The steamer from Placentia calls at Burgeo island weekly.

White islands are a group occupying a space $1\frac{3}{4}$ miles long and nearly $\frac{1}{2}$ mile broad, lying 2 miles southeastward of Burgeo island, the channel between deepening to 151 fathoms. There are three large islands, several smaller islands, and many rocks.

Greens island, near the northern end of the group, is 110 feet high, round, and covered with stunted trees, interspersed with grass over gray rock. From the south side of the island rocks and shoals extend for 400 yards, the highest being a square islet about 40 feet high, off which are two rocks. A small rock lies close to the north extreme of the island, and a large shoal extends northwest of the chain of rocks south of Greens island.

Gooseberry island, 200 yards northwestward of Greens island, is about 40 feet high, flat, and covered with grass over reddish-gray rock. Sunken rocks extend 200 yards from the west extreme.

Deepwater bank, with 7 fathoms water, bears 16° , distant 800 yards from Gooseberry island, and **Rock of the Bank**, with the same depth, bears 93° , distant 1,400 yards from Greens island.

Stearin rocks are the cluster next southwest of Greens island; they are nearly connected at low water, and occupy a space 200 yards in diameter.

A reef, with two heads that just dry at low water, bears 112° , distant 250 yards from the highest of these rocks.

Middle Dock islands are 200 yards southwest by west of Stearin rocks and occupy a space 400 yards in diameter. The two southernmost are conical, with grassy summits, the western and highest being 37 feet above high water. These two have no dangers off their southeastern sides. The rest of the group are low, and the northern one covers at high water, but there are no outlying dangers beyond 200 yards distance from the group. There is a clear passage between these and Stearin rocks.

Anchor rock, bare, flat, and 8 feet above high water, is separated from the south side of Middle Dock islands by a clear channel 200 yards wide, and is steep-to. A sunken rock lies midway between it and Northwest island.

Northwest island, 115 feet high, and 400 yards southwestward of Middle Dock islands, is formed of several wooded hillocks covering dark rock, the highest falling steeply to the northwestern extreme. Some small pinnacle rocks lie close-to, but there is no sunken danger near, except on the eastern side.

West island, lying 150 yards southward of Northwest island, is wedge shaped, 300 yards long and 200 yards broad. The summit, which is wooded, falls steeply to the northern extreme, and is 115 feet above high water. A green mound, with a conspicuous patch of turf near its summit, is joined to the south extreme by a beach of shingle. A ledge of rock that dries only at low water springs extends 200 yards from the eastern side.

Western rock, the western of White islands, is a gray islet 24 feet high, with a little grass near its summit. A reef of rocks extends 200 yards northward, and there are rocks between it and West island, but no danger beyond 200 yards from them. A rock awash at high water lies close southward, and a shoal, with 7 feet of water on it, is a short distance southwestward. A rock that dries is a little more than 200 yards, bears 301° from West island.

Caution.—There is apparently no safe passage for ships among White islands.

Mackerel shoal, with 14 feet of water, bears 292° , distant about 400 yards from West island.

Harry rock, with 8 fathoms of water, bears 250° , distant 700 yards from Northwest island.

Big shoal, with 4 fathoms of water, bears 205° , distant 950 yards from Western rock, and is the highest part of a bank 200 yards in diameter within the depth of 10 fathoms.

Shoal bank, with 14 feet water, bears 236° , distant $1\frac{2}{10}$ miles from Western rock, and is a small pinnacle, with deep water close to it.

The coast from Parfrey point after a slight curve close west of that point trends in nearly a straight line to the entrance of Clatise

harbor, falling steeply, in many places perpendicularly, from wooded hills near the shore. The hills in the background gray and moss covered.

Red Point shoal, with $5\frac{1}{4}$ fathoms water, bears 233° , distant 850 yards from Parfrey point and 200 yards from the shore.

Skippers brook, a conspicuous waterfall, enters the sea $1\frac{1}{2}$ miles southward of Parfrey point. Skippers Brook rock, with 10 fathoms water, bears 82° , distant $\frac{1}{4}$ mile from the point of the cove into which the brook runs.

Ladder cove, a small bight, lies 1 mile southward of Skippers brook, and $\frac{3}{4}$ mile farther southward is Coffins cove, 300 yards deep, with a beach of shingle at the head.

Barren point, $1\frac{1}{2}$ miles southwestward of Coffins cove, is covered with moss and surmounted by a small peaked hill 216 feet high. Joss brook falls into the sea from an elevation of about 30 feet close northeastward of this point.

Clatise harbor, nearly 800 yards wide in its entrance between Gunning point on the north and Clatise Harbor head on the south, expands to a width of 1,600 yards and extends southwestward 1 mile, terminating in two arms. Culleton head, north of the entrance, is a bare round hill 452 feet high, falling steeply to the eastward. A few houses are built on the north shore immediately within the entrance. A large brook runs into a cove on the north shore $\frac{1}{2}$ mile southwest of Gunning point, and a rock that dries is situated close to the eastern entrance point of that cove.

Clatise Harbor head, the sharp extreme of a narrow promontory, rises to a wooded hill 253 feet high. A sunken rock lies close to it, and a bank, with less than 10 fathoms on it, extends 200 yards from the end of the head.

Shag rock, 6 feet high, is the highest of a small cluster lying 400 yards from shore and southwestward nearly 1 mile from Clatise Harbor head. A shoal, with $4\frac{1}{2}$ fathoms water over it, bears 295° , distant 200 yards from this rock.

Northwest arm extends southwestward 1 mile with a breadth of 400 yards, and then turns northwestward, forming a cove 400 yards across. The hills on the north shore, which are 330 to 360 feet high, fall sharply to the sea, and are generally wooded. A hill, 150 feet high, covered only with moss, slopes to the east point of the cove at the head. Between Northwest and Southwest arms the coast is bold, encircling a cove into which a streamlet runs. Rocks lie close to the head of this cove.

Cross rock, a small pinnacle 5 feet high, lies close to the northern side of the entrance to this arm, and is nearly joined at low water to the shore of a small cove, round which are a few houses. This rock has deep water close to its southern side.

Northwest head, on the southern side of the entrance, is a bold cliff rising to a round wooded hill, 256 feet high. A reef, that dries at low water, extends 150 yards eastward; and a rock, that dries 2 feet, lies close northward of this head.

A **rock** that covers lies close to the eastern point of the cove, at the head, and shoal water fringes the north shore of that point. With these exceptions the shores of Northwest arm are steep-to.

Anchorage.—There is anchorage anywhere in the arm in depths of 16 to 18 fathoms, or for small vessels in the cove at the head in 6 to 8 fathoms.

Southwest head is a bold bluff 175 feet high, with a small islet joined to the eastern side.

Southwest arm is 1,300 yards long and 600 yards wide between Southwest head and the southern shore; but at 700 yards within the entrance it is narrowed to 300 yards by Jigging Cove head. A rock, with 13 feet water over it, lies 200 yards from the northwestern shore, but the southeastern side is clear.

Coast.—The coast from Clatise Harbor head trends southward for $\frac{1}{2}$ mile to White point, so named from the color of a small islet that forms it; from White point the coast trends southward $1\frac{1}{2}$ miles to Oliver cove. A few white houses stand on the shores of the cove between White point and Clatise Harbor head. Collins rock, 2 feet high, lies close to the shore $\frac{1}{2}$ mile south of White point; and Redland, a reddish cliff, south of a beach of shingle through which a stream runs, is situated 1,200 yards south of Collins rock.

Oliver cove, formed by a beach of shingle, lies west-southwestward 2 miles from Clatise Harbor head. Shoal water extends 100 yards from the beach, but beyond that there is anchorage for small vessels in 10 fathoms water, sheltered from offshore winds. There is a road from this cove to the head of Presque harbor, about 1 mile distant, near which, at about midway, is the Roman Catholic church.

Oliver rock, small and 12 feet high, lies close to the bluff southward of this cove, down to which Calvary hill slopes from an elevation of 423 feet.

Mahany cove lies southward of the bluff, and some rocks extend 100 yards from its southern shore. A deep ravine encircles Calvary hill, and through it passes the road from this cove to the church.

The coast from this to Grandy point is free from danger beyond 100 yards, and is surmounted by a serrated ridge, with several sharp peaks ranging from 526 to 550 feet in height.

Grandmother rocks are two groups of islets, separated by a clear channel 334 yards wide. The southern group contains the highest islet, which is 30 feet above high water, surrounded by numerous rocks, and bears 67° , distant $1\frac{1}{2}$ miles from the north extreme of great isle of Valen.

The islets in the northern group are all above high water, the highest being 7 feet. There is deep water at 100 yards from this group.

Whales back, a rock that dries 4 feet, bears 101° , distant 1,800 yards from the north extreme of great isle of Valen. It is steep-to on all sides but the west, from which a shoal with 15 feet water on it extends 200 yards. This rock nearly always shows by a breaker.

Two rocks, covering a space 100 yards long, with 4 feet least water, bear 17° , distant $\frac{3}{4}$ mile from Grandmother rocks, and a shoal with 12 feet lies at the same distance on the bearing of 352° . Two shoals, with $4\frac{1}{2}$ and 5 fathoms on them, lie a little more than 200 yards southward of this shoal.

Sam Adams shoal, with $5\frac{1}{2}$ fathoms, bears 3° , distant 1 mile from Grandmother rocks, and a shoal with $4\frac{1}{2}$ fathoms water lies nearly midway between it and the rock with 4 feet water.

Big shoal, with $3\frac{1}{2}$ fathoms water, bears 157° , distant 850 yards from Grandmother rocks. Little isle of Valen open eastward of great isle of Valen, bearing 205° , leads east of this shoal.

Great isle of Valen is separated on its western side from the mainland by a deep channel $\frac{1}{2}$ mile wide. The island is much indented and intersected by many valleys which are thickly wooded: the hills, most of which have bare summits, attain an elevation of 520 feet, and picturesque lakes are situated among them.

The island is 3 miles long, nearly $1\frac{1}{2}$ miles broad, and terminates toward the north in an isolated wooded hillock 180 feet high. A rock that dries is situated close northeast of the square rock which terminates this point, and a beach of shingle lies inshore of the hillock.

Pete cove, on the east coast, nearly $1\frac{1}{2}$ miles from the northern extreme, contains several islets, the eastern and highest being 8 feet above high water. A rock lies between the two eastern islets, but the water is deep to the eastward. Pete Cove head, a bare isolated hill 260 feet high, stands north of this cove.

Storehouse cove, on the southeastern coast, an indentation 800 yards deep, terminates in a small bight, 100 yards in diameter, where fishing craft find good shelter. Sugarloaf island, a cone 43 feet high, lies in the middle of the entrance; and Blow-me-down, a conspicuous bluff 425 feet high, falls steeply to the north entrance point. Below that hill shoals fringe the shore for 100 yards.

A rock, with less than 6 feet water on it, bears 149° , distant 70 yards from Sugarloaf island, and another rock, with 12 feet water on it, bears 56° , distant 100 yards from the first named. A rock, with 7 feet water, bears 236° , distant 60 yards from Sugarloaf island. A small islet is joined to the south shore by shoal water, and off the

north shore is situated a smaller rock, from which two rocks that dry at low water extend to the southward.

Directions.—To enter, pass north or south of Sugarloaf island in midchannel, and then between the two smaller islets west of it. The anchorage is in 7 fathoms, close within the islets. A small rock lies close to the shore west of the anchorage. Several houses are built at the head of the cove.

Isle of Valen harbor, on the southern side of the island, is available only for small vessels; it is sheltered by Little isle of Valen, Dutch cap, and Canary isles. A wharf is situated on the east shore, alongside which vessels may lie in 5 fathoms, but the approach is encumbered with shoals.

Isle of Valen harbor may be recognized by a flagstaff erected on a small hillock 38 feet above high water, on the northeastern side of the entrance, which is about 50 yards wide and clear of danger. Immediately within, the harbor expands to 150 yards in diameter, and the wharf is situated on the north side of this expansion. Again narrowing, and with a sharp bend to the northward, the harbor then opens into a perfectly sheltered basin 250 yards in diameter. Both outer and inner portions have an even depth of 5 fathoms, but a bar joins the opposite shore just within the narrows, with only 12 feet on it at low water, and a sunken rock lies in the middle of the bend, off two islets. The point close north of the wharf is foul for a few yards, otherwise the shores are steep-to. Small vessels may lie in perfect safety in the outer basin or alongside the wharf.

Ice.—Isle of Valen harbor occasionally freezes during severe winters, but, the ice being as a rule thin, anchorage can generally be obtained.

Communication.—The steamer from Placentia calls at Isle of Valen harbor weekly.

Dutch cap is a conical island, 600 yards long, 266 feet high, and composed of two parts, joined by a low narrow isthmus. The north-western and lower part is faced by reddish cliffs.

A channel 100 yards wide, with 6 fathoms in it, separates Dutch Cap island from the south extreme of Great Isle of Valen.

Three rocks that cover at high water lie nearly 200 yards from the southeastern side of Dutch Cap island.

Little isle of Valen, $\frac{3}{4}$ mile long, 400 yards broad, and 327 feet high, is separated at its northern end from Dutch Cap island by a passage 600 yards wide. The western end of Little isle of Valen is low, and a short distance from it is an isolated rock, with 8 feet water over it. A ledge, 100 yards in extent, with 3 feet water over the shoalest part, lies 133 yards southeastward of the southern end, and a rock, with 5 feet water on it, lies 200 yards from the northeastern end.

Leading mark.—The summit of High lookout, over Presque, in line with the northern end of Little isle of Valen, bearing about 252° , leads northward of this rock and southward of those off Dutch Cap island.

Canary isles are a group of low rocks, the highest covered with grass and 23 feet above high water.

Shoals extend in all directions and almost block the channel north of these islets.

A shoal with 12 feet bears 101° distant 300 yards from the highest, and Trinity shoal, with 9 feet water, extends 200 yards in a direction 56° from the northernmost of Canary isles.

Net rocks lie off the south shore of Great isle of Valen, and are 4 feet above high water. A rock, with 1 foot water on it, lies 100 yards westward of Net rocks.

Betty island, 84 feet high, round, and covered with brush wood, is joined at low water to the southwestern extreme of Great isle of Valen. A conical hill 480 feet high lies close within Betty island.

The west shore of Great isle of Valen is almost straight. Francis cove, a small bight with a few houses round it, is $\frac{1}{2}$ mile from the southern point. A sunken rock lies close to the north point of the cove. Net rocks, 1 foot above high water, are joined to the shore $\frac{1}{2}$ mile north of Francis cove, and a rock with 5 feet of water bears 149° distant $1\frac{1}{4}$ miles from the northern extreme of the island and about 80 yards from the shore.

Grandy point, on the mainland, 1,600 yards southwestward of the southern end of Little isle of Valen, is the name of a settlement surrounding a cove, nearly 200 yards across, that affords good sheltered anchorage for fishing craft, in 4 fathoms water, except with northeasterly winds. A small islet, with a house on it, lies northwestward of the cove, and the southern entrance point is foul for a short distance.

Grandy Point rock is the turning point westward of the passage between Great isle of Valen and the mainland; it just covers at high water, and has foul ground extending 200 yards southward of it.

The land southward of Grandy point comprises a flat ridge backed by a peaked hill, 414 feet high, behind which rises another sharp peak, 526 feet high.

Rocky cove is situated southwestward $\frac{1}{2}$ mile from Grandy Point rock, and Rocky Cove sunken, a small rock that dries 4 feet, bears 206° , distant 250 yards from its northeastern point. Foul ground nearly joins the rock to the point, and two shoals, the outer of which has 12 feet water over it, extend eastward 400 yards from the rock.

The coast to the southward of Rocky cove is rugged and cliffy, falling from hills covered with moss, and is foul for a short distance.

Brook rock, with 10 feet of water on it, bears 191° , distant 1,050 yards from the northern entrance point of Rocky cove. Stony Point rock, with 10 feet water on it, lies 150 yards from the shore, at 200 yards in a direction 56° from Stony point, a rugged projection sheltering the cove of the same name, situated $1\frac{1}{2}$ miles south of Rocky cove.

Clearing mark.—The southwestern end of Great isle of Valen, open northeastward of Grandy point, bearing 354° , leads eastward of Brook rock.

Long point, a narrow promontory 89 feet high, extends 250 yards from the coast at $1\frac{3}{4}$ miles south of Rocky cove. Some rugged rocks, the lowest of which covers at high water, lie north of the point, and shelter a small cove with a beach of shingle.

Patrick island, 27 feet high and bare, is 1,300 yards southwestward of Long point; another small islet lies close east of it, and sunken rocks that break in ordinary weather extend east and south for a distance of 200 yards from Patrick island. This island is the dividing point of two coves, and the turning point of the entrance to Presque harbor. In the northern of the two coves is a rock that dries 1 foot at low water.

Presque harbor, 5 miles long and 1,200 yards wide, has many rocks in its entrance, which is consequently intricate, but within the entrance there is generally a great depth of water. The passage between the inner rocks at the entrance is only 100 yards wide.

The harbor extends nearly north-northeast and south-southwest, with the entrance about the middle of its length. There is a conspicuous house at the head of the northern arm.

Western rocks are two bare islets 13 and 12 feet high and 200 yards apart, situated southward of the entrance to Presque harbor; there is no passage between them, but they are bold to on the southern side.

Big island is a flat bare rock 30 feet high, situated 800 yards northeast from Western rocks; it is bold-to on the northeastern and northwestern sides, but from the southwestern side a bank extends south-southwest a little more than 400 yards, with $3\frac{1}{4}$ fathoms water at its extremity.

Goat island, situated on the northeastern side of the entrance to Presque, and separated by a clear channel 200 feet wide from the eastern shore, is covered with moss, and has a flat summit, surmounted by a small tuft, 108 feet high.

Little Goat islands are two square islands and a small rock lying close south-southwestward of Goat island, with shoal water extending a short distance in the same line to the southward. A cluster of rocks extends westward of these islands $\frac{1}{4}$ mile; the western, on which the

depth is 9 feet, being situated close westward of a rock that dries at low water.

Harbor rock, lying southwestward 550 yards from Little Goat islands, is the western turning point into Presque; it is 11 feet high, small and flat, and has a sunken rock lying a few yards eastward of it.

Coppaleen rock, 5 feet high, lies 600 yards southeastward of Harbor rock, and is connected by a reef to the mainland, from which it is distant nearly 200 yards; it may be approached to 100 yards on the southern side.

St. Kyrans, a bight 800 yards long and 250 yards broad, is entered from the northwestern side of the head of the northern arm of Presque. Shoal ground extends a short distance from the eastern entrance point.

Tides.—It is high water, full and change, in St. Kyrans, at 8h. 20m.; springs rise 7 feet, neaps 5 feet.

Northwest cove, situated on the western shore, opposite the entrance, affords anchorage for a few small craft in 5 fathoms water, but the holding ground is bad.

Shoal.—A small shoal, with 3 fathoms water on it, lies in the middle of the southern arm of Presque, and is the summit of a rocky bank, 200 yards long, within the depth of 10 fathoms.

Southwest beach, situated at the head of the southern arm of Presque, has shoal water extending nearly 200 yards from its head, but there is anchorage in 15 to 17 fathoms water.

Ice.—During severe winters Presque harbor occasionally freezes, but the ice is generally thin and does not interfere with anchorage.

Communication.—The steamer from Placentia calls at Presque harbor weekly.

Directions.—Strangers will find Presque harbor difficult of approach, and if under sail must be prepared for the squalls that descend with great violence from the hills and through the valleys when high winds prevail.

There are two entrances; the better is that close eastward of Western rocks; the other, eastward of Big island, is not available in bad weather.

Enter with Goat island well open eastward of Western rocks, bearing about 354°, and pass Western rocks at the distance of 100 yards. Then keep the two Western rocks in line until Harbor rock is open northeastward of Coppaleen rock, when steer to pass 200 yards northeastward of Coppaleen rock and 100 yards northeastward of Harbor rock.

Anchorage.—Large vessels anchor in 25 fathoms water off the conspicuous house at the head of the northern arm of Presque; and small vessels in St. Kyrans harbor in 7 to 11 fathoms water, mud bottom and good holding ground.

Tasse l'argent (Tostello) is a shallow harbor, with its entrance southwestward 600 yards from Western rocks; it is available only for small craft, and is at all times difficult of access, the winds being frequently baffling.

The shore.—From Tasse l'argent to Eastern head, $2\frac{1}{2}$ miles southwestward, low rocks lie off many of the points, and shoals front the shore at the distance of $\frac{1}{4}$ mile.

White sail, a conspicuous white patch in the cliffs, is situated southwestward $\frac{3}{4}$ mile from Tasse l'argent; and White Sail head, a remarkable sharp peak 615 feet high, is $\frac{1}{2}$ mile southwestward from it.

Eastern head, southwestward $1\frac{1}{2}$ miles from White Sail head, is a narrow cliffy promontory, terminating in a peaked rock, off which shoal water extends nearly 200 yards.

Black rock, bearing 190° , distant 1,650 yards from Eastern head, is 23 feet high, small, bare, and bold-to. The Sunker, a rock with 6 feet of water over it, bears 247° , distant 600 yards, and Heptidge rock, with $4\frac{1}{2}$ fathoms over it, bears 240° , distant $\frac{3}{4}$ mile from Black rock.

Gull islands, a group of conical rocks, the highest of which is 156 feet, lie southwestward $\frac{3}{4}$ mile from Eastern head.

Great Bonah cove, $\frac{3}{4}$ mile northwestward of Eastern head, is 1,100 yards deep and 400 yards wide; the settlement is situated round a small bight on its eastern shore.

Anchorage.—There is temporary anchorage for small vessels off Great Bonah in 11 fathoms, sheltered from all winds except those from southeast to west through south; or for large vessels in 11 to 13 fathoms of water, farther out.

Little Bonah cove is southwestward nearly 2 miles from Great Bonah cove. A rock, with 11 feet water on it, lies just within the entrance at 100 yards from the eastern shore; and another, with 13 feet water on it, 300 yards within the entrance, at 100 yards from the same shore.

There are a few houses round a small shallow inlet in the western shore, where fishing boats find good shelter.

Little Paradise, a harbor 800 yards long, is entered through a channel 100 yards wide, at 1 mile southwestward of Little Bonah. Shoal water extends a short distance from both sides of the entrance, and only 5 fathoms can be carried through at low water, though the depth increases to 17 fathoms immediately the bar is crossed.

Anchorage.—Anchor in the northern of two coves, in a space 300 yards across, with 9 fathoms of water and good holding ground. A few families reside here.

Paradise harbor, $\frac{1}{2}$ mile southwestward of Little Paradise, and fronted by Marticot island, is shallow and obstructed by rocks, but

it is a good boat harbor and there is a considerable settlement around its shores.

Anchorage.—Anchor off the harbor in 11 fathoms of water, with shelter from all but easterly winds.

Ice.—Paradise harbor occasionally freezes during severe winters, but anchorage can generally be obtained, as the ice is usually thin.

Communication.—The steamer from Placentia calls at Paradise harbor weekly.

Merashéen island is 19 miles long, north-northeast and south-southwest, and 5 miles broad near its southwestern end. Gallivan hill, the highest part, situated in the southern part of the island, is 936 feet high. The southern hills are flat and have long slopes, covered with moss, while the northern hills are rugged, with wooden summits.

Virgin cove, situated $\frac{1}{2}$ mile north-northeastward of Breakheart point (on the southwestern side and the nearest part of Merashéen island to Great isle of Valen), has several houses on its eastern side, and steep cliffs inshore, over which a conspicuous waterfall runs to the sea; the cove affords anchorage, with offshore winds, in 7 fathoms of water, sandy bottom.

Merry harbor, nearly 6 miles northeastward of Virgin cove, is 600 yards long, 300 yards wide, and contains excellent anchorage in 4 to 6 fathoms of water. Two flat islets, 8 feet high and nearly joined together, lie close to the southwestern entrance point, and two small islets lie close to the northeastern entrance point. Vessels may enter between these two groups of islets and anchor as convenient.

In southeasterly gales, which are frequent in autumn, heavy squalls sweep over the harbor.

Water may be taken from a waterfall.

Ragged islands consist of numerous islands, islets, and rocks, extending $11\frac{1}{2}$ miles on the western side of Merashéen island. There is a clear passage between them and Merashéen island, and several passages between the different islands of the group, but they are known only to the inhabitants, and none are available for large vessels without the assistance of a local pilot.

Only those islands in the outer channel, or near the first anchorage from the southward, have been surveyed.

Numerous rocks lie off these islands, which should be approached only with very great caution.

It is not necessary nor desirable to name all the islands of the group. It would be almost impossible for a stranger to recognize them, therefore only the limiting and the principal islands or rocks will be named.

Black rock, the southwestern islet, is 18 feet high, dark, bare, and flat; it is bold-to except on the eastern side, from which a ledge extends a short distance.

Jean de Gaunt island is the most remarkable of the southwestern portion of Ragged islands, being surmounted by a conspicuous hill, with a sharp fall near the summit, and 388 feet above high water. This island is $1\frac{1}{2}$ miles long and 1,200 yards wide, and contains numerous hills, divided by deep valleys. The most remarkable hills besides the summit are a bluff hill, with a triangular rock at the top, 292 feet above high water, over the southwestern extremity, and a sharp peaked hill, 282 feet high, near the northwestern extreme. The shores are bold and cliffy, with a few small coves, to which the hills slope less steeply.

Jean de Gaunt harbor is a small cove, nearly 200 yards deep, that affords shelter only for small craft, and is situated on the northwest shore of the island, 800 yards from the northwestern extreme. Small craft enter by keeping the southwestern shore of the harbor on board.

Jean de Gaunt Harbor sunker, awash at low water, bears 290° , distant 850 yards from the entrance, and a shoal, with $5\frac{1}{2}$ fathoms on it, lies 200 yards beyond.

Frank head, a projection with two wooded mounds, 106 and 89 feet high, forms the north entrance point. Three shoals lie off this head, with 3 feet least water on them.

Anchorage.—Jean de Gaunt island anchorage is situated at the northeastern end of the island, off a cove where are some white houses. The approach from the northward is possible only for vessels of 10 feet or less draft, and then only with a local pilot, but there is a clear channel from the southward.

Directions.—Keep in mid-channel between Merasheen island to the eastward and Gray Gull island to the westward. Approach Jarvis islands (the group next northeastward of Gray Gull island) within $\frac{1}{2}$ mile, and then pass between Creve islands on the northwest, and Jarvis and Jean de Gaunt islands on the southeast. Round the latter at the distance of 100 yards, and anchor off the cove before mentioned.

Large vessels anchor between Creve islands and the entrance to the cove in 14 to 16 fathoms water, mud bottom.

Tides.—It is high water, full and change, at Jean de Gaunt island at 8h. 6m.; springs rise 7 feet, neaps 5 feet.

King island, the largest of the Ragged islands, is 5 miles long, and nearly divided in several places by deep coves from either side. Northward of King island there is a labyrinth of small islands and rocks. The eastern coast of King island has not been surveyed.

Galton island, nearly 600 yards north-northeastward of Jean de Gaunt island, has a square summit 76 feet high. A small creek on its southern side, surrounded by houses, affords good shelter to fishing craft.

Brandies shoal, a patch of three rocks, 300 yards in extent, bears 265° , distant $1\frac{1}{4}$ miles from the northern end of Jean de Gaunt island. The two western rocks dry 2 feet, the eastern has 2 feet water over it at low water, and all generally break.

Forked Duck rock, about 3 feet high, and so named from the forked appearance presented by its two small pinnacles, bears 309° , distant 1,650 yards from the western end of Galton island. Western sunker, with 4 feet water on it, bears 253° , distant 800 yards from Forked Duck rock. Both these are small, and steep-to.

Leading mark.—(Greens island of White islands (see p. 120) shut in with West island of the same group, bearing 27° , leads westward of these rocks.

Shag island, 77 feet high, stands out prominently about half-way between Ragged and White islands. **Roost rocks**, 6 feet high, lie 100 yards northwestward of this island, and are continued a short distance by shoal water.

Shag Roost sunkers, two of which dry at low water, bear about 225° , distant about $\frac{3}{4}$ mile from Shag island.

Broad cove, King island, a good harbor for small craft, lies about 1 mile eastward from Shag island, and may be distinguished by Pond head, a round, wooded mound, 125 feet high, on the western side of the entrance, and Tacks lookout, a bare-topped hill, 212 feet high, that falls almost perpendicularly to the eastern side of the cove.

The cove is 750 yards deep and 250 yards broad, but a shoal, on which the depth is 11 feet, lies close to the eastern shore, and the head is filled with rocks that dry at low water.

Tacks beach, the head of a bay 600 yards across, is only 50 yards wide between the bay and a cove on the southeastern side of King island. A settlement, with a schoolhouse, is built round a small bight northwestward of the beach, and on the low projection separating the two. Boats proceed from Ragged islands to Buffet harbor of Long island by hauling over this beach, and over a similar one at Dog harbor in Merasheen island, whence they cross to Mussel harbor, which is connected by road with Buffet harbor.

Anchorage can be obtained here only in moderate weather, and the holding ground is bad.

Communication.—The steamer from Placentia calls at Tacks beach weekly.

Tacks head, northward of the beach, is the most conspicuous headland in Ragged islands; it rises in steep bluffs to a sharp peak 420 feet high.

Cooper cove, a small boat harbor, lies at the southern base of Tacks head, a steep high hill separating it from Tacks beach.

New Harbor head, 1 mile northward of Tacks head, is a conspicuous square, wooded headland, 130 feet high, and the summit

of an island which forms the northern shore of New harbor. This harbor is a shallow inclosure available only for boats.

Green island, $\frac{3}{4}$ mile northward of New Harbor head, is wooded, and 100 feet high. Several small islets lie off both its eastern and western ends; and a rock, that dries 4 feet at low water, bears 287° , distant 300 yards from its western end.

Marshall island is flat, wooded, and about 50 feet high; a rock that dries 2 feet lies east-southeastward 250 yards from it.

North Tilt island, situated eastward 1 mile from Marshall island, has a tuft of trees, the top of which is 155 feet above high water, on it. The other islands of the Ragged Island group are difficult to distinguish, the passages between being narrow.

Hollett's islands, at the northern end of the Ragged islands, are low and covered with small trees.

Bagg's island, 6 feet high, and bare, lies north-northeastward of the passage between Merasheen and Ragged islands; rocks extend north-northeastward and south-southwestward nearly 200 yards from it.

In the large bay northeastward of this island a narrow neck divides the bay from Great Brûle harbor, on the northeastern side of Merasheen island. A conspicuous white house, surrounded by cultivated land, stands on the southern side of the bay. A small wooded eminence, 66 feet high, on the summit of which there is a church, stands on the narrow neck.

St. Bernard, a small cove northward of the bay, also has some houses built round the shore.

The northern end of Merasheen island is a high rocky peninsula, surmounted by bare hills on the west, covered with moss in the middle, and terminating at the northeast in a steep slope from a dark wooded hill, off which is situated Winging rock, a small bare islet 6 feet high.

The western side of this peninsula is bordered by Duck islet, 9 feet high, dark and barren, situated about 1 mile from the northern end of the passage between Merasheen and Ragged islands, and by numerous rocks and islets situated about $\frac{3}{4}$ mile from shore.

White island, 108 feet high, lies 750 yards northward from the northeastern end of Merasheen island, but the navigable passage, narrowed to 400 yards in width by the shoals off Stickland point, the northwestern point of the peninsula, is available only for small vessels.

Duck rocks are two small bare rocks, situated 1,800 yards north-eastward from the northeastern end of White island. The northern and higher is 4 feet high; and close westward of it lies a rock awash at low water. These rocks are all the summit of a bank, extending $\frac{3}{4}$ mile northwestward and 600 yards northward from them, within the depth of 10 fathoms, on which are numerous shoals.

Clearing marks—Caution.—Stickland point, open westward of White island, bearing 202° . leads westward; the southern end of the Jerseyman in line with Long Island point, bearing 134° . leads north-eastward; and Stickland point, open southward of White island, bearing 224° , leads southeastward of this bank.

Passing to the westward of these shoals, one should give them a wide berth; and in taking the passage between Barren island and Merasheen keep to the Barren island and mainland side. These passages have in them some shoals, having on them from 8 to 18 fathoms water, which in southerly gales cause a heavy sea. For the names and situations of these shoals consult the chart.

Little Brûle harbor lies on the eastern side of the peninsula at the northern end of Merasheen island, and is formed by that peninsula and some islands to the southward; the largest of these islands, Big island, is 140 feet high, and has several rocks and shoals extending eastward from it.

The harbor is 500 yards long, 300 yards wide, and is entered from the north-northeastward, avoiding the bank situated midway between Big rock and Batts island by keeping along the shore of Merasheen island.

Anchorage.—Anchor in 8 to 10 fathoms water, with good shelter except from northeasterly winds.

Crabbe cove, a boat harbor 200 yards across, lies immediately southwestward of Little Brûle harbor, and is joined to it at high water.

Great Brûle harbor, situated eastward of the narrow neck at $1\frac{1}{2}$ miles from the northern end of Merasheen island, is 700 yards deep, 500 yards wide at the entrance, and affords anchorage in 6 to 12 fathoms water.

Rising from the southern part of the harbor are two round hills called Ledwick hills, 415 feet high, which may be seen from each side of Merasheen island. There is a red spot on the northern slope of these hills.

Brûle shoal, with a depth of 17 feet over it, is the shallowest part of a bank bearing 79° , distant 800 yards from Brûle head, north-eastward of Great Brûle harbor.

The Castle, a small square rock 14 feet high, is situated $2\frac{3}{4}$ miles southward from Big island; rocks that dry at low water extend south-southeastward about 200 yards, and a shoal, with 12 feet water over it, bears 217° , distant 750 yards from it.

Butler island, 183 feet high, and separated from Merasheen island by a channel 200 yards wide, with 6 fathoms of water in it, lies south-southwestward $1\frac{3}{4}$ miles from the Castle.

Anchorage.—There is temporary anchorage for small vessels off the cove westward of Butler island, in 16 fathoms of water.

Little Butler island, 80 feet high, is situated south-southwestward 800 yards from Butler island and 200 yards from Merasheen island.

Dog harbor, Merasheen island, the entrance to which is 1,600 yards south-southwestward of Little Butler island, is 950 yards long, 400 yards broad, and clear of shoals; it affords anchorage in 6 to 15 fathoms of water.

Just inside the eastern point is a narrow neck, 35 yards across, over which boats are hauled to the channel between Merasheen and Ragged islands.

Merchant cove, on the southern side of the isthmus joining Dog Harbor head to Merasheen island, is available only for one or two small vessels, and is open southward.

Rosiru point, 2 miles southward of Dog Harbor head, projects to the eastward, and forms a bight 600 yards deep, terminating in a narrow creek. Small vessels anchor off this bight; but they must give the point a berth of 200 yards to avoid the rocks extending from it.

Rosiru island, bearing 196° , distant $1\frac{1}{2}$ miles from Rosiru point, is $1\frac{3}{4}$ miles long, and separated from Merasheen by a clear channel nearly 200 yards wide at its narrowest part.

Bird islands compose a group lying eastward $\frac{1}{2}$ mile from Rosiru island. Duck rocks are two small bare islets; the higher, 6 feet high, lies northward 600 yards from Bird islands.

Rosiru sunker dries 2 feet at low water, and bears about south 800 yards from the southern end of Bird islands. A ledge extends northward 250 yards, and a rock, with 16 feet of water over it, lies southwestward, 150 yards from the sunker.

Indian harbor, Merasheen island, $\frac{1}{2}$ mile deep, is entered on either side of Southwest island, which is 187 feet high, and lies in the middle of the entrance; the better passage is that eastward of the island.

Anchorage.—The head of the harbor, which is shallow, affords excellent anchorage for fishing craft; but the anchorage for vessels is very limited, as a shoal extends 140 yards from the southwestern shore, just within Southwest island, leaving a clear space only 200 yards across.

Darby harbor, an open cove, lies close southward of Indian harbor.

The coast of Merasheen island trends south-southwestward $5\frac{1}{2}$ miles from Indian harbor to Redland, a remarkable slip in the cliffs of a more yellowish hue than the color of those in Red island; this distinction should prevent mistakes in identification. Hogan cove, north-northeastward $1\frac{1}{2}$ miles from Redland, affords shelter for fishing boats from offshore winds.

Big sunker lies south-southwestward 900 yards from Redland and has 2 feet of water over it.

Dirty rocks, 33 feet high, situated 400 yards off the coast at 1,400 yards southwestward from the southeastern point of Merasheen island, consist of two prominent pinnacles, named, from their colors, respectively, "Blue" and "Red" rocks, and several smaller rocks which are joined at low water.

Allen, Charley, Hennessy, and Owen rocks, having depths of 6 to 10 fathoms, lie south-southwestward 2 to 2½ miles from Dirty rocks, and are said to break in bad weather.

Little shoal, with 8 feet of water over it, bears 96°, distant ¾ mile, and Barrett rock, with 4½ fathoms over it, lies 118°, 1⅓ miles from Dirty rock.

Big Bald head, a conical wooded mound 211 feet high, lies in the middle of the southern side of Merasheen island, and projects a short distance from the coast. A waterfall descends over the cliffs in the cove eastward of this head.

Little Bald head, 1 mile west of Big Bald head, has, 400 yards southeast of it, a rock with 20½ feet of water on it.

Scrape Cove head, 419 feet high, is darker in color than the background, and is continued to the southward by Long point, a flat islet 51 feet high, which in turn is terminated by Long Point rock, small, conical, and 10 feet high, off which, distant 140 yards, there is a shoal, with 6 feet water over it.

Merashéen harbor, at the southwestern end of Merasheen island, is a good anchorage for small vessels: but the entrance is only 200 yards wide, and during and after a southwesterly gale the heavy sea prevents access till it subsides.

The harbor is divided into two parts by Soldier point, a narrow promontory 31 feet high, and it is so encumbered by rocks and shoals that local knowledge is required to enter it, and the anchorage space is very limited.

West head forms the western and Cross point the eastern entrance point of the harbor, from which sunken rocks extend 300 yards.

Cross Point shoal, with 16 feet water on it, bears 250°, distant 700 yards from Long Point rock, and Big shoal, with 4¾ fathoms on it, bears 238°, distant 105 yards from the same rock. The church in line with the entrance to the harbor, bearing about 30°, leads westward of these shoals.

Shoals.—Several shoals, among which are Isaac rock and Inside rock, not dangerous in ordinary weather, lie southward and also westward of those just described, but some of them break in bad weather and cause a confused sea in the approach to Merasheen harbor.

Communication.—The steamer from Placentia calls at Merasheen harbor weekly.

West head is the southwestern point of Pond head, the southwestern peninsula of Merasheen island.

Pond Head sunkers bears 242° , distant 500 yards from Margaret point, the northern end of Pond head, and nearly always breaks.

Clearing marks.—Fish island, 12 feet high, open northward of Margaret point, bearing about 67° , leads northward, and Long Point rock, open southward of West head, bearing 123° , leads southward of these rocks.

Little Merasheen harbor, situated eastward of Pond head and separated by a narrow isthmus from the head of Merasheen harbor, is 400 yards deep, but it is narrow and shallow, so that only three small craft can lie there, and it is quite open north-northeastward. A large settlement surrounds this and Merasheen harbor.

Two miles northeastward of Little Merasheen harbor is Breakheart point.

Navigation.—In clear weather, for navigating this part of Placentia bay, the mariner will find useful the eastern ends of the two Burgeo islands in line bearing 10° . This range clears all dangers off Merasheen island to the eastward, and all those off the mainland to the westward.

Red island is situated eastward about $1\frac{1}{2}$ miles from the southeastern part of Merasheen island. On the southwestern slope of the summit of the island, which is 880 feet high, is a gray spot that when seen from the southward appears like a small cloud or smoke. The Tolt, a sharp cone 723 feet high, has a white stripe extending from its summit nearly $\frac{2}{3}$ down its northern face.

Red Island harbor, close southwestward of a point on the northeastern coast of Red island, is fronted by several extensive rocky shoals and available for only a few small craft. It is 360 yards deep and about 100 yards wide, with 8 feet of water in it. A settlement surrounds the harbor.

Communication.—The steamer from Placentia calls at Red Island harbor weekly.

Cochrane cove, 200 yards deep, with a shingle beach at the head, is $\frac{1}{2}$ mile southward of Red Island harbor.

Southwest cove, on the northwest coast, is fringed by a beach of shingle. Small fishing vessels anchor here with offshore winds, in 6 to 9 fathoms water.

Southwest Cove head, westward of this cove, is also known as Blue point, from the apparent color of the land in ordinary weather.

Long point, in the middle of the northwest coast, is low and sloping, and shoal water extends nearly 200 yards from it.

Plateau.—Red island rests on a plateau of less than 50 fathoms water, which leaves only a narrow valley between the plateau of Merasheen island on the west and that of the Seal islands on the north, and which, extending 4 miles from the southern side of the island, does not extend beyond $\frac{1}{2}$ mile on the other sides. Southward of the island the depth of 5 fathoms will be found at $\frac{1}{2}$ mile south-southwest from Hole-in-the-Wall point, the southwestern point of the island. To the southeastward of this are Murphy rock with 8 fathoms, Neverfail rock with 10 fathoms, and Red Island rocks with 7 to 15 fathoms, the last-named rocks being 3 miles, in a direction 220° , from Rogges point, the southern point of Red island.

Goat island, surmounted by a remarkable tree, 108 feet above high water, has no navigable passage, unless a local pilot be taken, between it and the northern end of Red island, from which it is distant 250 yards.

Goat island sunker bears 270° , distant 800 yards from the southern end of Goat island, and dries 2 feet at low water.

Little Seal islands, 2 miles north-northeastward from Goat island, consist of a small group, occupying an area 700 yards long and 250 yards broad; the eastern and highest island is 91 feet high, and covered with small trees.

Great Seal islands, $\frac{1}{2}$ mile north-northeastward from Little Seal islands, is flat in outline, 346 feet high, and falls in steep cliffs to the southward, but slopes gradually to the northward. It should not be approached nearer than 200 yards.

Long island, situated $1\frac{1}{2}$ miles eastward of Merasheen island, 13 miles long northward and southward, and $1\frac{1}{2}$ miles broad at its widest part, contains two good harbors—Buffet harbor on the southeastern side and Mussel harbor on the southwestern side of the island.

Buffet head, the southern end of the island, is a remarkable perpendicular cliff about 300 feet high, falling from the summit of the island, 599 feet high, at about 1 mile to the northward. This summit, named Mount Ironskull, is readily recognized from all parts of Placentia bay.

Iron island lies southward 1,200 yards from Buffet head; it is bluff, flat-topped, 245 feet high, and bold-to.

Ironskull rock, southeastward 1,000 yards from Iron island, is 14 feet high, and steep-to, except on its southwestern side, from which a reef that covers 2 feet at high water extends 200 yards.

Dog islands, about a mile north-northeastward of Buffet head, are three wooded islets, the highest being 135 feet high, separated from Long island by a channel 400 yards wide. There is a passage in mid-channel between the western and the two eastern islands, but none between the two eastern.

Tides Cove sunker, bearing 233° , distant 550 yards from the western Dog island, covers 4 feet. This is the only known shoal off the southern part of the coast.

Buffet harbor is on the southeastern side and 3 miles from the southern end of Long island.

Buffet island, a cone 151 feet high, lies eastward $\frac{1}{2}$ mile from the harbor entrance, which may thereby be easily recognized.

A shoal, with 4 fathoms water over it, bears 237° , distant 450 yards from Buffet island; and Matthew rock, that covers 5 feet, and does not always break, bears 6° , distant 450 yards from Buffet island.

Clearing marks.—The eastern part of Dog islands open eastward of Buffet island, bearing about 200° , leads eastward of Matthew rock, and the northeastern fall of Iron island in line with the summit of West Dog island, bearing 193° , leads westward.

Dicks island, 174 feet high, and Isaac island, 108 feet high, lie southward of Buffet Harbor entrance, and are separated from Long island by narrow channels, passable only for boats. On the shores of these channels is a settlement named the Tickles.

The harbor, within the entrance, divides into three arms: the southern has shallow water stretching 200 yards from the shores, and Seal rock, awash at high water, close to its western point: the northern arm is $\frac{1}{2}$ mile deep and 300 yards broad, and has no danger except a rock with 12 feet of water, 100 yards from the eastern shore and 380 yards within the arm. The harbor proper, which is the western arm, has a church, prominent houses, and wharves around it. The entrance is clear, but a shoal extends 100 yards off a low point near the inner entrance on the northern side, and the whole of Buffet island a little open southward of the northern point, bearing about east, leads southward of it.

Anchorage.—In a large vessel anchor immediately within the harbor in 17 to 20 fathoms water, but in small vessels in either of the arms, as convenient.

Ice.—Buffet harbor is partly or completely frozen over, every second or third winter, from about the end of February to the beginning of April. Northern ice only visits the harbor every third or fourth year, and the time both of its arrival and departure is uncertain; it seldom arrives before March 1, and leaves between the end of March and early in May. In 1868 and 1882 drift ice remained unusually late; in the winters of 1875 and 1882 the bay was completely frozen over, and these were the only occasions that this had happened during forty years.

Current.—The current generally sets south-southwestward past Buffet harbor, and in on the eastern shore of Placentia bay.

Tides.—It is high water, full and change, in Buffet harbor at 8h. 12m.; springs rise 7 feet, neaps 5 feet.

Communication.—The steamer from Placentia calls at Buffet harbor weekly.

Little harbor, situated northward $1\frac{1}{2}$ miles from Buffet harbor, is available only for small fishing craft, for which there is good anchorage in 4 fathoms water, mud bottom.

Kearney head is a large, steep bluff, 192 feet high.

Collett cove, northward 2 miles from Little harbor, affords fair anchorage in 5 to 10 fathoms water, sand bottom. Collett Cove island, at its entrance, is 45 feet high.

In approaching from the south, one should give the southeastern point of the cove a good berth in order to avoid a rock that covers at high water, situated 100 yards off.

Northeast and Southwest coves are situated 2 miles northward of Collett cove. They are entirely exposed.

Shagroost is a vertical rock 69 feet high, with several low islets, situated in northeast cove.

Haystack harbor, situated north-northeastward 4 miles from Collett cove, is westward of a wedge-shaped peninsula, 256 feet high, joined to the mainland by a shingle beach on which are some houses. There is good anchorage in the harbor in 5 fathoms water, mud bottom, sheltered from all winds: and the inhabitants state that even in winter gales small vessels lie there securely. Both sides of the entrance to the harbor are clear at a short distance from the shore.

The name Haystack comes from a small island resembling a haystack, situated 400 yards north-northeastward from the northeastern point of the peninsula.

Communication.—The steamer from Placentia calls at Haystack harbor weekly.

Long Island point is a narrow tongue of land which is the northern end of Long island.

Cheese island lies north-northwestward about 1,200 yards from Long Island point; it is 145 feet high.

The Jerseyman, a bare rock 14 feet high, lies south-southwestward $\frac{1}{2}$ mile from Cheese island, and bears 314° , distant 700 yards from Long Island point.

Bread island, bearing 5° , distant $1\frac{1}{10}$ miles from Long Island point, is wooded, conical, and 229 feet high. A shoal, with 15 feet water over it, lies 300 yards from its southwestern end.

Caution.—The channel between Bread and Cheese islands has a rock with 12 feet water on it in mid-channel. The channel between the Jerseyman and Long Island point is clear of dangers and deep.

Spencer cove, on the northwestern side of Long island and south-southwestward 2 miles from Long Island point, is nearly $\frac{1}{2}$ mile deep. Rocks, 4 feet high, lie just within the northern entrance point, which extends 200 yards east-southeast, forming a reef, a part of which is

awash at low water. To clear these rocks when entering, keep the southern shore aboard.

Green island is a small rock 30 feet high situated $\frac{1}{2}$ mile north-west of the northern entrance point of Mussel harbor. A small reef lies north-northwest of it.

Mussel harbor, a fine basin on the western side of Long island at $3\frac{1}{4}$ miles from Buffet head, is well sheltered throughout, with good holding ground. It is $1\frac{1}{2}$ miles long north and south, $\frac{1}{2}$ mile broad, with a depth of 19 to 21 fathoms water, mud bottom, and is divided into two arms at its northern end; small vessels anchor in the north-western arm, but a short sea heaves into the other with southwesterly winds.

There are three islands at the mouth of Mussel harbor; the entrance is southward of the southern of these islands, keeping in mid-channel to avoid a rock situated a few yards from the south shore. An islet lies on the western side of the northern arm, and several shoals are westward of it; the passage is eastward of the islet.

North Wild cove, $1\frac{1}{4}$ miles southward of Mussel harbor, affords no shelter, nor does **South Wild cove**, $1\frac{1}{4}$ miles farther southward.

Barren island, 315 feet high, is separated from Mussel Harbor entrance and the land southward of it by a clear deep channel 400 yards wide. Several shoals lie near the western coast of the island, which should not be approached within $\frac{1}{4}$ mile. A small islet, 27 feet high, is situated close to the southern point of Barren island, and a rock, that nearly always breaks, lies 100 yards off the islet.

Merasheen and White Sail banks are extensive banks lying south-southwestward of Merasheen island and separated from the shoals off that island by a deep channel 2 miles wide.

Telegraph rock, with 11 feet water over it and the shoalest rock on these banks, lies 191° , distant $8\frac{1}{2}$ miles from Scrape Cove head, and from it shoals, with 5 to 9 fathoms water over them, extend to Upper Big shoal, which has 8 fathoms water over it, and is situated 1 mile within the southern end of Merasheen bank and south-southwest 15 miles from Scrape Cove head. Southern ridge, $\frac{3}{4}$ mile south-southwestward of Upper Big shoal, has 13 fathoms on it and is the southern limit of the shoalest part of the bank.

Rocks.—On the northern portion of White Sail bank are Northward rock, with 7 fathoms; Joe Ground, $5\frac{3}{4}$ fathoms; and Jeans rock, 6 fathoms water, all lying on a general southwesterly bearing from Scrape Cove head, and Jeans rock, the western, being distant 6 miles. To the southeastward of these $1\frac{1}{2}$ miles is Burges ground with 6 fathoms water. There are also several patches of 6 to 9 fathoms on White Sail bank.

Clearing mark.—Margaret and Breakheart points in line bearing 47° leads northwestward of all these dangers.

Bennett bank, about 2 miles in length east-northeast and west-southwest, and $\frac{3}{4}$ mile in breadth, with general depths of 10 to 25 fathoms over it, has a least depth of $5\frac{3}{4}$ fathoms on Hollett rock, which bears 193° , distant 6 miles from Scrape Cove head. Bennett bank is 1 mile southeast of White Sail bank, from which it is separated by a deep and narrow gully.

Caution.—In navigating the eastern part of Placentia bay, a clear passage may be obtained by keeping in line, from as far southward as possible, Iron island and Dog islands, bearing 20° .

Marticot island, 4 miles southwestward of White Sail head on the northwestern shore of Placentia bay, is $1\frac{1}{2}$ miles long and nearly 1 mile wide, and consists of two high parts joined by a low, marshy isthmus. Marticot Back cove, on the southern side of the isthmus, is 850 yards deep, with sides of steep cliff, and is quite open, with rocks extending a short distance off both entrance points.

Close off the northern end of the island are some low rocks, with a shoal having white bottom a short distance off them. Marticot cove, northward of the isthmus, has a shingle beach at its head and is foul for a short distance around its shores, but it affords anchorage in 8 fathoms water, sheltered from southwesterly winds. Rocks extend a short distance from its eastern point, and a shoal, with 5 fathoms water over it, lies 65° , distant 400 yards from them.

Gull shoal, with 13 feet water over it, bears 176° , distant $\frac{1}{4}$ mile from Gull rocks, a cluster of cliffy islands off the southern end of the island.

Shoals.—Southward of Marticot island are several shoals, some of which break in bad weather. They are: The Point, with $5\frac{1}{2}$ fathoms, 1 mile east-southeastward of Gull rocks; Western grounds, with 8 fathoms; Middle shoal, with $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms; Larkin bank, with $4\frac{1}{2}$ fathoms; Bill White rock, with 4 fathoms, the last being just northward of Long Island bank.

To pass eastward of all the above shoals, as well as of Spicer rocks (see p. 141), keep points of Margaret and Breakheart in line from abreast Jude island to abreast Presque harbor.

Fox island is situated northwestward of Marticot island, leaving a channel 250 yards wide between. A rock, with 12 feet water over it, lies off the southeastern entrance to this channel bears 124° , distant 300 yards from the southeastern end of Fox island. This island is almost joined to the southwestern point of Paradise at low water.

Rock.—A rock that breaks in ordinary weather bears 306° , distant $\frac{1}{2}$ mile from the southwestern end of Fox island. The summit of Marticot island, open southward of Fox island, bearing about 117° , leads southward, and a remarkable peak up Paradise sound, open of Red Cove head, about 16° , leads westward of this rock.

The coast of the mainland from Paradise peninsula trends north-northwestward $\frac{1}{2}$ mile to Red cove, which is 800 yards deep, 400 yards wide, and open. Red Cove head, the northwestern point of the cove, is skirted by rocks off reddish cliffs, and the coast continues foul to Southeast cove.

Long island, the northeastern end of which is situated west-northwestward $1\frac{1}{2}$ miles from Marticot island, is nearly 4 miles long and $\frac{3}{4}$ mile wide at the broadest part near the southwestern end, gradually narrowing to a sharp point, Long Island point, at the northeastern extreme. It is bold-to at a short distance, and rises to a series of peaks, the highest, a sharp cone 472 feet high, ascending steeply from the western coast at about $1\frac{1}{4}$ miles from the southwestern end. Some low black rocks lie off the southeastern coast.

Light.—A circular white lighthouse, 30 feet high, on the southwestern part of Long island, exhibits at 237 feet above high water, a fixed white light, which should be seen seawards from a distance of 18 miles in clear weather.

The keeper's flat-roofed dwelling is connected to the northwestern side of the lighthouse by a covered way 44 feet long, all painted white.

A white flat-roofed storehouse is situated on the point of the island at 112 feet below the lighthouse, and possibly it may be visible when the lighthouse above it is obscured by fog.

Long Island bank lies nearly a mile southeastward of Long island. It is $1\frac{3}{4}$ miles long and $1\frac{1}{2}$ miles broad within the depth of 30 fathoms.

The shoalest parts are two places with 10 fathoms water, eastward 2 miles and $2\frac{2}{3}$ miles, respectively, from the southwestern extreme of Long island.

A shoal, with 8 fathoms water on it, bears 140° , distant $3\frac{3}{4}$ miles from the southwestern extreme of Long island.

Paradise sound entrance is northwestward $1\frac{3}{4}$ miles from Marticot island, and the sound, which extends northeastward 11 miles, is about $\frac{3}{4}$ mile wide, and generally has deep water. There is anchorage for small vessels in Southeast cove, the first indentation on the southeastern shore, where are a few houses; in Gilberts cove on the northwestern shore, opposite the first island; and at the head. The sound is clear of dangers, except a rock, which lies a short distance northeastward of the first island, and out of the fairway up the sound.

Shag rocks, a group of peaked rocks, the highest 4 feet above high water, lie just west of the entrance to Paradise sound. The easternmost of the group covers at high water and faces a deep cove. There is no passage between these rocks and the shore.

A shoal, with 8 feet water, bears 155° , distant 300 yards from the highest rock.

Petit Fort harbor, next westward of Paradise sound, is entered through a passage 400 yards wide between Eastern head, a sharp point on the eastern side, and White point, low and shelving, with small rocks a short distance off on the western side. The harbor extends north by east $1\frac{3}{4}$ miles, expanding to $\frac{1}{2}$ mile wide inside the entrance and thence narrowing gradually to the head. Two wooded islets, about 20 feet high, lie close to the west shore, and nearly join each other and the mainland at low water. Petit Fort harbor is surrounded by high hills, those on the east shore being a series of sharp peaks, 272 to 375 feet high, with deep valleys between, and on the west shore a wooded, flat range 450 feet high, faced by cliffs, and falling almost perpendicularly to the water line.

Shoals.—A shoal, with 7 feet water over it, bears 131° , about 800 yards from Eastern head, and the ground inside this shoal is foul.

A shoal, nearly in mid-channel, immediately within the harbor entrance, has 12 feet water over it, and is steep-to. Long island, open eastward of Nonsuch head, bearing about 202° , leads eastward of this shoal.

Petit fort, a small cove on the western shore, is formed by a peninsula rising to a round wooded hill about 90 feet high; on the neck joining this peninsula to the mainland stands the church, which is a white wooden building. Off the neck lies a cliffy island 20 feet high, joined to the mainland at low water. A settlement surrounds the cove.

Harrington cove, next south of Petit fort, has a few houses round the shores, and a small islet, 13 feet high, off the south point.

Anchorage may be had as convenient, after the shoal in the entrance is passed, in 5 to 10 fathoms water, mud bottom. Small vessels should proceed northward of the wooded islets on the western shore, where they are sheltered from all winds.

Communication.—The steamer from Placentia calls at Petit Fort harbor weekly.

Wild cove, immediately southwestward of Petit Fort harbor entrance, is quite open.

Nonsuch head, a steep bluff rising to a round wooded summit 253 feet high, is the dividing point between Petit Fort harbor and Nonsuch. Off the south side of the head is a detached rocky hummock, 30 feet high; off the southwestern side of the head are some low square rocks, and a shoal, with 9 feet water over it, lies southwestward about 400 yards from the head.

Shag islets, 16 feet high, lie close off the northwestern part of Nonsuch head. A rock, that covers 6 feet, lies southward 100 yards, and a ledge extends the same distance north-northwestward from them.

Nonsuch extends north-northeastward $1\frac{1}{4}$ miles from Shag islets to the narrow channel, 140 yards wide, between the eastern shore of the mainland and the northern Burnt island. A shoal with $5\frac{1}{2}$ fathoms water on it lies nearly in the middle of the entrance, distant 750 yards, in a direction 293° , from Shag islets, and a rock, with 6 feet water over it, lies in mid-channel, bearing 325° , distant 1,100 yards from Shag islets; and a shoal, with 15 feet water over it, bears 212° , 650 yards, from Gooseberry island.

Gooseberry island is a small clifly mound, 53 feet high, forming a good mark for recognizing Nonsuch narrows. A cove, 1,400 yards deep and 700 yards wide at its entrance, narrowing gradually to the head, situated northeastward of Gooseberry island, affords good anchorage in $6\frac{1}{2}$ to 9 fathoms water, sand and mud bottom, with shelter from all but southwesterly winds.

Burnt islands, on the western side of the entrance to Nonsuch, and the eastern side of Southwest Nonsuch, are nearly joined to each other and the mainland of cape Roger, and are $1\frac{1}{4}$ miles long. The southern island is surmounted by a barren cone, cleft in two; the higher part, 285 feet above high water, is continued to the southward by wooded hills. The eastern shore is foul for 200 yards. An inlet, 600 yards deep and 100 yards wide, on the shores of which are a few houses, is entered on the southern side of this island, and affords shelter for fishing boats.

The northern island is barren, 165 feet high, and has a small, nearly detached mound on its southeastern side, off which rocks, that cover 5 feet, extend 100 yards into the narrow entrance of Nonsuch, leaving a channel only 100 yards wide, through which $8\frac{1}{2}$ fathoms can be carried by keeping the eastern shore close aboard.

Tides.—It is high water, full and change, at Burnt islands at 7h. 48m.; springs rise 7 feet.

Northeast Nonsuch extends north-northeastward, $2\frac{3}{4}$ miles from the northern Burnt island, with an average breadth of 400 yards, expanding in a cove on the western shore at about 1 mile within the entrance, off which there is anchorage, in 7 fathoms water, for vessels of moderate length. Small vessels anchor as convenient in the harbor up to $\frac{1}{4}$ mile from the head.

Water may be taken from several streams in this harbor, and small firewood may be obtained from the valleys.

Southwest Nonsuch extends south-southwestward, 2 miles from the northern Burnt island, but is unsuitable for vessels drawing more than 12 feet water; it may be entered by keeping in mid-channel between Burnt islands and the mainland. Southwestward of the islands a fine basin opens out $\frac{1}{2}$ mile long and $\frac{1}{3}$ mile wide, with sheltered anchorage in 11 fathoms water, mud bottom. In this basin are two

islands; and the head of the basin narrows to a shallow creek 600 yards long.

Mouse island, 17 feet high, is a small, grassy rock, 150 yards from the southern extreme of Burnt islands, with a reef extending 200 yards from the southern end. A rock that covers 4 feet bears 79° , distant 150 yards, and a shoal with 7 feet of water bears 115° the same distance from Mouse island.

Anchorage for small vessels may be had in 6 fathoms northwestward of Mouse island, but they must pass over a bar with $3\frac{1}{2}$ fathoms water between that island and the mainland.

Woody island, about 700 yards in length and the same in breadth, lies $\frac{1}{4}$ mile south of Burnt islands, and is separated from the mainland by a deep, clear channel 300 yards wide. It is surmounted by three wooded hummocks; the highest, over the southern side, being 228 feet high, slopes steeply to the water line, and may be approached to within 100 yards.

Hay island, 2 miles westward of Nonsuch head, 800 yards long, and narrow, is surmounted by a wooded cone 100 feet high and is joined to the mainland by shoal water; a low black rock lies close off its southwestern end, and another just southeastward of its northeastern end, but the southeastern coast is bold-to.

Hay Island bank, with 9 fathoms water on it, lies southeastward $\frac{1}{2}$ mile from Hay island.

Cape Roger is a steep cliff, 150 feet high, the southern termination of a remarkable moss-covered head and 500 feet high, situated northwestward of Hay island and falling almost in a perpendicular line to the sea. A low black rock lies close to the foot of the cliff. The east coast of this cape may be approached close-to, but the west shore has shoal water a short distance from it.

Cape Roger island, 220 feet high and wooded, lies westward nearly 1 mile from cape Roger. Shingle beaches fringe the northeastern shore and several rocks lie off the northwestern and northeastern coasts at the distance of 200 yards.

A rock, with 7 feet of water over it, bears 67° , distant 450 yards from the rock at the northeastern point, and another, with 12 feet of water over it, lies 600 yards in a direction 62° from the same rock; a third, with 8 feet of water over it, lies 140° , distant 300 yards from the southern point of the island.

Cape Roger bay extends north by east 4 miles on the western side of cape Roger, and is nearly 1 mile wide at its entrance, narrowing to 600 yards at 1 mile within, and to 300 yards at a short distance farther, keeping that breadth to near its head. A cluster of islets lies just within the entrance, 250 yards from the eastern shore; the southern, a pinnacle 10 feet high, and the northern flat, 6 feet above

high water. Sunken rocks lie 200 yards off these islets, and the channel between them and the mainland should not be taken.

A swell rolls across the entrance of this bay even when it is calm outside, especially after a prevalence of southerly winds.

Cape Roger mountain, a conspicuous round hill, 1,220 feet high, lies $9\frac{1}{2}$ miles inland from cape Roger, and shows prominently over the intervening land from the banks in Placentia bay.

Cape Roger harbor, situated on the western shore of the bay at $1\frac{1}{2}$ miles within its entrance, is sheltered by Harbor island, which is wooded, 113 feet high and 400 yards long, separated at the southern end from the mainland by a narrow channel, through which 4 feet can be carried at low water. This harbor affords anchorage for small craft only, between the island and the mainland, in 2 fathoms, sand; but large vessels may find anchorage anywhere in the bay after the island is passed in from 4 to 10 fathoms, mud, as convenient.

Rocks extend off the point next south of Harbor island, in a line crossing the bay, and that part of the west shore should not be approached nearer than 200 yards, but the island may be closed to within 100 yards from the east point. Rocks that cover lie in the harbor close southwest of Harbor island. A conspicuous round hill 470 feet high lies on the eastern shore, separated by a marsh from the hills of cape Roger, and shows out well from the south.

Cape Roger head, marking the western side of the entrance, is 498 feet high and falls steeply to the bay, but in wooded slopes to the northwestward and in a succession of wooded hills to the southwest point of the bay; a rugged, cliffy point under a wooded hillock, off which rocks that cover extend 200 yards.

Water may be procured in many places, and small wood is abundant in the valleys off this bay.

Little Gallows harbor extends northward nearly 1 mile on the western side of the southwestern point of Cape Roger bay to a shingle spit, within which it forms a small shallow basin.

The harbor, which is 700 yards wide at its entrance, narrows to 200 yards off a peaked rock on the western shore at 1,200 yards within, and thence gradually to the shingle spit. Shoal water extends a short distance from both shores, and a bar with 4 feet of water on it crosses the head of the harbor just outside the shingle spit.

The water shoals suddenly from 17 to 8 fathoms off the first low neck on the western shore, and thence gradually to the bar. A few houses are situated round the head of the harbor.

Anchorage.—Small vessels anchor in the harbor in 5 to 8 fathoms of water, sheltered from all except southerly to southwesterly winds.

Gallows Harbor head lies between Little Gallows and Gallows harbors, and its northern end is separated from the mainland at high water by Push through, a passage just wide enough for a boat. The

head, surmounted by mossy hills 320 feet high, falls in sharp cliffs to the southward, but in wooded slopes to the northward; the two northern hills being connected to each other and to the highest part by two low necks of land covered with grass.

Great Gallows or St. Joseph harbor, on the northwestern side of Gallows Harbor headland, is entered between a low point surrounded by bowlders, close off which is a black rock that covers at high water, on the southeastern side, and Sams head, a narrow point sloping from a steep bluff, on the northwestern side. The harbor, 500 yards across, has a few houses round its shores and affords good anchorage in $7\frac{1}{2}$ fathoms of water, mud bottom.

A bank with 7 feet least water over it bears 241° , distant 500 yards from Sams head, and the summit of Cross island, shut in with the rocks of Mouse island, bearing 247° , leads southeastward of it.

Gallows Harbor island, about $\frac{1}{2}$ mile long, lies $\frac{1}{2}$ mile westward of Gallows Harbor head, and has a wooded summit 257 feet high. The water is deep to within a short distance of the shores.

Jigging cove, entered 600 yards north-northwestward of Sams head, extends northward 600 yards; the entrance is 200 yards wide, and the cove expands within to 300 yards in breadth. A rock with 7 feet water over it lies a short distance from the western entrance point. Small craft anchor in 5 fathoms of water, mud bottom, with good shelter.

Mouse island, 35 feet high, and covered with grass over black rock, lies between Gallows Harbor island and the mainland northward of it, leaving a clear passage 400 yards wide between the islands, but none between it and the mainland.

Steering rocks, 14 feet high, lie close to the shore off a slight indentation north of Mouse island. A rock with 5 feet of water bears 93° , distant 300 yards from the highest of the Steering rocks.

Little harbor, northwestward $1\frac{1}{4}$ miles from Great Gallows harbor, extends northward 1,200 yards and is about 200 yards in width, but narrowed at a short distance within the entrance by a rock off a shingle point. Fishing craft anchor with tolerable shelter in $1\frac{3}{4}$ fathoms water off a small settlement.

Burnt island, $\frac{1}{2}$ mile west of Little harbor, lies close off the mainland, and shelters a small cove frequented by fishing boats. The coast between Little harbor and this cove is rugged and much indented. A shoal lies just each of the island a short distance from the mainland, but the island is bold-to on the south and west sides.

Holloway passage, between Burnt and Cross islands, is 500 yards wide, clear of danger, and deep.

Bay de l'Eau head, immediately northwestward of Burnt island, rises steeply to an isolated hill 227 feet high, covered with moss; it is bold-to.

Bay de l'Eau, extending north-northeast, with a slight bend, nearly 4 miles, is about 900 yards in breadth; the water is deep and clear for 2 miles from the entrance, when it shoals suddenly from 18 to 7 fathoms in mid-channel. A depth of 6 to 7 fathoms, mud bottom, then continues for $\frac{3}{4}$ mile, and affords sheltered anchorage.

Water and wood can be procured readily from many places on the shores of this bay.

Cross island, $2\frac{1}{2}$ miles long northeastward and southwestward and $1\frac{1}{4}$ miles broad, is surmounted by two conspicuous hills, covered with moss. The highest and northern has a small, flat summit 593 feet high, and the southern is a sharp peak 550 feet above high water. Lower, rugged, and wooded hills, with deep valleys between, extend to the shores, sloping steeply to the water line. Rocks that cover lie off the southeastern shore that should not be approached nearer than 200 yards, and shoal water extends a short distance from the points on the northwestern side. A shoal, with 6 fathoms water, bears 194° , distant $\frac{1}{2}$ mile from the southwestern point, and a rock, with 5 fathoms water, lies 200 yards off the northwestern shore, opposite the channel between Petticoat and Gull islands.

Gooseberry islet, 34 feet high, the northern end of a chain of islands lying westward of Cross island, is small and cliffy with shoal water extending a short distance northeastward of it; a rock, with 5 feet water over it and the end of a ledge, bears 205° , distant 150 yards from the islet.

Petticoat island, 182 feet high, is separated from the southern end of Gooseberry islet by a passage 400 yards wide, 2 fathoms deep, and clear in mid-channel. It is wooded over three round hills, the highest 182 feet high. A rock, with 7 feet water over it, lies nearly 200 yards off a cove at the northeastern end, and shoal water extends a short distance off the northwestern coast of the island.

Gull island is 450 yards south-southwest of Petticoat island, and the channel between is clear of danger. The highest part, a wooded cone 210 feet above high water, lies near the northeastern extreme; the southeastern shore has dark cliffs and is steep-to, and the northwestern shore consists of shingle beaches at the base of gentle slopes.

Little Gull island, a grass-covered rock 30 feet high, is nearly joined to the southwestern extreme of Gull island.

Jerseyman island, 257 feet high, is flat in outline and wooded, falling steeply to the shore, and terminated to the northward by a small islet 7 feet above high water. A rock, on which there is 6 feet water, bears 180° , distant 200 yards from the southern extreme. The passage between Jerseyman island and the mainland is clear, the distance to Broad Cove head being 1 mile.

Boat Harbor head, dividing bay de l'Eau from Boat harbor, falls in steep bluffs from a moss-covered tableland 490 feet high, and is fringed on its western side by shingle beaches.

The Friar, a peaked rock, 11 feet high and steep-to. lies close off the southern end of this head.

Boat harbor extends north-northeastward $3\frac{1}{2}$ miles on the western side of Boat Harbor head with a breadth of about $\frac{1}{2}$ mile; the harbor divides at its head into northeast and northwest arms, the former 900 yards deep, and containing anchorage for small vessels, but shoaling 600 yards from its head.

Northwest arm is 1,400 yards deep and 500 yards wide; it affords anchorage in 18 fathoms water, but is shoal at 400 yards from its head. The only anchorage in Boat harbor for vessels of any size is in this arm.

Parker cove, just inside the entrance on the west shore, is 600 yards deep. A rock that covers 5 feet lies in the middle of the cove 250 yards from the shore, and a shoal with 9 feet water lies in the line of the points 950 yards from Manny point south of the entrance.

Anchorage for ships can be had only in Northwest arm, and for fishing craft in Northeast arm and Parker cove inside the rocks.

Water may be obtained from several streamlets on the sides of this bay.

A shoal, with 9 fathoms of water, bears 247° , distant $\frac{3}{4}$ mile from Boat Harbor head. It is the summit of a bank, with less than 20 fathoms water, nearly $\frac{1}{2}$ mile in extent.

The coast of the mainland, from Boat harbor trends southwest by south $2\frac{1}{2}$ miles to Bane harbor; it is backed by wooded ranges with several sharp, barren peaks 470 to 616 feet high, and is bold-to. Bane Harbor tolt. the southern of these hills, is a sharp peak 585 feet high.

Bane harbor, a landlocked basin 700 yards long and 500 yards broad, is entered through a curved channel 100 yards wide, narrowed to half that breadth by rocks extending from the northern shore. The entrance is well defined by some white houses and the church, a white wooden building standing on a small eminence just within the entrance on the north shore. The point under the church is rugged and continued under water to the opposite shore, forming a bar, over which only $3\frac{1}{2}$ fathoms can be carried. The northern side of the harbor slopes from wooded hills, and over the west point is an isolated hill 130 feet high, covered with small wood.

Rodway point, east of the entrance, is a low, wooded mound, east of which is a rocky islet about 10 feet above high water. A rock lies close off the islet, and a reef that covers, with a shoal at the extreme, extends nearly 100 yards from Rodway point.

Smith point, south of the entrance, is steep-to, but a rock, awash at low water, lies a few yards from the point next within.

Inside the entrance the harbor divides into Northeast cove and the Bottom, the former extending 300 yards and the latter a continuation of the main basin.

No vessel should go into this harbor for the first time without a pilot.

Steering rock, 7 feet high, lies southward 350 yards from the entrance to Bane harbor. A low black rock lies off the southwestern extreme, and a rock, with 2 feet water, bears 25° , distant 50 yards from the eastern extreme.

Communication.—The steamer from Placentia calls at Bane harbor weekly.

Miller point, $\frac{1}{2}$ mile south by west of Bane harbor, is a low projection from a high range, and is bold-to.

Rushoon head is the end of a range of cliffs $\frac{2}{3}$ mile southwestward of Miller point, falling from a high, barren tableland surmounted by a boulder 330 feet above high water. Low boulders extend a short distance from the head with deep water close-to.

Rushoon harbor, entered northward of Nipper head, a dark, wooded hill 112 feet high, situated $\frac{1}{2}$ mile northwestward of Rushoon head, is a shallow harbor, affording good sheltered anchorage for fishing craft in $2\frac{1}{2}$ to 5 fathoms water: it dries 200 yards from the fresh-water brook at the head.

Jigging cove, between Rushoon and Nipper heads, is faced by a steep-to shingle beach on which are several houses.

A **rock**, that covers 3 feet at high water, with a shoal stretching a short distance southwestward, bears 295° , distant 650 yards from Rushoon head, and a rock with 6 feet water lies 140 yards from Nipper head.

Anchorage.—Vessels may anchor on a flat outside Rushoon in $7\frac{1}{2}$ fathoms, mud, with the northeastern point of the entrance to the brook at the head open of Nipper head, bearing about 5° , to clear the rock that covers: or inside that rock, close off the beach at Jigging cove, by having the northeastern end of Jerseyman island well shut in with Rushoon head, bearing about 144° .

Rushoon bank, with 9 fathoms water, bears 205° , distant 600 yards from Rushoon head.

The coast between Rushoon and East Broad cove 2 miles southward, slopes steeply from wooded hills, and may be approached to within 100 yards. Gull rock, near the entrance of the cove and close to the shore, is 10 feet above high water and shows white against the dark background.

Broad Cove head, a peninsula nearly 1 mile long, $\frac{1}{4}$ mile wide, and 307 feet high, is separated from the mainland by a narrow, marshy isthmus about 60 feet high.

East Broad cove, on the northern side of the marshy isthmus, affords good anchorage in 7 to 12 fathoms, mud and sand, the holding ground being better nearer the western shore, on which are several houses. There is a shingle beach at the head of the cove. A

plateau of shoal water extends northward of this cove, falling suddenly to deep water on the southeast; the general depth on this plateau is $7\frac{1}{2}$ fathoms, and the line of 10 fathoms joins Broad Cove head and the north point of the entrance to Rushoon.

A shoal, with 5 fathoms water, bears 123° , distant $\frac{2}{3}$ mile from the southeastern extreme of Broad Cove head.

West Broad cove also affords good anchorage in 10 fathoms water, but is entirely open to southerly winds. The holding ground is said to be better than in East Broad cove.

Green island, 90 feet high, is the northeastern of a group lying off Broad Cove head. It is small, covered with grass, and faced by dark cliffs. A reef extends 250 yards from the northeastern end and 200 yards from the southwestern extreme. A rock, with 6 feet water, bears 76° , distant 800 yards from the eastern extreme of Green island, being the outer edge of a bank extending from the island.

Emberlys or Fords island, $1\frac{1}{2}$ miles southwestward of Green island, is surmounted by a peak, with a small flat top, 330 feet above high water, that shows prominently from all directions. The sides are steep, in many places formed of dark cliff, except the southwestern extreme, that is terminated by a grassy mound 70 feet high. A white islet, 10 feet high, lies off the northern point, and a sunken rock close off the point just south of it. Two small rocks lie off the eastern shore, and the south side is fringed by rugged rocks that cover and extend 200 yards from the shore.

Puddock bank, with 6 fathoms water at the eastern extreme, extends nearly $\frac{1}{2}$ mile from Mainyard point, the eastern end of Emberlys island. Simonds rock, with $7\frac{3}{4}$ fathoms on it, bears 104° , distant $\frac{1}{2}$ mile, and Soundbone rock, with 6 fathoms water over it, bears 73° , distant 1,600 yards from the same point. Upper rock, with 10 fathoms water, bears 48° , distant 1,150 yards, and Lower rock, with 12 fathoms, bears 45° , distant 1,500 yards from Mainyard point.

Fords rock, awash at high water and steep-to, bears 124° , distant 270 yards from some black peaked rocks, off the eastern point of Emberlys island.

The Washball, a rock that covers 4 feet at high water and is steep-to, bears 278° , distant $\frac{1}{4}$ mile from the white islet off Emberlys island.

Andrews island, 38 feet high, is the largest of a group of square rocks, joined at low water to the southwestern point of Emberlys island. Rocks that cover lie a short distance off the northernmost of the group.

Oderin island (Audierne) is separated from the southwestern point of Emberlys island and the above group by a channel 200 yards wide, through which a depth of 9 feet can be carried at low

water. A rock that covers lies off the western point of the channel, and another nearly 100 yards from a large boulder at the foot of the cliff on the southern side of the passage. No vessel should attempt this channel without a pilot.

Castle island, 36 feet high and covered with grass, lies off the western point of this passage, with shoal water between. The beach, of shingle, is just south of this point and is backed by a row of houses.

Oderin harbor is entered from the west side of the island and nearly divides it. Chimney rocks, of which the shoalest has 1 foot on it at low water, lie outside the harbor, nearly in the middle of the approach, and there is no passage between them and that part of the island to the southward.

Spurrier point, north of the entrance, is a grassy peninsula 20 feet high, from which the harbor extends 1,400 yards eastward, and then, with a sharp bend, 400 yards northeast by north. The Breadbox, a small rock that covers, lies close to the west extreme of Spurrier point. The northern shore is cliffy, and the southern slopes from wooded hills, the highest of which, 255 feet above high water, has a flat summit, with a steep fall to the westward. Two small islands are situated 400 yards within Spurrier point, and are nearly steep-to on the east and south sides. A rock that covers at high water bears 143° , distant 200 yards from the inner of the two islands, and is nearly connected to the south shore by rocks above and below water. The Episcopal church, with a square tower, stands on the north shore, and the Roman Catholic church, with a spire, is situated on the dividing point of the bends of the harbor, and a considerable settlement is built round the shores.

The Breeches is a shoal rock, with two heads close together, bearing 273° , distant 250 yards from the point on which the Roman Catholic church stands, and nearly in the fairway of the approach to the inner part of the harbor. The water is shoal between the Breeches and the south shore of the harbor, but a safe passage may be obtained by keeping the north shore on board.

Directions.—To enter Oderin harbor, shut in the Episcopal church with Spurrier point, bearing about 92° , and pass that point at 50 yards, and the same distance southward of the islets. To clear Breeches rock and enter the inner part of the harbor, keep the northern shore aboard.

Anchorage.—Anchor in 7 fathoms water in Ship cove, just eastward of the islets, or inside the rock that covers; or in small craft at the head in 3 to 4 fathoms.

Tides.—It is high water, full and change, in Oderin harbor at 8h. 6m.; neaps rise 5 feet.

Communication.—The steamer from Placentia calls at Oderin harbor weekly.

The southern shore of Oderin island is composed of steep cliffs and is foul for 200 yards distant. Lance Cove head, the eastern extreme of that shore, is a flat-topped bluff 215 feet high that also overlooks the harbor. Rocks extend 200 yards from both bills of this head.

Lance cove, an open bay north of the head, has shingle beaches separated by spurs of red cliff. A rock awash at low water lies just off the south point of the cove.

White rock, with 6 fathoms of water on it, is the shoalest part of a bank extending nearly $\frac{1}{2}$ mile from Lance Cove head.

Patrick island, 110 feet high, lies close to the southwestern point of Oderin island, and is wedge shaped, with dark cliffs to the southward and grassy slopes to the northward.

Crow island, 201 feet high, is wooded and conical, with dark cliffs lying close to the western side of Patrick island. Patrick rocks, 13 feet high, are a ledge of black rocks extending southwestward 350 yards from Crow island.

Fox island, with a wooded summit about 100 feet high and reddish cliffs, lies northwestward of Crow island, and is steep-to on the northern side. There is no passage for vessels between these islands.

Jude island, 435 feet high, $2\frac{1}{2}$ miles long and 2 miles wide at the northern extremity, narrowing irregularly to a point at the southern extreme, lies southward of Oderin island and is separated from it by a clear channel nearly $\frac{1}{2}$ mile wide, which should be taken when passing inshore of the group.

The northern coast is of bold cliff with some curious red stripes near its eastern end, off which is Gull island, a gray rock 48 feet high, and bold-to. The eastern shore is also nearly bold-to, consisting of steep cliffs round Eastern cove, a curve in the coast line filled with islets and rocks fronting shingle beaches.

Cape Jude, a remarkable headland, lies about 1,400 yards from the southern end of the eastern shore, and is a round-topped hill 417 feet high, falling in a nearly perpendicular cliff to the sea. A sharp hill, 400 feet high, with a boulder on its top, is situated just southwestward of it.

A rock, with 4 feet water over it, bears 167° , distant 750 yards from the southern point of the island.

Hay cove, 1,500 yards wide and 600 yards deep, lies northwestward of the southern point and affords anchorage, sheltered from easterly winds, in 9 to 10 fathoms water, sand bottom. At the bottom of this cove is a dark cliffy head with a shingle beach on each side. A rock that covers 2 feet lies off Green point, a low projection north of the cove, and a rock with 8 feet water bears 296° , distant 550 yards from the same point.

Jude harbor, on the western side of the island, extends north-eastward $\frac{1}{2}$ mile, is free from shoals, and is entered northward of Round head, a hillock 120 feet high, that makes as an island.

Rocks that cover extend southwestward 200 yards from Poplars head, the northern entrance point, and a rock, with about 7 feet water over it, bears 230° , nearly $\frac{1}{3}$ mile from Round head.

Anchorage, sheltered from winds between south and north, through east, may be obtained in 10 to 12 fathoms, sand and mud bottom, but a heavy swell rolls in with westerly winds.

Duck rocks, that cover at high water, are two reefs, bold-to on the northwestern side, lying in a line parallel to the shore northward of the harbor and distant $\frac{1}{4}$ mile from it. An islet 8 feet high marks the northwestern end of Jude island, and a rock, on which the depth is 10 feet, bears 247° from this islet.

Middle island, the northeastern of a chain of islets lying south-eastward of Jude island, is situated in a direction 77° , nearly 2 miles from the southern point of that island. It is conical in shape, 80 feet high, and bold-to on the northeastern and northwestern sides.

To pass inside this group, the channel between Jude and Oderin islands may be used, but no attempt should be made to pass through them except by those possessing local knowledge.

Binghams shoal, with 6 fathoms water, bears 79° , distant $\frac{9}{10}$ mile from Middle island.

Spicer rock, with 9 fathoms of water over it, bears 87° , distant $3\frac{4}{10}$ miles from Middle island.

Harbor rocks, about 10 feet high, bear 204° , distant 1,100 yards from Middle island; there is deep water a short distance from them, except on the eastern side, where, distant 200 yards, is a rock that covers 2 feet at high water. There is a good channel between Middle island and these rocks.

Badger rock, with $3\frac{3}{4}$ fathoms of water over it, bears 128° , distant 1,700 yards from Harbor rocks, and breaks in bad weather.

Clearing marks.—Western rocks open southward of Little Pinnacle, bearing 261° , leads eastward; the eastern end of Jude island well open northeastward of Middle island, 337° , leads northeastward; and well open southwestward, 341° , westward of Badger rock.

Old Poe shoal, with 6 fathoms least water, bears 82° , distant nearly $1\frac{1}{2}$ miles, and Point shoal, with 7 fathoms least water, bears 104° , distant $1\frac{3}{4}$ miles from Harbor rocks. Both these are said to break in bad weather.

Pinnacle island, about 30 feet high, bears 210° , distant $\frac{1}{2}$ mile from Harbor rocks, with a clear passage between them. Little Pinnacle, about 10 feet high, and Long rock, about 50 feet high, lie close in a line bearing 206° from Pinnacle island, with no passage between for a vessel.

Saddleback islet, castellated, black, and 104 feet high, with grass at the summit, is the most conspicuous of the group, and is bold-to. The passage between it and Long rock is 400 yards wide and clear in mid-channel.

Little Saddleback islet, black and about 20 feet high, bears 119° , distant 600 yards from Saddleback. There is deep water close eastward of it, but a bank, with $4\frac{1}{4}$ fathoms least water extends in a direction 189° for 600 yards from the islet, and breaks in bad weather.

Oderin bank is a large shoal with depths on it varying from $5\frac{1}{2}$ to 27 fathoms. The western shoal, with 6 fathoms of water over it, bears 137° , distant $4\frac{3}{4}$ miles from Saddleback. From this shoal the bank trends northeasterly $4\frac{1}{10}$ miles to Eastern rock, a shoal with $5\frac{1}{2}$ fathoms water, the intervening ground being very uneven.

Big shoal, on which the least water is 7 fathoms, extends southwestward 3 miles from Oderin bank, from which it is separated by a gully $\frac{1}{2}$ mile wide with depths of 20 to 53 fathoms.

John-on-the-bay bank lies $\frac{1}{4}$ mile southward of Big shoal, the water between deepening to 45 fathoms. It is $\frac{3}{4}$ mile in extent between the depths of 30 fathoms. Southwest rock, with 8 fathoms water, is the shoalest part of this bank.

Osmond, Dicks, and Joe rocks are three heads of a bank, with least water of 12 fathoms. Joe rock, the westernmost, being nearly $2\frac{1}{2}$ miles in a direction 181° from Saddleback.

Jim Drake ledge, with 7 fathoms of water, bears 201° , distant 1 mile from Saddleback.

Western rocks, a group of square dark islets, the highest of which is 20 feet high, bear 272° , distant $1\frac{1}{2}$ miles from Saddleback.

Washing-tub islet, 5 feet high, bears 249° , distant $1\frac{1}{2}$ miles from Western rocks. It is surrounded by reefs, and is nearly connected to Western rocks by a line of shoals that break in ordinary weather, leaving scarcely room for a boat to pass between.

South sunker, on which the depth is 2 feet, bears 157° , distant 1 mile from Western rocks, and there is deep water close southward of it. Harry ledge, with 5 fathoms water over it, lies in the same direction $1\frac{1}{2}$ miles from Western rocks.

Smith shoal, a bank 600 yards long, with depths varying from $3\frac{1}{2}$ to 5 fathoms, bears 190° , distant $1\frac{6}{10}$ miles from Western rocks.

Kelpy sunker, with 9 feet water over it, bears 154° , distant $1\frac{6}{10}$ miles from Washing-tub islet; there is a shoal of 3 fathoms of water eastward nearly 200 yards from it.

Clearing marks.—Middle island open eastward of Saddleback, bearing 24° , leads eastward, and Roche peak of Flat island, open eastward of Western rocks, bearing 314° , leads northward of these shoals.

Flower shoal, the western of this group, bears 230°. distant 2 miles from Washing-tub islet, and consists of 2 heads a short distance apart; the shoalest, with 9 feet of water over it, breaks only in bad weather.

Green islands are a group lying 2½ miles westerly from the southern point of Jude island.

Green island, the largest, is 32 feet high, and sunken rocks extend westward, northward, and eastward of it for a distance of nearly 1,400 yards.

Flat islands, lying between Jude island and the mainland, and separated from the latter by a channel 1 mile wide, are 2 large islands and a great number of smaller islands and rocks.

Yardie island, the eastern of the group, is 130 feet high; a ledge extends 250 yards from its northeastern end, and islets and rocks, with deep water close southward of them, lie a short distance off its southern side. Tinkershare island, small and wooded, lies close westward of Yardie island.

Glimshire island, 100 feet high, flat and wooded, is separated from the west side of Yardie island by a channel 350 yards wide, containing several islets and rocks. A stranger should not take this passage.

Flat island, the largest of the group, is 2 miles long, and nearly divided into three parts by coves extending from both shores. The eastern part is high and wooded, surmounted by a flat summit 236 feet high, and terminated to the southward in Roche peak, a remarkable sharp-topped hill 203 feet high. Vinegar hill, a sharp cone 150 feet high, lies between them. The middle part of the island has a flat range on the east side, with several wooded tufts, the highest 107 feet high, and some lower wooded hills to the westward inclosing a pond. The western part is composed of a flat hill about 100 feet high, a conical mound 82 feet high, and several low wooded hills on the northwestern shore terminating in sand cliffs.

Flat Island cove is on the northeastern side of the island, between the east and middle parts. It is 700 yards long and 500 yards wide, affording good anchorage in 8 fathoms, mud, with shelter from all winds but those from north to east. At the head is a shingle beach, about 10 feet above high water, containing a salt-water pond, dividing Flat Island cove from Flat Island harbor. The water is shoal 100 yards from the head of the cove, the depth decreasing gradually. A ledge extends 300 yards to the eastward from Foots point, north of the cove, that should be given a good berth when turning into the cove.

Tides.—It is high water, full and change, in Flat Island cove at Sh. 27m.; springs rise 6½ feet, neaps 5 feet.

Hay cove, near the center of the island between the middle and western parts, is filled with sunken rocks nearly to the line of the points. It is much frequented by fishing craft in the caplin season, when that bait is always plentiful. The bottom of the north shore of this island is composed of bowlders, that extend fully 200 yards from the shingle beaches that fringe it. Frenchman rock lies close off the north point, and covers at high tide.

Rocks.—A rock with 10 feet of water over it, bears 224° , distant 500 yards from the northwestern end of Flat island.

Hiscock rocks, a group of low islets and sunken rocks, lie close off the southern end of Flat island.

Davis island is 1 mile long and has near its eastern end Osmond hill, a sharp peak 114 feet high.

Duck rock, 5 feet high, is the end of a ledge of rocks and shoals stretching off the western point of Davis island; and **Duck Rock sunker**, with 2 feet of water over it, bears 2° , distant 500 yards from Duck rock.

Flat Island harbor, between Flat and Davis islands, is approached from both sides in small craft, but in large vessels from the eastern side only. The channels are both very narrow and are obstructed by numerous rocks, and neither of them should be taken without local knowledge. The harbor is $\frac{1}{4}$ mile across and affords good anchorage in 7 to 9 fathoms, mud bottom: the water shoals suddenly close to the beach at the head. There is a large settlement around this harbor.

Communication.—The steamer from Placentia calls at Flat Island harbor weekly.

Copper island, the southern island of this group, is a wooded and conspicuous cone, 135 feet high. Low islets extend southward $\frac{1}{3}$ mile from it, ending in Copper Island rock, 6 feet high. The northwestern side of the island is foul for the distance of $\frac{1}{2}$ mile.

Paddle rocks are two shoals, with 3 fathoms of water over them, lying 800 yards apart on a line bearing 224° , the eastern bearing 233° , distant $1\frac{1}{2}$ miles from Copper island.

Pinnacle rock, with 4 feet of water over it, bears 219° , distant 2 miles from Copper island, in the middle of the apparent fairway between the mainland and Flat islands, and **Upper Pinnacle**, with 10 feet water over it, bears 219° , distant 750 yards from the Pinnacle.

Red Harbor head, southwestward $2\frac{1}{4}$ miles from Broad Cove head, is a steep cliff with a hole through the base and a small ledge of rocks just inside.

Red harbor extends northward on the western side of Red Harbor head for $1\frac{1}{2}$ miles, and is 800 yards broad. Rocks that cover lie close to both shores, but the remainder of the harbor is clear. A small islet is nearly joined to the western shore, and northward of this are a few

houses. Two considerable streams flow into this harbor: the deposit from the western stream has formed a shoal extending nearly 300 yards from the mouth.

Anchorage.—Anchor in 6 to 7 fathoms of water, sand bottom, off the houses, sheltered from all but southerly and southeasterly winds, which send in a heavy swell.

Stanley rocks, which cover 1 foot at high water, bear 199° , distant $1\frac{3}{4}$ miles from Red Harbor head. The sea nearly always breaks on them, and they are bold-to within a short distance.

Big shoal, with 4 fathoms of water over it, bears 231° , distant 1,850 yards from Stanley rocks.

Black rock, small, and awash at high water, with a shoal extending 200 yards southwestward of it, bears 233° , distant $1\frac{1}{2}$ miles from Stanley rocks.

Woody island, bearing 219° , distant 1 mile from Black rock and $\frac{1}{2}$ mile from Dock point, the southern entrance point of John the bay, is wooded, and 25 feet high.

John the Bay harbor, 5 miles southwestward of Red Harbor head, is 600 yards across and contains several rocks; it is a shallow basin, where fishing craft anchor, in 3 fathoms of water, sheltered from westerly winds.

John the bay, an open cove, $\frac{1}{2}$ mile southward of the harbor, and locally known as the Dock, is 1,100 yards wide. It affords good anchorage in 10 fathoms of water, with winds from south-southeast, through west, to north. The shores are rugged and foul; at the head is a sand cliff faced by a shingle beach, the eastern side of a marshy isthmus about 50 feet high, that connects to the mainland the peninsula, forming Mortier bay.

John the Bay islands, southeastward 2 miles from Dock point, lie close off the eastern point of the peninsula, and are two gray islets and some low rocks, the highest 44 feet high. Rocks that cover lie northward nearly 200 yards from these islands, and a shoal, with 12 feet of water over it, lies 100 yards southward.

John the Bay head, just southwestward of the islands, rises to a round hill 331 feet high, which shows conspicuously from the line of the coast. Deadman cove, southwestward of this head, is open and rocky.

There are many shoals off the coast between John the bay and the entrance to Mortier bay. Pig ledge, the northeastern, with $3\frac{1}{2}$ fathoms of water over it, bears 84° , distant $1\frac{2}{10}$ miles from John the Bay islands. Stickland rock, with $3\frac{1}{2}$ fathoms of water over it, bears 110° , distant $1\frac{1}{2}$ miles from Rock harbor point. Sams ledge, with 15 feet of water over it, bears 98° , distant 1 mile, and Point shoal, with 9 feet of water over it, bears 158° , distant nearly a mile, from the same point.

Rock harbor has numerous rocks in it and is only available for fishing craft; a considerable settlement surrounds the harbor, and the church, a white building, stands near its head.

The coast from Rock harbor to the entrance of Mortier bay, nearly 2 miles southwestward, is dark cliff backed by wooded hills and is steep-to. The turning point shows as an overhanging cliff, and shoals lie nearly $\frac{1}{4}$ mile off it.

Mortier bay is entered through a channel $1\frac{1}{2}$ miles long and $\frac{1}{2}$ mile wide, at the northern end of which the bay opens to nearly 2 miles across, with deep water and no anchorage except in the harbors and coves off it.

Saul islands are close off the eastern entrance point. The southern, 70 feet high, bare and gray, is conspicuous against the dark background on northerly bearings; shoal water extends a short distance southward from the western island.

Skiff-sail rock, with 6 feet of water on it, bears 93°, distant 1,000 yards, and Saul Island rock, also with 6 feet of water over it, bears 124°, distant 400 yards from the southern Saul island.

Thomas rock, on which the depth is $4\frac{1}{2}$ fathoms, bears 124°, distant 1 mile from the southern Saul island.

Big head, the inner entrance point into Mortier bay on the western side, is 437 feet high, and rises in steep cliffs from the channel and eastward, but in a gradual slope northward and westward.

Goolds cove, a slight indentation with a sandy beach, around which are a few houses, lies just within the entrance on the eastern side.

Spanish Room harbor, where there is a settlement, is at the northeastern corner of the bay.

Rocks lie off the western side of the entrance: they are steep-to, and the highest is 5 feet high. The eastern shore is foul for 200 yards off the cove immediately within the entrance; and at 800 yards within a spit, with 13 feet water on it, extends 400 yards from the western shore.

Anchorage.—Anchor in $5\frac{3}{4}$ fathoms of water, mud bottom, before reaching the spit, where there is swinging room 800 yards long and 600 yards broad.

Water.—A considerable stream, spanned by a bridge, flows into the eastern side of the harbor.

Cashel cove, just northwestward of the peninsula forming Spanish room, affords anchorage in 6 to 10 fathoms of water, mud bottom, sheltered from all but southerly to westerly winds.

Cashel lookout, a hill 615 feet high, and surmounted by a bowlder, lies $1\frac{1}{2}$ miles inland northward of Cashel cove; it is conspicuous and is visible from Placentia bay.

West arm.—The western part of Mortier bay narrows to an arm 900 yards broad, that decreases in breadth gradually to a bar at $1\frac{1}{4}$ miles from its entrance.

Jonas rock, which covers 3 feet, lies 200 yards from the northern entrance point, and is joined to it at low water; rocks extend 100 yards from the southern shore. From the bar, which is passable by boats at high water, a narrow saltwater arm extends southwestward $5\frac{1}{2}$ miles, and nearly joins the head of Burin inlet; there is a settlement named Marytown on the banks.

Anchorage.—Anchor in this arm in 6 to 9 fathoms of water, over mud bottom.

Communication.—The steamer from Placentia calls at Marytown weekly.

The Tolt, a conspicuous conical hill 701 feet high, lies between the long arm of Marytown and Little bay.

Little bay, entered northward of the slopes of Big head, extends southward with a slight bend 1,900 yards, and then divides into two arms: the southeastern deep inside, but blocked by islets and shoal water, the southwestern shallow from the mouth.

The bay is barred just within a shingle spit on the eastern shore, but vessels drawing 13 feet of water can cross the bar at high water springs by keeping the eastern shore close aboard, and may careen in safety in the inner basin.

Seal rock, which covers 3 feet at high water, bears 304 distant 500 yards from the eastern entrance head of Little bay, to which a rock and shoal water nearly connect it. A shoal extends in a direction 310° for 100 yards from Seal rock.

Anchor in 8 fathoms water, mud bottom, immediately within the western entrance point, where the bay is 350 yards wide.

Beaubois cove, southwestward of Mortier bay entrance, is 150 yards long, 200 yards wide, and affords good sheltered anchorage for a few fishing craft in 2 fathoms of water. Islets lie in the entrance. The church, a white wooden building, stands on a small hill just northward of the harbor. To enter this cove keep the eastern shore close aboard.

Communication.—The steamer from Placentia calls at Beaubois cove weekly.

Blow-me-down sunker, bearing 42° , distant 600 yards from Blow-me-down, has 15 feet of water over it and is steep-to.

Clearing mark.—The extreme of Big head in line with the western end of the western Saul island, bearing 344° , leads eastward of this rock.

Duricle cove, lies south-southwestward, distant 1,400 yards, and Tides cove southward, distant 1 mile from Blow-me-down. Both

these coves are open, but nevertheless afford anchorage with off-shore winds in 7 to 13 fathoms water. There are some houses on these shores.

Croney island, south-southeastward, distant 700 yards from Tides cove point and close to the mainland, is a remarkable conical island 170 feet high, wooded at the summit, with steep cliffs to the eastward, and bold-to.

Croney rock, with 5 fathoms of water over it, bears 152° , distant 250 yards from Croney island. The following-named rocks and shoals lie within 1,200 yards easterly from Croney island: Croney shoal, 6 to 8 fathoms; Laurence rock, 7 fathoms; Little Green point shoal, 8 fathoms; and Green point shoal, 9 fathoms.

Black Head rock bears 158° , distant 1,200 yards from Croney island, and has 16 feet of water over it.

Little Mortier bay, situated southwestward $1\frac{1}{2}$ miles from Croney island, divides into two arms at its head; Mortier creek, the western, is only suitable for fishing craft.

Fox cove, the eastern arm, affords good anchorage in 10 fathoms, though the space is confined; it has a settlement on its eastern shore.

Breakheart rock, bearing 179° , distant 250 yards from the western point of Cuckold cove, has 14 feet of water over it.

Western rock, with 3 feet of water over it, bears 349° , distant 350 yards from Western island, on the western side of the bay, and there is a rock, with 3 fathoms of water over it, between Western rock and the shore; there are no other shoals. In entering the bay keep in mid-channel.

Mortier rock, with 3 fathoms of water over it, is the shoalest part of Mortier bank, which is 3 miles long, northeastward and southwestward, and $\frac{1}{2}$ mile broad within the depth of 20 fathoms; the rock bears 77° , distant $6\frac{1}{2}$ miles from Burin lighthouse, and there are depths of 6 to 11 fathoms of water close around it.

Iron island, situated in a direction 212° at a distance of $1\frac{6}{10}$ miles from Western head of Little Mortier bay, is about 300 yards across, and 160 feet high.

Light.—A square white pyramidal tower, 18 feet high, situated on Iron island at a height of 118 feet above the sea level, exhibits a fixed red light, which should be visible from a distance of 8 miles in clear weather. A flat-roofed, keeper's dwelling, attached to the northern side of the light-tower, is also painted white.

Brandy rocks, on which the sea always breaks, lie off the land north-northeastward of Iron island, leaving a passage 800 yards wide between them and the island.

Leading mark.—The northern end of Simmons island, the southern entrance point of Little Burin harbor, just open of Pardy point,

the northern end of Pardy island, and seen between it and Charlie island, bearing 260° , leads 200 yards southward of these rocks.

Rocks.—Galloper rock, with 10 feet of water over it, bears 98° , distant 1,100 yards; Whitehorse rock, on which the depth is $4\frac{1}{2}$ fathoms, bears 124° , 1,150 yards; Gregory rock, with a depth of 6 feet, bears 215° , 800 yards, and Dutch rock, with 3 fathoms of water over it, bears 200° , 1,400 yards from Iron island.

Leading marks.—Pardy point just open northward of Iron island, bearing 270° , leads northward of Galloper and Whitehorse rocks; and Bras point, just open southwestward of Iron island, bearing 307° , leads southwestward of the same rocks.

Burin harbors are several small coves and a long inlet, affording excellent shelter for vessels of all sizes.

Burin island, which, with Pardy island, forms the seaboard and protects the small coves, is $2\frac{1}{10}$ miles long northward and southward; the southeastern end is Dodding head, a remarkable bluff, which rises to a conical hill, 400 feet high. Pardy island, separated from Burin island by the narrow and shallow Bull gut, continues northward for 1,300 yards.

Light.—A cylindrical lighthouse, 25 feet high, surmounting a square dwelling, painted white with a red roof, on the summit of Dodding head, exhibits, at 430 feet above high water, a white revolving light, which attains its greatest brilliancy every minute, and should be seen from a distance of 24 miles in clear weather. Owing to the great height of this light, it is often obscured by fog when the coast is clear.

Signals.—This light station is supplied with the International code of signals.

Dodding rock, awash at low water, bears 95° from the lighthouse, distant nearly 600 yards from the shore.

Cockle rock, with 3 fathoms of water over it, bears 188° , distant 470 yards from Cat island, a small island nearly joined to the southern end of Dodding head. The southwestern end of Woody island, just open westward of Shalloway head, bearing 324° , leads southwestward of the rock.

Great Burin harbor, on the southwestern side of Burin island, and between that island and Shalloway island, has several rocks near its head, and is only suitable for small vessels. Shoal water extends westward more than 200 yards from Shalloway head, the western end of Shalloway island, and breaks in bad weather; therefore when rounding the head give it a good berth.

Mine, Oven, and Hooper rocks, lie off the western side of Burin island; to clear them, when using Burin passage, between Burin island and the mainland, keep the western side of the passage aboard.

Port au bras, a narrow arm affording good shelter for small vessels, extends in a northerly direction about 1,300 yards on the western side of Bras point, which lies northward nearly $\frac{1}{2}$ mile from Pardy point.

Little Burin harbor entrance is $\frac{1}{4}$ mile in a westerly direction from Charlie island, situated close to the northern part of Pardy island. The harbor affords anchorage in 8 to 9 fathoms water, in a space 600 yards long and 400 yards broad, but the entrance, between Jersey and Simmons island, is only 100 yards wide, narrowed by a rock, with 8 feet water over it, lying about 100 yards southward of Jersey. To enter, keep Simmons island on the southern side of the entrance, close aboard.

Communication.—Steamers from Placentia and St. Johns call at Little Burin harbor weekly during summer and autumn.

Coal.—A small supply of coal can generally be obtained at Burin.

Ice.—Burin harbors freeze occasionally during severe winters from the middle of February to early in March, but the ice seldom interferes with the anchorage; eastern ice is occasionally drifted onto the shore.

Ship cove, southward of Little Burin harbor, is 1,200 yards long, with a width of 600 yards at the entrance, diminishing gradually to its head. A rock, with 11 feet water over it, lies northeasterly 50 yards from Troak point, and a shoal, on which the depth is 3 feet, the same bearing and distance from Jeans point, the next southward of Troak point.

Anchorage.—There is anchorage in 11 to 13 fathoms water, sand or mud bottom, with good shelter; in a strong breeze a large vessel should moor.

Poor rock, with 12 feet water over it, is at the end of the ledge extending southwestward 350 yards from Poor island, at the entrance to Burin inlet, and is steep-to on its western side.

Woody island, 100 feet high, lies 700 yards northwestward from Poor island; there is a clear passage on each side of this island.

Burin inlet extends in a northerly direction 5 miles from Woody island; it is $\frac{1}{4}$ mile wide for 2 miles, expanding to $1\frac{1}{4}$ miles at 3 miles from the entrance. To enter, pass westward of Woody island, keep the western shore aboard to avoid some rocks close to the eastern point just within the entrance, and round Spoon point, $\frac{3}{4}$ mile from the entrance on the western shore, at the distance of 200 yards into Spoon cove to clear Stag rock, the end of a ledge extending 500 yards off the eastern shore. When the entrance points close, bearing 177° , keep in mid-channel to the anchorages.

Anchorages.—Anchor off Back cove, 2 miles within the entrance, in 15 fathoms of water, southward of Sugarloaf island, a

cone 145 feet high, close to the eastern shore; or northwestward of Sugarloaf island in 7 to 9 fathoms of water, mud bottom. Northward of this the harbor is narrowed by a shallow spit extending from the eastern shore, and should not be entered.

Water.—Big Salmonier, a considerable stream, flows into the harbor on the western shore northwestward of Sugarloaf island.

Tides.—It is high water, full and change, at Burin harbors, at 8h. 45m.; springs rise $6\frac{1}{2}$ feet, neaps $4\frac{1}{2}$ feet.

Little Burin island, $1\frac{1}{10}$ miles west-southwestward of Cat island and separated from the mainland by a deep passage 450 yards wide, is 200 feet high and bold-to on all sides.

Emberly rock, bears 138° , distant 1,350 yards from the eastern end of Little Burin island, and has 4 fathoms of water over it.

Corbin island, situated southwesterly, nearly 1,400 yards from Little Burin island, and separated from the mainland by a deep channel $\frac{1}{4}$ mile wide, is 250 feet high and steep-to.

Corbin harbor, southwestward a little more than 1 mile from Corbin island, is a narrow inlet suitable for small vessels, entered between Long point on the north and Miller head on the south.

Old Harry rock, awash at low water, bears 100° , distant $\frac{1}{4}$ mile from Long point.

Miller rock, with $2\frac{1}{2}$ fathoms water over it, bears 90° , distant about 350 yards from Miller head, and is near the end of shoal water extending $\frac{1}{4}$ mile from the head.

Leading mark.—Goat island, just open southwestward of Long point, bearing 302° , leads between Old Harry and Miller rocks to the mouth of the harbor.

Corbin head, southward 1,200 yards from Miller head is a wedge-shaped cliff-faced head, 180 feet high and bold-to.

A rock, with 10 feet of water over it, bears 204° , distant $\frac{1}{4}$ mile from Corbin head, and in the middle of the entrance to l'anse au Diable, a small cove southwestward of that head.

Bass rock, with $3\frac{1}{4}$ fathoms of water over it, bears 225° , distant 700 yards from Bass point, a hummock with low rocks close to the base.

Sauker rock, with $3\frac{1}{2}$ fathoms of water over it, bearing 132° , distant 400 yards from Sauker head, is the outer of three rocks lying off the head. The coast between Bass point and Sauker head is foul, and should not be approached within $\frac{1}{4}$ mile.

Sculpin shoal, with $3\frac{1}{2}$ fathoms of water over it, bears 96° , distant 900 yards from Sculpin point, eastward of Little St. Lawrence harbor entrance, close off which is a small rock.

Little St. Lawrence harbor, southwestward 5 miles from Corbin head, extends northwestward $2\frac{3}{10}$ miles, with a breadth of 800 yards.

Harbor shoal lies southward 150 yards from the peninsula at the inner end of the harbor, $1\frac{1}{2}$ miles inside of the entrance.

Anchorage.—Large vessels anchor temporarily in 11 to 15 fathoms of water, but a heavy sea rolls in with southerly winds.

Small vessels lie in safety northward of the peninsula at the head of the harbor in $2\frac{1}{2}$ to 4 fathoms of water, mud bottom; in proceeding to this anchorage keep the western shore close aboard to avoid Harbor shoal.

Water.—A cascade falls into the eastern side of the harbor, just within the peninsula.

Middle head.—Separating the entrances of Little and Great St. Lawrence harbors, slopes from Blow-me-down, a conspicuous hill, 420 feet high, on the western shore of Little St. Lawrence harbor at 1,700 yards to the northward; the shore is bluff, with deep water close-to.

Shoals.—Point rock, with 4 fathoms of water over it, bears 211° , distant 450 yards; Butler rock, with 5 fathoms, bears 152° , 150 yards; and Garden bank, with 9 fathoms, bears 121° , 1,200 yards from Middle head.

Great St. Lawrence harbor is $2\frac{1}{2}$ miles long, and $\frac{1}{2}$ mile wide, for $1\frac{1}{2}$ miles, when it narrows to 600 yards between Blue Beach point on the western and Herring cove on the eastern shore. A beach of shingle stretches off the western shore at 800 yards from the head. There is a large settlement around the harbor.

Anchorage.—Anchor in 10 to 20 fathoms of water at the entrance, or in 12 fathoms off Herring cove; small vessels shelter northward of the shingle beach in $2\frac{1}{4}$ fathoms.

The anchorage off Herring cove is not recommended during south-westerly winds, as heavy squalls are then experienced, and southerly gales send a heavy sea into the outer parts of the harbor.

Ice.—Great St. Lawrence harbor seldom freezes so that anchorage can not be obtained, but eastern ice is occasionally drifted into it.

Tides.—It is high water, full and change, in Great St. Lawrence harbor at 8h. 30m.; springs rise 7 feet, neaps 4 feet.

Water.—A stream flows into the eastern side of the harbor nearly opposite the shingle beach.

Communication.—Steamers from St. Johns and Placentia call at Great St. Lawrence harbor weekly during summer and autumn.

Chapeau rouge. a remarkable conical hill 748 feet high, situated westward 900 yards from Cape Chapeau rouge, the western entrance point of Great St. Lawrence harbor, is generally sighted by vessels bound to the south and east coasts from the westward.

Rosey rock, with 12 feet of water over it, is situated 150 yards off-shore, and bears 211° , distant 1,400 yards from Cape Chapeau rouge.

Little Laun harbor, $1\frac{1}{2}$ miles long in a north-northeasterly direction and $\frac{3}{4}$ mile wide, is situated northward 2 miles from Laun head; a shingle beach at its head nearly separates it from a salt-water pond.

Anchorage.—There is anchorage with offshore winds in 9 to 11 fathoms of water, rocky bottom.

Duck and Tiller coves, two open bights, lie between Little and Great Laun harbors.

Great Laun harbor extends northward for $1\frac{1}{2}$ miles with a breadth of 800 yards; its shores are bold-to, and the depth of water decreases gradually to 5 fathoms at 1 mile from the entrance, and thence gradually to the head; there is a settlement, with a church on the eastern side. Murphy rock, with 5 feet of water on it, lies 200 yards off the eastern shore at 600 yards from the head. There is good trout fishing in the vicinity of this harbor.

Anchorage.—There is well-sheltered anchorage in 8½ fathoms water off the eastern shore.

Vestal rock, with 6 feet of water over it, bears 191°, distant 600 yards from East head, the eastern entrance point of Great Laun harbor; Black hill, 520 feet high and conspicuous, at the head of the harbor, just open westward of Laun point, on the eastern side of the harbor, bearing 11°, leads westward of this rock into the harbor.

Ice.—Great Laun harbor seldom freezes to the extent of interfering with anchorage.

Tides.—It is high water, fall and change, in Great Laun harbor at 8h. 15m.; springs rise 7 feet, neaps 4 feet.

Communication.—The steamer from Placentia calls at Great Laun harbor weekly during summer and autumn.

Ragged head lies southwestward 1 mile from Great Laun harbor and is the dividing point between it and Lansey Bank cove. A point of low rocks runs southeastward from it.

Ragged rock, with 6 feet of water over it, lies east-southeastward 600 yards from Ragged head.

Clearing mark.—Webber point, a low projection on the western shore of Great Laun harbor, open eastward of Blow-me-down point, the next southward, bearing 11°, leads eastward of Ragged rock.

Lansey Bank cove is an open bight affording no shelter.

Columbier island, 217 feet high, with a small islet close south-westward of it, lies south-southwestward 1,200 yards from Ragged head, and there is a clear channel 1,100 yards wide between; shoals lie 200 yards southward of the islands.

Laun islands.—Middle island, 163 feet high, bears 229°, distant $2\frac{1}{2}$ miles from Columbier island. Offer island, 102 feet high, bears 201°, distant $\frac{1}{2}$ mile from Middle island.

A rock that uncovers 4 feet at low water bears 284°, distant $\frac{1}{2}$ mile from the southern point of Middle island.

Southeast rock, awash at low water, bears 101°, distant 600 yards from the northeastern point of Offer island, and **Southwest rock**, with 10 feet of water on it, bears 214°, distant 1,200 yards from the southwestern point of same island.

The coast from Sandy Cove head, northward of Laun islands, to Lamalin, forms many deep coves, but they are all open.

Taylor bay, westward $3\frac{1}{2}$ miles from Laun islands, is the deepest of these: it is an open bight, and affords anchorage in 8 fathoms of water, with offshore winds. **Taylor Bay rock**, with 7 feet of water over it, bears 276°, distant 300 yards from Taylor Bay point, its eastern entrance point, and several shoals, with depths of from $5\frac{1}{2}$ to 10 fathoms, lie southward and southeastward within 2 miles from Taylor Bay point.

Lamalin bay, which is filled with islets and shoals, is divided from Taylor bay by point aux Gauls, a low and narrow promontory, 200 yards southeastward of which is Point rock, 3 feet high. **Barred island**, 19 feet high, lies northwestward about $\frac{3}{4}$ mile from Point rock: bearing 189°, distant 600 yards from the island, is **John Thomas rock**, 2 feet high, and **Rogers rocks** extend westward of the island for about 400 yards.

Light.—An octagonal tower, 36 feet high, with the sides painted red and white alternately, on Bluff head, the southeastern point of Allan island, exhibits, at 64 feet above high water, a fixed white light, which should be seen seaward over an arc of 170° from a distance of 9 miles in clear weather.

Rocks.—**Shag rock**, 18 feet high, bears 203°, distant $\frac{1}{2}$ mile from Point rock: shoal water extends northward 400 yards from it. Rocks and shoals lie from Shag rock as follows: **East Sunker**, awash at low water, bears 47°, distant 400 yards; **Saint rock**, with $5\frac{3}{4}$ fathoms least water over it, bears 214°, 700 yards; **Frank rock**, with 13 feet of water over it, bears 231°, 1,250 yards; **John Walsh shoal**, with $5\frac{1}{2}$ fathoms of water over it, bears 253°, 1,900 yards; and **Northwest sunker**, with less than 6 feet of water over it, bears 264°, distant 800 yards.

Clearing mark, the middle elevation of Morgan island, named the "Bread box," open southwestward of Allan island, bearing 294°, leads southwestward of the above rocks.

Leading marks.—Lamalin Bay entrance is between Rogers rocks, on the east, and Whalesback, which dries 5 feet, and the shoals extending 400 yards from Big Salmonier rock, 10 feet high, on the west; **Strand rock**, 1 foot high, lies in the middle of Lamalin bay. The highest of **Berry hills**, in line with Strand rock, bearing 16°, leads from sea through the fairway into the bay. The highest of **Berry hills** open westward of Barred island, bearing 40°, leads in midchannel between Frank rock and John Walsh shoal; and Tay-

lor Bay point in line with Point rock, bearing 63° , leads northward of the shoals lying westward of Shag rock. In entering the bay by the channel between Frank rock and John Walsh shoal, when the latter mark is on, keep northwestward and bring the highest of Berry hills in line with Strand rock, the leading mark for the entrance.

Bluff Head shoal, with $4\frac{1}{2}$ fathoms least water over it, lies with Bluff Head lighthouse bearing 336° , distant $\frac{3}{4}$ mile.

Page rock, with $4\frac{3}{4}$ fathoms least water over it, lies with Bluff Head lighthouse bearing 24° , distant 1,300 yards.

Lamalin harbor, situated northward of Allan island, is only suitable for fishing craft during summer: there is a considerable settlement on the northern part of the island.

Small vessels anchor in Lamalin harbor, northeastward of Allan island, but no attempt should be made to enter or leave the harbor without a pilot: vessels must be prepared to leave should the wind freshen from the southward.

Lamalin road, between Allan island on the east and Morgan island on the west, affords anchorage in $4\frac{1}{2}$ fathoms of water, but it should be used for temporary shelter only, as the swell always rolls in.

Besides a shoal, with 7 feet least water over it, other shoals with from 13 to 30 feet of water, lie near the middle of the entrance: to clear them keep either shore aboard.

The western barn, on the northern shore of Lamalin road, open eastward of Morgan island, bearing 341° , leads eastward of these shoals.

Lamalin Shag rock, an islet 20 feet high, with a rock close off its western side, lies off the southern end of Morgan island, and there is a rock with 9 feet of water over it southwestward 200 yards from the rock.

Ice.—Lamalin harbor is occasionally closed by field ice to the thickness of 6 inches for ten days at a time, but at intervals of from five to ten years it is frozen over: vessels arrive about June and leave in November.

Tides.—It is high water, full and change, in Lamalin harbor at Sh. 25m.: springs rise $7\frac{1}{4}$ feet, neaps $5\frac{1}{2}$ feet: neaps range $4\frac{1}{4}$ feet.

Communication.—Steamers from St. Johns and Placentia call at Lamalin bay weekly during summer and autumn.

The coast from Lamalin to Crew point, northwestward 8 miles, is low and fronted by sandy beaches, rising to a moderate height in long sloping hills at some distance inland.

Piercey hill, wooded, about 100 feet high, near the shore at 2 miles westward of Lamalin road, has a double summit, close to which are some houses. Flagstaff point is a small conical hillock 26 feet high. There are groups of white houses at High beach.

Lamalin ledges extend along the whole of this coast at a distance of 3 miles and less from it, and in bad weather the sea breaks on all of them.

No vessel should venture between these shoals without a local pilot, and very few of the fishermen are trustworthy, as they have a knowledge only of the fishing banks frequented by them.

Offer rock, with $5\frac{3}{4}$ fathoms water over it, lies with Bluff head lighthouse bearing 355° , distant $2\frac{1}{2}$ miles.

Western ground, a shoal of $4\frac{1}{2}$ fathoms, bears 228° , distant $1\frac{1}{2}$ miles from Lamalin Shag rock.

Clearing marks.—Chapeau rouge, well open southward of Lamalin Shag rock, bearing 78° , leads southward of the ledges, and the extreme of the land about Dantzie coves well open to the westward of Crew point, bearing about 3° , leads westward of them.

These marks clear all the shoals excepting Western ground and Offer rock. Offer island open southward of Shag rock (point aux Gauls), bearing 75° , leads southward of Western ground, and about $1\frac{1}{2}$ miles northward of Offer rock.

At night this coast should not be approached to a depth less than 40 fathoms.

Bank.—At about 9 miles southward of Lamalin bay is a bank, about 5 miles long, eastward and westward, and $3\frac{1}{2}$ miles broad, within the 40-fathom contour line, which has depths of from 29 fathoms on its southern edge to 36 fathoms at its northern end, over stony bottom.

CHAPTER IV.

NEWFOUNDLAND, SOUTH COAST—ST. PIERRE AND MIQUELON ISLANDS.

The islands of St. Pierre and Miquelon and five islets, lying off the coast of Newfoundland, at the entrance of Fortune bay, comprise a colony under the dominion of France. They are rugged masses of rock, with a thin coating of soil and little vegetation. The colony contained 6,482 inhabitants in 1902: since then about 1,000 have emigrated to Canada and the United States.

St. Pierre island, situated southwesterly 10 miles from Crew point, is about 1½ miles in length, 3 miles in width, barren in appearance, irregular in outline, and rises to many peaks, the highest of which is 671 feet high: it is thus easily distinguished from Langlade or Little Miquelon, the outline of which is nearly horizontal. St. Pierre island contains several lakes: Sanyard, the largest, is about $\frac{3}{4}$ mile in length. Galantry head, a conspicuous conical hill at the southeastern end of the island, is joined by low land to the main part of the island.

St. Pierre harbor is on the eastern side of the island and between it and Chien island.

Light.—A white semicylindrical lighthouse 38 feet high, with a square building adjoining it, on Galantry head, exhibits, at 210 feet above high water, an intermittent light showing thus: White flash, 5 seconds: eclipse, 15 seconds: white flash, 5 seconds: eclipse, 15 seconds: red flash, 5 seconds: eclipse, 15 seconds: which should be seen from a distance of 18 miles in clear weather. The light is obscured on southeasterly bearings by the high land of St. Pierre.

Fog signal.—A steam fog siren, placed, 40 feet above high water, in a semicylindrical tower on the coast 250 yards southeasterly from the lighthouse, sounds a blast every minute, thus: Blast, 6 seconds: interval, 54 seconds, during thick or foggy weather and in snow storms.

If the siren is out of order, a gun at the lighthouse is fired once every half hour.

Signal station—Ice report.—There is a signal and telegraph station on Galantry head, and it is specially supplied with informa-

tion as to the weather, wind, and the movement and condition of the ice in the gulf and river St. Lawrence, during April and May, for the guidance of any vessel asking for it.

Blanche point, nearly 1 mile southwestward of Galantry head, is the rocky termination of Little Harbor head, a peninsula which rises conically to a height of 69 feet; on the point is a conspicuous square rock.

Tournioure shoal is a patch extending northeastward and southwestward 300 yards, with a width of 100 yards; the least water on the shoal is 2 fathoms, situated near its middle and bearing 228 . 1,200 yards from Blanche point.

Bonniere shoal, with 4 fathoms of water over it, bears 215°, distant $1\frac{1}{4}$ miles from Blanche point.

Ravenel bay, about a mile northwestward of Blanche point, is the landing place of some telegraph cables. Its eastern shore is foul, but near its western shore there is a fine, clear, sandy bottom, with $4\frac{1}{2}$ fathoms of water and good shelter from offshore winds.

Shoals.—Two shoals, each with 3 fathoms of water over it, lie in the entrance of Ravenel bay: the outer, from which Diamant point, the western entrance point of the bay, bears 263°, distant 1,500 yards, being about $\frac{1}{2}$ mile from the shore.

Marne shoal, a patch with 16 feet of water over it, bears 181°, distant $1\frac{1}{10}$ miles from Diamant point.

Clearing mark.—Galantry Head lighthouse, open southward of Blanche point, bearing 49 . leads southeastward of Marne shoal.

Savoyard point, the southwestern end of the island, is a prolongation of the fall of the high land. Savoyard shoal, with 3 feet of water over it, bears 220 . distant 350 yards from this point, and between it and Diamant point are several shoals, the outer of which, Belier shoal, with 6 feet of water over it, bears 282°, distant 1,400 yards from Diamant point, and is 800 yards offshore.

Henry point, the northern end of the island, is a low peninsula under high land. A shoal, with 12 feet of water over it, lies close to the eastern end of the low-water line, and a bank, on which the depth is $4\frac{1}{4}$ fathoms, bears 63°, distant 350 yards from the point.

Great Colombier island, 492 feet high, is bold, dark, and steep, and lies off Henry point, with Henry channel between. A shoal, on which the depth is $2\frac{3}{4}$ fathoms, lies close to the western point of Great Colombier. Little Colombier islet lies northeastward, nearly 200 yards from Great Colombier.

Little shoal lies with the western point of Great Colombier island bearing 202°, distant 500 yards: it is about 16 yards across, with $4\frac{1}{2}$ feet water over it at low water, and is steep-to, there being depths of 7 to 8 fathoms close around.

Colombier shoal, with 12 feet of water over it, bears 45° distant 650 yards from Little Colombier.

Clearing mark.—Galantry lighthouse, open eastward of cape Aigle, bearing 185°, leads eastward of this shoal.

Cape Blanc, a white cliff, is southeastward 700 yards from Henry point, and southward $\frac{1}{2}$ mile farther is cape Rouge, a high red cliff; the coast is bold-to from cape Blanc to cape Rouge.

Cape Rouge shoals are three patches off cape Rouge: from the eastern of the shoals, on which the depth is 12 feet, cape Rouge bears 293°, distant 400 yards.

Cape Aigle is southward nearly 800 yards from cape Rouge, and the coast between is foul.

Little St. Pierre, a small islet, steep-to on its eastern side, lies $\frac{1}{4}$ mile east-northeastward of cape Aigle, and is 17 feet high; there is no passage for ships between this islet and the main.

Beacon.—A stone beacon, 16 feet high, with its upper part painted black and its lower part white, stands on this islet.

St. Pierre harbor. **Zöé bank**, on which there is about 1 foot water, extends about 600 yards from the shore northward of Canon point.

Buoy.—The eastern edge of Zöé bank is marked by a buoy painted black and white in horizontal stripes.

Canon point, a reef of rocks, extending eastward from the town of St. Pierre, covers at high water.

Lights.—A square white tower, 33 feet high, on the eastern part of Canon point, exhibits, at 36 feet above high water, a fixed light, showing green over an arc of 74° between the bearings of 216° and 290°, and white in other directions when not obscured by the land; it should be seen from a distance of 6 miles in clear weather.

A lighthouse, 36 feet high, painted white with its southwestern and southeastern sides red, on the plain at the north of the town of St. Pierre and 800 yards northwestward of Canon point lighthouse, exhibits, at 64 feet above high water, a fixed red light, which should be seen from a distance of 3 miles in clear weather.

These lights in line, bearing 285°, lead in mid-channel through South channel; they were very indistinct in 1902.

La Vache rock is situated 200 yards southward of the lighthouse on Canon point.

Beacon.—A beacon, 8 feet high, stands on la Vache rock.

Bertrand rocks, situated $\frac{1}{2}$ mile southeastward of Canon point, are low and extend 350 yards from the shore. The inner harbor of St. Pierre runs in southwestward 1,200 yards from between Canon point and Bertrand rocks; it is shoal and contracted by Moules island at about 300 yards southward from Canon point. (See also p. 177.)

Beacon.—A tower, 28 feet high and painted black and white in horizontal stripes, stands on the eastern Bertrand rock. Vessels must pass eastward of this beacon.

St. Louis bank, with 4 feet of water over it, bears 332° , distant 250 yards from the beacon on Bertrand rocks.

Buoy.—The eastern side of St. Louis bank is marked by a black buoy.

Chien island, separated by South channel, 500 yards wide, from Bertrand rocks, is easily distinguished by the church and lighthouse.

Light.—A red lighthouse, 25 feet high, on Leconte point, the southwestern end of Chien island, exhibits at 62 feet above high water, a fixed light, which shows white over an arc of 40° between the bearings of 296° and 336° ; red over an arc of 123° from 336° , through 90° , to 99° , and should be seen from a distance of 7 miles in clear weather.

Le Flétan rock is situated near the northern edge of the bank extending from the northern side of Chien island.

Buoy.—A buoy, painted black and white in horizontal stripes, marks the northern side of le Flétan rock.

Massacre islet, 300 yards off the northwestern end of Chien island, is low.

Vainqueur island lies northeastward of Chien island, being separated by Flétans channel, which is nearly 600 yards wide, and there are two patches, each with a depth of $4\frac{1}{2}$ fathoms, in mid-channel. Cape Chèvre, the northeastern end of Vainqueur island, is a mound 102 feet high, and Plat rock, 13 feet high, is nearly 200 yards off it. Black rock, 20 feet high, bears 80° , distant 800 yards from the same cape; and Pelée island, 51 feet high, is joined to the southern end of Vainqueur island at low water.

Gros-nez, a conspicuous rock, 27 feet high, lies in Flétans channel between Chien and Vainqueur islands.

Pigeon island, northward 300 yards from Vainqueur island, is wedge-shaped, the highest part, 90 feet high, being at its northern end. Some islets, named les Canailles or point aux Ilots, extend 300 yards in a northeasterly direction from this end; they are about 20 feet high and steep-to on their eastern and northern sides. Haché rock, 16 feet high, lies 330 yards off the eastern point of Pigeon island.

Rocks.—**Enfant perdu,** a small rock, 3 feet high, with shoal water extending northeastward nearly 200 yards from it, bears 113° , distant 1,200 yards from Pelée island.

Little shoal, with 10 feet of water over it, bears 119° , 350 yards from Enfant perdu.

Great shoal bears 57° , distant 670 yards from Enfant perdu, and has 5 feet of water over it.

Les Cailloux de terre, with $3\frac{3}{4}$ fathoms least water, bears 215° , nearly $\frac{1}{2}$ mile from Enfant perdu.

Bataille bank, having a rock with 2 fathoms of water over it at its southern end, bears 115° , distant 1,400 yards from Leconte Point lighthouse, and 50 yards northward of the line of the leading light-houses through South channel.

Gélin shoal, with 6 fathoms of water over it, bears 61° , distant $1\frac{1}{10}$ miles, and Les Cailloux au Chat, on which the depth is 8 fathoms, bears 66° , 1,700 yards from Chasseurs island. Cat rock, with 5 fathoms of water over it, whose existence is doubtful, is stated to bear 98° , distant 500 yards from Les Cailloux au Chat.

Indre shoal, with 2 fathoms of water over it, bears 130° , distant 250 yards from cape Noir.

Clearing marks.—Henry point, open northeastward of Les Canailles, bearing 302° , leads northeastward of all the above rocks, and Blanche point, open southward of Chasseurs island, bearing 249° , leads southward of them excepting Cat rock: the whole of Little Harbor Head peninsula open of Chasseurs island, bearing 257° , leads southward of the position assigned to that rock.

Les Grappinots, over which the depth is 7 fathoms, bears 114° , distant nearly 600 yards from Chasseurs island.

Grappin shoal, with $4\frac{1}{4}$ fathoms of water over it, bears 154° , distant $\frac{3}{4}$ mile from Chasseurs island.

Clearing marks.—The lighthouse on Leconte point, open eastward of cape Noir, bearing 14° , leads eastward of Grappin shoal, and the eastern point of Ravenel bay, open southward of Blanche point, bearing 288° , leads southward of it.

Anchorage.—Large vessels anchor in St. Pierre roadstead in about mid-channel between lines drawn from the battery on the northern point of Chien island to cape Aigle and from the eastern point of Massacre islet to the mouth of the Courval river, in 7 to 15 fathoms of water. One of the port officers directs vessels where to anchor. The telephone cable between cape Aigle and Tréhouart cove must be avoided. Vessels should moor. Northeasterly winds blow right into the roadstead and cause the heaviest sea.

Vessels should not proceed westward of the western limit of the anchorage given above without local knowledge or a pilot.

Mooring buoy.—A white mooring buoy, for the use of vessels of war, bears 206° , distant 634 yards from cape Aigle; other vessels must not anchor near this buoy or make fast to it without permission from the harbor master.

Pilots.—By the harbor regulations it is compulsory for all vessels except fishing craft to employ a pilot when entering and leaving the port of St. Pierre, and payment will be required if a properly distinguished pilot offers his services, whether accepted or not. The pilot boats are painted red and blue, and fly a blue flag.

Directions.—**North channel**, northwestward of Pigeon island and between the northwestern part of Chien island and Little St. Pierre islet, is about 1,000 yards wide, easy for sailing vessels working to windward, and it is the only one that should be taken by large vessels.

From the eastward, when in the vicinity of Great shoal, keep Henry point open northward of les Canailles; the islets and rocks off Vainqueur and Pigeon islands may be approached closely. When northward of Little St. Pierre, keep that islet open westward of the battery on the northwestern point of Chien island, bearing 184°, to clear Cape Rouge shoals.

When working to windward, guard against the squalls that come from the high land between Great Colombier and cape Diable on the northwest and cape Aigle on the southwest side.

When beating southward between Massacre islet and Rodrigue bay, tack before vigie d'Aigremont, a beacon on a hillock 87 feet high, southward of the town, comes in line with the eastern side of the small fort at the southeastern end of the town of St. Pierre, bearing 203° to clear Zôé bank.

When working along the coast of Chien island, the lighthouse on Canon point should be kept open of the west point of Massacre island, bearing 224°, in order to clear the shoals off the west shore of Chien island.

At night, the red light, on the plain at the north of the town of St. Pierre, open of cape Aigle, bearing 228°, clears cape Rouge shoals.

South channel, between Bertrand rocks and Chien island, will admit vessels drawing less than 14 feet of water. The lighthouse northward of the town in line with Canon Point lighthouse, bearing 285°, leads between St. Louis bank and Rallier shoal, but the channel is barely 200 yards in width; when cape Aigle and the eastern end of Massacre islet are in line, bearing 11°, steer 320° for the beacon standing on a large white stone on the brow of the hill eastward of the town, until vigie d'Aigremont is in line with the lighthouse on Canon point, bearing 207°, which mark on astern leads to the anchorage.

At night the sector of white light of Leconte Point lighthouse shows over Cailloux au Chat, Gêlin shoal, and the reported position of Cat rock; the red sector shows over Indre shoal.

To pass between Indre shoal on the west and Cailloux au Chat on the east, keep in the white sector of Leconte light, with the lighthouse between the bearings of 336° and 319°, until the leading lights are in line bearing 285°, which line leads across the bar between St. Louis bank and Rallier shoal. The alignment of these lights also leads northward of Gêlin shoal and close southward of Bataille bank. The green sector of Canon Point light clears St. Louis bank.

Flétans channel.—Approach with Canon point and St. Pierre leading lighthouses in line 285° , which mark leads between Gelin shoal and les Cailloux de Terre: when cape Bawdry, the northeastern extremity of Chien island, is in line with Gros-nez rock, bearing 358° , keep that mark on until within 200 yards of Gros-nez rock: leave that rock 100 yards to the westward, then pass 200 yards eastward of cape Bawdry, and round that cape into the anchorage.

In foggy weather.—It is extremely hazardous to approach St. Pierre during fog owing to the numerous outlying shoals, and no attempt should ever be made to enter the harbor under such circumstances in a sailing vessel. If actually necessary to enter the harbor in moderate weather in a steamer, from a known position off Little Miquelon island, endeavor to sight land on the south coast of that island in the vicinity of cape Coupe and then steer for the western side of St. Pierre: proceed northeastward along the coast of that island and pass through Henry channel, close southward of Great Colombier to its eastern end, whence steer 142° for $1\frac{1}{2}$ miles and 237° for 1 mile to the anchorage. The greatest caution is necessary, and even then there is risk.

Barachois de St. Pierre, or the inner harbor, partly naturally and partly artificially protected by a breakwater, carries 14 feet at low water on the bar at its entrance, where it has been dredged, and is available for vessels drawing 11 feet at high water only. The dredged channel into the harbor is marked by buoys. The holding ground is indifferent, there is little sea, and vessels that ground are rarely damaged. A number of schooners lay up there for the winter.

Buoys.—Two warping buoys are moored between Moules island and Canon point.

Tides.—It is high water, full and change at St. Pierre at 8h. 33m.; springs rise $6\frac{1}{2}$ feet, neaps, $4\frac{1}{2}$ feet.

Tidal streams and current.—The flood stream runs northward through South and Flétans channels, and northeastward through North channel, but this regularity is only found near the land. At a short distance seaward the current runs almost constantly northward, and is very little influenced by the feeble tidal stream of these localities. In the anchorage the tidal stream is sometimes of sufficient force to swing ships against a strong breeze. The ebb stream runs in the opposite direction to the flood.

Between St. Pierre and Little Miquelon the flood stream runs northeastward through the channel and turns 1 to $1\frac{1}{2}$ hours after high water, but the stream often continues to run in the same direction at a reduced rate all through the ebb. The currents and tidal streams are, however, very irregular, and no dependence can be placed on any particular direction or rate.

Ice.—St. Pierre harbor was frozen over in 1874, this being the only occasion for about 50 years. Field ice appears in February and disappears about the end of March; it rarely closes the harbor, which is usually open to navigation throughout the year.

St. Pierre town stands on the northwestern side of the Barachois de St. Pierre, or inner harbor; the administrator of the French islands resides here and the port is the headquarters of the French squadron in Newfoundland. The population was 5,385 in 1902, and during the fishing season some thousands are temporarily added to this number. The chief buildings are the administrator's house, the courts of justice, a large church and convent, and the treasury and post-office.

Life saving stations.—A rocket apparatus is maintained at the port of St. Pierre and another at Chien island.

Communication.—The only mail and passenger service that exists is maintained by a small steamer, the "St. Pierre-Miquelon," under the French flag, which makes a round trip to North Sydney and Halifax once a fortnight.

Telegraph cables.—There are 2 cables between France and St. Pierre; 2 between Newfoundland and Cape Breton, via St. Pierre; 2 between St. Pierre and Massachusetts, United States, and 1 between St. Pierre and Cape Breton; 2 of the cables are landed at St. Pierre harbor.

A telephone cable has been laid between cape Aigle and Tréhouart cove.

Coal and supplies.—Provisions and water can be obtained, and there is usually a quantity of 420 tons of coal in stock, but there are no facilities for coaling vessels.

Marine railways.—There are four marine railways: No. 1 is 147 feet in length, will take a vessel of 200 tons, and has 9½ feet forward and 13½ feet aft, on the blocks; No. 2 is 75 feet in length, will take a vessel of 100 tons, and has 8½ feet forward and 11½ feet aft, on the blocks; No. 3 is 162 feet in length, its lifting power is 600 tons, and it has 10 feet water forward and 15½ feet aft, on the blocks, but this slip is reported to have been burnt; No. 4 is 75 feet in length, its lifting power is 200 tons, and it has 9½ feet water forward and 12½ feet aft, on the blocks.

Hospital.—The hospital at St. Pierre has 70 beds, but a permit must be obtained from the governor or commandant before a patient can be admitted. The lazaretto is on Chien island.

Trade.—In 1905, 2,119 vessels of 97,458 tons entered, and the value of the exports for the same year was \$1,386,840, and that of the imports \$1,055,723.

The legal currency is French, but the bulk of the money in circulation is American. The rate of exchange is 5 francs 40 centimes to the dollar, whether United States, Canadian, or Newfoundland, and al-

though prices are always quoted in francs, payment is made in dollars.

French cod fishery.—This industry is principally prosecuted by vessels averaging from 120 to 200 tons each, which are equipped at the northern ports of France and leave there each year on the 1st of March; some proceed at once to the Newfoundland banks, but the greater number go first to St. Pierre for herring, and they all return to St. Pierre for a second supply of bait in June. The vessels anchor on the banks, while bultows are laid out in large undecked boats, sometimes as far as 6 miles from the vessel. This system is attended by frequent loss of life, the boats being unable at times to return to the vessels, and the latter occasionally go down at their anchors.

On the west coast of Newfoundland the vessels follow the fish from south to north till the caplin have disappeared, when they repair to the several ports at which the catch is to be cured, and after the vessels are moored the crews fish with bultows off their respective anchorages till the end of the season.

On the northeast coast of Newfoundland vessels have a position assigned to each for a term of five years, and they proceed direct from France to these posts, where they are moored. The crew then fish with seine, hook and line, or bultows. As a rule the fishery season does not commence before the 18th of April and ends about the middle of October. Vessels are fitted out for the Great bank, with a drying factory at St. Pierre or Miquelon, or to fish in the vicinity of St. Pierre and Miquelon, or for the Great bank, but with no drying factory; in the last case the vessels are fitted for preserving cod in salt.

Vessels carrying salting apparatus are compelled to export the whole of their catch during the season to France, but are permitted to go to St. Pierre when full and tranship their fish to a trading vessel if they wish to continue fishing.

St. Malo and Granville principally engage in the drying industry; vessels with salting apparatus usually belong to Dieppe and Fecamp. A vessel fitted out locally is called a "goëlette," and is usually less than 90 tons in size, working in connection with a drying factory; those at St. Pierre are schooners, and carry 6 dories.

The fishery named "la grande pêche" is practiced on Great bank, St. Pierre and Banquereau banks, as well as on the east and west coasts of Newfoundland; that named "la petite pêche" is carried on along the coast in wherries or dories, which go out in the morning and return at night.

In the bank fishery the schooner, on arriving at the fishing ground, anchors, having a hemp cable with sufficient iron cable on the anchor to prevent chafing on the bottom. Here, besides the danger from bad weather, there is the chance of being run down by steamers, and it is

sometimes necessary to cut the cable, but this is a costly expedient, and consequently is frequently undertaken too late.

Trots or bultows, ready fitted with hooks on snooding, are carried in tubs, the hooks being about a fathom apart; each man baits his lines, 12 to 15 in number, which takes him about four hours. A schooner carrying 6 dories has to bait 12,000 hooks. When coiled and baited the lines are stowed in the dories ready for setting.

Dories are very good sea boats; they are small, light, flat-bottomed, and shaped so that they stow within each other on deck. Each French dory is marked with the name and port of registry of the schooner from which she is detached.

The lines are set in the evening after 4 p. m. The master in charge of the dories lets go a bultow or trot anchor, and the bultows uncoil as the men row away from the schooner in all directions. The depth of water at the fishing ground is from about 30 to 45 fathoms, and the bait lies on the ground unless the tidal stream is strong. The ends of the bultow are marked by 2 buoys (ordinary barrels) each with a staff and flag, and when all the lines are set the schooner becomes the center of a circle of buoys whose radii are the trots or bultows.

Next day at about 4 a. m. each dory puts off to fish her lines; starting from the weather buoy, the bultow anchor is weighed and the line hauled in and coiled, the fish as they appear being unhooked. After hauling their lines the dories return with the catch to the schooner.

When a certain number of daily hauls of the lines has taken place—the average number a month is 25, because of the days lost by the weather being too bad for dory work—the schooner returns to St. Pierre.

Bait.—From April to June herring is used; from June to July caplin, and from July to October squid. During the last few years a new bait has been discovered, namely, the periwinkle, also known as the cou-cou or bulot. It is found actually on the banks, and is obtained by dredging from the bottom in baskets, four or five being taken at each haul.

Fishing grounds.—On the banks, where the bottom is rock, broken shells, sea-urchins, and sand, the cod are supreme, for with the exception of flounders, rays, toads, and catfish, the cod is the only fish caught.

St. Pierre bank is only fished by schooners which are too small to make longer voyages.

Banquereau bank is visited by both French and American vessels, and the fish taken here, although numerous, run small, averaging about 1 pound. In June the cod temporarily forsake this bank, following the caplin.

Great bank has the finest cod; they average about 8 pounds, but have been caught up to 32 pounds. Halibut are also caught on this

bank. Mother Carey's chickens, which frequent the banks, are often caught for food by the fishermen. They are taken on a hook baited with a bit of fat; their flesh is very oily.

On the west coast of Newfoundland the fishery is carried on by nomadic schooners or by the livers. Expeditions commence when caplin appear; the caplin are chased northward by the cod, and the fishermen following the latter gradually progress up the coast, carefully fishing bays, creeks, and harbors as they go, until toward the end of July they usually rendezvous in the neighborhood of Old or New Férolle. The gulf fishermen then return south and fish in the various harbors and bays.

A very common method is to sail from place to place, stopping wherever good signs of fish are found, and leaving for other places when the fish disappear. The anchoring ground and duration of stay depend entirely on whether the cod are plentiful, and the result of the expedition is a matter of chance.

About 34,411 tons of cod are annually imported into France.

Hospital steamer.—The French hospital steamer, *St. François d'Assise*, usually frequents the banks during the fishing season, and although her main object is to attend to French fishermen, sick seamen of any nationality are treated gratuitously.

Green island, lying northeastward, distant $4\frac{1}{4}$ miles from the eastern end of Great Colombier, is $\frac{1}{2}$ mile long and 156 feet high. Southward from it are Little Green islets and rocks, the outer of which, *Enfant perdu*, is distant $1\frac{1}{4}$ miles.

The eastern of these rocks covers at two-thirds flood, and bears 177° , distant 1,100 yards from the southern end of Green island.

Intended light.—The government of Newfoundland has published information to the effect that, at the opening of navigation in 1909, a light for the guidance of mariners would be exhibited from a circular iron tower erected on the summit of Green island, at the southern entrance to Fortune bay. The lighthouse is painted red, and the keeper's dwelling and the engine and store houses are painted red and white in vertical stripes.

Fog signal.—A siren near the lighthouse sounds every 90 seconds, thus:—blast, 3 seconds; silent interval, 87 seconds, during thick weather, fog, or snowstorms.

Little Miquelon or Langlade island, situated northwestward 3 miles from St. Pierre island, is steep-to; the sides are cliffy except on its northern coast. The summit, which is 656 feet high, is nearly flat, and this is the general appearance of the island, but on easterly bearings some hummocks show out at the northern end. Little Miquelon is connected with Great Miquelon by a sandy neck $5\frac{1}{2}$ miles long, at the northern end of which is a large pond named Great Barachois, to which small craft find access at high water, entering from the eastern side of the beach.

A reef, which breaks, extends about 200 yards from Plate point, the western end of Little Miquelon.

Light.—A lighthouse on Plate point, 127 feet high, and painted black and white in horizontal bands, exhibits, at 154 feet above high water, a flashing light having a period of four seconds, the duration of the flash being one second. The light is white except between the bearings 155° and 163° , or over Seal rocks, where it is red, and it should be seen from a distance 18 miles in clear weather. Within the distance of 16 miles, a fixed light is visible between the flashes.

Fog signal.—A siren, at about 27 yards southward of the lighthouse, sounds twice about every minute, thus:—blast, four seconds; silence, four seconds; blast, four seconds; silence, forty-eight seconds, during thick weather, fog, or snowstorms.

The mean distance the siren can be heard is 6 miles, but under certain conditions of the atmosphere it can be heard only 2 miles.

The siren produces a trembling sound, and is shrill. If the siren is disabled, a gun is fired at intervals, but it is not fired while the siren is sounding.

La Baie, the passage between St. Pierre and Little Miquelon, is deep and its shores are bold.

Great Miquelon island is very irregular in outline, and its hills reach a height of 813 feet. The northern part of the island is a semicircular and hilly tongue of land, forming Miquelon road; cape Miquelon, its northeastern end, is a steep cliff, 606 feet high and bold-to. On the southern end of the tongue is a large settlement with a prominent church; in 1892 the population was 544.

Light.—A lighthouse, 49 feet high, the lower part of which is painted white, and the upper part black, with a white lantern, on cape Blanc, the southwestern end of the northern part of Great Miquelon, exhibits, at 103 feet above high water, a flashing light, showing thus: Light, ten seconds; eclipse, fifty seconds. The light is white, except between the bearings, 34° and 57° , or over Seal rocks, where it is red, and it should be seen from a distance of 16 miles in clear weather.

This light is obscured on southwesterly bearings by Calvary hills; it is obscured southward of a line passing about 220 yards northward of Chatte rocks, so that the light in sight leads northward of Outer Miquelon and Chatte rocks, but the southern limit of visibility of the light only just clears them; the light is also obscured on northwesterly bearings by the hills of Great Miquelon island.

Rocks.—**Seal rocks** are two groups about $\frac{1}{2}$ mile from each other; the highest, 18 feet high and situated in a direction 228° , distant $6\frac{1}{10}$ miles from cape Blanc, is steep-to around.

Shoal.—A shoal, with $2\frac{1}{2}$ fathoms water over it, bears 231° , distant 4 miles from cape Blanc.

Briand shoal, with 13 feet of water over it and 11 fathoms around, is very small in extent and bears 203° , distant $2\frac{1}{10}$ miles from cape Blanc.

Caution.—The channel between Seal rocks and Great Miquelon island should not be used for navigation, as it has not been properly examined.

Chatte rocks, 5 to 8 feet high, are situated on a shoal which stretches northeastward about 1,200 yards from a point on the southern side of Miquelon road situated a little more than $\frac{1}{2}$ mile northward of Chapeau de Miquelon, a conical hill, 374 feet high.

Buoy.—A black buoy is moored in 19 feet near the outer end of Chatte Rocks shoal.

Miquelon rocks comprise a group of rocks on a shoal spit extending northeastward $1\frac{1}{2}$ miles from the land at $\frac{1}{2}$ mile southward of Soldier point, which is southeasterly 5 miles from Miquelon road. The eastern and highest rock is nearly $1\frac{1}{2}$ miles from the point, about 10 feet high, and steep-to on its eastern side.

Patracan shoal, with $7\frac{1}{2}$ fathoms of water over it, bears 67° , distant $2\frac{1}{4}$ miles from Soldier point.

Landry bank, with $4\frac{1}{4}$ fathoms of water over it, bears 97° , distant $2\frac{1}{4}$ miles from Soldier point.

Outer Miquelon rock, with 10 feet water over it, is the northeastern shoal off Soldier point, and bears 33° , distant $2\frac{3}{4}$ miles from the eastern Miquelon rock. A shoal, with $7\frac{1}{2}$ fathoms water over it, lies about 800 yards southwestward of Outer Miquelon rock.

Anchorage.—There is anchorage in Miquelon road with winds from north, through west, to south, in 6 fathoms of water, off the settlement, with fair holding ground.

There is also open anchorage eastward of the long shingle beach which joins Great Miquelon and Little Miquelon islands. The best place is off the northern coast of Little Miquelon in $6\frac{1}{2}$ fathoms water, near a cove just southeastward of the gens d'armes station.

Tides.—It is high water, full and change, in Miquelon roads at 8h. 33m.; mean rise about $3\frac{1}{4}$ feet.

Climate.—In St. Pierre and Miquelon islands the winters are long and severe, and the summers short and cool; the mean annual temperature is about 40° Fahrenheit; the annual rainfall is 40 to 48 inches, and fog prevails on an average for one hundred days in the year.

CHAPTER V.

NEWFOUNDLAND, SOUTH COAST—CREW POINT TO CAPE RAY.

Fortune bay.—Pass island bears 346° , distant 35 miles from Crew point, and the entrance to Fortune bay lies between. This bay, which extends eastward about 67 miles, contains numerous smaller bays, harbors, and islands.

Caution.—The currents in Fortune bay, especially near Plate and Brunet islands, are irregular.

At night or in thick weather, when sounding, bear in mind that the water is in many places as deep near the shores as in the middle of the bay.

Brunet island, nearly in the middle of the entrance to Fortune bay, rises to a ridge, 528 feet high, extending along its northern coast; several hills at its eastern end appear from a distance as separate islands.

Light.—A lighthouse, 30 feet high, a square white building with a red roof and the lantern rising from the middle, on Mercer head, the southeastern end of the island, exhibits, at 408 feet above high water, a flashing white light showing a flash every ten seconds, which should be seen, excepting over an arc of 67° between the bearings of 85° and 152° , where it is obscured by the land, from a distance of 23 miles in clear weather. From its great height this light is often obscured by fog when the land below is visible.

Signals.—This light station is supplied with the International code of signals.

Fish rock, with $3\frac{1}{2}$ fathoms over it, bears 186° , distant 600 yards from Mercer head lighthouse.

Mercer cove, on the southeastern side of the island, affords good sheltered anchorage for small vessels in 3 to 6 fathoms water, eastward of Harbor rock, situated in the middle of the cove, which is awash at high water and may be passed on either side. The entrance, between Major point, on the northwestern, and Pancake, 18 feet high, on the southeastern side, is 500 yards in width, and the cove extends north-eastward 1,400 yards, the water in it shoaling toward the head; there are several houses on the shores.

Harbor shoal, with $4\frac{1}{2}$ fathoms water over it, bears 180° , distant 700 yards from Major point.

Tides.—It is high water, full and change, at Brunet island at 9h. 3m.; springs rise $6\frac{1}{4}$ feet, neaps $4\frac{1}{4}$ feet.

Ice approached Brunet island between March 20 and April 5, 1867; this may be considered as the western inshore limit of the eastern ice.

Water.—Streams flow into Mercer cove.

Anchorage.—There is fair anchorage in a bay on the eastern side of Brunet island in 6 to 13 fathoms water, sheltered from southerly and westerly winds, but some rocks off the head of the bay and nearly $\frac{1}{4}$ mile from the shore, as well as a shoal, with 15 feet water over it, bearing 273° , distant 800 yards from Little cape, must be avoided.

Little Brunet islands lie close southwestward of Brunet island.

Bird island has a sharp peak 384 feet high, and $\frac{1}{3}$ mile westward of it are Brandies rocks which uncover 2 feet at low water.

Puffin bank, with $3\frac{1}{2}$ fathoms water over it, bears 79° , distant 1,400 yards from Puffin island.

Plate islets are three in number and rocky; Big Plate islet, 49 feet high, bears 222° , distant $4\frac{1}{4}$ miles from the western end of Brunet island; Little Plate islet, 33 feet high, bears 211° , distant $1\frac{1}{4}$ miles from Big plate.

Numerous rocks and shoals surround these islets; those with less than 10 fathoms are said to break in heavy weather, and none of them should be approached within the distance of 1 mile.

Sagona island, 256 feet high, bears 23° , distant 6 miles from Little cape of Brunet island. On its western side is a small inlet suitable only for fishing vessels; a sunken rock in the middle of the entrance makes the passage difficult except in very fine weather. Numerous banks, some of which break in bad weather, surround Sagona island.

Crew point is the southern entrance point of Fortune bay, and Sugarloaf rock, conspicuous, conical, and 26 feet high, lies close westward of it; a cluster of houses and a flagstaff stand near the point. A ledge of rocks extends 1,200 yards southwestward from the point, and Crew Point shoal, with $5\frac{1}{2}$ fathoms of water over it, bears 236° , distant $1\frac{1}{4}$ miles from the point. Little Dantzie cove lies $1\frac{1}{4}$ miles in a northerly direction from Crew point; Great Dantzie cove, the northern point of which is Dantzie point, is situated 2 miles farther northward; the holding ground in this cove is bad.

Fortune head, situated $7\frac{1}{4}$ miles in a northeasterly direction from Dantzie point, is composed of steep cliffs, with rocks off-lying for 200 yards; at the western end of the head is a hillock with a single tree on it.

Fortune village is situated $\frac{1}{2}$ miles east-southeastward of Fortune head, and there is fine weather anchorage off it in 6 to 10 fathoms

of water, but the holding ground is very bad, the bottom being smooth rock. The best holding ground is well toward Fortune head in 7 fathoms of water. At the western end of the village is a shallow basin protected by two breakwaters, into which fishing vessels enter after a quarter flood.

Communication.—The steamers from St. Johns and Placentia call at Fortune weekly during summer and autumn.

Ice.—Fortune bay is very seldom frozen over, and the harbor is always open.

Jerseyman bank, the southern end of which is 6 miles westward of Dantzic point, extends nearly 10 miles in a north and south direction and has on it depths ranging from 20 to 24 fathoms.

Grand Bank head, $3\frac{1}{4}$ miles east-northeasterly from Fortune head, is steep, and 187 feet high. Admiral cove, about 800 yards southeastward of the head, affords anchorage in 5 to 10 fathoms of water.

Grand Bank village is situated on Bouilli point at 1 mile south-eastward of the head; there is anchorage off the village in 10 fathoms of water.

Light.—From a wooden beacon, painted red and white in horizontal bands, and 23 feet high, bearing 264° , distant 130 yards from the end of the breakwater at Grand Bank, there is exhibited at 28 feet above high water a fixed red light, which should be seen on southerly bearings between 117° and 241° , a distance of 5 miles in clear weather.

Water can be obtained by sending a boat up Grand Bank brook at high water.

Ice.—Field ice appears at the end of February and leaves early in April; vessels arrive during the first week in March and leave toward the latter end of December; this harbor was only frozen over twice in 30 years.

Tides.—It is high water, full and change, at Grand Bank at Sh. 48m.; springs rise $6\frac{1}{4}$ feet, neaps $5\frac{1}{4}$ feet.

Communication.—The steamers from St. Johns and Placentia call at Grand Bank weekly during summer and autumn.

Grand Beach point, eastward, $10\frac{3}{16}$ miles from Grand Bank head, is a low projection covered with trees. Scott rock, with $4\frac{3}{4}$ fathoms of water over it, bears 309° , distant 1,300 yards from the point.

Grand beach is situated at the head of a cove about $\frac{1}{2}$ mile south-eastward of the point. It is much frequented by vessels of the herring fishery during the spring season.

White point, northeastward, $3\frac{1}{2}$ miles from Grand Beach point, is bare granite; the shore of Fortune bay for 5 miles northeastward of White point is fronted by rocks, known as Garnish rocks, extend-

ing nearly 2 miles offshore, and there is no safe passage between them and the land.

Caution.—The fishermen of this locality are not trustworthy pilots except for the pass to Frenchman cove.

Frenchman cove, $3\frac{3}{4}$ miles northeastward of White point, affords fair anchorage for small vessels in 4 to 5 fathoms of water.

Tides.—It is high water, full and change, in Frenchman cove at Sh. 47m.; springs rise 7 feet, neaps $5\frac{1}{4}$ feet.

Garnish, a small boat harbor, lies $1\frac{1}{2}$ miles northeastward of Frenchman cove; there is a considerable settlement and a church here.

Light.—A square beacon tower, 33 feet high, carrying an octagonal drum and a lantern, and painted red and white, at Garnish entrance, exhibits, at 20 feet above high water, a fixed red light. This light is intended for the guidance of the fishing craft, and may be seen from a distance of about 3 miles.

Rosée point, bearing 17° , distant $9\frac{3}{4}$ miles from Garnish, terminates in remarkable conical hillocks; some rocks lie off the intervening shore, the principal being Charleys rock, with 13 feet over it, and Tilt rock with less than 6 feet over it; these rocks are situated over $\frac{1}{2}$ mile offshore, and Hay shoals are nearly 1 mile off Scott point. The shore eastward of Rosée point is bold rocky cliffs.

Grand Jervey head lies 7 miles northeasterly from Rosée point, and in Grand Jervey cove, $\frac{1}{2}$ mile easterly from the head, there is open anchorage in 14 fathoms of water.

Langue de Cerf cove, 8 miles east-northeasterly from Grand Jervey head, affords anchorage in 16 fathoms water, sheltered, except from northerly and westerly winds.

Jack Fountain cove, 2 miles eastward of Langue de Cerf point, affords anchorage for small vessels in 7 fathoms water, but Jack Fountain rock lies in the middle of the cove. There is a small village around the cove.

Bay l'Argent back cove is situated on the southern side of a peninsula immediately eastward of Jack Fountain cove, and affords no anchorage for ships, but small craft shelter in it close to the shore.

Bay l'Argent, on the eastern side of the peninsula, affords shelter for small craft close to the shore; there are a few houses around the bay.

East bay entrance is northeastward of the entrance to bay l'Argent; Boat rocks, islets 23 feet high, lie immediately outside the entrance.

Two arms branch from the entrance; Lower Little bay, the southeastern, extends eastward 1 mile, and East bay, the northeastern, extends northeastward 2 miles. Anchorage may be obtained at the heads of both these arms.

Mille harbor, on the northern side of the peninsula forming East bay, is surrounded by a settlement. The harbor affords sheltered anchorage to small craft in 3 to 4 fathoms water.

Cape Mille, northward $1\frac{1}{4}$ miles from Mille Harbor entrance, is a high red cliff under a wooded hill, and Fortune bay runs 7 miles east-northeastward from the cape, with a width of $1\frac{1}{4}$ miles to 1,600 yards. The bay immediately westward of the cape opens out to a width of 3 miles.

The shores of this part of the bay are high, with steep cliffs on both sides, and at the head of Fortune bay the shore is steep-to and free from shoals; anchorage may be obtained here, in 7 to 9 fathoms water, off a large settlement, with a conspicuous red house bearing 140° .

Grand le Pierre harbor, on the northern side of the bay, at $1\frac{3}{4}$ miles from the head, has good anchorage in 4 to 8 fathoms water, and a clear approach.

Tides.—It is high water, full and change, in Grand le Pierre harbor at 9h. 10m.; springs rise 7 feet, neaps 5 feet.

English harbor, with good anchorage in 4 to 10 fathoms water, and sheltered except from southerly winds, is situated $4\frac{1}{4}$ miles westward of Grand le Pierre; rocks lie close off the entrance points, otherwise the harbor is clear. There are two inner harbors, which can be entered by small craft at high water, and there is a small village at the head of the outer harbor.

Little bay de l'Eau is about $1\frac{1}{2}$ miles westward of English harbor. There are some islets and rocks off it. The entrance is 200 yards wide, but the harbor expands near its head, where there is anchorage in 21 fathoms water.

New harbor is situated 2 miles westward of Little bay de l'Eau and affords sheltered anchorage to fishing craft in 12 feet water.

Femme harbor is 3 miles westward of Little bay de l'Eau. Petticoat island and Smock island, with several small islets, lie at its entrance.

Femme shoal, on which the least water is $4\frac{1}{4}$ fathoms, extends southwestward $\frac{1}{4}$ mile from the western point of Petticoat island.

The passage into the harbor is westward and northward of Petticoat island, between it and Smock island, and thence northward through the channel into the basin: it is about 150 yards wide. In entering, as soon as the harbor channel begins to open, keep near Smock island to avoid sunken rocks extending from the northeastern part of Petticoat island, and Drew rock, which dries 3 feet, off the eastern side of the harbor. When past Drew rock keep in mid-channel till near the narrows at the head, where a buoy ought to be placed beforehand on the eastern side of Druid rock, and steer midway between the buoy and the eastern shore into the fine basin

which opens out to the northward and affords anchorage in $4\frac{1}{2}$ to 18 fathoms water, sand and mud bottom.

The passage eastward of Petticoat island is obstructed by rocks, and can only be used by very small craft.

Tides.—It is high water, full and change, in Femme harbor at Sh. 35m.; springs rise 7 feet, neaps 5 feet; neaps range about 4 feet.

Big Conne is an open bay 2 miles westward of Femme harbor, and there is anchorage in 9 to 17 fathoms water at its head. Little Conne is a cove in its western shore, suitable for fishing craft; there are a few houses on its southern shore.

Long harbor entrance is $4\frac{1}{2}$ miles westward of Femme harbor; Gull island lies in the entrance, and Black rock, 6 feet high, is $\frac{1}{2}$ mile southward of the island; a patch of sunken rocks, part of which is awash at low water, lies about 200 yards westward of Black rock. The harbor extends about north-northeasterly 14 miles, with a general breadth of $\frac{1}{2}$ mile, and it contains several anchorages. Rocks which cover at high water are situated in the passage northeastward of Gull island, and about 300 yards from the shore. Entering by the eastern passage, keep close to Gull island.

A patch of sunken rocks, with less than 6 feet water over it, lies 300 yards southwestward of Gull island. Entering by the western entrance keep near the western shore.

At 3 miles within the entrance are the narrows, where there is a depth of $6\frac{1}{2}$ fathoms. Just above Indian Tea island the channel is only 300 yards wide between two sunken rocks with 2 feet and 5 feet water over them, respectively.

Telegraph.—There is a telegraph office at Otter point, nearly 1 mile from the head of the harbor.

Anchorage in Long harbor:

Anderson cove, $1\frac{1}{2}$ miles within the entrance on the western shore, affords anchorage in 6 to 14 fathoms water, but there is barely room for a vessel 200 feet long, anchored in the middle of this cove, to swing when lying at single anchor.

There is anchorage off Tickle Beach point, immediately southwestward of the narrows, 3 miles within the entrance, in 7 to 9 fathoms water, mud bottom; anchor near the point, out of the tidal stream, which is rapid. Large vessels should not anchor here in a depth of less than 15 fathoms in order to have sufficient space.

There is fair anchorage in 9 fathoms water, mud bottom, close off Woody island, southward of the narrows; the strong tidal stream runs through it, but for a large vessel it is preferable to the anchorage off Tickle beach.

There is a basin inside Woody island for small craft, which can go alongside the wharf there.

Above Tickle head there is good anchorage, out of the tidal stream, with moderate depth of water and good shelter.

There is good anchorage in 5 fathoms water in Schooner cove, 8 miles above Gull island, at a point where Billy island, at the head of the harbor, opens, bearing about 41° .

Tides and tidal streams.—It is high water, full and change, in Long harbor, at 8h. 50m.; springs rise 7 feet, neaps $5\frac{1}{2}$ feet; neaps range 4 feet.

It is high water, full and change, at Schooner cove at about 9h. 0m.

The tidal stream past Tickle point probably attains at times a rate of 3 knots an hour.

The greatest rate of the ebb stream off Woody island is $1\frac{1}{4}$ knots an hour, and that of the flood $\frac{1}{2}$ knot.

The ebb stream has sufficient strength at Schooner cove to keep a vessel broadside on to a strong breeze.

Belle bay.—Long Harbor point bears 224° , $1\frac{1}{10}$ miles from Gull island, and the southern point of Chapel island bears 252° , distant 10 miles from Long Harbor point; the entrance to Belle bay, which contains numerous islets and islands, lies between Long Harbor point and Chapel island.

Hare harbor lies about $1\frac{1}{4}$ miles northwestward of Long Harbor point and eastward of some islets; it is only suitable for fishing craft.

White rock, with $3\frac{1}{2}$ fathoms of water over it, lies 700 yards westward of the southern islet.

Mal bay entrance is 2 miles northwestward of Hare harbor, and the bay extends north-northeastward 5 miles; there is anchorage near the head of the bay, which is narrow; use caution when anchoring, for the water shoals suddenly from 23 to 5 fathoms.

Rencontre islands are immediately west-northwestward of Mal bay; the largest, 464 feet high, is joined to the mainland at low water.

Southern harbor stretches into the southern side of this island; it is narrow and open to southerly winds.

Anchorage may be obtained eastward of the isthmus joining the large island to the mainland and off Salmonier village, sheltered by the two smaller islands to the southward; to enter, keep in mid-channel between the islands and the mainland.

A rocky ledge, with a depth of 3 fathoms over it, extends some distance off the village; and a small rock, with 4 feet of water over it, lies about 200 yards off-shore, with Low point, a low shelving point at the western end of the harbor, in line with a small solitary house on the northeastern end of Rencontre island, bearing 272° , and a small rock about 3 feet high, close westward of Stage point, in line with the eastern end of Rencontre island.

Belle harbor, a narrow arm of the sea at $3\frac{1}{2}$ miles west-north-westward of Rencontre islands, is entered westward of Doctor island. Doctor cove is on the eastern shore, and small craft anchor in it sheltered by the island. There is anchorage in Belle harbor in 8 to 17 fathoms of water; approach the head of the harbor with caution, as the water shoals suddenly.

The land on the northern side of the anchorage at the head of the harbor is a peninsula, with two rises on it; the eastern of these is a remarkable black cliff, to the northeastward of which vessels should not proceed.

Lally head, west-southwestward $2\frac{1}{2}$ miles from the entrance to Belle harbor, is the end of a long promontory that with Lally Cove island forms Lally cove and Lally Back cove. Both these coves are only suitable for boats, but there is open anchorage off the latter in 14 to 16 fathoms water.

East bay, wide and open, is entered at $1\frac{1}{2}$ miles northward of Lally Back cove: East Bay head separates it from North bay, which is on the western side of the head. There is good anchorage off the mouths of the brooks flowing into both East and North bays, and at the head of the latter is a large salmon river, while northward of the river there is good ground for deer.

Cinq Isles bay, west-southwestward about $2\frac{1}{2}$ miles from Lally head, is square in shape, and divided near the middle by a line of five small islands, which extends $1\frac{1}{4}$ miles northeastward from the north-western shore: on its northwestern side is a small inlet, named Simmons brook, in which small vessels anchor; there is an island in the inlet, and at the head is Salmon river. There is anchorage with fair shelter for large vessels at the western side of the bay, but a shoal lying $\frac{1}{4}$ mile from the river mouth at the southern corner of the bay must be avoided.

Coal.—About 20 tons of coal may be usually obtained at Salmon river.

Corbin Head promontory, forming the southeastern side of Cinq Isles bay and the northwestern of Corbin bay, is steep and bold to the eastward; Belle bay is $1\frac{3}{4}$ miles wide between the promontory and Lally head.

Corbin bay, on the southern side of Corbin Head promontory, forms three branches, named Northwest arm, Southwest arm, and Hatcher arm, all affording anchorage in 7 fathoms water; Bob head is the southern entrance point of Corbin bay.

White rock, with 19 feet of water over it, bears 5° , distant 500 yards from Bob head.

Ducie rock bears 72° , distant 1,300 yards from Bob head, and is awash at low water; a shoal, with 2 fathoms of water over it, lies

northward about 100 yards, and a shoal on which the depth is $2\frac{3}{4}$ fathoms, westward 200 yards from the rock. These shoals lie on a bank about 700 yards long in an easterly and westerly direction, with depths of 4 to 9 fathoms on it.

Lord and Lady island, 75 feet high, lies southeastward $\frac{1}{4}$ mile from Bob Head promontory, and **Thrum cap**, a small steep island, 87 feet high, lies easterly 800 yards from the middle of this island.

Dog and Belle islands lie northeasterly, $1\frac{1}{2}$ miles and $2\frac{3}{4}$ miles, respectively, from Lord and Lady island; Dog island is 202 feet, and Belle island 293 feet high. A shoal, one rock of which dries 2 feet, extends southward 600 yards from Dog island. Dog Island bank comprises three rocks; the shoalest, with 9 feet of water over it, bears 117° , distant $1\frac{1}{2}$ miles from the southern end of Dog island.

Long island, $1\frac{1}{4}$ miles long, 600 yards broad, and 375 feet high, is $\frac{1}{2}$ mile southward of Bob Head promontory, and Barrow rock, 15 feet high, lies nearly in the middle of the channel between. Tickle island lies on a bank extending from the southeastern part of Long island.

Chapel island, $2\frac{3}{4}$ miles long in a northerly and southerly direction, about $1\frac{1}{2}$ miles broad, and 843 feet high, is bold-to on all sides but the northern, and is situated $\frac{1}{4}$ mile southward of Long island, the channel between being foul. Farmers cove, at its northeastern end, affords anchorage for small craft in 5 fathoms water.

Belloram, or *Bande de l'Arier* harbor, is on the mainland southwestward of Chapel island, and Iron head, a high bluff, rises almost perpendicularly 1,129 feet from the sea at $1\frac{3}{4}$ miles northward of the harbor. A semicircular beach forms a snug harbor for small vessels, with 5 fathoms water in it, and large vessels anchor northward of the harbor in 14 to 18 fathoms; a large settlement surrounds the harbor.

Light.—A white tower, 37 feet high, on Beach point, exhibits at 35 feet above high water a fixed white light, which should be seen from a distance of 7 miles in clear weather.

Tides.—It is high water, full and change, in Belloram harbor at 8h. 59m.; springs rise 6 feet.

Communication.—The Newfoundland Railway steamer from St. Johns calls at Belloram weekly during summer and autumn.

St. Jacques island, situated 3 miles southward of Belloram, and 700 yards offshore, is 163 feet high and consists of two hummocks joined by a low neck; it may be approached to a short distance all around.

Light.—A white circular iron tower, 38 feet high, on St. Jacques island, exhibits, at 132 feet above the level of the sea, an intermittent white light every ten seconds, thus: Light seven seconds, eclipse three seconds, which should be seen from a distance of 15 miles in clear weather.

A white dwelling with a flat roof stands a short distance from the light tower.

St. Jacques harbor, the entrance of which is $\frac{1}{2}$ mile northward of the island, is clear of shoals, except a small spit off the eastern point.

Anchorage.—There is anchorage in the harbor, with good shelter, in 4 to 17 fathoms water, but in its northwestern part anchorage should not be taken in a less depth than 9 fathoms, as in shoaler water the bottom is rocky with kelp.

Settlement.—A settlement surrounds the harbor: water and wood can be obtained, but no provisions.

Communication.—The Newfoundland Railway steamer from St. Johns calls at St. Jacques weekly during summer and autumn.

Blue Pinion harbor, $1\frac{3}{4}$ miles westward of St. Jacques harbor, extends 1 mile in a northerly direction, and is 700 yards broad; a shoal stretches 300 yards off its western side, near the head.

Anchorage may be obtained at the head of the harbor in 5 to 15 fathoms water, nearer the eastern shore to avoid the shoal, but it is open to southerly winds.

English harbor, 1 mile west-southwestward of Blue Pinion harbor, is suitable for small craft only: it is surrounded by a settlement having two churches.

Great Mon Jambe (Great Mose Ambrose), nearly 1 mile westward of English harbor, is about 400 yards wide, and extends $\frac{1}{2}$ mile northerly; it affords anchorage for small craft in 4 to 5 fathoms water. Little Mon Jambe, next westward of it, is open to southerly winds.

Boxey harbor, $3\frac{1}{2}$ miles westward of Blue Pinion harbor, is small and barred by a shoal with 3 fathoms water over it, but inside there is anchorage in 4 to $4\frac{1}{2}$ fathoms water, fine sand bottom. The mound on Boxey point in line with Friar head, bearing astern about 205° , leads in through the deepest channel. A few houses and a lobster factory stand on the northern shore.

Tides.—It is high water, full and change, in Boxey harbor at 8h. 43m.; springs rise $6\frac{3}{4}$ feet.

Boxey Point promontory is nearly 3 miles long and rises to the height of 310 feet. Sunken rocks lie off the points of the promontory, which should not be approached within $\frac{1}{4}$ mile.

Boxey rock, with 3 feet water over it, bears 209° distant 735 yards, from Boxey point.

Clearing marks.—The houses on the northern shore of Boxey harbor, open eastward of Friar head, bearing 16° , leads eastward; and the southwestern point of St. Johns island, open southward of Shepherd rock, bearing 283° , leads southward of Boxey rock.

Vessels should not pass between the rock and the mainland, as a shoal, which breaks with a moderate sea, extends about 300 yards off the point northwestward of the rock.

St. Johns island, at the entrance to St. Johns bay, is 380 feet high; a shoal with a depth of $2\frac{1}{4}$ fathoms over it lies 400 yards southward of the middle of its southern side, and Kippins shoal, with $6\frac{1}{4}$ fathoms least water over it, bears 158° , distant 800 yards from the southeastern point of the island.

St. Johns head, bearing 302° , distant 3 miles from the southwestern end of Boxey Point promontory, is the southwestern end of a promontory extending southeasterly $2\frac{3}{4}$ miles from the main; this promontory rises to the height of 542 feet, and its coasts are cliffy.

St. Johns bay, between these promontories, has anchorage in moderate depth with offshore winds, the best being in its northern part, where the bay narrows to a boat harbor.

Gull and Shag rocks are on the northern side of St. Johns head promontory: Shag rock is 51 feet high and $\frac{3}{4}$ mile from the shore; westward and southward of these rocks, and also within the 100 fathoms line which runs parallel to the promontory at about $1\frac{1}{2}$ miles northward of it, are several shoals which are marked on the plan.

Great bay de l'Eau.—Eastern head of Harbor Breton bears 286° , distant $4\frac{6}{10}$ miles from St. Johns head, and Great bay de l'Eau extends 10 miles northeastward from between them. Great bay de l'Eau terminates in Old bay, and it affords no good anchorage except near its head. Devils island lies in the bay at nearly 5 miles within St. Johns head, and forms two channels, the western of which is barred by a bank with 6 feet water over it; the eastern channel is clear.

Anchorage.—Little Devils island is situated about 200 yards off the northern side of Devils island, and there is anchorage northward of it in 11 fathoms, or westward of it in 6 fathoms.

Little bay, situated $3\frac{1}{2}$ miles in a northerly direction from St. Johns head, has anchorage on its western side in 7 to 10 fathoms water. A rock lies off the western entrance point, and the head branches in two arms.

River Head settlement is in the northwestern part of the bay, and wood and water may be obtained there.

Harbor Breton, situated westward of Eastern head, extends north-northeastward for 9 miles, with Jerseyman harbor on the eastern shore and Southwest arm, or Harbor Breton proper, on the western shore at 2 miles within the entrance.

Jerseyman harbor entrance is southward of Jerseyman head, a remarkable red-cliffed promontory. This harbor has excellent anchorage for small vessels in 5 to 7 fathoms, but the entrance is barred by a shoal with 19 feet on it at low water.

The cliff fall of a hill, westward of the Barasway in Southwest arm, just open southward of Jerseyman head, bearing 261° , leads through the deepest part of the narrow channel over the bar, until the harbor is open, when haul northeastward and anchor as convenient.

The principal settlement is on the northwestern shore, where there is a wharf. It is shoal alongside the wharf, but at a few feet distant there is a depth of 5 fathoms. A lobster factory is situated on the eastern shore.

Northeast arm of Harbor Breton is bordered by steep cliffs, and it affords no anchorage, except southward of the narrows, in 8 fathoms water, for small vessels.

Southwest arm, or Harbor Breton proper, extends southwestward 160 yards, with a width of about 150 yards, to a bar of 12 feet water, when it passes into a basin about 700 yards across, with depths of 4 to 10 fathoms. From the northern part of this basin, the Barasway, a shallow arm where small craft lie in safety, trends northeastward for about 1,800 yards. The largest settlement in Fortune bay is at Harbor Breton.

Light.—A cylindrical tower, 29 feet high and painted red and white in horizontal bands, on Rocky point, the southeastern point of Southwest arm, exhibits at 68 feet above high water a fixed white light, which should be seen from a distance of 9 miles in clear weather. The light is obscured when bearing about 141° over Harbor rock.

Harbor rock, with $2\frac{3}{4}$ fathoms water over it, bears 28° , distant 200 yards from Thompson beach.

Buoy.—A red warping buoy is moored about 100 yards northeasterly from Harbor rock.

Anchorage.—There is anchorage in any part of the arm northeastward of the bar, but large vessels must anchor in about 17 fathoms water, northward of Harbor Rock buoy, with a good scope of cable out to prevent dragging with the heavy squalls that prevail with strong breezes, even in summer.

There is not room for many large vessels, as the water deepens quickly to the northeastward.

Mooring buoys.—Two red mooring buoys are placed in Harbor Breton at about 30 yards from the wharf on Thompson beach. The buoys lie close to the 3-fathom line of soundings and are 200 yards apart on a line bearing northeasterly and southwesterly.

Directions.—Entering Harbor Breton in a small vessel, pass northward of the red warping buoy northward of Harbor rock, and anchor in 10 fathoms water, mud and gravel bottom, in the middle of the harbor between the red buoys off Thompson beach and the north shore, with two long wooden whitewashed buildings with black roofs on the southern shore bearing about 152° .

Communication.—The Newfoundland Railway steamer from St. Johns calls at Harbor Breton weekly during summer and autumn; there is a telegraph station at the settlement.

Ice.—Harbor Breton is sometimes closed by field ice; during a period of thirty years it has only been unavailable to the mail steamer on three occasions. The field ice appears toward the end of February and leaves about March 25, the first vessels arriving at the end of April and the last leaving about the middle of December. The outer anchorage freezes over about the beginning of January, and harbor ice disappears about the middle of April.

Tides.—It is high water, full and change, in Harbor Breton at 8h. 52m.; springs rise 7 feet, neaps $5\frac{1}{2}$ feet; neaps range 4 feet.

Deadman bight.—The shore westward of Harbor Breton is foul and rocky, forming a bay named Deadman bight, and there are several patches off Harbor Breton entrance, on some of which the sea breaks in gales.

Offer rock, with 12 feet water on it, and the southern of a group of rocks, bears 214° , distant 1,700 yards from Gull island, which is situated about 400 yards offshore at a distance of $1\frac{1}{4}$ miles westward from Western head, the western entrance point of Harbor Breton; the beach of Saltwater cove, which is southward of Jerseyman harbor, open southward of Western head, bearing 58° , leads $\frac{1}{3}$ mile southward of Offer rock.

Connaigre head, clifty, bold, and 310 feet high, is the termination of a long promontory forming the western side of Deadman bight and the southeastern side of Connaigre bay.

Connaigre rock, with $1\frac{3}{4}$ fathoms of water over it, bears 200° , distant 3 miles from Connaigre head.

Connaigre bay.—Basse-terre point bears 283° , distant 8 miles from Connaigre head, and Connaigre bay extends northeastward 14 miles from between them: it contains several islets and inlets.

Shag rocks, 24 feet high, lie in the middle of the mouth of the bay; in using the channel northward of them observe that a ledge of rocks extends 1 mile from the northern shore. Black rock, 1 foot high, lies $\frac{1}{2}$ mile southwestward of Shag rocks.

Clearing mark.—Seal island, well open southward of Basse-terre point, bearing 283° , leads close southward of Black rock.

Great Harbor bight, on the southeastern side of the bay at 5 miles northeastward of Connaigre head, is clear of shoals; there is anchorage in 10 fathoms water, at 400 yards from its head, but it is entirely open to southwesterly winds.

Great harbor is within Will island, 310 feet high, which lies on the northwestern side of Great Harbor bight entrance, with no passage between it and the mainland. To enter, pass southward of this island, and near the eastern shore of the harbor.

Great and Little islands, 482 and 270 feet high, respectively, are northwestward of the harbor and in the middle of the bay; some rocks lie southward of these islands.

Anchorage.—Small vessels can anchor, in 4 to 14 fathoms water, in Salmonier, at the head of Connaigre bay, but eastward of Great island there is no other anchorage except for boats.

Dawson cove, on the northern side of the bay, about 5 miles in a northerly direction from Connaigre head, affords anchorage in 6 fathoms of water, but it is open to southerly winds.

Dog Cove head is at the southwestern end of Dawson cove, and the shore westward of the head is bordered by bowlders. Rocks and shoal water extend 1,700 yards southeastward from the bight, an open bay, at $3\frac{1}{2}$ miles westward of the head.

Clearing mark.—Blow-me-down head, 692 feet high, well open eastward of Dog Cove head, bearing 58° , leads southeastward of these dangers.

Basse-terre point, the western point of Connaigre bay, is bare, and the shore thence northwestward to Beck bay is foul; a confused sea is caused by South Red Head shoal, extending $\frac{3}{4}$ mile from Red point, $1\frac{1}{2}$ miles northwesterly from Basse-terre point.

Pass island, the northern entrance point of Fortune bay and the southern of Hermitage bay, is about 1 mile long, and separated from the mainland by Pass Island tickle, a channel 265 yards wide, with a depth of 4 fathoms of water. A group of islets and shoals extends 1 mile southwestward of Pass island, and Tom Cod rock, on which the sea breaks, lies about $\frac{1}{4}$ mile off its northwestern side.

Lights.—A square white lighthouse with a lantern on its flat roof, 33 feet high, on the summit of Pass island and near its southern end, exhibits at 281 feet above high water a fixed white light, which should be seen from a distance of 19 miles in clear weather.

A lantern placed at the corner of the above lighthouse exhibits at 267 feet above high water a fixed red light, which is visible from 300° to 76° , or over an arc of 136° , included between Basse-terre point and the shoal ground off Wolf rock; the two lights appear as one at the distance of about $4\frac{1}{4}$ miles.

Signals.—This light station is supplied with the International code of signals.

Settlement—Anchorage.—There is a fairly large settlement on Pass island and anchorage for small vessels can be obtained in $6\frac{1}{2}$ fathoms water, sand bottom, in Pass Island tickle, off the houses in the middle of the island, but it is quite open to the southward.

Hermitage bay.—Western head of Long island bears 27° , $8\frac{1}{2}$ miles from Pass island and Hermitage bay extends eastward nearly 25 miles from between them; the bay contains several anchorages. Grole western cove, about 3 miles eastward of Pass island, is the

western of these, and affords anchorage in 9 fathoms water. Grole cove is suitable for boats only; there is a settlement around it.

Fox islands.—Fox island, 210 feet high, and Little Fox island, 89 feet high, with Fox Island rock, 26 feet high, between them, are situated $\frac{3}{4}$ mile from the southern shore at 10 to 11 $\frac{1}{2}$ miles eastward of Pass island. Several rocks lie off the northwestern side of Fox island, the western and larger island, and Virgin rock is situated off its eastern side. A reef extends 250 yards westward of Little Fox island. Eastward of these islands Hermitage bay narrows to a mile in width.

Hermitage cove, southeastward of the eastern end of Fox island, is $\frac{3}{4}$ mile deep, nearly 800 yards broad, and affords good anchorage in 8 fathoms water, at 800 yards from the head. A settlement, having a stone church, surrounds the cove. The squalls are heavy here, and great care is necessary in boat sailing.

Tides.—It is high water, full and change, in Hermitage cove at 8h. 45m.; springs rise 7 feet; neaps 4 $\frac{3}{4}$ feet.

Anchorage.—There are many anchorages suitable for small craft eastward of Hermitage cove, among which are Furby, Olive, Hardy, Salmonier, and Northwest coves. There is good anchorage for large vessels at the head of Hermitage bay in 22 fathoms and less water as convenient.

Ice.—The head of Hermitage bay for some 5 to 8 miles is generally frozen between the first week in January and the first week in April.

Little passage is a deep, narrow channel, connecting Hermitage and Despair bays, and separating Long island from the mainland. Its southern entrance is about 11 miles from the head of Hermitage bay, and it is navigable in mid-channel, passing westward of the two islands off l'anse à Flamme. L'anse à Flamme, branching into several small coves, is situated on its western side at $\frac{1}{2}$ mile from Margery head, the western entrance point and the southeastern end of Long island; it affords anchorage for small vessels, near its head, in 13 fathoms water.

At 3 miles within the southern entrance is a small islet about 30 feet high, with a clear passage on either side of it.

Little islet, 20 feet high and separated from the eastern shore by a narrow shallow channel, is $\frac{1}{2}$ mile farther northward. The navigable channel, which is here only 150 yards wide, is close along the coast of Long island.

Maria cove in Long island and about 600 yards northward of Little islet, has some sunken rocks in it. Northward of Maria cove keep Day point shut in with the eastern shore, bearing 21° to clear a rock off the point southward of Cold harbor, until the waterfall in Deer cove bears 96°, when a mid-channel course leads to Despair bay.

Long island, separating Hermitage bay from Despair bay, is barren and rugged, with many valleys, and it reaches in Mullins hill

a height of 819 feet; its coasts are much indented, and contain several harbors available for small vessels.

Gaultois harbor, on the southern side of Long island and about a mile westward of Margery head, is small, and there are some islets in the middle of its entrance. Whale or Lamy islet, on which is a boiling house for whale oil, is the northern of these islets, and it, open eastward of West head, bearing 13° , leads eastward of a rock with 3 feet of water over it, lying 50 yards southward of the head, after passing which keep West head aboard.

Light.—A red iron column, placed on a rock (awash at high water) off West head, exhibits at 14 feet above high water a fixed white light.

A tramway, on which the light is run out, extends from a small store on West head to the column. The light, kept on a bearing 6° , leads eastward of the sunken rock above mentioned.

Buoy.—A mooring buoy is placed about 200 yards westward of Whale islet.

Anchorage.—Vessels anchor in 24 fathoms of water, avoiding the heavy moorings laid from Whale island to the opposite shore, or they make fast to the buoy.

Ice.—Field ice arrives about the middle of February and leaves toward the end of March; Gaultois harbor seldom freezes except during severe winters with calm weather, and the ice generally breaks up in a few days.

Tides.—It is high water, full and change, in Gaultois harbor at 8h. 45m. (approximately); springs rise 7 feet, neaps $4\frac{3}{4}$ feet.

Picarre harbor, $1\frac{3}{4}$ miles westward of Gaultois, is 400 yards wide; on the eastern side of the entrance is a shoal, with 16 feet of water over it, bearing 197° , distant 300 yards from Crow nest, the eastern entrance point: also Mad Doll, drying 2 feet, and Crazy Betty, drying $1\frac{1}{2}$ feet.

The western side of the harbor must be kept aboard to clear these shoals; the Narrows, at the head of the harbor, shut in with Buffett point, $\frac{1}{2}$ mile inside the entrance on the western side, bearing 13° , clears them, and there is anchorage immediately within Crazy Betty in 11 to 13 fathoms water, or for small vessels as far in as the Narrows.

Round harbor is $2\frac{3}{4}$ miles westward of Picarre, and its entrance is 200 feet wide. It is only suitable for small vessels.

Little Bay and Sam Hitches harbor are two narrow inlets entered at about 2 miles westward of Round harbor. They afford anchorage to small craft only.

Long Island rock, bearing 232° , distant $\frac{1}{2}$ mile from Western head, the southwestern point of Long island, is 10 feet high and steep-to.

Despair bay, entered between Western and Great Jervis heads, both prominent bluffs, is divided into two principal arms, the eastern extending 22 miles and the northern 13 miles. Off the western entrance point are several islands and shoals. The land in this locality is hilly and barren, but at the head of the bay it becomes flat, and there is an abundance of wood.

Ice.—The head of Despair bay generally freezes about the end of December, and clears about April 20.

Big shoal, with 16 feet water over it, lies 735 yards from the north coast of Long island at about one mile eastward of Green point, which is near the northwestern end of that island.

Clearing marks.—Saddle island open westward of Long island, bearing 228° , leads northwestward, and Harbor le Gallais hill open northward of Grip island, bearing 85° , leads northward of Big shoal.

Grip island, small and 65 feet high, is connected with Long island by a reef at $2\frac{6}{10}$ miles eastward of Green point.

Patrick harbor, $1\frac{1}{10}$ miles eastward of Grip island, offers anchorage for small vessels in 6 fathoms water. The western entrance point rises to a wooded cone, about 200 feet high, and close off the point is a sunken rock. The eastern entrance point is a small promontory 10 feet high, close off which are a rock that covers at high water and a sunken rock; there are no shoals in the harbor.

Patrick Harbor rock, bearing 32° , distant $\frac{1}{4}$ mile from the eastern entrance point of the harbor, uncovers 2 feet at low water. Two sunken rocks lie westward of it, the western being distant 350 yards.

Clearing mark.—The summit of Great Jervis island, open northward of Long island, bearing 249° , leads northward of these rocks.

Harbor le Gallais is situated eastward of Harbor le Gallais hill, a wooded cone, 280 feet high, immediately eastward of Patrick harbor. It is only suitable for small vessels, being 150 yards wide, with depths of 4 to 6 fathoms.

A rock that covers lies close to the north entrance point, and sunken rocks lie eastward 265 yards from it.

Sloop rock, a small bare islet 15 feet high, bears 68° , distant 1,200 yards from Harbor le Gallais north entrance point, and Gull rock, which uncovers 3 feet at low water, bears 224° , distant 400 yards from Sloop rock. The depth between these rocks is from $4\frac{1}{2}$ to 9 fathoms, uneven bottom.

Raymond point, the northeastern end of Long island, is a small cliff close northeastward of a wooded hillock 99 feet high: a few houses stand between the several mounds within the point.

Day cove, 1 mile southeastward of Raymond point, affords anchorage to small vessels off its entrance, in 10 fathoms water, but is open to easterly winds.

Fox island, northwestward $\frac{1}{2}$ mile from Raymond point, is 370 feet high: a rock 6 feet high lies close to its western end, and in several places there are small rocks close off the island.

Dollond bight, situated 3 miles northeastward of Brimball head, which bears 88° , distant $1\frac{1}{10}$ miles from Raymond point, affords open anchorage in 13 to 20 fathoms water.

Taylor Island rocks extend southward 100 yards from a small islet at the northern point of Dollond bight, but there are no other shoals.

Simmonds barasway, immediately northwestward of Dollond bight, shoals gradually from the depth of 15 fathoms in the entrance to the narrows at the head, where it dries at low water.

Anchorage.—There is anchorage in 10 fathoms water just inside the entrance, and for small vessels in less depths farther in.

Cape Mark is the western end of a narrow, wooded promontory 157 to 197 feet in height, which forms the northern side of Simmonds barasway.

Gull cove, a small indentation at the northeastern end of the northern side of the promontory, affords anchorage for small craft in 7 fathoms water.

Barasway de Cerf, about 1,600 yards eastward of Gull cove, is shoal and suitable for boats only.

Sunken rocks extend $\frac{1}{4}$ mile northward of Barasway de Cerf entrance; the southern side of Bois island open northwestward of Ingram point, between Gull cove and the Barasway, bearing 234° , leads northwestward of them.

Little river, the entrance of which bears 50° , distant $1\frac{1}{4}$ miles from Ingram point, is a narrow arm of the sea expanding into a large basin at its head, and again contracting into an arm that extends northward; it is suitable for small vessels only, as a depth of no more than 13 feet can be carried in, and the tidal streams attain a rate of 3 knots an hour.

A wooded islet, 38 feet high, from which a reef extends northeastward to about 50 yards from the southern shore, divides the narrow arm into two channels; the northern is shallow, and a rock that covers lies in the middle, but the southern is practicable by keeping close to the shore till past the reef, when a mid-channel course leads to the basin.

Arran back cove, west of the basin, is shallow, and the head of the basin is almost dry at low water.

Riches island, 433 feet high, situated westward $\frac{1}{2}$ mile from Little river entrance, is nearly connected to the mainland eastward of it by islets and reefs.

Sunken rocks lie 250 yards off its eastern end, and Seal rocks, that are awash at high water, lie 150 yards off its southeastern side.

Anchorage may be obtained off Little river entrance in 14 fathoms, or eastward of Riches island in 7 fathoms, mud bottom, good holding ground.

Dawson passage is between Riches and Bois islands. A shoal extends eastward from Dawson point, the northeastern end of Bois island, into the passage, and at the eastern end of the shoal, at 250 yards distant from Riches island, is a rock with $3\frac{1}{2}$ fathoms water over it. Vessels should, therefore, be kept close to Riches island in proceeding through the passage.

Arran cove entrance is northeastward of Riches island, and the cove extends $1\frac{1}{2}$ miles in an east-northeasterly direction. The southern shore is foul for a short distance off it, but the northern shore is bold, with the exception of a rock, quite close to it, in the first small bight within the entrance.

Little Crow head forms the northern entrance point of Arran cove, and Crow head is about 800 yards northward of it. These heads are conspicuous cliffs rising to heights of 525 and 718 feet.

Anchorage.—There is anchorage about halfway up Arran cove in 12 fathoms water, or farther toward the head in less depths.

Water can be taken from a stream falling into the cove.

Conne river entrance is on the eastern side of the northeastern arm of Despair bay, at 4 miles above Crow head, and the river, at about a mile within the entrance, flows through a channel only 200 yards wide. Eastward of this narrow channel the water is shallow and suitable only for vessels drawing less than 12 feet of water, which anchor immediately inside, as the greater portion of the arm to the eastward dries at low water.

There is a small settlement of Indians immediately eastward of the narrow channel, and a church stands on a mound on the southern side of this channel, but it is hidden from the westward by trees.

Anchorage, with good holding ground, may be obtained in 6 fathoms or less water in the river entrance, but proceed slowly, and carefully watch the soundings when taking up a berth.

Ship cove is situated on the western side of the northeastern arm of Despair bay, opposite to Conne river.

Birchy point is the northeastern end of a small projection in the cove, which rises to a mound 55 feet high, southwestward of which is a small settlement and a church. The cove northwestward of Birchy point is dry at low water.

Anchorage may be obtained in the middle and near the entrance of Ship cove in 7 fathoms water.

Supplies.—Water can always be taken from Big Rattling brook, a large stream which flows into the bay at about $1\frac{1}{2}$ miles southward of Ship cove, and a small quantity of beef and vegetables may generally be obtained in summer.

Tides.—It is high water, full and change, in Ship cove at 8h. 36m.; springs rise $7\frac{1}{4}$ feet, neaps $5\frac{1}{2}$ feet; neaps range $3\frac{1}{2}$ feet.

A stream runs through the narrow channels of Despair bay and Conne river, but it rarely attains the rate of 1 knot an hour.

Head of Despair bay.—Northward of Ship cove the northeastern arm of Despair bay narrows to the breadth of $\frac{1}{4}$ mile, and is clear of shoals, except off Clarke cove, the first bight eastward of the narrows, where a bank, with less than 3 fathoms water over it, extends to the line of the points.

A rock that dries 3 feet lies close to the eastern shore, at $\frac{1}{4}$ mile northeastward of the narrows.

Swagger cove, on the western shore, is immediately northwestward of the narrows, and dries to its mouth at low water.

Anchorage.—There is anchorage, in 5 fathoms, on a bank extending eastward from the cove.

Weasel islet consists of two rocks, the higher 5 feet high, joined together and to the southern shore of the bay, from which they are 100 yards distant, at low water, situated northeastward $1\frac{3}{4}$ miles from Eads point, the southern entrance point of Swagger cove.

Several conspicuous white houses stand on a spit immediately southwestward of this islet, from which shoal water extends 200 yards to the depth of 3 fathoms. Northward of Weasel islet there is a good salmon and sea trout river, and deer may be obtained in the vicinity.

Telegraph station.—There is a telegraph station of the Anglo-American Company northeastward $1\frac{3}{4}$ miles from Weasel islet.

Landing.—Deepwater point, about 800 yards northwestward of the station, and just southward of the southernmost garden visible, is the only landing place at low water for the station, as the bay dries $\frac{1}{2}$ mile from the mouth of Southeast brook, a considerable stream, close southeastward of the station.

Anchorage.—The western limit of the anchorage at the head of Despair bay is with the eastern entrance point of Cock and Hen cove, bearing 331° , in $5\frac{1}{2}$ fathoms of water, with 20 fathoms close westward. From this line the depths decrease gradually, the deepest water being nearer the northern shore.

Bois island, dividing the southern part of the northeastern arm of Despair bay into two channels, is 8 miles long and 2 miles wide at its broadest part; its summit is a barren hill, 664 feet high, about 800 yards within the middle of its northern coast.

Flobber Cove islet, 15 feet high, lies close off the southeastern coast at about $1\frac{1}{4}$ miles from Dawson point, and there are two rocks that cover at high water, eastward of that islet, the eastern being distant 100 yards.

May cove, northward of May head, the southeastern point of Bois island, affords anchorage in $7\frac{1}{2}$ fathoms water, and is clear except that a shoal extends 150 yards northward from May head, and the head of the cove dries at low water.

A shoal, with $3\frac{1}{4}$ fathoms water over it, bears 85° , distant 300 yards from May head.

Snooks Harbor entrance is about $2\frac{7}{10}$ miles westward of May head, and the harbor, being encumbered with rocks, is suitable for boats only.

Big Copper head, the southwestern end of Bois island, is a reddish yellow cliff, 340 feet high. Eastward of it is a cove with a shingle beach, and off the cove is a rock that covers at high water, distant nearly 200 yards from the shore.

Roti bay is in the mainland, and its entrance is $\frac{1}{2}$ mile northward of Dawson passage. The bay extends northwestward 2 miles, and thence an arm continues southwestward for about $\frac{1}{2}$ mile.

A rock, that uncovers 2 feet at low water, lies nearly in mid-channel, 1,400 yards northwestward from the entrance, and is joined by a bar, with $5\frac{1}{2}$ fathoms water over it, to the eastern shore.

There is no convenient passage westward of the rock, but the western end of Riches island completely open east of the western entrance point, bearing 144° , will lead east of the rock.

Shoal water extends 150 yards from the southern entrance point of the arm at the head, and also a short distance from the northern shore, leaving a passage only 150 yards wide, with a depth of 4 fathoms, to that arm.

Anchorage.—Anchorage may be obtained in from 14 to 17 fathoms water, at $\frac{1}{4}$ mile within the entrance, or northward of the rock, in the same depths.

Water.—Water may be procured from the streams in the northwestern arm or from the bight westward of the rock in the bay.

Lampidoes passage, the channel north of Bois island, has deep water throughout. The northern shore rises precipitously in high cliffs, and is indented by one large and several small coves.

During northwesterly and southeasterly winds violent squalls sweep through this passage, and vessels should then avoid it.

Rock.—A rock, with 5 feet of water on it, lies 100 yards from the shore, bearing 33° , distant $\frac{1}{4}$ mile from Western head, the southwestern point of entrance to Lampidoes passage.

Margery cove, at $2\frac{1}{4}$ miles west-southwestward of Roti bay entrance and eastward of Margery head, a steep cliff 500 feet high, is formed by a small projection 38 feet high, and extends about 200 yards in a westerly direction.

Northwest cove, on the northern shore near the middle of the passage, extends north-northeastward $\frac{3}{4}$ mile.

Anchorage.—Anchorage for small vessels may be obtained at the head of Northwest cove in 7 fathoms water, over mud.

Pomley cove, 2 miles west-southwestward of Northwest cove, has anchorage for small vessels only, in $6\frac{1}{2}$ fathoms water, at 150 yards from the shore. The head of the cove dries at low water.

Goblin head, probably so named from its showing a resemblance to the profile of a face on certain bearings, is a steep bluff surmounted by a round hill 648 feet high. It forms the southern entrance point to Goblin bay, an indentation extending northeasterly nearly 2 miles, with deep water throughout, and no anchorage. Two small islets, 15 feet high, with rocks between, lie close to the southeastern shore of the bay, near the head.

Middle Goblin bay is a narrow inlet extending northward about 1,200 yards from the outer part of Goblin bay, from which it is separated by a round hill 520 feet high. Two rocks, one round and the other square, and each 11 feet high, lie southward and southwestward of the entrance, and a rock, that covers at high water, lies 50 yards southeastward of the round rock.

This bay is not suitable for large vessels, as a rock, with 6 feet water over it, lies in the middle, but small craft pass on either side of the rock, in 3 fathoms of water, and anchor inside it in 5 to 10 fathoms.

Little Goblin bay, westward of Middle Goblin bay and separated from it by a hill 503 feet high, being encumbered with rocks, is only suitable for boats.

Raymond island, northward 2 miles from the northern point of Goblin head and separated from the mainland by Raymond passage, a channel 100 yards wide, is 265 feet high.

East bay, a little more than 6 miles in length, contains depths ranging from 30 to 100 fathoms as far in as the eastern entrance point of Northwest cove, a distance of about $2\frac{3}{4}$ miles. A small islet, 15 feet high, is joined at low water to the eastern shore of the northeastern arm opposite the eastern entrance point of Northwest cove, and a few rocks lie close southwestward of that islet.

Anchorage.—There is anchorage in $7\frac{1}{2}$ fathoms water, northward of the islet, or in less depths for small vessels farther eastward, the water shoaling gradually to the head.

Northwest cove, the northern arm, is deep and unsuitable for anchorage except in small vessels, which anchor in 7 fathoms water 200 yards from the head.

Stone point is the southern end of the land dividing East bay from North bay, and it rises to a small conical hill 102 feet high under other round hills northwestward of it.

North bay extends in a northerly direction for $7\frac{1}{2}$ miles, and is clear of shoals till near its head. Its shores are bold, in many places

precipitous, and the water is deep. Anchorage can be obtained only at the following mentioned places.

First brook, a small indentation on the eastern shore at $1\frac{1}{4}$ miles within the entrance, affords anchorage for small vessels only, in 7 to 11 fathoms water.

Second Brook cove, 2 miles farther in on the same shore, has no anchorage.

Telegraph station.—A telegraph station of the Anglo-American Company stands on a low point near the head of the bay at a little more than $\frac{1}{2}$ mile from Indian point, which is on the eastern shore at $3\frac{6}{10}$ miles within the northern entrance point of Second Brook cove.

Indian point.—Anchorage can be obtained from 600 yards below Indian point and in mid-channel, in $6\frac{1}{2}$ fathoms water, to abreast that point, in $4\frac{1}{2}$ fathoms water. The bank falls rapidly southward from a depth of $6\frac{1}{2}$ to 46 fathoms.

Small vessels proceed as far as Dogberry rock, a small islet 4 feet high, joined to the eastern shore at 600 yards above Indian point: there is a good salmon and sea trout river at the head of the bay, and deer frequent the vicinity.

Water can be taken from several brooks flowing into the bay on each side, near the head. A large stream flows into the head, westward of the telegraph station, but it is completely obstructed by bowlders at low water.

North Bay head, the western entrance point, rises in cliffs to the height of 600 feet, and there is a hill 1,045 feet high at $\frac{3}{4}$ mile northward of it. On the southwestern side of the head is a conspicuous white stripe.

Cul-de-sac, a small basin close westward of North Bay head, contains anchorage for small vessels in 4 to 6 fathoms water, but the entrance is only 80 yards wide with a depth of 3 fathoms in it.

Sugarloaf island.—Cul-de-sac point bears southwestward, distant $\frac{8}{10}$ mile from North Bay head, and Sugarloaf point $\frac{1}{2}$ mile farther southwestward. Sugarloaf island, close off the point, rises to a conical hill 264 feet high.

There is a passage for boats between it and the point. A rock, with 6 feet water on it, lies close to the western end of the island.

Great Cuiller bay, the entrance of which is between Sugarloaf and Great Cuiller point, bearing 168° , distant 800 yards from the eastern end of the island, extends westward $1\frac{1}{4}$ miles, narrowing gradually to its head.

A rock, awash at high water, lies in Great Cuiller bay at 1,700 yards westward of Great Cuiller point and nearly 200 yards off the southern shore, and a sunken rock lies 100 yards eastward of it. The passages, both northward and southward of these rocks, are clear: the southern is less than 100 yards, while the northern is 250 yards in width.

Leading mark.—Stone point in line with the passage northward of Sugarloaf island, bearing 64° , leads northward of these rocks.

Anchorage.—There is anchorage westward of the rocks, in 7 to 10 fathoms, good holding ground, but eastward of them the water is deep.

Great Cuiller point.—A remarkable white patch, that from a distance looks like a church with a spire, appears on the land at 300 yards southwestward of this point.

Tides.—It is high water, full and change, in Great Cuiller bay at 8h. 55m.; springs rise $6\frac{1}{2}$ feet, neaps 5 feet; neaps range 3 feet.

Little Cuiller bay, southward of Great Cuiller point, is clear of shoals, except at the head which dries to the narrows.

Anchorage for small vessels may be obtained in $8\frac{1}{2}$ to 10 fathoms water, but open to easterly winds.

Birchy cove is southward of Little Cuiller bay. Its shores are foul for a short distance, and shoal water extends 200 yards from the southern entrance point.

Stone islet, about 20 feet high, lies in the mouth of this cove bearing 162° , distant 700 yards from its northern entrance point.

Anchorage may be obtained in 11 to 14 fathoms water, at the distance of 400 yards from a small projection at the middle of the head of the cove.

Stanley cove, $\frac{3}{4}$ mile southward of Birchy cove, is a small bight, with several houses on the shingle beach at its head. It affords shelter for boats or small craft in 4 to 9 fathoms.

Old Harry, a high pinnacle rock, is the southernmost of three similar pillars that are close to the headland southward of Stanley cove.

Manuel arm, an open bay southwestward of Old Harry headland, extends westward 1 mile from its entrance and has a width of about 1,400 yards; it contains no anchorage, except for boats or fishing vessels quite close to the shore.

Great Jervis harbor is on the western side of the entrance to Despair bay. The northern entrance point is low, and fringed by rocks extending 65 yards. On the northern shore of the harbor are several small coves.

Man-of-war cove, the eastern, has anchorage for small vessels as far in as the wharf on its eastern shore.

Man-of-war rocks, on the western side of the entrance to Man-of-war cove, are two pinnacles, 4 feet high, joined at low water. A rock, that uncovers at low water, lies 40 yards southward of these rocks.

Great Jervis island divides the entrance to the harbor. The summit, 442 feet high, is a sharp peak at about 600 yards from the

eastern end of the island, which is bounded by cliffs, and is bold-to. Shoal water extends 50 yards from the northern end.

The Brothers uncover 3 feet at low water and extend 150 yards from the northwestern end of Great Jervis island; shoal water extends about 65 yards northward of the Brothers.

Dory rock, that just uncovers at low water, lies close to the western end of Great Jervis island.

Push through is a passage for boats at high water between the promontory and the island forming the southern shore of the harbor, under a bridge which connects them. A considerable settlement is situated in this locality, with a schoolhouse and a church. A flagstaff stands on a hill, 102 feet high, at the western part of the island.

A rock, on which the least water is 7 feet, lies 150 yards from the southern shore of the harbor, and $\frac{1}{4}$ mile westward from the northwestern end of Push through.

The Barasway is situated about $\frac{3}{4}$ mile west-southwestward of Great Jervis island: a small rock lies close to the southward of its northern entrance point.

Anchorage.—There is anchorage, in 14 fathoms water, off the entrance to the Barasway: in 9 to 16 fathoms, southward of Pearl island; and in 8 fathoms, between Great Jervis island and Man-of-war cove.

Directions.—The best entrance to the harbor is southward of Great Jervis island; if proceeding to the anchorage off the Barasway, avoid the rock, with 7 feet water on it, off the southern shore.

In a small vessel proceeding from the anchorage northward of Great Jervis island into the western part of the harbor, keep the northern entrance point of the harbor just open southward of Man-of-war rocks, bearing 79° , which leads between the Brothers and the rocks southwestward of Shallop cove; the high house of Western harbor open westward of Great Jervis island, bearing 167° , leads westward of the Brothers.

Tides.—It is high water, full and change, in Great Jervis harbor at Sh. 55m.; springs rise $6\frac{1}{2}$ feet, neaps 5 feet; neaps range 3 feet. The tidal streams in the harbor are scarcely perceptible, and the movement of the water is much influenced by the prevailing winds.

Pigeon island, 19 feet high, lies southward of Western harbor, a small cove on the southern side of the promontory southward of Great Jervis harbor. Crib Nose shoal, bearing 180° , distant 150 yards from the eastern extremity of Pigeon island, has 11 feet water on it.

Pigeon Island shoal, bearing 129° , distant 600 yards from Pigeon island, has 13 feet water over it.

Saddle island, nearly 1 mile southwestward of Dawson point, rises to two conspicuous hills, the southern conical and 243 feet high. The eastern coast of the island is bordered by rocks as far as White

rock, an islet 7 feet high. Two sunken rocks lie nearly 200 yards from the southern point of the island, and Black rock, an islet 9 feet high, bears 186° , distant 265 yards from the same point.

Buffett tickle, the narrow passage northward of Saddle island, is only suitable for small vessels. The passage between Saddle island and Middle island is clear in mid-channel.

Middle or Crooked island, 225 feet high, is clear at a short distance from its eastern coast, but its western coast is foul, and the bight contains several islets and rocks.

Mark rocks, 250 yards southeastward of the southeastern point of Middle island, uncover $4\frac{1}{2}$ feet at low water.

Mark Rocks shoal, 100 yards eastward of Mark rocks, has 3 fathoms water over it.

Bonne bay extends northward $2\frac{1}{2}$ miles from its entrance between Middle and Taylor islands.

Drake or Gooseberry island, 31 feet high, lies in the middle of the bay, and there is a good passage on either side of it, but it should not be approached within the distance of 100 yards.

Anchorage for small vessels may be obtained at the head of Bonne bay, in 7 fathoms water, at 600 yards distance from the mouth of the brook at the head.

Taylor island is 408 feet high, and near its northern end is a round wooded hill, 352 feet high, known as Crib Nose.

The northeastern coast of Taylor island is very foul, small rocks and islets extending 150 yards off it; and Hardy rock lies 250 yards from the northern point of Hardy cove, a small bight with some houses around it.

Leading mark.—The extreme of the western shore of Bonne bay shut in with Drake island, bearing 329° , leads into Bonne bay eastward of Hardy rock.

Taylor rock, bearing 115° , distant 750 yards from Salmon point, the southeastern point of Taylor island, has $\frac{1}{2}$ fathoms of water over it.

Clearing marks.—The mark given for leading eastward of Hardy rock also leads eastward of Taylor rock, and Mosquito island open southward of Grip head, bearing 293° , leads southward of this rock.

Whale rock, bearing 149° , distant 550 yards from Grip head, the western of the southern points of Taylor island, dries $\frac{1}{2}$ feet at low water.

Rocky passage, the channel westward of Taylor island, contains numerous rocks, and is available for small vessels with local knowledge only.

Bonne Bay harbor, situated northwestward of Taylor island, is about 700 yards across and completely sheltered from all winds, but

there is anchorage only in its western portion, where there are depths of 14 to 17 fathoms. Large vessels should anchor in 17 fathoms, with Drake island completely shut in by Poole island, bearing about 28° .

A rock, which dries 1 foot, lies nearly 100 yards off the southern entrance point of the harbor on the western shore, and a shoal, with $3\frac{3}{4}$ fathoms water on it, is situated in the middle of the harbor.

Kelpy rock, bearing 259° , distant 1,100 yards from Grip head, has $3\frac{1}{2}$ fathoms of water over it, and a shoal, 150 yards northwestward of Kelpy rock, has 4 fathoms water over it.

Tides.—It is high water, full and change, in Bonne Bay harbor at 8h. 54m.; springs rise $6\frac{1}{2}$ feet, neaps 5 feet; neaps range 3 feet.

Mosquito harbor, close westward of Bonne bay, extends northwestward nearly $1\frac{1}{4}$ miles, and it is clear of shoals, but there is anchorage, only for small vessels, in 8 fathoms of water in a cove on the western side of the head.

Mosquito island, separated from the western entrance point of the harbor by a shallow channel containing several rocks, is flat in outline, 295 feet high, and cliffs to seaward.

Mosquito Back cove extends westward of the harbor, to the shingle beach that joins the western peninsula of Mosquito harbor to the mainland, and it is quite open.

Halibut rocks are two rocks, the higher 5 feet high, bearing 226° , distant nearly 1,400 yards from the western point of Mosquito island, and they are surrounded by sunken rocks that extend southward $\frac{1}{4}$ mile.

Razorback rock, with $3\frac{1}{2}$ fathoms water over it, bears 290° , distant 1,100 yards from Halibut rocks.

Clearing mark.—Bear head open southward of Fish head, bearing 270° , leads southward of all these rocks and those southward of Taylor island.

Fâcheux Eye, a small cove with a waterfall at its head, is close eastward of Eastern head of Fâcheux bay. This cove is available for boats only, and is entered by keeping close to the eastern shore, as the western side is foul.

Fâcheux Head shoal, at 300 yards from the shore and 600 yards westward of the entrance to Fâcheux Eye, has 4 fathoms water over it.

Fâcheux bay extends northward 10 miles in nearly a straight line; it is deep and there are no anchorages in it except at the places mentioned.

Allan cove, on the eastern shore at $4\frac{1}{2}$ miles from the entrance, extends $\frac{1}{2}$ mile eastward, and it affords good anchorage in 8 to 9 fathoms water at about 400 yards eastward of the line of the entrance points.

The head of Fâcheux bay, southward of the narrows, affords anchorage in 6 to 10 fathoms water, the latter depth being $\frac{1}{4}$ mile distant. Southward of that depth the soundings increase suddenly to 40 fathoms.

Brent cove, on the western shore and opposite to Allan cove, extends 1,400 yards westward, but shoal water and ground that uncovers at low water extend 600 yards from the head.

This cove affords good anchorage in 6 to 10 fathoms water, close within the entrance points, but the plateau falls suddenly eastward to a depth of 34 fathoms.

Black Otter rub, a small projection, 10 feet high, situated on the western shore at about $\frac{3}{4}$ mile southward of the cove, is a good mark.

Dennis arm, on the western shore at $2\frac{3}{4}$ miles within the entrance, is 1 mile long and 150 yards broad; it affords good anchorage for small vessels in 7 to 9 fathoms water. The northern shore is bold-to, but off the southern side there is a fringe of foul ground that dries at low water, and the head dries for 200 yards from the tree line.

Warren cove, on the western shore of Fâcheux bay at $1\frac{1}{2}$ miles from the entrance, affords anchorage for small vessels only, in 8 fathoms water, and close to the shore. A conspicuous white stripe shows on the cliff on the northern side of the cove.

Fâcheux harbor, separated from Warren cove by a bare promontory, 167 feet high, that terminates in low rocky points, is suitable for boats only.

Dragon bay extends west-northwestward for about 3 miles; it is deep, and there is only anchorage for small vessels in the narrow arm at its head.

A rock lies 100 yards distant from the shore, immediately eastward of a small projection on the northern shore, westward of which is a waterfall.

Muddy hole is a small boat harbor nearly one mile westward of Dragon bay. There is a depth of 8 feet at high water in its entrance, but there is a rock that uncovers in the middle, and local knowledge is necessary to avoid it. Boats anchor at the head of the harbor.

Richards harbor is situated about 3 miles westward of Dragon bay. The entrance passes between precipitous cliffs, on the western side, and low points under cliff on the eastern side.

For 600 yards within the entrance the harbor trends northward, it then turns more eastward for a farther distance of 600 yards, with a breadth of 400 yards to the head. The turning point on the southern shore is a small islet, 12 feet high, joined to the mainland at low water. Sunken rocks lie a short distance southwestward of this islet.

Anchorage.—This harbor is available for temporary anchorage only, as the depths vary from 20 to 24 fathoms, with indifferent hold-

ing ground, and violent squalls sweep down the valley with strong breezes from northwest to southeast, which are sufficient to cause vessels to drag, though there is no sea. In emergency vessels can, however, be secured to rocks on the shore.

Shoal Point rock, bearing 174° , distant 200 yards from Lower Shoal point, the western entrance point, has $4\frac{1}{2}$ fathoms of water over it.

The coast westward of Richards harbor is cliff, colored alternately red and gray, the red being very conspicuous in sunshine. A wedge-shaped rock, 22 feet high, lies close to Upper Shoal point, at one mile westward of Richards harbor, southwestward of which and distant 200 yards is a bank, with $5\frac{1}{2}$ fathoms water over it, that breaks in bad weather.

Bear head is $\frac{1}{4}$ mile westward of Upper Shoal point.

Horse brook, a remarkable waterfall, is situated in the cove next westward of Bear head, and Mare fall, a wider but less elevated stream, falls over the cliffs into a cove at $1\frac{1}{2}$ miles farther westward.

Several banks lie off this coast, but none are dangerous except with a very heavy sea.

Hare bay, about $3\frac{1}{2}$ miles westward of Bear head, extends northward 4 miles, with an average breadth of $\frac{1}{4}$ mile, when it expands in two arms. Northwest arm affords the best anchorage on the southern coast of Newfoundland.

Bob Lock cove, on the eastern shore of Hare bay at $1\frac{1}{4}$ miles from the entrance, has anchorage for small vessels in 15 fathoms water with good holding ground. The southern entrance point is a remarkable round hill, 618 feet high, and cliffy to seaward.

Water can be taken from a stream at the head of this cove.

Morgan arm, the eastern of the two branches at the head, is 1 mile in length, 600 yards in width, and divided near the head into two shallow coves by low wooded projection. A large stream flows into the eastern, and a waterfall descends into the western, of these coves.

Anchorage may be obtained, southward of the wooded projection, in 5 to 8 fathoms water.

Northwest arm extends northwestward $1\frac{1}{4}$ miles to the first narrows, the northeastern side of which is Sandy point, a shingle spit, drying at low water, 100 yards from the trees.

The passage through the narrows is only 100 yards wide, with a depth of 7 fathoms in the middle, but within is a bay nearly 800 yards wide, with depths less than 3 fathoms at 300 yards, and less than 6 feet at 600 yards, distant, respectively, northwestward of the narrows.

Small craft, however, proceed over this bar at high water and through a second narrows, 1,600 yards distant from the first, within

which is a basin 1,600 yards long and 300 yards wide, but it dries at low water for 400 yards from the head.

Vessels drawing 9 feet or less water lie afloat at low water close inside the second narrows.

Anchorage.—There is anchorage for vessels of any size within the outer part of Northwest arm over a space 1,600 yards long, and nearly 800 yards broad, with depths of 5 to 9 fathoms, mud bottom, and good holding ground.

The eastern limit of the anchorage is a line drawn southward from a point on the northern shore of the arm at $\frac{1}{2}$ mile within the northern entrance point, eastward of which line the bank falls rapidly to depths of 30 and 40 fathoms.

Tides.—It is high water, full and change, in Hare bay, at Sh. 38m.; springs rise 7 feet.

Cul-de-sac, immediately westward of Western head of Hare bay, is an open cove nearly 1 mile in length and 300 yards in width. The head, which is very narrow for $\frac{1}{4}$ mile and contains numerous bowlders, has a few houses on its shores.

The western entrance of Cul-de-sac is a sharp-pointed and rocky hill, 724 feet high, terminated eastward by a low black rock. A rock that uncovers lies close to it, and a shoal, with $3\frac{3}{4}$ fathoms water over it, bears 129° , distant 200 yards from the black rock.

Anchorage.—There is temporary anchorage for small vessels in 9 fathoms water, southeastward of the entrance to the head of the cove, but, as a heavy sea soon rises with southeasterly and southerly winds, they must leave on the first appearance of wind from those directions.

The coast from Cul-de-sac westward to Red point is cliffy and intersected by deep ravines, and generally steep-to, while ranges that attain heights of 1,000 to 1,500 feet extend inland.

Numerous shoals extend east-southeastward from Red point, but Red Point rock, bearing 112° , distant 650 yards from Red point, with 4 fathoms of water over it, is the only one that is dangerous in ordinary weather.

In heavy weather this coast should not be approached nearer than $\frac{1}{2}$ mile, as there is then a confused sea over these shoals.

Red point, about 3 miles westward from Western head of Hare bay, is composed of red cliffs.

Devil bay, the western entrance point of which lies $\frac{3}{4}$ mile westward of Red point, stretches in a northerly direction $2\frac{3}{4}$ miles, and has deep water almost to its head, where there is anchorage for small craft in 7 fathoms of water, close to the shore. Within the entrance on either side is a waterfall; Blow-me-down, a steep bluff 1,280 feet high, is on the western side at about 1,600 yards within the western entrance point.

Rencontre bay.—New Harbor island lies southwestward, distant $1\frac{1}{4}$ miles from the western entrance point of Devil bay, and from between them Rencontre bay extends westward for 3 miles, when it turns suddenly northward for 2 miles to its head.

Anchorage.—There is anchorage at the head of this bay in 11 to 18 fathoms water.

Water can be obtained at many places on the shores of the bay, and wood at its head.

Little bay entrance is on the northern shore of Rencontre bay at $1\frac{6}{10}$ miles westward of the western entrance point of Devil bay, and the bay extends northward $1\frac{1}{4}$ miles, but the water in it is too deep for anchorage. The western entrance point rises to Ironskull, a conspicuous hill 1,077 feet high, with a remarkable white spur visible from the southward: Sugarloaf, a remarkable mountain 1,290 feet high, is 1,200 yards northward from the head of the bay.

The Cove lies westward of High Lookout, on the southern shore at 2 miles within the entrance of Rencontre bay. There are several houses at high-water mark, from which sand dries for the distance of 100 yards.

Anchorage.—There is anchorage in the Cove for small vessels in 17 fathoms water at 300 yards from the shore, but it is unsafe in northerly winds, when violent squalls come down the bay from the high hills.

Tides.—It is high water, full and change, in the Cove at 8h. 55m.; springs rise $6\frac{1}{4}$ feet, neaps $4\frac{1}{4}$ feet.

Barasway, on the southwestern shore of Rencontre bay, $\frac{3}{4}$ mile westward of the Cove, affords anchorage in 10 fathoms of water at 300 to 400 yards off the beach.

New harbor, southward of a peninsula situated westward of New Harbor island, is 1,000 yards long, about 400 yards wide, and it affords anchorage, open southeastward, in 15 fathoms of water at 200 yards from the head, but there is shelter for small vessels in 5 fathoms off a small cove containing a few houses, situated eastward of the head of the harbor.

Hare's Ears point.—Pinchgut point lies $\frac{3}{4}$ mile southward of New Harbor island, and Hare's Ears point is $\frac{3}{4}$ mile farther southwestward; two peaked rocks with a hole through between them, the inner 84 feet high, lie off the point.

Lower rock, bearing 67° , distant 1,100 yards from Hare's Ears point, has 2 feet of water over it, and Hare's Ears rock, bearing 101° , distant 400 yards from Hare's Ears point, has 5 feet of water over it and 15 fathoms close to the southward.

Clearing marks.—The western entrance point of Devil bay open eastward of Pinchgut point, bearing 26° , leads eastward of Hare's Ears and Lower rocks; and the bill of Lance cove open southward of

Hare's Ears point, bearing 80° , leads southward of Hare's Ears rock.

Lance cove, northwestward of Hare's Ears point, is 1,200 yards wide and 1,000 yards long. It has anchorage for small vessels, open to southeasterly winds, in 3 to 6 fathoms of water at 250 yards from the beach.

Lance cove promontory, on the southern side of Lance cove, is 250 feet high, and its coasts are steep cliffs ending southeastward in a sharp point, named the bill of Lance cove.

Chaleur bay.—Gull island lies about 1,600 yards westward of the bill of Lance cove, and West point bears 219° , distant 1,400 yards from the island. The entrance of Chaleur bay is between Gull island and West point, and thence the bay extends northwestward, with one bend, for $5\frac{1}{2}$ miles. At its inner entrance, about 1,200 yards within Gull island, the bay is 600 yards wide, but it expands to 1,200 yards inside, and then narrows gradually toward the head.

Gull island is white and 102 feet high. Shooter rock, close to the northern shore at $1\frac{1}{4}$ miles westward of Gull island, is 2 feet high.

Cooper cove is on the western shore at $2\frac{3}{4}$ miles within Gull island. A brook, that drains a deep valley, flowing into Cooper cove, has formed a sandy beach, off which, at 300 yards distance, there is anchorage for small vessels in 9 to 14 fathoms of water. There is a similar cove opposite on the eastern shore, but without anchorage.

Anchorage can be obtained, at 600 to 1,200 yards distance from the head of the bay, in 6 to 15 fathoms of water, mud bottom.

Water and wood are easily procured.

Fransway bay, also known as François bay, is an inlet extending $1\frac{1}{4}$ miles north-northwestward, 400 yards wide, and surrounded by steep bluffs, situated 1,800 yards southwestward of West point of Chaleur bay. A brook flows into its head, and the settlement is eastward of the brook and under the Friar, a cliffy hill 680 feet high, with landslips extending to the sea.

Anchorage.—There is anchorage, in 14 to 22 fathoms of water, within 400 yards of the head of the bay.

Tides.—It is high water, full and change, in Fransway bay at 8h. 40m.; springs rise $6\frac{1}{4}$ feet, neaps $4\frac{1}{4}$ feet.

The coast.—Southwestward of West point of Fransway bay is Brandy cove, the western entrance point of which is Brandy head, a gray, conical-shaped promontory, 278 feet high. Between Brandy head and Nick Power point, at 1,200 yards farther southwestward, is a cove faced by steep cliffs.

Nick Power point is the southern end of an isolated headland, 216 feet high, terminating in rugged points, with breakers 100 yards off its southwestern end.

Nick Power cove, the entrance of which is westward of the point, extends northward 1,600 yards, with a general width of 300 yards. At the northwestern side of the head of the cove is a brook, off which, distant 100 yards, lies a rock that covers at high water.

Anchorage.—There is anchorage in 15 fathoms water, eastward of this rock, but the cove is open to the southward.

The bar, with 3 fathoms of water on it, bears 290° , distant 400 yards from the western end of Nick Power point headland.

Aviron point, $1\frac{3}{4}$ miles west-southwestward of Nick Power point, is the southern end of an isolated conical-shaped hill, 290 feet high, connected by a low marsh to the mainland. Distress rock, 20 feet high, bears 93° , distant 400 yards from Aviron point. Styles point is a mile north-northwestward of Aviron point, and the coast between is rugged, with deep gaps in the cliffs.

Aviron bay.—Long point bears westward, distant $1\frac{6}{10}$ miles from Aviron point, and from between them Aviron bay, also known as Oar bay, stretches northward with a slight curve for $3\frac{3}{4}$ miles; it has a general width of 600 yards, and depths of water ranging from 43 to 86 fathoms.

Aviron rock, 20 feet high, lies in the middle of Aviron bay entrance. A bank extends southeastward 500 yards from the rock, and at its end there is a depth of $2\frac{3}{4}$ fathoms.

Northeast cove, near the head of Aviron bay, has anchorage in 16 to 20 fathoms water.

The head of the bay, a basin nearly $\frac{1}{2}$ mile deep, is entered by a passage 150 yards wide, through which a depth of 15 feet can be carried, and there is excellent anchorage in it for small vessels in 4 fathoms water. On its northern side is a magnificent waterfall over the slope of a hill 1,120 feet high.

Bagg cove lies immediately within the narrows on the northwestern side of Aviron bay, but it affords no anchorage.

Water can be obtained at many places in Aviron bay, and small wood from near its head.

Cul-de-sac, northwestward $1\frac{1}{4}$ miles from Aviron point, is an inlet 1,400 yards in extent, divided at its head into two coves by Battery point, a bare promontory 120 feet high.

There is a settlement on the eastern side of Battery point, but only small vessels can anchor off it. For larger vessels there is sheltered anchorage in 5 fathoms of water, sand bottom, at 163° , distant 400 yards from Battery point.

Wild cove, on the eastern side of the shingle beach connecting cape la Hune with the mainland, is $\frac{1}{2}$ mile deep, and at its northeastern part is a sandy beach 400 yards off which there is anchorage in 6 to 7 fathoms water, but open to southerly and easterly winds.

Cape la Hune, a peninsula joined to the mainland by a shingle beach with a castellated rock in the middle, has three peaks. The northeastern, 424 feet high, terminates southeastward in Long point, a rugged, curved neck of land that forms Cape cove, which is 700 yards deep, with anchorage in 9 to 11 fathoms water, but open to the southward. The western peak is a remarkable cone 579 feet high.

A rock with 15 feet water over it lies 100 yards southward of the cape at 100 yards westward of the western entrance point of Cape cove.

Watch rock, bearing 172° , distant $8\frac{1}{2}$ miles from cape la Hune, and 89° , distant $5\frac{3}{4}$ miles from Harbor island, is awash at low water, and the summit of a bank on which there are several shoals of less than 15 fathoms.

Of these shoals, Pinnacle shoal, with 4 fathoms of water over it, bears 207° , distant $1\frac{1}{10}$ miles; and a shoal, with 6 fathoms of water, bears 255° , distant $1\frac{3}{4}$ miles from Watch rock; the sea breaks on both in heavy weather.

Penguin islands, a group of numerous islands and rocks occupying a space of more than 1 mile square, are situated about south-southwestward, distant $9\frac{3}{4}$ miles from cape la Hune.

Harbor island, the eastern island, is the largest and 78 feet high. On its southern side is a small cove where boats shelter, but a heavy sea rolls in with southerly winds. The passages between the islands are not navigable by ships.

Mile rock, bearing 68° , distant $1\frac{1}{10}$ miles from Harbor island, has 9 feet of water over it and is steep-to.

La Hune bay.—West point of la Hune bay bears 326° , distant 700 yards from the northwestern point of cape la Hune, and la Hune bay extends thence northward $6\frac{1}{2}$ miles with an average width of 800 yards to a mile from its head, where it narrows to about 300 yards.

There is excellent anchorage at the head of the bay in 10 to 13 fathoms water, mud bottom.

The eastern shore of the bay is an almost continuous line of cliffs, over 1,000 feet high, terminated northward by Northeast cove, an indentation 600 yards in extent, with a sand spit 200 yards from its southeastern shore, and another the same distance from its head. There is good anchorage in this cove in 14 fathoms water at 300 yards offshore.

Deadman cove, at the southern end of the cliffs, extends eastward 600 yards. There are two waterfalls on its northern side, where water is easily procured. The cove affords anchorage in 12 to 15 fathoms water, good holding ground.

A rock, with 15 feet of water over it, bears 301° , distant 200 yards from the southern entrance point of Deadman cove.

West point of la Hune bay is the southern end of a peninsula rising to a remarkable cone 697 feet high, its coasts being rugged cliffs seawards and steep bluffs in la Hune bay; it is joined to the mainland by a shingle beach, which is said to have subsided considerably since 1873.

Two rocks, the southern with 9 feet water over it and 18 feet fathoms close-to, extend 250 yards southward of West point.

Tides.—It is high water, full and change, in la Hune bay at 8h. 40m.; springs rise $6\frac{1}{4}$ feet, neaps $4\frac{1}{4}$ feet.

Ice.—La Hune bay freezes over about December 1, and the ice disappears by April 1; the ice breaks up easily, and is no obstacle to vessels, which come and go all the year. In 1885 field ice arrived in February and left on April 1.

Long point juts out south-southwestward from the peninsula northwestward of the entrance of la Hune bay, and it bears 277° , distant 900 yards from West point.

Long Point shoal, bearing 276° , distant 600 yards from Long point, has a depth of 10 feet over it. The northeastern Gulch Cove island, open southward of Cape island, bearing 294° , leads nearly 200 yards southward of this shoal.

Cape island, separated from the western point of the peninsula northwestward of la Hune bay entrance by a channel 400 yards wide, in the middle of which is a shoal with $3\frac{1}{4}$ fathoms of water over it, is 267 feet high, flat and rugged.

La Hune harbor, an inlet of the main northeastward of Cape island, is open and has 8 to 11 fathoms water, but not shelter. The fishing craft belonging to the settlement moor under a cliff at the head of the harbor, where neither wind nor sea reaches them even in winter.

Cape rocks, bearing 276° , distant $4\frac{3}{4}$ miles from cape la Hune, are a cluster of bare black islets, the highest at the southern end being 30 feet high.

Shoal and uneven ground surrounds Cape rocks for $1\frac{1}{2}$ miles, except to the southward, where the water deepens suddenly to 50 fathoms at the distance of 200 yards.

Gulch cove, northwestward, distant $5\frac{1}{4}$ miles from Cape island, extends northward 600 yards and has anchorage for a small vessel in 5 to 7 fathoms of water, but with southerly winds a heavy sea rolls in. The hills fall almost perpendicularly on each side of the cove to a narrow, low neck of land that separates it from Southeast arm of Little river.

Gulch Cove islands, two in number and lying nearly east and west, 500 yards from each other, are small and rocky; the western and higher, 95 feet high, bears 177° , distant $1\frac{1}{2}$ miles from Gulch cove entrance. Numerous rocks surround them; the western rock,

that covers 1 foot at high water, bears 248° , distant 950 yards from the western island, and there is a depth of 30 fathoms at 100 yards westward of it.

The coast from Gulch cove trends west-southwestward for $4\frac{1}{4}$ miles to Little river, and is bold and steep.

Seal rocks, southeasterly, distant 1,200 yards from Little river entrance, are 18 feet high, and are not easily made out against the dark coast. A rock, awash at low water, lies 100 yards northeastward from Seal rocks.

Two rocks, about 5 feet high, lie between Seal rocks and the eastern entrance point to Little river and about 200 yards offshore.

Little river is a long inlet, with an entrance about 130 yards wide. It continues of that width northeastward for 1,200 yards to Jerts cove, when it expands to 600 yards, with excellent anchorage in 7 to 10 fathoms water; mud bottom. Again narrowing to about 150 yards northeastward of Jerts cove the channel extends northeasterly for $1\frac{1}{4}$ miles to Frenchman cove, a fine basin $1\frac{2}{10}$ miles long in an easterly and westerly direction, and $\frac{1}{2}$ mile broad, with good anchorage in 5 to 9 fathoms water; mud bottom. At the eastern end of this cove Little river divides into two branches, Southeast and Northeast arms.

Small vessels should not leave Little river when the wind is against the tidal stream, as a confused sea soon gets up.

Southeast arm extends eastward 3 miles, with a general width of 600 yards, and has good anchorage in 7 to 8 fathoms of water for the first mile, when the arm widens, and deepens to over 37 fathoms; then grows gradually shallower and narrower to the head. A shoal, with $3\frac{1}{2}$ fathoms water over it, lies a short distance off the southern shore at about 2 miles distant from the head.

Northeast arm trends northerly for $\frac{3}{4}$ mile and then north-northeasterly for 4 miles. It has a depth of about 4 fathoms for the first mile, when it becomes more shallow.

Northwest arm branches off, in a northerly direction, from Northeast arm at $1\frac{1}{2}$ miles from its western entrance point. The depths in Northwest arm are from 4 fathoms to $1\frac{1}{2}$ fathoms near its head.

The shores of Little river are steep and bold, in many places falling precipitously from hills 750 to 1,000 feet high. Avoid the débris from the hills quite close to the shore.

Tides.—It is high water, full and change, at Little river at 8h. 40m.; springs rise $6\frac{1}{4}$ feet, neaps 4 feet. The tidal streams run in the direction of the channel and attain a rate of 2 knots an hour at springs.

Little River rocks, southward, distant 6 miles from Little River entrance, are 4 feet high and steep-to on the southern side, but a fringe of shoal water extends northwestward 200 yards from them.

Little River bank.—Eastern rock, bearing 218° , distant $3\frac{1}{4}$ miles from Little River rocks, and on the southeastern part of Little River bank, has $3\frac{1}{2}$ fathoms of water over it. From this rock uneven ground extends northwestward $2\frac{1}{4}$ miles to Big shoal, a head on which the depth is 7 fathoms, near the northwestern end of the bank. The bottom is rocky.

Bay de Vieux, or Old Man bay, the entrance of which is $3\frac{1}{4}$ miles west-northwestward of Little river, extends northward 6 miles, with a general width of $\frac{1}{2}$ mile. The water is deep.

A rock, awash at high water, lies quite close to the western shore at $1\frac{8}{10}$ miles within West point.

Denny island, in the eastern part of the bay at 1 mile within East point, is 335 feet high and steep-to, except off its northwestern side, where there is a rock with 1 foot water over it.

Dog cove, eastward of Denny island, is 150 yards wide, but there is good anchorage for small craft in 8 fathoms water near its head.

The Nook, an inlet on the eastern side of the bay, is 1,450 yards long, 300 yards broad, and it affords anchorage for small craft at its head in 9 to 12 fathoms water.

The head of bay de Vieux, which is about 600 yards wide and shoals gradually to the shore, affords anchorage in 7 to 12 fathoms water within $\frac{1}{2}$ mile of its northern end.

Water.—Several streams run into the head of the bay.

Cobbett or Mosquito harbor, $1\frac{1}{4}$ miles westward of West point of bay de Vieux, is a basin nearly 1 mile long in an easterly and westerly direction, with an average width of 450 yards, approached through a channel 100 yards wide.

It is perfectly sheltered, but the water is 20 to 35 fathoms deep in its greater part, and anchorage even for small craft can only be obtained in 12 fathoms water, near its western end, off a cove where there are a few houses. A rock lies about 50 yards off the southern side of this cove.

East Black rock, near the eastern entrance point of Cobbett harbor and bearing 118° , distant 500 yards from White point, the western entrance point, is 5 feet high; two rocks, awash at low water, lie off it, the outer being distant nearly 200 yards to the southeastward.

West Black rock, bearing 249° , distant $\frac{9}{10}$ mile from East Black rock, is awash at high water; several islets and rocks lie northwestward of it and between it and Fox island, which space should not be used for navigation.

Fox island, $1\frac{3}{4}$ miles westward from White point, is 310 feet high, rugged and faced by cliffs, and separated from the mainland by a channel 135 yards wide, in the western part of which is good anchorage for small craft.

Rocks and foul ground lie off Fox island; Fox Island rock, bearing 187° , distant 950 yards from the southeastern point of the island, is 18 feet high, and Fish Island shoal, bearing 236° , distant 1,100 yards from the southwestern end of Fox island, has 5 fathoms of water over it; vessels should not navigate within this rock and shoal.

Brimball Storehouse cove, $1\frac{3}{10}$ miles westward from Fox island, is a shoal inlet 500 yards long.

A rock, bearing 225° , distant 250 yards from the eastern point of Brimball Storehouse cove, has 4 feet of water over it.

Bear head, the western point of Brimball Storehouse cove, is a steep bluff, falling abruptly from its summit, 526 feet high, and fringed by dark cliffs. There is deep water close to the head, but off West point, at about 1,400 yards northwestward, is a pinnacle rock.

Squier cove, northward of West point of Bear head, extends eastward for 1,200 yards; it is deep, and affords no anchorage; a few houses are situated near its head.

Bear island is situated in the entrance to White Bear bay, and northwestward $\frac{9}{10}$ mile from West point of Bear head; its summit is a dark wooded cone 600 feet high, and the island falls steeply on the southern and eastern, but gradually on the other sides. The eastern and southern sides have deep water close to them. On the southern side the cliffs are white and bare for some distance above the sea, while the cliffs under Bear head are dark.

Cul de sac harbor, on the western side of the southern part of Bear island, is 1,200 yards long, with 16 to 20 fathoms water in it; an islet lies northward of its southern entrance point, and a rock, awash at high water with deep water close to, lies 100 yards southward of that point.

Cul de sac rocks are two heads with 4 feet of water over them, bearing 296° , distant 800 yards from the southern entrance point of Cul de sac harbor.

Deer island, separated from the northern part of Bear island by a narrow shallow channel, on both sides of which are a few houses, is 132 feet high.

Anchorage.—There is fair anchorage, with southerly and easterly winds, in 14 fathoms of water, at 300 yards westward of the islets off Deer island, but a heavy swell rolls in with westerly winds.

Seal island, bearing 11° , distant 700 yards from the northern point of Bear island, is 85 feet high; and Round island, 329° , 1,300 yards from the same point, is 113 feet high.

White Bear bay extends $10\frac{1}{2}$ miles in a northerly direction from the northern point of Bear island to the freshwater brook at its head, with an average width of 1,200 yards. The shores are steep, in many places precipitous, 700 to 1,000 feet high, with deep water close-to.

Anchorage.—The depth of water in the bay decreases suddenly northward of Bald point to 13 fathoms and then shoals gradually. Large vessels anchor in 8 fathoms, with Blow-me-down point bearing 208° , distant 800 yards, perfectly sheltered, with good holding ground.

Northwest brook, northward $\frac{3}{4}$ mile from Blow-me-down point, is a conspicuous waterfall and an excellent watering place. A shoal, with 3 fathoms least water over it, lies 500 yards from it, and the water then shoals gradually to the head of the bay.

Telegraph station.—There is a telegraph station at the head of the bay.

Turks and Woody islands lie off the western entrance point of White Bear bay, and are almost connected to it by shoal water. Woody island, 213 feet high, is very conspicuous from the dark color of its foliage and conical shape.

White island, 600 yards westward of Woody island, is 138 feet high, and from its color shows in contrast to Woody island.

Black rock, bearing 208° , distant 950 yards from White island, is 8 feet high, and clear except on its eastern side. Black Sunker, bearing 84° , distant 335 yards from Black rock, has 1 foot water over it, and is the western end of a bank of shoal ground stretching eastward 500 yards from it.

Directions.—To enter White Bear bay from the westward, make White island, approach it on an easterly bearing, and keep in mid-channel between that island and Black rock, and thence between the mainland and the rocks and shoal water, which extend northward about 600 yards from the northwestern side of Deer island.

Ramea islands, the eastern end of which lies southward, distant 3 miles from Bear head of White Bear bay, consist of two large islands, with numerous smaller islands, islets, rocks, and shoals to the southward and westward of them.

Great island, the eastern and largest of the group, is $1\frac{3}{4}$ miles long in an easterly and westerly direction and 1,200 yards broad; its northern coast is bold and slopes abruptly from rugged hills that present an irregular outline. Gull hill, the highest of these hills, is 427 feet high, flat topped, and has a steep fall on its eastern side that makes it conspicuous on northerly bearings.

Numerous rocks and shoals on the southern side of Great island prevent the passage to Eastern harbor being taken without local knowledge.

Eastern harbor is a small cove 950 yards westward from Bonnells point (the southeastern point of Great island); there is a rock awash at low water in mid-channel at its entrance, and 2 fathoms water at its head, where fishing craft obtain sheltered anchorage.

Northwest island, 400 yards westward of Great island, is $1\frac{6}{10}$ miles long in a northeasterly and southwesterly direction, about 900 yards broad, and has several peaks: Man-of-war hill, the highest, is 211 feet high, and there is a boulder on its summit.

Gull rock, 250 yards off the northwestern point, is 8 feet high, round, bare, and joined to the shore by rocks and shoal water.

A bank, with 6 fathoms least water over it, on which the sea breaks in bad weather, bears 253° , distant $\frac{1}{2}$ mile from Gull rock, and a rock, awash at low water, lies 150 yards off the northern part of Northwest head.

Light.—A cylindrical lighthouse, 35 feet high and painted red and white in spiral bands, with a white dwelling attached, on Northwest head, which is the southern point of Northwest island, exhibits at 125 feet above high water, an intermittent white light showing thus: Light, one and a half seconds: eclipse, one and a half seconds, which should be seen from a distance of 16 miles in clear weather excepting on westerly bearings, where it is obscured by the land.

Ramea Colombier island, distant 1 mile west-northwestward from Northwest head lighthouse, is 135 feet high; it is one of the western of the islands, makes as a cone from all directions, and is surmounted by a flagstaff.

Turr islets, distant $\frac{1}{2}$ mile west-northwestward from Ramea Colombier, are two bare rocks, the eastern 29 feet and the western about 10 feet high.

Northward rocks, distant 400 yards in a northwesterly direction from Ramea Colombier, are several black islets 12 feet high. A rock, 8 feet high, lies $\frac{1}{2}$ mile west-northwestward of Ramea Colombier.

The passage between these and the main islands is clear of shoals in its fairway, but the water is comparatively shallow, and a heavy confused sea rises when a strong breeze opposes the tidal stream.

The channel between Northwest island and the rest of the group is 200 yards wide, except off Ship cove and Muddy harbor, two small bays on the southern end of Northwest island, where small vessels anchor in 6 to 11 fathoms water, with 200 yards swinging room.

The channel shoals gradually from 11 fathoms at its western end to 5 fathoms midway between Muddy harbor and Ship cove, then suddenly to 15 feet off the eastern point of that cove.

Southwest island, southward of the western end of Northwest island, is about 80 feet high. Ramea harbor, on its eastern side, is a good harbor for fishing craft. Southwest rocks extend westward 600 yards from the western point of Southwest island. Southward of this island and these rocks are several shoals.

Harbor island is much indented, and forms the northeastern side of Ramea harbor.

Copper island, southwestward, $1\frac{3}{10}$ miles from Bonnells point, is a conspicuous bare cone, 102 feet high; and there is a shoal, with 3 fathoms of water over it, close to its eastern end. Bad rock lies 600 yards westward of it, and there is a third rock midway between them. There is no channel among the numerous rocks and shoals northwestward of Copper island that is navigable without local knowledge.

Black rock, bearing 86° , distant 1,300 yards from Copper island, is a small pinnacle 14 feet high, with 10 fathoms water close around and deep water a short distance to the eastward of it.

Ramea Southeast rocks, bearing 148° , distant $3\frac{8}{10}$ miles from Bonnells point, are two rocks separated by a boat channel. The eastern and higher rock is 20 feet high. A rock with 1 foot of water over it bears 99° , distant 400 yards from these rocks.

Ramea South bank, bearing 221° , distant 3 miles from Ramea Southeast rocks, has $2\frac{3}{4}$ fathoms of water over it.

Ice.—Northern ice has arrived at Ramea only four times during twenty years: on these occasions it appeared between the end of February and the middle of March and left between the first and the middle of April. The harbor is only frozen when northern ice is present.

Northwest head, the northwestern part of the western entrance point of White Bear bay, is rugged and faced by cliffs.

Turks head, westward, distant $1\frac{1}{2}$ miles from Northwest head, is a steep bluff with a rugged background. Between these heads is Emily Storehouse cove, a bight 1,000 yards deep and open to the southward.

Offer Sunker, bearing 273° , distant 1,400 yards from White island, and 315° , distant 1,400 yards from Black rock, has 1 foot of water over it, with depths of 11 to 22 fathoms close-to.

Anderson rock, bearing 339° , distant 700 yards from Offer Sunker, is awash at high water springs and steep-to.

Anderson Sunkers, bearing 294° , distant 1,200 yards from Offer Sunker, are 2 rocks awash at low water.

Gull island, bearing 239° , distant 1 mile from Turks head, is 73 feet high, and the outer of a cluster of cliffy islets. Being of the same color as the mainland, it is not easily distinguished.

Several shoals which lie within a little over a mile westward and southward of Gull island, with depths of 4 to 7 fathoms over them, break heavily in bad weather.

Red island, westward $1\frac{1}{2}$ miles from Gull island, is about $\frac{9}{10}$ mile long in a northerly and southerly direction, with a width varying from 1,000 to 300 yards, and it is divided into two parts by a low neck of land, the inner a wooded cone 377 feet, and the outer a flat-topped hill with a white summit 326 feet high. Its outer cliffs are red.

This island divides a deep bay into two parts, Northeast arm, which extends $1\frac{1}{4}$ miles, and Northwest arm, $1\frac{1}{8}$ miles.

Northeast arm has deep water and affords no shelter for 1 mile within its entrance; then a channel 50 yards wide leads to an inner basin, named Doctor harbor, 750 yards long and 150 yards wide, with sheltered anchorage for small craft in $\frac{1}{2}$ to 5 fathoms water.

Red Island harbor, a widening of the channel separating the island from the mainland, is 500 yards long and 200 yards broad; it can be entered only from the eastward through a channel 30 yards wide, and it is suitable for fishing craft.

Northwest arm.—Cross rocks narrow the channel between them and Red island, at $\frac{1}{2}$ mile within the entrance of the arm, to 200 yards, with a depth of $5\frac{1}{2}$ fathoms; inside these rocks there is anchorage for small craft in 8 to 9 fathoms water, good holding ground.

Western point of Northwest arm is the southern end of a headland consisting of a series of rocky hummocks faced by cliffs on the seaboard. Western Point rock, bearing 205° , distant 265 yards from the point, has 13 feet of water over it.

White Island shoal, bearing 256° , distant 800 yards from Western point, has $3\frac{3}{4}$ fathoms over it, and deep water close-to.

Bay de Loup point, westward $1\frac{1}{2}$ miles from Western point, is the eastern entrance point of bay de Loup, and the southern end of an island 700 yards long in a northerly and southerly direction, and 223 feet high, connected at low water with a narrow peninsula. Between Western point and Bay de Loup point is a deep bay that should not be entered within the line of the points. The coast is rugged and fringed by cliffy islets and rocks.

Bay de Loup rock, 350 yards from Bay de Loup point, has 7 feet water over it.

Bay de Loup, or Wolf bay, extends northeastward $2\frac{3}{4}$ miles from its entrance between Bay de Loup point and Kings Head point, situated northwestward, about 1,700 yards. The shores of the bay are precipitous, with deep water close-to, and there is no anchorage until Blow-me-down, a steep bluff, 513 feet high, on the northern shore at about $\frac{3}{4}$ mile from the head, is passed, when there is good shelter in 10 fathoms water, and the depth gradually decreases to $4\frac{1}{2}$ fathoms toward the head. The most convenient anchorage is off the houses at the mouth of Seal brook, a small stream situated northeastward about 800 yards from Blow-me-down.

Water.—Excellent water is obtainable in bay de Loup.

Kings harbor, immediately westward of Kings head, the western entrance point of bay de Loup, is an inlet extending northeastward 1,050 yards, which affords anchorage in 9 fathoms of water at 150 yards off its southern shore. Kings Harbor brook flows into the

western part of the harbor, and a bank extends eastward 250 yards from its mouth.

Buffetts island, southward 900 yards from Kings Head point, is 91 feet high, and a ledge of rock runs parallel to, and 100 yards from, the northern side of the island, with a depth of 6 feet between them. Aldridge head, the eastern point of Greenhill island, bears 204° , distant 600 yards from the southwestern point of the island.

Anchorage.—There is fair anchorage northwestward of Buffetts island, in 13 fathoms water, sand bottom, but a swell rolls in with strong southerly winds.

Grip island is westward $\frac{1}{4}$ mile from Buffetts island, and there is a rock, with less than 6 feet of water over it, about 200 yards south-eastward of its southern end.

The **Ha ha** is an inlet stretching 1 mile in a westerly direction to the northward of Aldridge and Richards heads, and it is clear till within 100 yards of its head, near which there is anchorage for small vessels in 10 to 12 fathoms water, but exposed to easterly winds.

Greenhill island, on the southern side of the Ha ha, is 280 feet high.

Richards head, on the mainland westward of Greenhill island, is a remarkable saddle-topped hill, 340 feet high, with steep cliffs on its southwestern side, and dark foliage on the others. It is an excellent mark.

Aldridge rock, bearing 144° , distant 250 yards from Aldridge head, is awash at high water. There is a depth of 48 fathoms at 200 yards eastward of it, but only $6\frac{1}{2}$ fathoms of water between it and the head.

Grandy island, west-southwestward about 1,400 yards from Greenhill island, is rugged and barren; it is separated from the mainland by Long reach, a narrow strait, whose eastern entrance, southward of Greenhill island and Richards head, is shallow, and whose western entrance is spanned by a bridge.

Burgeo is a considerable village on the eastern side of Grandy island; it has several conspicuous houses, and a wooden church with a short spire.

Communication.—The Newfoundland Railway steamer from St. Johns calls here weekly during summer and autumn.

There is a telegraph station at Burgeo.

Supplies can generally be obtained at Burgeo in small quantities, and water from bay de Loup.

Ice.—Burgeo port is never frozen over, but it is occasionally blocked for a few days by ice from the outer coves, which moves off in February and March; vessels come and go all the year. Northern ice appears only at intervals, arriving generally between the middle

of February and the middle of March, and seldom remaining more than a fortnight or three weeks.

Fish islet, southward, 200 yards from the southwestern point of Greenhill island, and the eastern of the islets extending eastward from Grandy island, is 40 feet high.

Fish Islet rock, bearing 108°, distant 200 yards from Fish islet, has less than 6 feet of water over it.

Short reach, extending westward about $\frac{1}{2}$ mile into Grandy island, with an average breadth of 300 yards, affords anchorage at its head in $8\frac{1}{2}$ fathoms of water, mud bottom, with swinging room for small vessels.

Smalls island is the southern of the group of islets and rocks off the eastern coast of Grandy island, and between it and the island is a good harbor for boats and small vessels, with 11 feet of water in it. There is a flagstaff on the island.

Rock—Beacon.—A rock, bearing 65°, distant 300 yards from Furber point, the southern point of Grandy island, covers 1 foot at high water. There is a beacon on it.

Ship dock is a small cove westward of Furber point and between that point and Franks island, around which are situated the wharves and warehouses of the principal trading firm at Burgeo; the agent's double-storied house shows conspicuously from all directions, and there is a flagstaff on Furber point.

The water is deep close to the wharves, but the anchorage, in 13 fathoms water, is small; and care must be taken to avoid the small rock eastward of Franks island and the shoal water off the channel separating that island from the mainland.

White ground (Pylades rock) bears 220°, distant 865 yards from the southeastern point of Fish islet, and has 13 feet of water over it, with 20 fathoms at 100 yards to the southeastward.

Two shoals, with depths of $4\frac{1}{4}$ and 3 fathoms, respectively, lie between White ground and the rock off Furber point.

Clearing mark.—The fall of the Sandbanks, open southward of Furber point, bearing 252°, leads 100 yards southward of these shoals.

Anchorage.—There is anchorage off Burgeo and southeastward of Smalls island in 16 to 24 fathoms of water, mud bottom and good holding ground, keeping the fall of the Sandbanks open southward of Furber point, and Grip head open northward of Morgan island, bearing about 266°, which latter mark leads just northward of the rock with 9 feet of water over it, described on page 231.

Mercer point, the southwestern end of Grandy island, is a bluff dark point forming the southern point of Mercer cove, an inlet extending northwestward 800 yards into Grandy island. The cove

forms two basins; it is crossed by a bridge, and a low neck of land separates it from Long reach to the southwestward. A small islet lies in the entrance northeastward of Mercer point, and small vessels shelter in the outer basin.

Water from the streams flowing into Mercer cove is not good.

The Sandbanks.—Grip head, westward, distant $1\frac{3}{10}$ miles from Mercer point, is 152 feet high, and close southward of it are the Sandbanks, 70 feet high; Sandbanks point, about 850 yards farther southward, was formerly their southern end, but it is now an island and there is a passage with a depth of about $1\frac{1}{2}$ fathoms between the Sandbanks and Sandbanks point.

Sandbanks Point island lies close southeastward of Sandbanks point: some rocks, always above water, lie southward of Sandbanks point, with $3\frac{1}{2}$ fathoms of water close to them.

Beacon.—A white rectangular beacon stands on Sandbanks Point island, and is conspicuous.

Cornelius island, northwestward 1,600 yards from Sandbanks point, has a double summit, and is almost divided in two parts by the meeting of the two coves: the Harbor, available only for boats, on the northern side, and Back cove, open and containing several rocks, on the southern side. Rocks and foul ground extend 150 yards from the northwestern point of this island, and it should not be closed on its western side nearer than the distance of 400 yards.

There are some houses and a church on the shores of the Harbor.

The Boar, bearing 234° , distant 400 yards from the southwestern point of Cornelius island, is a round rock, 14 feet high; there is deep water close to it.

The Sow, bearing 262° , distant 600 yards from the Boar, is 17 feet high: there are some detached rocks close to it, and a depth of 8 fathoms at the distance of 50 yards.

A shoal with $3\frac{1}{2}$ fathoms of water over it bears 211° , distant 350 yards from the Sow.

Clearing mark.—The summit of Rencontre island, in line with the southern end of Sandbanks Point island, bearing 91° , leads 150 yards southward of this shoal in 11 fathoms of water.

The land in the vicinity of Burgeo, from a distance, appears gray where denuded of the stunted trees that grow generally on the coast, and its outline is almost unbroken, but on approaching it the rugged and contorted nature of the country, the innumerable hills, and deep ravines become apparent.

Burgeo islands, a numerous group of islands and rocks, are composed of Laurentian gneiss, and show white where bare, excepting Round and Harbor islands, which are composed of dark micaceous gneiss. Only the important islands are described herein.

Boar island, the northeasternmost of the group, and situated southwestward, about $1\frac{3}{4}$ miles from Bay de Loup point, is 201 feet high. It is divided by a marsh: the southern or higher portion is wedge-shaped, and shoals, with 2 fathoms of water over them, extend nearly 200 yards from the southeastern point and about 100 yards from the northeastern point.

Light.—A square lighthouse, 47 feet high, rising from the gable of a dwelling, and painted white with red roofs, on the summit of Boar island, exhibits, at 207 feet above high water, a fixed red light which should be seen seaward over an arc of 270° from a distance of 11 miles in clear weather.

Signals.—This lighthouse is supplied with the International code of signals.

Boar Island rock, bearing 122° , distant $1\frac{1}{10}$ miles from Boar Island lighthouse, covers 1 foot at high water.

Boar Island shoal, bearing 133° , distant nearly $\frac{1}{2}$ mile from Boar Island lighthouse, has 5 fathoms of water over it, and 10 to 15 fathoms close around.

Leading marks.—Round Shag island, open southward of Musket islets, bearing 241° , leads southward of all shoals; and Richards head, open eastward of Boar island, bearing 317° , leads southwestward of Boar Island rock and northeastward of Boar Island shoal.

Little Boar island, 150 yards westward of the northern part of Boar island, is 20 feet high; shoal water extends 50 yards from it toward Boar island, but its northern and western sides are steep-to.

Cuttail island, southwestward of Boar island and separated from it by a channel 250 yards wide, that requires local knowledge for its navigation, is 140 feet high, and its southeastern coast has bare, steep slopes.

Goose islet and Hug-my-dug, the northern and southern of a group of rocky islets eastward of Cuttail island, are white; Goose islet is 34 feet high, and Hug-my-dug is about 40 feet high, and square-shaped.

Venils island, southward of Cuttail island and separated from it by a channel 150 yards wide, with foul ground stretching from both sides which requires local knowledge for its navigation, is 165 feet high.

A cove indenting the southeastern side of Venils island for 200 yards affords good sheltered anchorage for small craft in $3\frac{1}{2}$ fathoms of water.

Venils shoal consists of two patches lying with the rock at the eastern end of Venils island bearing 301° , the northwestern with $2\frac{3}{4}$ fathoms over it being distant 350 yards, and the southeastern with 3 fathoms over it 700 yards.

A bank, with 8 fathoms of water over it, lies with the eastern end of Venils island bearing 270° , distant 750 yards.

Baggs island, on the western side of Venils island and separated from it by a narrow, shallow channel available for boats at low water, is a barren island with a peaked summit, 160 feet high. A rock, awash at low water, lies about 50 yards westward of its western point.

Rencontre island, southwestward 300 yards from Baggs island, is the highest of the Burgeo group; its western end rises to a conspicuous truncated cone, 269 feet high, covered with dark foliage.

Gull island, situated $\frac{1}{4}$ mile eastward of Rencontre island, is a bare rock 50 feet high, and steep-to on its eastern side, but foul ground extends 150 yards off its western side.

A rock, about 6 feet high, lies 150 yards northwestward of Gull island, and a shoal, with 13 feet of water over it, between the end of the foul ground southwestward of Gull island and Rencontre rock.

Rencontre rock, bearing 102° , distant 350 yards from the southern point of Rencontre island, has 7 feet of water over it.

Musket islets are two rocks about 40 yards apart in a northerly and southerly direction, the northern and higher, 32 feet high, bearing 202° , distant 450 yards from the southern point of Rencontre island.

Bearing 301° , 200 yards from Musket islets, and between them and Little Rencontre rocks, is a shoal, with 4 fathoms water over it and steep-to.

Little Rencontre island, about 150 yards southwestward of the western end of Rencontre island, is dark, conical, and 150 feet high, and shows a saddle-shaped summit on easterly bearings; Little Rencontre rocks are about 400 yards southeastward of the island.

Crocker island, northwestward about 80 yards from Little Rencontre island, is 90 feet high, of a gray color, and steep-to, except off its northern end, from which a shoal, with 6 feet of water over it, extends 50 yards.

White island, northward 200 yards from Crocker island and northwestward 350 yards from the northwestern end of Rencontre island, is 45 feet high, and being white it is conspicuous when seen against the larger islands.

Beacon.—On the summit of White island is a pyramidal wooden beacon.

Morgan island, the northeastern end of which lies westward distant nearly $\frac{1}{10}$ mile from Bear Island lighthouse, is about 1,400 yards long in a northeasterly and southwesterly direction, 350 yards wide, 138 feet high, moss-covered and undulating.

Shoal water fringes its northern and northwestern coast; the southwestern coast is bold-to; the southern coast is encumbered with rocks

and shoals, and a shoal extends 50 yards off the northeastern point of the island. There are two coves on the southern side, with the houses of fishermen around them.

Rock.—A rock, with 9 feet of water over it, bears 91° , distant 400 yards from the northeastern point of Morgan island.

Eclipse island, 160 yards northward of the northern side of Morgan island, is conical in shape, 33 feet high, covered with stunted bushes, and has a low projection to the eastward, off which shoal water extends 100 yards. A whitewashed cairn stands on the island. Captain Cook observed an eclipse of the sun here in 1766. There is a passage between Eclipse and Morgan islands.

Franks island, northwestward of and nearly joined to Eclipse island is flat. A small rock, that covers 4 feet at high water, lies 100 yards off its eastern side.

There is only 6 feet of water in the passage between this island and Grandy island.

The Douglas is a small round rock bearing 292° , 600 yards, from the southwestern end of Morgan island: it covers 1 foot at high water, and the sea nearly always breaks on it.

A rock, with 10 feet of water over it, bears 260° , distant 200 yards, from the Douglas; there is a depth of 5 fathoms between and deep water around them.

The Baldwin, bearing 53° , distant 600 yards from Sandbanks Point island, consists of two rocks close together, the higher being about 15 feet high; it is steep-to on all sides.

Baldwin shoal bears 92° , distant 600 yards from the Baldwin, and has 10 feet of water over it.

Rock.—A rock, with 4 fathoms of water over it and 11 fathoms close-to, bears 99° , distant 1,150 yards from Sandbanks Point island.

Round Shag island, bearing 237° , distant 1,300 yards from Musket islands, is a cone 64 feet high, with 10 fathoms of water at 100 yards around it.

Colombier island, bearing 282° , distant 1,500 yards from Round Shag island, is conical, with a double summit, the higher 177 feet high; it shows prominently from all directions, and is an excellent mark.

Petit Marchand, bearing 200° , distant 500 yards from Sandbanks Point island, is an islet about 5 feet high.

Rock.—A rock, with 15 feet over it and 5 fathoms close to, bears 90° , distant 600 yards from Petit Marchand.

Fish rock, bearing 275° , distant 400 yards from Petit Marchand, is awash at low water; between them is a shoal with 6 feet least water over it.

Marchand rock, bearing 260° , distant 950 yards from Sandbanks Point island, has 9 feet of water over it.

Stern rock, bearing 79° , distant 1,200 yards from the northern end of Round island, has 1 foot water over it.

Miffel island, bearing 234° , distant nearly 2 miles from Round Shag island, and the southernmost island of the Burgeo group, is 60 feet high, composed of gray gneiss, and makes as a cone from all directions.

A rock, with 6 feet of water over it, lies northward 135 yards from its northern end; and a rock awash at low water, with $3\frac{1}{4}$ fathoms, 100 yards eastward of it, bears 57° , distant 350 yards from the same point.

Fortune rock, bearing 91° , distant 500 yards from Miffel island, has $4\frac{1}{2}$ fathoms over it and deep water close to.

Whales back, the shoalest spot of some uneven ground lying $\frac{1}{2}$ mile westward from Miffel island, has 5 fathoms of water over it, and the sea breaks on it in winter gales. With a fresh breeze against the tidal stream, there is a heavy sea in its locality.

Green island, bearing 320° , distant $\frac{9}{10}$ mile from Miffel island, is a flat-topped grass-covered island, about 80 feet high, with white cliffs and deep water on its seaward face, and a small islet off its eastern end.

Neverfail shoal, bearing 227° , distant 600 yards from the southwestern end of Green island, has 7 fathoms of water over it.

Green Island shoal, bearing 242° , distant 600 yards from the western end of Green island, has 5 fathoms of water over it, and depths of 11 to 13 fathoms close to.

Miffel island, bearing 113° , leads about 200 yards southwestward of these shoals; both shoals are said to break in heavy weather.

Harbor island, situated $\frac{2}{3}$ mile northward of Green island, has numerous islets and rocks of a dark color extending $\frac{1}{4}$ mile northeastward from it. The island and islets have steep cliffs on their northern and western sides, but slope to the eastward, where there is a shallow cove with good shelter for boats. The western end of Harbor island is surmounted by a remarkable hummock named the Louse-box.

Harbor Island rock, bearing 252° , distant 265 yards from the southern point of Harbor island, is 2 feet high, and there is a depth of 6 fathoms around it.

Round island, situated 350 yards northwestward from Harbor island, is about 180 yards across, 79 feet high, dark micaceous rock, cliffy, and steep-to, except on its northeastern side, from which a ledge of 3 fathoms water extends 50 yards.

The fairway of the passage between Harbor and Round islands is clear, but it is better to pass northward of Round island except with local knowledge.

West Flat island, situated 1,400 yards westward of Round island and the westernmost of the Burgeo islands, is a bare white rock, about 25 feet high, with two flat summits; a rock awash at low water lies

100 yards off the southern point, and there is a depth of over 10 fathoms at the distance of 200 yards around the island and rock.

Beacon.—A pyramidal wooden beacon stands on the western summit of this island.

Graley rock, bearing 157° , distant 1,400 yards from West Flat Island beacon, has 9 feet of water over it and 10 fathoms at 200 yards around.

Point shoal, bearing 229° , distant $1\frac{1}{10}$ miles from West Flat Island beacon, has 5 fathoms of water over it and 13 to 19 fathoms close around.

Offer shoal, bearing 227° , distant $1\frac{1}{2}$ miles from West Flat Island beacon, and the outer and western of these shoals, has 4 fathoms of water over it and 15 fathoms close around.

The sea breaks on the last three shoals; there are other shoals and fishing banks with 8 to 10 fathoms of water over them in this locality.

Burgeo bank.—See page 79.

Directions for Burgeo port.—From the eastward, pass between Boar Island rock and Bay de Loup rock with Richards head bearing between 279° and 307° , and steer for a position 400 yards northward of Boar island. Then steer for Furber point, keeping the fall of Sandbanks open southward of Furber point, bearing 253° , to clear White ground and the shoals lying eastward of Smalls island, pass about 200 yards southward of the beacon on the rock eastward of Furber point and round that point to the anchorage.

From the westward steer to pass about 400 yards northward of West Flat and Round islands, then steer 62° and bring the summit of Rencontre island in line with the southern end of Sandbanks Point island, bearing 91° , and keep this mark on until Round Shag island opens eastward of Ragged island, bearing 126° , then round Sandbanks Point island at the distance of 200 yards, and steer 76° , keeping Round island open southward of Sandbanks Point island until the cairn on Eclipse island is in line with the northern point of Morgan island, bearing 42° , which mark leads southeastward of Baldwin shoal and the Douglas. Proceed along the northern coast of Morgan island at the distance of 200 yards until the channel between it and Eclipse island is open, when steer through that channel to Burgeo anchorage, using the chart as the guide.

In a vessel drawing over 21 feet, proceed southward of Miffel island, avoiding Whales back and Fortune rock. From a position $\frac{1}{2}$ mile southward of Miffel island, steer about 52° , and when past Round Shag island keep it open southward of Musket islands, bearing 239° , to pass southward of Venils and Boar Island shoals. When Richards head opens eastward of Boar island, bearing 317° , being clear of Boar Island rock, steer north-northwestward for a position

about 400 yards northward of Boar island, and then as above directed in entering from the eastward.

Small vessels can use the channel between Ragged and Seal islands, keeping Richards head and Burgeo church shut in with Morgan island, until Crocker island is distant about $\frac{1}{4}$ mile, when steer to pass 200 yards westward of Crocker, White, and Morgan islands, and as before directed.

To enter between Round Shag and Musket islets, keep about 400 yards from Musket islets, Little Rencontre rocks and island, rounding Crocker island at the distance of 200 yards, and then proceed as before directed.

Tides and tidal streams.—It is high water, full and change, at Burgeo at 8h. 32m.; springs rise $6\frac{1}{4}$ feet, neaps 4 feet.

The direction of the tidal streams off Burgeo is greatly influenced by the prevailing winds. The west-going stream attains a rate of $1\frac{1}{2}$ knots an hour after a prevalence of easterly winds, but the rate of the east-going stream seldom exceeds 1 knot an hour.

Green island, northward 700 yards from Cornelius island, is about 40 feet high, long and narrow, with rocks extending 350 yards southwestward from it, and a rock, awash at low water in mid-channel between it and Little Barasway head, which is 250 yards to the northward.

No Mans rock, bearing 259° , distant 400 yards from the western point of Green island, is 1 foot high; and a rock, distant 900 yards on the same bearing from the island, has 12 feet water over it, and 7 fathoms close to, except on its southern side where there is a depth of $4\frac{3}{4}$ fathoms for a distance of about 75 yards.

Galloping Moll rock, bearing 217° , distant 800 yards from No Mans rock, covers 5 feet at high water, and the sea nearly always breaks on it.

Little Barasway is a large bay which nearly all dries, with First and Aaron arms, two inlets, extending to the eastward. The entrance is nearly dry at low water, and in it is a conical islet.

The canal, a cutting connecting Little Barasway with Grandy brook, is available for the fishermen's small boats from three-quarters flood to a quarter ebb.

Flannagan island, northwestward, distant 1,400 yards from Little Barasway head, has a flat top 33 feet high, and is faced by cliffs; a small rock lies close to its eastern side.

A rock, bearing 163° , distant 400 yards from Flannagan island, covers 2 feet at high water, and has a depth of 7 fathoms close around it; and 121° , distant 350 yards from the same island, is a patch of rocks, with two heads covering 3 feet.

Little Gut head, northwestward $1\frac{1}{10}$ miles from Little Barasway head, is the southwestern point of a sharp-topped conical hill, 225

feet high. The rocks about this head are white, and close off it is a rock, awash at high water, with a depth of 4 fathoms at a short distance seaward of it.

Little Gut, northward 700 yards from Little Gut head, was an entrance to Grandy brook, but it is now closed.

Grandy brook is an arm of the sea extending from Little Gut $2\frac{1}{2}$ miles inland to the fresh-water brook at the head.

The land eastward of Grandy brook consists of conical hills and mounds, partially covered with stunted trees or whitened by former fires, while that westward of the brook consists of ranges of hills with cliff-faced summits and smooth, mossy slopes.

Norman head, the northern entrance point of Little Gut, is a bare-topped mound 93 feet high, with a spit of shingle extending from its base into Little Gut. Westward of this head a long shingle beach, 10 feet high, with a grassy mound as its western end and two mounds at short distances eastward of that end, forms the shore of Barasway bay and separates it from Big Barasway, a large shoal inland bay containing several islands. The entrance to Big Barasway at the western end of the beach is encumbered by rocks, and it is rarely used even by local small craft.

Barasway bay, between Cornelius island and Barasway point, that lies $4\frac{1}{2}$ miles to the westward, has general depths of 13 to 17 fathoms across its mouth, but islets, rocks, and foul ground make the bay useless as an anchorage, and in heavy weather it appears a mass of breakers.

Mile rocks, the highest of which bears 84° , distant $1\frac{6}{10}$ miles from Little Gut head and is 14 feet high, with rocks awash and below water all around, occupy an area 1,400 yards long in an easterly and westerly direction, and about 800 yards broad.

A rock, bearing 94° , distant 1,650 yards from the highest Mile rock, has 6 feet of water over it, and a shoal, bearing 52° , distant 1,400 yards from the same Mile rock, has 7 feet of water over it.

The Jumper, bearing 116° , distant $1\frac{1}{2}$ miles from Barasway point, is awash at low water, and the sea always breaks on it; and a shoal, with 18 feet water over it, bears 72° , nearly 800 yards from the Jumper.

Doctor harbor, with the small white Doctor island in its entrance, is an inlet extending 600 yards in a northwesterly direction into the southeastern side of Barasway Point promontory. It is available for small vessels only.

Barasway point is the southwestern end of a low promontory extending from the slopes of Father Hughes hill, 398 feet high, which is situated $1\frac{9}{10}$ miles northward from the point and appears as a cone from seaward: from it a flat range of hills stretches to the interior. The moss and stunted growth that cover this hill are darker

than the surrounding country, and tend to make it conspicuous even in misty weather.

A rock, nearly 200 yards distant from the southern side of the promontory just westward of Doctor harbor, covers 1 foot at high water; and a rock, bearing 158° , distant 300 yards from the point, has 6 feet of water over it.

The coast from Barasway point to Connoire head, west-northwestward, distant $5\frac{4}{10}$ miles, is foul, with several small coves. The outer rocks are generally marked by breakers, and may be approached from seaward to $\frac{1}{4}$ mile. Connoire Head hill completely open westward of Wreck island, the low green island next eastward of it, bearing 309° , leads southwestward of all the shoals.

Middle brook.—Anchorage can be obtained off Middle brook, between Green island, at 2 miles west-northwestward of Barasway point and off which are Green Island rocks, a small cluster above water, and Baring island, reddish, white, rocky, and 53 feet high, about $\frac{3}{4}$ mile farther northwestward, in 12 fathoms of water, but it is open southwestward. A few houses stand on the western entrance point of Middle brook, at the head of the anchorage.

Connoire head is conspicuous from its isolation and a white rock at its base: the dark stunted trees that crown its summit are 175 feet above high water.

Connoire bay, the entrance of which has a width of $2\frac{2}{10}$ miles between Connoire head and Muddy Hole point, extends northward $2\frac{1}{2}$ miles with a breadth of $1\frac{1}{4}$ miles to Mid head, where it branches into Northeast and Northwest arms. Northeast arm extends in a curve northeastward $2\frac{1}{4}$ miles, and Northwest arm northward $3\frac{1}{2}$ miles, but in this arm the depth of water is less than 5 fathoms over its whole extent, and at half tide only boats can enter the shallow portion which begins at 1 mile within Mid head.

The only shoal in the outer part of Connoire bay is a rock with 3 fathoms water over it, situated 300 yards from the eastern shore of the bay and $1\frac{1}{10}$ miles within Connoire head. Northeastward of Connoire head the land slopes smoothly from hills that attain a height of 514 feet and are covered with brown moss. Mid head terminates in a series of peaked hills, and its highest part, on the northwestern shore of Northeast arm, is 689 feet high.

Anchorage.—The bay is quite open to southerly winds, but anchorage can be obtained with offshore winds in depths of 10 fathoms or less, as convenient.

Northeast arm affords good shelter to vessels drawing 18 feet or less water, anchorage being taken by the lead and according to the size of the vessel. A sand bank extends from the northwestern shore, just within the point where the arm narrows, and a rock, with 12 feet water on it, lies in mid-channel off Billiard cove, a small bight on the eastern shore.

Water.—A good stream flows into the head of Billiard cove.

Tides.—It is high water, full and change, in Billiard cove, Connoire bay, at Sh. 40m.; springs rise $5\frac{3}{4}$ feet, neaps 4 feet; neaps range 3 feet.

Muddy Hole point is the end of a conical hill 97 feet high, and the apparent southern termination of a ridge extending from a hill with a sharp peak 246 feet high, which bears 34° , distant $1\frac{9}{10}$ miles from the point, and slopes northwestward to Gull pond, a salt-water lagoon. Cow-house hill, northward about 2 miles from Gull pond, is 855 feet high, and the highest land near the sea in this locality. Round hill, northward about $2\frac{3}{4}$ miles from Muddy Hole point, is 570 feet high. Rocks extend southeastward and southward 800 yards from Muddy Hole point; the summit of Baring island in line with the southern end of Wreck island, bearing 99° , leads southward of them.

Muddy Hole bay is open southward, and has a small boat cove in its northeastern corner.

Anchorage.—The bay affords open anchorage with offshore winds in 11 to 12 fathoms water, but the holding ground is not good.

Otter point, the western entrance point of Muddy hole, rises to a round hill 137 feet high: Trimming hill, immediately within the point, is a small cone 37 feet high.

Two shoals, with 3 fathoms of water over them, bear 118° , distant 665 and 950 yards, respectively, from the point.

The Painter, a rock bearing 149° , distant $\frac{3}{4}$ mile from Otter point, almost dries at low water, but often it is not marked by a breaker. The western house on the shore of the boat cove at the head of Muddy Hole bay in line with the passage between a small islet, 20 feet high, and the eastern shore of that bay, bearing 9° , leads eastward; and the southern end of Couteau Colombier in line with Winging rock, the first black rock northward of Shag island, bearing 279° , leads southward of the Painter.

Shag island, 1 mile southward of Otter point and the southernmost of a chain of islands and rocks extending from that point, is a conspicuous white rock 42 feet high. Numerous sunken patches lie westward of Shag island: Colombier shoal, bearing 246° , distant $1\frac{1}{10}$ miles from the summit of Shag island, is the southern of them, and there is a depth of 6 feet of water over it. This shoal was formerly known as Comus rock, and the present local corruption of the name is Clumpy shoal.

Clearing marks.—The western entrance point of Connoire bay open southward of Shag island, bearing 59° , leads southward, and the southeastern end of Captain island in line with Couteau Colombier, bearing 9° , leads westward of Colombier shoal.

Otter Point settlement, with a population of about 50, is situated on the northern side of Duck island, a small island at the head of a rugged bight immediately northwestward of Otter point.

Local knowledge is necessary to approach this settlement, or the anchorage between it and the mainland northward of it, and only vessels drawing 12 feet or less water can enter it from the eastward. The flagstaff of the settlement is all of it that is visible from seaward.

Tides.—It is high water, full and change, at Duck island, at Sh. 47m.; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{1}{2}$ feet; neaps range $2\frac{3}{4}$ feet.

Couteau Colombier, situated west-northwestward $1\frac{1}{4}$ miles from Shag island, is a remarkable square-shaped rock 49 feet high, with a low spur extending northeastward. On certain southeasterly bearings it presents a resemblance to a human profile.

Captain island, northward, $1\frac{1}{4}$ miles from Couteau Colombier, is about $\frac{3}{4}$ mile long in a northerly and southerly direction, $\frac{1}{2}$ mile wide, and it rises in two hillocks, the northern being 216 feet high. The whiteness of the rock of this island where bare, and the darkness of the vegetation which covers the remainder, are noticeable. Its features are much diversified, and there is a white stripe on one of the hills on its northern side.

Rock and shoals extend westward 1,200 yards from this island. The passage between it and the mainland northward is 200 yards wide, with a depth of $4\frac{1}{2}$ fathoms water in the fairway.

Anchorage.—Small vessels will find excellent anchorage in this channel northward of the opening between Captain island and Duck island, which are almost connected by islands and rocks, taking care to avoid Seal rocks, 1 foot above high water, which lie off the mainland on the northern side of the channel.

Couteau bay extends northward $2\frac{3}{4}$ miles to Couteau brook entrance. The entrance to the bay is almost blocked by islets and rocks, but there is one safe, though narrow, passage through them.

Couteau Flat rocks, 6 and 10 feet high, respectively, and the southernmost of those above water off Couteau bay, are surrounded by submerged rocks and shoals for a short distance. Copped Duck rock, 197° , distant 1,300 yards from the 6 feet high Flat rock, and the outer shoal off Couteau bay, has 5 fathoms water over it. Connoire head, open southward of Shag island, bearing 85° , leads southward, and the eastern end of the land on the northwestern shore of Couteau bay, open westward of the 10 feet high Flat rock, bearing 9° , leads westward of Copper Duck rock.

Man rock, situated $\frac{3}{4}$ mile northwestward of Flat rocks, is 3 feet high; and Black rock, 800 yards west-southwestward of Man rock, is a black wedge-shaped rock 17 feet high. Shoals extend southward and south-southeastward from Man rock, and a shoal, with 5 fathoms of water over it, bears 195° , distant 550 yards from Black rock.

A rock in Couteau bay, bearing 35° , 1,350 yards from Man rock and 650 yards from the western shore of the bay, has 3 fathoms of water over it.

Directions.—The only available passage, without local knowledge, into Couteau bay is between Man rock and Black rock, and even in this passage there is a heavy swell during, or after, southerly and westerly gales. Approach with Baggs head midway between Couteau bay western entrance point and Black rock of Cinq Cerf bay, bearing 316° , to clear Copper Duck rock, and when Shag roost, a conspicuous hillock 126 feet high and faced by cliff, on the western shore of Couteau bay, is midway between Man rock and Black rock, bearing 18° , steer with this mark on until past Man rock, when keep 300 yards off the western shore of the bay until Horses head, a cubical black rock 13 feet high, off Otter point, is in line with the southwestern end of Captain island, bearing 125° , which mark leads northward of the 3-fathom rock in the bay, and then steer for the head of the bay.

Anchor in 5 to 9 fathoms of water; a swell rolls in with southwesterly and westerly winds.

Gull islet, 274° , 300 yards from the northwestern point of Captain island, is 18 feet high and white, and shoal patches extend westward 600 yards from it. To enter the passage between Captain island and the mainland northward of it, when 300 yards off the western shore of the bay, with the Horses head in line with the southwestern end of Captain island, steer 63° until the houses on Duck island are open northward of Captain island, bearing 111° , then steer for the passage, and keep in mid-channel. Small vessels may anchor in any part of this passage.

Couteau brook is a considerable stream draining a large valley; the valley is noticeable from seaward.

Blue Hills of Couteau, situated northward about 8 miles from Couteau bay, are two remarkable bluffs, 1,903 and 1,845 feet high, respectively. Extensive mountainous ranges extend both eastward and westward from them, but these are the most remarkable, and are excellent marks in clear weather.

Cinq Cerf bay lies next westward of Couteau bay, and is encumbered with islands and rocks. The dividing point between the two bays is foul seaward to White ground, the outer shoal, which is situated 900 yards south-southwestward of the point, and has $2\frac{1}{2}$ fathoms water over it.

Culotte, a small cove in the northeastern part of the bay, and the only anchorage, is available for small vessels.

Flat island, the southernmost of the islands off the bay and situated $1\frac{2}{10}$ miles southwestward of the dividing point between Couteau bay and Cinq Cerf bay, is a bare rock, 23 feet high. It may be approached to the distance of 200 yards on its southern and western sides, but shoals extend northward 800 yards from it.

Black rock, situated $\frac{1}{10}$ mile north-northeastward of Flat island, is a small rock 11 feet high, and shoals extend 300 yards in all direc-

tions from it; there is no safe passage between it and the mainland to the eastward.

Directions.—For Culotte, from a position 400 yards northwestward from Flat island steer 18° until Black rock bears 125° , distant $\frac{1}{4}$ mile, observing that Pools island (low and wooded, in the northeastern arm of Cinq Cerf bay, and under Devil head, a steep bluff 280 feet high, that forms the northeastern entrance point to Culotte) just open northward of the southeastern shore of Cinq Cerf bay, bearing 41° , leads close northward of the shoals off Black rock. Then steer for Pools island, giving the southern shore of the bay a berth of about 200 yards, and leaving Seal rocks (a cluster of flat rocks 8 feet high, situated southward of a peninsula on which are two hills 115 and 117 feet high respectively, that forms the western entrance point to Culotte) to the northward. Pass in mid-channel between Woody island, which is separated by a narrow channel from the eastern end of the peninsula, and Pools island, and anchor in 6 to 8 fathoms water, mud bottom, and good holding ground.

Water can be taken from a brook at the northeastern corner of Culotte, and wood is abundant.

Baggs head, in the northwestern part of the northern shore of Cinq Cerf bay, is a conspicuous dark wooded cone 188 feet high. There is a white patch on the side of the hill at $\frac{1}{4}$ mile eastward of Baggs head, which is noticeable from a distance of 3 miles seaward.

Numerous islands and shoals extend southeastward of the head; Woody island, open eastward of Seal rocks, bearing 45° , leads southeastward of them.

Cinq Cerf brook, a considerable stream, which runs from many miles inland, discharges its waters through a deep valley close westward of Baggs head: it usually contains salmon and trout.

Cinq Cerf islets lie eastward of the western entrance point to Cinq Cerf bay. Their seaward coasts consist of steep gray cliffs. The highest and southwesternmost islet is 84 feet high, while Shag islet, the northeasternmost, is a bare white rock 26 feet high. There is a very small settlement round a cove in the mainland, close northward of these islets.

Big Sunker, the southwestern of a group of rocks lying off Cinq Cerf islets, bears 284° , distant 1 mile from Flat island, and has 15 feet of water over it. Shag island, off Otter point, open southwestward of Flat island, bearing 100° , leads southward; Baggs head well open southeastward of Shag islet, Cinq Cerf, bearing 7° , leads eastward; and Baggs head open northwestward of Shag islet, Cinq Cerf, bearing 26° , leads northwestward of this rock.

Whittle hill, situated on the mainland at about 1,200 yards west-northwestward of the western entrance point of Cinq Cerf bay, is a round hill 333 feet high.

Three islands, westward about 2 miles from Cinq Cerf islets, are a cluster of three islands with two lower islets eastward of them, and several rocks and shoals around. The southernmost and highest is a round gray rock 46 feet high. Pigeon islet, bearing 268° , leads southward of the shoals off these islands.

Bad Neighbor rock, bearing 168° , distant $1\frac{1}{3}$ miles from the southernmost of the Three islands, is nearly awash at low water.

Clearing marks.—Roti Colombier in line with Offer islet, bearing 268° , leads southward; the Highland of Grand Bruit well open eastward of the southern of Three islands, bearing 347° , leads close eastward; and open westward of that island, bearing 351° , leads close westward of this rock.

Chance rock, bearing 256° , distant 700 yards from Bad Neighbor, has $4\frac{3}{4}$ fathoms of water over it.

The Highland of Grand Bruit rises in a steep cliff to the height of 1,012 feet, and on it there is a cairn of stones, at about $2\frac{3}{10}$ miles north-northeastward of Grand Bruit harbor. It is very remarkable, and an excellent landmark. Rocky and serrated ranges extend inland from it for several miles.

A cascade falls over the hills at nearly 1 mile westward of the high land.

Grand Bruit harbor, $1\frac{1}{10}$ miles westward from Three islands, is only 200 yards wide, but it affords excellent sheltered anchorage for small vessels in 7 fathoms water. The houses of the village surrounding the harbor, a white schoolhouse on the slope of the hill above, and the large waterfall at the head of the harbor are visible from seaward. A line of rocky patches extends southeastward 450 yards from the southwestern end of the island forming the eastern entrance point of the harbor, and there is a least depth of 13 feet of water over them.

The Smoker, 1,200 yards southeastward from the eastern entrance point of the harbor, is an isolated rock 10 feet high. Two patches, with $2\frac{3}{4}$ and 3 fathoms of water over them, respectively, lie in a direction 49° , within 600 yards from this rock.

A group of islands lies southward of the entrance to the harbor. Southeast island of this group is a gray bare islet 40 feet high, and White island at the northern end is a steep round islet 35 feet high. Harbor island, the largest of the group, has two boat coves, one on either side of a narrow neck of land in the middle of the island. It falls in gray cliff from its southern summit 105 feet high. Duck island shelters the northern boat cove, and rocks extend 200 yards from its northwestern end. Pigeon islet, the northwestern of the group, is a rugged rock 24 feet high.

Grand Bruit Colombier, 900 yards south-southwestward from Jones island, the southernmost of the group off the harbor, is a conspicuous small cone about 35 feet high. A rock that dries about 2 feet at low water lies east-northeastward 650 yards, and a sunken rock southeastward 200 yards from Grand Bruit Colombier.

Offer islet, southward $\frac{1}{4}$ mile from Grand Bruit Colombier, and the southernmost islet off Grand Bruit harbor, is 22 feet high, and shoals do not extend over 200 yards from it.

Hares ears are two sharp peaks, 120 feet high, immediately over the mainland at about 1,200 yards west-southwestward of Grand Bruit harbor.

Directions.—For Grand Bruit harbor from the eastward: After passing Big Sunker, steer for White island, keeping Hares Ears shut in with Pigeon islet, bearing 268° , to clear the shoals off Three islands; when the southernmost of the Three islands bears 7° , edge northward and bring and keep the northern ends of White island and Salmon-net islet (a white islet under Hares ears) in line bearing 274° . Pass close northward of White island and steer 285° until the western entrance point of the harbor bears 344° to clear the shoals off the eastern entrance point; then enter the harbor in mid-channel.

From the westward, keep Flat island open southward of Offer islet, bearing 75° , until the Highland of Grand Bruit is over Pigeon island, bearing 24° , to clear the rocks off the Barasway; then steer for the middle of Harbor island, till the waterfall at Grand Bruit harbor is in sight, bearing 7° . Close Harbor island, round its north-western end at the distance of about 200 yards, and proceed in mid-channel between Pigeon islet and the mainland northward of it to the harbor.

Tides.—It is high water, full and change, in Grand Bruit harbor at 8h. 43m.; springs rise $5\frac{3}{4}$ feet, neaps 4 feet.

The Barasway, a large bight westward of Hares Ears, is almost filled with islands and rocks, and the passage between them requires a local pilot.

Flat island, open southward of Offer islet, bearing 75° , leads southward of the outlying shoals.

Old Man hill, situated $1\frac{3}{4}$ miles northward of the Barasway, is a peaked hill 684 feet high and faced by cliff. For about an hour from noon when the sun is shining the shadow of the cliff on the face of the hill forms a curious resemblance to the figure of a man.

Roti Colombier, at the southwestern end of the islands off the Barasway, is a conspicuous bare conical rock 62 feet high. There are several rocks, both above and below water, between Roti Colombier and Jacques island.

Ireland island lies westward, distant 3 miles from Roti Colom-bier, and southward, one mile from the eastern entrance point to La Poile bay: a ledge extends eastward 600 yards from this island, with $1\frac{3}{4}$ fathoms water at its outer end.

Light.—A cylindrical lighthouse, 39 feet high, with a dwelling attached, both lighthouse and dwelling being painted red and white in horizontal stripes, on Ireland island, exhibits, at 67 feet above high water, a revolving white light, showing flashes which attain their greatest brilliancy every twelve seconds, and are separated by total eclipses: the light should be seen from a distance of 9 miles in clear weather.

Rocks.—Naked Man rock, bearing 339° , distant 1,300 yards from Ireland island, dries 3 feet at low water.

A rock, situated with Naked Man rock bearing about 318° , distant 550 yards, has a depth of less than 6 feet over it, and the sea breaks on it.

A rock, situated with Naked Man rock bearing 304° , distant 400 yards, has a depth of $2\frac{1}{2}$ fathoms over it, and 4 to 5 fathoms close around.

Southeast rock, bearing 55° , distant 600 yards from Ireland Island lighthouse, is awash at low water: bearing 1° , 400 yards from the lighthouse, is a shoal with $2\frac{1}{2}$ fathoms of water over it; and bearing 232° , 650 yards from the lighthouse, is a sunken rock.

A rock, bearing 49° , distant $\frac{1}{2}$ mile from Naked Man rock, is about 12 feet high, and there is a rock, with less than 6 feet of water over it, close westward of it: the ground is foul between these rocks and the eastern entrance point of La Poile bay, which bears 57° , distant about $\frac{1}{4}$ mile.

La Poile bay extends about north-northeastward 6 miles, with a general width of $1\frac{3}{4}$ miles to Dolman head and North Bay point; Northeast arm extends northeastward $2\frac{1}{2}$ miles from south of Dolman head, and North bay extends northward $3\frac{1}{2}$ miles from North Bay point.

Gallyboy harbor, on the eastern shore of La Poile bay, at $2\frac{1}{4}$ miles within its eastern entrance point, is a narrow boat creek, and there is a rock, with 6 feet water over it, in the middle of its entrance.

Friar rock, bearing 225° , distant 250 yards from the western point of Sandy cove, on the eastern shore of the bay at $3\frac{3}{4}$ miles within the entrance, is awash at low water.

Northeast arm affords excellent anchorage, 1,600 yards long and 600 yards broad, in 10 to 13 fathoms water, mud bottom. The arm is clear of shoals at a short distance from its shores. Water can be taken from Rattling brook, near the head of Northeast arm.

Dolman cove is an open bight between Dolman head, which is a steep bluff, 770 feet high, and North Bay point.

North bay is shallow within its entrance, but anchorage may be obtained just outside in 12 fathoms water, gravel bottom. A telegraph wire crosses the head of the bay.

Bennet rock, with 12 feet of water over it, bears 112° , distant 400 yards from Vineyard islet, a small islet off the eastern point of Broad cove, which is on the western shore of the bay at about $1\frac{3}{4}$ miles within its entrance.

Little bay, on the west shore and bearing north-northwestward from the eastern entrance point of la Poile bay, extends inland $1\frac{1}{4}$ miles in a westerly direction, and affords anchorage, in a space about 350 yards across, off the fishing settlement in 10 fathoms water. Bouys are placed for warping vessels to the wharves.

Shoal.—A shoal, with $6\frac{1}{2}$ fathoms of water over it, is said to lie northeast of the settlement in Little bay; it has been unsuccessfully searched for.

Tooth rock, bearing 176° , distant 250 yards from Tooth head, the northern entrance point of Little bay, has a depth of $2\frac{3}{4}$ fathoms over it, and 5 to 10 fathoms close around.

Anchorage may be obtained off the mouth of this bay in 15 fathoms of water, open to southerly winds, but Tooth rock limits the anchoring space.

Communication.—The Newfoundland railway steamer from St. Johns calls here weekly during summer and autumn, and there is a post and telegraph office.

Ice.—Little bay freezes occasionally in February, but the ice seldom remains long.

La Poile harbor, the entrance of which bears northwestward from the eastern entrance point of la Poile bay, is 400 yards wide and 1,700 yards long, as far as Pig island, which lies in mid-channel; beyond Pig island it extends southwestward for $\frac{1}{2}$ mile in a narrow arm to its head.

This harbor affords anchorage in 11 fathoms of water at about 300 yards eastward of Pig island. There are a few houses on its southern shore.

Beacon.—A beacon stands on Beacon point, the southern entrance point.

Harbor rock, with 10 feet water over it, is on the outer part of a shoal extending northward 200 yards from the southern shore, just within the entrance; to clear this rock, keep the northern shore aboard.

Ice.—La Poile harbor freezes over about February 10, and the ice disappears about March 20; although blocked at intervals, generally between March 1 and 20, navigation has not been impeded more than six spring seasons during fifty years, and field ice rarely arrives, but when forced in by southerly winds it becomes a serious obstruc-

tion; the bay is cleared by northwesterly winds. The ice in the river is generally about 6 inches thick.

Tides.—It is high water, full and change, in la Poile bay at 9h. 0m.; springs rise 6 feet, neaps 4 feet.

La Plante harbor, situated $1\frac{1}{10}$ miles southwestward of Beacon point, is a narrow boat creek. To clear a rock just inside the mouth, keep the eastern entrance point close aboard.

Cox rock, with 9 feet of water over it, lies 600 yards off the land at the western entrance of la Poile bay, and bears 271° , distant $2\frac{1}{2}$ miles from Ireland Island lighthouse.

Little la Poile is a narrow shallow inlet, extending northeastward, 1,800 yards into the land at about $3\frac{1}{4}$ miles west-northwestward from Ireland island.

The coast between la Poile bay and Garia bay, westward about 4 miles, is bordered by islands and rocks, which no stranger should attempt to pass inside of at any time, nor shoal the water to less than 50 fathoms at night.

Crafty head, 140 feet high, and Black George head, 141 feet high, are two conspicuous conical headlands, eastward 2 miles and $1\frac{1}{4}$ miles, respectively, from Garia bay. Behind these headlands the land gradually rises to the height of 860 feet on the eastern side of Garia bay, while at 4 miles northward of the head of that bay are the Blue mountains of Garia; Garia peak, the highest, is sharp and 1,814 feet high.

Indian island, southeastward $\frac{1}{4}$ mile from the eastern entrance point of Garia bay, is 58 feet high, and there is a white cliff at its southwestern point.

Deer island, in Garia bay entrance, rises to a conical hill 68 feet high, and is covered with dark spruce. The northern coast of Deer island is generally foul. Islets and rocks extend southward $\frac{3}{4}$ mile from Deer island, the most prominent being Shag islet, which is a gray rock, 32 feet high, and Black rock, the southernmost, which is 12 feet high.

Garia bay extends north-northwestward 3 miles and thence turns north-northeastward for 2 miles. The water in the bay is generally shallow, and the anchorage for large vessels is only 300 yards wide, but that for small vessels is excellent.

Wood, suitable for building fishing craft, grows in Garia bay.

Smock island, just inside Garia bay entrance, is 53 feet high, and composed of gray rock partially covered with moss; its coasts are foul for a short distance. Ship Cove hill, on the eastern shore of the bay at $1\frac{4}{10}$ miles within the entrance, is a remarkable headland, 155 feet high, and Big island, 114 feet high, lies northwestward 400 yards from it. Spruce island, joined by rocks to the western shore at $\frac{1}{2}$ mile within Smock island, is 52 feet high, and Round island, $\frac{1}{4}$ mile

farther northward, is 72 feet high and separated from the western shore by the deepest channel leading to the head of the bay.

Rocks.—Big rock, Bell rock, and Flat rock (named from their shapes) are the highest heads of a reef extending about 900 yards in a northerly and southerly direction lying in the entrance to Garia bay westward of Deer island. Big rock is 18 feet high and Bell rock 5 feet high.

Brag rock, about 65 yards eastward of Flat rock, has 2 feet of water over it.

The Bull, the Calf, and the Cow, three rocks showing only at low-water springs, lie about 400 yards westward from the northern part of Deer island.

Garia harbor is a small cove with numerous rocks in it, on the western side of Garia bay just inside the entrance. There is a small settlement here; the northeasternmost house, standing on a small eminence above the other houses, is the school.

Tides.—It is high water, full and change, in Garia harbor at 8h. 50m.; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{3}{4}$ feet; neaps range 2 feet.

Wreck island, southward about $\frac{3}{4}$ mile from the western entrance point of Garia bay, is 35 feet high, and covered with grass; there are two rocky mounds near its northwestern end. Wreck island sunkers are rocks that extend southward nearly $\frac{1}{2}$ mile from Wreck island; and Offer Gob rock, bearing 208° , distant $\frac{3}{4}$ mile from Wreck island summit, has 15 feet of water over it.

Hatcher's cove, a small bight completely open to the southward, lies close westward of the entrance to Garia bay. The eastern part of the cove is full of rocks, but there is good anchorage for small craft in the remainder, in 6 to 11 fathoms water.

There is a small black rock off the eastern entrance point, and one that dries at low water close to the western entrance point.

Garia bay—Directions—From the eastward.—Give Black rock off Little la Poile a berth of $\frac{1}{2}$ mile and bring the northeastern end of Big Seal island and the southwestern end of Wreck island in line, bearing 277° , which mark leads southward of Harpoon shoal. This shoal, which has 25 feet water over it, is the southern shoal in this locality and bears 133° , distant $1\frac{7}{10}$ miles from the southwestern end of Indian island. The southern end of Big Seal island, well open southward of Wreck island, bearing 268° , leads southward of Tinker rocks, a patch lying southeastward about a mile from Indian island.

Eastern channel.—This channel, being only 100 yards wide in its entrance, with a depth of 21 feet water, is suitable for small vessels. Having the northeastern end of Big Seal island and the southwestern end of Wreck island in line, when Smock island is open westward of the eastern entrance point of Garia bay, bearing 316° , keep this mark on until 200 yards off the southwestern end of Indian

island, then steer in mid-channel between the low reef at the north-eastern end of Deer island and the eastern entrance point of Garia bay, with the western end of Smock island bearing about 308° , until the schoolhouse at Garia harbor is shut in with the northern entrance point of that harbor, bearing 265° , which mark leads northward of the shoals off Deer island. Then pass westward of Smock island and anchor in about 7 fathoms of water, midway between the island and a cove northwestward of it.

Small vessels can proceed between Spruce and Big islands, through the channel westward of Round island, then for 1 mile in the direction of the waterfall, and on to the narrows.

Western channel.—Having the northeastern end of Big Seal island in line with the southwestern end of Wreck island, when Black rock, southward of Deer island, bears 333° , steer 299° until the northern entrance point of Garia harbor, a small bluff, is in line with Bell rock, bearing 348° , then steer for the channel between Deer island and Bell rock; open the whole of Smock island westward of Deer island, bearing 357° , before passing Black rock, in order to clear Sculpin rock, the westernmost of the rocks southward of Deer island.

When abreast Bell rock keep the fall of the hills on the eastern side of Garia bay open eastward of the northern entrance point to Garia harbor, bearing 344° , to clear Brag rock, and, after passing Flat rock, Black rock its own breadth open westward of Deer island, bearing 153° , to clear the Bull. Then continue northward, passing at about 100 yards off the northern entrance point of Garia harbor, and anchor as above directed.

From the westward—Western channel.—Keep Black George head open southward of Black rock, bearing 37° , to clear Wreck Island sunkeners until the north entrance point of Garia harbor is in line with Bell rock, when proceed as above directed.

Eastern channel.—After passing Wreck Island sunkeners, as above, keep the southern end of Big Seal island open southward of Wreck island, bearing 268° , until the entrance points of the eastern passage are open, bearing 336° , then steer for the entrance, and as above directed.

Little Garia bay is westward, about 1,200 yards from Hatcher's cove, the eastern entrance point of the bay being Slammer point, which has the appearance of an island. Firmages head, a remarkable bluff, 180 feet high, is just within the eastern entrance point. There is no shoal in this bay except close to the shore, but the water is deep, and it is completely open to the southward. A bar of flat rock, with 12 feet water over it, crosses the bay at $\frac{1}{2}$ mile from its head; within the bar is a basin with $4\frac{1}{2}$ fathoms in it, and a good anchorage for small craft. Large vessels anchor, sheltered from off-shore winds, in 13 fathoms water off Pigeon island, 40 feet high,

close to the western shore, and just northward of Pillar rock, 35 feet high. Berry point, the western entrance point, is a low peninsula of red cliff with a small rock above water close to its southern side.

Seal islands are a group off Berry point.

Big Seal island rises to a sharp pointed hill 130 feet high, and is generally covered with grass and moss. Round island, close northward of it, is a sharp cone about 70 feet high, and Offer Seal island, close southwestward of Big Seal island, is 54 feet high, with Black rock, 6 feet high, 200 yards off its southern side.

Rocks extend from Offer Seal island except on its northern side, and Edge of Ground shoal, bearing 143° , distant 800 yards from its eastern point, has 15 feet water over it.

Gob rock, northeastward 100 yards from the northeastern end of Big Seal island, is awash at low water. Sunken rocks fringe the northern coasts of Big Seal and Round islands, and a rock, awash at low water, lies northeastward 150 yards from the northeastern end of Round island.

Directions.—Proceeding southward and westward from Garia bay, having Bell rock in line with the northern entrance point of Garia harbor, when Black George head opens southeastward of Black rock, southward of Deer island, bearing 39° , keep it so astern until Seal Island head is in line with the northern end of Offer Seal island, bearing 291° , to clear Wreck Island sunken rocks and Offer Gob rock. Keep this mark on until the western entrance point of Garia bay is between the two hummocks of Wreck island, bearing 26° , which mark leads westward of Offer Gob rock. For Little Garia bay or Seal islands, the course is then direct, avoiding the rocks off Seal islands.

The coast westward of Seal islands is bordered by rocks and shoals, and except with local knowledge, vessels should not close the land northward of the line of the summit of Wreck island in line with Black rock of Offer Seal island, bearing 71° .

Seal Island head, southwestward about 600 yards from Round island, is a conspicuous red bluff 55 feet high; there is a small cove eastward of it in which small vessels anchor in 7 fathoms of water in a space about 200 yards in diameter.

The entrance is from the eastward and northward of Big Seal and Round islands, and to clear the rocks off Round island keep close to the northern shore, as the passage is only 65 yards wide. There is a small settlement here.

Bennett cove, northwestward $\frac{1}{4}$ mile from Seal Island head, affords refuge for small craft, but it is barred from the southward by rocks, and it is approached only from the westward by keeping about 65 yards from the land.

Bay le Moine entrance is west-southwestward about $2\frac{1}{4}$ miles from Seal Island head, and the bay extends north-northeastward 4 miles; there is good anchorage at its head.

Petites is a considerable settlement situated round the basins formed by a group of islands and rocks at the eastern entrance point of bay le Moine.

These basins are suitable for small vessels only, which moor to the wharves; local pilotage knowledge is required.

Black rock, the southernmost of the group, is 4 feet high, and lies 300 yards southward of Gull island, which is 33 feet high, and covered with grass over red rock.

Black Rock shoal, bearing 235° , distant nearly 400 yards from Black rock, has 3 fathoms of water over it.

Major rock, bearing 292° , distant 600 yards from the summit of Gull island, is a very sharp pinnacle, with 6 feet of water over it, and deep water close around; it does not often break.

Fish head, the western entrance of bay le Moine, is a steep bluff at the southwestern end of a hill which is 231 feet high, and faced by gray cliff.

The Friar, close off the land at 600 yards northeastward of the head, is an isolated pillar rock.

Dublin cove, northward of the eastern part of the hill forming Fish head, is 300 yards wide at its entrance, and narrows gradually to its head. It is clear of shoals except close to its head.

Dublin Cove rocks, 100 yards northeastward of the eastern entrance point of Dublin cove, are 2 feet high and small; they may be approached to 100 yards.

Anchorage.—Small vessels can anchor in Dublin cove, in from 22 fathoms at the entrance, to 6 fathoms water off a small islet at the head.

Bay le Moine rock, bearing 53° , distant $\frac{1}{2}$ mile from the eastern entrance point of Dublin cove, and nearly in the middle of the bay, has 4 feet least water over it.

The Red house, close to the northern shore of bay le Moine, at nearly $\frac{1}{10}$ mile within the eastern entrance point of Dublin cove, is a conspicuous rock, 20 feet high, and faced by red cliff; at one mile farther in on the same shore, is a waterfall just westward of a red point; a shoal extends a short distance from this point.

Water can be taken from the fall or the streams at the head of the bay at high water.

Harbor le Cou lies westward of Fish head, and consists of a cove to the southwest, and a basin to the northeast. A settlement of some 225 people is situated round the southwest cove.

Shark Cove head, northwestward, 550 yards from Fish head and close eastward of the entrance, rises to a conspicuous sharp hill,

160 feet high, and the Sugarloaf, northwestward 1,100 yards from Shark Cove head, is a conical hill 220 feet high and covered with dark spruce, which surmounts the turning point into the basin.

Calapoose rocks, 3 feet high, are nearly in the middle of the entrance; and a shoal, with 12 feet of water over it, bears 122° , 200 yards from them; Sugarloaf point open westward of Calapoose rocks, bearing 310° , leads southwestward of this shoal; the harbor and entrance are otherwise clear of shoals except close to the shore.

The cove, $\frac{1}{4}$ mile deep, and 250 yards wide at its entrance, affords anchorage for small vessels in 8 to 11 fathoms water.

Some rocks lie close to a small hillock, on the northern side of the cove, and a rock, that dries at low water, lies in the middle of its head.

The basin is $\frac{1}{4}$ mile in diameter, with a depth of 14 to 20 fathoms water almost to the shore, but a spit extends a few yards from the small islet on its western side and just within the entrance, and some rocks lie a similar distance from the bluff at its northeastern end.

The Barasway, a shallow inlet, extends northward 350 yards from the northwestern end of the basin, and there is a waterfall at its head.

The coast between harbor le Cou and Rose Blanche point (said to be a corruption of Roches Blanches), which bears 233° , distant $1\frac{3}{4}$ miles from Fish head, is a whitish gray rock, and generally steep. Wash rocks, which dry 4 feet, lie a little more than 100 yards from the coast at 1,600 yards northeastward of Rose Blanche point.

Light.—A granite lighthouse, 40 feet high, surmounting the corner of slate-roofed buildings, with one side and one end painted red and white in vertical stripes, on the eastern head of Rose Blanche point, exhibits, at 95 feet above high water, a fixed white light, that should be seen over an arc of 169° between the bearings 62° and 253° , from a distance of 11 miles in clear weather.

Black rock, lying westward, distant 250 yards from Rose Blanche point, is 11 feet high, and from it a line of rocks extends northeastward about 800 yards. Black Rock sunken, 200 yards southward of Black rock, has 7 feet of water over it.

Directions.—Proceeding southward and westward from Little Garia bay, pass well eastward of Edge of Ground shoal, and when Shag islet off Deer island is open southward of Wreck island, bearing 55° , keep it so astern until Seal Island head opens westward of Black rock of Seal islands, bearing 319° , to clear the shoals off Seal island; then steer for Rose Blanche point.

When approaching Petites, keep Seal Island head open southward of Winging island, the southeastern of the group of islands off that place, bearing 63° , until the Red house is open northwestward of the southeastern shore of bay le Moine, bearing 24° ; then steer northward

to shut in the waterfall on the northwestern shore of the bay with the point southwestward of it, bearing 29° , to clear Major rock.

After passing the northern entrance point of Petites, bring the waterfall well open of the point southwestward of it, bearing 26° , which mark leads eastward of Bay le Moine rock, and when abreast the Red house keep in the middle of the bay and anchor at its head, in 14 fathoms or less water, remembering that the water shoals quickly from 5 to 3 fathoms.

To pass westward of Bay le Moine rock, run along the northwestern shore of the entrance of the bay at the distance of about 200 yards, giving a sufficient berth to Dublin Cove rocks: then bring the summit of Shark Cove head open westward of the eastern shore of Dublin cove, bearing 230° , and keep this mark on astern till clear of the rock. The highest hill over the head of bay le Moine, shut in with the apparent extreme of the western shore of the bay, also leads westward of the rock.

To enter harbor le Cou, bring Sugarloaf point open westward of Calapoose rocks, bearing 311° , and keep in mid-channel.

The coast from Rose Blanche point trends north-northeastward for $\frac{1}{2}$ mile; then turning westward and southward, it forms, with two small bays at its head, Rose Blanche harbor.

Cains island lies immediately westward of Rose Blanche point, and is almost connected with it by rocky islets; westward of the island is the entrance to Rose Blanche harbor. This island is steep to off its western point and along its northwestern side; there are a few houses and fishing stages on its eastern side, where it is separated from the mainland by a narrow bay, almost a strait.

Fog signal.—A fog horn, placed on the southwestern point of Cains island, gives two blasts every two minutes, thus:—blast, six seconds; silence, fifteen seconds; blast, six seconds; silence, ninety-three seconds, during thick or foggy weather.

The engine house is square, flat-roofed, and painted in black and white horizontal bands; the keeper's dwelling is square, white, with a flat black roof, and there is a similar building close to it.

Light.—A fixed red lantern light is exhibited from the roof of the engine house.

Rose Blanche harbor is tolerably easy of access and affords sheltered anchorage in 8 to 9 fathoms of water, sand bottom; but the space is very confined, and a vessel over 200 feet in length should moor.

Rose Blanche village, situated principally on the peninsula which forms the western side of the harbor, has a population of about 500, all of whom are, directly or indirectly, dependent on the fishing industry. There is a church, the spire of which is a good mark from the westward; a school, and a resident medical officer.

Supplies.—Ordinary supplies can be obtained, and good water is easily taken from the mouth of a river in the next large bay to the westward.

Communication.—Communication is maintained with St. Johns and other ports along the coast during summer by a steamer weekly, and there is telegraphic communication. Nearly all intercourse between the villages is by water, as there are no roads, with the exception of one from Rose Blanche to harbor le Cou.

Ice.—Rose Blanche occasionally freezes with thin ice, but when gulf ice is pressed in by southwesterly winds it becomes a serious obstruction.

Rose Blanche shoals are several rocky heads, the outer of which bears 221° , distant 1,900 yards from the lighthouse, and has over it a least depth of 2 fathoms: north-northwestward 300 yards from this shoal is a patch of $2\frac{1}{4}$ fathoms, and northeastward 600 yards from it are three other patches with less than 3 fathoms of water over them; all break heavily.

Shag rocks, west-southwestward, distant $1\frac{1}{4}$ miles from Rose Blanche point, are a group of rocky ledges, the highest of which is 17 feet high. To the southeastward of this ledge are some rocks which dry 5 feet, and at 400 yards from the highest ledge there is a rock with $2\frac{1}{4}$ fathoms over it. Bearing 40° , distant 600 yards from this rock, is a ledge on which the depth is from 2 to 3 fathoms. These rocks break heavily in any swell, but they are steep-to, and in calm weather should be approached with caution.

Northwestward, a little over 400 yards from the highest Shag rock, is a patch having 1 fathom water over it; it is white rock and is distinctly visible from a short distance.

Duck island, between Shag rocks and the mainland, is 60 feet high and covered with coarse grass; eastward of it there are several rocky heads, making the channel between it and Duckling, the small islet inside, very dangerous at high water, when they may not be visible. Off the western end of Duckling there is a rocky shoal with a least depth of 10 feet, but between the two, very close to the islet, there is a deep channel used by the coasting steamers. The north side of Duck island is tolerably steep and clear of shoals.

Butterpot, a conspicuous flat-topped hill near the head of Otter bay, open southwestward of Tinker island, bearing 279° , clears Shag rock and Rose Blanche shoals.

Hopkins island, lying inside Duck island and fronting a deep bay locally known as West arm, is 89 feet high and of the same rocky sterile nature as the neighboring coast, from which its northern point is separated by a shallow passage, 150 feet wide. Together with the mainland this island forms, on its western side, a bay, the

shores of which are steep-to; the water is deep, but there is no shelter from southwesterly winds and swell, which are frequent.

West arm, extending 1,200 yards in a northeasterly direction, affords anchorage for small vessels in 5 to 6 fathoms of water, rocky bottom. Its entrance is contracted by Bell rock (between which and Rose Blanche peninsula there are several ledges) and farther in by Goose island, a small rocky islet, having several rocky patches southward and southwestward of it.

Rose Blanche brook, a stream of moderate size, flows into the head of West arm.

Rose Blanche harbor—Directions.—From the westward keep Butterpot hill open southward of Tinker island, bearing 279° , to clear Shag rocks and Rose Blanche shoals, and when Bell rock is just open of the western point of Cains island, bearing 6° , steer for the harbor, observing that Bell rock must be only just open. Pass the western point and along the northwestern side of Cains island, which are steep-to, and anchor as convenient northeastward of the island. From the eastward give the lighthouse a berth of $\frac{1}{2}$ mile to clear Black Rock sunken off Rose Blanche point, and when Goose island opens westward of Cains island bearing about 353° , steer to pass westward of Cains island and as above directed.

Rose Blanche church spire, over the summit of the outer part of the village peninsula, bearing about 38° , leads between Shag rock and Rose Blanche shoals, but neither this passage nor that inside Duck island should be attempted without local knowledge.

Tides and tidal streams.—It is high water, full and change, at Rose Blanche at Sh. 40m.; springs rise $4\frac{1}{2}$ feet, neaps $3\frac{1}{2}$ feet.

The flood and ebb streams, running westward and eastward, are quite perceptible close to the shore, but during the survey of this coast in spring and autumn, the stream outside the 20-fathom line was nearly always to the westward.

The coast from inside Hopkins island trends, generally, west-southwestward to a bluff point forming the eastern entrance point to Mull Face bay. A rocky ledge extends 800 yards eastward, or toward Duckling islet, from this point, and near its eastern end there are some small rocks which dry at low water, making a good mark for the northern limit of the channel inside Duck island. Between Duck island and the bluff point mentioned above there are two rocks with 3 and $3\frac{1}{2}$ fathoms of water over them.

Yankee rocks, immediately westward of the entrance to Mull Face bay, are a cluster of rocks and ledges, the highest of which is 11 feet high; at 200 yards eastward from the highest rock there is a pinnacle rock which dries at low water.

Mull Face bay, an inlet nearly $\frac{1}{2}$ mile long, is contracted near the middle of its length to a width of little more than 100 yards, inside

which it opens out to a basin affording sheltered, but very confined, anchorage to small vessels, in 4 fathoms of water. The entrance, between the cliffs on the western side (which must be kept close aboard) and the shoals extending from the eastern point, is only about 200 feet wide, but it is safe with local knowledge.

The coast from Mull Face bay trends generally westward to Barasway bay, which is much encumbered by rocks and shoals. In its northwestern corner there is a conspicuous waterfall, formed by a stream which flows from several large ponds between the hills.

Green island, lying off the eastern point of Barasway bay, with deep water between, is 21 feet high, and being covered with grass, is rather prominent. Southeastward and southwestward of it are Green Island sunkeners, several rocks and ledges which generally break: of these, the southeastern rock, with 10 feet of water over it, bears 131° , distant 1,200 yards, and the western rock, with 6 feet over it, bears 209° , 700 yards from the summit of the island. Also a ledge of 2 to 3 fathoms of water extends west-southwestward 550 yards from the island.

Butterpot hill, open southward of Tinker island, bearing 279° , leads southward of these shoals.

The coast from Barasway bay, trending still generally westward, is cliffy and fairly steep-to for $\frac{3}{4}$ mile to White head, which is conspicuous. Half a mile westward of this the coast is fronted by a group of small islands, inside of which there is a fishing village named Baziel. There is a narrow passage between these islands and the mainland with 3 to 4 fathoms of water in it.

Tinker island, the western of Baziel group, is large blocks of shale and granite, 20 feet high, and quite bare of vegetation; on the summit there is a single block of shale standing at an angle of about 45° . There is a rock, bearing 187° , distant 500 yards from the middle of this island, with 9 feet of water over it. Rose Blanche lighthouse, open southward of Duck island, bearing 77° , leads 700 yards southward of this rock.

Pigeon island, nearly 1,200 yards westward of Tinker island, is 23 feet high, rocky, and barren like the mainland in this vicinity. A small rock off its southern side has 2 fathoms of water over it.

The mainland coast between Tinker and Pigeon islands recedes and forms a bay nearly $\frac{1}{4}$ mile in extent, but it does not afford anchorage. Westward of Pigeon island is another bay, fronted by a group of small rocky islets, and, a little farther westward, a group of islands, the highest of which is 48 feet high, fronts the entrance to a narrow channel leading into Grandy sound, and known as Milners tickle. Half a mile farther westward is Grandy passage.

Pigeon Island shoals, lying westward of Pigeon island, are a cluster of rocky patches, some of which dry at low water; the outer

patch has 4 fathoms of water over it, and is steep-to on its southern and western sides.

Black rock, lying off the entrance to Grandy passage, is a small rocky islet, 20 feet high; it is a good mark. There are several rocks and ledges southeastward, southward, and southwestward of this islet, two of which, at nearly 600 yards southeastward, dry at low water. At 265 yards southwestward of Black rock there is a rocky head with only 4 feet of water over it, and 400 yards outside this there are two patches of $4\frac{1}{2}$ fathoms, both of which break heavily with a swell from seaward.

Grandy passage is close westward of Black rock; between it and a group of rocks and ledges lying off the southeastern point of Harbor island. There are two small rocks in the passage, one close off Grandy head and one a little farther out; in the channel there is good water, but owing to these rocks and those off the entrance it must not be attempted without a pilot.

Harbor island is the largest of a group of islands and ledges which fronts the coast in this locality. Together with Bakers island and some others it forms the sheltered anchorage named Grandy sound. These islands are of moderate height, and some of them are covered with grass, on which a few sheep, belonging to the villages in the vicinity, are left to feed. One of these villages, consisting of five or six houses, is situated on a small island just within Grandy passage.

Westward of Harbor island there is a deep passage into Grandy sound, but, like the others between these islands, it is narrow, and there are some rocks off its entrance.

Grandy sound has good and sheltered anchorage in its north-eastern part in 6 fathoms of water, mud bottom, but the entrances are narrow, and intricate, and unsuitable for large vessels. A stream of moderate size runs into the northwestern corner of the sound, and boats ascend it for about $\frac{3}{4}$ mile to a stony bar. From the large valley above this the local fishermen procure timber and spars of considerable size.

The western portion of Grandy sound is filled with flats of sand and mud, which dry at low water, leaving only very shallow channels to the mouth of the stream.

The mainland forming the western and southwestern sides of the sound is indented by several small bays, and continues southwestward to Stickland point, on which there is a considerable fishing village.

Anchorage can be obtained inside Harbor island in 5 to 6 fathoms of water, but the holding ground is not good, and the space is limited.

Directions for Grandy sound.—The entrances to Grandy sound should not be attempted without local knowledge, but if necessary

for a small vessel to enter the sound by Grandy passage without such assistance, proceed thus—

Make, with certainty, Black rock (see p. 255), bring it to bear 43° , and approach it on that bearing, or with the southwestern corner of Bakers island open northwestward of it, about 49° , to clear the rock, on which the depth is 4 feet, lying off it. Pass close to the western end of Black rock, and then steer for the eastern end of Harbor island, giving a sufficient berth to the two rocks on the eastern side of the channel, that off Grandy head being the more dangerous, though in calm weather the discolored water is generally visible; rounding this, pass close along the northern coasts of Grandy and Bakers islands, and between the latter and another island lying northward of it into the deep basin; then haul to the northward and anchor in 6 to 7 fathoms of water.

Offlying rocks.—Grandy Passage sunkers lie off the western point of Harbor island, and immediately outside Burnt island is Black rock, a rocky islet, 15 feet high and very similar in appearance to Black rock off Grandy passage. The sunkers have depths of 2 to 5 fathoms over them, the former depth bearing 226° , distant 600 yards from Black rock. Westward of Black rock there are numerous rocky ledges, shoals, and foul ground, extending to Bad Neighbor patch, which is just dry at low water, and steep-to on its southern side, but shoal water extends westward 200 yards from it.

Southwest rock, west-southwestward $1\frac{1}{2}$ miles from Bad neighbor and nearly $\frac{3}{4}$ mile from the shore, has 1 fathom of water over it, is of small extent, and only breaks in a heavy swell.

Clearing mark.—Black rock off Grandy passage, open southward of Burnt island Black rock, bearing 73° , leads southward of Southwest rock, and very close southward of Bad neighbor.

The coast from Stickland point bends sharply northeastward and forms God bay, which is nearly $1\frac{1}{4}$ miles in length; a small stream flows from a valley between the surrounding hills into its head; and a stream, from which good water can be taken, runs into its northwestern corner, and inland of this there is a pond of considerable extent.

From this corner the land trends southwestward and forms a long rocky peninsula, divided near its middle by a narrow cut, and terminating in Coney head or Hiscock point. (See p. 258.)

At about 800 yards northeastward of the point there is a small indentation of the coast and a village.

Eastward, distant 500 yards from Coney head, are Hiscock islets, a small group of rocky islets, and $\frac{1}{2}$ mile farther eastward are some rocky ledges, named Twin rocks, reaching a height of 2 feet.

Burnt islands is the name given to the numerous islands and rocks that front and partly fill God bay. On the largest island,

which is just within the entrance of the bay, there is a settlement, which, together with Stickland village, has a population of about 300, all connected with the fishing industry. Two or three cargoes of dried codfish are annually sent from this place to Europe.

Of the smaller islands, the most conspicuous, as marking the entrance channels to the bay, are Colombier and Little Colombier, rocky islets 27 and 35 feet high, respectively, and East White island and West White island, the summits of which are white rock. Among the islands there are several rocky patches, and in heavy weather nearly the whole space between Colombier and the western end of Harbor island is covered with breakers.

Coal and supplies.—Ordinary supplies can be obtained, and occasionally perhaps 15 to 20 tons of coal.

Communication.—The coasting steamers do not call at Burnt islands, but there is telegraphic communication.

Burnt Islands harbor affords good and sheltered anchorage for vessels of moderate size, but even with a small vessel no attempt should be made to enter without a pilot, for the channels are not easily distinguished from seaward, and the numerous rocks give but little room for maneuvering.

Channels.—There are three channels into this anchorage, one narrow and deep, but straight in its outer portion, close eastward of Colombier islets and up to the deep water at the head of the bay.

A second passing between Bad neighbor and Twin rocks, thence closing the western shore of the bay, and, keeping it close aboard to avoid the patches northward of Hat rocks, on to the space northward of the largest Burnt island, where there is excellent anchorage in 10 fathoms of water, mud bottom.

The third channel, and the one generally used by the small vessels frequenting the port, is closed to vessels drawing more than 12 feet of water by a bar extending northeastward from Hat rocks, and even vessels of this draft must not attempt to pass over it at low water.

Buoy.—A small spar buoy is moored on the southwestern edge of the shoal water extending from the largest Burnt island, to mark the channel between it and the Hat rocks.

Directions.—For the channel over Hat Rocks bar, bring Inner White islet, a white-topped rock off the southwestern side of the largest Burnt island, just open of Colombier island, bearing about 24° , which leads between Bad neighbor and the shoal water off the Twins. Pass close to Little Colombier and very close westward of the spar buoy before mentioned, then keep on toward the northern shore of the bay, and when the whole of Colliers island (half way up the bay) is open, steer for the anchorage. The channel over the bar is very narrow in the deepest parts; the water is generally clear and the bottom easily seen.

Coney head is a white cliffy bluff and the end of a tongue of land $1\frac{1}{2}$ miles in length, separating God bay from Coney bay.

Coney bay extends east-northeastward $1\frac{1}{4}$ miles on the northwestern side of Coney head peninsula: to enter it, after having passed the outer reefs, keep about 300 yards off Coney head to clear a rock lying off it, then cross to the northern shore, keeping it aboard till the head is reached, and anchor in 4 fathoms of water, but from 800 yards inside of the entrance to the head there are rocks lying off both sides of the bay.

Otter bay, or Baie de La Loutre, is about $\frac{1}{2}$ mile westward of Coney bay; its entrance is encumbered by rocks.

Butterpot hill, about 600 yards southeastward from the head of this bay, is 269 feet high and remarkable.

Caution.—A pilot is necessary to enter either Coney bay or Otter bay.

Dead Islands harbor (also known as "Morte harbor" or "Seal cove") is westward of Otter bay and northward of Dead or Morte islands, a group of islands and rocks with shoals extending more than $\frac{1}{2}$ mile southward and westward.

It affords anchorage for small vessels in a space 1,000 yards long and 300 yards broad, approached by three passages—Eastern and Middle passages, which are too shoal and intricate to be taken without a pilot, and Western passage, which is 100 yards wide at its narrowest parts, and available for vessels drawing less than 20 feet of water. To enter by Western passage keep Butterpot in line with the northern end of Dead island, the largest and highest of the group, bearing about 66° , which mark leads between the shoals on either hand to the western end of Dead island, then pass in mid-channel between that and the island next northward, and anchor in 4 to 5 fathoms of water, northward of the eastern end of Dead island.

A shoal on the northern side of the harbor has 15 feet of water over it.

Light.—A white wooden frame on the western end of Pitman island, which is on the eastern side of the Eastern passage at about 900 yards within its entrance, exhibits a fixed green light at 26 feet above high water.

The coast, westward of Dead islands, is low, and foul ground extends $\frac{1}{2}$ mile off it. Black shoal bearing 223° , distant 600 yards from Black rock, and 94° , $2\frac{1}{10}$ miles from Channel Head lighthouse, has 15 feet of water over it.

Little Bay shoal extends southwestward $\frac{1}{2}$ mile from Little Bay head the southern entrance point of Little bay.

Southeast shoal, bearing 95° , distant 1,200 yards from Channel Head lighthouse, has 3 fathoms of water over it.

Leading mark.—The beacon on Flagstaff hill in line with the southwestern end of Road island, bearing 300° , or the leading light-houses in line, leads between Southeast and Little Bay shoals and southwestward of Black shoal. (See p. 261.)

Little bay, 1 mile northeastward of Channel head, is a narrow creek affording shelter for small craft and may be entered by bringing the southeastern shore to bear 52° and steering for it on that bearing; when the bay is entered, anchor as convenient.

Port aux Basques, westward $1\frac{1}{2}$ miles from Little Bay head and east-southeastward $7\frac{1}{2}$ miles from cape Ray, is entered between Shoal point to the northward, and Channel head to the southward: the land around it is barren and rocky in appearance, but the anchorage, nearly $\frac{1}{2}$ mile long and 300 yards broad, with 8 to 11 fathoms of water, mud bottom, is good for moderate-sized vessels. The fishing for salmon and sea trout at port aux Basques is excellent.

The southwestern shore of port aux Basques is divided by a small projection into two coves, both of which are shallow; and a government wharf, alongside which there is a depth of 15 feet at low water, extends from the northwestern side of the projection. When going alongside this wharf, do not enter that part of the cove immediately southwestward of the wharf, as the water shoals rapidly. At the head of this cove is a small islet, just above high water, on which is a ringbolt, to aid vessels when hauling into the narrow anchorage between the foul ground off this islet and Pancake rock.

Light.—A circular white lighthouse 29 feet high, with an attached dwelling, having white sides and a red roof, on Channel head, exhibits, at 101 feet above high water, a fixed red light, that should be seen from a distance of 15 miles in clear weather.

A red brick building stands 30 feet northward of the lighthouse.

Fog signal.—A fog signal house having white sides stands about 65 feet southward of the lighthouse, and is connected with it by a covered way. A diaphone horn, projecting from the southern end of this house, and worked by compressed air, gives one blast about every two minutes, thus: Blast, three and one-half seconds; interval, one hundred and fourteen seconds, during thick or foggy weather.

Signals.—Channel Head light station is supplied with the International code of signals.

Channel, a large village with a population of 723, situated on the mainland, just northward of the island, whose eastern end forms Channel head, contains three churches and a windmill; this village is conspicuous from seaward.

East Baldwin, nearly in the middle of the apparent channel to the harbor, is a rock that dries $1\frac{3}{4}$ feet at low water, and shoal water extends 100 yards southwestward from it.

Buoy.—A red spar buoy is moored in $3\frac{1}{2}$ fathoms of water at the southwestern end of the shoal extending southwestward from East Baldwin rock.

Rock.—A small rock, bearing 268° , distant 250 yards from East Baldwin, has 10 feet of water over it, and a shoal with $3\frac{1}{2}$ fathoms of water extends southward nearly 65 yards from the rock.

Buoy.—A white spar buoy, with a white St. Andrew's cross topmark, is moored in $3\frac{1}{2}$ fathoms at the southern end of the shoal extending southward from this rock.

West Baldwin, 150 yards off the southwestern shore of the harbor, $\frac{1}{2}$ mile inside of Channel head, is a rock 50 yards in diameter the shoalest part of which has 1 foot on it at low water. The passage between it and the shoal extending from the rock westward of East Baldwin is 80 yards wide.

Buoy.—A black spar buoy, with a black conical topmark, is moored in $3\frac{1}{2}$ fathoms at the northeastern end of the shoal water off West Baldwin rock.

Road island, the western of two islands extending from the northeastern shore of the harbor, at nearly $\frac{1}{10}$ mile within Channel head, is 30 feet high and covered with turf over gray rock.

Gallyboy island, the eastern island, low, flat, covered with grass, and joined to the northeastern shore at low water, lies east-northeastward of Road island, and is separated from it by a channel 200 yards wide, through which is a narrow passage with $3\frac{1}{2}$ fathoms of water, but only available with local knowledge.

Pancake rock, the eastern end of foul ground extending from the shore of the harbor southwestward of Road island, is about 130 feet in diameter and awash at low water. The channel between the shoal off this rock and the foul ground off Road island is only 90 yards wide, and it is necessary, therefore, to keep on the marks when passing through it.

Buoy.—A black cask buoy is moored at the northeastern end of Pancake rock.

Flagstaff hill, 222 feet high, and the highest land in this locality, is surmounted by a large stone cairn, with a wooden triangle at the top.

Leading lights.—A white pyramidal tower, 22 feet high, on the southwestern end of Road island, exhibits an intermittent white light, thus: Light, one and a half seconds; eclipse, one and a half seconds.

A fixed red light is shown from the northern and western sides of the lantern and is visible over the harbor, but not from seaward.

A white pyramidal tower, 15 feet high, on the land, bearing 300° , distant 490 yards from the preceding lighthouse, exhibits at 81 feet above high water an intermittent white light, thus: Light, one second; eclipse, one second.

Beacons.—Two beacons with diamond-shaped topmarks stand on the shore northwestward of Pancake rock; and two beacons with circular topmarks stand, one on the western end of Woody island, and the other on the northeastern shore of the Bottom of port aux Basques, the narrow inlet northwestward of Woody island.

Caution.—When the presence of ice renders it necessary, the buoys in port aux Basques are taken up.

Directions.—From the southeastward, pass northeastward of Southeast shoal with Flagstaff Hill beacon just open northeastward of Road Island lighthouse, bearing 298° , and when Little Bay head bears 52° bring the leading lighthouses in line.

From the westward, pass between Channel head and Southeast shoal, and bring the leading lighthouses in line. Keep the leading lighthouses in line, bearing 300 , which mark leads through the channel between East Baldwin, with the rock westward of it, and West Baldwin, until the beacons with diamond-shaped topmarks are in line, bearing 288° . Then keep these beacons in line, which leads southwestward of the shoal off the southern point of Road island, until the beacons with circular topmarks are in line, bearing 325° , which mark leads in mid-channel between Pancake rock and the shoals off Road island, and when the northeastern point of Gallyboy island opens northward of Road island, bearing 64° , steer northward for the anchorage.

The holding ground is bad until the channel between Road and Gallyboy islands is well open.

The red buoy marking East Baldwin, and the white buoy marking the rock westward of it, are left on the starboard hand, and the black buoys marking West Baldwin and Pancake rock are left on the port hand, entering.

Ice.—Port aux Basques is rarely frozen over, and navigation is, as a rule, open all the year; the harbor is sometimes blocked for a few days by drift ice which comes with southerly winds in February and March. The ice in the stream flowing into the northeastern end of the port generally reaches a thickness of about 4 inches.

Tides.—It is high water, full and change, in port aux Basques at 8h. 55m.; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{1}{2}$ feet.

Settlement.—The settlement at port aux Basques consists of a few wooden houses, a railway station, and some sheds for the storage of goods; it may, however, become a place of importance.

Coal.—There is usually a stock of Cape Breton coal at port aux Basques.

Communication.—There is a railway to St. Johns. Steamers run three times a week between port aux Basques and Sydney, Cape Breton island, in connection with the trains; steamers also run

weekly to St. Johns, and fortnightly to Halifax via Bras d'Or lakes, Cape Breton island. The steamers go to the railway wharf which lies along the mainland, southwestward of Woody island.

There is telegraphic communication, and both the Anglo-American Telegraph Company and the Newfoundland government have telegraph offices here.

Telegraph cable.—A telegraph cable was laid between port aux Basques and Canso, Nova Scotia, in 1905.

The coast between Channel head and Enragée point, $4\frac{1}{2}$ miles to the west-northwestward, has a group of islands and rocks and some foul ground lying off it. The islands should not be approached by large vessels within the distance of 1 mile.

West rock, bearing 226° , distant 1,500 yards from Channel Head lighthouse, has 4 fathoms of water over it.

Yankee rock, bearing 260° , distant $2\frac{1}{10}$ miles from Channel Head lighthouse, is low.

Yankee shoal, bearing 145° , distant 700 yards from Yankee rock, has 4 fathoms of water over it. Fail rock, bearing 229° , 600 yards from Yankee rock, has 15 feet over it.

Duck island, 40 feet high, bears 296° , distant 1,100 yards from Yankee rock, with Green islet and some foul ground between. Foul ground extends southwestward nearly 600 yards from this island.

Durant island, 800 yards north-northwestward of Duck island, rises in two mounds, the higher being 25 feet high, joined by a shingle beach. Rocks and foul ground extend southwestward 800 yards from this island.

Anchorage may be obtained in the eastern part of the channel between Duck and Durant islands, in 3 to 4 fathoms water, sand bottom. To enter it, from the westward keep in mid-channel between these islands; from the eastward keep the eastern ends of Durant island and Yankee rock in line, bearing 316° , till that rock is neared, and then in mid-channel between it and Hobbs rock, steering for Granby point, the point of the mainland eastward of Durant island.

Grand bay is available for vessels drawing less than 9 feet of water, and affords perfectly sheltered anchorage in 2 to 4 fathoms of water; it is entered through a narrow channel northeastward of the preceding anchorage by keeping the eastern shore aboard.

Enragée point is a low point surrounded by rocks. The coast from it to cape Ray, which is distant about 4 miles in a northwesterly direction, consists of low sand hills facing salt water lagoons, and should not be approached by large vessels within the distance of 1 mile.

Halibut rock bears 292° , distant $1\frac{1}{4}$ miles from Enragée point, and 235° , $\frac{1}{4}$ mile from Shag island, a narrow rock nearly joining the

mainland. Halibut rock is awash at low water and there is shoal water between it and Shag island.

Barachois rock, bearing 329° , distant 1 mile from Halibut rock, and nearly the same distance offshore, has 9 feet of water over it.

Snook bank, bearing 212° , distant $\frac{3}{4}$ mile from Cape Ray lighthouse, has 6 fathoms of water over it.

Signal and telegraph station.—A signal and telegraph station is situated in a cove a little more than 1 mile eastward of cape Ray. (See p. 66.)

Cape Ray, the southwestern extremity of Newfoundland, is about 50 to 160 feet high, but at about 3 miles north-northeastward of it Table mountain rises abruptly to the height of 1,700 feet. Cook stone, 1,570 feet high, is a small peak at the southwestern end of the mountain and at about $\frac{1}{10}$ mile farther southwestward is Sugarloaf hill, conspicuous, conical, and 800 feet high. Two smaller conical hills lie between Sugarloaf hill and the sea.

Light.—A white octagonal tower with a red lantern, 75 feet high at 217 yards within the western extreme of cape Ray, exhibits at 127 feet above high water a flashing white light, which shows one group of three flashes every fifteen seconds, and should be seen from a distance of 17 miles in clear weather.

A white dwelling and outbuildings, with red roofs, are situated near the lighthouse.

Fog signal.—A diaphone horn, worked by compressed air, at a fog signal house situated on the shore at cape Ray, gives one blast of five seconds' duration every minute during thick weather, fog, and snowstorms. The fog signal house is a white building with a red roof and a high brick chimney.

Wireless telegraph station. A wireless telegraph station has been established at Cape Ray lighthouse by the government of Canada and it is operated for the Marine and Fisheries Department of the Dominion by the Marconi Wireless Telegraph Company, Limited. (See p. 42.)

Ice report station.—Information as to the weather, wind, movement and condition of the ice can be obtained during April and May by communicating with the signal station on cape Ray.

Brandies rock, bearing 277° , distant 1 mile from Cape Ray lighthouse and 1,400 yards offshore, is about 50 yards in diameter and nearly awash at low water; the sea breaks on it.

Shag ledge, northwestward $\frac{3}{4}$ mile from Cape Ray lighthouse, and close to the shore, is a small, rocky islet.

Tides.—It is high water, full and change, at cape Ray at 9h. 15m.; springs rise 6 feet, neaps 4 feet.

St. Paul island, in Cabot strait, the main entrance to the gulf of St. Lawrence, between the southwestern extremity of Newfoundland

and the northern extremity of Cape Breton island, is nearly 3 miles long and 1 mile broad. It is composed of primary rocks, principally mica slate, dipping at an angle of about 45° to the southward. Its northern point is a small detached rock (although it appears connected from the sea), separated by a very narrow channel from a peninsula, about 400 feet high, which, together with the isthmus joining it to the body of the island, is so precipitous as to be nearly inaccessible. The remaining greater part of the island is also precipitous toward the sea, and it rises in two parallel ranges of hills, that on the eastern coast being the higher, and attaining an elevation of 500 feet.

A valley runs between these hills, and in it are two ponds, at some 250 feet above the sea. These supply a stream, which is about 6 feet wide and flows into the sea in the southern part of Trinity cove. Its water is of a yellowish-brown color, but it is wholesome and tastes good. There are several other much smaller streams of water, one of which runs into Atlantic cove. Trinity cove is on the western, and Atlantic cove on the eastern side of the island, both being nearly 1 mile from its southern point, and 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, except for fuel.

The island belongs to the province of Nova Scotia.

Half a mile off the island the water becomes deep, so that there is little or no warning by the lead in approaching it in foggy weather; although bold and high, many shipwrecks, attended with loss of life, have occurred upon it.

The varying tidal streams and currents add much to the danger arising from fog, which prevails in southerly, easterly, and often with southwesterly winds. (See p. 52.)

Provision depot.—A depot of provisions for the relief of shipwrecked persons, furnished by the government of the Dominion of Canada, is on the northern point of Trinity cove, where there is a store and a dwelling house for the men in charge. Fish are plentiful around the island.

Anchorage.—Small fishing vessels anchor off Trinity and Atlantic coves with offshore winds at 400 yards from the rocks in 10 to 12 fathoms, sand and gravel bottom. In very fine weather large vessels might ride with a stream anchor, at about $\frac{1}{2}$ mile offshore, in 25 to 30 fathoms, but such vessels must be ready to weigh at any sign of a change of weather. (See also Beacons.)

Atlantic cove Tide Gauge house.—A white tide-gauge house, which is conspicuous from seaward, stands about 40 feet above high-water mark on the western shore of Atlantic cove.

Beacons.—Two beacons with white circular tops are on the hill in the bight of the cove above the tide-gauge house, and in line, bearing 299° , lead well clear of Big Dick rock, a detached rock lying off the northern point of the cove, on which the sea breaks heavily. There are also two diamond-shaped white beacons about 70 yards eastward of the superintendent's house, which in line, bearing 344° , lead clear of the foul ground off the southern point of the cove, and indicate the best anchorage in 18 fathoms when their alignment intersects that of the two above-mentioned circular-topped beacons.

These beacons are intended for the guidance of vessels calling at the cove with supplies and mails as well as for small schooners and fishing vessels.

Lights.—There are two lighthouses on St. Paul island, one on the detached rock at its northern point and the other on its southern point.

North Point lighthouse, a white, octagonal, wooden tower 40 feet high, exhibits at 140 feet above high water a fixed white light, which should be seen from seaward from a distance of 18 miles in clear weather, except on northerly bearings between 351° and 41° , when it is obscured by the island throughout an arc of 50° .

South Point lighthouse, also a white, octagonal, wooden tower 40 feet high, exhibits at 140 feet above high water a revolving white light which attains its greatest brilliancy every minute, and should be seen from seaward, from a distance of 18 miles in clear weather, except on southerly bearings between 132° and 250° , when it is obscured by the island throughout an arc of 118° .

Both the lights are extinguished whenever navigation is closed, without reference to any dates. The northern light is exhibited as late in the season as there are any vessels crossing to Newfoundland, and it is resumed in March if any sealing is being done in the neighborhood of the island, although there may be no other traffic.

Fog signal.—During thick weather or in snowstorms a steam fog whistle, on the southern point of Atlantic cove, is sounded for five seconds in every minute. The fog signal building is of wood painted brown, and the whistle is about 137 feet above high water.

Marine signal and telegraph station.—There is a telegraph and signal station at the main establishment on St. Paul island, on the northern point of Atlantic cove, about 300 yards eastward of the superintendent's house.

In communicating with this station the signals should be made from positions that are visible from Atlantic cove and well clear of the cliffs either northward or southward. There is no signal station at either of the lighthouses, and signals made which are not visible from the Atlantic Cove station are not forwarded.

This signal station is included in Lloyds system. See page 66.

The telegraph cable runs from the island to Meat cove, at the northern end of Cape Breton island. A land wire crosses the island from Atlantic cove to Trinity cove.

Ice report.—This signal station is supplied with information as to ice, winds, temperature, and weather indications; and communicates this information to vessels requesting it by signal.

Tides.—It is high water, full and change, at St. Paul island at 8h. 40m.; springs rise 4 feet, neaps 3 feet. Tide tables for St. Paul island are published by the department of marine and fisheries of the Dominion of Canada.

Life Saving station.—A lifeboat and a Lyle gun are maintained at St. Paul island.

CHAPTER VI.

NEWFOUNDLAND, WEST COAST—CAPE RAY TO CAPE BAULD.

Cabot strait, the principal entrance to the gulf of St. Lawrence, lying between the southwestern end of Newfoundland and Cape Breton island, is 55 miles wide.

Cape Ray, light; fog signal, signal, telegraph, wireless telegraph, and ice report stations; tides, etc. (See pp. 263, 264.)

Brandies rock and Shag ledge. (See p. 263,)

The west coast of Newfoundland from cape Ray trends northward for about 9 miles to Larkin point, $\frac{3}{4}$ mile southeastward of which is the entrance to Little Codroy river.

The Tolt, northward $5\frac{3}{4}$ miles from cape Ray, is a conical spur 1,280 feet high, off the middle of the western face of Table mountain.

Little Codroy river can only be entered by boats, but small vessels anchor off the mouth during off-shore winds. This is a capital river for salmon and sea trout fishing from June to September.

Great Codroy river, the entrance of which is $3\frac{1}{2}$ miles northward of Larkin point, can be entered by vessels, drawing 6 feet, at low water; it can be ascended $3\frac{1}{2}$ miles from the entrance, but a pilot should be taken, as there is no leading mark and the tidal streams are very strong. There is a conspicuous church steeple on the southern side of the river entrance.

The country about Little and Great Codroy rivers near the sea is well settled and somewhat under cultivation; great stretches of land on either side of these rivers are at present covered by dense forest. There is said to be coal in these valleys.

Stormy point, westward 2 miles from Great Codroy river, is a reddish colored, narrow, cliffy projection, terminating in a ledge of low rocks, and should not be approached within $\frac{1}{2}$ mile.

Codroy road, between Stormy point and Codroy island, at 2 miles to the northward, affords indifferent anchorage in 5 to 9 fathoms of water, stony bottom, but a swell nearly always rolls in from the westward. With strong westerly winds there is no shelter, and the anchorage is then insecure. Numerous fishing nets are generally moored along the coast of the island, but the small buoys on them are visible and should be avoided.

Tides and tidal streams.—It is high water, full and change, at Codroy road at 9h. 0m.: springs rise $4\frac{1}{2}$ feet, neaps 3 feet. The flood tidal stream generally sets northward, and the ebb southward; frequently there are heavy rips between Codroy and cape Anguille, and, during stormy weather, there is nearly always a heavy confused sea in this locality.

Codroy island, 1,200 yards long in a northerly and southerly direction, and 400 yards wide, is 36 feet high, and covered with grass. It lies about 400 yards off the mainland, and shoals, with less than 3 fathoms water over them, extend about $\frac{1}{4}$ mile from its northern and southern ends. A bank of stones extends northward from a point on its eastern side, and, with a similar ridge extending southeastward from the northeastern end of the island, forms a small harbor fairly well sheltered in westerly winds. Here numerous fishing vessels occasionally anchor.

Codroy village is situated on Beach point, a stony spit, and on the rising ground behind it, immediately northeastward of the middle of the island; landing can generally be effected on the western side of Beach point, sheltered by the island and the shallow bar extending between its northern end and the mainland.

A little southeastward of the village is the church, a large white building, without tower or spire, conspicuous from seaward. The population of this locality is about 500.

Supplies.—Small supplies of fresh meat can occasionally be obtained.

Communication. A steamer from Halifax and Sydney, Cape Breton island, calls here monthly during summer; and there is communication with Great Codroy by road.

The coast between Codroy island and cape Anguille, about $2\frac{1}{2}$ miles northward, rises steeply to the western termination of the Anguille range. The higher portions of these slopes are covered with trees, but the lower portions show extensive clearings made by the settlers: the contrast between these clearings, with their large patches of dead timber, and the dark foliage of the trees above, and in some cases below them, is conspicuous from seaward.

Between the foot of the slope and the sea is a narrow strip of flat land, dotted here and there with the settlers' cottages, and immediately southward of cape Anguille is Shoal point, a small village.

Cape Anguille rises steeply from the sea to a sharp summit, 615 feet high, then the land within it, forming a small hollow, rises again to the range of high hills. The faces of the slopes on the western and southwestern sides of the cape have been cleared and are covered with grass and dead stumps of trees: but the northeastern side, and also the summit, are thickly wooded.

Light.—An octagonal tower of reinforced concrete surmounted by a red circular metal lantern, 97 feet high, at 100 feet within the coast line, northward of Shoal point, and 1 mile southward of cape Anguille, exhibits, at 115 feet above high water, a flashing white light, which shows groups of flashes every 10 seconds, thus: Light, 0.525 second; eclipse, 1.350 seconds; light, 0.525 second; eclipse, 7.6 seconds, and should be seen from all points of approach by water for a distance of 16 miles in clear weather.

A rectangular, wooden, double dwelling house, painted white, with a red hip roof, is situated at 128° , distant 288 feet from the lighthouse.

Fog signal.—A diaphone horn, situated in a rectangular wooden building with white sides and a red roof and a high brick chimney, at 174° , distant 208 feet from Cape Anguille lighthouse, is operated by compressed air, and sounds, every 90 seconds, 2 blasts each of $3\frac{1}{2}$ seconds' duration, thus: Blast, $3\frac{1}{2}$ seconds; silent interval, 5 seconds; blast, $3\frac{1}{2}$ seconds; silent interval, 78 seconds, during thick and foggy weather.

Tides.—It is high water, full and change, at cape Anguille at 9h. 0m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet; neaps range $1\frac{1}{4}$ feet.

St. George bay.—The land from cape Anguille trends northeastward for a distance of about 50 miles, and then curving to the westward for about 30 miles forms an extensive bay, the entrance to which, between capes Anguille and St. George, is $34\frac{1}{2}$ miles across. This bay is, with the exception of St. George harbor, situated at its head, entirely without sheltered anchorage, and, as westerly winds prevail, there is generally a swell rolling in, which, in gales, quickly increases to a very heavy sea.

Landing in the bay anywhere outside St. George harbor, with the exception of two small rocky bights on the northern side (*see* page 280), is impracticable during heavy westerly weather. This is especially the case on the southern shore, owing to the large number of ice-deposited stones and bowlders fronting the beaches. Numerous cottages and a few villages stand on the shores of the bay. The settlers are, with few exceptions, fishermen, and large quantities of cod and herring, as well as some salmon and lobsters, are annually caught; farming, in a primitive fashion, is carried on, but the crops are mostly confined to hay and to the small quantity of oats and potatoes required for themselves and their cattle, sheep, and horses.

Ice.—St. George bay fills with river ice, which is always in motion, being driven upon cape Anguille by northerly winds and upon cape St. George by southerly winds; the head of the bay occasionally freezes. According to the severity of the winter the ice may fill the bay early in January or not until February, and the clearance may be between April 10 and 25; but it has been full during May, and in 1886, owing to the prevalence of southerly and southeasterly winds,

it remained clear altogether. The upper part of the bay is generally frozen over between December and April; the average date of freezing is January 15, and of clearance of ice, April 8, but sometimes the bay is clear of ice throughout the winter.

Fog.—In spring, after the ice has disappeared, fog is not uncommon, but it is neither so thick nor so lasting as that on the southern coast.

Tidal stream.—During the prevalence of strong southeasterly winds the flood stream sets into the bay at the rate of about a knot an hour.

The coast from cape Anguille to Lewis point, northeastward, distant about 16 miles, is composed of cliffs, reaching, in places, a height of 270 feet, and broken here and there by gullies extending from Cape Anguille mountains, which are immediately inland. It is steep-to and free from offlying shoals, the 10-fathom contour line, over its whole extent, being about 800 yards from the shore. The tops of the cliffs and the slopes of the mountains behind are densely wooded, and waterfalls mark the mouths of several streams, especially during spring.

At the entrance to some of the gullies there are small clusters of rude huts in which the fishermen live during summer. A narrow bush trail, originally cut for the benefit of persons shipwrecked on this inhospitable coast, runs parallel with the cliffs a short distance inland and connects cape Anguille with Ship cove.

Cape John, northeastward, $1\frac{1}{2}$ miles from cape Anguille, is a rocky point, and immediately westward of it is Snake bight, which affords anchorage in 16 to 18 fathoms water, during southerly and southeasterly winds.

Great Friars cove, northeastward, 2 miles from cape John, is a small semicircular indentation at the mouth of Friar's gulch, a deep gully, and northeastward, $\frac{3}{4}$ mile from the cove, there is Old Bone-em, a remarkable needle-pointed rock detached from the cliff, which is only distinctly seen from a direction nearly parallel with the shore.

Johnsons cove lies northeastward, nearly 6 miles from Old Bone-em, and between them are three similar little bays named respectively Mary Anns cove, Hines cove (situated at the mouth of a very deep gully), and Wreck cove.

At Johnsons cove is a fan-shaped waterfall just inside of the beach, and conspicuous bare cliffs, 1,260 feet high, form the eastern side of Johnsons gulch, the deep gully which here stretches back through the range.

Lewis point lies northeastward, 3 miles from Johnsons cove, and midway between them is Little Friars cove. The point on easterly bearings shows as the apparent tangent of the cliffy coast. About 400

yards northeastward from the point are Lewis rocks, two detached rocks, the eastern being 20 feet high, and both are steep-to.

The coast from Lewis point continues cliffy eastward, $2\frac{3}{4}$ miles to Gulls Nest rock, a large detached rock, 53 feet high. Immediately westward of this there is a cluster of low-water rocks which, with Gulls Nest rock, form, at the foot of the cliff, a place known as Seal cove, where boats easily land during the fresh northerly breezes that occasionally blow obliquely across the bay. A small patch of rocks, with less than 6 feet of water over it, lies $\frac{1}{2}$ mile westward of Seal cove at 200 yards from the shore.

From Gulls Nest rock the cliffy coast trends nearly eastward for $1\frac{3}{4}$ miles, and then turns northeastward for 1,200 yards to the mouth of a gully, off which at a distance of 200 yards is Ship rock, 58 feet high.

Ship cove, formed by the slight curve in the coast $\frac{1}{2}$ mile southwestward of Ship rock, extends from the Spout, a conspicuous waterfall eastward $\frac{3}{4}$ mile from Gulls Nest rock, to Shoal point northeastward 1,200 yards from Ship rock.

Shoal point is the termination of the cliffy coast which extends here from cape Anguille, though from Ship rock to this point the cliffs are almost entirely clay and sand, while to the westward they are more generally rocky. A stony ridge, with 1 to 3 fathoms of water over it, extends southwestward 1,500 yards from the point, and terminates 600 yards westward of Ship rock. There is an extensive patch of low-water rocks and boulders directly off Shoal point, but close to the shore.

Cape Anguille mountains extend northeastward from cape Anguille and terminate southward 5 to 6 miles from Shoal point; their highest point is 1,862 feet above the sea, but the range is generally flat-topped and much cut up by large, deep gullies. The slopes are densely wooded, but the summits are bare of large trees and generally covered with dwarf spruce, which grows so thickly as to be almost impassable.

A noticeable feature on the side of the hill inland from Ship cove is the telegraph road leading to Great Codroy, which has been cut through the woods and passes over the top of the range.

The locality under the eastern end of the mountains, and extending from Shoal point to Harbor head, is known as the Highlands.

Plaster cove lies northeastward about a mile from Shoal point; its shores are dotted with the cottages of settlers, who are employed in fishing, farming, and lobster packing; at $\frac{3}{4}$ mile from the point there is a striking outcrop of gypsum in the cliff.

The northeastern part of the cove is shallow, there being only $3\frac{1}{4}$ to 4 fathoms water at 600 yards from the shore, but, westward of this,

good anchorage may be found during offshore winds in 6 to 10 fathoms water, with, in places, a soft bottom.

The summit of Robinson head open northward of Harbor head, bearing 51° , leads northward to the shoal water in this cove.

Highlands church, on the northeastern point of Plaster cove, is a conspicuous white building with a small square tower, and bearing 325° from it, distant $\frac{1}{2}$ mile from the shore, there is a small stony patch of $3\frac{3}{4}$ fathoms, with 6 and 7 fathoms of water around it.

The coast from Highlands church to Harbor head, northeastward 1 mile, is composed of clay cliffs, 65 to 100 feet high, fronted by a stony beach. Behind the cliffs there is a flat wooded rise, the summit being 200 feet high. The country eastward of this consists of low wooded ridges alternating with extensive and generally swampy flats, through which flow several streams or brooks that rise in the mountain ranges 12 to 14 miles inland. Good salmon pools exist in all these streams.

The coast for $1\frac{1}{2}$ miles east-northeastward from Harbor head falls a little, the cliffs giving place to low slopes, again succeeded by a short stretch of cliff, 80 to 90 feet high, fronting which, to a distance of 200 yards from the shore, are some detached bowlders and patches of rock.

River or Highland brook, at the eastern end of these cliffs, is rather more than 100 yards wide at its entrance, but not deep enough to admit boats except at high water. About 2 miles from the entrance this stream opens out to a small lake, which has a local reputation for large trout.

The coast from River brook to Crabb brook, northeastward 2 miles, is composed of low cliffs and steep slopes of sand and clay, fronted by a stony beach. Off this are numerous bowlders, probably deposited by ice, and $\frac{1}{2}$ mile from River brook a prong of shoal water, formed by some of the bowlders and detached rocky patches, extends 600 yards from the shore, which should here be given a berth of $\frac{3}{4}$ mile.

Crabb brook is nearly 400 yards wide between the heads forming its mouth, but a stony spit projects 200 yards from the foot of the hill on the western side. Banks of stones, that dry at low water, extend nearly across the entrance, leaving a narrow, crooked channel, in which there is only 1 foot at low water.

Small vessels enter the river at high water and discharge at a rough wharf on the eastern side. Abreast this the water quickly shoals, and the space, that at high water appears extensive, is at low water largely filled by dry banks of sand and stones. Three-quarters of a mile within the entrance the bed of the stream is filled by marshy flats, which become islands as the tide flows in little channels through them. These channels unite about $\frac{3}{4}$ mile farther up,

when the stream turns abruptly to the eastward, under a high wooded cliff.

The village is situated on both sides of the stream, just inside the entrance, but the larger number of houses is on the western side. The population is about 200, all of whom are engaged in fishing and farming.

There is a church, school, and post-office. Crabbs station of the Newfoundland railway is on the left bank of the river $2\frac{1}{2}$ miles from the mouth. There is a rough road to the southern side of St. George harbor.

Barachois brook, northeastward, 2 miles from Crabb brook, is very shallow, and has a stony bar that is nearly dry at low water; the coast between is composed of sand cliffs, rising at one point to a height of 190 feet; some fishermen live on its shores.

Robinson brook, the entrance to which lies $\frac{1}{2}$ mile northeastward from Barachois brook, has also a stony bar, which is nearly dry at low water. Inside, between the sloping sides of the river valley, are numerous flat, marshy islets, through which the stream runs in narrow channels. The village, with a population of about 200, stands on the eastern side of the entrance; there is a church and school, and the inhabitants are chiefly engaged in fishing and farming.

Good coal is said to have been discovered at about 9 miles inland from the village. There is a small patch of 5 fathoms, with 6 and 7 fathoms of water around it, $\frac{1}{2}$ mile offshore, between Barachois and Robinson brooks. The bottom is generally stony off this coast and affords only temporary anchorage.

Communication.—There is a post-office at the village. Robinsons station of the Newfoundland railway is on the left bank of Robinson brook 2 miles from the mouth. A road runs to the settlement at Sandy point, which is 26 miles distant.

Robinson head.—From the northern side of Robinson brook, the coast, of clay and sand cliffs, rises gradually toward Robinson head, distant $\frac{3}{4}$ mile northeastward. The western summit of the head is a little peak of white sand, with some grass and a few stunted trees on its landward side, where it falls steeply to a hollow in which there are two small ponds. Thence the slope rises again, turning a little southeastward and culminating in a flat-topped hill, 244 feet high. Inside this there is a short saddle, when the land rises to a grassy summit, 276 feet high. The seaward face of the slope is composed of alternating patches or strips of white sand and dark brushwood, which makes this part of the coast conspicuous from any direction.

Eastward of the hill, 244 feet high, the land falls to Stinking cove, an angle in the shore, in which there is a small lobster factory. From

this cove to Fishels brook, distant 5 miles to the northeastward, the shore consists of sand and clay cliffs, 80 to 113 feet high, and the land behind of slight elevation with marshy flats or barrens separating low, densely wooded ridges.

Three small stream, known respectively as Red brook, Seal brook, and Rattling brook, cause breaks in the cliffy shore, which is fronted by a stony beach having off it numerous ice-deposited stones and boulders that make landing at low water, even in fine weather, difficult for ordinary boats.

Here and there, behind the cliffs, are cottages and strips of cultivated land.

Fishels brook rises in the mountain range some 12 miles inland and flows into the sea between a steep bank, 130 feet high, on its eastern side, and a long, stony spit, on which are some houses, projecting from the higher land on the western side. The entrance is very narrow and, at low water, nearly dry; inside, there is a small deep pool, above which numerous banks of stones and shingle occupy the bed of the stream.

From a little over a mile off this brook a ridge of rocky, uneven ground extends toward Bank head. Its western portion, with 7 to 9 fathoms water over it, is outside the 10-fathom contour line, and there are depths of 10 to 12 fathoms around it. Eastward, the bank inclines a little toward the shore, the depth over it varying from 6 to 9 fathoms.

Bank head lies $2\frac{3}{4}$ miles northward from Fishels Brook entrance, the coast between being a continuation of the sandy cliffs to the southwestward, which, however, are in this locality somewhat higher and fronted by a wider beach of stones. Barry brook, Middle brook, and Journois brook, the last being 1 mile from Bank head, are three brooks which flow through deep valleys in this coast to the sea. Half a mile northward from Journois brook the cliff rises to its summit, 156 feet high. This cliff, which is conspicuous, is, strictly speaking, Bank head, but the whole of the neighboring locality is generally so named.

Behind the head there are some small ponds and several detached ridges of moderate elevation, separated by barrens, that so frequently occur in this country, and reaching to the foot of the range, which trends southwestward at a distance of about 12 miles inland. Several of the summits of this range are very conspicuous. There is one, $13\frac{1}{2}$ miles southeastward from Robinson head, which reaches a height of 1,764 feet, and, from the northward, appears saddle-shaped.

The coast.—Northeastward, $\frac{1}{4}$ mile from the summit of Bank head, the sandy cliff ceases abruptly, and the coast then rises to a low conical sand hill, eastward of which is Bank Head cove, a small bight. Here there are a few cottages and fish stores, and landing can

be effected when it is impracticable anywhere else between Robinson head and Sandy point.

The coast is lower northeastward of Bank Head cove than to the southwestward. It continues, in cliffs about 75 feet high, here and there covered with bushes, for $2\frac{1}{2}$ miles to Youngs cove, which is a slight curve formed by the western end of Flat island. There are a few fishermen's cottages on the shores of Youngs cove.

Flat Bay brook is a stream flowing into Flat bay. Immediately inside of the entrance, which is $\frac{1}{4}$ mile wide, is a low projecting point with some houses on it. Muddy hole, the portion westward of this point, is merely a shallow bay; the eastern portion is the stream, flowing from the mountain range at about 7 miles inland through a channel that is much obstructed by banks and islets.

South side is the district extending east-northeastward about 5 miles from Flat Bay brook. The shore is formed of low banks terminating the long slope from a ridge, about 300 feet high, the summit of which is about 1 mile inland. Numerous houses and fish stores line the shore, and the land is more or less in cultivation. A fairly good road runs westward to Robinson head and eastward to the head of St. George harbor.

Cairn or Steel mountain, a remarkable mass of ironstone, is situated $6\frac{3}{4}$ miles east-southeastward from the entrance of Flat Bay brook. From the low country behind the coast ridge, and in front of the mountain range extending from the southwestward, it rises to a height of 952 feet, and on it there are two stone cairns said to have been erected by Captain Cook. Flat Bay brook runs along the southwestern foot of this mountain. Deposits of iron and gypsum have been found in the locality.

Rugged broken ranges continue northeastward from Cairn mountain, and in this direction 3 miles away there is, on the western face of the range, a white patch, formed by a landslide, which is conspicuous from far down St. George bay.

Flat bay, between Flat island and the mainland, is very shallow and obstructed by banks which dry at low water. On the southern side there is sufficient depth at low water for a boat to go about 3 miles up the bay; but the bottom is covered with thick weeds, which would quickly foul a propeller.

Moyac or Woody island, situated toward the northeastern part of the bay, is the head of a large bank of sand and shingle, 3 feet high, and covered with coarse grass. At one time several trees stood upon it.

Flat island is a low bank of stones and shingle extending in a curve from Youngs cove to Harbor point, a distance of $6\frac{1}{2}$ miles in an east-northeasterly direction and forming with the shore of the mainland the shallow basin known as Flat bay. The width of this bank

of stones is only about 50 yards in places, while toward the eastern end it is rather more than $\frac{1}{2}$ mile. Long stretches of the bank are bare, but there are two extensive clumps of spruce trees as well as some small patches of scrub.

Three-quarters of a mile from the junction of this bank with the main shore, and northward 200 yards from the beach, there is a patch of stones which dries at low water, and shoal ground, which continues east-northeastward for some 3 miles, extends for nearly $\frac{1}{2}$ mile from the beach; seaward of this the water deepens quickly to upward of 20 fathoms. Therefore, when navigating along this shore in fog, do not decrease the depth to less than 12 fathoms. Toward the eastern end of Flat island the deep water closes the shore, and eastward of Harbor point the 5-fathom line is only 60 yards from the beach.

Light.—A circular iron lighthouse, 35 feet high, and painted with three red and two white horizontal bands, stands, on a concrete base, at 100 yards within Harbor point, and exhibits, at 35 feet above high water, a fixed white light, which should be seen from a distance of 7 miles in clear weather.

The keeper's dwelling is attached to the southern side of the lighthouse and also painted in red and white bands.

St. George harbor is situated at the head of St. George bay; its entrance, between Harbor point on the south and Indian head on the north, is 3 miles across, and its extent to the entrance of St. George river is about 3 miles.

Sandy point settlement stands on the wider part of Flat island, near its eastern end, and it has a population of about 400 people, who are chiefly employed in the fishing industry.

Communication.—There is communication with Halifax by steamer monthly during summer. St. George station of the Newfoundland railway is situated $\frac{3}{4}$ mile southward of Turf point. The mail trains, which run three times a week between St. Johns and port aux Basques, stop at St. George. There is telegraphic communication.

There is hotel accommodation of a kind at St. George for about 12 people.

Supplies.—There are some stores at the settlement, and supplies of fresh meat and vegetables can generally be obtained, either there or at South side.

Bank.—The flat sandy shore trends southwestward from Harbor point and forms a slight curve, in which there are numerous fishing stores and landing stages. A bank of sand and mud, dry at low water, extends nearly 200 yards off this shore, and 150 yards off Messervy point, which is distant about 1,400 yards from Harbor point; it is steep-to, there being 5 fathoms water within 75 yards of

the edge. A cask buoy is generally moored in 4 fathoms off the end of the shoal.

Wharf.—The government wharf at Messervy point has a depth of 2 fathoms alongside it at its southwestern corner, and 3 fathoms at its southeastern corner, but, as there is a good deal of wreckage about this part of the anchorage, keep eastward of the western corner when going alongside.

Westward of the wharf the dry bank extends farther from the shore, and the line of 3 fathoms stretches southeastward across the entrance of Flat bay.

The Episcopal church, with a low spire, is situated in a clump of trees $\frac{1}{2}$ mile southwestward from the lighthouse, and is conspicuous from the westward.

Turf point, on the southern side of St. George harbor, $1\frac{2}{10}$ miles south-southeast from Harbor point, is a low, flat projection of peat; off it are Seal rocks, some detached bowlders, which give the name to the adjoining cove and settlement. A cathedral, with a clock tower, is situated near the settlement.

Indian river, or Little Barachois brook, lies $1\frac{1}{2}$ miles east-northeastward from Turf point. Indian pond, the space within the entrance, is of considerable size, but it quickly narrows between high wooded banks. A government ferry crosses at the mouth.

St. George river entrance, which is known as the Gut, lies $2\frac{4}{10}$ miles northward from Indian river entrance. The intervening shore is composed of low sand cliffs. During fine weather boats enter the river at low water, but the tidal stream runs strongly through, and there is generally more or less swell setting on the shore; during strong westerly winds it should not be attempted. There is a large lumber mill and some houses on the southern side of the entrance. The Newfoundland railway crosses the mouth of this river by an iron bridge, and the road to Stephenville is continued by means of a ferry across the river.

Sea Wolf lagoon, on the northern side of St. George harbor, is between an indentation in the shore and a long narrow strip of stony beach; its entrance is nearly dry at low water, but inside of the spit there is a depth of $3\frac{1}{2}$ fathoms.

Indian head is a remarkable cliffy headland on the northern side of St. George harbor. The summit of the cliff is 180 feet high, but it gradually rises to a conspicuous conical wooded peak, 631 feet high, at $1\frac{1}{2}$ miles to the northeastward, from which wooded hills extend northeastward to a deep valley which separates them from the higher ranges inland. Some conical summits of these higher ranges are conspicuous from seaward; mount Hubert, which has some remarkable bare patches near its summit, is 1,472 feet high, and a peak $10\frac{1}{2}$ miles northeastward from Indian head is 2,290 feet high.

The northwestern sides of Indian Head hills fall steeply to a large shallow lagoon, separated from the sea by a narrow strip of stony beach 300 yards across, which trends north-northwestward nearly 3 miles from Indian head. Off this beach, and also off Indian head, the 10-fathoms line is less than $\frac{1}{2}$ mile from the shore.

Anchorage.—The soundings in the middle of St. George harbor northward of Harbor point vary from 12 to 18 fathoms, and there is anchorage anywhere within a reasonable distance of the shore, but during strong westerly winds a heavy sea sets in, and during fresh easterly winds there are violent squalls off the high land. The anchorage under Flat island should, therefore, be obtained if possible; it is easy of access, and affords excellent holding ground, with smooth water, in 6 to 10 fathoms water, stiff mud bottom. A good berth is in 7 fathoms of water, with the outer end of the government wharf bearing 278° , and the lighthouse 356° . Strong easterly winds are frequently experienced here, but though the squalls are very heavy, the water is smooth, the holding ground very good, and a vessel can lie in safety.

Many local schooners anchor on the southern side of the harbor off Turf point.

Tides.—It is high water, full and change, at Sandy point at 9h. 45m.; springs rise $5\frac{1}{4}$ feet, neaps $3\frac{1}{2}$ feet; neaps range $1\frac{1}{2}$ feet.

During springs the tidal streams run with some strength at the anchorage.

Directions.—Round the beach at Harbor point at a convenient distance, give its southern side a berth of over 300 yards, and anchor as above directed.

Stephenville comprises the district extending northwestward about 5 miles from Indian head. There are numerous houses about the shores of the lagoon, northwestward of Indian head, and on the low slopes northwestward of it, as well as on the beach; and there is also a Roman Catholic church standing near the beach. A road passes round the lagoon to the ferry at St. George river, and also westward to Isthmus bay. At a short distance eastward of the church, Blanche river, a small stream, flows through the stony beach into the sea; the country inland is of moderate elevation, thickly wooded where not cultivated, and has several ponds.

Romaines brook flows into the sea $3\frac{1}{2}$ miles westward from Stephenville church, the coast between being high banks of sand, broken in places by small streams; the entrance to the brook is dry at low water and very narrow; the pools inside are frequented by sea trout. About 200 yards within its mouth the brook is crossed by a bridge carrying the road to Isthmus bay; above it the stream is obstructed by banks of stone and shingle, and on the eastern side there is a remarkable outcrop of gypsum, small quantities of which are

occasionally exported; this outcrop is conspicuous from the southward when the sun is shining on it.

Supplies.—One of the best farms in this locality is situated on the right bank of the stream, and such supplies as fresh meat and butter can generally be obtained there.

Table mountain, a thickly wooded hill, rises to the height of 980 feet, at $1\frac{1}{4}$ miles north-northwestward from the entrance to Romaines brook; northward of this summit it rises a little, forming the southern end of the range of high hills extending along the eastern shore of Port au Port. Deposits of asbestos have been found in these hills, and the mines are worked during summer.

The country northeastward of Table mountain is broken, but rises gradually from the coast; two detached whale-backed summits, about 4 miles inland, the higher of which is 1,090 feet high, are conspicuous.

Table mountain slopes gradually westward or toward Isthmus bay, and terminates in a steep sand cliff 94 feet high, near the western end of which is the conspicuous Roman Catholic church, with a high white spire.

Isthmus bay is the indentation in the coast just southwestward of Table mountain. It is about $1\frac{1}{4}$ miles across and $\frac{1}{2}$ mile deep. The soundings in the bay increase gradually from the shore to 6 fathoms, stone and gravel bottom, and though frequently used as an anchorage, the holding ground is uncertain, and there is a heavy swell during westerly to southwesterly winds. The stony beach at the head of the bay is about 50 yards across, and behind it is a shallow lagoon separated from East bay of Port au Port by another narrow stony beach. There are numerous cottages on both these beaches, as well as on the sloping ground over the western side of the bay. The Episcopal church and the post-office are on the eastern side, approached from the shore by a road up the steep sand cliff, which terminates the slope of Table mountain.

This district is locally known as the Gravels, and the population is about 100.

Shoals.—About 1 mile south-southeastward of the western point of Isthmus bay there are some patches with 6 to $6\frac{1}{2}$ fathoms of water over them, and southward, distant $1\frac{6}{10}$ miles from the same point, there is a stony patch of 5 fathoms: slight tide rips form over these patches at spring tides.

Tides.—It is high water, full and change, at Isthmus bay at 9h. 40m.; springs rise $5\frac{1}{4}$ feet, neaps $3\frac{1}{2}$ feet.

Communication.—Coasting steamers call at Isthmus bay occasionally during summer, and there is a short pier on the western shore for their convenience, but the postal communication is generally by road to Benoit station of the Newfoundland railway, which is situated about $1\frac{1}{2}$ miles northward of the mouth of St. George river.

The coast, westward of Isthmus bay, is composed of low cliffs backed by thickly wooded ridges 125 to 270 feet in height, for about $2\frac{1}{2}$ miles, to Felix cove, a slight bend, where a few houses are located and a small stream runs over the beach. There is a rocky patch with $4\frac{1}{2}$ fathoms of water over it $\frac{1}{4}$ mile southward of the cove.

The coast, westward of Felix cove continues in low cliffs, but the bordering land rises in densely wooded ridges 400 to 500 feet high.

At $1\frac{1}{2}$ miles from Felix cove, and below two rather conspicuous houses on the green slope, is a rocky cove affording a partially sheltered landing place for boats except in very bad weather. The rocks forming this cove make a small angle with the shore for about 70 yards, the entrance facing eastward.

This coast is everywhere steep-to.

Campbells cove is a small bight in the coast at $2\frac{3}{4}$ miles westward of Felix cove. In the middle of the cove is a rocky projection affording a good landing place, and, being more sheltered, it is better than that just described. At low water, however, there is hardly depth enough for an ordinary ship's boat, and, if there is any swell running, landing can not safely be effected until the tide has risen.

There are several cottages and a good deal of cultivated land around the shores of the cove. A fairly good road runs to Isthmus bay. Pierways hill is a remarkable stone and comparatively bare hill, with two similar summits; the western summit, north-northwestward nearly a mile from the cove, is 779 feet high, and it falls in a gradual slope to Abrahams cove.

The western point of Campbells cove is a perpendicular cliff, 99 feet high, having some rocks and boulders at its foot. Messervy cove is a small indentation westward of the western point of Campbells cove, and there are some houses and cultivated lands around it.

Abrahams cove.—The coast continues cliffy to Abrahams cove, an indentation with a ravine at its head, westward, $2\frac{1}{4}$ miles from Campbells cove; there is a very conspicuous cliff, 145 feet high, on its western side. Here the 20 fathom contour line crossing St. George bay from the southward closes the coast and continues westward at a distance of about $\frac{1}{2}$ mile.

The land within Abraham cove consists of flat-topped thickly wooded ridges.

Jerry's nose, a low rocky point $1\frac{1}{4}$ miles westward of Abrahams cove, forms the eastern side of Fiords cove, a small bight, where there are also some cottages. Numbers of dories may be seen about all these coves, but there is no landing in bad weather except where mentioned.

Ship island, small, rocky, and 36 feet high, lies off the end of the projection on the western side of Fiords cove, with which it is connected at low water. A rocky patch, with $3\frac{1}{2}$ fathoms of water over it, lies from 200 to 500 yards southwestward from the island; there is a

depth of $6\frac{1}{2}$ fathoms between the island and patch, but the passage is narrow and should not be used.

Ship cove lies northwestward of Ship island and of the projection on the western side of Fiords cove, and though a deeper bight than any of those to the eastward, it does not afford good anchorage except during continued periods of off-shore winds. At the head of the cove is a shingly beach on which are some cottages, and a path through a valley between the ridges leads to Head harbor (Pic à Denis harbor) in Port au Port.

The coast, consisting of rugged, irregular cliffs 80 to 90 feet high, continues from Ship cove westward for $1\frac{1}{2}$ miles to Pigeon head, a remarkable perpendicular bluff, 110 feet high, with some bowlders and ledges of rock at its foot, but they are steep-to. Inland there are thickly wooded ridges, 700 to 800 feet high, intersected here and there by deep ravines from which streams flow into the sea.

Lower cove is northward of Pigeon head, from which the cliff falls gradually toward the beach at the head of the cove, where there is a small settlement.

In the mouth of the cove, bearing 270° , distant 1,200 yards from Pigeon head, there is a rocky shoal of 4 fathoms with 7 to 11 fathoms of water around it. Inside the shoal temporary anchorage may be found in 7 to 10 fathoms of water, but the ground is rough, and with westerly winds there is a heavy swell.

The coast, composed of moderately high cliffs, continues from Lower cove westward to a small gravelly beach with sloping ground behind it, and a large waterfall near, locally known as Charlie Sheaves cove, and where there are two or three houses. Westward the cliffs again become higher for a short distance, falling gradually toward March point at $4\frac{1}{2}$ miles from Lower cove. At $1\frac{1}{2}$ miles eastward of March point the land rises very steeply from the cliffs to a hill, the eastern part of which is bare and stony, and conspicuous from the southward and westward. The western part, separated from the eastern by a deep gully, is thickly wooded and culminates in a summit 765 feet high, though farther inland the hills again rise to a height of 1,120 feet.

Sea Mouse rocks are three rocky patches lying off the coast between Charlie Sheaves cove and March point. The northeastern patch, bearing 262° , distant $2\frac{1}{4}$ miles from Pigeon head and 750 yards offshore, has a depth of 15 feet over it; it is about 250 yards long east and west, and 150 yards wide within the 3-fathom line.

Bearing 214° , distant 750 yards from this northeastern patch, is a patch with $5\frac{3}{4}$ fathoms least water over it, and there is a narrow channel between them with 12 fathoms of water.

The western shoal bears 262° , distant $1\frac{1}{10}$ miles from the northeastern patch and 750 yards offshore; it is about 300 yards long east

and west and about 200 yards wide within the 3-fathom line, with a least depth of 6 feet over it. Between these shoals and the shore the soundings vary from 6 to 10 fathoms.

The whole of the shingle beach at the head of Ship cove, open southward of the cliffy bluff half way between it and Pigeon head, bearing 79° , leads southward of the two shoaler patches, but over, or close-to, the $5\frac{3}{4}$ -fathom patch.

March point is low and flat, and it is noticeable from its generally green appearance projecting some little distance from the dark wooded hills behind. Eastward of it there are some houses, both on the shore and on the flat, and near them the ground is more or less cultivated. The point is fronted by a stony beach and some ledges of rock, off which the 5-fathom line extends to the distance of $\frac{1}{4}$ mile. March Point bank, south-southwestward $1\frac{1}{2}$ miles from March point, is a ridge about $1\frac{1}{2}$ miles in length, with 22 to 24 fathoms of water over it.

The coast from March point trends west-southwestward, and consists of low cliffs with a narrow strip of level land behind them, thickly wooded except where cleared by settlers, and extending to the foot of the hills, which here approach the sea. The stony beach, having off it some flat ledges of rock, is fairly steep-to, but the bottom is rough and only fit for temporary anchorage in fine weather.

Degras is a small settlement nearly 3 miles from March point; and Grand Jardin is a similar settlement $1\frac{1}{2}$ miles farther westward. The inhabitants of these two places, and also those at Petit Jardin, a few huts $\frac{3}{4}$ mile westward of Grand Jardin, are principally French, and engaged almost entirely in fishing.

Cape St. George.—From the land 960 feet high, at $1\frac{1}{4}$ miles north-northwestward of the village of Degras, dark wooded ridges, with occasional bare stony summits, fall toward cape St. George, a short distance from which the woods terminate and bare grassy slopes extend to the cliffs, which on the southern side of the cape are about 50 feet high. A pyramidal rock, connected with the western end of these cliffs by a low shelf, shows well from the southward; close to it is a low detached rock, and here the coast turns abruptly northward, rising in high perpendicular cliffs, which at a distance of $\frac{1}{4}$ mile from the cape are 225 feet high. Cape St. George is steep-to, and may be rounded closely, but a swell nearly always sets on to the shore, and the tidal streams are strong.

The coast from cape St. George to cape Cormorant consists of high cliffs, and nearly midway is Big cove, where a few fishermen occasionally live during summer. Northward of this cove the cliffs are fronted by some low rocky islets and rocks, but the coast is generally steep-to and free from off-lying shoals. The land rises in bare

stony hills and wooded gullies to the summit of White hills, a long rocky ridge which extends eastward toward the head of Port au-Port.

Cape Cormorant, north-northeastward $5\frac{1}{2}$ miles from cape St. George, is a perpendicular limestone cliff, about 700 feet high, from which the land rises in a steep slope to a somewhat conical summit 968 feet high, at a distance of $\frac{1}{4}$ mile inland.

Red island, northwestward, distant $\frac{9}{10}$ mile from cape Cormorant, is about 1,400 yards long in a northeasterly and southwesterly direction and 700 yards wide; its coast consists of red clay cliffs, rising, on the northwestern side, 292 feet above the sea. The top of the island is covered with coarse grass and dead stumps of trees, and at the southeastern end, where there is a stony beach and spit at the foot of the cliffs, are some storehouses and dwellings that may be occupied by fishermen during summer. A wooden tramway, for conveying stores from the beach to the top, is conspicuous from the southward.

The northern side of the island is fairly steep-to, shoal water of less than 3 fathoms fringing it to the distance of about 200 yards; but foul ground extends off its northeastern and southwestern ends for about $\frac{1}{4}$ mile, and continues off the southern and eastern sides of the island.

The Ridge crosses from the southeastern end of Red island to the mainland and meets the coast at a steep gully, 1,400 yards eastward from cape Cormorant. It is narrow and rocky, being midway between the island and the mainland, where the depth is 15 to 18 feet, about 100 feet across; nearer the island and about 400 yards from the end of the stony spit, there is a depth of 9 feet water, but between this and the spit there are depths of 12 feet.

Vessels of suitable draft cross the Ridge in fine weather with Crow head (the first cliffy headland northeastward of the island) in line with Low point, bearing about 47° .

Tidal streams.—At springs the streams run strongly over the Ridge, the flood setting northeastward and the ebb southwestward, and there are considerable overfalls on it, especially with strong westerly winds, whilst in heavy weather breakers extend over nearly its whole extent.

Red Island road.—There is fairly good anchorage northeastward of the Ridge, with southerly winds, in 11 to 14 fathoms water, sand and in places mud bottom; but a heavy sea sets in with southwesterly and westerly winds, and although a vessel, with good ground tackle, might hold on, it would be imprudent to remain. A good berth, for a large vessel, is in 14 fathoms of water, with the northeastern end of the island, bearing 279° , and the first cliff northward of cape St. George just shut in, 201° . White rock. (See below.)

A heavy ground swell usually indicates strong westerly winds in this locality.

The coast is cliffy for about 1 mile eastward of cape Cormorant, it then turns to the northeastward, and is low and fronted by a stony beach for about $2\frac{1}{4}$ miles, whence to Crow head, a bluff 112 feet high, distant $1\frac{1}{2}$ miles, it consists of cliffs of moderate height. Low point, $1\frac{1}{2}$ miles southwestward of Crow head, is a slightly rounded projection of the shore, and westward of it is les Vaches, a small settlement where there is a lobster factory and some cottages. The land behind this coast rises gradually to thickly wooded ridges of moderate height.

White rock, lying $\frac{1}{2}$ mile offshore with the northeastern end of Red island bearing 267° , distant $1\frac{3}{16}$ miles, and nearly midway between Low point and the Ridge, is a small rocky patch with a depth of 18 feet over it: the land about cape St. George, open westward of the cliffs southward of cape Cormorant, bearing about 201° , leads westward of the rock.

Cow rocks, a cluster of rocks and shoals about 1,600 yards long in a northeasterly and southwesterly direction, front the coast about Low point at a distance of 600 yards. The northeastern rocks are 9 feet high; 700 yards southwestward from them is a small cluster that dries 4 feet, and between are several shoal patches, while southwestward, 700 yards from the rocks that dry 4 feet, and directly off the houses at les Vaches, is a detached rock with 18 feet water over it.

Cow rocks are fairly steep on the northwestern side, there being depths of 10 fathoms at about 700 yards outside of them: in thick weather, therefore, when passing along the coast, do not shoal the water to less than 20 fathoms to insure passing outside of Red island and these rocks.

The coast for a short distance northeastward of Crow head consists of cliffs; it then falls quickly and continues low to Three Rocks point, a distance of 2 miles. In the shallow bight between the head and point there are a few fishermen's cottages.

Three Rocks point has three rocky islets off it (the western being 14 feet high), and a store and huts on the beach inside. Some shelter is afforded by the rocks, and landing may be effected here when it is impracticable elsewhere in the locality: but a very heavy sea rolls along the coast with winds westward of south-southwest.

Shoals.—There are depths of less than 5 fathoms for 1,300 yards westward of Three Rocks point, and there is a patch, with a depth of $2\frac{3}{4}$ fathoms over it, bearing 275° , distant 800 yards from the highest islet. Northeastward of the point a shelving ledge extends 500 yards from the shore, and outside of this there is very foul ground with depths of less than 3 fathoms for 300 yards farther; this locality should therefore be approached with caution.

Cow rocks open northwestward of cape Cormorant, bearing about 216° , leads northwestward nearly $\frac{1}{2}$ mile from the $2\frac{3}{4}$ fathoms patch, in 12 to 15 fathoms of water.

The coast, trending east-northeastward from Three Rocks point, gradually rises, in clay cliffs, to a height of 230 feet and then falls again to Red point, a slight projection from which low cliffs continue to Clam Bank cove, nearly 4 miles from Three Rocks point. The coast is fronted by rocky ledges, and shoal water extends about 600 yards off it, but between Red point and Clam Bank cove there are depths of 5 fathoms and less for nearly $\frac{1}{2}$ mile offshore.

There is a small lobster factory at Salmon cove, on a stony beach, eastward of Three Rocks point, and a few settlers' cottages stand along the shore; the inhabitants live principally by cod fishing.

Round head, a remarkable hill bordering the coast between Three rocks and Red points, has three distinct conical summits, the middle and highest being 880 feet high. The seaward face of this hill is a perpendicular cliff, and, with the conical summit, is conspicuous.

The southern slope and summit of Round head are thickly wooded with spruce, pine, and birch; the hill falls rather steeply to a ravine just behind it, from which Victor brook, a small stream, runs into West bay, Port au Port. Southward the country is composed of thickly wooded hills and valleys, having a general east-and-west direction and culminating in White hills (p. 283).

Clam Bank cove is a small bight with a broad stony beach, on which, as well as on the bank behind it, there are some fishermen's cottages. A ledge of rocks projecting from the western point of the bight, gives some little shelter to boats when landing, except at low water; but during strong westerly winds, the heavy sea makes landing impracticable.

A rough road is cut from the vicinity of the cove, through the wooded country, to Port au Port.

The coast.—The western shore of the remarkable tongue of land known as Long point may be considered to begin at Clam Bank cove, from which place the extreme of the point is about $12\frac{1}{2}$ miles distant. Along this shore there are two small villages, known as Shoal cove and Black Duck brook, as well as a few detached cottages of the settlers, who, in this locality, are chiefly of French descent. Between Clam Bank cove and Black Duck brook the point is about 1 mile across, but northeastward of this its average width is not more than 400 yards. It is thickly wooded with dwarf spruce and other stunted trees and bushes, excepting near its northeastern end, and slopes gently from the eastern side toward the sea. It is fronted throughout nearly the whole of its length by rocky ledges and bowlders extending from the shore for distances of

100 to 200 yards, and it is only at rare intervals that a heavy surf is not rolling in on these.

Immediately westward of Clam Bank cove the coast line is composed of cliffs 80 to 100 feet in height, which gradually fall to a low shore at the village of Shoal cove.

Black Duck brook.—The village of Black Duck brook, nearly a mile northeastward of Shoal cove and $4\frac{1}{2}$ miles from Clam Bank cove, is principally situated on the shores of a sandy bight, where a sharp bend of the coast line in an easterly direction narrows the tongue, forming Long point, to about 600 yards. Off the point at the western angle of the bend a rocky ledge, dry at low water, extends for a distance of nearly 600 yards and gives some shelter to the bay, except during northwesterly winds. Shoal water extends from the rocky ledge for nearly $\frac{3}{4}$ mile in a northerly direction; vessels wishing to communicate should therefore approach with caution. Near the point previously mentioned a store with a flagstaff makes a conspicuous mark from seaward.

The inhabitants, principally fishermen, are also owners of several head of cattle and sheep, for which they find pasture in the neighborhood. A lobster factory near the eastern end of the village is worked during the summer by a party of fishermen. There is a good road to Port au Port.

Echelles or Portage.—Two boat ways connect Black Duck brook factory with Port au Port. Boats are hauled up to the top of the hill, by a capstan, and lowered on the opposite side, thus saving the fishermen the necessity of going around Long point.

The coast from Black Duck brook to Long point consists of low banks fronted by rocky ledges and boulders. The land slopes from the southeastern side of the tongue and the narrow flats, contiguous to the northwestern shore, are generally mere bogs. At about $1\frac{1}{2}$ miles from the point the land becomes bare of trees, and covered with coarse grass.

Long point is the eastern end of the tongue, which for $\frac{1}{2}$ mile within the point is a narrow strip of rocks. A spit of shoal water, forming the bar, extends northeastward nearly a mile from the point.

Position.—The observation spot, at $1\frac{1}{4}$ miles southwestward of Long point, and on top of the highest bank directly behind the eastern huts, used during summer by migratory fishermen, is in north latitude $48^{\circ} 46' 28''$ and longitude $58^{\circ} 46' 37''$ west of Greenwich.

Banks.—The 20-fathom contour line passes about 1 mile off Three Rocks point, but a long, narrow, irregular bank, with 17 to 20 fathoms of water over it, extends north-northeastward about $8\frac{1}{2}$ miles from Round head. Northeastward of this bank the 20-fathom contour line again approaches the shore to distances of from $1\frac{1}{2}$ to 3 miles, but at 6 to 7 miles off Long point there are some extensive banks of 17 and 20 fathoms.

A long narrow bank, with depths of 7 to 10 fathoms over it, extends parallel to the coast of the tongue at a distance of $1\frac{3}{4}$ miles, its western end being 3 miles from Black Duck brook.

Between this bank and the shore there is a long bank with depths of 8 to 10 fathoms over it, while between the two, as well as between the inner bank and the shore, the depths vary from 11 to 14 fathoms.

Leading mark.—Cape Cormorant cliff, just open northward of the western shoulder of Round head, astern, bearing about 227° , leads inside the outer of these banks and up to the mark for entering Port au Port.

Port au Port is the extensive area southward of a line joining Long point with Bluff head, the latter being a conspicuous cliffy headland of the mainland, bearing 98° , distant $5\frac{1}{2}$ miles from the point. The southwestern part of this area is divided by a projection terminating northward in Shoal point, into East and West bays, both of which are extensive.

The shores of this inlet are very sparsely populated, and the major portion of the inhabitants are settled on the southern shore of East bay and on Shoal point.

The eastern shore has a few settlers, and Long Point tongue, besides a few permanent residents, is visited in summer by fishermen.

Codfish are caught in large numbers about the bar and on the banks outside, and lobsters abound near Long point, as well as around the rocky coasts of Fox island and its vicinity. There are two factories for tinning lobsters at the Gravels, at the head of East bay, and one at Fox island, while there are ruins of others at Long point and Broad cove.

Several mineral deposits have been found in the neighborhood of Port au Port, and asbestos is being mined in the hills, eastward of Bluff head.

Anchorage.—Excepting in Pic à Denis harbor at the head of West bay, where the depth is only sufficient for vessels of moderate size, Port au Port does not afford secure anchorage, although the bottom is generally mud.

Southeasterly to northeasterly gales blow violently, even during summer, and although the eastern shores may at such times afford sheltered anchorages, the probability of the wind shifting to the southward and westward renders them insecure.

West bay affords the best anchorage during southwesterly and northwesterly gales. (See p. 289.)

In uncertain weather avoid anchoring on the southeastern side of Long Point tongue, eastward of the portage from Black Duck brook, for here southerly and easterly winds, which are very prevalent, throw up a short choppy sea, and the bottom, although mud, is soft, and is not so good holding ground as that farther southwestward.

Ice.—Port au Port generally freezes early in January and the ice breaks up toward the end of April; during the winters of 1884–1886 the bay did not freeze, but this had not happened before for fifty years. Field ice never enters the port to a great extent, and under no conditions inside Fox island.

The southeastern shore of Long Point tongue is higher than the seaward side, and is for the most part composed of cliffs, which in places reach a height of 114 feet, and rocky foreshore.

At Beach point, southwestward $1\frac{3}{4}$ miles from Long point, a stony beach projects a little to the eastward, and incloses a shallow pond. In this locality there are a few huts as well as an old lobster factory. Farther southwestward are a few scattered cottages, and abreast Black Duck Brook village is a wooden tramway, on the face of the slope, for conveying goods to the road leading to the villages, as landing is frequently made here when the weather prevents communication with the shore outside. It often happens, however, during southerly winds, that landing on the inner side is impracticable, owing to the sea on the rocky shore, and the absence of shelter for boats.

Tidal stream.—Near the shore about Beach and Long points the ebb stream at springs sets strongly, sometimes at the rate of 2 knots an hour, northeastward, and turns westward across the bar, where it causes eddies and overfalls. Outside the bar this stream sets westward.

French bank lies southeastward about $\frac{1}{2}$ mile from Long point; within the 5-fathom contour line it is nearly circular, and about $\frac{9}{10}$ mile in diameter. The depths over it are generally from 4 to 5 fathoms, but there are two small heads on which the least water is 22 feet. One of these is near the middle of the bank, and the other near the southern end. There is a good passage, carrying 9 fathoms water, between this bank and the shore to the westward.

American bank is situated near the middle of the outer part of Port au Port, its northern end being separated from French bank by a channel 1,400 yards wide, with depths of 7 to 9 fathoms in it.

Within the depth of 5 fathoms the bank is $3\frac{1}{2}$ miles long in a northerly and southerly direction and $1\frac{1}{2}$ miles wide at its widest part, which is nearly 2 miles from the southern end. The general depth on the bank is 2 to 5 fathoms, rock, stones, and sand bottom, but there are the following patches on it.

A shallow patch, 1,400 yards long, north-northeast and south-southwest, with less than 6 feet water over it, lies 1 mile from the northern end of the bank, and on this patch are 3 large bowlders awash at low water; there are depths of $1\frac{1}{2}$ to 3 fathoms around the patch.

Near the southern end of the bank there is a rocky head with 7 feet water over it and 2 fathoms around, and on the northwestern end of

the bank is a patch with 9 feet water over it. These shallow spots only break during heavy weather.

There is a small rocky head, with 19 feet water over it, southward 1,200 yards from the southern 5-fathom edge of American bank.

Leading marks.—Road point, in line with the southwestern end of Fox island, bearing 164° , leads 600 yards eastward of French bank and about the same distance eastward of American bank; the left extreme of the high hills, on the southern side of the valley behind Bear head, just open westward of Shag island, bearing about 44° , leads between French and American banks and into West bay; the summit of Bear head in line with North rock (off Fox island), bearing 27° , leads from westward of Fox island southeastward of American bank and of the detached shoal off its southern end.

The shore from Black Duck landing trends southwestward in cliffs and broken rocky foreground, for $3\frac{3}{4}$ miles to Rocky point, a low bluff; and the whole of the southeastern side of Long Point tongue between Beach and Rocky points is fairly steep-to and may be approached to a distance of 200 yards, except a little southwestward of the landing place, where the bank extends off 600 yards to the depth of 5 fathoms, and a little northeastward of Rocky point, where a rocky head, with 2 fathoms water over it, lies 400 yards from the cliffs, and the bank, with less than 5 fathoms, reaches 900 yards offshore.

West bay.—The shore from Rocky point, low and of sand and shingle, turns southward and southeastward for about 5 miles to South head of West bay, a rocky spur which divides the head of West bay into two parts.

A few settlers reside on this shore, in which there are several small streams, the largest being Victor brook, $1\frac{1}{4}$ miles from Rocky point, and Harry brook, $2\frac{1}{2}$ miles from South head; both afford good fishing. Inland to the southwestward thick wooded hills rise in long sloping ridges to heights of 700 and 800 feet.

With the exception of a small patch of $4\frac{3}{4}$ fathoms, lying westward $1\frac{2}{10}$ miles from the northern extremity of Shoal point, West bay is clear and has a general depth of 7 to 9 fathoms, mud bottom. Northerly gales raise a heavy sea, especially during the ebb tidal stream.

Anchorage.—The middle of West bay, westward of Shoal point, affords the best anchorage during southwesterly and northwesterly gales, for large vessels, in Port au Port, as the sea, although heavy, is not so short as in East bay, and the stiff mud bottom is fairly good holding ground. During easterly winds also anchor in the middle of the bay. West road, the western part of the bay, affords shelter in westerly winds.

Head harbor or Pic à Denis (locally Picadilly), the bight on the eastern side of South head, is about 2 miles in extent to the southward and $1\frac{1}{2}$ miles wide. Its western shores are rocky, the wooded hills behind rising steeply to a long ridge extending southwestward toward Lower cove in St. George bay. The head of the bight is low, and flat land extends a little distance back toward the hills; the eastern shore is a low bank of peaty soil. At the head of the bight and on the western side there are two small streams.

Flats of sand and mud extend for some distance off the shores of this harbor, and the depth in the middle is $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms. The harbor affords anchorage to vessels of moderate size, the holding ground is good, and the anchorage secure even during strong northerly winds.

A settler's dwelling house, storehouse, and stage are situated on the western shore at $1\frac{1}{2}$ miles southward of South head, and limited quantities of meat, butter, and milk may sometimes be procured. The flat land at the head of the bay is cultivated to some extent; a road leads to Abrahams cove, and a path to Ship cove, in St. George bay, across the neck, between the hills, which are here comparatively low. There is also a road to West bay.

Tides and tidal streams.—It is high water, full and change, in Pic à Denis harbor at 10h. 20m.; springs rise $6\frac{1}{4}$ feet, neaps $4\frac{1}{4}$ feet; neaps range about $2\frac{1}{4}$ feet. There is considerable diurnal inequality in the height of the tides at Port au Port, consecutive high waters differing from $2\frac{1}{4}$ feet to 3 inches, and consecutive low waters from 2 feet to 1 inch.

The flood stream sets along the western side of Shoal point and directly into the harbor; the rates of both flood and ebb are sufficient to cause a heavy short sea when the wind is contrary.

Shoal point is the northern end of a narrow, flat spur extending northward $4\frac{3}{4}$ miles from the range of hills of which Pierways hill is the summit. The height of this spur gradually decreases until at about 2 miles within the point it becomes a flat about 15 feet high, with straight peaty banks on either shore. The inner part is wooded, but the outer part for about 2 miles is covered with moss and coarse grass. A little over $\frac{1}{4}$ mile within the point the grass-covered bank ceases, and the northern portion is a low shelf of sand inclosing muddy spaces, into which the tide flows.

Off the western side of the spur the shoal water shelves away gradually into 5 and 6 fathoms at about $\frac{1}{2}$ mile distant, but off the eastern side it extends 1,400 yards to a mile, and northward of the point a large flat of sand, with several bowlders on it that dry, extends, within the 5-fathom line, about $2\frac{1}{4}$ miles. This flat, the greater part of which has less than 15 feet water over it, obstructs navigation between East and West bays, particularly in thick weather, as then

the low land terminating in Shoal point is most difficult to make out, and the lead is the only guide.

The summit of Round head in line with the first rise in the trees, just northward of Rocky point, bearing about 250° , leads northward of the northern end of the flat, but this mark leads close to the tail of American bank. A better mark is a flat-topped distant mountain in line with the low wooded bluff over Fox brook, bearing 89° (see page 292); this is easily recognized except when the sun is on about the same bearing.

From a depth of 5 fathoms, at the northeastern end of Shoal Point flat, bearing 45° , distant $2\frac{1}{2}$ miles from the point, a narrow ridge, with depths of $5\frac{1}{4}$ to $5\frac{3}{4}$ fathoms over it, extends north-northeastward, toward American bank for $1\frac{1}{2}$ miles.

East bay extends about $6\frac{1}{2}$ miles to the southward, and is $5\frac{1}{2}$ miles wide; a considerable portion of it has depths of over 20 fathoms. The western shore of East bay from Shoal point trends southward for about $3\frac{1}{2}$ miles, in low peaty banks and a narrow sandy beach; thence it turns southeastward and after rising in slopes for about $1\frac{1}{2}$ miles, becomes rocky and forms, just westward of the Gravels, three small deep coves. Behind the foreshore the land rises in more or less wooded slopes to the summit of the ridge extending eastward from Pierways hill.

Boswarlis is a small settlement on the shore of East bay $3\frac{1}{2}$ miles westward of the Gravels; it has a few cottages and a schoolhouse. Limited supplies of such provisions as meat and butter may generally be obtained at the settlement during late summer and autumn.

The Gravels is the locality of the narrow neck separating Port au Port from Isthmus bay (page 279); a small steam vessel, belonging to one of the lobster factories, almost daily communicates with the several fisheries around the shores of Port au Port.

Anchorage.—The anchorage in East bay, off the Gravels, is by no means secure, although the bottom is mud, owing to the deep water running close to the shore, and the consequent heavy sea that sets in during strong northeasterly to northwesterly winds.

The eastern shore of East bay trends north-northeastward $2\frac{3}{4}$ miles from the Gravels to Black head, and is tolerably steep-to; the land behind rises to a conspicuous ridge or plateau, the summit of which is 1,210 feet high, terminating at its southern end in Table mountain. Northward this plateau rises to the height of 1,360 feet, before it gradually falls to Fox Brook valley. Its western face is bare, gray rock, which, in contrast with the dark trees on the lower slopes, makes it conspicuous.

Two Guts barachois, situated $2\frac{2}{10}$ miles northward from Black head, is a shallow lagoon separated from East bay on its western side

by a narrow strip of sandy beach. At its southwestern end there is a small opening, but a bar off it dries at low water.

There are a few settlers occupied in fishing and farming along the shore in the vicinity of the lagoon.

East road, just southwestward of Two Guts barachois, is probably the best anchorage on this side of the bay, during the strong northeasterly to southeasterly winds which so frequently blow here. The bottom is mud, and a vessel can anchor as convenient, but, should the wind haul to the southward, with a falling barometer, as it usually does, it would be prudent to shift into West bay.

Road point is a long, rounded projection of the coast, $2\frac{3}{4}$ miles northward from the opening into Two Guts barachois. It is steep, red clay banks, 20 feet high, to seaward, and the land behind is covered with coarse grass and clumps of dead trees. Comparatively level country, thickly wooded, reaches inland from Road point to the high stony plateau (see above), and is bounded on its northern side by Fox brook.

From Road point the shore bank of less than 3 fathoms gradually increases its distance offshore to 1,200 yards, and closes in about $\frac{1}{2}$ mile northward of Fox brook.

Anchorage.—There is indifferent anchorage northward of this bank, in 10 fathoms water, mud bottom, with the southern end of Fox island bearing 287° , distant $1\frac{2}{10}$ miles, but it is only safe during southerly and southeasterly winds and fine weather.

Fox brook, the entrance to which lies north-northeastward, $1\frac{1}{4}$ miles from Road point, is the largest stream running into Port au Port, but although the water inside its mouth is deep enough for a ship's boat, it is fronted by a bar which dries 1 to 2 feet at low water. A small stream from the eastward flows into the sea through the same outlet.

At a short distance inside its mouth the brook is obstructed by banks of sand and shingle, as well as by low marshy islets which extend up for more than a mile; above these the stream turns eastward, flowing along the foot of a thickly wooded ridge. The western end of this ridge makes, from the westward, as a steep wooded bluff, and it is used as a leading mark.

The shore from Fox brook trends northward for $3\frac{1}{4}$ miles to Broad Cove point, which consists of low, rocky cliffs, fairly steep, and may be safely approached to the distance of 600 yards.

Near the shore there are a few cottages, and the land behind rises, in thickly wooded slopes, to the considerable elevation of 1,770 feet, $2\frac{1}{4}$ miles eastward from Broad Cove point.

Two ladders for ascending from the beach to the top of the cliffs are situated at $1\frac{1}{10}$ miles and a little over 2 miles, respectively, northward of Fox brook entrance.

Broad cove, just eastward of Broad Cove point, is a small indentation of the shore about $\frac{3}{4}$ mile wide across its mouth.

The cove is foul and rocky, and a ledge extends northward nearly 400 yards from Board Cove point.

At the southern side of this cove, near a small stream, there is a cluster of buildings, used at one time as a lobster factory, and now forming a mark for crossing the bar off Long point on a compass bearing. A path leads from this locality to the asbestos mines, a little behind Bluff head, the distance by it being about $1\frac{1}{2}$ miles.

Bluff head, north-northeastward, $1\frac{1}{2}$ miles from Broad Cove point, is a very conspicuous headland, showing a perpendicular cliff to seaward, its summit attaining a height of 1,630 feet. From it, and from the higher summits eastward of it, the hills slope down, forming deep gullies and watercourses toward Broad cove.

Fox island, situated $4\frac{1}{4}$ miles south-southeastward from Long point, is 1,200 yards long in a northerly and southerly direction, 600 yards wide, and near the middle of its length, 145 feet high; the grassy slopes on its western side are in strong contrast to the dark clumps of spruce still standing about its summit.

The coast at the southern end of the island is cliffy for about 500 yards, and eastward of this a steep bank is fronted by a small shingle beach occupied by the buildings of a lobster factory; the coasts elsewhere are rocky with shelving ledges off the points, while two steep bluffs alternate with grassy slopes on the western side. The southeastern side of the island is steep-to at a short distance, and so is the southern outside a steep rock off the end, but Fox tail extends northward and northeastward from the island.

Fox tail is the rocky shoal bank, which within a depth of 5 fathoms extends northward to a distance of 2 miles from Fox island, with a breadth near its outer part of 1 mile.

Northeastward, 400 yards from the northeastern end of the island, there is a ledge, 300 yards in length, which covers at high-water springs; and north-northwestward 400 to 600 yards from the ledge are two small rocks awash at low water; around the northeastern of these the depths are $3\frac{1}{4}$ to 4 fathoms.

White rock is the northern end of Fox tail. The least water over it is 7 feet at $1\frac{3}{10}$ to $1\frac{1}{2}$ miles from the island. From this shoalest part there are depths of less than 3 fathoms for 700 yards both northward and toward the island, leaving, between White rock and the rocks awash at low water, a channel $\frac{1}{2}$ mile wide, and carrying $3\frac{1}{2}$ to 4 fathoms of water.

The western extreme of Bear head in line with the western end of Shag island, bearing 25° , leads eastward of Fox tail in not less than 9 fathoms of water, and through the channel between Fox island and Road point.

North rock, near the edge of Fox tail, bearing 342° , distant 900 yards from the northwestern point of Fox island, is small, detached, and 6 feet high. Bearing 272° , distant 800 yards from North rock, is a detached rock with 16 feet over it at low water and 8 to 10 fathoms around, which is in the fairway between American bank and Fox island.

Anchorage.—There is fairly good anchorage at a little eastward of the beach on the southeastern side of Fox island, in 11 to 13 fathoms of water, mud bottom; but it should not be used during strong southeasterly to southwesterly winds, as they cause a heavy sea, especially during the flood tidal stream.

Tides and tidal streams.—It is high water, full and change, at Fox island at 10h. 15m.; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{3}{4}$ feet; neaps range 2 feet.

In the passage between Fox island and the mainland, the flood stream sets southward; the ebb northward and across Fox tail.

Directions.—From the southward, to enter Port au Port in clear weather, pass about $1\frac{1}{2}$ miles northwestward of Black Duck brook village, and bring the tangent of cape Cormorant cliff just northward of the western shoulder of Round head, bearing 227° . Keep this mark on until Road point is in line with the southwestern end of Fox island, bears 164° , when either proceed on that mark, which leads into the entrance of port au Port, or steer direct to Broad cove.

Small vessels may cross the bar, in about 6 fathoms of water, with the houses in Broad cove bearing 123° ; or with the highest summit, immediately southeastward of Bluff head, in line with the low part of the southern slope of Bluff Head cliff, about 117° .

For West bay, keep Road point in line with the southwestern end of Fox island until the left extreme of the hills, on the southern side of the valley behind Bear head, is just open northward of Shag island, bearing 43° , which mark leads between French and American banks into West bay.

For the fishing station inside Long point, cross the bar as above directed; when the stony projection of Beach point opens, bearing 218° , steer about 207° , giving the shore a berth of about 400 yards, and anchor as convenient, observing that the high cliff northward of Rocky point just open southward of Beach point, bearing 226° , leads northwestward of French bank, and that soundings of over 10 fathoms indicate that the bank has been passed.

For the Gravels, if of deep draft, from about a mile outside the bar with Road point in line with the southwestern end of Fox island, steer toward Broad cove until the western extreme of Bear head is in line with the western end of Shag island, bearing 25° . This mark leads eastward of Fox Island shoals and northwestward of the shoal

water off Road point; when the wooded bluff over Fox brook bears about 88° , steer (about 182°) direct to the anchorage.

To pass between Fox island and American bank, a small vessel may take the channel eastward of the 16-foot patch off North rock by keeping Road point in line with the western end of Fox island, bearing 164° , until North rock is in line with Broad cove point, 68° ; then turn to the southward until Fox island is passed, when steer direct to the Gravels anchorage.

This channel is not suitable for a large vessel, as the tidal streams are strong at times, and the passage, with a depth of 5 fathoms, is only 300 yards wide. There is no good mark available for passing between the 16-foot patch and American bank; the chart is therefore the guide.

The coast from Bluff head (see p. 293) is clifty and backed by high, rocky hills and deep gullies, northward for about 2 miles to a rounded point, off which there is a conspicuous pinnacle rock 22 feet high. It is steep-to and may be safely approached to a distance of 400 yards, but, with strong offshore winds, squalls of great violence prevail near Bluff head, and sailing vessels should then keep some distance from the land.

Immediately northeastward of Bluff head cliff, and on the face of the steep, wooded slope $\frac{1}{2}$ mile inland, are the houses of the workmen employed in the asbestos and chrome mines in the vicinity.

Anchorage—Buoy.—Temporary anchorage has been obtained off the northeastern end of Bluff head cliff in 8 fathoms, sand bottom. A large red buoy was moored here at about 400 yards offshore in 1898, and vessels calling for the chrome produced at the mines made fast to it.

The coast from abreast the pinnacle rock, 22 feet high, trends about northeastward for $1\frac{1}{2}$ miles to Lewis brook, where the cliffs cease; from Lewis brook it trends about north-northeastward for 3 miles to Deadmans brook, and is a steep clay bank, averaging 70 feet in height, fronted by a stony beach. Deadmans brook is a small stream flowing from a deep gully in the clifty ranges, which here run parallel to the shore at $\frac{1}{2}$ mile inland. Behind these the land rises, in bare and scrub-covered hills, to a height of 2,700 feet.

The same coast features continue from Deadmans brook north-northeastward for $3\frac{1}{2}$ miles to Rope cove. Molly Ann cove is $1\frac{1}{2}$ miles from Deadmans brook; a small stream flows into the cove, and there are one or two huts, occupied by fishermen during summer. The coast northward of Lewis brook is fronted by a bank of sand, stones, and rocks, and depths of less than 3 fathoms extend to a distance of 400 yards from the beach.

Inland from Molly Ann cove the high range of hills turns abruptly eastward; near the angle thus formed, and eastward $1\frac{1}{2}$ miles from

the cove, is mount Barren, a conspicuous summit, 2,300 feet high, showing a bare perpendicular cliff to seaward. A detached summit, 1,530 feet high, $\frac{1}{2}$ mile northward of mount Barren, shows a conical peak from the westward, and is a useful mark.

Shag island, west-northwestward $1\frac{1}{2}$ miles from Deadmans brook, is $\frac{1}{2}$ mile long in a northerly and southerly direction, 250 yards wide, and it rises, in broken cliffs, to the height of 180 feet. It is steep-to on its eastern side, and shoal water extends only a short distance off its western side, but its southwestern end should not be approached within 200 yards. The summit, covered with coarse grass, slopes toward the northern end of the island, on the eastern side of which there is a good landing place for boats. The channel between the island and the mainland is clear.

Anchorage.—There is fair anchorage northward of the island in 12 fathoms of water, during fine weather.

Round reef.—The shoalest head of this rocky reef, over which there is a depth of 4 feet of water, bears 251° , distant $1\frac{9}{10}$ miles from the southwestern end of Shag island, and it breaks in heavy weather. From this head the reef, with depths of less than 5 fathoms, extends southwestward for $\frac{9}{10}$ mile, and northeastward for nearly $\frac{1}{2}$ mile, and it has a general width of 700 yards.

Leading marks.—The conical peak, northward of mount Barren, in line with the northern end of Shag island, bearing 76° , leads northward of Round reef; and the snout of Bear head in line with the inner summit of Little Port head, bearing about 30° , leads eastward of the reef.

Shoals.—There is a small shoal, with $4\frac{3}{4}$ fathoms of water over it, and 5 to 6 fathoms around, bearing 216° , distant $1\frac{1}{2}$ miles from the shoalest head of Round reef. A small patch, with 5 fathoms of water over it, bears 5° , distant 1 mile from the shoalest head of Round reef; there are depths of $5\frac{1}{2}$ to 6 fathoms between it and the reef, and from the patch there are depths of 6 to $4\frac{1}{4}$ fathoms northwestward toward Long ledge, but between this shallow water and the ledge there is a channel about $\frac{1}{4}$ mile wide with depths of 8 to 10 fathoms.

Long ledge is a narrow ledge of rock, with depths of less than 5 fathoms, extending northeastward $4\frac{1}{4}$ miles from its southwestern end, which bears 30° , $3\frac{3}{4}$ miles from Long point, the channel between having depths of 6 to 9 fathoms in it. The middle of the ledge lies $4\frac{3}{4}$ miles off the main shore; $3\frac{1}{4}$ miles from Shag island; and 2 miles from the shoalest head of Round reef. From its southwestern end the ledge is shoal for $2\frac{1}{4}$ miles. The middle part of the ledge, $1\frac{1}{2}$ miles in length, with an average breadth of less than 100 yards, dries at low water, and some small detached patches and boulders on this are 3 to 6 feet high. Northeastward of the dry part, the ledge is shoal for the distance of $\frac{1}{2}$ mile.

Although the breakers on Long ledge can generally be seen from some distance, at spring tides with very calm weather they may not be visible.

Leading marks.—Mount Virgin, well open northward of Bear head, bearing 45° , leads northwestward of Long ledge in 11 to 13 fathoms of water; the conical peak, northward of mount Barren, in line with the middle of Shag island, bearing 72° , leads southward of the southwestern end of the ledge in depths of 6 to 7 fathoms, but use caution with this mark as it leads on to the northeastern part of Round reef. Lark mountain summit in line with the tangents of the white cliffs, southward of Wild cove, bearing 36° , leads midway between Long ledge and Round reef.

Anchorage.—Long ledge is fairly steep on its northeastern and southwestern sides, and during northwesterly winds, good anchorage may be obtained under its lee, in 8 to 10 fathoms of water.

Rope cove, into which a stream flows, and where there are a few buildings used by fishermen during summer, has indifferent landing, although there is sometimes less swell at its head than on the adjoining coast. There is a patch of stones and bowlders, on which the depth is 20 feet, at $1\frac{3}{10}$ miles southward of the cove and 800 yards offshore. The snout of Bear head open westward of the land northward of Coal river, bearing 17° , leads westward of this patch.

Coal river entrance is at the southern side of a bight and close to the Friar, a remarkable detached rock, 77 feet high, at $1\frac{3}{4}$ miles northward of Rope cove. The coast between is a narrow stony beach, backed by low cliffs, behind which there are extensive marshy barrens with numerous small ponds and occasional clumps of trees.

On a sandy spit, projecting from the cliff on the northern side of the entrance, there are several houses, occupied by fishermen during summer.

The river entrance has a bar, nearly dry at low water, but the stream inside is about 100 yards wide, with a deep channel running up to the first bend, $\frac{1}{4}$ mile from the mouth. A quarter of a mile farther up, a small stream flows in from the northward, and here the bed of the river is obstructed by banks of gravel and stones. Turning eastward the stream gets narrower for about $1\frac{1}{2}$ miles, then it again becomes wider and deeper, and at 8 miles by its course from the entrance it opens into a series of extensive ponds. The fishermen living at the entrance carry their small boats to the rapids, about 2 miles up, during freshets, and are thence able to reach the ponds at any time for hunting and fishing.

Anchorage.—Shoal water of less than 5 fathoms extends $\frac{1}{2}$ mile off the mouth of Coal river, and outside of that depth there is indifferent anchorage, but only during fine weather, for even with strong southeasterly winds there is usually a high ground swell, which becomes a heavy sea when the wind hauls to the westward.

The coast from Fish head, the northern entrance point of the bight of Coal river, northward to Bear head, a distance of $3\frac{1}{2}$ miles, is composed of cliffs, more or less broken, which become higher and steeper as the land rises behind; these cliffs are steep-to and may be approached closely in fine weather, but in stormy weather there is a very heavy sea in this locality.

A bank about $\frac{3}{4}$ mile in length, with 8 fathoms water over it, lies about $1\frac{1}{2}$ miles northwestward of Fish head; the depths between the land and the bank are 12 to 16 fathoms.

At $1\frac{1}{4}$ miles northward of Fish head is the southern summit, 1,255 feet high, of the range terminating in Bear head. Being fronted by a shelf of sloping ground terminating in low cliffs, its appearance is not very striking.

Bear head is very conspicuous from the southward, whence it has the shape of a crouching animal; a projecting rock on its summit resembles the ears, and a perpendicular cliff partially detached from the shore underneath, an upturned snout.

The summit is 1,210 feet high, falling in a perpendicular cliff. The land within the range slopes rapidly down to Coal river valley, in which there are several ponds.

Eastward of this valley, broken, barren-looking hills rise to a considerable height, two rounded summits, lying southeastward from Bear head, being conspicuous from seaward. The northern tangent of these hills, bearing 84° , distant $3\frac{8}{10}$ miles from Bear head summit, forms with Shag island, a leading mark for Port au Port.

Depths offshore.—The 20-fathom contour line passes northwestward of Long point, at a distance of about 3 miles, and continues approximately north-northeastward for about 11 miles, when it turns toward the southern summit of Bear head. The long narrow ridge, with 8 to 10 fathoms water over it, situated parallel to Long point and $1\frac{3}{4}$ miles westward of it, extends northeastward to abreast the dry portion of Long ledge. Outside, and north-northwestward of Long point, there is an extensive flat, with general depths of 21 to 25 fathoms, and some irregular soundings of 18 to 20 fathoms over it; this flat reaches northwestward to a distance of about 13 miles from Long point.

Bear cove is situated northeastward of Bear head; there are two yellowish rocky islets in it, which are scarcely seen against the low cliff of the same color, at the head of the cove.

Mount Virgin, northeastward, distant $5\frac{1}{2}$ miles from Bear head, is 1,600 feet high, and its summit appears as a remarkable isolated column.

Wild cove (Capelan bay), north-northeastward $5\frac{1}{2}$ miles from Bear head, is at the southern end of a projection a little over a mile in length and 816 feet high, the northern end of which is Vide Bouteille cape; the beach of Wild cove is broken white coral.

Little port extends southeastward 600 yards on the northeastern side of Vide Bouteille cape; its width narrows to 100 yards in the entrance, and expands to 200 yards at the head. It is frequented by fishing vessels, that moor head and stern, until about June 20, when they leave to follow the codfish that disappear about that time from these waters.

Little port affords anchorage for small vessels in $2\frac{1}{2}$ fathoms water, sand and mud bottom, but winds from southeastward to southwestward are accompanied by violent squalls, and northerly winds bring a sea into the harbor; the entrance is, therefore, always dangerous for boats, and in spring and autumn for vessels.

Tides.—It is high water, full and change, at Little port at 10h. 42m.; springs rise $5\frac{1}{2}$ feet.

Woody bay, east-northeastward, 1,600 yards from Vide Bouteille cape, is a circular basin, about 400 yards in diameter, and only suitable for boats, but considerable difficulty is experienced in entering with westerly winds.

Miranda cove, northward 300 yards from Woody bay, is a small boat creek with a fishing establishment.

The coast from Miranda cove trends northward for about 1,200 yards, and then northeastward for $1\frac{9}{10}$ miles to South head of the Bay of Islands.

Devil head, north-northeastward, $1\frac{1}{2}$ miles from Vide Bouteille cape, is 815 feet high and rises in black perpendicular cliffs, but the inshore slope of the headland is covered with grass, which shows in contrast to the dark cliffs.

Lark mountain, southeastward, 1,700 yards from Devil head, is 1,583 feet high, and the summit of the promontory northward of Lark harbor.

South head is bold-to and rises in steep black cliffs; there are several pinnacles of light-colored rock at its base; the Monkey, the highest of these, is 110 feet high.

Bay of Islands.—This extensive inlet is very picturesque, on account of the high hills surrounding it, the steep high islands within, and the deep arms which trend from it.

Communication.—The Newfoundland railway skirts the southeastern part of the southern shore of Humber arm above Pleasant cove and at Birchy cove it connects with the weekly coasting steamer (see p. 37). A steamer from Halifax calls monthly at some of the ports in the Bay of Islands.

Ice.—The arms in the Bay of Islands generally freeze between December 20 and January 20, and the ice breaks up suddenly between April 20 and May 10; field ice clears away early or late in May, according to the season. For tidal streams see page 314.

Fishing nets.—During autumn large numbers of herring nets are laid in the arms of the Bay of Islands and around Woods island. They are always laid parallel to the shore and usually in the depth of 18 feet. The fishery continued till the middle of January in 1907.

Guernsey (or Weebald island), the southwestern island of the group lying in the entrance to the Bay of Islands, situated $1\frac{9}{10}$ miles northward of South head, is a little over a mile long, in a north-northwesterly and south-southeasterly direction, 1,400 yards wide, and 1,053 feet high; it is almost barren, but there are a few trees near its southern end, where is the best landing place in ordinary weather.

Tweed island (or French Island), separated from Guernsey island, lying to the northeastward, by a passage $\frac{2}{3}$ mile wide, is $1\frac{7}{10}$ miles long east and west, $\frac{9}{10}$ mile in greatest width, with a bare summit, 702 feet high, falling in black perpendicular cliffs on the northwestern and northeastern coasts.

A round rock, 2 feet high, lies close to the southwestern point of Tweed island, and a rock that uncovers 4 feet, lies southwestward nearly 200 yards from the round rock.

The passage between Guernsey and Tweed island is otherwise clear to within 200 yards from the northern end of Guernsey.

During summer temporary fishermen's huts are erected on the eastern coast.

Temporary anchorage may be obtained off the cove between Grassy and Little Grassy islets, on the northeastern side of Tweed island, in 9 to 12 fathoms water, and also off the cove on the northern side in 8 to 11 fathoms, but westerly winds quickly cause a heavy sea.

Hen island, situated 800 yards northward from the northwestern end of Tweed island, is about 400 yards in length, covered with grass, and rises in a round hummock to the height of 222 feet.

A rock, with 4 feet of water over it, bears 105° , distant 900 yards from the southern point of Hen island.

Green island, or Woody island, northeastward 700 yards from Hen island, is 1,100 yards long, in an easterly and westerly direction, 900 yards in greatest width, and it rises to a round hill 415 feet high, with the summit covered with moss; there is a small cove on the southwestern side of this island, in which are several rocks.

Saddle island (formerly Shag rocks), northward $\frac{1}{2}$ mile from Green island, is a narrow island, rather more than 600 yards long, in a north-northeasterly and south-southwesterly direction, and divided into two rocky parts, connected by a narrow ridge: the southern part, 170 feet high, is round and covered with grass and a few stunted trees, while the northern is 163 feet high, bare and rugged, with a square pillar 150 feet high on its northern side, which is prominent on easterly or westerly bearings.

Gregory island, north-northeastward, nearly 2 miles from Saddle island, is about 600 yards long in a curve and 245 feet high.

A pinnacle rock, 52 feet high, lies southwestward 150 yards from Gregory island, and is nearly joined to it by reefs at low water; close southwestward of this pinnacle is a small round islet, and the channel between it and the shoal water extending 200 yards northward from Saddle island is clear.

Brandies rocks, a shoal 250 yards in diameter, the middle of which bears 29° , distant 1,400 yards from the eastern end of Gregory island, show by breakers with a slight swell; the eastern rock uncovers 2 feet at low water. The northern end of Saddle island, open westward of Gregory island, bearing 203° , leads westward; and Little Shag rock in line with the middle of Lark harbor entrance, bearing 194° , leads eastward of the rocks.

Pearl island (or Big island), eastward 1 mile from Tweed island, is $1\frac{3}{4}$ miles long, in an easterly and westerly direction, with a greatest breadth of $1\frac{1}{4}$ miles, and it is 845 feet high. Four curious pillars (the highest of which is 597 feet high) stand on its eastern side, on the northern part of a deep valley which separates them from the hill in the southeastern part of the island. Shivery point, the northern end of the island, has a rock with 5 feet water over it, bearing 83° , distant 200 yards from it.

Big Island cove is on the northeastern side of the island at about $\frac{1}{2}$ mile from Shivery point, and there are small shingle beaches at its head, on which fishermen's huts are erected in summer. The water is deep, except close to the shore, so only small vessels can anchor off the cove.

Cloué patches.—The soundings are irregular for 1,200 yards westward of that part of the western coast of Pearl island which extends about a mile southward from Shivery point, and are in places less than 10 fathoms. A rock, with 4 feet of water over it, lies on this bank, bearing 234° , 1,600 yards from Shivery point. The southeastern end of Guernsey in line with the summit of Little Shag rock, bearing 220° , leads northwestward; and the summit of Blow-me-down, open westward of Pearl island, bearing 177° , leads westward of this rock. A rock, with 7 feet of water over it, bears 77° , distant 265 yards from the 4-foot rock, and there is a 3-fathom patch between the 7-foot rock and the island.

A bank, with $5\frac{1}{4}$ fathoms water over its southern part, bears 251° , distant 1,700 yards from Shivery point.

Shag rocks consist of two groups; the northern group is a round islet 20 feet high, bearing 125° , distant $\frac{1}{2}$ mile from the southeastern end of Pearl island, with low rocks extending westward 100 yards, and southeastward 300 yards from it. The southern group is a flat,

bare islet, 19 feet high, bearing 156° , distant 800 yards from the highest of the northern group, with low reefs extending northwestward 200 yards, and eastward 700 yards from it.

The shore of the Bay of Islands from South head trends about southeastward for $\frac{3}{4}$ mile to White point, and thence southward for $1\frac{8}{10}$ miles to the entrance of Lark harbor.

Lark harbor lies between the peninsula of which Lark mountain is the summit and a peninsula $1\frac{1}{4}$ miles long, the summit of which, mount Tortoise, is a round hill 787 feet high, and thickly wooded. The harbor stretches southwestward $1\frac{1}{2}$ miles with a slight bend to the westward and is 700 yards wide; there are several houses and piers on the northern shore. Low point is on the northern shore at 1 mile within the entrance, and a spit of shingle, which dries in places, extends southward about 450 yards from it. Low island, on this spit, is small and covers at high water springs; shoal water extends about 250 yards from the northern shore at 600 yards eastward of Low island.

A church, with a steeple, stands on Low point, and is noticeable among the fishermen's huts and sheds.

Rocky point is on the southeastern shore of the harbor at 1,600 yards within Tortoise point, the southern entrance point. There is a whaling establishment at Lark harbor, with a slipway for hauling up the whales, and a pier alongside of which the steam whalers go.

Anchorage can be obtained in 13 fathoms of water, mud bottom, northward about 265 yards from Rocky point; or farther southwestward in $6\frac{1}{2}$ fathoms, mud, with excellent holding ground; easterly winds bring a little sea into this anchorage; and heavy squalls sweep down Lark mountain with south and southwesterly winds, so that South head should not be approached closely.

Tides.—It is high water, full and change, in Lark harbor at approximately 10h.; springs rise 6 feet, neaps 5 feet.

York harbor lies southward of mount Tortoise, and between it and the foot of Blow-me-down, a conspicuous mountain 2,125 feet high. A valuable copper mine on the slopes of Blow-me-down mountain is being worked, and about 250 men were employed there in 1903.

Governor island is situated nearly in the middle of York harbor, and is $1\frac{1}{2}$ miles long in an easterly and westerly direction, with a general breadth of $\frac{1}{2}$ mile.

The coasts of the island are wooded; inland there is a large marsh with a lake and some ponds, and a few tufts of trees rise above this marsh, the highest being 95 feet above high water.

Sword point is the northwestern end of the island, and a sand spit extends northwestward 300 yards from it; shoal water extends $\frac{1}{4}$ mile off the southwestern end of the island.

Seal island, $\frac{1}{4}$ mile eastward of Governor island, to which it is nearly joined by shoal water, is 900 yards long in an easterly and westerly direction, about 200 yards wide, and 75 feet high; rocks awash at low water extend eastward 200 yards from the island.

Anchorage.—There is sheltered anchorage, in 6 to 11 fathoms of water, between the southwestern end of Governor island and the mainland, but heavy squalls come from Blow-me-down with southerly winds.

Pier.—A pier, about 90 yards long and 16 feet broad, extends from the southern shore of York harbor southward of the eastern end of Governor island. There is a depth of 3 to $5\frac{1}{2}$ fathoms of water at its outer end, which is 175 feet long, and steamers of about 3,000 tons and drawing 16 feet of water go alongside it to load with copper ore brought from the mine by a tramroad.

A shoal with 6 feet of water over it extends eastward from the eastern end of the pier.

Water.—Fresh water can be obtained from a pipe at the pier end at the rate of 2 tons an hour.

Blow-me-down, 2,125 feet high, falls almost perpendicularly from the summit, and then in a steep wooded slope from the base of the cliffs to the sea. The range trends southeastward in a line of cliffs, and long slopes, covered with shingle or scrubby wood, descend from them to the deep valley, down which flows Bear Deadfall brook, a considerable stream.

The shore from a point northward of Blow-me-down trends about eastward $4\frac{1}{2}$ miles to Lower Frenchman head.

A small yellow rock, 6 feet high, lies 150 yards from the shore at 800 yards westward of the mouth of Bear Deadfall brook, which is situated eastward 2 miles from the point northward of Blow-me-down.

Temporary anchorage can be obtained at $\frac{1}{4}$ mile northward of Bear Deadfall brook in 9 fathoms of water.

Frenchman cove, situated immediately westward of Lower Frenchman head, is bold-to on its western shore, but from the mouth of the brook at the head to Lower Frenchman head a sand bank and bowlders line the shore, extending nearly 150 yards from the high water line; a small settlement with a few gardens is situated here. There is anchorage in 11 to 13 fathoms of water, mud bottom, off the eastern side of the bank of shingle at the head.

Tides.—It is high water, full and change, in Frenchman cove at 10h. 0m.; springs rise 6 feet, neaps 5 feet; neaps range $3\frac{1}{4}$ feet.

Lower Frenchman head, or Spurn point, the western entrance point to Humber arm, rises to an earth cliff 45 feet high; a reef extends 65 yards northward from its high water line, and then falls quickly to deep water.

Light.—A square pyramidal lighthouse, about 30 feet high and painted red and white in horizontal bands, on Lower Frenchman head, exhibits at 160 feet above high water a fixed white light, during the season of navigation.

Humber arm, extending southeastward 6 miles, and thence about eastward 7 miles, has, with a few exceptions, bold shores and deep water; it affords good anchorage in a few places only. Strong winds usually blow up or down the arm.

The shores generally rise steeply to wooded hills, on the sides of which are houses and cultivated fields, the soil being rich.

Bay of Islands village is a scattered hamlet extending along the southern shore of Humber arm for several miles.

It is a progressive place, possessing a branch of the Bank of Montreal, a fine copper mine a few miles off, slate quarries, and fishing establishments for curing cod; it also has churches of all denominations.

Bay of Islands station of the Newfoundland railway is about a mile above Corner brook.

A T-shaped railway wharf is situated at the extremity of the point opposite the railway station. Coasting steamers berth alongside the end.

Ice.—Humber arm freezes about December 26, and is usually completely closed by ice $1\frac{1}{2}$ to 3 feet in thickness from January to April, both inclusive. The early freezing which closed these waters to navigation as early as December 15, 1906, was unusual. Field ice appears about January 1 and disappears about April 15.

The first vessel generally arrives about May 12 and the last leaves about January 1.

Frenchman head, southeastward, 700 yards from Lower Frenchman head, rises in a steep cliff to the height of 220 feet.

The shore from Frenchman head trends south-southeastward $3\frac{1}{4}$ miles to Benoit cove. Nearly midway and close to the shore is a church with a little tower, and at Johns beach, $\frac{1}{4}$ mile southward of the church, is a small settlement.

Benoit cove, a bend in the shore fronting a deep valley that is drained by a considerable stream, has a moderate sized settlement around it, with a large storehouse in its eastern part, and at its head is a wooden church with a small spire; shoal water extends for about 400 yards off the mouth of the stream. Fox point is the southeastern point of the cove.

Anchorage can be obtained at 200 yards distant from the shore between the large storehouse and Fox point, in 10 to 17 fathoms water.

The shore from Fox point trends southeastward for 1 mile to Halfway point.

The best anchorage in Humber arm is off the shore between Fox and Halfway points, there being depths of 10 fathoms at 400 yards and of 20 fathoms at 600 yards from the shore.

A reef extends 300 yards from the shore at 1,300 yards southeastward of Fox point. The house on the western side of Cook cove, open eastward of Halfway point, bearing 142° , leads eastward of this reef.

Pleasant cove, east-southeastward $3\frac{1}{2}$ miles from Halfway point, and separated from Bannatyne cove, westward of it, by a bluff point, is 400 yards wide and 200 yards deep; a shoal extends 100 yards off its head. The magistrate's house, a large two-storied building, stands on a rise southward of the cove, southwestward of a bare mound 150 feet high, on the summit of which is a large boulder.

A wharf, at which the local mail steamer discharges her cargo, projects northward from the eastern entrance point; and a rock and shoal water extend 150 yards from the shore eastward of this wharf.

Anchorage for small vessels can be obtained off Bannatyne and Pleasant coves, the depth of 10 fathoms being distant a little more than 200 yards from the shore.

Communication.—The telegraph office in connection with the Anglo-American Company is in the courthouse, a white wooden building on the summit of the slope southward of the magistrate's house.

Birchy cove is situated at about $1\frac{1}{4}$ miles eastward of Pleasant cove; on its shores are an Episcopal church, a white building, with a small spire; the parsonage, a large two-storied house with a clock in the gable end facing the river; and a Roman Catholic church, which is white, with two spires. Shoal water extends but a short distance from the shore of this cove.

Anchor off Birchy cove as convenient, there being depths of 10 fathoms at about 200 yards from the shore. The best position appears to be about midway between the two piers and 200 yards off shore, in 10 to 12 fathoms of water, mud bottom, where a vessel of moderate size can lie with about 40 fathoms of cable out. For any stay, and also late in the year, it is advisable to moor.

Piers.—The western pier in Birchy cove has a depth of 16 feet water at its outer end, which is 60 feet long, and the small coasting steamers go alongside it. There are some other piers in the cove.

Tides.—It is high water, full and change, in Birchy cove at 10h. 26m.; springs rise 5 feet, neaps $3\frac{1}{4}$ feet; neaps range $2\frac{3}{4}$ feet. The water level is influenced by the state of Humber river.

Coal.—In 1905 there was a small stock of government coal (some 200 tons) stored in a shed on the western pier. A vessel of 12 feet draft could coal alongside the pier; there are no coal lighters.

Communication.—The Newfoundland railway passes about 120 yards from the shore of Birchy cove.

There are a railway station and a post and telegraph office at Birchy cove. The mail trains which run three times a week between St. Johns and port Basque stop here.

Supplies.—Meat, good except early in spring; vegetables, scarce in spring; bread, good; and water, fairly good, can be obtained in Birchy cove. The bakery is at Meer point.

Soundings of about 8 to 10 fathoms have been reported at about 400 yards from the shore between the church at Birchy cove and de Grouchy point, a distance of rather more than a mile.

Corner brook, situated eastward $1\frac{1}{2}$ miles from Birchy cove, is shoal to the line of de Grouchy point, the western entrance point, and the wharf, that projects about 400 yards from the sawmill at the mouth of the brook. There is a depth of 15 feet alongside the outer end of the wharf, whence the water deepens rapidly to 5 fathoms. A considerable settlement stands near the sawmill.

Humber river bar, a shallow flat, with two rocks, awash at low water, situated close together near its northwestern edge, extends $\frac{3}{4}$ mile from the head of Humber arm and falls suddenly to deep water. Caution is therefore required in approaching it.

Three streams flow into the head of Humber arm: Humber river, the southern and the second largest river in Newfoundland, flows from Deer pond, and is navigable for boats when the stream is not too strong. Large rafts of timber are floated down this stream from the country about Grand pond.

Wild cove is about $\frac{1}{2}$ mile northward of Humber river entrance, a projection separating them. The hills between the river and cove are flat-topped, and in terraces, attaining at a distance of 1 mile eastward of the end of the projection, a height of 1,150 feet, the rock on the western face showing a deep blue color in ordinary weather. The northern point of Wild cove is earth cliffs about 50 feet high, fronting a tableland, of good soil, which extends to the base of the hills.

Between Wild cove and the mouth of Hughes brook, at about 1,200 yards northwestward, the land rises to a wedge-shaped wooded hill, 942 feet high, falling steeply eastward, with a wooded mound 150 feet high southward of it.

Anchorage.—Good anchorage has been obtained in 9 fathoms of water, stiff mud bottom, with the mouth of Hughes brook bearing 38° , and the northern shore of Wild cove 105° . At 200 yards eastward of this position the depth is 5 fathoms, while at the same distance westward it is 12 fathoms. The streams setting out of Humber river and Hughes brook kept a vessel here broadside on to a fresh westerly breeze.

Tucker head, a mound 131 feet high, is situated on the northern shore about a mile westward from the mouth of Hughes brook.

Irishtown is a conspicuous white house, with a few smaller buildings, situated on the shore of a small cove westward about 600 yards from Tucker head. Inner Aspen point, the western point of this cove, has a conspicuous single aspen tree on it. Rood point is about $\frac{9}{10}$ mile westward of Inner Aspen point.

Petitpas cove, situated between Rood point and Petitpas point, distant $\frac{3}{4}$ mile to the westward, has a considerable settlement and a white church with a spire on its shores; there is also a sawmill and several wharves. The whole place seemed almost deserted in 1905.

Anchorage.—Shoal water extends but a short distance from the shore, and anchorage can be obtained in Petitpas cove, in 13 to 19 fathoms water, sand and mud bottom, depths of 20 fathoms being distant $\frac{1}{4}$ mile from the shore; the holding ground is very good.

Davis cove, immediately westward of Petitpas cove, affords no anchorage; there is a waterfall above the mouth of the brook flowing into the cove.

Meer point, westward, 2 miles from Davis cove, is low and flat, rising gently to a hill 200 feet high, close to the shore northwestward of it; between Davis cove and the point are a series of small coves.

A rock, that dries $1\frac{1}{2}$ feet at low water, lies about 100 yards from the shore midway between Davis cove and Meer point.

Guilem cove.—The shore from Meer point trends north-northwestward $1\frac{1}{4}$ miles to Kelp Cove point, and Guilem cove lies between Kelp Cove point and a point 1,300 yards farther northward. A deep valley extends inland from the cove, and is drained by a stream, off the mouth of which a shoal extends 350 yards.

Anchorage can be obtained in 12 fathoms of water, with the extreme of the land southward of Kelp Cove point, bearing 158° , and the mouth of the brook 38° , distant 300 yards from the shore, the depths decreasing gradually eastward and southward of this position.

The shore from the northern point of Guilem cove trends north-westward for 2 miles, and thence northward for $\frac{9}{10}$ mile to Big head.

Big head, the northern point of Skeleton cove, is a steep cliff rising to a dark wooded conical hill 488 feet high. Rattler brook flows into the arm in a conspicuous waterfall, at 600 yards northward of Big head.

Maciver cove is situated north-northwestward 1,400 yards from Rattler brook, and Maciver island, a bare rock, 15 feet high, near the southern end of the cove, is joined to the mainland by a shoal.

Maciver point, the eastern entrance point to Humber arm, lies about $\frac{1}{2}$ mile west-northwestward of Maciver cove.

Anchorage can be obtained between Maciver island and Rattler brook, there being depths of 10 fathoms at 400 yards, and of 20 fathoms at 600 yards from the shore.

Woods or Harbor island.—Shoal point, the southeastern end of Woods island, lies west-northwestward $1\frac{1}{10}$ miles from Maciver point, and about northward $1\frac{3}{10}$ miles from Lower Frenchman point, and the island extends northwestward, 3 miles from Shoal point, with an average width of 1 mile. It is wooded throughout, and attains, at about its middle, a height of 195 feet, and there is a small range of hills, 245 feet high, near its northwestern end.

A small settlement, with a considerable space of cultivated ground attached to it, is situated near Shoal point, and there are several houses on the southeastern and southern coasts.

A shoal, composed of rock covered in places with sand, with 1 to 6 feet water over it, extends southeastward 550 yards from Shoal point, and then the water deepens to 6 fathoms. This shoal is said to be extending and a wide berth should be given to the point.

Woods harbor, the entrance of which is on the western side of the island northwestward, $2\frac{3}{10}$ miles from Shoal point, is an inlet, 400 yards wide, extending northeastward 600 yards and thence eastward $\frac{1}{2}$ mile.

A reef, that uncovers at low water, extends 100 yards from the southern entrance point, and narrows the passage, with 12 feet of water, to a breadth of 95 yards.

Enter with a grassy point, in the middle of the northeastern shore of the harbor, just open northward of a small round rock lying off the first point on the southern shore within the entrance, bearing 49° , and when within the entrance points, close the northern shore, to clear a rock with 6 feet of water over it, situated westward nearly 100 yards from the small round rock described above.

When the points on the southwestern shore of the inner bend are open, bearing about 122° , turn southeastward, and anchor in $3\frac{1}{2}$ fathoms of water, mud bottom.

Puffin islands are two islands lying within 1,200 yards northwestward of the northwestern point of Woods island: the southeastern island has a group of trees on each of its two mounds, which are 91 feet high; the northwestern island is 70 feet high.

The passage between the southeastern island and the northwestern point of Woods island is a few yards wide, with a rock that uncovers lying in the middle; it is only suitable for boats.

Vesuvius rock, with $1\frac{1}{2}$ feet of water over it, is near the northwestern end of a ledge extending north-northwestward, 900 yards from the northwestern Puffin island. The western fall of Blow-meadow range, open westward of Seal island, bearing 220° , leads close

northwestward; and Woman point, the apparent northeastern extreme of Middle arm, open northward of Black head, the apparent southern extreme of that arm, bearing 87° , leads northward.

Outer Shag rock, eastward, distant $\frac{2}{3}$ mile from the northern Puffin island, is a round dark islet 18 feet high, with foul ground extending about west-northwestward, 350 yards from it.

The passage between Outer Shag rock and Woods island has several rocks in it, and must not be attempted.

The shore of the bay from Maciver point trends about northward $3\frac{3}{10}$ miles to Middle Arm point, and the channel between it and Woods island, which is nearly a mile wide, is clear, giving a sufficient berth to the shoals extending off the island.

Middle Arm point slopes from a long wooded ridge, and falls in small cliffs; there is deep water close to it; a small bight, in which are a pinnacle rock and a waterfall, lies immediately southward of the point. Black head bears east-northeastward, distant $\frac{3}{4}$ mile from Middle Arm point.

Middle arm (formerly South arm) is nearly 1 mile wide at its entrance within Black and Northern heads; from the entrance it extends with a greatest breadth of $1\frac{1}{2}$ miles for $5\frac{1}{2}$ miles in an easterly direction to Penguin head, and there separates into two branches, Goose arm and Penguin arm.

Jennings cove, east-southeastward $1\frac{1}{2}$ miles from Black head, is 800 yards deep, but its shores are foul generally for 200 yards from the high-water line. A few houses are situated on the shore of the cove, which is much resorted to for bait by the men fishing off the mouth of the bay.

Anchorage can be obtained, in depths of 10 to 14 fathoms water, in the middle of the cove, but at 200 yards from the head the depth decreases rapidly from 6 to 3 fathoms. The cove is frequented by schooners.

Cox cove (French cove) is separated from Jennings cove by Cox point, and it affords temporary anchorage in 16 fathoms of water, but a considerable sea sets in during strong easterly winds; there are a few houses on the beach.

Parkes cove, southeastward $1\frac{1}{2}$ miles from Cox point, affords anchorage, there being a depth of 20 fathoms of water at 800 yards from the shore, which gradually decreases to the shoal water extending from the beach.

Water can be obtained from two streams which flow into the cove.

Long point, the western entrance point to Goose arm, situated northeastward, $2\frac{2}{10}$ miles from Parkes cove, is the low termination of a densely wooded round hill, 960 feet high, and bold-to.

Goose arm, extending east-southeastward $2\frac{3}{4}$ miles, and thence northeastward for $4\frac{1}{2}$ miles, is a little more than $\frac{1}{2}$ mile wide in its

western part: the width decreases to 200 yards at the Narrows, but expands northeastward of the Narrows to 600 yards; the shallow basin at the head is $\frac{3}{4}$ mile wide.

There are two conspicuous landslips in the red earth cliff on the shore of a cove at the bend of the southern side of Goose arm.

A shoal bank extends from the landslips, increasing gradually to $\frac{1}{4}$ mile in breadth off the entrance to Big Barasway.

Several large streams flow into the head of Goose arm, but boats can not approach their mouths until half flood.

Raglan head is a gray cliff, 1,080 feet high, rising almost perpendicularly from the water on the western side, and in slopes from Big Barasway to the southward.

The Narrows, between Raglan head on the eastern side and the end of the smooth slope of a peaked hill 611 feet high, on the north-western side, are rather more than 200 yards wide, but banks extending from both shores reduce the navigable breadth to 100 yards; the bank from Raglan head falls suddenly to the channel, in which there is a least depth of $4\frac{1}{4}$ fathoms.

The summit of the Sugarloaf, 828 feet high (over the head of Goose arm), in line with the northern ends of William Wheeler point and Raglan head, bearing 50° , leads between the shoals on either side until the landslip in the cove southwestward of Big Barasway entrance is in line with the bowlders on the western side of Raglan head, bearing 202° ; then steer for the middle of the arm. A house stands on the northern side of the Narrows.

Penguin cove, on the northern side of Goose arm, eastward of Penguin head, its eastern entrance point, is clear of shoals.

Anchorage can be obtained in 14 fathoms water at 300 yards from the head of this cove, but the holding ground is not good.

Penguin head, dividing Goose and Penguin arms, is the western end of a flat-topped, isolated, and bare gray hill 1,020 feet high, on which are a few trees; it is bold-to.

Penguin arm (formerly Penman arm) extends from Penguin head northeastward $1\frac{1}{2}$ miles, and thence east-northeastward nearly 2 miles: the water in it is deep, and it is clear of shoals. There is no secure anchorage for large vessels in this arm, though schooners seeking bait anchor in the bends of the shore.

The north shore of Middle arm rises generally in gray cliffs fronting densely wooded hills, and there is deep water at a few yards off it.

Old Woman head, a mountain 1,020 feet high, in the peninsula separating Middle and North arms, and about midway between them, falls in a steep cliff to the southward, and sharply to the northward; it shows well over the lower ranges.

Seal cove, on the northern shore of Middle arm, at $1\frac{1}{2}$ miles within Northern head, is an indentation extending 400 yards to the northward, but affords no shelter, as shoal water extends 250 yards from its head.

Northern head of Middle arm rises in a steep cliff about 300 feet high, and is streaked with curiously thin stripes of quartz following the stratification, which is much contorted. The shore from the head curves northward round a small cove, into which a streamlet flows, and the stripes of quartz show as far as North Arm point, a distance of $1\frac{1}{2}$ miles. This shore is foul for 350 yards off it.

Eagle island, westward, $1\frac{1}{4}$ miles from Northern head, is 600 yards long in a northerly and southerly direction, and 112 feet high. The western side is composed of steep cliffs, striped vertically with red and gray rock, and near its northern end is a conspicuous mass of sandstone, projecting from the rock forming the body of the island; the eastern coast rises steeply in a grassy sward from a shingle beach.

Low rocks and shoals extend 200 yards from the northern and southern ends of the island.

Fisherman rock lies in the channel between the mainland and Eagle island, with North Arm point bearing 21° , distant nearly 1,400 yards, and has 2 feet of water over it.

A shoal, with 17 feet of water over it, lies nearly in mid-channel between Eagle island and the mainland, with the northern end of Eagle island bearing 277° , distant $\frac{1}{2}$ mile.

Seal head, open southward of a cliff southeastward of Northern head, bearing 119° , leads southward; and the cliff at Stowbridge head, open westward of North Arm point, bearing 32° , leads north-westward of Fisherman rock and the shoal.

Cox point, just open of Northern head, bearing 142° , leads between the 17-foot shoal and Fisherman rock.

North arm entrance is between North Arm point and Stowbridge head, which bear north-northeasterly and south-southwesterly, distant nearly 2 miles from each other, and the arm extends eastward $3\frac{1}{2}$ miles, and then northeastward 4 miles.

North Arm cove lies east-southeastward $\frac{1}{2}$ mile from North Arm point, and there is a beach of shingle at its head.

Anchorage in the cove is not good, but small vessels anchor for a short stay, in 14 fathoms water, off the middle of the cove, the water shoaling quickly thence to the beach.

An open cove is situated on the southern side of North arm, $4\frac{1}{2}$ miles eastward from North Arm point; a rocky bank, with 6 fathoms water over it, lies at its entrance and distant 400 yards from the northern shore; and a shoal, with depths of 5 to 7 fathoms water over it, extends from the southern shore at $\frac{1}{4}$ mile from the head.

Harbor cove, northward of the preceding cove and separated from it by a promontory, 515 feet high, is $\frac{3}{4}$ mile in extent and about 300 yards wide; a shoal, with 2 fathoms water over it, extends southward nearly 100 yards from the northeastern entrance point; and a small bank, with 5 fathoms of water over it, extends a short distance from the southern side of the narrowest part.

Water can be obtained from a cascade which falls into the eastern side, and from a considerable stream flowing into the head of the cove.

The southeastern shore of North arm, northeastward of Harbor cove, rises in wooded hills 300 to 400 feet high. In this part of North arm the water is deep at a short distance from the shore; and there is no convenient anchorage in it, except for small vessels.

At the head is the mouth of a shallow stream, flowing through a deep valley, that extends many miles inland, between high ranges of hills.

Stowbridge head is a square mound, 87 feet high, situated on the western side of a small shingle beach, on which are some houses.

A black rock, 12 feet high, lies northwestward, 300 yards from Stowbridge head; from this rock the shore trends west-northwestward and falls in small cliffs, with an outlying small islet 10 feet high.

Liverpool brook flows into the bay at $1\frac{2}{10}$ miles from Stowbridge head, and Liverpool cove, with a few houses on its shores, is about $\frac{1}{2}$ mile farther westward.

Anchorage can be obtained, with offshore winds, southward of Liverpool brook, in 18 fathoms water.

Parkes rock, bearing 192° , distant $1\frac{1}{10}$ miles from the houses in Liverpool cove, has $4\frac{1}{4}$ fathoms of water over it, and 6 to 8 fathoms for a short distance around. Bearing 184° , distant $\frac{1}{2}$ mile from Parkes rock, is a shoal with $6\frac{1}{4}$ fathoms of water over it.

These shoals are on a bank extending in a northerly and southerly direction 1,600 yards, with a width of 500 yards, and having depths of 11 to 19 fathoms, with 23 to 75 fathoms at a short distance around.

Buck head is the western point of Liverpool cove, and a shingle beach extends from it, in a curve, to Crabb point, which point lies westward, distant $2\frac{1}{4}$ miles from the head.

Upper Crabb brook flows into the bay at 1 mile from Buck head; several houses stand close to the mouth of the brook.

A flat of sand and stones extends southward from the mouth of the brook, and there are depths of 3 fathoms at 200 yards, and of 10 fathoms at 500 yards from the shore.

Middle Crabb brook is westward 800 yards from Upper Crabb brook, and at a shingle point projecting southward.

A shoal, with $4\frac{1}{2}$ fathoms water over it, bears 161° , distant 500 yards from this point, the water deepening to 12 fathoms close southward of the shoal.

Lower Crabb brook, a large stream flowing into the bay at a distance of 800 yards eastward of Crabb point, and at the western end of the shingle beach, drains a deep valley which extends inland to the foot of the northern slope of mount St. Gregory; several houses stand close to its mouth.

A bank, with less than 3 fathoms of water over it, extends 335 yards from the shore eastward of the mouth of Lower Crabb brook; the depth then increases suddenly from 7 to 30 fathoms at a farther distance of 200 yards off the shore.

Crabb point rises in low dark cliffs to a small wooded hillock, 215 feet high, the southern end of a long stony ridge that extends northward and culminates in mount St. Gregory. This is the turning point into the Bay of Islands. A rock lies close southward of it.

The coast from Crabb point trends northwestward $1\frac{1}{10}$ miles, then north-northwestward $2\frac{3}{4}$ miles to Beverley cove, whence it continues northward $1\frac{3}{4}$ miles to North head of the Bay of Islands.

Davis cove lies north-northwestward $2\frac{1}{2}$ miles from Crabb point and between Lower Gull rock, 22 feet high, and the Friar, 60 feet high, which are nearly 1,200 yards apart; a considerable stream flows through the shingle beach at its head. The cove is a resort of fishermen during summer, who erect temporary huts there.

Beverley cove, a semicircular basin 100 yards in diameter, situated north-northwestward nearly $1\frac{1}{2}$ miles from Lower Gull rock, is shallow and surrounded by black rock, except in a small creek immediately eastward of the southern entrance point, where boats moor, sheltered by a reef extending nearly across the entrance; it is frequented by fishermen during summer.

The Green Handkerchief, a remarkable grassy sward on the cliff 700 yards northward from Beverley cove, is conspicuous from seaward, being bright green during summer and yellowish during spring and autumn; a similar but much smaller sward is situated a short distance northward of the Green Handkerchief.

Waterfall.—A conspicuous waterfall flows over dark black cliffs $\frac{1}{2}$ mile southward of North head, and from the mouth of this stream a rocky ledge, that nearly dries, extends 150 yards, and makes landing difficult for boats. A small headland, with dark cliff, in which at some height is a large cave, lies between the waterfall and the shingle beach extending to North head; two small streams flow through the shingle beach.

North head, a low red earth cliff, 54 feet high, fronts a marshy plateau, that is generally green in summer, at the foot of the slope from mount St. Gregory; it is fringed by bowlders that uncover, extending to a distance of 200 yards, shoal water continuing for 300 yards farther; on this shelf are two rocks, with 2 feet of water over them, bearing 274° , distant 400 yards from North head.

The southeastern point of Pearl island, open westward of the rocks off Beverley head, bearing 173° , leads close westward of these rocks.

Mount St. Gregory, situated east-northeastward, distant 2 miles from North head, exhibits from the southward one sharp peak, but from the westward it shows three small though distinct summits, the middle and largest one, which is 2,240 feet high, being covered with stones and boulders.

The western face of the mountain is bare and stony, with deep gullies reaching generally to its base, which lies directly behind the beach. The slopes on its northern side are wooded and fall more gradually toward the valley of Gregory river, distant about $3\frac{1}{2}$ miles.

Tidal streams.—No law has yet been deduced for the tidal streams in the Bay of Islands. On June 13, 1881 (moon's age, 16 days), from 8h. 20m. a. m. till 6h. 45m. p. m., the stream set eastward, with a slight curve from Guernsey, while from 9h. 20m. a. m. to 5h. 10m. p. m. of the same day it set northward from Pearl island, and at the same time set with a rate of about one knot up Middle arm.

During May, June, and July the surface stream in Humber arm set almost continuously seaward, while there was an undercurrent setting in the opposite direction. The west-going surface stream is split by Woods island, and attains a rate of nearly $1\frac{1}{2}$ knots over the shoal off Shoal point. The east-going stream converges to Humber arm round Woods island, its rate decreasing on the surface as it nears the river.

The tidal streams through the narrows of Goose arm attain a rate of 2 knots at springs, the time of the turning of the streams being irregular with respect to high water, varying with the direction of the wind, and the amount of water flowing into the head of the arm from the streams.

Close to all shoals and banks, especially Vesuvius rock, a stream attains occasionally a rate of $1\frac{1}{2}$ knots, though it is scarcely perceptible $\frac{1}{4}$ mile distant from them.

Population.—The residents of the Bay of Islands are of mixed nationality, comprising descendants of deserters from French vessels of war, former inhabitants of the east coast of Newfoundland (principally of Irish descent), and natives of Nova Scotia, the last named being employed principally at sawmills.

The coast from North head trends northward nearly 4 miles to Chimney Cove head and is a stony beach, fringed with rocky ledges, backed by a steep clay bank, behind which rise the slopes of mount St. Gregory and the hills falling from it. The rocky ledge extends generally to a distance of about 200 yards from the beach, but near North head it extends 300 yards, and southward $\frac{3}{4}$ mile from Chimney cove it extends 400 yards. At Shoal cove, $\frac{3}{4}$ mile from North head, there are some buildings used as a lobster factory.

Chimney Cove head is a slight projection, 450 feet high, with a perpendicular cliff on its southwestern side; eastward, toward the river valley, it falls in a conspicuous green slope extending from summit to base.

Immediately southeastward of the head is Chimney cove, into which Gregory river falls; this is a small shallow stream, flowing from the hilly country inland, and barred by stones and boulders that dry. On the southeastern side of the entrance is a low spit of sand and shingle on which are several huts, and there are also a few houses on the green slopes behind.

Fair anchorage can be obtained off Chimney cove, with southerly and southeasterly winds, in 12 to 14 fathoms of water.

The coast from Chimney Cove head trends northward to cape St. Gregory, a distance of 1 mile, and is composed of cliffs fronted by rocks, some of which are 20 feet high.

Cape St. Gregory is a shelf of level ground, about 200 yards wide, projecting from the higher cliffs, and its cliffs are 75 feet high. It is steep-to, but during heavy weather there is a very high confused sea, and then small vessels should keep at least 2 miles off shore.

The coast from cape St. Gregory trends about northeastward for 5 miles to Big Cove head, and is composed of high cliffs, behind which are wooded hills and deep ravines. In the vicinity of Rencontre cove, a small bight at $1\frac{1}{4}$ miles from cape St. Gregory, a conspicuous cliff, nearly 1,000 feet high, recedes a little from the fore-shore and terminates in a series of white rocky hills.

There are few places available for landing, the best being at Rencontre cove, where boats may land safely in any weather, except during strong westerly winds.

Big Cove head is 820 feet high, and rises almost perpendicularly from the sea. From the head the coast trends northeastward for $1\frac{3}{4}$ miles to Trout River entrance, and the land behind it is high, culminating in a summit, 1,040 feet high, the eastern side of which slopes quickly down toward Trout river.

Soundings.—The coast between cape St. Gregory and Trout river is steep-to, the 20-fathom contour line being about $\frac{3}{4}$ mile distant nearly to Big Cove head; it then runs off the land, forming a bank, 1 to 4 miles wide, which stretches west-northwestward about $4\frac{1}{2}$ miles.

Bearing 248° , distant 1,600 yards from Big Cove head, and rather more than $\frac{1}{2}$ mile from the shore, there is a small patch of 10 fathoms, with 11 to 15 fathoms around, and bearing 355° , distant $2\frac{8}{10}$ miles from the head is Trout River rock, a patch with 13 fathoms of water over it and 22 to 24 fathoms around. Both these rocks are resorts of the local fishermen, and, during fine weather, numbers of boats anchor near them.

Trout river flows into the southern corner of Trout River bay, a deep bight, and its entrance is sheltered from the sea by a projecting headland. The river is a small stream discharging from a series of extensive ponds, which begins a little over a mile inland. The river bar has 2 to 3 feet of water over it, but it is encumbered by bowlders, and only small boats can cross it.

On a sandy beach at the eastern side of the river's mouth, and on the rising bank behind, there are several houses, containing about 170 inhabitants who are engaged in the cod and lobster fisheries.

Anchorage can be obtained, with offshore winds, off the middle of Trout River bay in 9 to 10 fathoms of water; small vessels may go closer in, but there is usually a heavy ground swell during winds from seaward.

Communication.—From Trout River settlement there is a rough road to South arm of Bonne bay, and the coasting steamer, to and from that place, occasionally calls off the river during fine weather.

The coast from Trout River bay trends northeastward for $5\frac{3}{4}$ miles to Western head of Bonne bay, and is clifty and fronted by low water rocks and ledges, extending, in places, 200 yards from the land. There are occasional patches of conspicuous red cliff and steep slopes, forming low headlands covered with grass, the bright green of which is, in summer, in contrast to the dark spruce-covered hills above.

Immediately within the coast the hills rise to a considerable height, and farther inland are the seaward face and upper portion of an extensive tableland covered with broken sandstone, bare of vegetation, and occasional marshy patches, which begins near the large ponds behind Trout river, and reaches across to within $1\frac{1}{2}$ miles of South arm of Bonne bay.

At Green garden, $3\frac{1}{4}$ miles from Trout River bay, where a green slope leaves a narrow strip of flat land behind the shore, there are one or two huts, occupied, during summer, by fishermen from Bonne bay.

The low water ledge extends rather more than 200 yards off Green garden, and there are some small detached rocks a little eastward of it. At Skinner cove, $\frac{3}{4}$ mile farther northeastward, a small stream runs into the sea; and between this cove and Western head, northeastward $1\frac{1}{2}$ miles, the very steep slopes rise to the height of 1,005 feet.

Western head, from the westward, appears as the end of the high land to the southward; there are some detached rocks close off it, the highest of which is 57 feet high.

Bonne bay, the entrance to which, from Western head to Lobster Cove head, is nearly 4 miles across, extends southeastward for about 6 miles, then separates into two arms, East arm, the eastern, being $5\frac{1}{2}$ miles long and about $\frac{3}{4}$ mile wide; and South arm, the western, 4 miles long and a little more than $\frac{1}{2}$ mile wide. The scenery in these arms

is grand and picturesque, the shores rising steeply to high, timber-clad hills.

The water in Bonne bay is generally too deep for anchorage, but there are places in it where good shelter can be obtained in a moderate depth of water.

For $4\frac{1}{2}$ miles westward of the entrance to the bay there are soundings of 50 to 70 fathoms, outside this deep area there are depths of 25 to 45 fathoms, while at about 10 miles off the entrance there is a bank with 10 to 25 fathoms over it. (See also p. 322.)

Sailing vessels entering Bonne bay during strong southerly or westerly winds must be prepared for the violent squalls that blow off the high land on the southern side.

The principal settlement is at Woody point, on the western shore, at $6\frac{1}{4}$ miles inside the entrance, and the population of the whole bay numbers about 1,200, engaged chiefly in the cod and lobster fisheries.

Ice.—Bonne bay never freezes until the field ice appears, which is generally about the middle of January, but it is then completely closed with ice about 2 feet in thickness until about the middle of April, when the field ice disappears. There is occasionally ice on the coast, sometimes blocking it up to about June 8.

The first vessel usually arrives early in May, and the last leaves about the end of December.

Eastern head, eastward $1\frac{1}{2}$ miles from Western head, is high and steep; between the heads there is a long strip of shingly beach at the foot of the cliffs, and off the western end of this there is a detached rock, situated 250 yards from the shore, which dries 2 feet.

Vessels should not approach this shore within 400 yards; at Eastern head, however, it becomes very steep and may be approached closely.

The shore from Eastern head trends southeastward for $2\frac{1}{2}$ miles and then turns to the southward for $1\frac{8}{10}$ miles to Woody point; it is steep, and rises, in high wooded cliffs and steep slopes, to a remarkable cliffy escarpment which culminates in Crag peak, a summit 1,939 feet high; northeastward of this and directly over the shore is a large, pinnacle-shaped rock, conspicuous on southeasterly or westerly bearings. There are several houses along the shore for $\frac{3}{4}$ mile northward of Woody point.

This shore may be approached closely until within $\frac{3}{4}$ mile from Woody point.

Woody point is 54 feet high and projects from the higher land behind, which here rises in steep slopes, more or less wooded and broken by deep ravines.

Woody Point village contains about 220 inhabitants; the English and Roman Catholic churches on the slope southwestward of the point are conspicuous; there are post and telegraph offices, schools, and churches of various denominations.

Anchorage can be obtained at about 800 yards southward of Woody point in 12 to 20 fathoms water, but the bank with this depth is narrow and steep, and the bay is subject to sudden and violent squalls during strong winds, therefore a vessel's stay should be temporary only.

Wharves.—Silver's and Halliburton's wharves are the best for a vessel of any size to lie alongside, as their heads are in line, and together afford a length of 113 feet. There is a depth of 16 feet at a distance of 18 feet off these wharves; if required, floating stages about 4 feet wide can be obtained to breast a vessel farther off. Vessels go alongside heading southward.

Coal.—There is usually a small quantity of coal in store at Woody point.

Supplies and fresh provisions can be obtained at reasonable rates.

Communication.—The steamer from Bay of Islands calls at Woody point weekly, and the steamer from Halifax calls monthly during summer and autumn.

There is a telegraph office at the village.

Trade.—The exports are lobsters (tinned), fish, oil, and a few furs; in 1894 the imports were valued at \$66,300.

South arm.—The shore, on which are several houses, wharves, and fishing stages, extends from Woody point south-southwestward about $1\frac{1}{10}$ miles to a low flat stony spit at the mouth of a small stream; off this spit the water shoals a little and then deepens toward Hell cove. On a point at the southern end of this cove there is a wharf and warehouses, now out of repair, but formerly used by a local trading company.

A good road runs along this side of South arm, and the track from Trout river meets it at the northern side of Hell cove.

Birchy head, a birch-covered bluff on the western side, is $1\frac{6}{10}$ miles above Hell cove. The shores on both sides of the arm, excepting only off a small bight southward of Hell cove, are steep-to. Silvertown district is around Birchy head.

Foul point is on the eastern shore southeastward from Birchy head, and at the foot of the slope from a cliffy summit, 1,180 feet high, which rises steeply from the sea. A small rock, with 6 feet water over it, lies westward rather more than 100 yards from the point, and there are depths of 3 fathoms between, but otherwise there are 14 to 28 fathoms close to it. To avoid this rock keep toward the western shore. The shores around the head of the arm are low and flat, and mud banks occupy its middle for fully $\frac{1}{2}$ mile. The outer edges of the banks are very steep, there being 10 fathoms within 100 feet of the portion that dries at low water.

Anchorage.—Vessels anchor near the head of the arm in depths of 20 to 25 fathoms, but the anchorage is not recommended on ac-

count of the deep water, the heavy squalls which blow occasionally, and the distance from the settlement.

Entrance point, on the eastern side of the arm, southward $1\frac{1}{10}$ miles from Woody point, is a wooded bluff, 281 feet high, with very steep shores.

Deep Water cove is a small bight, east-northeastward $\frac{1}{2}$ mile from Entrance point, with water not too deep for anchorage, but it is not a desirable berth; there are a few houses on the shores.

The shore from Gray point, the eastern point of Deep Water cove, trends northeastward for $1\frac{6}{10}$ miles to Gadds point; the western portion is rocky, steep-to, and backed by wooded hills rising to heights of 338 to 870 feet, but from Rattling brook, a small stream half way between Gray and Gadds points, it is shelving and can not be approached closely. Water can be procured from Rattling brook.

Gadds point is the northern end of Gadds head, a rounded headland, 127 feet high, about 200 yards in diameter, and connected to the mainland by an isthmus; the point is steep-to, there being from 14 to 30 fathoms water close to the rocks.

Gadds harbor, a cove on the southeastern side of Gadds head, has anchorage for small vessels close to the shore.

East arm extends southeastward about $5\frac{1}{2}$ miles, and has a general width of about $\frac{9}{10}$ mile, with steep shores. It is entered through the Tickle, a channel about 400 yards wide, between Gadds and Norris points (page 321).

The central part of East arm is a deep basin in which there are depths of 100 to 126 fathoms, mud bottom. The shores are quite steep, excepting only at the southern corner, where East Arm barachois, a narrow inlet, dries at low water, and from which banks of sand and mud extend about $\frac{1}{4}$ mile. The land on both sides is high; on the western side the slopes are densely wooded, but on the eastern some are bare and stony.

Shag cliff, eastward 1,300 yards from Gadds point, is a gray limestone cliff, steep-to, which rises directly to the height of 390 feet. Immediately eastward is a small bay, with a white stony beach, terminating eastward 600 yards from Shag cliff, in Storehouse point, a low grass-covered projection, at 200 yards off which is a rock with 18 feet water over it and 6 fathoms between it and the shore.

Norris cove.—At Storehouse point the shore turns south-southeastward, and Norris cove, a small bight at 1 mile from the point, has a convenient depth for anchorage, but very little room; there are a few huts within the beach.

Tuckers head, bearing 125° , distant $2\frac{8}{10}$ miles from the southern point of Norris cove, is a castellated cliff, 420 feet high. Southeastward of it is Murphys cove, a small bight, and here begin the banks of sand and mud extending from the entrance of East Arm barachois.

which is about $1\frac{3}{4}$ miles long, and quite dry at low water; a small river, in which the salmon fishing is said to be good, flows into its head from a series of ponds a short distance inland.

Basin.—At $\frac{3}{4}$ mile northeastward of the entrance of the barachois is a narrow, deep, and clear passage leading into the head of East arm, which is an oval basin, $\frac{3}{4}$ mile long, nearly $\frac{1}{2}$ mile wide, and affords good sheltered anchorage in 13 to 18 fathoms water; the best berth is on the western side at about 600 yards inside the entrance.

A small river flows into the head of this basin, and from it stony flats extend for nearly $\frac{1}{4}$ mile, but being steep-to, they do not interfere with the anchorage.

Seal cove is on the northwestern side of the eastern entrance point of the basin, and vessels anchor off it, but during strong westerly winds the squalls are heavy, and the short, choppy sea set up is inconvenient for boats. There are a few huts on the shore.

The eastern shore of East arm northwestward of Seal cove is steep-to, and rises in bare stony slopes to a remarkable conical peak, 2,135 feet high, over which there is a rough track to the interior.

Deer arm, the northern part of East arm, extends northward nearly 2 miles; inside a low sandy point at its head is a small basin, dry at low water, and Deer brook, a stream from a large pond under the mountains to the northward, flows into it.

Gros Morne, the highest of these mountains, is bare rock, 2,540 feet high, and conspicuous from seaward. (See also p. 323.)

Deer arm does not afford convenient anchorage, as the water is too deep, and it is subject to violent squalls, which blow from the surrounding hills.

Neddy harbor, situated on the northern side of the entrance to East arm, is an indentation extending northwestward about $\frac{1}{2}$ mile, with a width of 400 yards, and toward the head the harbor is $\frac{1}{2}$ mile long in an easterly and westerly direction, with an average width of 300 yards, but the area, with a depth of over 3 fathoms, available for anchorage is 700 yards long and 400 yards wide.

The entrance is clear beyond the shoal water reaching about 150 yards from the shores on either side; but a prong of shoal water extends southward 300 yards from Shoal point, the outer eastern entrance point.

Neddy harbor is the most convenient, and probably the best anchorage in Bonne bay, as it is sheltered from all except southeasterly winds; with southeasterly winds the squalls are often severe, and a heavy sea is quickly raised. Large vessels moor, as the space is limited.

Wharf.—On the southern side of the inner part of Neddy harbor is a coal wharf, 130 feet long, with a head 92 feet long, alongside

which is a depth of 23 feet water. There are ringbolts in the rocks for securing hawsers.

Buoy.—A spar buoy, northwestward about 200 feet from the wharf, marks some moorings for small vessels to use when lying alongside.

Coal.—A small stock of Welsh coal is maintained at Neddy harbor for the use of British government ships. The coal shed is at the inner end of the wharf.

Supplies.—Meat is very good except early in the year; vegetables are scarce in spring; bread is good. Water is good and plentiful; it was to be conveyed to the wharf by pipes.

Position.—A large flat boulder of serpentine rock, marked with a broad arrow and situated on the northwestern shore of the harbor, 100 yards from a small fishing stage with a store on it, is in latitude $49^{\circ} 31' 30''$ north, and longitude $57^{\circ} 52' 27''$ west of Greenwich.

Norris cove is a bight in the shore, just southwestward of Burnt point, the southwestern entrance point of Neddy harbor; it has a small settlement, which, with Sandy cove, contains about 175 inhabitants; there is a path from Norris cove to Roche harbor.

Norris point, the western point of this cove, has a ledge of rocks extending 100 yards from it; between the point and Gadds head is the Tickle, a deep and clear channel 500 yards wide.

Sandy head, northwestward 800 yards from Norris point, is a conspicuous projection, 74 feet high, appearing steep, bare, and sandy from the southwestward. Between it and Norris point there are several houses and fishing stages, as also in Deckers cove, northward of it, which is separated by a narrow neck from the head of Neddy harbor.

Wild Cove head, northwestward nearly $\frac{1}{2}$ mile from Sandy head, is a dark, rocky, wooded point, and separates Deckers cove from Wild cove.

Shoal.—An extensive stony flat fronts the shore from Norris point to Wild Cove head, the outer edge of the 3-fathom contour line being a little over 600 yards off Sandy cove, while at the distance of 300 yards there is a small patch with 6 feet of water over it. Bearing 246° distant 350 yards from Norris point, where the edge of the shoal turns sharply northwestward, there is a small patch, with 2 feet of water over it, and $1\frac{1}{2}$ fathoms between it and the point; off Sandy head the stones dry for nearly 200 yards.

Leading mark.—Gadds point in line with Shag cliff, bearing 84° , leads southward of the shoal off Norris point, and through the western part of the Tickle.

Anchorage.—A flat, with depths of 6 to 8 fathoms of water over it, is situated at the western entrance to the Tickle, and it affords

good temporary fine weather anchorage, with Gadds point in line with Shag cliff, bearing 84° , and Wild Cove head bearing 347° . It is subject to very violent squalls from the high mountains when the wind is fresh.

Wild cove, a deep bight on the northern side of Wild Cove head, has a moderate depth of water, but the bottom being stony, and the cove open to westerly winds and sea, it is not suitable for anchorage.

Salmon point, north-northwestward, $3\frac{1}{10}$ miles from Wild Cove head, is a narrow bare slate point, the shore between being slate cliffs, backed by thickly wooded hills and generally fronted by a narrow rocky foreshore. It is fairly steep-to, except close to Salmon point, where low-water ledges and foul ground extend for nearly 200 yards.

Tides and tidal streams.—It is high water, full and change, in Norris cove at 10h. 40m.; springs rise 6 feet, neaps $4\frac{1}{2}$ feet. There is considerable diurnal inequality in the height of the tides, consecutive high and low waters differing, about the time of springs, as much as 2 feet.

The tidal streams run generally fair in and out of East arm through the Tickle, where, during springs, they are very strong. In South arm the direction of the ebb stream is not regular, apparently owing to its being met and checked, by the stream through the Tickle.

Bank.—The northern side of the entrance to Bonne bay is fronted by an extensive rocky bank, with general depths of 11 to 17 fathoms; the 20-fathom limit terminating 10 miles northwestward from Western head, where the bank is about $1\frac{1}{2}$ miles wide. The bank extends southwestward from Martin point, and some small patches of 8 and 9 fathoms bear 291° , distant 6 miles from Green point; the 10-fathom contour terminating $3\frac{1}{2}$ miles westward from Gun point. Fish are usually plentiful on this bank, and during fine weather numerous boats anchor on it.

Roche (Rocky) harbor is an indentation northward of Salmon point, extending about one mile to the eastward, with a width of $\frac{3}{4}$ mile; it affords good anchorage, except during strong westerly winds, when a heavy sea is thrown in.

A flat ledge of stones and bowlders, drying 1 to 4 feet, extends north-northwestward 650 yards from between Salmon point and the next point inside, where there are a few houses and fishing stages. The ground is foul for nearly 200 yards on either side of this reef, and rocky ledges fringe the shore nearly all around the harbor, with foul ground extending about 300 yards from them.

The best anchorage is in 6 to 7 fathoms of water off the southern shore of the harbor, with the end of the northern head bearing 305° , and Salmon point in line with the next point inside it bearing 216° .

At the head of the harbor, known as the Bottom, there is a small break in the ledges, with good landing for boats; and in Bear cove, on the northeastern side of the harbor, there is a similar break with good landing. There are a few houses at both these places.

The population of this locality numbers about 160 persons, all engaged in the fisheries. There is some cultivated ground on the southern side, inside of Salmon point, where potatoes and other vegetables are grown.

Directions.—Enter Roche harbor with the northern summit of Gros Morne in line with a saddle-shaped wooded coast hill, bearing 88° , which leads southward of the shoals on the northern shore. When abreast Woody cove, the first bight on the northern shore, with the end of the northern head bearing 313° , steer about 116° for the anchorage, avoiding a rocky projection from the inner point of Woody cove, and the foul ground extending from the ledge of stones and boulders.

The coast between Bonne bay and Cow head is low, fronted by rough stony beaches and boulders. It contains no harbors, nor even anchorages, except at Cow cove, where shelter can be found in westerly to northerly winds; and it is only in the finest weather that vessels can anchor off any part of this coast.

The water deepens gradually to seaward, but some extensive banks of comparatively shallow water extend a considerable distance, and a ridge of shoals (p. 326) lies upward of a mile off, about halfway between Lobster cove and Cow head. The bottom is rock and boulders, with, in places, very small patches of sand.

Strong westerly to northerly winds throw a heavy sea on the shore, and landing with safety is then almost impossible, except in a few places where there is a little indifferent shelter. There is a large quantity of drift wood and wreckage on the coast.

Mountains.—A conspicuous range of mountains extends northward from the northeastern side of East arm of Bonne bay. Gros Morne, the summit of the range, situated north-northeasterly, distant 3 miles from the head of Deer arm, is 2,540 feet high, and is distinguishable from seaward by its elevation; its southern face slopes and is bare, and its western side descends in steep cliffs into a deep gorge.

From Gros Morne the range trends nearly parallel to the coast, its western ridge being about 5 miles inland, and low wooded spurs branch off seaward from it, terminating, northeastward of Green point, in large tracts of bog and barren, with numerous ponds.

Western Brook mountain is a conspicuous wedge-shaped summit at $3\frac{3}{4}$ miles east-southeastward of Martin point and on the western side of a remarkable gorge, both sides of which appear as vertical walls of rock. Western Brook pond, a large sheet of water, said to extend

10 to 12 miles inland, occupies this gorge, and stretches through the flats to within $1\frac{1}{4}$ miles of the sea.

Caution.—Sailing vessels navigating on this coast during strong easterly winds must guard against the violent squalls which come down from the mountain gorges.

Winds.—Easterly gales are not frequent; they are generally accompanied by thick rainy weather. In 1896, southerly winds prevailed in June, July, and August, and northwesterly winds in autumn, but there were occasional short intervals of easterly winds.

Current.—Inshore between Bonne bay and Cow head, a current generally sets northward with a greatest rate of about $1\frac{1}{2}$ miles an hour.

Lobster Cove head, the northern entrance point of Roche harbor, is composed of low red cliffs, 34 feet high, fronted by flat ledges of rock for 150 yards. Near the western end of these ledges there are two large rocks, 12 feet high.

Light.—A circular white tower, 25 feet high, on Lobster Cove head, exhibits, at 115 feet above high water, an intermittent white light every $2\frac{1}{2}$ seconds, thus: Light $1\frac{1}{4}$ seconds, eclipse $1\frac{1}{4}$ seconds, which should be seen from a distance of 16 miles in clear weather.

The keeper's dwelling is close eastward of the tower and connected to it by a covered way, both being white with black roofs.

Signals.—The lighthouse is supplied with the International code signals.

Lobster cove is the small bight northward of Lobster Cove head; on its shore are a few houses and a canning factory, off which there is a long stage or jetty for landing, but this can only be effected in fine weather or with offshore winds.

Rock.—A small rock, with 13 feet of water over it, bears 335° , distant nearly 800 yards from Lobster Cove head. Between the rock and the northern head of Lobster cove there are depths of $3\frac{1}{2}$ to 4 fathoms.

The coast between Lobster cove and Green point, northward, distant $4\frac{1}{2}$ miles, is low, wooded, and fronted by a stony beach, off which the water is shoal for about 200 yards.

Berry head, northward $1\frac{3}{4}$ miles from Lobster cove, is a slight projection of the low shore; northward 1 mile from the head is Bakers brook, a small stream with a rough bridge across its mouth. Between this brook and Pond point, 1 mile farther northward, there are two large ponds directly within the beach.

Berry hill, a small wooded knoll, 115 feet high, situated $\frac{3}{4}$ mile inland at about midway between Lobster cove and Berry head, is conspicuous on northerly or easterly bearings.

At some 2 miles westward from Berry head there are frequently overfalls and tide rips when the ebb stream is running strongly out of Bonne bay.

Green cove, between Pond and Green points, is shallow for about 400 yards from the shore, and unfit for anchorage, as a swell generally sets in when the wind is from seaward, while, with strong winds blowing offshore, the squalls from the mountains are violent. There are some houses on the northeastern side of the cove.

Green point, northward, 1,300 yards from Pond point, is a projecting low clay cliff, flat topped and grass covered.

A ledge of rocks extends southwestward from Green point, and at 600 yards southwestward from the point there is a detached patch, with 3 fathoms water over it and a narrow boat passage, slightly deeper, inside. At 1,100 yards southwestward from the point there is a detached rock with a depth of $4\frac{1}{2}$ fathoms over it and 5 to 8 fathoms around. These rocks break with an on-shore swell.

The coast from Green point is a boulder beach, with a low bank, more or less wooded, rising within it, north-northeastward for $2\frac{3}{4}$ miles to Gun point. Inland are low ridges with extensive marshes and many ponds. Little brook, a small stream with a canning factory on its northern side, flows into the sea at 1 mile from Green point.

Gun Point shoals are a group of rocky heads on a narrow ridge extending westward nearly $1\frac{1}{2}$ miles from the shore at a place 1,600 yards northeastward of Gun point. The shoalest spot, with a depth of 3 fathoms, bears 320° , distant 1,400 yards from Gun point, and around it are depths of 4 to 5 fathoms. Westward of the ridge there are depths of less than 10 fathoms for a distance of $3\frac{1}{2}$ miles from the land.

Clearing mark.—Crag peak (p. 317), on the southwestern side of the entrance to Bonne bay, just open westward of Green point, bearing 180° , leads westward of Gun Point shoals.

The coast from Gun point, north-northeastward, for $2\frac{8}{10}$ miles to Martin point, is of the same character as that toward Green point, but the shoal water fronting the beach extends a little farther off. Sally cove is a shallow bight, about 1,200 yards from Gun point, where there is a canning factory and some houses; and on either side of this bight a tongue of stones and boulders, dry at low water, extends about 300 yards from the beach; the 3-fathom line is here distant over 800 yards from the shore.

Communication.—The steamer from Halifax, monthly, sometimes stops off Sally cove.

Martin point is a low cliff, 35 feet high, covered with grass on the top, and having a large clump of trees close behind it. From the point the coast turns sharply eastward for about 400 yards and thence about northeastward, forming a small bight, in which there

is a solitary cottage. Rocks, dry at low water, extend 200 yards from the point, but are steep-to.

Indrie rock (locally Dixie rock) lies about halfway between Gun and Martin points, $1\frac{2}{10}$ miles from the beach, with Martin point bearing 57° , distant $1\frac{8}{10}$ miles; it is about 250 yards in extent and has 2 fathoms of water over it.

There are some rocky shoals of 4 to 5 fathoms at rather more than $\frac{1}{2}$ mile southeastward from Indrie rock.

The Whaleback is a narrow ridge of rocks; near its middle, bearing 288° , distant 1 mile from Martin point, is a small mushroom-shaped rock that dries 4 feet, and from it the ridge with depths of less than 5 fathoms extends southwestward 900 yards and northeastward 1,300 yards. There are several spots of $1\frac{1}{2}$ to 2 fathoms on the ridge, both sides of which are steep-to, but especially the northwestern, where the 20-fathom contour line is distant but little over 200 yards. In thick weather, therefore, the lead is not to be depended on when standing toward the shoal.

There is a clear passage, carrying 4 to 6 fathoms, between the Whaleback and Indrie rock, lying south-southwestward, distant one mile.

The Brandies, a cluster of shoals, begins northeastward, distant $1\frac{2}{10}$ miles from the northeastern end of the Whaleback, and its western head, with a least depth of 2 fathoms water over it, bears 8° , distant $1\frac{9}{10}$ miles from Martin point and $1\frac{1}{4}$ miles from the nearest shore. A patch with a depth of 15 feet, bears 76° , 600 yards from the western head, and bearing 31° , distant 800 yards from this patch there is a cluster of rocks, the top of which is awash. These shoals are steep-to on their western sides, and break with a swell from that direction. There is a good clear passage between these shoals and the shore, but its northern end, with depths greater than 5 fathoms, is contracted to a width of 650 yards by a bank extending 600 yards off the beach. But the shoalest part of the Brandies being generally marked by the break, or wash over it, the navigation of this passage is not difficult.

Leading mark.—Martin and Gun points in line, bearing 205° , lead through the passage inshore of the Brandies.

Clearing marks.—Crag peak, open westward of Green point, bearing 179° , leads 1,200 yards westward of Indrie rock, and leads $1\frac{1}{10}$ miles westward of the Whaleback.

Parsons Pond hill, a conspicuous wooded, double-topped hill near Parsons pond, in line with the eastern part of Cow Head peninsula, bearing 37° , leads westward of the Whaleback and the Brandies, passing the latter at a distance of $1\frac{2}{10}$ miles. (See view on chart No. 2415.)

The coast from the bight eastward of Martin point continues about northeastward $1\frac{1}{4}$ miles to Gulls marsh, where there is a can-

ning factory on the stony beach, and from which a trail leads through the marshes to Western Brook pond, where the factory people keep a small boat for hunting purposes.

At nearly $2\frac{1}{2}$ miles northward from Gulls marsh the beach becomes sandy, and Western brook, a small stream flowing from Western Brook pond, runs some little way behind it and falls into the sea. Northward of this the coast becomes rocky and, with a small bight, forms the projection known as Broom point, on which there are a few cottages. Two ridges of dry rocks extend about 500 yards westward from the point, and in the bight between them there is a landing stage and fish store. The outer ends of these ridges are steep-to, but off the sandy beach southward of the mouth of Western brook there are depths of less than 3 fathoms for upward of 600 yards from the shore; to this distance, and often beyond it, the sea is frequently discolored by the water from the brook.

St. Pauls bay, lying between Broom point and St. Pauls point, north-northeastward, distant $3\frac{1}{4}$ miles, extends about 1 mile eastward of the line joining the headlands, and is open to seaward. The shores are low and stony, the bottom is foul, and the anchorage, even with the strong breeze that frequently blows seaward, is unsafe.

A rocky patch, with 5 fathoms of water over it, bears 343° , distant 1,900 yards from Broom point. Bearing 340° , distant nearly 2 miles from Broom point, there is a small patch of 6 fathoms; and a patch with $2\frac{1}{2}$ fathoms of water over it lies 600 yards offshore, a little southward of the entrance to St. Pauls inlet.

Basin.—On the eastern side of the bay, at a break in the low shore, 1,200 yards wide, is the entrance into St. Pauls inlet. Inside the break the shores open out into an oval basin about $1\frac{1}{2}$ miles long and 1 mile wide, which is filled with banks of sand and stones that dry. It is surrounded by low marshy shores, and two channels lead from the sea. The southern side of the break in the shore is a sandy spit with some houses on it, a little to the southward of which is a wooded hill 220 feet high; a large wooden building, situated near the end of the spit, is used as a lobster-canning factory.

From the end of the spit a ridge of shingle extends northward and forms a narrow bar across the entrance of the channel, over which there is a depth of 3 feet of water.

The bar is easily crossed by boats during fine weather by keeping close along the northern side of the ridge projecting from the end of the spit, but it is dangerous during strong winds with a heavy swell.

The northern of the two channels in the basin is very shallow, and terminates near a low, stony islet. The southern channel is about 200 feet wide, and has a depth of 1 to 3 fathoms; from close northward of the factory it turns eastward and then southeastward, in

which direction at rather over a mile from the factory it passes between two slightly elevated points into St. Pauls inlet.

The edges of the channel are clearly defined except at high water, and there is no difficulty for boats beyond that caused by the tidal streams which run through it and over the bar with considerable strength.

St. Pauls inlet is about $5\frac{1}{2}$ miles long in an easterly and westerly direction, with a width varying from 3 miles to $\frac{1}{2}$ mile. Inside the entrance the water is shallow, and there are several rocks, some above water, and rocky patches; but a channel along the western shore, with about 2 fathoms of water, leads into the deeper part of the inlet, where the general depths are 7 to 20 fathoms.

The eastern and the southern parts of the inlet lie at the foot of the northwestern side of a portion of the mountain range extending northward from Bonne bay, and toward them the water is deep and clear of shoals.

On the western side of the inlet, at about 1 mile southward of the entrance, borings for oil have been made, and it was reported in 1897 that a good supply had been obtained at a depth of 1,000 feet.

The coast from St. Pauls point trends northeastward for rather over 2 miles to the head of Cow cove, and is a rough, stony beach in front of a low wooded bank, behind which are ponds and marshy ground reaching to the mountains, which here begin to incline farther inland, and are broken by steep gorges with cliffs on either side, presenting a very rugged and barren aspect from seaward.

Cow cove affords good anchorage in 4 to 10 fathoms of water, during northerly gales, and in moderate breezes from eastward of a north-northwestward direction, but with winds westward of this a heavy swell rolls in, rendering the anchorage unsafe. Northerly gales are prevalent in early spring and autumn.

Cow head is a peninsula 1 mile long in an easterly and westerly direction, $\frac{1}{2}$ mile wide, 206 feet high, and densely wooded on its southern and western sides. From its eastern end a low isthmus of sand and stones runs southeastward to the main land, and separates Cow cove, on the southwestern, from Cow Head harbor on the northeastern side. The northern side of the head is steep-to, but rocks, which dry 2 feet, extend about 200 yards southwestward from the southwestern point.

The northern slope of the head has been partially cleared and affords grazing to the sheep and cattle of the residents, whose houses are situated at the eastern end. Here there is a large canning factory and some landing stages, the latter getting some partial protection from a ridge of dry rocks extending from the northeastern point.

Cow Head harbor.—Northeastward of Cow Head isthmus a curve of sandy shore continues northward to Downes point, a distance of a

little over 2 miles. White Rock islets, a chain of small islets and low-water rocks, nearly $1\frac{1}{4}$ miles long in a northeasterly and southwesterly direction, lie 600 yards off Downes point, and the bight, within these islets, lying between Cow Head isthmus and Downes point, is Cow Head harbor.

White Rock islets are connected with Downes point by a sandy flat drying at low water, which, extending southeastward and southward, occupies a considerable portion of the harbor.

Tortoise rock, awash at low water, is in the harbor entrance and separated from the rocks extending northeastward from Cow head, by a channel about 100 yards wide. In the middle of this channel and just inside Tortoise rock, is a rock, with 6 feet of water over it, and a very narrow passage, 12 to 15 feet deep, on its northeastern side. Between Tortoise rock and Thorn rock, which has less than 6 feet of water over it and lies close southwestward of White Rock islets, there is a depth of 9 to 10 feet of water.

The harbor is only suitable for vessels of moderate length, and drawing less than 10 feet of water, because not only is the passage into it narrow and tortuous, but during northerly to northwesterly winds such a heavy swell rolls in that there is great risk of touching the ground; in any case local knowledge is necessary to enter safely. Inside there is anchorage in $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms of water but in heavy westerly weather there is not much shelter.

Tides and tidal streams.—It is high water, full and change, at Cow Head harbor at 10h. 48m.: springs rise $6\frac{1}{4}$ feet, neaps $4\frac{1}{2}$ feet.

The tidal streams between Cow Head harbor and Steering island are strong, the flood, setting northeastward, sometimes attaining a rate of 2 knots at springs. The duration of this stream is much longer than that of the ebb, which sets in the opposite direction.

Communication.—The steamer from Halifax, monthly, calls off Cow Head harbor on her way to and from the northern ports.

Steering island, north-northwestward, distant 1,600 yards from Cow head, is 500 yards long in a northeasterly and southwesterly direction, 100 yards wide, and 22 feet high; it consists of limestone rock scantily covered with coarse grass. Broken islets and low-water rocks extend westward 600 yards and eastward 350 yards from the island, and shoals for upward of 600 yards from it, except from its southeastern side, which is fairly steep-to. Caution is necessary when in its vicinity at night or in thick weather: then keep in depths of over 20 fathoms which will insure being $\frac{1}{2}$ mile northward and westward of the island shoals.

Shallow bay (White Rock bay).—The coast from Downes point is a long sandy curve backed up by wooded flats and marshes, but broken by two small streams to Lower head, which lies northward at a distance of $1\frac{6}{10}$ miles from Downes point. This curve, together

with the eastern part of White Rock islets, forms Shallow bay, where there is fairly good anchorage for vessels of less than 14 feet draft, with southerly winds; and vessels drawing less than 12 feet find shelter, with the wind from southward of a westerly direction, by going as close as possible to White Rock islets; but with westerly winds a heavy sea is likely to roll in and, at low water, to break over the greater part of the bay.

Anchorage.—The best anchorage is with the whole of Stearing island and rocks, just open northward of the northeasterly grassy White Rock islet, bearing about 256° , and the cannery factory at Cow Head harbor, a conspicuous whitewashed building on the shore just open southeastward of White Rock islets in $3\frac{1}{4}$ fathoms of water, but quite close to the edge of the 3-fathom bank extending from the islets and Downes point. A little northeastward of this position a 3-fathom bank extends from the main shore, leaving a bight of $3\frac{1}{4}$ to $4\frac{1}{2}$ fathoms of water between it and Downes point; and it is in this bight that anchorage should be obtained.

Directions.—From the southwestward pass westward of White Rock islets, which are fairly steep-to, and haul round their northeastern end, giving the rocks a berth of about 100 yards. From the northward pass the shoal water off Lower head in 8 to 9 fathoms, and then steer for the northeastern end of White Rock islets before hauling into the anchorage.

Evangeline banks are a series of rocky patches extending from 700 yards northward of Tortoise rock to the shoals westward of Lower head (Stanford point). The general depths of the banks are $3\frac{1}{4}$ to 5 fathoms, but the shoalest patch of 2 fathoms bears 319° , distant 900 yards from the northeastern grassy White Rock islet, and is on a patch about 500 yards long in a northerly and southerly direction, and 200 yards wide. North-northeastward, 300 yards from this patch, there is a patch of $2\frac{3}{4}$ fathoms, with $3\frac{1}{2}$ fathoms between.

Inside these banks, between White Rock islets and Lower head, fronting the shoaler area in Shallow bay, there is a space of water with depths of 5 to 7 fathoms in it.

Lower head (Stanford point) is a rocky projection at the termination of the sandy shore extending northeastward from Cow head. It is 35 feet high, and from it a low cliffy coast with a small sandy bight extends north-northeastward 800 yards. Off Lower head, and also off this cliffy coast, shoal water extends nearly $\frac{1}{2}$ mile, and is clearly marked by breaks, when there is any swell.

The coast from the cliffs trends north-northeastward, and is low and thickly wooded for $3\frac{1}{2}$ miles, rising gradually to the slopes of Parsons Pond hill, which is 460 feet high, densely wooded to the summit, and conspicuous. The rough beach of stones and bowlders is

fronted by flat ledges of rock extending off about 200 yards, and outside them the water deepens gradually to 10 fathoms at the distance of $\frac{1}{2}$ mile.

At about 4 miles from Lower head the rocky ledges cease, and the stony beach becomes less rough, and finally changes to sand; inside these is a steep yellow-clay bank, which shows well from seaward. Behind this bank there is a large pond and low, marshy ground.

Sandy bay, 5 miles from Lower head, is a shallow bend in the coast; it is generally foul and rocky, and affords only temporary anchorage. The entrance to Parsons pond is near its southeastern end.

Parsons pond extends inland about 7 miles from Sandy bay, with an average breadth inside the narrows near the entrance of about 1 mile. The entrance is obstructed by a bar of coarse shingle, with a depth of 4 feet over it, and immediately inside the entrance, on the southern bank, is the village, with some buildings on the sandy spit opposite. Here the depth in the channel is about 1 fathom, but farther in it quickly shoals again to 3 feet, through a stony flat. At $1\frac{1}{2}$ miles within the entrance the channel contracts to little over 200 yards, with a depth of 1 to 2 fathoms. Above this the pond opens out for about $1\frac{1}{2}$ miles, where are the inner narrows, beyond which the water deepens to 5 and 8 fathoms. This depth continues to the head, which lies directly at the foot of the mountains.

Borings for oil have been made on the southern shore of Parsons pond at $5\frac{1}{2}$ miles from the entrance.

The coast from Sandy bay trends about north-northeastward, and is a low, stony beach, with a clay bank behind it, for $\frac{3}{4}$ mile. Thence a rough beach of stones and boulders, fronted in places by rocky ledges, extends for about 4 miles to the Arches, a cluster of detached masses of sandstone honeycombed by the sea, and standing on a sandy beach a little above low water. The coast is fairly steep, the 10-fathom contour line being generally about $\frac{1}{2}$ mile off, while the contour line of 50 fathoms closes in to a distance of 4 miles from the land west-northwestward of Sandy bay.

The country within this coast consists of low ridges, thickly wooded, with large tracts of marsh extending toward the mountains, some 6 miles inland.

At 2 miles north-northeastward of the Arches the direction of the coast bends to the northeastward, and Portland hill, rather more than $\frac{1}{2}$ mile inland, is 530 feet high, thickly wooded, and, from the southward, wedge-shaped. Its western end is a perpendicular cliff, which extends a little along the southern and northwestern faces, gradually changing to a steep slope, which joins with the ridges farther inland. This hill is conspicuous from seaward.

Westward of Portland hill, flat ledges appear outside the stony beach and continue for a distance of 2 miles to a place where there are some cottages and a canning factory. Thence the coast, a sandy beach, gradually turns to the northward for about $\frac{3}{4}$ mile, to the entrance of Portland creek, and then, forming a bight, westward for 800 yards to Eastern head.

Portland cove lies between the canning factory and Eastern head; the water in it off the creek is shallow for about 500 yards, but outside this there is fairly good anchorage, during easterly winds, in about 4 fathoms water, sand and mud bottom, but it appears to be bad holding ground.

There are no shoals outside the depth of 3 fathoms, which, however, is nearly 600 yards from the shore. A little more than 200 yards off the factory there is a ledge which dries, with shoal water between it and the rocks.

Portland creek runs 1 mile inland from Portland Creek pond; there is a depth of 2 to 3 feet in the creek, but owing to its being obstructed by bowlders, it is difficult for a boat to get through, though the entrance is easy of access in fine weather.

Portland Creek pond, of an irregular ovate form, is nearly 5 miles long in a northeasterly and southeasterly direction and $2\frac{1}{2}$ miles wide; it reaches to within 1,200 yards from the sea in an easterly direction from Clifty point. At its southeastern end is the mountain range. Its outlet is Portland creek.

At $4\frac{1}{4}$ miles within the entrance it passes, by a narrow channel accessible to boats, into its inner part, which occupies a mountain gorge.

The depth of water in the outer pond is 3 to 7 fathoms, but a sounding of 95 fathoms has been obtained in the inner one.

The residents of Daniels cove keep several boats on the outer pond in which they make hunting excursions.

On the eastern side of the inner pond is Gros paté (Blow-me-down), a truncated mountain, 1,650 feet high, with nearly vertical sides, and conspicuous. The range continues northeastward for some 5 miles, and it terminates a little beyond East hill, a summit 2,115 feet high.

Eastern head, the northern point of Portland cove, is 47 feet high, rocky, and bare on the top.

The coast trends north-northeastward and is rocky for $1\frac{3}{10}$ miles from the head; here there is a white stony beach, in front of a high green bank; it then turns northward to Clifty point, which is rocky, with a bank 60 feet high inside of it.

Brown shoal, a small rocky patch with 4 fathoms of water over it and 10 fathoms inside, bears 352° , one mile from Eastern head and $\frac{1}{2}$ mile offshore.

The coast from Clifty point continues to trend north-northeastward and is stony and backed by a more or less wooded bank for 2 miles, to a low point fronted by some rocks, two of which are pinnacles 25 feet high. There are several houses on the point, and the rocks in front, extending a little northward, form Daniels cove, which is sheltered from the southwestward.

The coast from Daniels cove trends north-northeastward, and, for a distance of $3\frac{1}{2}$ miles, is a stony beach, with a high clay bank, covered on the top with scrub, and broken here and there by small streams.

Caution.—The prominent points of the land between Daniels cove and port Saunders are reported to be inaccurately laid down, with reference to one another, on the charts.

Bowing brook, the largest of the streams, is $1\frac{1}{2}$ miles from Daniels cove, and there is a narrow bridge across it.

Spudgels cove, $1\frac{1}{2}$ miles from Bowing brook, is a slight bend, and here the foreshore changes to a jumble of ledges and rocks, fronting a bank of broken limestone shale, which falls in low cliffs. Inside of this bank, the land rises to wooded ridges 250 to 380 feet high, with intervening marshes and numerous ponds.

Belvans cove, 6 miles from Daniels cove, is a small bight, with rocky ledges fronting it, which afford some shelter for boats. There are several huts on the narrow foreshore under the low cliff, that here recedes a little. A stream, bridged near its mouth, runs into the eastern side of the cove.

Table cove, $\frac{3}{4}$ mile northward of Belvans cove, is a shallow bay with a stony beach, but it affords no shelter. There are a few huts on the beach.

Table point, northward $1\frac{1}{2}$ miles from Belvans cove, is a projection of the shale bank and cliffs, fronted by low rocky ledges. The land back of the point rises gradually in wooded slopes. The soundings offshore between Daniels cove and Table point are regular, and the land may be approached to a depth of 20 fathoms, which is approximately one mile from it.

The coast from Table point trends north-northeastward, and at about $\frac{3}{4}$ mile from the point there is a small bight into which a small stream runs from some ponds at a short distance inland. The bight is foul and rocky, but a boat might land there between the ledges, when landing is not possible southward of the point. The land north-northeastward of Table point is of moderate height, and the coast inside of the rocks is covered with grass, but there is nothing noticeable.

Deer cove, $1\frac{1}{2}$ miles from Table point, is a small break in the rocks. For about 4 miles from the cove, the rocky ledges are backed by low

cliffs, within which the land rises gradually to heights of 110 to 170 feet. This vicinity is known locally as Bateau barrens.

La Fontaine point is about 7 miles from Table point. Southward, $1\frac{1}{2}$ miles from la Fontaine point, the rocky foreshore suddenly ends, and between it and the point is a rough beach of bowlders, behind which is a high-topped bank. The face of this bank, at $\frac{3}{4}$ mile from the point, is steep, and shows prominently from the southwestward.

The soundings between Table and la Fontaine points are fairly regular, the 20 fathom contour line being about 400 to 1200 yards from the shore, while the line of 100 fathoms here approaches the land to within a distance of about $3\frac{1}{2}$ miles. Directly off la Fontaine point, however, the bottom is foul and uneven, depths of 5 to 8 fathoms reaching off for nearly $\frac{1}{2}$ mile. This uneven ground is sometimes marked by tide rips.

Bad bay (formerly Mall bay).—The shore from la Fontaine point trends northeastward for $4\frac{3}{4}$ miles, and then turns northward for $2\frac{1}{4}$ miles to Burntwood point. Bad bay, which may be said to lie between these points, is completely open, and affords no shelter. There is a conspicuous yellow clay cliff, 78 feet high, at the head of the bay, and directly southward of the cliff is the entrance to Ponds river. With offshore winds there is temporary anchorage, in about 10 fathoms, off the entrance to the river.

Ponds river, the bar of which has about 2 feet of water over it, has a tortuous easterly course, between wooded hills, for about 1 mile from its mouth, where it opens into Steady lake, which is small. From the eastern end of Steady lake, a narrow channel, $\frac{1}{2}$ mile long, leads to a large pond that extends southwestward toward la Fontaine point, and southeastward toward a range of high hills, distant about 12 miles. The river, inside the bar, is much obstructed by bowlders, and a very strong stream usually runs out, but it is practicable for boats to reach the pool, just inside the entrance, during fine weather. With strong northerly and westerly winds this shore is unapproachable, owing to the heavy sea. There is a small settlement in the bay at $\frac{3}{4}$ mile southward of the river entrance, and a few houses just inside the bar.

The shore between Ponds river and Burntwood point is a rough, stony beach with a grassy bank behind it; inside this bank is Little Brook pond, which extends eastward about 3 miles, but its western part for $1\frac{1}{2}$ miles is divided by a low wooded peninsula. The western ends of the pond reach to within 100 yards of the coast, and Little brook, a small stream, runs through a narrow cut in the bank near its western corner into the sea.

Shoal water of less than 5 fathoms extends about 600 yards off this shore, which between Ponds river and Burntwood point should not be approached nearer than 800 yards.

Burntwood point is 20 feet high, with a green bank just behind it, from which wooded ridges rise gradually to the height of about 250 feet.

Eboulement point (locally Spirity point), the southern entrance point of Ingornachoix bay, lies north-northeastward, 2 miles from Burntwood point. Between them the land rises a little, and is thickly wooded, but a large bare space on the face of the high clay bank at $\frac{1}{4}$ mile from Eboulement point, is conspicuous.

Rocks.—A rocky patch, with a least depth of 2 fathoms over it, is situated with Eboulement point bearing 120° , distant 700 yards.

A rock, with a depth of 22 feet over it, is situated with Eboulement point bearing 137° , distant 1,100 yards.

A rock, with a depth of 16 feet over it, is situated with Eboulement point bearing 213° , distant 1,300 yards. The shoal on which this rock lies extends northeastward about a mile from Eboulement point, and there are depths of 3 to 4 fathoms over it.

Leading mark.—The southern part of Two Hills point open northward of Keppel island, bearing 64° , leads northward of these rocks in a least depth of 7 fathoms of water.

Caution.—When rounding Eboulement point in thick or heavy weather do not decrease the soundings to less than 25 fathoms.

Ingornachoix bay, the entrance to which is between Eboulement and Rich points, which are distant 6 miles from each other in a northerly and southerly direction, extends $3\frac{1}{2}$ miles eastward of the line joining the entrance points, and is quite open. The entrances to Hawke harbor and bay, Keppel harbor, and port Saunders are in the southeastern part of the bay.

Trapper cove, northeastward $1\frac{2}{10}$ miles from Eboulement point, is a shallow bight. Hawke point is its eastern entrance point.

Keppel island, northeastward, distant $2\frac{2}{10}$ miles from Eboulement point, and at the head of the bay off the entrances to Hawke and Keppel harbors and port Saunders, is about 1 mile long in an easterly and westerly direction, with a greatest width of $\frac{1}{2}$ mile; its coasts are steep-to, but Morue spit, shingle-covered at high water, extends eastward $\frac{1}{4}$ mile from Grass point, the eastern end of the island. The northwestern end of the island is a blackish cliff.

Light.—A square pyramidal lighthouse, 23 feet high, surmounted by an octagonal drum and lantern, and painted red and white in horizontal bands, on the northwestern point of Keppel island, exhibits, at 107 feet above high water, a fixed white light that should be seen from a distance of 14 miles in clear weather.

Rocks.—A rock, with a depth of 22 feet over it, is situated with Keppel Island lighthouse bearing 144° , distant 1,200 yards.

A rock, with a depth of 27 feet over it, is situated with Keppel Island lighthouse bearing 169° , distant 1,600 yards.

Hawke harbor entrance is between Keppel island and a low wooded point 1,600 yards eastward of Hawke point. Hawke flat, a sand bank that dries, extends nearly 800 yards from the shore within the low wooded point, and narrows the passage between it and the foul ground westward of the peninsula, of which Keppel point is the northwestern end, to 600 yards. Foul ground stretches off nearly 400 yards from the northern and western part of the peninsula. Robinson island lies southward 600 yards from Lossieux point, the southern end of the peninsula, and is joined to it by shoal water; shoals extend westward about 100 yards, and eastward and north-eastward nearly 400 yards from the island.

The harbor is between Hawke flat and the shore southeastward of it, on the southwest, and the peninsula, on the northeast; it is $1\frac{1}{2}$ miles long in a northwesterly and southeasterly direction, and from 400 to 700 yards wide, with depths of 7 to 18 fathoms.

Directions.—Pass rather more than 200 yards southward of Keppel island till within the low wooded point, then steer about 102° , and when Grass point bears 1° , steer about 133° for the middle of Robinson island, not opening Saunders point northeastward of Grass point till Keppel point bears 57° to clear the shoal off Keppel point, and guarding against Hawke flat: anchor in the harbor $\frac{3}{4}$ mile south-southeastward of Keppel point in 15 fathoms of water, mud bottom, or about 600 yards northwestward of Robinson island in 16 fathoms.

Hawke bay is inside of and to the eastward of the harbor and extends east-northeastward, $4\frac{1}{2}$ miles from Robinson island, with an average width of $1\frac{1}{2}$ miles. The southern shore from southward of Robinson island trends somewhat northward of eastward for 1,300 yards to Ourson point, off which shoals lie nearly 600 yards distant, and this side of the bay eastward of Ourson point is foul, but the northern side is clear except for Cook bank: there is a salmon fishery in the northeastern part of the bay, from which shallow water extends 500 yards, and Torrent river flows into the eastern side.

The shores of the bay, except Ciblé point, are low, and faced by flat rocks, or shingle or sand.

Cook bank, east-northeastward, distant $1\frac{1}{2}$ miles from Robinson island, has a least depth of 7 feet water over it; the passage between it and the northern shore is 200 yards wide. From the place of least depth, the west extreme of Ciblé point bears 116° , distant $1\frac{1}{2}$ miles, and the east extreme of Robinson island bears 240° .

Commander shoal extends northward for 1,500 yards from the southern side of the bay at $1\frac{4}{10}$ miles eastward of Ourson point, and has 5 feet least water over it at a place from which the west extreme of Cible point bears 111° , distant 1,060 yards, and Gull islet bears 86° . Commander shoal is composed of bowlders, and soundings of less than 5 fathoms extend 350 yards northward of these rocks. Cible point lies $1\frac{8}{10}$ miles eastward of Ourson point, and Cible shoal extends 300 yards from it; the point is the only cliff in the bay.

Rock.—A patch with 3 fathoms of water over it is located north-eastward of Commander shoal with the west extreme of Cible point bearing 158° , distant 840 yards, and Gull islet bearing 102° .

Gull shoal, nearly 400 yards off Gull point, which lies east-north-eastward 800 yards from Cible point, has 5 feet of water over it.

Anchorage.—There is anchorage in the bay in 7 to 20 fathoms of water, mud bottom; in the eastern part of the bay the stream from the Torrent may be sufficiently strong to keep a vessel riding athwart a good breeze.

Directions.—Pass in mid-channel southwestward of Robinson island and bring a round hummock, 266 feet high, to bear 243° ; keep it on this bearing astern and when past Ourson point, anchor clear of the shoals.

Tides and tidal streams.—It is high water, full and change, at Hawke bay at 11h. 0m.: springs rise 6 feet, neaps 4 feet. The tidal streams are strong in Hawke harbor. During the flood tide the stream from the Torrent sets toward the northern shore.

Water can be conveniently taken from the stream between Cible and Gulf points. At the head of the bay there is good salmon and trout fishing in the season, and deer may be shot in the vicinity.

Ice.—Hawke bay freezes late in November or early in December, and the ice breaks up between April 20 and May 10.

Keppel harbor, eastward of Keppel island and within Keppel point, is 1 mile long and nearly $\frac{1}{4}$ mile wide, but shoal water extends $\frac{1}{3}$ mile from the head.

Directions.—Pass rather more than 200 yards southward of Keppel island and Morue spit; when the harbor opens keep in mid-channel and anchor in 6 fathoms water, at about 600 yards within the entrance. An anchorage much frequented by fishermen is between Saunders point and Morue spit in 11 fathoms water, mud or sand bottom.

Port Saunders entrance is northeastward of Keppel island and 400 yards wide between Saunders point on the south and Two Hills point, a wooded hill with a double summit, on the north, and the harbor extends eastward $2\frac{1}{2}$ miles, with an average width of $\frac{1}{2}$ mile. (See Caution at p. 333.)

Bank.—A little within the entrance a steep dry shingle bank extends a short distance off the northern shore.

Montaignac rock, which uncovers at about low water, is situated 1 mile within the entrance and 300 yards from the southern shore. Keppel Island lighthouse, open northward of Saunders point, bearing 252° , leads northwestward of the rock.

Kent point is on the northern shore, 650 yards northeastward of Montaignac rock: Dunlop spit extends southeastward 400 yards from this point, and there is a depth of 3 feet water near its end.

Directions.—There is anchorage inside the entrance and between it and Montaignac rock in 7 to 14 fathoms water. To proceed to the head of the bay, keep Keppel Island lighthouse open northward of Saunders point till within 500 yards of Kent point: then steer 125° between Montaignac rock and Dunlop spit, and when Two Hills point is in line with the southern shore, bearing about 269° , Dunlop spit is cleared; anchor in 6 fathoms water, just southward of that mark. Boulders that dry extend from 40 to 60 yards from the beach nearly all around port Saunders, and make landing bad at low water.

Tides.—It is high water, full and change, in port Saunders at 10h. 30m.; springs rise 6 feet; neaps rise $4\frac{3}{4}$ feet.

Ice.—Port Saunders freezes late in November or early in December, and the ice breaks up between April 20 and May 10.

Supplies.—Fresh provisions can be obtained at port Saunders.

Communication.—During summer and autumn the steamer from Bay of Islands calls at port Saunders weekly and the steamer from Halifax monthly.

The land from Hawke bay slopes gradually down until in the extreme north it is flat and low, and the formation changes from granite and quartzite to a compact cherty limestone with an almost horizontal stratification.

The shore of Ingornachoix bay from Two Hills point trends north-northwestward for 4 miles to Gargamelle cove, and caution is required in its approach, as rocky ground, with less than 5 fathoms water over it, extends off it in places for distances of $\frac{1}{2}$ to $\frac{3}{4}$ mile.

Anchorage.—Temporary anchorage may be obtained, with land winds, off the shore northwestward of Two Hills point in 10 fathoms water and clear of the shoals.

Gargamelle cove is only adapted for boats. At the head of the cove the isthmus, 400 yards long and 300 yards broad, that separates it from Old Port au Choix, joins Rich Point peninsula to the mainland.

Rich Point peninsula extends westward $2\frac{2}{10}$ miles from the isthmus connecting it with the mainland and it has a width of about

1 $\frac{3}{10}$ miles. It consists of flat, gray rocks, and is terraced, and there are several crosses on its summit and slopes.

The coast of the peninsula from Gargamelle cove bends southward and reaches Rich point at a distance of 2 $\frac{2}{10}$ miles.

Rich point is the northern point of Ingornachoix bay and the western end of Rich Point peninsula.

Light.—A white octagonal lighthouse, 64 feet high, with a red lantern, on Rich point, exhibits, at 98 feet above high water, a flashing white light, showing two flashes every five seconds, thus: Light 0.25 second, eclipse 0.75 second, light 0.25 second, eclipse 3.75 seconds. The light should be seen from a distance of 15 miles in clear weather. The keeper's dwelling near the lighthouse is white.

Wireless telegraph station.—There is a wireless telegraph station at Rich Point lighthouse. (See p. 42.)

Soundings.—The soundings westward of Rich point are irregular, and rocky ground, with less than 20 fathoms water over it, extends 1 $\frac{3}{4}$ miles from the lighthouse. There are depths of 7 fathoms bearing 248°, distant 1,200 yards and 1 $\frac{1}{10}$ miles from the lighthouse. There is deep water on the northern side of this rocky ground, in which direction the 100-fathom contour line is 1 mile from it, and this line passes $\frac{3}{4}$ mile northwestward of Black cape.

Rich Point rock, with 6 feet of water over it, bears 302°, 900 yards from the lighthouse; it is steep-to except on its western side, where depths of less than 5 fathoms extend to a distance of 250 yards. There is a passage between this rock and the shore, but a rock, with 4 fathoms of water over it, bears 237°, nearly 600 yards from the lighthouse.

In heavy weather the sea is said to break on the 7-fathom patches and on Rich Point rock.

Clearing marks.—The eastern end of Keppel Island cliff, just open westward of Rich point, leads about 100 yards southwestward of Rich Point rock; Round head, of Round Head island, well open northward of Black cape, leads northward of it.

Caution.—As the ground seaward of Rich point has not been completely sounded, give a wide berth to the point.

Current and tidal streams.—A current usually sets northeastward off Rich point and along the coast: it is influenced by the tidal stream, which sets northeastward during the rising tide and southwestward during the falling tide. During the prevalence of strong northeasterly winds this current sometimes sets southwestward. (See p. 54.)

The coast of Rich Point peninsula from Rich point trends northeastward for 1 $\frac{4}{10}$ miles to Black cape, and thence about eastward for 1,400 yards to the entrance to port au Choix.

Port au Choix extends $\frac{1}{2}$ mile east-southeastward, and it is accessible to vessels drawing less than 11 feet water, the entrance being 120 yards wide, but le Malouin, a shoal off the southern shore, narrows the navigable channel to 50 yards.

Port au Choix is separated from Old port au Choix by an isthmus 300 yards broad, over which there is a path.

Anchorage.—There are anchorages both westward and eastward of Bénie islet, which lies 250 yards inside of the entrance, and is connected to the northern shore by a sand bank.

Directions.—Entering, keep one-third of the distance across the entrance from Laignet point, its northern point, and anchor in 13 feet of water between it and Bénie islet; or pass southward of Bénie islet at high water, and anchor in 9 to 12 feet at low water off the northeastern shore, with Bénie islet bearing about 254° ; westerly winds bring a swell into the outer anchorage.

English bank (Anglais shoal), bearing 321° , distant $\frac{3}{4}$ mile from the entrance to port au Choix, is nearly 400 yards long in a northeasterly and southwesterly direction, 150 yards wide, and has a depth of $7\frac{1}{2}$ to 10 fathoms over it.

Port au Choix peninsula lies northeastward of port au Choix and the isthmus at its head: it is roughly circular in outline and about a mile in diameter. Its northern coast from Laignet point trends about north-northeast for $\frac{1}{2}$ mile and then turns eastward for 600 yards to Barbacé cove.

Barbacé cove is small and used by boats, but it affords no shelter with westerly winds. The coast from the cove trends northeastward for 900 yards to Barbacé point, from which shoals extend 300 yards, and it then turns south-southeastward for $\frac{3}{4}$ mile to the entrance to Old port au Choix.

Old Port au Choix (locally Back arm), on the southeastern side of Port au Choix peninsula, is 1 mile long, $\frac{1}{4}$ mile wide at the entrance and $\frac{1}{2}$ mile at the head; shoals, which partly dry, extend off its northwestern shore, but the southeastern shore is nearly bold-to; it is entered by two channels, one on each side of Querré islet.

Querré islet, in the middle of the entrance, is 350 yards long in a northeasterly and southwesterly direction, 100 yards wide, and bold-to on the northwestern side, but the other coasts are foul.

Savage island, northeastward $\frac{3}{4}$ mile from Querré islet, and nearly joined to it by a chain of rocks and shoals, is 700 yards long in a northeasterly and southwesterly direction, 300 yards wide, and 49 feet high: there are several fishermen's huts on it. The island is joined to the mainland by a bank, over which the depth is generally less than 3 fathoms.

Sauvageon rock lies 200 yards westward of the island.

Ardent rock lies less than 150 yards westward from Querré islet, and is joined to Port au Choix peninsula by shoal water. Ardent tail, a shoal, extends 200 yards northeastward from the rock.

Beacons.—A beacon stands on the southwestern end of Querré islet, and a similar beacon on a small cliff on the southeastern shore of the port; these beacons in line bear 200° .

At the head of the harbor are three pyramidal beacons. Lower pyramid, the lowest of these, is on the shore; the middle one, surmounted by a ball, is about 350 yards behind it; and Gargamelle pyramid, the third, is on the summit of the land at rather over 100 yards inside of the northwestern shore of Gargamelle cove; these beacons in line bear 223° .

A beacon stands on the shore, bearing 132° , distant $\frac{1}{4}$ mile from Querré Islet beacon; and two beacons are situated on the shore, bearing 96° , distant about 950 yards from Querré Islet beacon, which in line bear 127° .

A beacon, with a St. Andrew's cross top mark, stands on the southern shore of the port, bearing 80° , distant 665 yards from Lower pyramid beacon; it is a good anchoring mark.

Directions.—From about $\frac{1}{2}$ mile northeastward of Barbace point steer southwestward and bring the beacon on the southeastern shore of the port in line with the beacon on the southwestern end of Querre islet, bearing 200° . Keep these beacons in line until the three beacons at the head of the harbor are in line, bearing 223° , which mark leads in $4\frac{3}{4}$ fathoms, the deepest water, into the port. When inside of Querre islet keep a little toward the southeastern shore, and anchor at the head in $4\frac{1}{2}$ fathoms water. Round head, just shut in southeastward of Savage island, leads southeastward of the shoals on the northwestern side of the port.

To pass southeastward of Savage island in a least depth of 16 feet bring, while about $\frac{1}{2}$ mile northeastward of Savage island, the beacon southeastward of Querre islet, just opened southward of the southern end of a rocky islet, situated about 250 yards northeastward of the beacon, bearing 219° , which mark leads about 100 yards southeastward of Savage island.

The beacons eastward of Querre islet in line lead over the shoal northeastward of the islet at about 100 yards from the islet, and in a least depth of 15 feet water.

Caution.—In a steam vessel, avoid the nets that are usually set off Barbace point.

Anchorage may be obtained at 400 yards southward of Savage island, in $5\frac{1}{2}$ fathoms water, sheltered except from northeasterly winds, and temporary anchorage in the bay between Barbace point and Savage island in about 11 fathoms water, gravel bottom.

Ice.—Port au Choix freezes about December 15 and is completely closed by ice, about 3 feet thick, until about May 20; in 1883 the port was blocked till June 9; field ice appears about January 15 and disappears about May 15. The first vessel usually arrives about May 15, and the last leaves about November 10.

Tides.—It is high water, full and change, in Old Port au Choix at 10h. 40m.; springs rise $7\frac{1}{2}$ feet.

St. John bay, lying southeastward of a line between Barbace and Ferolle points, which are $19\frac{1}{2}$ miles apart in a north-northeasterly and south-southwesterly direction, contains several islands, of which St. John island, situated 5 miles northeastward from Barbace point, is the largest; on the southeastern side of the bay are the South and North summits of the Highlands of St. John, flat and steep to seaward. South summit, $1\frac{1}{4}$ miles inland, is 1,610 feet, and North summit, $\frac{3}{4}$ mile inland, 1,595 feet high.

Ice.—St. John bay fills with northern ice and freezes in December or January; the ice breaks up in May. During severe winters the ice extends from Rich point to Ferolle point.

Rock.—A small rock, with a depth of 33 feet over it, white bottom, on which the sea breaks in heavy westerly gales, is situated with Savage island summit bearing 198° , distant $1\frac{8}{10}$ miles.

Bustard cove, situated eastward 2 miles from Savage island, is open northwestward, and affords temporary anchorage in 11 fathoms water, but the holding ground is not good; shoals extend 900 yards from Chasseurs point and the eastern side of this cove.

Green islet, surrounded by rocks and breakers, lies $\frac{3}{4}$ mile westward from Chasseurs point, leaving a narrow passage between.

Old Man cove, eastward 2 miles from Chasseurs point, is a shallow bight, fronted, at the distance of about $\frac{1}{2}$ mile, by Old Man shoal, a shoal bank about 800 yards in diameter, with two heads on it that dry.

The shore of the bay from Old Man cove trends approximately northeastward for $11\frac{1}{2}$ miles to Squid cove, and it is fairly steep-to; heavy squalls sweep down from the Highlands of St. John. (The shore is continued at page 347.)

St. John island is about 3 miles long in an easterly and westerly direction, and $2\frac{1}{4}$ miles wide, moderately high, with a round summit, and wooded only at its northwestern end.

Seal rocks, $\frac{3}{4}$ mile southwestward of Photograph point, the southwestern point of St. John island, are narrow and low, and extend about $\frac{1}{4}$ mile in a northeasterly and southwesterly direction; they are steep-to on the southern side, but foul ground extends for a little more than 200 yards off the northern side.

St. John harbor, on the western side of the island, extends eastward and northeastward about $1\frac{1}{4}$ miles, with a width of 600 to 200 yards, and is a good anchorage for steamers or small vessels, but square-rigged sailing ships require a leading wind to enter.

Both sides of the entrance are nearly steep-to, but the southern shore shoals, within the line of the points immediately inside.

The Fox, a rock nearly awash, is situated 100 yards off the first point on the southern shore within the entrance.

Shoal water extends a short distance off English point, the first point in on the northern shore.

Clearing mark.—Bare point, just to the southward of a woody eminence in the profile of the land at the head of the bay, bearing 60° , leads close northward of the Fox and southward of the shoal water of English point, but this mark is reported to be of very little use.

Anchorage.—There is temporary anchorage in Sesostris bay, a bight in the southern shore opposite English point, in 9 to 13 fathoms of water, sand and mud bottom; small craft anchor in the Haven, at the head, in 5 fathoms, mud; the holding ground is good, but fresh westerly winds soon raise a sea. A vessel over 100 feet long should anchor in Sesostris bay and haul into, and moor in, the Haven, where the holding ground and shelter are good, but in heavy westerly gales the swell rolls in.

The Men-hir, a remarkable rock, stands on the coast at a little more than $\frac{1}{2}$ mile northwestward of the entrance to St. John harbor.

Tides.—It is high water, full and change, in St. John harbor at 10h. 40m.; springs rise $7\frac{1}{2}$ feet, neaps $5\frac{1}{2}$ feet. The tidal streams in the harbor are inappreciable.

Square rock, southeastward, $\frac{3}{4}$ mile from Photograph point and 300 yards offshore, is about 265 yards long in a northeasterly and southwesterly direction, 100 yards wide, 20 feet high, and steep-to on its northwestern side, leaving a clear passage between it and the island, but shoals extend nearly 200 yards from the other sides.

Horn island, $\frac{1}{4}$ mile long in a northeasterly and southwesterly direction and 150 yards wide, lies northeastward $\frac{1}{2}$ mile from Square rock and is separated from St. John island by a passage 100 yards wide, with 13 feet of water in mid-channel.

Horn spit, with 12 feet least water over it, extends east-northeastward for 600 yards from the middle of the eastern side of Horn island; it is steep-to.

Beacon.—There is a beacon on Horn island.

Round Head island, 750 yards southward of the eastern part of St. John island, is $1\frac{1}{4}$ miles long in an east-northeasterly and west-southwesterly direction, 750 yards wide and 180 feet high. Round head is a conspicuous hummock, 98 feet high, situated toward the western end of the northwestern coast of the island; and immediately southeastward of Round Head point, the northwestern end of the island, is Round Head cove, a shallow inlet nearly 600 yards in extent.

Round Head shoal, with 7 feet of water over it, extends southward 250 yards from the southwestern point of the island.

Shoal.—A shoal, with $4\frac{1}{2}$ fathoms of water over it, lies 295° , distant 450 yards from Round Head point.

Falaise shoal, with 13 feet of water over it, lies 150 yards northward of the northeastern part of Round Head island; there is a depth of 5 fathoms close northward of it. Horn island, a little open northward of the foot of Round head, bearing 239° , leads northwestward of the shoal.

Good bay, a spacious anchorage between St. John and Round Head islands, has deep water, but good holding ground, and there is never any sea; it is entered either from the eastward or westward.

Anchorage beacons.—Well point lies northeastward, distant 600 yards from Horn island, and on the point are two beacons which in line bear 255° .

On the northern shore of Good bay, nearly $\frac{1}{2}$ mile northeastward of Well point, are two beacons which in line bear 355° .

The best anchorage in Good bay is in about 17 fathoms at the intersection of the lines of the two pairs of beacons.

Well bay, a small bay of St. John island northward of Well point, affords good anchorage for small vessels in 7 fathoms of water, sand bottom, but shoal water extends 200 yards from the northern shore at $\frac{1}{4}$ mile eastward of the head of the bight. The well that gives the name to the bay is a curious natural excavation in the rock, 65 feet below the surface of the ground, near the path from Well bay to St. John harbor; the depth of water in the well is about 30 feet.

Sheep island lies 150 yards off the northwestern shore and near the eastern end of Good bay; it is less than 200 yards in diameter; an islet and shoal water are between it and the shore to the westward, and a reef extends 400 yards southeastward of it. This reef is joined to Flat point, 400 yards to the northeastward, by a shoal bank.

Barred bay, between Sheep island and Flat point, affords anchorage to small craft, but the holding ground is bad. The northwestern side of Square rock in line with the southeastern side of Horn island, bearing 235° , leads southeastward of the shoals off Barred bay.

Beacon.—There is a beacon on Flat point, the northeastern entrance point of Barred bay.

Hare island, northeastward 1,200 yards from Round Head island, is 1,700 yards long in a northeasterly and southwesterly direction, $\frac{1}{4}$ mile wide, low and rugged; shoals extend nearly 400 yards from its southwestern end.

Passage shoals, lying 350 yards from Round Head island, and between it and Hare island, are two heads, the western with a depth of 6 feet of water, and the other, about 200 yards to the eastward, with

a depth of $3\frac{3}{4}$ fathoms. There is a deep passage both eastward and westward of these shoals.

Bayot shoal is a flat extending about $\frac{1}{4}$ mile in a general north-easterly and southwesterly direction, with a width of 250 yards and depths of 7 feet to $4\frac{1}{2}$ fathoms over it, situated northward 350 yards from the northern end of Hare island. The beacons on Flat point and Horn island in line, or Black cape open northwestward of Round head, bearing 230° , lead northward of Bayot shoal and between it and Reculoux shoal, and North summit of the Highlands of St. John in line with the middle of the western Turr island, bearing 91° , leads northward of this shoal.

The east coast of St. John island is foul to the distance of $1\frac{1}{4}$ miles from Flat point to Turret point, which is the northeastern point of the island, and is so called from a circular mound near it.

Wolf rock, at the northeastern end of these shoals, bears 81° , distant 1,600 yards from Turret point, to which it is almost joined by rocks and a bank; Wolf tail, a reef, extends east-southeastward 600 yards from it.

Reculoux shoal bears 114° , distant 2,100 yards from Wolf rock, and there is a depth of $2\frac{1}{2}$ fathoms over it. The channel between Reculoux shoal and Bayot shoal is about 900 yards wide.

Numerous shoals, with 3 feet to 5 fathoms of water over them, lie southward of Wolf rock and westward of Reculoux shoal.

Round Head island, well open southward of Flat point, bearing 226° , or the beacons on Flat point and Horn island in line, 230° , leads southward; and the ravine near South summit of the Highlands of St. John, open eastward of Hare islands, about 144° , leads eastward of all these shoals.

Directions.—For Good bay from the westward, when southward of Square rock, bring Flat point beacon just open northward of Round Head island, bearing 40° , and approach Round Head point, with this mark on, to within 300 yards to clear Horn spit and the shoal with $4\frac{1}{2}$ fathoms of water over it. Then steer northward and anchor, with the beacons on the northern shore of the bay in line, bearing 355° , and those on Well point in line, bearing 255° , in about 17 fathoms of water. Large vessels should moor eastward and westward. Southerly winds are the most violent, but there is never any sea, and the holding ground is good.

From the eastward: Approach with the southern side of Horn island in line with Flat point, or the beacons on the island and point in line, bearing 230° , either of which marks leads between Bayot shoal and the shoals southeastward of Wolf rock. When the eastern end of Hare island bears 125° , steer 215° until the northwestern side of Square rock is in line with the southeastern side of Horn island,

bearing 235° ; keep this mark on into the bay and anchor as above directed.

Tides.—It is high water, full and change, in Good bay at 10h. 40m.; springs rise $7\frac{1}{2}$ feet, neaps $5\frac{1}{2}$ feet.

Turret bay.—The northern coast of St. John island from Turret point trends southwestward for 1,200 yards to Turret bay, which extends south-southeastward about $\frac{1}{4}$ mile and is shallow, but affords good shelter for small fishing craft in $1\frac{1}{4}$ to 3 fathoms. Temporary anchorage may be obtained off this bay in 12 fathoms of water.

Fossil shoal, with 6 feet least water over it, stretches westward nearly a mile along the coast from about 700 yards northeastward of the western point of Turret bay.

Flat island, about 1 mile westward of St. John island, is $1\frac{3}{10}$ miles long, in a northerly and southerly direction, $\frac{3}{4}$ mile wide, low, smooth, and wooded on its northeastern part; rocks and shoals extend about 600 yards off the coasts of the southern half of the island; the Watchman (le Guetteur), a rock above water, is on the southeastern edge of these shoals. Shoal water extends $\frac{1}{4}$ mile off the northern end of the island.

Soundings.—The soundings westward of St. John bay are not regular; there is a depth of 26 fathoms in a position bearing 285° , distant $7\frac{3}{4}$ miles from the summit of Flat island, with 66 fathoms not far off.

Shoal.—A shoal, with $4\frac{1}{2}$ fathoms of water over it, bears 60° , distant about 1,600 yards from the northeastern point of Flat island; its position is doubtful.

Twin islands, north-northeastward, $2\frac{3}{4}$ miles from Flat island, are two islands separated by a narrow channel, and together extend 1 mile in a north-northeasterly and south-southwesterly direction, with a width of $\frac{1}{4}$ mile; they are low, flat, and covered with grass. There is a solitary house on the southern Twin island.

Shoal.—A shoal, with 4 fathoms of water over it, bears 110° , distant $1\frac{1}{2}$ miles from the northern end of the northern Twin island.

Turr islands (îles aux Godes), bearing 74° , distant $1\frac{1}{2}$ miles from the northeastern end of Hare island, are two small islands, low and grassy, joined by shoal water, and together extending in an easterly and westerly direction 1,200 yards, with a width of about 400 yards.

The Calculus, bearing 105° , distant $\frac{3}{4}$ mile from the eastern Turr island and about 1,600 yards off the mainland, is a small rock with clear passages on each side of it.

Whale islands, northeastward about $3\frac{3}{10}$ miles from Turret point, St. John island, are two islands, each about 900 yards long and 400 yards wide, low, flat, and grassy, lying nearly in an easterly and westerly direction from each other, the channel between being about 300 yards wide, and shallow. There are several islets and reefs

within a distance of 1,200 yards southward from them, among which boats find shelter. Dolmen, the western island, has a remarkable cliff, 20 feet high at its eastern end, and shoals extend southward $\frac{3}{4}$ mile from it; the southern and southwestern sides of these islands should not be approached nearer than a mile.

A rocky shoal, with 8 to 9 fathoms over it, extends southwestward from the shoals southward of Dolmen island; the western end of this shoal bears 230° , distant $1\frac{3}{10}$ miles from the western end of Dolmen island.

Freycinet shoal, with 7 feet water over it, bears 350° , distant 1,600 yards from the eastern end of the eastern Whale island. A rock, with 27 feet of water over it, bears 96° , distant 900 yards from Freycinet shoal.

James island, bearing 68° , $3\frac{1}{2}$ miles from the northern Twin island, is about 1,200 yards long in a northeasterly and southwesterly direction, 400 yards wide, 20 feet high, covered with grass, and clear on all sides.

Fox islands, situated north-northeastward, 2 miles from Whale islands, are two flat islands about 20 feet high and covered with grass, together extending about 1 mile northwest and southeast, with a width of 800 yards. An islet lies in the southern part of the channel between them. Breton reef, southwestward, 1 mile from the western island, uncovers. The channels between the islands and between them and Breton reef must not be used for navigation, but those between Breton reef and Freycinet shoal, and between Breton reef and James island are clear. Fishing boats and small schooners anchor in the space between the two large islands, but the holding ground is bad and the sea heavy with northerly winds.

Squid cove is shallow and open southwestward. Castor point is on the northern side of the cove, and an islet lies off its western side.

Shoal water extends 248° for 2 miles from a point situated southward $\frac{1}{2}$ mile from Castor Point islet: this includes Cloué shoal, which has 3 feet of water over it, and lies $1\frac{3}{10}$ miles from the point. Testu bank, bearing 248° , $2\frac{1}{4}$ miles from Castor Point islet, is about 350 yards in diameter, and has a least depth of 4 fathoms over it.

Castors harbor entrance is between Castor and Yellow points, Castor point being low, wooded, and bordered by rocks extending off nearly a mile.

The harbor extends eastward 2 miles, and the entrance is $\frac{3}{4}$ mile wide, but banks and shoals stretch off both shores, making the channel narrow and intricate. It is suitable only for small vessels.

Beacons.—There are two beacons on Yellow point.

White island, westward, $\frac{9}{10}$ mile from Yellow point, is 300 yards long in a northeasterly and southwesterly direction, and 100 yards wide. A small rock lies northward 250 yards, and shoals extend

southeastward $\frac{1}{2}$ mile from it; both island and rock are fairly steep-to except to the southeastward.

The Bar, a low rock, lies nearly in the middle of the harbor, within the entrance, and is scarcely visible, except at low water, when there is no difficulty in rounding its southern end.

Directions.—The tidal streams are strong both in the entrance and at the anchorage, and it is better not to enter nor leave Castors harbor except at slack water. From the southward bring St. Margaret mountain, distant 8 miles from Yellow point, in line with the eastern extreme of the bare part of Yellow point, bearing 49° , which mark leads less than 200 yards northwestward of Testu bank, 400 yards northwestward of the shoals off Castor point, and 450 yards southeastward of the shoals southeastward of White island.

When the first hill, to the right of a summit that lies southward of a wooded hill at the head, is in line with the northern end of the high-water line of the Bar rocks, bearing 87° , keep this mark on till the beacons on Yellow point are in line. Keep the beacons in line astern, 316° , and round southward of the Bar, to the anchorage in $3\frac{1}{4}$ fathoms water in a direction at about 91° from the Bar.

If the beacons on Yellow point are down, keep a remarkable notch in the Highlands of St. John, eastward of the bare point of that hill, a little eastward of the square boulder on the southern shore, bearing 136° . See views of the leading marks on chart 606a.

Castor river flows into the southeastern part of the harbor from a large pond at a short distance inland, and it affords good salmon fishing during the season.

Tides.—It is high water, full and change, in Castors harbor at 10h. 50m.; springs rise about 5 feet.

John Meagher cove, on the northern side of Yellow point, is open westward, and encumbered with shoals off both points and in the cove, while rocks extend southwestward some distance from the northern point.

Black islet, north-northwestward, about 2 miles from White island, is low and surrounded by rocks that cover, and shoals that extend northward $\frac{3}{4}$ mile from it; there is a passage for boats between it and the shore.

Maldigues bay.—Ferolle point, the western end of New Ferolle peninsula, lies northwestward, $3\frac{3}{4}$ miles from Black islet, and Maldigues bay, between them, is filled with shoals, some of which are over a mile offshore.

Old Boy shoal, bearing 205° , distant $1\frac{1}{10}$ miles from Ferolle point, is a patch about 800 yards long in a north-northeasterly and south-southwesterly direction, with $4\frac{1}{4}$ to 6 fathoms of water over it.

Ferolle point bearing eastward of 35° , leads northward of Old Boy shoal.

New Ferolle peninsula, of moderate height, and partly wooded, is $2\frac{1}{4}$ miles long from Ferolle point to New Ferolle point, and is joined to the mainland by a low isthmus, 600 to 800 yards wide, over which the masts of the fishing vessels can be seen. Detached rocks appear to extend nearly 200 yards from Ferolle point. The northern coast is steep-to, but New Ferolle point is foul to the distance of 400 yards northeastward.

Jehenne bank.—A rock with 16 feet of water over it is situated on Jehenne bank, with New Ferolle point bearing 178° , distant 2,050 yards.

This rock is approximately in the middle of the bank, which extends within the 10-fathom line 1,400 yards in a northeasterly and southwesterly direction, with a width of 700 yards; there are depths of $4\frac{1}{2}$ to 6 fathoms in places on the bank.

A shoal, with $4\frac{1}{4}$ fathoms over it, lies north-northeastward of the bank with New Ferolle point bearing 193° , distant $1\frac{1}{2}$ miles.

New Ferolle cove extends southward 1 mile from New Ferolle point. Black point, which bears 105° , distant $1\frac{1}{2}$ miles from New Ferolle point, is the other headland. The cove is open northeastward, and, although it is a bad anchorage, it is much frequented.

The middle of this cove is occupied by a shoal, with 2 to $2\frac{1}{2}$ fathoms water over it, which extends as far to the northeastward as the line between New Ferolle to Black points. Anchorage in 4 fathoms of water may be obtained at a distance of $\frac{1}{2}$ mile in a direction 152° from New Ferolle point.

St. Margaret bay is entered between Black point and Dog peninsula; this peninsula bears 46° , distant $1\frac{1}{2}$ miles from the point, and is of moderate height, covered with brushwood, and faced by cliffs.

The bay extends $3\frac{1}{2}$ miles southeastward, but the eastern portion is filled with islets and shoal banks, among which only very small craft can find shelter. There are several shoal spots near the center of the bay; the two westernmost, with least depths of $4\frac{1}{2}$ fathoms, lie 24° , distant 2,800 yards, and 28° , distant 2,130 yards, respectively, from Bank point. The western side is fairly clear, and anchorage may be obtained off South cove. Care must be taken to anchor in the small space, in not less than 6 fathoms water, mud bottom, with the fall of the Highlands of St. John open westward of a large square stone at the head of South cove, bearing about 192° , and St. Margaret mountain in line with the western reef inside of Rase island, 80° . The depths in the approach to this anchorage were reported in 1885 to be 1 fathom less than charted. Except in the position given, the bottom consists of slippery rocks with long seaweed, over which the anchor drags. Shoal water $3\frac{3}{4}$ fathoms lies 300 yards inside the anchorage.

Rock.—A rocky patch about 400 yards in extent with less than 5 fathoms water over it, and with a small head, on which there is a

depth of 15 feet, near its western edge, lies in the fairway to the anchorage in St. Margaret bay, with Black point bearing 290° , distant 1,900 yards. New Ferolle point in line with Black point leads close northward of the patch.

Ice.—St. Margaret bay freezes late in November or in December, and the ice breaks up about the middle of May.

Tides.—It is high water, full and change, in St. Margaret bay at 10h. 31m.; springs rise $5\frac{1}{4}$ feet. Strong southerly winds raise the water about $1\frac{1}{4}$ feet.

The coast from the northern point of Dog peninsula to Grave point, situated 3 miles eastward, is low and indented with several open coves, on the shores of which are some huts. It is difficult to distinguish from a distance. Shoal water extends 700 yards off the shore of Dog cove, which lies eastward of the peninsula, and less than 400 yards off other parts of the coast.

Woody hill, southeastward, 1,300 yards from Grave point and $\frac{1}{4}$ mile inland, is 151 feet high, and the highest part of the coast range; a bare patch on its seaward face helps to indicate it when seen against the high ranges of the background.

Brig bay is immediately southeastward of Grave point. A rock, with 15 feet of water over it, bears 18° , distant 450 yards from Grave point, and there are depths of less than 5 fathoms between it and the point.

Entrance island bears 29° , distant $\frac{1}{2}$ mile from Grave point, and lies on the northeastern side of South pass, the entrance to Brig bay and to Old Férolle harbor. It is about 200 yards across, 10 feet high, and covered with gray flat stones. Rocks that cover, and shoal water extend 465 yards southwestward of the island, and shoal water extends 200 yards off the northwestern side, but the southeastern side is bold-to. A shingle spit, steep-to, extends 100 yards eastward of it.

Beacons.—A pile of stones, surmounted by a pole, stands on Entrance island, and there is a beacon on West mound, 52 feet high, 300 yards within the southwestern end of Old Férolle island. Two leading beacons, consisting of poles surmounted by white casks, are situated on the shore southeastward of Front point. Three beacons stand on Grave point. Dependence should not be placed on these beacons being in position.

Directions.—To enter by Southern pass, bring the two leading beacons in line, bearing 119° , which leads southward of the shoals extending from Entrance island and about 100 yards northward of the 15-foot rock off Grave point. When the beacons on Entrance and Old Férolle islands are in line, bearing about 18° , or when Grave point bears 203° , keep the beacons in line astern, or steer for the western shore of Brig bay, keeping it distant 150 yards, until the first

cove opens on the western shore, when anchor in the bay in $6\frac{1}{2}$ fathoms of water, mud bottom, with good holding ground.

Vessels bound northward and requiring temporary anchorage can go into this bay, as it is left easily with westerly winds.

Old Férolle island.—The southwestern end of this island lies northward 200 yards from Entrance island; the channel between is shoal, and there is a small rock in the middle, but it is used by boats and small schooners. Old Férolle island is $1\frac{4}{10}$ miles long in a north-easterly and southwesterly direction, generally about 400 yards wide, 69 feet high, bare on its northwestern side, and covered with gray flat stones. On the upper parts of the northwestern side of the island there are dead trees, except for about 800 yards from the southwestern end, where there is grass.

Fish island lies northward 600 yards from Old Férolle island; a shallow flat, on which are three islets and some rocks, connects them.

Old Férolle harbor, between Old Férolle island, with the islands northward of it, and the mainland, is about 1 mile long in a direction parallel to Old Férolle island, about 300 yards broad between the 5-fathom lines southeastward of Old Férolle island, with an anchorage about 800 yards long in a northerly and southerly direction, and over 200 yards wide, northeastward of that island, is entered by Southern pass, southwestward of Entrance island, and Northern pass, northeastward of Fish island, the latter being available only for small vessels.

Local magnetic disturbance of the compass has been experienced in this harbor, and is said to continue off the coast northeastward to Current island. (See p. 75.)

Directions.—By Southern pass: Enter with the leading beacons, within Front point in line, bearing 119° , and when Debon peninsula is open eastward of Entrance island, bearing 57° , round into the channel: pass southeastward rather less than 200 yards from Entrance island, and keep near the northwestern shore; or the three beacons on Grave point in line, astern, bearing 225° , lead southeastward of Entrance island and up the harbor. Anchor with Debon peninsula bearing 125° , in 6 to 9 fathoms water, or farther northeastward with the fresh-water stream bearing 80° , in 7 fathoms.

To proceed northeastward from the anchorage, keep the southeastern coast of Old Férolle island close aboard, and just shut Entrance island in, bearing 220° , before the stream bears 91° ; this mark leads northeastward in a least depth of $3\frac{1}{4}$ fathoms. When the eastern end of Fish island bears 0° keep it so until the northern point of Old Férolle island bears 282° , when steer toward the middle of Fish island and anchor with the eastern point of Fish island bearing 12° , distant 400 yards, in 7 fathoms of water, mud bottom.

By Northern pass: Previous to entering, mark the eastern end of

the bank off Fish island by a buoy or boat; pass this bank at a distance of 40 yards, and then steer for nearly $\frac{1}{4}$ mile toward the summit of Old Férolle island, and anchor in 7 fathoms of water, mud bottom.

This entrance is difficult to distinguish, and care should be taken not to mistake another passage between the islands for it.

Tides.—It is high water, full and change, in Old Férolle harbor at 9h. 46m.; springs rise about 5 feet. The flood tidal stream sets southward and the ebb northward, but when the wind is strong the water moves in its direction.

Seal cove, north-northeastward, $\frac{3}{4}$ mile from Fish island, is open westward and does not afford good anchorage. A reef extends southwestward, 350 yards from Seal point, the northern point of this cove.

Cape Ste. Genevieve, northeastward $\frac{3}{4}$ mile from Seal point, is low, covered with small trees, fringed by shoals, and must not be approached within $\frac{1}{2}$ mile. Cape islet is nearly joined to the northern point of the cape headland by shoal water.

Pond cove, eastward of the cape headland, extends 1 mile to the southward, is completely open northward, and filled with shoals; the eastern side of the cove is a narrow peninsula projecting about north-northeastward nearly $\frac{9}{10}$ mile from the mainland; it is low, wooded, and terminates in South West point, which lies eastward, distant 1,700 yards from Cape islet.

Entry island, lying close northward of South West point, with shoal water between and passage only for small boats, is shingle, with a little verdure at the top, low, and difficult to recognize. Reefs stretch westward from this island, leaving a channel 200 yards wide between them and the shoals off Gooseberry island.

Gooseberry island, northward about $\frac{1}{2}$ mile from Entry island, is nearly 1 mile long in a northeasterly and southwesterly direction, 300 yards wide, low, flat, and covered with grass. Reefs extend southward or toward Entry island for 700 yards, and on the eastern part of these reefs and 600 yards from Entry island is Porpoise rock, that uncovers at half tide.

Current island, northward about $\frac{1}{2}$ mile from Gooseberry island, is of irregular shape, about $1\frac{1}{10}$ miles long, and 600 yards wide, low, flat, and covered with verdure; the outer coasts are fringed by bowlders. Fisherman cove, in which are some huts, is a small indentation in the northern side.

Beacon.—There is a pile of stones surmounted by a pole on a mound near the southwestern end of Current island.

Ste. Genevieve bay lies between the mainland and Entry, Gooseberry, and Current islands. The eastern shore of the bay is wooded, low, without any distinctive feature, and bordered by shoals, several of which are situated eastward of Entry island, leaving, however,

sufficient space for a good anchorage for fishing craft between them and Entry island in $3\frac{3}{4}$ to 5 fathoms of water.

Beef island lies eastward from the northern end of Gooseberry island. Coot island lies northward 265 yards from Beef island, and there is safe anchorage eastward of the passage between these islands in 5 fathoms of water, mud bottom.

Mutton island lies close north-northwestward of Coot island, and a bank extends east-northeastward of it, leaving a narrow passage between it and the mainland, into which small craft enter.

Directions.—Ste. Genevieve bay should not be entered without a pilot; the channels are narrow, intricate, and lie between sunken rocks.

By South pass.—Approach with the northern end of Entry island bearing 80° , until a small hill, eastward of the bay, is in line with an alley between the trees bearing 64° ; keep this mark on which leads, in not less than 18 feet water, between the shoals off Entry island and Porpoise rock; or if Porpoise rock is visible, pass halfway between the island and that rock. After passing Entry island haul southward, and anchor before its summit bears 237° . To proceed farther eastward, either buoy the banks on both sides or send a boat ahead, and anchor off a stream on the southeastern side of the bay, where there is a salmon fishery.

To pass between Grand Platier and Green rocks: Proceed on the leading mark until the southeastern end of Beef island bears 23° , then haul up for it on that bearing and anchor southeastward about 400 yards from Green rocks.

By Middle pass, which is between Gooseberry and Current islands, and suitable for vessels drawing not more than 13 feet of water: Before entering, place a buoy in 13 feet of water on the southeastern side of the 6-foot bank in the middle of the pass, which should be 300 yards from the northern point of Gooseberry island, and a second buoy in 13 feet of water at the northeastern end of the bank stretching off that island. Pass close southward of the first buoy, and close northeastward of the second buoy, and anchor in 5 to $6\frac{1}{2}$ fathoms of water when inside it. To go farther eastward: When the fishing stage at the eastern point of Gooseberry island bears 192° , steer to pass 200 yards northward of Lobster island; then alter course to 113° , and anchor southward of Beef island.

North pass, between Current island and the mainland, is suitable only for small craft.

Ice.—Ste. Genevieve bay freezes late in November or during December, and the ice breaks up about the middle of May.

Tides.—It is high water, full and change, in Ste. Genevieve bay at 10h. 43m.; springs rise $6\frac{1}{4}$ feet, neaps 4 feet.

Black Duck cove, 1 mile northeastward from Current island, is an open bight, with several fishermen's houses on its shores.

St. Barbe point, $\frac{1}{2}$ mile northeastward from Black Duck cove, is tolerably steep, low, and wooded; it is bordered by a shingle beach and broken white stones, and must not be approached nearer than 400 yards.

St. Barbe bay lies within St. Barbe and Anchor points, which bear north-northwestward and south-southeastward, distant $1\frac{1}{6}$ miles from each other. The northeastern and eastern shores of the bay are fringed by shoals. Winter flat, with 10 feet least water over it, is nearly 800 yards offshore. Except in the harbor the ground is very foul and rocky, and breakers are said to extend right across the bay after heavy westerly gales.

St. Barbe harbor, at the southeastern end of the bay, is entered between Harbor point, which is marked by a lobster factory on it, on the western side, and Stony point on the eastern side. Shoal water extends a short distance off both shores, and the harbor stretches south-southeastward and east-northeastward with depths of $3\frac{1}{4}$ to $4\frac{1}{4}$ fathoms; from this it gradually shoals eastward to East river. The rocks are limestone, in nearly horizontal strata.

Directions.—Pass between Winter flat and the shoal water off the southern shore in not less than 6 fathoms of water; when the house in Traitant cove (the first bend on the western side of the harbor) opens off Harbor point, bearing about 181° , keep in mid-channel into the harbor and anchor in $4\frac{1}{4}$ fathoms of water, mud bottom, good holding ground, with the wharf in Traitant cove bearing 226° , and Harbor point 316° .

Ice.—St. Barbe bay freezes late in November or during December, and the ice breaks up about the middle of May.

Tides.—It is high water, full and change, in St. Barbe harbor at 10h. 0m.: springs rise 4 feet, neaps 3 feet. The streams in the fairway continue one hour after high and low water on the shore.

Communication.—The steamers from Bay of Islands call weekly at St. Barbe harbor during summer and autumn, and those from Halifax call monthly.

Winter cove, northward, $\frac{3}{4}$ mile from Stony point, is completely open westward, and the entrance is partially obstructed by reefs lying off the southern point.

Anchor cove, situated immediately southeastward of Anchor point, is open southwestward, but affords shelter to a few small craft that moor head and stern, and are safe, as the heavy sea breaks on the entrance points and only the swell runs up the cove; the houses at the head of this cove are white and generally conspicuous.

Anchor point is low, and Anchor ledge and shoal water extend southwestward for a distance of 1,100 yards from it.

Tidal streams.—The tidal streams along the coast from Anchor point to the entrance of Belle Isle strait sometimes attain a rate of 2 knots, an hour, the flood setting southwestward and the ebb northeastward, but they are much influenced by the wind.

The coast from Anchor point trends about north-northeastward for 2 miles to Bear Cove point: it is low, and shoal water stretches off it for 400 to 1,000 yards. Deadman cove, $\frac{1}{4}$ mile southward of Bear Cove point, contains some houses, and its northeastern point is a conspicuous black cliff; Bear cove, eastward 1,200 yards from Bear Cove point, has also some houses on its shores.

Seal islands, north-northeastward, $1\frac{1}{2}$ miles from Bear Cove point, are a group of four islands and some rocks, separated from the mainland by a narrow channel only suitable for boats. The outer or norwestern island is composed of white rock the inner and largest is covered with grass and has several houses near the summit. Seal ledges extend northward 300 yards from Seal islands and are steep-to.

Pillot bank, northwestward, $1\frac{1}{10}$ miles from the northwestern Seal island, and off the entrance of Flower cove, is about 400 yards in extent in a northerly and southerly direction, and has a depth of $5\frac{1}{2}$ fathoms over it. A depth of 19 feet has been reported, but the fishermen state that it does not exist.

Flower cove, east-northeastward of Seal islands, and southward $\frac{3}{4}$ mile from Flower Island lighthouse, is much frequented by fishing craft, and affords good anchorage to vessels of moderate length, drawing less than 16 feet water. The court-house, a large square house of darker color than any of the others in the settlement, is on the highest part of Capstan point, which is the northern side of the cove, and is low and fringed with a stony beach.

The cove extends northeastward nearly 1 mile, with a width of $\frac{1}{4}$ mile at the entrance, narrowing to the head. Rocky islet lies in the middle of the entrance, and there is shoal water between it and the northern shore.

It is reported that Flower cove has shoaled, and that there are $2\frac{1}{4}$ feet less water than is charted.

Directions.—Pass at least $\frac{1}{4}$ mile northward of Seal islands to clear Seal ledges, and when the rocky islet in the entrance to the cove bears 88° , steer to enter the cove in mid-channel between the islet and the point southeastward of it and anchor with the islet bearing 243° , distant about 300 yards, in $2\frac{3}{4}$ fathoms water, or about 400 yards farther northeastward in mid-channel, in the same depth inside of the peninsula on the southern shore.

Tides.—It is high water, full and change, at Flower cove at 10h. 6m.

Communication.—The steamers from Bay of Islands call weekly at Flower cove during summer and autumn, and those from Halifax call monthly.

Flower island lies northward about 900 yards from Capstan point, and southwestward 150 yards from Nameless point, the end of a peninsula about a mile in length on the northern side of Nameless cove. The island is 400 yards long, eastward and westward, and 200 yards wide; and there is a house on it.

Light.—A square white lighthouse with a red lantern, 50 feet high, and a dwelling attached, on the western side of Flower island, exhibits at 51 feet above high water, a revolving white light, that attains its greatest brilliancy every thirty seconds, and should be seen from a distance of 12 miles in clear weather.

Nameless cove, entered northward of Capstan point, is suitable only for small vessels drawing less than 9 feet water, being nearly filled by islands and shoals. Herb island lies eastward of Flower island, and northward of the passage between these two is Slab island.

Directions.—Bring the eastern fishing stage at the head a little open northward of Herb island, bearing 63° , and pass between Herb and Slab islands at one-third of the distance across from Herb island; when the western fishing stage bears 0° , steer for it and anchor in $3\frac{1}{4}$ fathoms water, with the northern end of Slab island bearing 271° , avoiding a bank northeastward of Herb island. There is another small space for anchorage, reached by passing northward of the bank northeastward of Herb island in 13 feet water.

Small craft enter this cove by passing between Herb island and the southern shore.

The anchorage southward of Flower island, off the entrance of Nameless cove, is bad.

Flower ledges, parts of which uncover at low water, extend $\frac{3}{4}$ mile west-northwestward of Flower island. The houses in Bear cove open westward of Seal islands, bearing 178° , lead westward of the ledges. The tidal streams set strongly over the ledges.

Grenville ledge, northward, 800 yards from Nameless point, has 2 feet water over it.

Strait of Belleisle.—Description, soundings, tidal streams, currents, icebergs, fogs, general directions, etc., see Chapters VII and X.

The coast of Newfoundland between Flower island and cape Norman, a distance of $37\frac{1}{2}$ miles, is low and featureless, backed by a wooded ridge about 100 feet high. There are numerous huts and fishing sheds near the sea, but no marks of any kind that enable a mariner to fix his position.

The coast from Nameless point trends east-northeastward for $12\frac{1}{2}$ miles to Eddies cove; it contains several small coves and bights.

Mistaken cove, east-northeastward, 1,700 yards from Nameless point, is nearly dry at low water: the land around the cove is low and covered with vegetation.

Savage cove, northeastward, $1\frac{2}{10}$ miles from Mistaken cove, affords good anchorage to small vessels in 13 feet water, and is easy of access. The entrance is northeastward of Cooper island, which is nearly joined to the southern shore, and on which are the fishing establishments. Strong northwesterly winds produce a heavy swell in the cove.

Tides.—It is high water, full and change, in Savage cove at about 10h. 45m.; springs rise about $4\frac{1}{2}$ feet.

Sandy cove, east-northeastward 1 mile from Savage cove, affords anchorage for small vessels in $4\frac{3}{4}$ fathoms water, sheltered from southerly and easterly winds.

Double ledge, about 800 yards offshore at 2 miles northeastward from Sandy cove, is nearly awash at low water.

Poynes Cove rock, $\frac{3}{4}$ mile off shore at $1\frac{1}{4}$ miles west-southwestward of Green island, has 6 feet of water over it.

Green island lies $\frac{3}{4}$ mile off shore at $4\frac{1}{2}$ miles northeastward of Sandy cove; it is about 1,300 yards long in a northeasterly and southwesterly direction, narrow, and 10 feet high, with its top covered with grass. There are three fishing huts close together near the middle of the island, which can be seen from a distance of about 10 miles in clear weather.

Green Island rock.—Shoal water extends east-northeastward 1 mile from the eastern end of Green island, and Green Island rock, which has two heads with less than 6 feet water over them, and on which the sea breaks heavily with any swell, lies within the shoal water at about 800 yards from the island.

Shoal water of less than 3 fathoms extends southwestward about 600 yards, and southward 300 to 500 yards from Green island.

Anchorage.—There is anchorage in 5 to 6 fathoms between the eastern end of the island and the mainland, with fair shelter except from northeasterly winds. The holding ground is indifferent, being hard and stony.

Directions.—Enter the anchorage from the eastward. Approach with the houses on the western side of Green Island brook, which flows into the sea at $1\frac{3}{4}$ miles eastward of Green island, bearing a little westward of 146° ; when the southwestern end of Green island bears 259° , steer about 251° , along the mainland at a distance of 600 to 800 yards, and anchor when the northeastern end of the island bears 315° , distant nearly $\frac{1}{2}$ mile. The Newfoundland coast must not be closed, as shoal water extends nearly 400 yards from it.

Tides.—It is high water, full and change, at Green island at about 10h. 20m.; springs rise about $3\frac{3}{4}$ feet. The streams run at the rate of

1 to 2 knots at the anchorage, the flood setting southward, and the ebb northeastward.

Eddies cove, eastward about $4\frac{1}{2}$ miles from Green island, affords good shelter for small boats, with all winds, inside a ledge of rock just eastward of West point, at the western end of the cove.

Tides.—It is high water, full and change, at Eddies cove at about 10h. 3m.; springs rise about $3\frac{1}{4}$ feet.

The coast from Eddies cove trends east-northeastward and is straight and rocky, with occasional low cliffs, to Big brook, a distance of 13 miles.

Anchorage.—Watts point is northeastward about $5\frac{1}{2}$ miles from West point of Eddies cove, and there is anchorage water between these points at $\frac{1}{4}$ to 1 mile offshore, but with no shelter from the prevailing winds.

Big brook affords good shelter for small boats.

The coast from Big brook continues northeastward for $5\frac{1}{2}$ miles to the western entrance point of Watts bight.

Watts bight, or Open bay, is $\frac{3}{4}$ mile wide between the entrance points and about $\frac{1}{4}$ mile deep, but shoal water extends around it; it does not afford any protection to vessels, although boats shelter in its shallow northeastern end during easterly weather.

Boat head, eastward of Watts bight, is a peninsula projecting about $\frac{1}{2}$ mile from the mainland; it is about $1\frac{1}{4}$ miles long in a northeasterly and southwesterly direction, 49 feet high, bare and grassy on top, and falls southeastward to a marshy flat separating Watts bight from Boat harbor.

Boat harbor, on the eastern side of Boat head, affords fairly good shelter to vessels drawing less than 14 feet of water during westerly winds, the anchorage abreast the northeastern point of Boat head being protected from the sea by a reef extending nearly 800 yards from the point. A reef, with 1 to 2 fathoms over it, extends nearly 600 yards from the main at nearly $\frac{1}{2}$ mile northeastward of Boat head. The passage into the harbor between the two reefs is about 200 yards wide, and there is anchorage in the harbor in $3\frac{1}{2}$ fathoms.

During strong northeasterly winds the harbor is unapproachable owing to the heavy swell, although boats find fairly good shelter at its head, where the swell is somewhat stopped by patches of reef and shoal water.

The coast is low and rocky for nearly a mile northeastward of Boat head, and thence to cape Norman, a distance of 3 miles, it is composed of cliffs of loose shale 70 to 80 feet high. It is steep-to, the 20-fathom contour line being little more than $\frac{1}{2}$ mile off the land.

Cape Norman is bare, rocky, and rises to low cliffs. On it are several huts used by the seal fishers. The northwestern side of the cape is steep, but from close southeastward of it to Whale point, which

lies southeastward $\frac{3}{4}$ mile from the cape, rocky ledges extend about 400 yards offshore.

Light.—A white cylindrical iron tower, surmounted by a white cylindrical iron lantern with a red roof, 57 feet high, on the summit of the cliff at about 400 yards westward of cape Norman, exhibits at 116 feet above high water a flashing white light showing groups of 3 flashes every 30 seconds, thus: Flash $\frac{1}{2}$ second, eclipse $5\frac{1}{2}$ seconds; flash $\frac{1}{2}$ second, eclipse $5\frac{1}{2}$ seconds; flash $\frac{1}{2}$ second, eclipse $17\frac{1}{2}$ seconds, which should be visible from a distance of 16 miles in clear weather.

Fog signal.—A diaphone, worked by compressed air, gives blasts of 5 seconds duration, with intervals of 30 seconds between them, during thick or foggy weather. The fog-signal house, a square white building with a red roof, is situated about 100 yards eastward of the lighthouse.

Tides.—It is high water, full and change, at cape Norman at about 8h. 5m.; springs rise 3 feet, approximately.

Cape Norman bay, a mile wide between Whale point and the northwestern end of Cook Point peninsula, is open to the northeastward, and affords no safe anchorage.

The coast from the northwestern end of Cook Point peninsula trends eastward nearly 1,200 yards to Cook point; it is low and bordered by shoals which extend off-shore for a distance of 400 yards and from an inlet named Bonne bay.

Cook rocks, over which there is a least depth of $2\frac{1}{2}$ fathoms, extend northeastward $\frac{3}{4}$ mile from the northwestern part of the peninsula.

Priest rock, the northern of the shoals off the peninsula, bears 343° , distant 1,300 yards from Cook point, and has a least depth of 13 feet over it.

Norman rock, the eastern of these shoals, bears 34° , distant 1,300 yards from Cook point, and has a least depth of 16 feet over it.

Leading mark.—Le trou de la Baleine, on Burnt island, midway between Black island and Black rock, bearing 135° , leads between Priest and Norman rocks.

Cook harbor.—Cook Point peninsula is on the northwestern side of this harbor, and Black islet, Green island, and Schooner island, with the islands and reefs lying between them, are on its southeastern side. Prosper islet lies nearly in the middle of the harbor at 1,200 yards within Cook point; there is shoal water between the islet and the northern shore, and also for 300 yards northeastward of the islet. Fauvette islet is $\frac{1}{2}$ mile within Prosper islet.

Neige bay is a small indentation northwestward of Fauvette islet, with a fishing establishment on its shores.

Directions.—The entrance of the harbor is not easily made out from the northeastward, owing to the uniform height of the land. Cape Degrat summit, midway between cape Onion and the Mewstone,

bearing 93°, leads to the entrance. In entering, keep on the southeastern shore, passing Green island at a distance of 500 yards, and Schooner island at a distance of 300 yards. Turn northwestward and pass 200 yards southwestward of Prosper islet; then steer for the northeastern point of Neige bay, to clear the shoals northeastward and northward of Fauvette island, and anchor in 4 to 6 fathoms of water, sand and mud bottom.

The anchorage space of Neige bay is less than 200 yards in width.

Tides.—It is high water, full and change, in Cook harbor at 7h. 25m.; springs rise 3¼ feet, neaps 2½ feet.

Pistolet bay.—The entrance of Pistolet bay is between Black islet and Burnt cape, which bear nearly east-southeastward and west-northwestward, distant 3¼ miles from each other, and the bay extends southward 6 miles, and widens to 6½ miles at its head, exclusive of Milan arm.

Shallow bay, on the western side of Pistolet bay, is formed by the mainland, Boisees islands, and Schooner island. There is anchorage, in 4 fathoms of water, just northwestward of Boisees islands, but there are bowlders on the bottom, the holding ground is bad, and the easterly swell comes in.

The southern part of Pistolet bay, being open northward and northeastward, affords only temporary anchorage.

Triangle point, low and wooded, stretches northward ¾ mile from the southern shore of the bay. It is surrounded by a bank, which extends northeastward, and leaves a channel, nearly 1 mile wide, between it and Chien bank.

Burnt island extends south-southwestward 2½ miles from Burnt cape and is about 1,200 yards wide; it is barren, whitish in color, and 223 feet high. The island is joined to the mainland by a low isthmus, 200 yards wide, which separates Isthmus cove from Ha-ha bay to the northward. On the western coast of the island, at about a mile from Burnt cape, is a deep hole named Whale cave (le trou de la Baleine), which is conspicuous from the westward.

Chien rock lies southwestward, nearly a mile from Isthmus point, the southern end of Burnt island, and it almost covers at high water. A bank, on which this rock stands, extends approximately from a mile northwestward to a mile southeastward of Isthmus point for 1½ miles off shore, with depths of less than 3 fathoms.

Milan point lies south-southeastward about 3¼ miles from Isthmus point, and from about 1,200 yards northward of Milan point, Trompe l'œil point, consisting of low rocks and bowlders, extends westward $\frac{9}{10}$ mile, and a reef continues westward about 1,600 yards from Trompe l'œil point. Micmac islet, in the entrance to Milan arm nearly 800 yards west-southwestward from Milan point, is small and grassy.

Parker river flows into Pistolet bay just westward of the southwestern entrance point of Milan arm. A salmon fishery is carried on here by some Indians, and a group of huts marks the point.

Milan arm extends southeastward 2 miles from Micmac islet, and then turns eastward, with shallower water, for 2 miles farther. It affords secure anchorage for vessels drawing 16 feet and less.

Directions.—In proceeding to the anchorages in the southern part of Pistolet bay, steer for a position bearing 254° , $1\frac{9}{10}$ miles from Isthmus point. A saddle in the hills, southward of the huts at Parker river entrance, then bears 149° ; keep it so until the western side of burnt island bears 17° , when alter course to 45° , and anchor in $4\frac{1}{2}$ to 6 fathoms, stones and gravel bottom, with Chien rock bearing 318° , distant $\frac{9}{10}$ mile. The least depth in this route is 4 fathoms.

If drawing under 16 feet, anchorage southward of Trompe l'œil point, which is the best in the bay, can be reached thus: Keep the saddle (as above) bearing 149° until the northern end of Micmac islet is in line with a beacon, situated southeastward, 1 mile from Milan point, bearing 114° . Continue with this last mark on until the huts on the southwestern entrance point of Milan arm bear 140° , when alter course to 93° , and anchor in about 6 fathoms of water, with Micmac islet bearing about 169° , distant 800 yards.

To enter Milan arm in a vessel drawing less than 16 feet of water pass northeastward of Micmac islet, with Little Rond Mount point in line with Rond islet bearing 126° ; when Micmac islet bears 225° , open Little Rond Mount point southward of Rond islet to clear the shoals with less than 12 feet of water that stretch about $\frac{1}{2}$ mile off Milan point. Anchor as convenient in the middle of the arm, with Micmac islet bearing 298° .

The cove running eastward from Milan point must not be entered without a pilot. Vessels also proceed with a pilot to the head of the arm, where there is anchorage in 2 to 3 fathoms of water, mud bottom.

Caution.—It is stated by the pilots that a constant stream sets about westward out of Milan arm; caution is therefore necessary not to be set toward the shoals extending from Triangle point when proceeding to sea. The stream is supposed to be caused by the number of fresh-water streams flowing into the arm.

Ice.—The upper part of the arms of Pistolet and Sacred bays freeze in December, and the bays from cape Norman to cape Bauld fill with ice. The ice breaks up in May, early or late, according to the season.

Tides.—It is high water, full and change, in Pistolet bay at 7h. 39m.; springs rise $3\frac{1}{4}$ feet, neaps $2\frac{1}{2}$ feet.

Ha ha bay.—Ha ha point lies eastward, distant $1\frac{1}{2}$ miles from Burnt cape, and Ha ha bay extends south-southwestward about 2

miles from between them. Piton point, the end of a hummocky peninsula extending northwestward nearly $\frac{1}{2}$ mile from the southeastern shore, is fringed by rocks, but steep-to on its northwestern side. There is fair anchorage in the bay in 5 fathoms of water, sand and mud bottom, but it is open to the northward.

The coast, from Ha ha point northeastward $3\frac{1}{4}$ miles to cape Onion is clifty and steep, with some small coves, that afford shelter to boats with offshore winds.

Cape Onion is 250 feet high. A ledge extends east-northeastward 600 yards from the cape, and on its outer end is the Mewstone (Gros Oignon). On the ledge are two other clifty rocks which form the northern side of Onion cove, and on the southern side of the cove are some fishing establishments. The southern shore of the cove is foul, and the cove is open eastward. Onion island lies about east-southeastward 600 yards from the southern entrance point of the cove, and it is surrounded by reefs for nearly 350 yards, except to the southward.

Sacred bay.—Cape Artimon bears eastward, $3\frac{1}{4}$ miles from cape Onion, and Sacred bay extends southwestward about 3 miles from between these capes. There are numerous islets and shoals in the bay, and West and South roads are the only safe anchorages.

Little harbor, on the northwestern side of the bay and between Low islets and a peninsula, which at $\frac{1}{2}$ mile farther southwestward terminates in Fauvette point, and from which two fishing stages project, is but a small bend in the shore, where there is anchorage in 5 fathoms of water, sand and mud bottom, with Onion island seen between Low islets and the mainland, bearing about 57° .

Shoal.—The outer shoal in the middle of the western part of the bay bears 22° , distant 350 yards from the eastern end of the northern Moyaes island; it has 16 feet of water over it, and is steep-to, except toward the land between South and West roads, the whole of which space is foul.

West road is a semicircular basin, extending $\frac{1}{2}$ mile northwestward of a line joining Fauvette and Franche points. Shoal water extends $\frac{1}{4}$ mile around its shores.

Shoals.—Mauvais Gars rock, lying $\frac{1}{4}$ mile southeastward of Fauvette point, is small, and covers at high water.

Bon gars and Petit gars are nearly connected to Fauvette point; Bon gars, the southeastern one, situated 163° , 400 yards from the point, is above water, and steep-to on its southern side.

An isolated rock, with 19 feet of water over it, lies nearly in the middle of West road, with Fauvette point bearing 62° , distant 700 yards.

Directions.—Pass southeastward of Onion island and Low islets; bring and keep Onion island just open eastward of Low islets until

past Mauvais gars, or till Bon gars bears 275° , then steer to pass Bon gars at the distance of 200 yards, and anchor as convenient in the road, avoiding the 19-foot rock.

South road is in the southern part of Sacred bay, and it is approached by a channel, about 200 yards in width, which lies between the shoals off Curlew point and the mainland south-southwestward of it, on the eastern side, and Moyacs islands, with the islands and shoals southward of them, on the western side. The road at the head of the channel has shoal water around it, and the anchorage space is about 600 yards in diameter.

Directions.—Approach with the eastern point of Green island, which lies about 1,400 yards southward from the southern Moyacs island, open westward of Curlew point, and bearing 217° . Pass Curlew point at the distance of 400 yards, to clear the shoal extending 200 yards from it, and the southern Moyacs island, at the distance of 200 yards. When the square rock on Onion island opens just westward of the southern Moyacs island, bearing about 14° , keep it so astern; this mark leads into South road, passing close westward of a rock that covers, lying midway between Gray point and Long island. When past this rock, haul to the southeastward and anchor in 5 fathoms of water, sand and mud bottom.

Tides.—It is high water, full and change, in South road at 7h. 23m.; springs rise about 3 feet.

Sacred islands—**Great island**, northeastward $1\frac{1}{10}$ miles from the Mewstone, is nearly 1 mile long, north-northeastward and south-southwestward, 200 to 800 yards wide, 269 feet high, and covered with grass. It is almost steep-to.

Little island, eastward $\frac{1}{10}$ mile from Great island, is of moderate height, and steep-to, except at its southwestern end, from which reefs extend over 100 yards.

Maudit bank, north-northeastward, distant $2\frac{1}{10}$ miles from Great island, has 7 fathoms of water over it, and the sea breaks on the bank in heavy weather.

Foirou island, or Gull rock, east-northeastward, distant $2\frac{1}{10}$ miles from the northern point of Little island, is a low round rock, 100 yards in diameter, from which a shoal extends southeastward 400 yards.

Islands.—Cape Artimon, southward 1,300 yards from Little island, is the northern end of an island, between which and Verte island, at $\frac{1}{2}$ mile eastward, there is much foul ground and only a narrow 19-foot channel; and the passage between it and the mainland to the southward has only a narrow boat channel. Shoals extend eastward 600 yards from Verte island, and there is a depth of 19 to 27 feet between them and Grand Mulou shoal; and there are rocks and two 17-foot patches between Verte island and Maria reefs.

Grand Mulou shoal, northeastward 1,200 yards from Verte island, is a bank about 300 yards in diameter, with a least depth of 6 feet of water over it.

Leading marks.—The Mewstone, in line with the southern end of Little island, bearing 264° , leads northward; Great Island summit, in line with the northern end of Little island, bearing 287° , leads northward; and the southwestern end of Great island, just open southwestward of the southwestern end of Little island, bearing 284° , leads southward of Grand Mulou shoal, and between it and Maria reefs.

Maria reefs, eastward 1,400 yards from Verte island, are a group of black islets, some of which are 7 feet high.

Medee bay, lying southward of Verte island, is obstructed by shoals and islets: there are some fishing stages at its head.

Cape Ardoise, $\frac{1}{2}$ mile southeastward of Verte island, is the northeastern end of a promontory, which, at 200 yards within the cape, rises to a remarkable round gray hill, 184 feet high.

Maria bay, lying between cape Ardoise and cape Raven, which bears 124° 1,900 yards from it, is open to the northeastward and affords no shelter.

Rock.—A rock, with 6 feet of water over it, lies nearly in the middle of the entrance to Maria bay, with cape Ardoise bearing 295° distant 800 yards.

Mauve bay (Noddy harbor).—Noddy point bears eastward $\frac{3}{4}$ mile from cape Raven, and Mauve bay extends southward $1\frac{1}{2}$ miles from between them. A peninsula projects from the eastern shore of the bay at about $\frac{2}{10}$ mile inside of Noddy point: deep water runs in a narrow channel for about 800 yards inside this peninsula, where a few small vessels obtain anchorage in $3\frac{1}{4}$ fathoms water, good holding ground; westerly winds are violent, but the anchorage is safe, and the sea with northerly winds does not fetch home.

Garden cove, on the western side of the bay opposite the peninsula, extends 500 yards to the westward, with shoal water about 150 yards off its shores: it affords anchorage for small vessels in 16 feet of water, sand bottom and fair holding ground, but an easterly swell sometimes fetches in.

The rest of the bay affords no shelter from the sea.

Wood bay.—The northern end of Jacques Cartier island bears eastward $\frac{1}{2}$ mile from Noddy point, and Wood bay extends southward 1,600 yards from between them. The bay is open northward, and affords no shelter.

Jacques Cartier island is $\frac{3}{4}$ mile long, in a northerly and southerly direction, 300 yards wide at its broadest part, and 138 feet high; its southern end is separated from the mainland by a channel 50 yards wide, which can be used by boats. The northern and north-

western points of the island are steep-to, but a rocky shoal extends nearly 100 yards off the shore just eastward of the northern point. There are several fishing establishments on the island, with their stages on its southern part.

Kirpon island.—(See also p. 367.)

Cape Bauld, the southern entrance point of Belleisle strait, and the northern point of Kirpon island, bears 188° . distant $14\frac{1}{4}$ miles from the southernmost point of Belleisle. (For description, light, fog-signal, and tidal streams, see p. 367.)

Tidal streams.—The inshore tidal streams are irregular between Kirpon island and cape Onion, but ordinarily the flood sets westward, and the ebb eastward, and when the stream goes with the wind it attains a rate of about one knot.

The coast of Kirpon island from cape Bauld trends southwestward $1\frac{3}{10}$ miles to Grapnel cove, a small indentation; it then continues south-southwestward 1 mile to Dumenil point; from this point it turns about south-southeastward $1\frac{7}{10}$ miles to the southern extremity of the island, and forms the eastern side of Kirpon harbor.

At about $\frac{1}{4}$ mile southward of Dumenil point is a group of low rocks, with a reef extending nearly 400 yards southwestward of them, and leaving a clear passage 200 yards wide between the reef and Jacques Cartier island. There is a fishing establishment on Kirpon island, eastward of these rocks.

Merchant island, 600 yards southeastward of the rocks, is low and attached to Kirpon island; there is a fishing establishment on it.

Morne Fontan, $\frac{1}{2}$ mile southeastward of Merchant island, is a conspicuous hill 105 feet high.

Kirpon harbor, situated between Jacques Cartier and Kirpon islands, affords excellent anchorage.

Vincent islet, 600 yards eastward of the southern end of Jacques Cartier island and 200 yards northeastward of a point of the mainland, is 16 feet high and covered with grass. The passage between it and the main to the southwestward has a depth of 15 feet in its fairway, which is tortuous.

Peaked rock, 100 yards northwestward of point Verte, on the southeastern side of the harbor, covers at high water.

Canias rock, 400 yards northward of point Verte, is above water. It is reported (1896) that the depth 300 yards west-northwestward of this rock is about 3 feet less than shown on the charts.

Beacons.—There is a beacon on the western part of Merchant island, and 400 yards east-southeastward of it and near the summit of a hill 118 feet high on Kirpon island is a white staff with a black ball on the top.

Three beacons are placed on the mainland, southwestward of Vincent islet; the outer or northernmost beacon is a pile of stones sur-

mounted by a cask on end; the middle beacon is a pile of stones with a pole and cask; the southernmost beacon is a pile of stones surmounted by a pole and triangle; these beacons and the rocks below them are whitewashed.

Anchorage.—There is anchorage in 7 fathoms at a point bearing 3° , distant 600 yards from Vincent islet, and in 8 fathoms at a point bearing 292° , distant 300 yards from the northern end of that islet.

Vessels drawing 16 feet and less can reach good anchorage at a point bearing 160° , distant 700 yards from the southern end of Vincent islet.

Vessels drawing less than 12 feet water can pass southward of Kirpon island.

Directions.—By the northern pass: Approach Kirpon harbor with the beacon on Merchant island in line with the beacon on Kirpon island, bearing 109° , which leads through the channel northward of Jacques Cartier island. When clear of Jacques Cartier island, haul to the southward, and anchor in about 7 fathoms water, with the three beacons southwestward of Vincent islet in line, bearing about 202° . If the weather is not clear the beacon on Merchant island may not be distinguishable; in this case borrow on the northern end of Jacques Cartier island.

By the southern pass, which is available for vessels drawing less than 12 feet: Bring a remarkable cascade on the southwestern shore of Little Kirpon harbor in line with the southern point of Kirpon island, bearing about 239° , which mark leads in 16 feet water northward of Green point. When that point is abeam, steer for the first fishing stage on the southwestern side, to avoid the Butterpot, a rock in mid-channel that shows only at low water; pass 25 yards off that stage and the shore to the next point, then turn sharply to port and anchor, or proceed to the northward.

Or keep the mark on and round the southern point of Kirpon close to. The tidal streams in this channel are strong and caution is necessary, especially as these directions are old and not clear.

Ice.—Kirpon harbor freezes between December 10 and 25, and the ice breaks up between May 5 and 25.

Tides and tidal streams.—It is high water, full and change, in Kirpon harbor at 7h. 5m.; springs rise 5 feet, neaps $1\frac{3}{4}$ feet.

The streams often attain a rate of 3 knots an hour in the passage between Kirpon and Little Kirpon harbors, but the direction depends more on the winds prevailing, or that have prevailed, than on flood or ebb.

Supplies.—Fresh mutton and vegetables can usually be obtained at Kirpon.

CHAPTER VII.

NEWFOUNDLAND, EAST COAST—CAPE BAULD TO CAPE ST. JOHN.

Strait of Belleisle.—(See chap. X, p. 641.)

Cape Bauld is the northern point of Kirpon island, which lies at the northern end of Newfoundland, and it is the southern entrance point of Belleisle strait. Kirpon island is $3\frac{1}{2}$ miles long from north to south, $1\frac{1}{2}$ miles wide, and separated from the mainland by a channel 100 yards wide. Cape Bauld is a steep, rocky, barren point, around which the tidal streams are strong, variable, and eddying.

Light.—A brown tower, having a height of 63 feet from base to vane, standing on a concrete foundation 6 feet high and surmounted by a circular metal lantern, painted white, with red roof, on the high ground about 230 yards within cape Bauld, exhibits at 187 feet above high water, a flashing white light which shows one group of 2 flashes every 15 seconds, and should be seen from a distance of 20 miles in clear weather.

Fog signal.—A diaphone horn, worked by compressed air, gives a blast of 7 seconds duration every 45 seconds, thus: blast, 7 seconds; silent interval, 38 seconds, during thick or foggy weather. The fog-signal house is a rectangular, white building with a red roof, situated 50 feet eastward of the lighthouse, and the horn points northward.

Tidal streams.—The inshore tidal streams at cape Bauld turn at about three hours after high and low water, the flood setting westward and the ebb eastward, but they are much influenced by the winds.

Grande cove, between cape Bauld and Split point, which bears southeastward, distant about 1,200 yards from the cape, is open to easterly winds: Split point is an islet, 88 feet high, joined by bowlders to Kirpon island, and with a rugged point southward of it, forms Colombier cove, a temporary shelter for fishing boats.

Pigeon cove, etc.—Between the rugged point southward of Split point and cape Dégrat, situated $1\frac{1}{10}$ miles southward, is a bay 1,200 yards deep, divided into numerous coves by islands and points, off which are shoals, and vessels should not enter westward of the line joining the points of this bay without special reason.

Dégrat harbor, on the northern side of cape Dégrat headland, is a small cove where six fishing vessels can moor in 13 feet of water inside a flat rock on the eastern side. Sheep channel, between Sheep and Dégrat islands, is the best passage to this harbor, and after passing Sheep bank, to clear which keep the northern side of Sheep island close aboard, the channel is clear, though narrow.

Cape Dégrat rises to a hill 505 feet high, the highest in this locality, and is faced by a steep cliff 300 feet high, with deep water close alongside. The cliffs fall at about 800 yards southward of the cape to White point, a landslip in the cliffs, of a lighter color than the rest of the coast.

Grands Galets bay is situated southwestward of Galets head, the southern part of cape Dégrat headland, but it affords no shelter.

Little Kirpon harbor, at the southern point of Kirpon island, is 500 yards long and 250 yards broad: the holding ground is bad.

Vessels drawing less than 12 feet of water can pass southward of Kirpon island to Kirpon harbor, but as the tidal streams are strong, caution is necessary to avoid Butterpot rock, that lies nearly in the middle of the channel southward of the southern point of Kirpon island and is nearly always covered. (For Kirpon harbor, see p. 365.)

White islands are three principal and some lower rocks, situated $2\frac{1}{4}$ miles eastward of Partridge point, which lies $1\frac{4}{10}$ miles south-southwestward from Galets head: the southwestern and highest island is about $\frac{1}{2}$ mile long, and a shoal lies 150 yards northward of its northern end.

White rocks (les Donzelles), west-southwestward $\frac{3}{4}$ mile from White islands, are a group of low islets with sunken rocks about 200 yards off their northern end.

A rock bears 112° , distant 850 yards, from the southeastern end of these rocks, and the sea always breaks on it.

Madeleine shoal is in the first cove southward of Partridge point; it has 2 feet least water over it, and there is a depth of $2\frac{1}{4}$ fathoms at about 200 yards southeastward of it; Galets head opens eastward of the islands situated close southeastward of Partridge point, bearing 10° , leads eastward of the whole of the shoal.

Green shoal, with 10 feet water over it, bears 129° , nearly 200 yards from Breaker point, a low point sheltering 2 small coves, at $1\frac{2}{10}$ miles southward from Partridge point.

Storm cape is a rocky islet close to the land at 1,600 yards southward of Breaker point, and Broize point is situated about 1,200 yards southwestward of the cape.

Griguet harbor (locally Fortune harbor) and several other small anchorages, formed by a group of islands lying close to the mainland,

are comprised between Broize point and White cape, which cape lies southward, distant $2\frac{1}{10}$ miles from the point.

Camel island, the northern and largest of the group, is 305 feet high; it forms the southern side of the entrance to North and Northwest bays, and takes its name from a remarkable mound at its northeastern end which forms the summit. Prune islet, northward of the northwestern extremity of Camel island, is 16 feet high. Baleine rock, lying nearly midway between Broize and Cove points at the entrance of North bay, is always uncovered.

Anchorage.—There is anchorage off the fishery establishment in North bay, in 15 to 16 fathoms water, with tolerably good holding ground, but easterly winds occasionally send in a swell.

Ice.—Griguet is generally frozen over about the middle of December, and is clear of ice about May 20. It is usually the first harbor open on the east coast of the northern peninsula of Newfoundland.

Communication.—Steamers from Tilt cove call here weekly during summer and autumn.

Good cove (Belle anse), between Cove and Bay points, is 400 yards in extent, and affords good anchorage for small vessels in 11 fathoms water, sand bottom.

Bay point divides Good cove from Northwest bay, and a rock lies 200 feet eastward of it; la Rose, a rock with 2 feet water over it, is the end of a shoal extending southward 150 yards from the point.

Northwest or Roncière bay extends north-northwestward 1 mile from Bay point, with a width of about 600 yards: a spit extends south-eastward nearly 600 yards from the head of the bay.

Anchorage.—Northwest bay affords anchorage anywhere in 10 to 18 fathoms water: near the head of the bay anchor eastward of the line joining Bay point and Crab island to clear the spit.

Southwest bay lies between Camel island and the mainland: it affords temporary anchorage for small vessels westward of the northern part of Camel island, in 9 fathoms water, and clear of the shoal off its northern point.

Griguet island, close eastward of Camel island, is about 66 feet high: Black islet, lying close eastward of the northern extremity of Camel island, is 33 feet high, and a small spit extends off its southern end, the other sides being steep-to.

Four Ears island, southward of Griguet island, is faced by a peaked black cliff, 120 feet high.

Griguet harbor proper is situated between Camel, Griguet, and Four Ears islands: it is 400 yards long and 200 yards wide, and the entrances are narrow and tortuous.

Upper Griguet or White Cape harbor, southward of Four Ears island, is 600 yards long and 200 yards broad. The channel between

the islets off the southern end of Four Ears island and those off the northern side of White cape promontory is clear, but the passage northwestward of Four Ears island is suitable for boats only.

Anchor in 7 fathoms water, near the mainland, and clear of the bank extending 250 yards from Four Ears island.

Tides.—It is high water, full and change, in these harbors at 7h. 10m.; springs rise 5 feet, neaps $2\frac{3}{4}$ feet.

White cape, a rugged white cliff, which rises to a grass-covered mound, 262 feet high, at $\frac{1}{4}$ mile within it, is a good mark. The cape, as well as the outer coast to White Dog point, which is situated $1\frac{2}{10}$ miles south-southwestward and forms the northern entrance point of St. Lunaire bay, is steep-to; and between these points are Great cove and Cow cove, only suitable for boats.

St. Lunaire bay, extending westward about 3 miles to the head of Northwest bay, is one of the finest harbors in Newfoundland, being always accessible to steamers. The squalls, however, in northwesterly gales are very heavy for sailing vessels. The entrance is well indicated by White cape, and when near, by St. Lunaire peak, 335 feet high, southwestward of the bay.

Westerly gales are stronger at St. Lunaire than at the neighboring ports, but usually lull at night.

Granchain island, on the southern side of the entrance of St. Lunaire bay; is 85 feet high; Granchain point, its northeastern end, is an islet joined to the island at low water, and is steep-to to the northeastward.

Flat rock, always above water, is the northernmost of a chain of islets and rocks stretching northward 800 yards from Granchain island, and it is steep-to, excepting on its southern side.

Salut islet, conspicuous, conical, and 65 feet high, lies southward 100 yards from Flat rock; and Coal islet, square, black, and cliffy, lies between Salut islet and Granchain island.

Vanguard shoal, bearing 331° , distant 650 yards from Granchain point, and the northeasternmost of the shoals off Granchain island, has 12 feet water over it; Adelaide islet, open northward of Flat rock, bearing 287° , leads northward of Vanguard shoal and the other shoals on the southwestern side of the entrance of the bay.

Amelia cove (locally Garden cove), on the northern shore of the bay at about $\frac{2}{10}$ mile within White Dog point, is foul for 200 yards from its head; it affords temporary anchorage in 15 fathoms water, but the holding ground is bad, and easterly winds bring in a sea. A good road connects this cove with Grignet harbor.

Carentonne island, on the western side of Amelia cove, is 72 feet high; there are two islets and shoal water between it and the point to the northward.

Red islet, in the entrance to Amelia cove, and eastward 200 yards from Carentonne island, is 16 feet high, and a 2-fathom shoal extends southwestward about 50 yards from it.

Adelaide islet, bears 295° , distant $\frac{1}{2}$ mile from Flat rock, and a shoal extends about east-southeastward 100 yards from it. Its northern and western sides are steep-to.

Elizabeth islet lies westward about 200 yards from Adelaide islet; there is deep water at 100 yards off it.

Shoals.—Two shoal patches, with 6 and 9 feet water over them, respectively, lie northwestward, 450 yards, and west-northwestward, the same distance from Carentonne island.

Strawberry island, west-northwestward, distant 1,100 yards from Elizabeth islet, is 59 feet high. A shoal patch, with $1\frac{1}{2}$ feet water over it, bears 112° , 265 yards from this island, and southward 200 yards from it there are two patches, one of which is above high water, while a line of shoals extends 350 yards toward North reef.

North reef, on the northern side of Northwest bay and westward 600 yards from Strawberry island, extends southward about 400 yards from the land, and dries $1\frac{1}{2}$ feet at low water.

Leading mark.—The conspicuous peak, 246 feet high, and situated $\frac{1}{2}$ mile northward of White Dog point, in line with the northern end of Elizabeth islet, bearing 85° , leads southward of North reef and the reefs off Strawberry island.

Northwest bay entrance is between Strawberry island and Nymph island, and the bay, which extends $1\frac{1}{4}$ miles to the westward, with a width of 600 to 250 yards, affords excellent anchorage in 6 to 21 fathoms water everywhere within the entrance.

Nymph island, 92 feet high, separates Northwest bay from St. Lunaire road. There is deep water at 100 yards off the outer points on its northern coast. A rocky patch, with $3\frac{3}{4}$ fathoms water over it, lies southward 200 yards from an islet near Nymph point, the eastern point of the island.

Middle bank, midway in the channel between Nymph island and the rocks north of Granchain island, has 10 feet least water over it.

Clearing marks.—The eastern end of Carentonne island in line with the middle of Adelaide islet, bearing 0° , leads eastward; the western end of Red islet in line with the eastern end of Adelaide islet, bearing 22° , leads westward; White Dog point in line with the southern end of Salut islet, bearing 86° , leads northward; and the same point in line with the northern end of Coal islet, bearing 78° , leads close southward of the bank.

St. Lunaire road, southward of Nymph island, and between it and Granchain islands and the mainland, affords good anchorage, in 18 to 21 fathoms water, or off the entrance to Southwest bay in 13 fathoms; the holding ground is good.

Southwest bay, entered from the southern part of St. Lunaire road through a passage about 400 feet wide, extends southward about 1 mile, but is only 200 yards wide, and shoal water extends $\frac{1}{4}$ mile from its head. The navigable fairway is in mid-channel. Vessels careen here in safety.

Tides and tidal streams.—It is high water, full and change, in St. Lunaire bay at 7h. 6m.; springs rise 5 feet, neaps $2\frac{3}{4}$ feet.

The tidal streams in the bay are very weak, but outside, the flood stream sets northward, and the ebb stream southward, along the coast without regularity, at times attaining a rate of 2 knots an hour, at other times ceasing entirely.

Ice.—St. Lunaire freezes late in November or early in December, and the ice clears some time in May.

Little Brehat bay, southward 2 miles from Granchain point, is a small cove, off which are Little Needles, some peaked rocks.

Needles rocks, about 300 yards offshore and 700 yards southward of Flat point, the southern entrance point of Little Brehat bay, are curiously shaped, and show well from a short distance seawards.

Great Brehat bay (locally Needles cove), situated southwestward $1\frac{1}{4}$ miles from Needles rocks, extends about 1,200 yards westward of the line between the entrance points, and at its head is a sheltered anchorage, about 200 yards in extent, for small vessels. Green bay, about $\frac{1}{2}$ mile southwestward of Needles rocks and just within the northern entrance point of Great Brehat bay, is a small cove faced by Green island; shoals extend from Green island and terminate in John Baptist shoal, which is situated 500 yards southward of the southern end of the island, and has 12 feet of water over it. The southwestern entrance point of the cove at the head of Great Brehat bay, well open southward of its northeastern entrance point, bearing 264° , leads southward of these shoals.

Foundling rock, on which the sea always breaks, is situated northward 300 yards from Brehat point, the southern entrance point of the bay. Crab rock bears 140° , distant 200 yards from Brehat point, and has less than 6 feet water over it. By passing between John Baptist shoal and Foundling rock and keeping in the fairway the cove at the head of the bay may be entered and anchorage obtained in $2\frac{3}{4}$ fathoms of water with moderately good holding ground.

Tides.—It is high water, full and change, at Great Brehat bay at 7h. 7m.; springs rise 5 feet, neaps $2\frac{3}{4}$ feet.

Brehat shoal, bears 73° , distant 2 miles from Brehat point, and is about 800 yards long and 65 yards wide, with a least depth of 13 feet water over it. A head with 6 fathoms water over it and 20 to 27 fathoms around lies $\frac{1}{4}$ mile southward of Brehat shoal; when the sea breaks on it in fine weather, the fishermen predict northerly winds; it breaks heavily with northerly winds, and is generally

marked by ripples. Another shoal lies northward, distant 300 yards from Brehat shoal, and has $6\frac{1}{2}$ fathoms water over it.

Clearing marks.—Camel island summit in line with White cape, bearing 0° , leads westward; and Goose cape open southward of French point, 222° , leads southeastward of these shoals.

Tidal streams.—The streams are variable in the locality of Brehat shoal, but they appear to have an increased rate over its plateau, which is indicated by the eddies.

French point lies southward 3 miles from Brehat point, and immediately westward of it is French bay, a bight about 800 yards across and open southward.

Cape St. Anthony is situated 1 mile southwestward from French point.

St. Mein bay extends northwestward 3 miles on the western side of cape St. Anthony, and is $1\frac{1}{4}$ miles wide at its entrance between that cape and Fox point, the western entrance point. The water is deep, and the bay completely open southward; there is a small fishing village on its northeastern side, at $1\frac{1}{4}$ miles within cape St. Anthony.

Ice.—St. Mein bay freezes about the end of November, and the ice clears in May.

Fox point is low, and appears more so from contrast to St. Anthony hill, westward 800 yards from it, which is 413 feet high, and faced by a black cliff.

St. Anthony harbor entrance is $\frac{1}{4}$ mile northwestward of Fox point, and it can only be distinguished when close to. The harbor extends southwestward 550 yards with a breadth of 335 yards, and then turns northwestward $1\frac{1}{4}$ miles, gradually widening to about 500 yards.

At 900 yards westward from Egg point, the southern entrance point, just beyond where the harbor commences to bend to the northwestward, and nearly in mid-channel, are Piquennais rocks, joined to the southern shore by a bank. Neither these rocks nor the northeastern shore are quite steep-to, but the harbor may be entered in the fairway between them, and affords good anchorage in 6 to 9 fathoms water, mud bottom.

A small white hut on the northwestern point of the southwestern side of the harbor, bearing 296° , leads through the narrow channel abreast the rocks.

It is often difficult to get a long vessel into this harbor on account of the boats and fishing vessels anchored off the turning point, particularly with winds across the harbor, and the space is narrow for turning. The wind blowing in eddies from the high lands round the harbor is very baffling for a sailing vessel making the entrance.

Light.—A fixed white light is exhibited from a lantern hoisted on a white open framework on Egg point from June to December.

Mission station. There is a mission station at St. Anthony, consisting of a hospital, a clubhouse, an orphanage, and a storehouse with a wharf near it. The hospital, which contains six beds for male and seven for female patients, is the only one in the island of Newfoundland outside of St. John's.

Marguerite bay, on the northeastern shore of this harbor, near the head, extends $\frac{1}{4}$ mile to the northward. Both points of the entrance are shoal, leaving a narrow passage in at one-third of the distance across from its southeastern point.

Tides.—It is high water, full and change, in St. Anthony harbor at 7h. 10m.; springs rise 5 feet, neaps $2\frac{3}{4}$ feet. The tidal streams are scarcely appreciable except in the narrows northeastward of Piquenais rocks.

Supplies.—Fresh mutton and vegetables, in small quantities, can usually be obtained.

Water is difficult to obtain here, as boats can not get near the mouths of the streams.

Ice.—St. Anthony harbor freezes about the end of November, and the ice clears in May.

Communication.—Steamers from Tilt cove call at St. Anthony harbor fortnightly during summer and autumn.

The coast from Fox point trends southwestward, $1\frac{1}{10}$ miles to Savage point, and is barren and cliffy, while Savage point, the southeastern end of a peninsula, is low with rugged rocks.

Cremaillere harbor.—Cape Haut-et-Bas lies southwestward, distant $\frac{3}{4}$ mile from Savage point and Cremaillere harbor extends northwestward, $1\frac{1}{10}$ miles from between them. Anchor point, the northwestern point of the peninsula of which Savage point is the southeastern end, has a snug cove northward of it.

The harbor entrance westward of Anchor point is nearly 400 yards wide between the shoals on either side, and the harbor within affords good anchorage over an area 1 mile long and $\frac{1}{2}$ mile wide, in 10 fathoms of water, mud and sand bottom. Shoals extend off Anchor point and the opposite shore for 150 yards, and Bear bank, a shoal with 9 feet of water over it, is situated 200 yards off the south-southwestern shore at 165 yards from the head of the harbor.

Southeasterly winds bring a sea into the harbor, and westerly winds produce heavy squalls under cape Haut-et-Bas, making the entrance difficult and sometimes impossible for sailing vessels.

Tides.—It is high water, full and change, at Cremaillere harbor at 7h. 13m.; springs rise $4\frac{1}{2}$ feet, neaps $2\frac{3}{4}$ feet. Low water occurs about three-quarters of an hour before the time calculated from the establishment.

Cape Haut-et-Bas is faced by high black cliffs, and Whale grotto, a deep recess in the cliffs, lies northward 600 yards from the cape.

Notre Dame island, south-southeastward about $\frac{3}{4}$ mile from cape Haut-et-Bas, is 85 feet high, and flat in appearance.

Notre Dame shoal, bearing 344° , distant 600 yards from the northern point of Notre Dame island, is a patch with 12 feet of water over it. Angel point (see below), shut in with Vierge point, bearing 233° , leads northwestward, and the fishing stage in Vierge cove open southward of Vierge point, bearing 259° , leads southward of this shoal.

Henry islet, situated westward 600 yards from Notre Dame island, is surrounded by shoals except on the northwestern side, but there is a deep passage, 150 yards wide, between it and Notre Dame island.

Three mountains.—Three conspicuous hills, having heights of 403, 423, and 525 feet, are situated, respectively, 600 yards north-westward of cape Haut-et-Bas, 900 yards westward of cape Haut-et-Bas, and 1,000 yards west-northwestward of Vierge point. Taken together, they form an excellent mark.

Vierge cove extends westward $\frac{1}{2}$ mile from close southward of Vierge point, which is situated southward 1,200 yards from cape Haut-et-Bas. The cove is open seawards.

Angel point, separating this cove from Three Mountain harbor, is low and narrow, but steep-to at the distance of less than 200 yards.

Three Mountain harbor is very small, but though open, the sea does not fetch home; it is suitable only for fishing vessels, which moor to the rocks. The tidal streams are scarcely perceptible.

Lobster point, southward 400 yards from Notre Dame island, is the eastern end of a barren peninsula, which attains a height of 335 feet, and is faced by rugged cliffs. Lobster point is low, and eastward at a little more than 200 yards from it is Lobster shoal, over which there is a depth of 6 feet. St. Anthony hill, well open eastward of Notre Dame island, bearing 11° , leads eastward of this shoal.

Goose cape is the southernmost point of the peninsula, and forms the northern entrance point of Hare bay.

Hare bay is 5 miles wide at its entrance between Goose cape and Great Cormorandier island; it extends 18 miles to the westward and contains several good but little frequented harbors; the depth of water is great, affording no anchorage till about 12 miles inside the entrance or westward of a line between How harbor and Brent islands, and the sea in the bay is often very heavy.

The northern shore of Hare bay is high and steep, falling in cliffs to the sea, with deep water close-to.

Ice.—The western portions of Hare bay within Brent islands freeze solid during December, and the eastern part fills in with northern ice and freezes: the ice generally breaks up in May, early or late, according to the season.

Goose cove, northwestward $1\frac{1}{2}$ miles from Goose cape, is entered between Loup Marin or Seal point, the western end of Goose Cape peninsula, and Flat point of the mainland, off which shoals stretch for 150 yards. The entrance, through which $4\frac{1}{2}$ fathoms water can be carried, is intricate. Coq islet, 20 feet high, lies close off Seal point, leaving a passage for boats between them, and a shoal extends northwestward 33 yards from this islet.

Beacon.—A beacon with a topmark stands on Coq islet.

Cigale point, the inner northern entrance point, is a quarter of a mile eastward of Flat point, and between them there is a cove extending nearly 400 yards to the northward with shallow water in it; shoal water extends nearly 200 yards southeastward from Cigale point, just south-southwestward of the end of which is la Fourmi (Ant) rock that covers at half tide. Eastward of this rock the harbor expands to about 550 yards across and affords landlocked anchorage in 5 to 9 fathoms water, good holding ground.

Directions.—Goose cove should not be entered except in a vessel under perfect command, and a sailing vessel requires a fresh breeze to take the bends. If the shoal off Coq islet is not breaking, buoy it, then enter, round the buoy and the island close to, pass southward of la Fourmi rock and turn eastward into the anchorage.

Tides and tidal streams.—It is high water, full and change, at Goose cove at 7h. 13m.; springs rise 5 feet, neaps $2\frac{3}{4}$ feet.

There is no appreciable stream in the entrance to the cove, and the streams, outside the entrance, appear to be independent of the tide, and to follow irregularly the direction of the coast, at rates rarely exceeding 1 mile an hour, and sometimes not perceptible, but they are always strongest off Goose cape.

Water is abundant, but difficult to obtain, as the boats can not get close to the mouths of the streams.

Bouleaux bay is immediately northwestward of Goose cove and open to the southwestward.

Ireland bay, west-northwestward 5 miles from Goose cove, is a slight bend in the land, where there is a small settlement and a church. Northward of this bay are Capillaire mountains, with a remarkable summit that is conspicuous from Belleisle strait.

How harbor, also known as Bustard bay, Havre Hodidou, and Baie de l'Outarde, is westward 11 miles from Goose cove and extends northwestward 2 miles: its width is $\frac{1}{4}$ mile at the entrance and $\frac{1}{2}$ mile inside.

Estaing shoal lies about 200 yards from the shore at 400 yards southeastward of Roland point, the eastern entrance point, and has 3 feet water over it.

Ledret shoal, bearing 173° , distant 1,350 yards from Fendue point, the western entrance point, has 13 feet water over it.

Anchorage may be obtained in 8 to 13 fathoms water in How harbor, observing that the water shoals in its northwestern part.

Tides.—It is high water, full and change, in How harbor at 7h. 18m.; springs rise 4 feet, neaps $1\frac{1}{2}$ feet.

Northern arm, westward 3 miles from How harbor, extends 2 miles to the northward with a width of $\frac{3}{4}$ mile, but it is open southward.

Anchorage.—There is good anchorage in this arm at about $\frac{1}{2}$ mile off a small river on the eastern shore, with Hare island, which forms the western entrance point of the arm and is 115 feet high and nearly joined to the mainland at low water, just open of the mainland, bearing about 202° , in $8\frac{1}{2}$ fathoms water.

Northwest arm, separated from Northern arm by Hare island and a projecting point northwestward of it, is completely open southward; anchorage sheltered from offshore winds may be obtained in 5 to 8 fathoms water; a bank of bowlders fringes the whole of the western shore of Northwest arm between Seal bay and Fournier point. A large stream runs into the head of Northwest arm.

Brent islands, southward $3\frac{1}{2}$ miles from How harbor, are two islands close together and connected by shoal water; North Brent island, the northeastern, being nearly bare, and South Brent island, the southwestern, being covered with brushwood; each is about 1 mile across and the passage between them and the mainland to the westward is shallow. A rocky ledge, awash at high water, extends a short distance northward from Brent islands, and shoal water northward $\frac{2}{3}$ mile, with Vert island near its end.

Anchorage.—West river flows into the bay southwestward of these islands, and off its entrance at about 1 mile southwestward of Brent islands, there is fair anchorage in 5 to 6 fathoms water, to reach which pass southeastward of Brent islands.

Shoal.—A shoal, with $2\frac{1}{2}$ fathoms of water over it, lies in mid-channel between South Brent and Direction islands, and in the fairway to the anchorage; from the shoal the northeastern end of Direction island, which is 82 feet high, bears 233° , distant $\frac{1}{2}$ mile.

Long island, 1 mile south-southwestward of South Brent island, is $2\frac{2}{10}$ miles long, in a north-northeasterly and south-southwesterly direction, 300 to 1,000 yards in width, and separates Western and Southern arms. The island is thickly wooded, except near its western point; the southwestern end is joined to the mainland at low water.

A shoal, with 3 to 15 feet of water over it, extends east-northeastward, 300 yards from the northeastern end of Long island, and there is a depth of 15 feet at about 200 yards off the southeastern coast of this island, but near the middle the shoal water extends off more than 400 yards.

Ariege bay, or Southern arm (locally Belyy bay), extends south-southwestward nearly 3 miles from the eastern end of Long island and thence south-southeastward 3 miles farther; a group of islands and rocks, within which there is no passage, forms the eastern entrance to this arm, which is about $\frac{1}{2}$ mile wide for 3 miles, when it narrows, and expands again into two basins, with good anchorage in 8 to 10 fathoms of water.

Cailloux islet, lying eastward 1,200 yards from the southwestern end of Long island, is low, flat, and covered with grass in summer. Shoal water extends about 300 yards from the northeastern side of the islet.

Directions.--Pass southeastward of Brent islands and keep in mid-channel: Cailloux islet in line with a low wooded point on the mainland, bearing about 215° , leads clear of the shoals extending along the eastern side of Long island: the low point is, however, somewhat difficult to make out.

Anchorage has been obtained in 8 fathoms of water, mud bottom, with the southwestern end of Long island bearing 332° , distant about 1,200 yards. The inner anchorage in Ariege bay, off the mouth of Salmon river, affords good holding ground in about 5 fathoms, mud bottom. It is approached between Devarenne island, on the northwestern side, and Paul and Charles islands, on the southeastern side.

Isabel island and several small islands extend off the southwestern shore of Hare bay northeastward of Southern arm. Demétre island, the northernmost of these islands, lies $1\frac{2}{10}$ miles northward of Isabel island, and all the area inclosed by them appears to be shallow and foul.

Indre point lies eastward $1\frac{3}{4}$ miles from the northeastern end of Isabel island, and it is 52 feet high.

Indre shoal, bearing 55° , distant $\frac{1}{2}$ mile from Indre point, has $1\frac{1}{2}$ fathoms of water over it, and $3\frac{1}{2}$ to $4\frac{1}{4}$ fathoms at the distance of 200 yards between the directions northeastward and southeastward from it.

Little arm lies between Indre point, and the land southward of it, and the northern part of MacGray island, the middle of the western side of which is almost connected with the mainland. The arm extends southward about 1,300 yards, and it affords anchorage near its head in 11 to 13 fathoms, but it is open northward.

Shoals.--Several islets and much foul ground lie around the northern end of MacGray island. There is a shoal of 4 fathoms in Little arm, bearing 270° , distant 450 yards from the northern extremity of MacGray island. Nu or Bare islet bears 83° , distant 300 yards from the same point of the island, and a reef extends westward 200 yards from the islet. Foul ground, with 9 feet least water over it,

extends eastward 400 yards from Johnson point, the eastern point of the northern part of the island.

Spring island, northward 1,100 yards from Nu islet, is 900 yards long in an easterly and westerly direction, about 400 yards wide, and 79 feet high. Two rocks above water lie within a cable of its southern side, and a reef extends 300 yards off its eastern end.

Great arm, the entrance of which is between Johnson point and La Source point, at about 1,300 yards to the southeastward, extends southwestward about 1,600 yards, and though open to northeasterly winds it affords on the southeastern side, at about 800 yards within the entrance fair anchorage with offshore winds in 6 to 8 fathoms of water. The bottom is uneven, and as there is a shoal, with $3\frac{3}{4}$ fathoms of water over it, at 133° , 600 yards from Johnson point and in the middle of the entrance, keep rather on the southern side when entering. Shoal water and some rocky patches of 4 to 5 fathoms extend $\frac{1}{2}$ mile northward from La Source point.

La Source or Spring inlets are three small arms, having shallow water, at the head of Great arm.

Tides.—It is high water, full and change, in La Source inlets at 6h. 57m.; springs rise $4\frac{1}{2}$ feet, neaps $1\frac{1}{4}$ feet.

The coast between La Source point and Maiden point, at 2 miles to the eastward, is bordered by islets and rocks for nearly $\frac{1}{2}$ mile off it; Goelands islet, the westernmost, bears 56° , distant 800 yards from La Source point.

Jehenne shoal, bearing 75° , distant 700 yards from the northern end of Goelands islet, has 9 feet water over it. This coast should not be approached within 1 mile.

Duchayla rock, bearing 340° , distant $1\frac{5}{10}$ miles from Maiden point, has 9 feet water over it. Caution is necessary to clear this rock when entering Hare bay; Deaths Head island, open eastward of Maiden point, bearing 135° , leads about 1,600 yards southwestward of the rock.

Maiden arm (havre de la Tête de Mort) is entered between Maiden point and Deaths Head island, which island bears about 130° , distant 1,300 yards from the point, and is a bare rock 56 feet high, steep-to, except on its southwestern side off which a reef extends 300 yards; Starboard island lies on the western side of the entrance, and southeastward about 150 yards from the southern point of Maiden point headland.

Port island, southwestward about 400 yards from Deaths Head island, is separated from the mainland by a channel 50 yards wide, with 13 feet water in it.

The harbor extends southwestward 1,400 yards within Port island to Elbow point, where it branches into two bays, the northern of which is shallow.

There is anchorage in an area rather over 200 yards across, westward of the point, in 7 fathoms of water.

The coast between Port island and Cow point, southeastward $2\frac{1}{10}$ miles, forms several coves open northeastward, but affording good shelter to boats from offshore winds.

An islet lies about 100 yards southeastward of the eastern part of Port island, and at 88° , distant 135 yards from the eastern end of this islet is Thistle shoal, which has $1\frac{1}{2}$ fathoms water over it.

Cow point, the turning point of the mainland at the southwestern entrance to Hare bay, is rocky, covered with grass, and rises to a summit 135 feet high close inshore.

Cow Point shoal, with $2\frac{1}{2}$ fathoms water over it, bears 150° , distant about 200 yards from this point.

Tidal streams.—Northward of Cow point the flood stream runs generally west-northwestward, and the ebb east-southeastward. Eastward of this point and about the Fichot islands, the flood stream runs westward, and the ebb eastward.

Fichot islands.—Little Cormorandier island, the northern of this group, whose summit bears 40° , distant $2\frac{1}{10}$ miles from Cow point, is about $\frac{1}{4}$ mile long in a northeasterly and southwesterly direction, nearly 200 yards wide, 95 feet high, clifty and steep-to except at its northern end, from which low rocks extend northward nearly 400 yards.

Great Cormorandier island, 1,600 yards in an east-northeasterly and south-southwesterly direction, with a greatest width of 600 yards, is 174 feet high and separated from the southeastern side of Little Cormorandier by a passage 450 yards wide, in the middle of which is a rock with 10 feet of water over it.

Pirogue shoal, bearing 285° , distant 300 yards from the northeastern end of the islet close northeastward of Great Cormorandier island, has $4\frac{1}{4}$ fathoms over it.

Legendre shoal, bearing 243° , distant 500 yards from the southwestern end of Little Cormorandier island, has 6 fathoms of water over it.

Pigeon island, a small clifty rock, is separated from the southern side of Great Cormorandier by a channel 100 yards wide, in which there are 5 to 6 fathoms water.

Great Cormorandier rock, bearing 81° , distant 450 yards from the eastern end of Pigeon island, has 5 feet water over it. The summit of St. Julien island, open eastward of Fichot islands, bearing 206° , leads eastward of the rock.

Melier islet, bearing 190° , distant 550 yards from the western extremity of Great Cormorandier island and in the passage between that island and Great Verdon island, is a black rock with a reef extending westward nearly 200 yards from it.

Melier rock, bearing 130° , distant 200 yards from Melier islet, has $4\frac{1}{4}$ fathoms water over it; and Melier shoal, bearing 100° , distant 400 yards from Melier islet, has $5\frac{1}{2}$ fathoms water over it.

Great Verdon island, southward, $\frac{1}{2}$ mile from the western end of Great Cormorandier island, is 121 feet high and nearly steep-to around.

Little Verdon island, southward, 335 yards from Great Verdon island, with a clear channel between, is 72 feet high and also nearly steep-to.

Massacrè islet, bearing 256° , distant 1,250 yards from Melier islet, is a bare rock; there is a patch at about 100 yards eastward of the islet with $3\frac{1}{4}$ fathoms of water over it.

Massacre rock, bearing 162° , distant 300 yards from Massacre islet, has 5 feet least water over it.

Monk islet, bearing 222° , distant $\frac{3}{4}$ mile from Massacre islet, is a bare rock lighter in color than Massacre islet.

Monk rock, bearing 73° , distant 990 yards from Monk islet, is awash at low water.

Little Monk rock, bearing 50° , distant 200 yards from Monk rock, has 13 feet water over it.

Ship shoal, bearing 280° , distant 1,200 yards from Monk islet, has $4\frac{1}{2}$ fathoms water over it.

Corlet shoal, bearing 4° , distant 600 yards from Monk islet, has $6\frac{1}{2}$ fathoms water over it.

Northeast island is in two parts, which together are $\frac{3}{4}$ mile long, in a northerly and southerly direction, and from 200 to 500 yards wide. Le Câlâs, the northern part, has shoal water extending northward 150 yards from it, leaving a passage about 100 yards wide, with deep water between it and Little Verdon island. The eastern coasts of both parts are nearly bold-to, and that of the southern part rises abruptly from cape Croix to a remarkable dome-shaped hill 177 feet high.

Beacon.—The hill within cape Croix has a beacon on it.

Fichot island, the largest of the group, is $1\frac{1}{4}$ miles long, in a northerly and southerly direction, about $\frac{9}{16}$ mile wide, but of irregular shape; its western coast, which rises steeply to the height of 194 feet, is steep-to.

Fichot harbor, lying between Fichot and Northeast islands, is entered by two passages: from the northwestward between Watering Cove point and Frommy island, and from the eastward by Flago pass, between Northeast island and the southeastern part of Fichot island, in which pass there is a depth of 8 feet. This harbor is only available for small vessels as the channel is narrow, the turns sharp, and the anchorage shallow and limited; there is a flagstaff on each

entrance point. It is necessary to have a pilot or local knowledge to enter or leave this harbor.

Tides.—It is high water, full and change, at Fichot harbor at 6h. 58m.; springs rise 4 feet.

Madame island is the northeasternmost of a group of islands, nearly joined to one another and the mainland, situated on the western side of Fichot channel.

Repisse shoal, bearing 2° , distant 400 yards from Madame island, has 3 feet water over it, and is near the end of a ledge, part of which uncovers, extending $\frac{1}{4}$ mile from Madame island.

Four harbor, southward $\frac{1}{2}$ mile from Cow point, is only suitable for small vessels that can anchor in a space 300 yards long and 200 yards broad in 5 to 6 fathoms water, or moor in an arm, 100 yards wide, extending southwestward about 700 yards from the anchorage. The entrance points are 200 yards apart, but the clear channel between the shoals off the points is only 100 yards wide.

Tides.—It is high water, full and change, at Four harbor at 7h. 5m.; springs rise 4 feet.

Virgin shoal, bearing 133° , distant 300 yards from the northern entrance point of Four harbor, has 7 feet water over it, and is steep to on its northern side. The southern hill on Fichot island open northeastward of Madame island, bearing 119° , leads northeastward of this shoal.

Virgin bay is southeastward of Four harbor and separated from it by a peninsula.

Little Islets harbor, southwestward of Madame island, lies between English island and the peninsula southeastward of Virgin bay, off which shoals extend a short distance.

Little Madame island is in the entrance to the harbor, and the only passage in is on the northwestern side of that island; it is clear in mid-channel and 50 yards wide. The harbor, suitable for small vessels, is 300 yards long and 200 yards wide, with anchorage in 13 feet water between the two northern fishing stages on its western side.

There is a flagstaff on the northern entrance point.

Fichot channel is between Madame and English islands, on the western side, and Fichot island, on the eastern side, and its width is 1,100 yards.

Midchannel rock, bearing 286° , distant 650 yards from the southernmost point of Fichot island, is awash and the sea always breaks on it; there is a good passage on either side of the rock, the nearer one to Fichot island being the wider.

Bruyantes rock, eastward 300 yards from English island and 267° , distant 400 yards from Midchannel rock, is awash and the sea nearly always breaks on it.

Louis Lemaire shoal lies 200 yards southeastward from the eastern end of English island, and has 6 feet water over it.

A patch of $4\frac{1}{4}$ fathoms bears 135° , distant 465 yards, and a patch of $4\frac{3}{4}$ fathoms bears 160° , distant 465 yards from the eastern end of English island.

Leading mark.—Massacre islet, its own breadth open westward of Fichot island, bearing 9° , leads between Midchannel rock and Fichot island.

Chasseurs island, southward of the western part of English island, is separated from it by a channel 200 yards wide, with 6 fathoms of water in its middle. A rock lies southward of English island, with the northern point of Chasseurs island bearing 258° , distant 400 yards.

Gros-plomb islet lies close southwestward of Chasseurs island. Double island, southwestward 700 yards from Chasseurs island, rises to two hills nearly joined at the base.

Sournoise shoal, bearing 133° , distant 665 yards from Chasseurs island, has 13 feet water over it. The eastern side of Madame island, open eastward of English island, bearing 4° , leads eastward of this shoal.

Great islets harbor (locally White's arm) may be recognized by the peaks of Great Buse, 531 feet high, and Little Buse, 384 feet high, situated on the south side of the harbor. The entrance, southward of Double island, is 800 yards wide to Jehenne point, which is bare and steep. The harbor extends westward a little more than 1 mile to River point, where it turns southwestward in an arm nearly 200 yards wide, which has depths of $4\frac{1}{2}$ to $3\frac{1}{4}$ fathoms and is navigable for $\frac{1}{4}$ mile.

Chabert island, 400 yards northwestward of Double island, and nearly joined to the northern shore, shelters the usual anchorage, which is westward of it in 12 fathoms of water, mud bottom. North-eastward of River point is an island joined to the mainland at low water, southwestward of a shallow cove. Off the southern shore of the harbor are two small islets, about 800 yards apart.

The shores of the harbor are nearly steep-to, and the harbor is clear to the anchorage westward of Chabert island, or to that available for small vessels, in $3\frac{1}{2}$ fathoms water, within River point. On Grelins point, the southern point of a little cove on the western shore of this anchorage, a small vessel may be careened and repaired.

The peak of Little Buse, bearing 248° , distant 1,200 yards from Jehenne point, and that of Great Buse, bearing 229° , a little more than 1 mile from the same point, are good marks.

Tides.—It is high water, full and change, at 7h. 22m.: springs rise 5 feet. The streams are very irregular.

The coast.—Enragée point bears 166° , distant $1\frac{1}{2}$ miles from Jehenne point, the coast between being high, steep-to, and indented by several deep open coves.

Goose island, bearing 202° , distant 1 mile from Enragée point, is 98 feet high, cliffy in parts, and barren and lighter in color than the coast in its vicinity.

Great Goose harbor, immediately southwestward of Goose island, is only available for very small vessels, and the holding ground is bad.

Baleine rock bears 100° , distant 250 yards from the southern entrance point of the southern entrance into Great Goose harbor; it dries 5 feet, and a ledge on which there is only 3 feet water extends west-southwestward 200 yards from it.

Little St. Julien harbor entrance is situated westward of Little St. Julien point, and south-southwestward, 400 yards from Baleine rock, and the harbor extends 850 yards nearly south-southwestward, with a width of 150 yards at the entrance, narrowing gradually to the head. Baleine rock and the narrow entrance shelter the fishing vessels, which moor head and stern, in 5 fathoms water, good holding ground, from the north-northeastward, in which direction the harbor is open.

Great St. Julien harbor, southward of Little St. Julien point, is 400 yards wide at the entrance between it and Jeanne point, which is a bluff cliff nearly steep-to on its northwestern side, but having shoal water extend 100 yards northeastward of it. The harbor extends south-southwestward $\frac{1}{2}$ mile, narrowing toward the head.

A shoal lies 100 yards from the western shore, nearly midway between Aurora point (pte a l'Aurore) and the fishing stage southward of it.

This harbor is only suitable as a temporary anchorage for small vessels, which anchor in 5 fathoms water just southeastward of the northern stage on the western shore. Fishing vessels moor head and stern in security, though north-northeasterly winds bring a little sea into the harbor.

St. Julien island, the northeastern point of which bears south-eastward, nearly 1 mile from Enragée point, extends thence south-westward about $\frac{3}{10}$ mile, with a greatest width of $\frac{1}{4}$ mile. The island is barren and rises to two hills, the higher, near the northern end, being 220 feet high. Northwest shoal extends northwestward 150 yards off the northwestern shore at 600 yards from the northeastern point; the western end of the island is continued by islets and shoals, leaving Jeanne channel, which is about 200 yards wide, between them and the shoals off the spur southeastward of Jeanne point.

St. Julien island stands out prominently from the line of the coast, and is a good mark.

Mulou shoal, bearing 30° , distant 265 yards from the northeastern point of St. Julien island, has 3 fathoms water over it, and breaks in bad weather.

Souris rock, awash at low water, lies southward 100 yards and Souriceau rock, with 3 feet water over it, southwestward 100 yards from the islet close southwestward of St. Julien island.

Jeanne channel has a clear navigable width of about 100 yards and is passable ordinarily by vessels drawing less than 13 feet water; from the southward keep near the mainland, until abreast the islets, and then in mid-channel; in vessels of greater draft buoy the passage before taking it. This channel is rendered difficult by the strong tidal streams in it, the flood stream beginning at low water and setting northwestward, and the ebb beginning at high water and setting southeastward.

The coast trends southwestward, $3\frac{1}{2}$ miles from St. Julien island to Groux point and is bold-to; Black or Irish islet, southward $\frac{1}{2}$ mile from Jeanne channel, is a rock, barren and steep-to; Flamands cove, southwestward 1,200 yards from the islet, is quite open, and at about $\frac{1}{2}$ mile farther southwestward is St. Julien peak, 279 feet high, which rises steeply from the coast and resembles the summit of Windy point. Corbeau islet and Petit Rocher lie close to the shore, northeastward 1,800 yards and east-northeastward 600 yards, respectively, from Groux point.

Ice.—In 1903 there were numerous bergs and pancake ice off the coast between Fichot islands and Croc harbor up to June 23.

Croc harbor entrance lies between Groux point and Windy or Barren point, which points bear northward and southward, distant 1,200 yards from each other; the entrance is not easily made out from the eastward.

The harbor within the entrance extends generally westward for $1\frac{2}{10}$ miles and then turns about north-northwestward for 1 mile to its head, le Fond, and from about 800 yards from the northern end of this arm a smaller arm, Epine Cadoret, stretches southwestward to Freshwater creek at its head.

The shore of the harbor from Groux point curves northward to Groux bay, which affords shelter to boats only, and within Bonhomme point, the western headland of this bay, the shore is steep-to except in Fishermans cove at 600 yards westward. This cove, in which there is a fishing establishment, is only suitable for boats.

Observation point, the southern entrance point of Épine Cadoret, is bold-to. About $\frac{1}{2}$ mile up this arm on the western side is Cemetery point, on which stands a large white cross, and just inside the first elbow is Careening point, where vessels can be hove down.

A square-rigged ship can beat into Croc harbor as far as Genille point, but it is better with fresh northerly winds to let go an anchor under foot off Groux point in 18 fathoms water gravel bottom, and wait until the wind moderates or changes direction.

Irish bay, nearly $\frac{3}{4}$ mile wide between Blanche and Windy points, is foul on the southeastern shore from $\frac{1}{2}$ mile southwestward of Windy point to the head; le Muloux, a rock awash, lies 350 yards off the southeastern shore, and la Baleine or Folle rock, 3 feet high, lies off the western shore.

This bay is quite open northward, but an islet, off the fishing establishment at the head of the bay, affords shelter for small craft.

Anchorage may be obtained anywhere in the upper part of the harbor inside of Genille point: vessels-of-war usually anchor off Observation point in 15 fathoms water, and moor. Westerly winds prevail, and when strong, violent squalls come alternately from Epine Cadoret and le Fond, causing great strain and heavy jerks on the cables. Merchant vessels moor, in 16 to 19 fathoms water, between Genille and Observation points, where a little sea comes in with easterly winds, but the squalls with westerly winds are less violent.

The anchorage abreast the watering place in le Fond is insecure during southerly winds.

Tides.—It is high water, full and change, in Croc harbor at 7h. 4m.: springs rise $4\frac{1}{2}$ feet. The streams are strong enough to keep a vessel tide rode in light breezes.

Water.—Water and wood can be easily obtained.

Ice.—Croc harbor freezes solid in December, and breaks up in May, early or late according to the season.

Windy point rises to a barren hill, 404 feet high, with whitish rugged slopes; it is not easy to distinguish from the northeastward, though prominent from other directions. Observatory islet, low and steep-to, lies close southeastward of this point.

Beacon.—There is a beacon on the summit of the hill bearing 226° , distant 735 yards from Windy point.

Gray islands.—**Groais island**, situated southeastward at a distance of 7 miles from Windy point, is clifty and thickly wooded, nearly flat in outline, and high enough to be seen from a distance of 40 to 50 miles. Islets and rocks extend from its northwestern point, which should not be approached within $1\frac{1}{2}$ miles.

The Sisters, two steep rocks, lie off its northeastern point, and the rest of the coast is so steep that there is no place of shelter even for boats and few where one could be hauled on shore.

Bell island (Belle île du petit Nord) lies southward from Groais island and is separated from it by a clear channel, $5\frac{1}{2}$ miles wide. This island is high, flat, and steep-to, except on the shores of a bay on its southwestern side. Northeast rock (île à Herpin), $\frac{1}{2}$ mile off

its northeastern point, is a barren islet, with several rocks between it and the shore.

L'Epervier rock is situated northeastward, distant a little more than $\frac{1}{2}$ mile from Northeast rock, and has 10 feet of water over it.

Green island lies near the coast at 1 mile northward of point Billard, the southwestern point of Bell island, and a rock, with 2 feet of water over it, bears 276° , distant 900 yards from Green island. The southern end of Groais island opens westward of Bell island, bearing 26° , leads westward of the rock.

Boulonnaise rock, part of which uncovers at low water, bears 153° , distant $\frac{1}{2}$ mile from point Billard, and bearing 237° , distant $\frac{1}{4}$ mile from the same point, is a rock with 7 feet of water over it.

Rocky bay is in the middle of the southwestern coast, and in it small vessels and boats shelter inside a cluster of rocks and islets. It is the only place of shelter in Bell island.

Red islet, or South rock, the southernmost of the cluster, bears 206° , distant $2\frac{1}{10}$ miles from point Lamy, the southern point of Bell island. It is about 300 yards in extent and 33 feet high.

Red rock, with less than 6 feet of water over it, lies southwestward about 400 yards from the islet. Two patches of $4\frac{3}{4}$ fathoms each bear 329° , distant 1,200 yards, and 7° , distant 1,800 yards, respectively, from the islet.

Isle aux Canes, southward 800 yards from the eastern entrance point of Rocky bay and the largest of the cluster, is low with a round hillock covered with grass in summer. It is surrounded by rocks, of which the outer ones to the westward are Bara rock, with 10 feet of water over it, bearing 229° , distant $\frac{1}{2}$ mile from the western end of the isle, and a rock, with 5 feet of water over it, 282° , 800 yards from the middle of the isle.

A ledge, with $3\frac{1}{4}$ fathoms of water over it, extends 220° , nearly a mile from isle aux Canes, and should be avoided, as there may be shoaler water in the vicinity.

A patch of $4\frac{3}{4}$ fathoms bears 175° , distant $\frac{3}{4}$ mile, and a patch of $2\frac{3}{4}$ fathoms 113° , distant $\frac{1}{2}$ mile, from the isle.

Anchorage may be obtained in Rocky bay in $2\frac{1}{2}$ fathoms water, sand bottom, passing a sufficient distance westward of isle aux Canes to avoid the rocks.

The French vessels, fishing off Bell island, moor in Southwest harbor inside a group of rocks that forms the western entrance point of Rocky bay; but fine weather and an experienced pilot are required to use this anchorage.

The coast southwestward of Windy point is high and steep for 2 miles to Million cove, where there is a fishing settlement, but the cove is open to the eastward and affords indifferent shelter even for boats.

Pilier bay, south-southwestward 3 miles from Million cove, and on the northern side of Cape Rouge peninsula, is completely open to the eastward, and a bad anchorage.

The coast of Cape Rouge peninsula is bold-to.

Pyramid point, the northeastern extreme of Cape Rouge peninsula, is a pyramidal rock, close southeastward of which is a low reef, separated by a narrow boat passage. In Pilier cove, at about 600 yards westward of Pyramid point, is a natural excavation supported by a pillar, from which the cove derives its name.

Cape Rouge, the southeastern extremity of Cape Rouge peninsula, rises at a short distance westward to a peak 492 feet high.

Truite point, the southwestern end of the peninsula, is the northern entrance point of Cape Rouge harbor, and the settlement is immediately northward of it. The shore of the harbor trends north-northwestward and northward nearly 2 miles from Truite point to the isthmus, which is about 850 yards across.

Frauderesse point, the northeastern end of Conche peninsula, situated southward, distant 1,400 yards from Truite point, is fringed by rugged and curiously shaped rocks. A shoal extends nearly 300 yards off the point, and shoals lie off the northern coast of Conche peninsula, which trends west-southwestward $1\frac{1}{2}$ miles from the point to the isthmus; the shoals extend nearly $\frac{1}{4}$ mile northward from a white cross on point Dos de Cheval.

Cape Rouge harbor, situated between Cape Rouge and Conche peninsulas, is divided into Biche arm and Southwest bay. The western or mainland shore of the harbor is steep-to and nearly straight; Priest cove is a small bend in it opposite the harbor entrance.

Biche arm affords secure anchorage, easy of access with any wind. The best position is in 15 fathoms of water, mud bottom, good holding ground, off a remarkable cascade on the western shore and northward of Partridge point, which is low and grassy. Shoal water extends about 200 yards off the shore northward of Partridge point.

Southwest bay (locally Cruce harbor) has Souris or Champ Paga shoal, the only isolated shoal in Cape Rouge harbor, in the middle of its entrance; this shoal is the summit of a bank of rock about 300 yards in diameter, over which there is a least depth of 6 feet of water. Cod-pile (a little peaked rise on the hills northwestward of Conche harbor) in line with the northern fishing stage, bearing about 226° , leads northwestward; the northwestern point of Bell island well open northeastward of Frauderesse point, bearing 130° , leads northeastward; and the northern point of Rouge island in line with Frauderesse point, bearing 102° , leads southward.

The northwestern end of Groais island in line with Gonde point, which is about 600 yards south-southwestward of cape Rouge, bearing

70°, leads between Souris shoal and the shoals off point Dos de Cheval.

Beacons.—A cross and a pyramidal beacon on Dos de Cheval point in line leads over Souris shoal.

Anchorage may be obtained near the head of the bay in 12 to 16 fathoms of water, but with only fair holding ground, gravel and mud bottom. Vessels with good ground gear hold on well through the heavy squalls that prevail with westerly winds and the little sea caused by easterly winds.

Tides.—It is high water, full and change, at Cape Rouge harbor at 7h. 0m. (approximate); springs rise 6 feet, neaps 4 feet.

Ice.—Cape Rouge harbor fills with northern ice and freezes; the ice breaks up in May, early or late according to the season.

Rouge island, bearing 100°, distant 3¼ miles from Frauderesse point, is 800 yards long, 350 yards wide, steep-to, and is composed of red rock covered with grass at the top.

The coast of Conche peninsula from Frauderesse point trends south-southwestward 3¼ miles to cape Fox, and it is steep-to, but islets and rocks extend 200 yards off cape Fox, its southern end.

Conche harbor stretches northward 2¾ miles on the western side of Conche peninsula, and it is 1½ miles wide at its entrance, diminishing gradually to its head; the fishing establishments, off which the fishing vessels moor head and stern, are situated at Stage and Silver coves, about 1½ miles northward of cape Fox.

The shore of the harbor from cape Fox to Silver cove is obstructed by nets during the fishery season.

Silver cove is immediately northward of Stage cove and between Silver and Latin points, which bear north-northwestward and south-southeastward, distant 700 yards from each other. The water is shallow for about 200 yards off its shores, and a patch about 30 yards in diameter, with 5 fathoms water over it, and 7 fathoms around, bears 350°, distant 350 yards from Silver point. Silver city, the settlement around the coves, has about 250 inhabitants, and there is a church and a priest's house.

Anchorage.—There is good anchorage off the southwestern village on the northern side of Conche harbor, in 7 to 12 fathoms water (not less than the latter depth for large vessels), with Silver city church bearing 113°; also for small vessels in Silver cove in about 9 fathoms, sand: large vessels anchor off the cove clear of the 5-fathom shoal.

Communication.—The steamer from Tilt cove calls at Conche harbor weekly during summer and autumn.

Supplies.—Fresh mutton and vegetables can usually be obtained.

Martinique bay, on the northwestern side of the head of the harbor, is open to the eastward and southward; the holding ground is said to be good and vessels manage to hold on there in the fishing

season; the anchorage off this bay is in 10 to 14 fathoms water. Southerly winds blow right in with great violence.

Ice.—Conche harbor fills in with northern ice and freezes; the ice breaks up in May, early or late according to the season, but it has happened that heavy pans of ice almost entirely blocked up the small anchorage in Silver cove at the end of June.

The coast of the mainland from the shore of Conche harbor westward of cape Fox trends south-southwestward nearly 6 miles to Boutitou point.

La Vache gare, a large pale yellow patch on the coast, bears 257° , distant 3 miles from cape Fox, and Vache Gare cove, a slight indentation in the coast, lies close northward of it.

Hilliers harbor (havre de Boutitou) extends northwestward 1,200 yards immediately westward of Boutitou point, with a width of $\frac{1}{4}$ mile. It is difficult to make out from the northeastward, but there are three parallel gaps in the cliffs that resemble a ship under sail close to the coast, the southern of which is Boutitou point. The harbor is open southeastward, but a cove in its northeastern shore affords shelter to three or four vessels in 6 fathoms water, moored head and stern, along its southeastern side. Dolo point is the southeastern entrance point of the cove, and there is a flagstaff on the northwestern entrance point.

Tides.—It is high water, full and change, at Hilliers harbor, at 7h. 2m.

Boutitou shoal, on the western side of the southern approach to Hilliers harbor bearing 195° , distant $\frac{3}{4}$ mile from Boutitou point and 400 yards off the coast, has 7 feet water over it.

The coast from Brown Rock point, which bears 202° , distant nearly a mile from Boutitou point, trends southwestward, $3\frac{1}{2}$ miles to cape Daumalen. It is fairly bold, but Rock island and Dog shoal lie within 400 yards of it at about a mile southwestward of Brown Rock point.

Canada bay (baie des Canaries) entrance is between cape Daumalen and Canada head, which bear south-southwestward and north-northeastward, distant 2 miles from each other. Within the entrance Bide arm and Chimney bay stretch northward, and Canaries and Gouffre harbors are on the southern shore.

Light.—A fixed white light is exhibited from a lantern hoisted on a white open framework near cape Daumalen from June to December.

Grevigneux or Englee island lies close westward of cape Daumalen headland; it is about 150 feet high and partly wooded. Aiguillettes island, joined to the southeastern part of Grevigneux island by a sand bank, is wooded and steep.

Aiguillettes harbor, between Aiguillettes island and the mainland, is only suitable for small craft.

Aiguillettes rock, bearing 116° , distant 850 yards from White point, the southern end of Grévigneux island, is small and has 13 feet water over it; there is deep water around the rock and the sea breaks on it during strong westerly winds.

The cascade on the western shore of Canada bay open southward of White point leads southward of Aiguillettes rock.

Grévigneux harbor, northeastward of the northern end of Grévigneux island, is so small that it is available for only one moderate sized vessel, when clear of fishing craft.

Communication.—The steamer from Tilt cove calls at Grévigneux harbor weekly during summer and autumn.

Supplies.—A small supply of fresh provisions can be obtained here.

Bide arm extends northward 5 miles from Grévigneux island, with an average breadth of 600 yards, and affords the best anchorage in Canada bay in heavy weather.

Hermit rock bears 29° , 650 yards from Grévigneux point, the northern point of Grévigneux island, and 200 yards off the eastern shore of this arm; it has 6 feet water over it.

Bide shoal, on which the least water is 4 feet, stretches 200 yards off the western shore at $\frac{1}{4}$ mile northward of Miot point, which is situated $3\frac{1}{2}$ miles within Grévigneux point.

The Watchers, rocks awash, and the Turtles, rocks dry at low water, lie between Lard point, the northwestern entrance point of the arm, and Milan point, a prominent point on the western side at about 1,200 yards within the entrance, and the shoal water around these rocks extends nearly 300 yards offshore.

Anchorage.—The water in Bide arm is deep for 2 miles northward of Lard point; within this distance there is anchorage, but it is safer to anchor at 3 miles inside the entrance, in 9 to 13 fathoms water in the middle of the arm, or to proceed beyond Bide shoal, and there is also sheltered anchorage in the basin at the head in 11 fathoms water, but vessels must not swing within 200 yards of the shore.

Directions.—Pass about 400 yards westward of Grévigneux island, then steer about north-northeastward for Wooded point. When abreast Stony point and 300 yards off it, keep in mid-channel till near Miot point, after which keep about 200 yards off the eastern shore till past Bide shoal, and then again in mid-channel.

Tides.—It is high water, full and change in Bide arm at 6h. 37m.; springs rise $5\frac{1}{4}$ feet, neaps $1\frac{1}{2}$ feet.

White islet lies southwestward, distant 800 yards from Lard point, and is conspicuous from its color. Northeastward of it, at a distance of 200 yards, is Flat islet, and there is a passage between these islets and Lard point.

Herring shoal, bearing 198° , distant 400 yards from White islet, has $2\frac{3}{4}$ fathoms water over it.

Cod rock, bearing 186° , distant 800 yards from White islet, has 12 feet water over it.

Milan point, open eastward of Lard point, bearing 20° , leads eastward; and the southern summit of the Chimneys or Cloud hills, open westward of Green islet, bearing 335° , leads southwestward of Cod rock and Herring shoal.

Clark rock lies in the fairway to Chimney bay, with White islet bearing 89° , distant 1 mile, and has 19 feet water over it. Green island, shut in by Fly point, bearing 359° , leads westward of this rock.

Wolf shoal, bearing 161° , distant $\frac{1}{2}$ mile from Marten point, which lies northwestward $1\frac{1}{10}$ miles from the southwestern point of Lard point promontory, has 3 feet water over it; some banks with $3\frac{3}{4}$ and $4\frac{1}{2}$ fathoms water over them extend northwestward 500 yards from this shoal. White point in line with the western side of White islet, bearing 143° , leads southwestward of Wolf shoal and the banks.

Chimney bay.—The western arm of Canada bay (the name Chimney is not used locally) extends northward, 6 miles from abreast Marten point, where it is 1,700 yards wide, to Weymouth point, which is low and wooded. The arm, which has a least width of 535 yards, opens northward of Weymouth point into a bay of some extent, and from this bay Northeast and Beaver arms continue northward, and Castor cove south-southwestward, while from the head of Castor cove Northwest arm runs northwestward about 5 miles.

Marten rock, bearing 307° , distant 550 yards from Marten point, is awash at low water. The eastern point of Grevigneux island in line with Lard point, bearing 127° , leads westward of the rock.

Fly point lies westward, distant 1,700 yards from Marten point, and a rock that covers bears 206° , distant $\frac{1}{4}$ mile from Fly point and nearly 200 yards offshore.

Cabin point, on the eastern shore $2\frac{1}{2}$ miles northward of Marten point, is low, flat, and fronted by rocky ledges that dry at low water. It should not be approached close-to.

Otter cove lies on the western shore northwestward of Green island, which bears northwestward, distant $1\frac{1}{4}$ miles from Marten point. Anchorage can be obtained in the middle of this cove in 8 fathoms, sand and mud bottom, but shoal water extends for some distance off its shores.

Bad rock, north-northeastward, $\frac{3}{10}$ mile from Green island and $\frac{1}{4}$ mile off the western shore, is a small rocky islet; foul ground extends about 200 yards eastward from it.

Shoal.—A shoal extends northeastward 300 yards from the western shore of the arm about 600 yards northward of Bad rock.

Grosse point, opposite Cabin point and nearly a mile northward of Bad rock, contracts the channel to a width of 500 yards, but it is clear excepting the ledges close to Cabin point. There is good anchorage in 18 fathoms, mud bottom, at a point bearing 160° , distant 700 yards from Grosse point.

Between Grosse and Weymouth points the arm is clear and deep beyond a distance of 300 yards from its shores, and there is good anchorage at $\frac{3}{4}$ mile northward of Cabin point in 11 to 13 fathoms, bottom mud, toward the western side.

Weymouth point is low, and wooded to the water's edge. Weymouth cove, immediately northwestward of it, extends nearly $\frac{1}{2}$ mile in a southwesterly direction and is surrounded by foul and rocky shores. Between the northern entrance point of this cove and Old House point, $1\frac{1}{10}$ miles farther northward, there are several shoal patches which extend more than halfway across the arm abreast Chaine point. Therefore keep the eastern side aboard.

Chaine point, on the eastern shore, 1,700 yards northeastward of Weymouth point, is flat and wooded. Foul ground extends southwestward over 200 yards, and northeastward $\frac{1}{4}$ mile from it, and a bank, with depths of 6 to 11 fathoms over it, mud bottom, stretches across the channel abreast of it. There is good anchorage in 12 fathoms in the eastern part of Dowers harbor, which is northeastward of Chaine point, but the space with depths over 5 fathoms is only about 350 yards across.

Scott point, northward, 1,200 yards from Chaine point, is low, and rocky shoals extend 300 yards off its southern side. A narrow cove runs northeastward about 1,200 yards from immediately southeastward of Scott point, but its greater part is filled with shallows of sand and mud.

Old House point forms with Scott point the termination of the channel leading to the open water space at the head of Canada bay. A quarter of a mile southeastward of it, on a low sandy point, there is a small wharf, behind which are a few buildings occupied by settlers, who are engaged in salmon fishing and trapping in the neighborhood.

A shoal of black mud, having a depth of 7 feet over its outer end, extends northeastward for $\frac{1}{2}$ mile, and northward for nearly the same distance off this point, forming two prongs with 4 to 6 fathoms of water between them.

Tenedos rock, bearing 49° , distant 1,200 yards from Old House point, has a least depth of 6 feet over it. Between it and the shoal extending from that point there is a clear channel 600 yards wide.

Beacons.—A beacon stands on the northern extremity of Drummond island, and another on the mainland northward of it. These beacons in line, bearing 337° , lead in mid-channel from northward of

Chaine point between Tenedos rock and the shoal off Old House point.

A wooden, triangular-shaped beacon stands on the southern extremity of Drummond island and a similar beacon on the middle of Fane island. These beacons in line, bearing 303° , lead southwestward of Tenedos rock and northeastward of the shoal off Old House point.

Northeast arm affords good anchorage in 8 to 10 fathoms northeastward of Zephyr rock, or in 12 to 15 fathoms between that rock and the western shore, but the latter position is open to southerly winds, which occasionally blow up the bay with some strength. A considerable stream flows into the head of Northeast arm.

Zephyr rock, bearing 337° , distant $\frac{1}{4}$ mile from Adamson point, is awash at low water. Two small patches, with depths of $\frac{1}{2}$ fathoms on them, lie northeastward from this rock, distant 800 yards and 1,200 yards respectively from it.

Adamson point lies northward, 2,100 yards from Scott point, and the promontory, of which it is the end, is very foul on its northeastern side; bearing 57° , distant 600 yards from the point, is a small detached patch which dries. The southern end of Fane island, open northwestward of the trees on the northern end of Drummond island, leads northwestward of the patch.

Drummond island, northward, 900 yards from Old House point, is clear on its southern and southeastern sides, but shoal water extends 300 yards from its eastern and northeastern sides. There is a narrow channel with depths of $\frac{1}{2}$ to 6 fathoms between the northern end of the island and the mainland.

Fane island, westward, 700 yards from Drummond island, is clear off its southern end, and shoal water extends but a short distance off its eastern and western sides. A stony spit, with depths of 1 to 2 fathoms over it, reaches nearly to the mainland from its northern end. Between Fane and Drummond islands the water is too deep for anchorage.

A small shoal bears 297° , distant $\frac{1}{2}$ mile from the southern end of Fane island, and has 4 fathoms water over it.

Beaver arm entrance is northward of Fane island and the shoals extending northward from it, and the arm extends northeastward for $1\frac{1}{16}$ miles with a width varying from 300 to 700 yards. There is anchorage in the middle of the arm in 8 to 9 fathoms, but its narrowest part is partly barred by a spit, with a depth of 21 feet over it, extending from the southeastern side. Foul ground stretches about 650 yards from the head of the arm, and there is a rock, 1 foot high, at its southwestern end. A stream runs into the head of the arm, constant netting of which has considerably reduced the number of salmon going in.

Beaver cove, in the mainland westward of Fane island, affords the best and clearest anchorage in the northern part of Canada bay in 15 to 17 fathoms, mud bottom.

Castor cove, the entrance of which lies between Old House point and a point bearing west-northwestward, nearly $\frac{2}{10}$ mile from it, extends in a southwesterly direction $1\frac{1}{10}$ miles to its head, where it contracts to a very narrow channel leading into Northwest arm, which extends northwestward for about 5 miles. Castor cove is quite free from danger, but the water is deep, while toward its head strong tidal streams flow from Northwest arm.

Northwest arm is shallow, and much obstructed by islets and rocks. There is a large salt water pond, stretching southward from just within the entrance to the arm, which boats enter at high water, but there is a very strong tidal stream in its narrow mouth.

Tides and tidal streams.—It is high water, full and change, at Old House point, at 6h. 55m.; springs rise 5 feet, neaps $3\frac{1}{2}$ feet. The tidal streams in the upper part of Canada bay are complicated by the large body of water flowing into and out of Northwest arm. When the flood stream is setting northward in the main channel and the water is rising at Old House point, the ebb is still running out of Northwest arm and through Castor cove.

These streams meet between Old House point and Drummond island, forming an eddy, which extends along the western shore to Weymouth cove.

Vessels passing to and from Beaver cove may thus be set toward Tenedos rock.

At the entrance to Northwest arm the stream is rapid, and at springs it is very difficult for boats to get through against it.

The Chimneys or Cloud hills, situated 2 miles inland from Grosse point, are a cluster of remarkable hills with bare rugged peaks, 909 to 1,150 feet high; they are conspicuous from a distance southeastward of Canada bay.

Torrent cove or Hells mouth, southward $1\frac{3}{4}$ miles from Green island, derives its first given name from the cascade falling over high land at the head.

Gouffre harbor (Wild cove) entrance, southward $2\frac{1}{2}$ miles from Torrent cove, is 735 yards wide between Gouffre islet, small, rocky, and difficult to distinguish under the land, situated 100 yards off the western shore, and Gouffre point to the eastward, which is long, low, and surrounded by rocks and shoals, that should be given a good berth. This harbor, which extends south-southwestward, $\frac{1}{2}$ mile, is much frequented, and affords good shelter southward of Gouffre islet, with cape Daumalen just shut in with Gouffre point, bearing 60° , in 13 fathoms water, hard bottom, but fair holding ground.

Fishing vessels moor head and stern in the harbor, though it is open to northerly winds.

Tides.—It is high water, full and change, at Gouffre harbor at 6h. 46m.; springs rise $5\frac{1}{4}$ feet, neaps $1\frac{1}{2}$ feet.

Water is easily obtained from a stream on the western side of the harbor; a stream flows into the head, but a fringe of bowlders renders it inaccessible to boats.

Canaries harbor (or Canada harbor) entrance is between the western point of Canada head and Calvary point, which lie south-eastward $1\frac{1}{10}$ miles from Gouffre point.

Calvary point, faced by white rocky cliffs, rises to a round hill, 128 feet high, on which is a cross. The western point of Canada head bears east-northeastward, 850 yards from Calvary point. In this harbor are the principal fishery establishments of the bay, and there is a sufficient depth for mooring vessels, but the holding ground is bad, and the harbor is completely open to northerly winds, which bring in a heavy sea.

Ice.—Canada bay freezes solid during December and breaks up in May, early or late according to the season. In 1905, there was ice off the mouth of Canada bay on June 13.

Canada head is a conspicuous cliffy bluff, rising gradually southward in rugged hills.

The coast from Canada head trends southward 3 miles to cape Goboso (locally Toulinguet head), and continues in steep and precipitous cliffs, except in Little Canada harbor, a small cove midway between the two headlands, where there are a few huts occupied by fishermen in summer, though there is little protection for boats in strong easterly winds. The land attains a height of 780 feet, about 800 yards west-southwestward of Little Canada harbor, and in cape Goboso summit about 1,600 yards southward, 950 feet.

Cape Tasse lies south-southwestward, $\frac{3}{4}$ mile from cape Goboso, and between them the coast falls back a little, forming a small open bay. A detached rock, with a depth of 6 fathoms over it, lies 200 yards off cape Tasse, and here the coast bends a little to the westward.

Cat cove is a small bight 1 mile southwestward from cape Tasse, and on its shores there are some fishermen's houses and landing stages. It affords fairly good shelter for boats with northerly and northeasterly winds.

The coast from Cat cove continues in high cliffs for 3 miles to Duckbill point. The Sugarloaf, situated about 1 mile southwestward of Cat cove, is a conspicuous peaked cliff rising almost perpendicularly 680 feet from the sea.

Duckbill point, situated west-southwestward, $1\frac{3}{4}$ miles from the Sugarloaf, is bare and rocky, rising to a steep escarpment terminat-

ing the summits of the hills southwestward of cape Goboso. On southwesterly bearings it has a resemblance to the shape of a duck's bill.

Hooping harbor lies immediately westward of Duckbill point, its entrance being nearly $\frac{1}{2}$ mile in width.

Within the entrance the harbor forms two arms—Eastern arm, which extends northward and terminates about $1\frac{1}{2}$ miles northward of Duckbill point, and Northern arm, which extends westward about 2 miles.

The shores are very high and cliffy, except at the head of Eastern arm, where there is a little flat land and a good stream flowing into the bay. Excepting this flat land and that of Duckbill point all the hills are densely wooded with spruce, birch, and maple.

The water in the harbor is deep, and there are no shoals outside the 5-fathom line, which extends about 100 yards off Duckbill point.

A small fishing settlement formerly existed at the head of Eastern arm, but nothing of it now remains beyond a few graves. During summer some fishing vessels frequent this arm, and temporary huts are erected near the stream for dwellings and stores. The place is usually vacated about the end of October.

Anchorage.—Eastern arm affords anchorage in 16 to 20 fathoms, with good holding ground, but it is open southward and strong breezes outside cause such a swell to roll in that it is not recommended. The head of Eastern arm and the mouth of the stream in it have numerous bowlders in them. There is good anchorage at the head of Northern arm off a stony beach in about 22 fathoms, mud bottom. The northern bight in this arm is too deep for anchorage, but small vessels moor to the rocks during summer.

The coast between Hooping harbor and Fourche point (cape d'Argent), which lies 5 miles southward, is composed of steep, high cliffs.

Little Hooping harbor, southward $1\frac{1}{4}$ miles from Hooping harbor, is merely an open bay. There is no shelter from offshore winds, and when these are continuous a heavy ground swell prevails.

Fourche harbor (locally Greenspond) is entered close southward of Fourche point. Its entrance, 1,200 yards wide, lies between Eastern head, a high, cliffy point at 600 yards southwestward of Fourche point, and Granite point, a dark, sloping, rocky point projecting from the high land to the southwestward. It is quite clear of shoals and is fronted by a rocky bank with 20 to 30 fathoms water over it. A patch of 9 fathoms is situated on this bank, bearing 126° , distant 300 yards from Eastern head.

The harbor, surrounded by high, cliffy hills, densely wooded, extends westward for 3 miles inside the entrance, and then, turning

northwestward, continues $\frac{3}{4}$ mile farther in a narrow arm, at the head of which there is a considerable stream.

At 2 miles within the entrance, on the western side of a wooded headland, is Northeast cove, which is small and has around it a few fishermen's houses and landing stages.

Anchorage.—Fourche harbor is everywhere deep, and the only anchorage for other than small craft is a little outside the entrance to the narrow Northern arm and eastward of a grassy flat on the western shore. The depths here are 14 to 20 fathoms, over mud and stones. This position is sheltered from the eastern sea, which often rolls into the outer part of the harbor, but during westerly gales it is subject to violent squalls from the surrounding high land.

Small vessels anchor in Northeast cove in 7 to 8 fathoms.

Directions.—Sailing vessels must enter the harbor with a fair wind, on account of the heavy squalls with westerly winds.

The coast from Granite point trends southwestward $10\frac{1}{2}$ miles to the entrance of Orange bay, and consists throughout of high, steep cliffs, forming in places open bays or coves. In all these, however, the water is deep and no shelter is afforded.

Between 2 and 6 miles from Granite point the coast is fronted by several detached banks with depths of 14 to 20 fathoms over them. Outside these the water is deep.

A heavy northerly swell is frequently experienced on this coast, making landing difficult, and, during strong winds from that direction, impossible.

Robineau cove, the second bight southwestward of Fourche and about $2\frac{1}{2}$ miles from Granite point, has a conspicuous peaked cliff, 1,075 feet high, on its northern side.

Pigeon cove, southwestward $3\frac{1}{2}$ miles from Robineau cove, has a rocky islet, separated by a narrow passage from the land, at its eastern entrance head.

Duggans cove, southwestward nearly 3 miles from Pigeon cove, is a small bight with a stony beach at its head. There is a fishing settlement in Duggans cove comprising several houses and some patches of cultivated land.

Orange bay (or Great Harbor deep) extends west-northwestward 2 miles and then divides into two branches. Soufflets arm running northward, and Pigeonniere arm running westward: Sault cove is the head of the latter arm.

Cats cove, just inside of the northern entrance point of Orange bay, contains a small fishing settlement.

Temporary anchorage may be obtained here in moderate weather or during strong northerly winds, in 20 to 25 fathoms.

Jacques cove, on the southern shore 1 mile inside of the entrance, is a fishing station, but in successive years many vessels that moored there were lost, and it is no longer used as an anchorage.

Soufflets arm extends northward $1\frac{1}{2}$ miles, and then, turning abruptly around Rade point on the western shore, runs westward and northwestward for over a mile to its head. At 1,600 yards westward of Rade point the arm narrows to the breadth of 200 yards between Observatory point and the opposite point to the southward; the navigable channel is here barely 100 yards wide, with a depth of $3\frac{1}{4}$ fathoms, and a spit, dry at low water, extends westward 300 yards from Observatory point.

In entering the head of Soufflets arm, hug the southwestern shore closely. At 400 yards westward of Observatory point the channel opens to the northward into a basin, about 300 yards across, having depths of $5\frac{1}{2}$ to 7 fathoms, but shoal at its head.

Sault cove is at the head of Pigeonniere arm, and its entrance is between Pigeon point lying to the eastward and Plate point lying to the westward. About 300 yards northwestward of Pigeon point, Emeraude shoal with 3 feet of water over it, extends southwestward 200 yards off-shore. The channel between this shoal and Plate point is about 200 yards in width, and rocks border the shore immediately northwestward of Plate point. The anchorage, in 10 fathoms of water, is about 600 yards inside of the entrance, where the cove has a width of 265 yards.

The coast from Orange bay trends south-southwestward, and it consists of high cliffs, wooded in places. Big cove, $3\frac{1}{2}$ miles from Orange bay, is a bight with a conspicuous waterfall; and Devil point (locally Eastern head) at $2\frac{1}{2}$ miles farther south-southwestward, is a rounded, projecting headland, 195 feet high, and covered with scrub.

Union cove (Petites Vaches), running northwestward of Devil point, is $\frac{3}{4}$ mile in extent and, though open southeastward, contains at its head excellent shelter and good anchorage for small vessels, but in an area so limited that it is necessary to moor.

The shores of the cove are high, wooded, and steep-to, and there are no shoals. There is a small fishing settlement at the head of this cove, but it is usually deserted in winter, when the inhabitants resort to winter houses in Little Harbor deep.

The coast of a high wooded headland, which rises in slopes, continues south-southwestward about 1 mile from Union cove to Grandfather head, the northern entrance point of Little Harbor deep.

Grandfather rock (Grandfers) comprises two rocks, 6 feet high, lying 600 yards eastward of Grandfather head. Shoal water extends about 100 yards from Grandfather rock, leaving a good passage between it and the mainland.

Little Harbor deep (Grandes Vaches) entrance is between Grandfather head and Little Harbor Deep head, which bear northward and southward, distant 1,600 yards from each other, and the arm extends west-northwestward for $1\frac{1}{2}$ miles to Net point, where it turns west-southwestward and continues for $\frac{3}{4}$ mile to the mouth of a considerable stream. This last bend of the arm is filled with an extensive shallow flat of sand and mud, on which and also at the mouth of the stream are many boulders.

A few fishermen's huts and stages stand on the northern shore opposite Net point, and farther up, behind a sandy beach, are the houses occupied by these fishermen and by those who come from Union cove in winter.

Shoals.—In the entrance to Little Harbor deep there are several detached patches with depths of 7 to 10 fathoms. Outside of these the water deepens to 20 fathoms, and beyond this depth some patches of 14 to 20 fathoms front the coast at a distance of $\frac{3}{4}$ mile.

Middle ground is a small rocky head of 4 fathoms, situated on one of the above patches, bearing 43° , distant 950 yards from Little Harbor Deep head.

Anchorage.—Though open eastward, there is fairly good anchorage in Little Harbor deep in 11 to 14 fathoms, with Net point bearing between southwestward and west-southwestward and with the northeastern shore distant between 250 and 450 yards. During easterly gales, which throw the heaviest sea on to this coast, this position is sheltered and but little swell rolls in.

Little Harbor Deep head is a bare rocky headland. A rock, bearing 109° , at a distance of 200 yards from its end, has 18 feet of water over it.

White bay, the entrance to which is between Little Harbor Deep head and Partridge point, which lies 15 miles to the east-southeastward, extends south-southwestward for 44 miles, gradually diminishing in width toward its head.

The shores are generally high, rising in steep slopes from the sea, and are densely wooded with spruce, birch, and maple. Several arms and inlets in the bay are easy of access and afford good shelter. White bay is deep, and, excepting Dossenger rock, there are no off-lying shoals affecting navigation. There are small settlements, the inhabitants of which make a scanty living by fishing in most of the harbors, but, as during the past few years the cod fishery has almost failed, these fishermen are, as a rule, in a condition of poverty. A sawmill, worked by water power, has been erected in Sops arms, and a considerable trade in timber is expected in that locality.

Ice.—White bay generally freezes over toward the end of December and remains so, or is obstructed by field ice and bergs, until April or May, but frequently there are bergs in it until July. In 1903 the

entrance of the bay was completely blocked on June 13; the bay was clear of ice on July 6.

Weather.—Easterly winds prevail during summer, and southerly and westerly, with fine clear weather, in autumn. Northerly gales throw a heavy sea into the bay, reaching as far up as Saltwater cove. Fog is common, with light northeasterly and northerly winds, but though occasionally continuing for three days in June and July, it usually lasts only a few hours. Rain is frequent and often of some duration, especially in those arms which are surrounded by high, wooded shores.

Currents.—During moderate weather currents generally run north-eastward along the eastern shore of White bay and nearly southward along the western shore, and the ice drifts almost constantly in these directions; but the fishermen state that a prevalence of strong southwesterly winds sometimes reverses the currents for a short time.

Communication.—The only means of communication with other places is by boat or by a mail carrier who crosses from Seal arm to bay Verte and proceeds thence by boat to meet the weekly mail steamer at Coachman harbor.

The shore of White bay from Little Harbor deep head trends southwestward and continues in cliffs for $5\frac{1}{2}$ miles to Stump point, but the faces of the cliffs are more generally bare and present a whiter appearance seaward than those to the northeastward and southwestward. In the entrance of Pumbly cove, a small bight, at $2\frac{1}{4}$ miles from Little Harbor Deep head and about 400 yards from the shore, there is a rocky head of $3\frac{1}{2}$ fathoms. Elsewhere the shore is fairly steep and fronted by detached banks with depths of 18 to 22 fathoms over them, while the 100-fathom contour line is $1\frac{1}{2}$ miles off.

Little Cat arm extends west-northwestward about $1\frac{1}{2}$ miles from its entrance between Stump point and White point, which are $\frac{1}{2}$ mile apart in a south-southwesterly and north-northeasterly direction. The hills northeastward of the entrance are bare and rocky, while those to the south-southwestward are thickly wooded. The arm is clear of shoals beyond 100 yards from its shores and affords anchorage in 14 to 16 fathoms near its head, sheltered from the sea, but subject to violent squalls from the surrounding hills, which rise to about 1,000 feet and are for the most part wooded with spruce, birch, and maple.

At 1 mile inside the entrance is a bar with depths of 6 to 10 fathoms of water, and within the bar a pool 12 to 18 fathoms deep extends to the head, where two small streams fall from the cliffy hills. On the southern side at a mile inside the entrance the shore forms a small cove, in which there are some fishermen's huts, and off which shoal water of less than 3 fathoms extends for nearly 200 yards.

Bank.—A bank, with 15 to 20 fathoms of water over it, extending $1\frac{1}{4}$ miles in a northeasterly and southwesterly direction, lies about 1 mile eastward of the entrance of Little Cat arm.

The shore.—White point, the southern entrance point of Little Cat arm, is a low bare point extending from the foot of wooded hills, and the shore of White bay thence to Eastern head of Great Cat arm at $1\frac{1}{10}$ miles south-southwestward is clifty, steep-to, and backed by high wooded hills.

Great Cat arm is about 1 mile wide at its entrance between Eastern head and Western head, two clifty points, which bear north-eastward and southwestward from each other. Eastern head is backed by high wooded hills, while the hills directly over Western head are bare and rocky.

At 700 yards west-southwestward of Eastern head is Shoal point, a low flat point with a beach of large stones and bowlders; from this point shoal water extends 300 yards, and farther off there are some detached rocky patches of 2 to $4\frac{1}{4}$ fathoms, the latter bearing 165° , 535 yards from the point. Outside these patches the water quickly deepens to 20 fathoms and upward, and on the southwestern side of the outer shoal the depth of 20 fathoms is distant less than 100 yards.

The western side of the entrance is clear of shoals, but at 400 yards southward of Western head a rocky patch, with a depth of $3\frac{1}{2}$ fathoms over it, lies 300 yards offshore. The contour line of 10 fathoms is 400 yards outside this patch, and depths of 6 to 9 fathoms reach from here to Western head. Southeastward 1 mile from Western head a bank, with 12 to 13 fathoms of water over it, extends north-eastward and southwestward $1\frac{1}{4}$ miles; it is the summit of a long ridge which has depths of 25 to 30 fathoms.

From its entrance Great Cat arm extends west-northwestward $2\frac{3}{4}$ miles, then after bending southwestward for 1 mile it turns sharply northwestward for about $1\frac{1}{2}$ miles. It is surrounded by high hills with clifty faces throughout, those on the northern side being generally bare or burnt, while those on the southern side are densely wooded. Inside the entrance the shores are everywhere steep-to except at the head of the arm, where there is a shallow flat $\frac{1}{2}$ mile in length. A small stream flows into the arm at its head, and at 600 yards from the head on the southern side is the mouth of a stream divided by two small islets; inside these islets there is a deep pool into which the stream falls from a small gorge between the hills.

Anchorage.—There is good anchorage in 12 to 18 fathoms, sand and mud, in Camp cove, on the southern side of the first bend and directly opposite a high clifty point on the northern shore, but this position is subject to violent squalls during strong westerly winds. A better position, where the squalls are not so violent, is found 1,400 yards up the arm from the clifty point and southeastward 400 yards

from a small rocky islet, 9 feet high, off the northern shore, in 15 fathoms, mud bottom. Here the stream always runs out, and vessels generally lie with their heads to the westward.

Tides.—It is high water, full and change, in Great Cat arm at 6h. 45m.; springs rise $4\frac{1}{2}$ feet, neaps $2\frac{1}{2}$ feet.

The shore of White bay from Western head of Great Cat arm trends southwestward and is high, cliffy, and wooded. A small bight lies $\frac{1}{2}$ mile from Western head, and at 4 miles from the head the fore-shore becomes low, forming a point and a beach of rounded, white stones, known as Wild beach. Shoal water extends 200 yards off this point and the stony bight southwestward of it.

At $2\frac{1}{4}$ miles south-southwestward from Western head and $\frac{3}{4}$ mile offshore, off-lying banks, with depths of 10 to 20 fathoms water over them, begin and extend parallel to the shore for upward of 5 miles, then joining a similar bank off Cobbler head.

Devil cove, 7 miles from Western head of Great Cat arm, is a small bay into which a stream falls from the hills. There is anchorage here with offshore winds, but when these are strong the squalls are often violent.

The shore from Devil cove turns southward and at a distance of $1\frac{3}{4}$ miles is Cobbler head, a round, wooded headland, noticeable on southwesterly bearings, and some remarkable patches of bare rock, forming the cliff face, $1\frac{1}{4}$ miles southward of the head, are conspicuous from a distance seaward in White bay.

Little Coney arm is $\frac{1}{2}$ mile southward of these patches; it is a deep notch in the hills, extending nearly $\frac{1}{2}$ mile inland, and then opening out into a circular basin nearly $\frac{1}{4}$ mile in diameter. The entrance to this basin is narrow and obstructed by a rocky bar, through which there is a crooked passage, with about 6 feet of water. In the basin there are depths of 1 to $2\frac{1}{2}$ fathoms, and small fishing vessels use it. Outside the bar the depth increases to 4 and 7 fathoms and vessels occasionally anchor here temporarily, but there is a rock with a depth of 23 feet over it, a short distance outside a line joining the two entrance heads and nearly midway between them.

A few houses occupied by fishermen are situated on the northern side of the entrance to the basin and on the slope at its head.

Great Coney arm extends south-southwestward, about $2\frac{1}{2}$ miles from its entrance between Little Coney arm and Coney head. A small river that runs into the head of the arm has some shoal patches of gravel and stones off its mouth. The arm is otherwise deep, and vessels anchoring in it do so in 20 to 22 fathoms. There is good shelter except from northeasterly winds, and when these are strong a swell rolls in, making the position undesirable.

Coney Head banks are some detached patches, with depths of 22 to 25 fathoms over them, lying $1\frac{1}{2}$ to 3 miles north-northeastward of Coney head.

Coney head is cliffy, covered with stunted trees, and conspicuous on southerly bearings. Dossenger cove, a small indentation with a beach at its head, is $\frac{3}{4}$ mile southward of the eastern part of Coney head.

Dossenger rock bears 92° , distant $1\frac{3}{10}$ miles from Big Cove head, the southern entrance point of Dossenger cove. It is a small patch, very steep-to, and there is a depth of $5\frac{3}{4}$ fathoms over its shallowest part. During calm weather at spring tides its position is usually marked by a slight tide-rip, and during bad weather the sea breaks on it.

The shore southward of Dossenger cove is high, wooded, and steep for nearly 3 miles to Frenchmans cove.

Frenchmans cove is an inlet extending westward about $\frac{3}{4}$ mile, with a width varying from 400 to 800 yards; though open to the eastward, the sea never reaches home, and there is consequently good anchorage off the flat ground near its head, in 12 to 15 fathoms water, mud bottom.

There are no shoals in the cove, but rocky banks with 7 to 10 fathoms water over them extend about $\frac{1}{4}$ mile from the heads on either side of the entrance, and these banks are connected by a bar over which the depth is 12 fathoms in the fairway. The water deepens to 47 fathoms inside this bar, and shoals again toward a mud flat extending from the beach at the head of the cove. The flat is steep-to, and it must be approached with caution, as the depth decreases from 12 to 3 fathoms in a distance of 120 yards.

Camp cove, on the southern side of Frenchmans cove, is open, and affords no shelter.

Tides.—It is high water, full and change, in Frenchmans cove at 7h. 0m.; springs rise $4\frac{1}{2}$ feet, neaps $2\frac{1}{2}$ feet.

Frenchmans head, a little southward of Frenchmans cove, is a high rock with a bare cliffy face, and is fronted by low rocks and ledges, which, however, are quite steep-to. A projecting low point, at $\frac{3}{4}$ mile southward of the head, is conspicuous, and southwestward 1,200 yards from this point is Godfather point.

Godfather cove, the entrance of which lies between Godfather point and Eastern head of Jacksons arm, situated about 600 yards to the southwestward, is a bight extending about 800 yards northwestward with a width of 350 yards, and having a stony beach at its head. There is a small rock, bearing 216° , distant 150 yards from Godfather point, with 4 feet water over it, and 4 fathoms between it and the shore. Godfather cove is of moderate depth, but it is not suitable for anchorage.

Jacksons arm.—The entrance to this arm is between Eastern head and Western head, which are $\frac{1}{4}$ mile apart, in a northerly and southerly direction. Eastern head is a round-topped limestone hill, and Western head is less thickly wooded than the land to the southward. Immediately inside, the arm expands to a width of $\frac{1}{2}$ mile for a distance of 1,400 yards, and there are two small coves, named Wicks cove and Schooner cove, with several houses and jetties around their shores, on its northern side. Westward of this the arm contracts to a width of 300 yards, forming the narrows, $\frac{1}{3}$ mile in length, after passing which it opens out into a second though a much smaller basin. Beyond this it again contracts to 150 yards for a short distance, and finally expands into an oval basin, about 400 yards in length and 350 yards in width, known as the Bottom.

The shores all around Jacksons arm are thickly wooded, and the locality is said to contain some of the finest timber in White bay.

That portion of the harbor outside the narrows is clear of shoals, and it affords anchorage off either of the two coves above mentioned, preference being usually given to Schooner cove, the western one; but during strong easterly winds a good deal of sea reaches in here, and it is therefore better, if intending to remain, to proceed through the narrows to the anchorage off Clay cove.

Light.—A fixed white light is exhibited from a white framework on the southern end of Eastern head of Jacksons arm from June to January, and it should be seen from a distance of 6 miles in clear weather.

The narrows.—From the southern shore of the narrows, some clusters of rocks, with 1 to 15 feet water over them, extend a little more than halfway across, leaving a channel about 250 feet wide, and carrying 7 to 8 fathoms, close along the northern shore.

Beacon.—A white triangular beacon, among the trees on the slope at the head of the arm, in line with the southern point of the inner narrows, bearing 280° , leads through this channel.

Inner narrows.—The inner narrows are clear of shoals and deep in mid-channel.

Anchorage.—There is anchorage in the Bottom, at the head of the arm, in 11 to 12 fathoms, mud bottom, or in about the same depth off Clay cove; at either place the squalls off the surrounding hills during strong winds are very violent.

Tides.—It is high water, full and change, at Jacksons arm at 7h. 0m.; springs rise $4\frac{1}{2}$ feet, neaps $2\frac{1}{2}$ feet.

Settlement.—There are a post-office and school at Wicks cove in the outer basin.

Communication is made by mail carrier from Wicks cove to Western cove, situated on the opposite side of White bay, and thence to Coachman harbor, by way of Seal arm and bay Verte.

The shore trends south-southeastward, $\frac{1}{2}$ mile from Western head to Virgin point, and thence generally southwestward; it is high, wooded, and broken into rocky coves. Virgin rocks, a cluster of rocks drying 2 feet at low water, lie about 200 yards southward of Virgin point. Breakheart cove, about $\frac{9}{16}$ mile southward of Virgin point, is the largest of the coves, but it does not afford anchorage. From Breakheart point, the high wooded shore continues to Garden cove, directly opposite the northeastern end of Sops island, and here the shore becomes steep and cliffy for a short distance, when it is broken into the three small coves known as Grassy cove, Schooner cove, and Batts cove. These coves, together with $\frac{3}{4}$ mile of cliffy shore, of which Hauling point is the southern end, form the northwestern side of North channel leading into Sops arm. (See p. 407.)

Sops island, which is $3\frac{1}{2}$ miles long in a northeasterly and southwesterly direction, $1\frac{1}{2}$ miles wide near its southwestern end, and $\frac{1}{4}$ mile wide at its northeastern end, fronts the western shore of White bay, eastward of Sops arm. The summit of the island is 700 feet high, and its southern and southeastern coasts rise steeply from the sea in bare rocky slopes and gullies, while its northern and northwestern coasts are of less elevation and densely wooded.

The northwestern coast, which forms the southeastern side of North channel, is broken into bays and coves, and at Sops cove, situated $\frac{1}{2}$ mile from the northeastern end, there is a small settlement where a little fresh meat and some vegetables may occasionally be obtained in the autumn. There is also a small settlement at Gills cove, on the southeastern coast of the island.

The eastern coast of Sops island is steep-to, but a rocky shelf, with 6 to 7 fathoms water over it, extends $\frac{1}{2}$ mile off the eastern end of its southern coast. The southern coast, with the adjacent mainland, forms South channel into Sops arm, and it is quite steep-to for $1\frac{1}{4}$ miles westward of the rocky shelf, having 6 to 7 fathoms over it. The coast then turns sharply northward, and at a distance of 800 yards in this direction and 200 yards offshore is Shellbird islet, a small island 15 feet high, covered with trees. Here a rocky bank extends from Sops island entirely blocking the passage between it and the islet except to boats. The coast of the island north-northeastward of Shellbird islet is fairly steep and clear to its northwestern point, which bears south-southwestward, distant 320 yards from Hauling point.

Deep cove, at the western part of the northern coast of the island, is of moderate depth, but it is not recommended as an anchorage.

Otter cove, the next cove to the eastward, is deep until close to the shore. A rocky head, with 5 fathoms water over it, bears 83° , distant 250 yards from Otter point, the western entrance point of Otter cove. Eastward of this cove there is a small barachois or shal-

low place, fronted by a rocky bank extending 200 yards from the shore, and thence to its northeastern end the coast of Sops island is fairly steep.

Sops cove.—The northern side of Sops cove is a small peninsula surmounted by a wooded hill 140 feet high. The neck of the peninsula is low and flat, so that on southwesterly bearings this hill stands out conspicuously.

The northeastern end of Sops island is composed of low cliffs fronted by ledges of rock. Open head is a remarkable black cliff 90 feet high.

Sops arm is an extensive inlet lying westward of Sops island, and South channel is its principal entrance. From White point, the southern entrance point of this channel, the arm extends westward $3\frac{1}{2}$ miles, with a general width in the open part of about 1 mile. Its shores are densely wooded and are broken into several bays or coves. The mouth of Main brook (see p. 409) is in the northwestern corner.

The northern portion is largely occupied by Georges island, which has a narrow channel on either side of it, but Western Tickle, which is the channel on its western side, is only navigable by small craft. The Tickle, which is the channel on its eastern side, though obstructed in some degree by Shellbird islet and by a 14-foot rock between it and Georges island, affords a safe passage to North channel.

The open portion of Sops arm is deep, but there is good anchorage in several places. There are few settlers in this locality.

North channel, the more open part of the passage separating Sops island from the mainland, lying to the northwestward, affords a good deep-water channel on either side of Mile rocks. (For the coast of Sops island, see p. 406.)

Mile rocks, lying nearly in mid-channel off the northwestern side of Sops island, are a cluster of rocks 5 feet high, together with a small detached patch which dries 2 feet at low water, at 350 yards southward of it. The rocks are connected by a shoal with $1\frac{1}{4}$ to 3 fathoms water over it, but otherwise are fairly steep-to and may be passed on either side.

Jockeys cove is a small bight, situated in the mainland north-northwestward from Open head, the northeastern end of Sops island. At 200 yards off its southwestern entrance point there is a rocky head with 9 feet water over it, 7 fathoms inside and the depth of 100 fathoms at 300 yards southeastward from it. This rock should be given a good berth.

Grassy and Schooner coves are shallow bays fit only for boats to enter. Bad islet, small and rocky, lies to the southward of them, forming Batts cove, which is a shallow bight.

Rocks.—Bearing 214° , distant 400 yards from the southern end of Bad islet, and 200 yards from the shore, there is a small rocky

patch, with 16 feet water on it; and bearing 197° , distant 700 yards from the southern end of Bad islet and 350 yards off-shore, there is a rocky patch with $4\frac{1}{2}$ fathoms water over it.

The shore westward of Hauling point, the termination of the cliffy shore from Batts cove, forms a small bight with shallow water extending a little beyond the line of its entrance points. Thence the shore is steep-to for $\frac{1}{2}$ mile, where there is a cove with shoal water in it. The shore bends abruptly round the headland on the western side of this cove, forming, northward of the western part of Georges island, a nearly circular basin 700 yards in diameter, with depths of 12 to 20 fathoms, which, as it can only be approached through narrow and intricate channels, is not available as a general anchorage.

Georges island is of moderate height and covered with clumps of burnt trees and low scrub, through which the bare limestone rock is visible. The coasts are low and shelving, but only from the northern side does shoal water extend more than about 70 yards.

There is a deep but narrow bight just westward of the northeastern end of the island, and off the western entrance point of this bight is Steering rock, a small island 3 feet high, connected with the point by a shelf of shoal ground.

Western tickle, the channel westward of Georges island, is barred at its northern end by a shelf of gravel and mud, with 7 feet water over it, but southward of the bar, in a bay rather more than 200 yards in width, formed by a bend in the coast of the island, there is anchorage for a vessel of moderate size in 8 fathoms.

Anchorage.—There is good anchorage northwestward of Steering rock in 7 to 11 fathoms, mud bottom. This position is easily approached and affords for vessels of moderate size the most sheltered anchorage in Sops arm. Large vessels anchor northeastward of Steering rock in 9 to 14 fathoms, avoiding a small mud patch of 27 feet, bearing 60° , distant 400 yards from the rock, and rather more than 200 yards off the northern shore.

The Tickle is the channel extending from Hauling point to Shellbird islet and passing between Georges and Sops islands. Abreast of Hauling point this channel is about 320 yards wide; it is deep and clear of shoals southwestward to the northeastern point of Georges island; then the water shoals to 6 and 9 fathoms over spits extending from either side.

A detached rock, with 14 feet of water over it, bears 350° , distant 300 yards from Shellbird islet, leaving a deep channel, about 500 feet in width between the rock and Shellbird islet.

Leading mark.—Hauling point in line with the westernmost point of the northwestern headland of Sops island, bearing 35° , leads just northwestward of Shellbird islet, which is steep-to and

may be approached closely because the rocks extending from it are visible.

Tides and tidal streams.—It is high water, full and change, in Sops arm, at 7h. 0m.; springs rise $4\frac{3}{4}$ feet, neaps $2\frac{3}{4}$ feet.

There is considerable diurnal inequality in the height of the tide, which, however, principally affects high water. Consecutive high waters vary up to 18 inches, and low waters from 3 to 6 inches.

The tidal streams are weak in South channel, but their rate through the Tickle is at times appreciable. Between Hauling point and Sops island, and also at the anchorage northeastward of Georges island, the stream has been observed to set northeastward for days continuously, and on the western side of White bay the north-going stream is almost constant.

Main brook is a considerable stream flowing into the northwestern corner of Sops arm. Nearly 1 mile from its mouth the stream enters a low flat, forming a delta with numerous marshy islets, and here it is joined by Doucers brook, a stream coming from the southwestward, through a valley at the foot of a range of high, densely wooded hills. The outer islets of the delta are fronted by gravel flats, and numerous large bowlders, to a distance of $\frac{1}{4}$ mile; outside these, the bank falls steeply to depths of 30 fathoms and more.

Giles cove is in the western part of Sops arm, $\frac{1}{2}$ mile southwestward of Main brook; shoal water extends from its shores for about 70 yards, but it affords fair, though close, anchorage for moderate-sized vessels. Large vessels occasionally anchor off this cove in about 15 fathoms.

Country cove.—A bight southeastward of Giles cove forms Burnt Head and Country coves. Corner brook flows northward from some ponds into Country cove, and at its mouth is a dam for the purpose of the sawmill which stands on the eastern side of the entrance. Near this mill are several buildings, and there is a small jetty with a tramway for loading timber, which is cut in quantities in the adjacent valleys and floated down Corner and Main brooks. The water in these coves is shoal for about 150 yards from the shore, and then deepens quickly to 30 and 40 fathoms, consequently there is no convenient anchorage. A vessel might anchor off Burnt Head cove in 20 fathoms, but she would swing very close in.

Pigeon islets, lying $\frac{3}{4}$ mile east-northeastward from the jetty in Country cove, are two rocks, close together, 14 feet high and wooded. Shoal water extends northward about 100 yards from them, and though there is a passage between them and the shore, carrying 14 to 15 feet water, it is narrow and must not be attempted.

Baileys cove lies just eastward of Pigeon islets. Its shore from the point inside the islets to Mohawk point is foul for 150 yards, and there are some ledges which dry at low water. Southward of Mohawk

point the western shore is steep until the head of the cove is approached, where a mud flat extends upward of 300 yards. The eastern shore of the cove is fairly steep-to.

Rock.—A rock, with 21 feet over it, lies in Baileys cove, with Mohawk point bearing 295° , distant 100 yards.

Anchorage.—There is good anchorage in Baileys cove in 9 to 13 fathoms either inside or outside the 21-foot rock.

Natlins cove.—The southern shore of Sops arm from Baileys cove trends northeastward for $\frac{1}{2}$ mile to Spruce point; Natlins cove lies southeastward of this point, and its western part is deep, but anchorage may be obtained off its southeastern shore in 11 to 13 fathoms. From this cove the southern shore of South channel trends eastward for $1\frac{1}{10}$ miles to White point.

Spear cove.—From White point the shore of White bay trends southward for $1\frac{3}{10}$ miles, where it forms Spear cove. This cove has a shallow flat extending 350 yards from its head; outside this, the water is fairly deep, but the bottom is rocky and the locality open to the northeastward.

The bight between Spear cove and cape Spear is rocky and shallow and the shore thence to cape Spear is foul.

Cape Spear is composed of dark limestone shale, 40 feet high, projecting from the cliffs behind it. Low rocky ledges surround the cape, but its eastern side is steep-to.

Saltwater cove.—The shore from cape Spear trends southward for $1\frac{4}{10}$ miles to Lower head, between which and Upper head, bearing 166° , distant 1,600 yards, is Saltwater cove. This cove is shoal toward its head, but affords anchorage during westerly winds: it is open northeastward and the sea rolls in with strong winds from that direction. Connected with the sea by a narrow opening through the beach at the head of the cove is a pond which stretches 2 miles south-southwestward.

The shore from Upper head, the southern entrance point of Saltwater cove, trends nearly south-southwestward for $8\frac{1}{4}$ miles to Cliff point; it is straight and steep-to, with a rocky, and in some places, cliffy foreshore. At about $4\frac{1}{4}$ miles from Upper head is Browns cove, a small indentation, backed by a grassy flat with two or three small houses on it. From Cliff point the shore turns westward for 350 yards, and then gradually to about southwestward, forming Gold cove. Within Cliff point the bay becomes a little wider, and then narrows gradually to its head at $1\frac{3}{4}$ miles south-southwestward.

Gold cove affords anchorage in deep water, but, as it is sheltered from wind and sea, it is very secure. The shore bank is steep-to, and the lead is the best guide. Osmond's house, a two-storied building on the southeastern shore, a little open of Cliff point, leads to a good position.

Miller island lies in the middle of the bay between Clift point and its head; it is 187 feet high, of limestone formation, covered with scrub and bare burnt trunks of stunted trees. Rocks and shoal water extend about 300 yards southward from its southern end.

Riverhead bay, the head of White bay, southward of Miller island, carries deep water close up to the flats extending 500 yards from the mouth of a small stream flowing into it, but a little north-eastward of Oody point, which is projecting and wooded, indifferent anchorage may be obtained in 17 to 20 fathoms. Galeville, a small settlement, is situated nearly $\frac{1}{2}$ mile northeastward of this anchorage, and $\frac{1}{2}$ mile farther northeastward, off a slight bend in the shore, from which rocky ledges and a stony shelf extend nearly 200 yards, there is anchorage in about 15 fathoms, stony bottom.

The eastern shore of White bay from Osmondville, which lies north-northeastward $1\frac{3}{4}$ miles from Galeville, trends north-northeastward, $9\frac{1}{4}$ miles to Little Pumbley cove, and it is generally cliffy and steep-to, and bordered by dense woods. Between Little Pumbley cove, which is a small bight, and Western head of Purbeck cove, $2\frac{1}{2}$ miles northeastward, are two small bays, known as Clay cove and Pumbley cove. There are a few houses located on the shores of both of them, and anchorage might be obtained off either in 15 to 20 fathoms.

Granby island, westward about 1 mile from Clay and Pumbley coves, is nearly a mile in length in a northeasterly and southwesterly direction. There are some houses, surrounded by grassed land and garden plots on its southeastern side. The northern coast is cliffy and wooded. The highest part of the island, 298 feet high, is near its middle. Toward the southwestern end a gully separates the summits, which, from the eastward, gives the appearance of two islands.

A line of detached rocks extends southward from the middle of the island for a distance of 850 yards, where there is a rock, nearly awash at low water, which is usually visible by the wash or tide-rip over it. This rock is steep-to to the eastward, in which direction between it and the mainland there is a deep channel 1,100 yards wide. Granby island is otherwise steep-to except between it and Gull rock, a detached grass-covered islet 94 feet high, lying northwestward 400 yards from the northwestern part of the island, where the ground is foul and rocky: the northwestern side of Gull rock is steep-to.

A bank with 18 to 20 fathoms over it reaches $\frac{1}{4}$ mile off the eastern point of Granby island. Temporary anchorage may be obtained eastward of the southern part of the island and between it and the line of rocks in 15 to 18 fathoms, but the ground is rocky, and the tidal streams attain some strength between the island and the mainland.

Purbeck cove affords the best anchorage on the eastern side of White bay southward of Hauling arm. Shoal water extends about 200 yards from the head of the cove, and a rocky patch, with 28 feet water over it, bears 284° , distant 400 yards from Eastern head, the eastern entrance point. Shale point, northeastward about 400 yards from Western head, is a detached block of shale 60 feet high, standing out from the cliff, and showing white when the sun shines on it. Purbeck brook is a small stream running into the head of the cove.

Anchorage.—There is anchorage anywhere in the cove, but the best berth is in 11 to 13 fathoms toward the eastern corner, where there are two or three houses.

Western cove is 2 miles northward of Eastern head of Purbeck cove, its northern side being formed by a small peninsula, which projects outside of the shore line. Gull rocks are two small rocks, the larger being 29 feet high, on the southern side of the cove; both are fairly steep-to. Western cove has a small settlement and a few landing stages on its shores. There is a post-office and a church standing on the rising ground behind the eastern side of the cove.

There is anchorage off the cove in about 11 fathoms, but it is open to the westward and to the sea, which rolls into White bay with strong easterly winds.

Light.—A fixed white light is exhibited from a white framework on the northern point of Western cove from June to January, and it should be seen from a distance of 6 miles in clear weather.

Wisemans cove, on the northern side of the small peninsula forming the northern side of Western cove, is separated from Pound cove, northeastward of it, by a low point. In both these coves there are some houses, but Wisemans curve is quite open. Pound cove has some dry rocks across its head, and there is some shelter for boats behind them.

The shore from Pound cove trends northeastward $2\frac{1}{2}$ miles to Wild Cove point, the southwestern entrance point of Hauling arm.

Western or Hauling arm.—Hauling point lies north-northeastward, distant 1,400 yards from Wild Cove point, and the entrance of Western arm is between them. The arm extends eastward $1\frac{1}{4}$ miles to the narrows, where its width is about 300 yards, and it then runs east-southeastward for $1\frac{3}{10}$ miles farther, with a width of 600 yards.

Wild cove extends southward for 1,200 yards immediately within Wild Cove point; its width is 700 yards at its entrance, decreasing to 200 yards at its head. It affords anchorage for small vessels, but it is open northward.

Western arm is clear of shoals at 50 yards off its shores up to the shoals at its head, but foul ground, with 4 fathoms and less water over it, extends 150 yards off Shoal point, the eastern entrance point of Bear cove, situated on the northern shore 1,200 yards westward of

the narrows. The depth of water in the arm decreases gradually from 30 fathoms in the entrance to 8 fathoms off Old House point, near the head. On the southern side of the narrows there are depths of 6 fathoms to about 100 yards offshore. Fishermans bank is a rocky patch, about 130 yards across, with 20 fathoms water over it, lying north-northeastward 500 yards from Wild Cove point.

Anchorage.—There is good anchorage near the head of the Western arm off Old House point.

Bear cove entrance lies between Shoal point and White point, which are 435 yards apart in a northeasterly and southwesterly direction, and the cove runs north-northeastward for 1,100 yards with a width decreasing to 140 yards at its head. Bear Cove islet lies in the cove 200 yards eastward from White point, and shoal water extends for 100 yards round the islet, except southeastward. The anchorage is very good for small craft, the best position being opposite the large house of the settlement in 9 fathoms, sand bottom.

From White point the shore trends northwestward for 600 yards to Hauling point.

The shore of White bay from Hauling point trends northeastward for a mile to a point within which is Back arm, a bay extending 600 yards southward. There are some houses and fishing stages on the shores of this bay, but the water is shoal. Stuckles cove, an inlet, lies 1,200 yards to the northeastward; it is entirely blocked by large bowlders.

Pigeon islands are situated northward of Stuckles cove and Back arm. Little Pigeon island bears 351° , distant 300 yards from the western entrance point of Back arm, and is 20 feet high. Steering rock bears 72° , distant 800 yards from Little Pigeon island, and is 12 feet high. The western end of Pigeon island bears 45° , distant about 400 yards from Steering rock, and the island extends northeastward 1,100 yards. It is of limestone formation, 150 feet high, and covered in places with coarse grass.

There are no shoals seaward of these islets, but between Little Pigeon island and Steering rock and the shore are some rocks and foul ground. The water in the middle of the channel inside Pigeon island is deep, but on the mainland side there are some detached rocks. Bearing 35° , distant 400 yards from the northern point of Pigeon island there is a rock with 9 feet water over it, and 10 to 4 fathoms between it and the point; the sea breaks heavily on this rock with a northeasterly swell.

The shore of White bay northeastward of Pigeon island, backed by high, wooded hills, trends northeastward for $3\frac{1}{2}$ miles to Fish point, the western entrance point of Middle arm; Middle Arm rock, a small rock 11 feet high, lies 200 yards offshore at $1\frac{1}{4}$ miles west-southwestward of Fish point; there is a smaller rock inside it, but

otherwise this shore is clear. The 100 fathoms contour line is a little more than 1 mile off, but at $2\frac{1}{2}$ miles north-northwestward from the northern point of Pigeon island there is a small bank with a depth of 29 fathoms over it.

Middle arm is an indentation extending southward nearly $3\frac{1}{4}$ miles on the eastern side of Fish point. A bare, rocky islet, 6 feet high, lies $\frac{1}{2}$ mile within the point. Northward of the islet the arm is fairly clear, but rocky shoals extend across the channel to the eastward, forming a bar of rocks and bowlders. A narrow and crooked channel, carrying 18 feet of water, passes through the bar, but it is only fit for small vessels, and even these require local knowledge or must place buoys.

Inside the bar the middle of the channel has a depth of $3\frac{1}{2}$ fathoms for about $\frac{1}{4}$ mile, when it deepens to 9 fathoms in the narrowest part.

Within the narrow part the arm opens out to a width of $\frac{1}{2}$ mile, with depths of 24 to 36 fathoms and clear of shoals. At the head is the mouth of a fair-sized stream, and a mud flat, dry at low water, extends for $\frac{3}{4}$ mile from it.

A narrow boat channel runs toward the river mouth along the eastern shore.

The shores of Middle arm are high and wooded. A small fishing settlement exists near the entrance, some of the houses being on the eastern side near the outer point, and some on the western side on the inner point of the narrows.

The shore from Middle arm trends north-northeastward for $2\frac{1}{4}$ miles to Crow head, the western entrance point of Southern arm. It is high, rocky, and steep to except westward of Crow head, where two patches of rocks, nearly awash, lie at distances of 50 and 100 yards from the shore. The depth of 10 fathoms is close outside the outer patch.

Southern arm.—Flat point lies eastward $\frac{1}{4}$ mile from Crow head; the southwestern part of Southern arm head lies east-northeastward 1,100 yards from Flat point, and within this line Southern arm extends southeastward 1,400 yards, and then southward 1,800 yards to the bar, its width gradually decreasing to 435 yards. It is an excellent harbor, free from shoals and affording good sheltered anchorage. Its shores are high and thickly wooded, but on the eastern side near its head there is a small area of lower land, and here there are a few houses with some little patches of cultivation.

There are a few houses in Pumbley cove, an open bight on the southwestern shore at about 1,200 yards within Flat point.

Cheese hill, conical, thickly wooded, and 235 feet high, is situated on the western side of the arm at $1\frac{8}{10}$ miles within Flat point, and is conspicuous. At its foot the arm contracts to a width of 200 yards.

and is almost completely blocked by stones and bowlders, forming a bar $\frac{1}{4}$ mile in length and reaching from shore to shore.

Above this bar the arm again opens out between very steep hills and forms an oval basin $\frac{3}{4}$ mile in length, with a greatest width of 435 yards, and with depths of 11 to 17 fathoms at 100 yards from the shore.

The shoal water of the bar extends nearly 400 yards northwestward from the narrows; here it is very steep-to, the depth quickly increasing to 16 fathoms off a two-story house, with a small jetty in front of it on the eastern side.

The best anchorage is in this vicinity, borrowing toward the western shore as far as possible.

Light.—A fixed white light is exhibited from a white framework on the northern end of the Southern Arm head from June to January, and should be seen from a distance of 6 miles in clear weather.

Seal cove.—The shore from Southern Arm head bends sharply to the northeastward and extends in curves for 1,200 yards, and then turns westward forming Seal cove, a bight from 800 to 400 yards in width.

At its head or eastern end there is a sandy beach strewn with bowlders and behind this a little flat land, extending toward a valley running southeastward. A shallow rocky flat extends upward of 200 yards from the sandy beach, and outside this the cove is clear.

At the head of the cove there are some houses and a small church with a spire. There are also some houses and a landing stage on the northern shore.

Anchorage.—The cove affords good anchorage, with northerly, easterly, and southerly winds. The best berth is off the landing stage on the northern shore in about 11 fathoms.

Tides.—It is high water, full and change, at Seal cove, at 7h. 10m.; springs rise 5 feet, neaps $3\frac{1}{2}$ feet.

Supplies.—A limited quantity of mutton and vegetables can generally be procured in autumn from the houses on the northern shore of Seal cove.

The shore of White bay from Pound head, which is 600 yards northwestward of Lucies point, the northern entrance point of Seal cove, trends north-northeastward, and continues cliffy for nearly $1\frac{1}{2}$ miles to Big head. Pound rocks, 10 feet high, lie 100 yards southwestward from Pound head; there are no offlying shoals.

Big Head cove, Beach cove, Lower cove, Downeys cove, and Lobster harbor lie between Big head and Wild cove, which are $2\frac{1}{2}$ miles apart in a northeasterly direction. These four coves are merely open bays, affording indifferent shelter to boats, but Lobster harbor is a small round basin much frequented by fishermen. There is good water inside its entrance, but this is obstructed by two rocky islets

having a channel on either side, the western channel carrying 4 feet of water, and the eastern 6 feet.

Wild cove extends $\frac{1}{2}$ mile to the east-southeastward and contains good anchorage in 9 to 13 fathoms, sand bottom, during offshore winds.

At the head of the cove the land is low, sloping to a sandy beach, which is fronted by a shoal flat extending nearly 300 yards off, and at its southern corner is a patch of rocks drying 2 feet at low water. Elsewhere the bay is clear, the bottom sloping gradually off to deep water. A small stream flows into the northeastern corner.

There are a few houses around the head of the cove, but most of them are unoccupied, the owners having moved to Sops arm, where the lumber mill offers regular work.

The shore from Wild cove trends nearly northward for $2\frac{1}{4}$ miles to Green point, and thence northeastward for $2\frac{3}{4}$ miles to a bight, with Little Lobster harbor, a narrow cove, immediately northeastward of it. This shore is rocky, and backed by steep wooded hills; it is clear and steep, but a few sand banks with 10 fathoms of water over them lie $\frac{1}{4}$ to $\frac{1}{2}$ mile off. Little Lobster harbor is used during summer as an anchorage for small vessels, the crews of which fish in the vicinity.

The shore from Little Lobster harbor trends northeastward and continues of the same character for $5\frac{3}{4}$ miles, where there is a small bight surrounded by cliffs and known as Hard bay; and from this bay to Partridge point, $1\frac{1}{2}$ miles northeastward, the hills are nearly bare and slope gently to the point.

Partridge point, forming the eastern entrance point of White bay, is the end of a low, rocky projection extending from the sloping hills. Westward of the point there are some small bights in the rocks, where good landing can be made during easterly winds, and eastward of it is an open cove with cliffy shores.

The point is steep-to, and may be approached closely, but when easterly winds prevail there is often a strong indraft toward the shore.

St. Barbe or Horse islands are two in number. The western point of the Western island bears 76° , distant $10\frac{1}{2}$ miles from Partridge point, and the island extends $2\frac{3}{4}$ miles in an easterly and westerly direction, with a width of a little more than 1 mile: a tongue of land projects about 800 yards from its northern side. This island is 500 feet high, and presents a smooth, conical summit on northeasterly or northerly bearings. Its coasts are fairly clear, the only shoal being on the southern side, where some foul ground extends a short distance from the rocks. It has no inhabitants.

The eastern island lies $1\frac{1}{10}$ miles eastward of the western island, and the channel between is clear and deep, but a little eastward of the

channel, a shoal, with 4 to 5 fathoms of water over it, extends nearly $\frac{1}{2}$ mile from the southern coast of the eastern island.

The eastern island is $4\frac{1}{2}$ miles long in a west-northwesterly and east-southeasterly direction, and about $1\frac{3}{4}$ miles wide: it attains a height of 550 feet, but it appears flatter than the western island and has a broken summit.

The eastern coast of this island is foul for the distance of about $\frac{1}{2}$ mile and must be approached with caution: $\frac{1}{4}$ mile off its southern coast, bearing 261° , distant $1\frac{3}{4}$ miles from the southeastern point, is a rock with a depth of less than 6 feet over it: and bearing 63° , distant $1\frac{1}{10}$ miles from the eastern of the northern point, is a small rock above water.

On the southern coast, at about $1\frac{1}{2}$ miles and $1\frac{1}{10}$ miles, respectively, from the southeastern point of the island, there are two coves with several houses around them, in which some 30 families permanently reside.

Small vessels anchor in the western cove, locally known as St. Barbe harbor; but, though there are no shoals, there is very little room, and the place is open to the southwestward.

Cape Crapaud, situated southeastward, distant 3 miles from Partridge point, is steep-to, and there are patches of white marble on its southeastern side. Between this cape and Paradise point, which bears south-southeastward, distant $1\frac{3}{4}$ miles from it, is the entrance of a bay, the shores of which are steep-to, except off a cascade just westward of Paradise point, where a rock lies 65 yards offshore.

Paradise point is high and remarkable: Pigeon island lies close northeastward of it.

Fleur-de-lis harbor entrance is situated southwestward 1 mile from cape Crapaud, and the harbor, though small, affords good, sheltered anchorage. The entrance is difficult to distinguish except on westerly bearings.

Fleur-de-lis hill lies $2\frac{1}{4}$ miles westward from the harbor entrance, is 820 feet high, has three hummocks, which give it a resemblance to the top of a fleur-de-lis, and is remarkable.

Directions.—Bring Fleur-de-lis hill to bear about westward, and steer for it to the entrance: then keep along the eastern shore, steering for the fishing establishment next eastward of Welch point, a little cliff with some huts on it, to clear The Rock, which has 8 feet of water over it and lies in mid-channel: when Bear hill (a mound 144 feet high, situated westward of the basin) opens northward of The Islet, bearing 283° , steer for Welch point to get in the middle of the narrows and avoid the bank stretching off The Islet. When the summit of Fleur-de-lis hill is open a little northward of Bear hill,

bearing about 280° , keep this mark on and anchor in the middle of the basin in $4\frac{3}{4}$ fathoms of water, stiff mud bottom.

Westerly and northwesterly winds are the strongest and come down in violent squalls. There is never any sea at the anchorage, but after strong northerly and easterly winds the sea breaks on the outer coast, while the sea in the entrance is so disturbed as to appear like breakers, and a heavy swell is felt as far in as The Islet. This has also followed a northerly gale at a day's interval, after the wind has completely fallen; then the sea rose in an hour.

Temporary anchorage in fine weather may be obtained in 12 fathoms of water, coral bottom, at about 500 yards eastward of Starboard point, the northern entrance point of the harbor.

Tides.—It is high water, full and change, at Fleur-de-lis harbor at 7h. 15m.; springs rise 2 to 4 feet.

Water can be obtained conveniently from the cascade just westward of Paradise point.

Green point lies 2 miles southward from Pigeon island, and is the southern end of a rugged indented coast, close off which, at $1\frac{2}{10}$ miles southward from Pigeon island, is an islet. It is also the northwestern entrance point of bay Verte.

Bay Verte extends southwestward $10\frac{1}{2}$ miles from its entrance between Green point and a point lying southeastward, distant $3\frac{1}{2}$ miles from it. The shores of the bay are high, wooded, and steep to generally, but the head of the bay dries for a distance of nearly 1 mile and shoals suddenly from 6 fathoms to 4 feet.

The Sisters are two rocks nearly in the middle of bay Verte entrance: the northwestern bears 126° , distant $1\frac{2}{10}$ miles from Green point, has 5 feet over it at low water and the sea generally breaks on it; the southeastern bears 142° , distant 1300 yards from the northwestern, and is above water with the sea always breaking on it. The water around and between the Sisters is deep and clear.

Coachman harbor (havre du Pot d'Étain) lies westward of a line drawn between Green point and French island, which bears 216° , distant $1\frac{3}{10}$ miles from the point. Tin-pot islands consist of two masses, each being a group of islets close together, with deep water around: the groups are 400 yards in an easterly and westerly direction, and the western island lies 800 yards eastward from French island. The north shore of the harbor is clear for nearly 1 mile from Green point, and then shoals, with 10 feet least water over them, stretch off 350 yards. The head of the harbor is divided into North and South coves by a point, close off which is Guibert islet. North rock is a shoal with 3 feet least water over it, on a ledge extending eastward 350 yards from Flat point, the northern entrance point of North cove.

The southern side of South cove is a narrow peninsula surmounted by a little wooded hill, with a fishing establishment at the isthmus, which is only 55 yards across.

Gentile islet, 100 yards northward of the peninsula, is small, low, and rocky; shoal water continues northward 200 yards from it; shoals extend 265 yards northwestward of French island and lie off the channel separating the island from the peninsula.

Anchorage.—South cove, about 500 yards across, affords anchorage in 5 fathoms water, sand bottom, with good shelter, inside Gentile islet, in a position from which the eastern end of Guibert islet bears 336° , and northern side of Gentile islet bears 72° . Small craft can anchor farther southeastward.

Northeasterly winds bring a sea into North cove.

Tides.—It is high water, full and change, at Coachman harbor at 7h. 16m.; springs rise about 4 feet.

Communication.—The steamer from Tilt cove calls at Coachman harbor weekly during summer and autumn.

Islets.—A yellow-colored islet with a little grass on its summit lies in the middle of bay Verte at $3\frac{1}{2}$ miles within French island; it is steep-to. Duck islet, wooded, lies 1 mile southwestward from the yellow islet, and there is a shoal, with 9 feet of water over it, 350 yards off its northeastern point; on this islet small seams of copper have been found. Do not pass between the yellow islet and Duck islet, but keep on the shore of the bay eastward of them, and when southward of Duck islet keep in mid-channel.

Copper mine.—A large and valuable copper and sulphur mine near the head of the bay is being worked by an American company named the Terra Nova Mining Company. About 200 men are working at the mine.

Pier.—Near the head of the bay is a pier 400 feet long and 100 feet broad at its end, extending off the northwestern shore; there is a depth of 6 fathoms at its end, and hawsers can be laid out to the shore and to a hauling-off buoy. A light railway connects the pier with the copper mine, about 2 miles distant.

Anchorage may be obtained in 13 fathoms of water, mud bottom and good holding ground, a little northeastward of the second point on the western shore within French island, which is bordered by white rocks. There is good anchorage at 200 to 300 yards southward of the pier in $9\frac{1}{2}$ to 12 fathoms, mud bottom, where the holding ground is good and it is quite landlocked. In northerly gales the sea is said to break as far in the bay as Duck islet.

Communication.—The mail steamer calls here twice a fortnight.

Islet.—A low islet is situated on the southeastern shore at $1\frac{1}{2}$ miles within the southeastern entrance point, which is bare.

Ice.—Bay Verte freezes solid between about the middle of December and early in January; the ice generally breaks up in May, but there have been instances in which it has not thawed before the middle of April, and afterwards remained fast until June 10.

Mings bight (baie des Pins) extends south-southwestward 4 miles, with a width of $1\frac{1}{4}$ miles, from its entrance between the eastern entrance point of bay Verte and Grappling point. Mings islets, eastward about 800 yards from the western entrance point of the bight, are two rocks, reddish in color and steep-to. Pines islet, a low rock sheltering a creek suitable for boats, lies close to Grappling point. On this islet and near the creek are fishing stations. The only shoals in the bight lie off a low point, which slopes from a barren hill on the eastern shore at about $1\frac{1}{2}$ miles within Grappling point. This point should not be approached within 400 yards.

There is a copper mine on the western shore of the bight at about 2 miles within the entrance, and gold has also been found here.

Anchorage may be obtained near the head; let go the anchor in 27 fathoms of water, so that the stern of the vessel, when swung, will be abreast a conspicuous square boulder just southwestward of the second stream on the western shore.

The coast from Grappling point trends eastward for $1\frac{3}{4}$ miles to cape Corbin, where it turns southeastward for $3\frac{9}{10}$ miles to Pelee point.

Hardy harbor, about $1\frac{1}{10}$ miles from cape Corbin, is a boat creek; its entrance is difficult and dangerous with onshore winds. Bois island, $\frac{1}{4}$ mile northeastward of the mouth of the harbor, which it shelters, is barren.

Paquet harbor entrance is between Pelee point and cape Brule, which lies about 600 yards to the south-southeastward. The harbor extends westward $\frac{3}{4}$ mile, and at about 900 yards within its entrance Northwest arm turns northwestward for 1,300 yards, while from 1,600 yards within cape Brule Paris bay extends southwestward for $1\frac{1}{10}$ miles. Pelee point, the north entrance point, is the end of a peninsula which rises in Calvary hill, at about 1,200 yards northwestward of the point, to the height of 269 feet. Four rocky islets, with boat passages between, lie close eastward of Pelee point, and a shoal with $2\frac{3}{4}$ fathoms of water over it bears 137° , distant 150 yards from the point.

Northwest arm has a width of about $\frac{1}{4}$ mile to its head, where are the fishing establishments. Baleine rock, with 9 feet of water over it, lies on the western side, nearly half way up the arm. It is connected by a shoal ledge to the western shore, and a shoal, with $1\frac{3}{4}$ fathoms of water over it, extends east-northeastward from it to mid-channel. Cape Brule, in line with Soup point, bearing 126° , leads just northeastward of this shoal.

Anchorage.—There is anchorage at the head of the arm in 8 to 10 fathoms of water, with fair holding ground, but vessels remaining require heavy anchors and a long scope of cable.

Paris bay is generally clear of shoals at 100 yards from its shores, till 300 yards from its head; at the narrows, 1,200 yards within its entrance, it is only 200 yards broad, but inside it opens to a width of 400 yards, with a small area of deep water.

Anchorage.—The holding ground in Paris bay is not good till Pelee point is shut in with Broussailles point, the southern entrance point of the bay, bearing 69°. Small vessels anchor in 5 fathoms of water, mud bottom. Westerly winds cause violent squalls in this harbor that strain the cables of vessels at anchor, and sometimes make beating in impossible.

Tides.—It is high water, full and change, at Paquet harbor at 6h. 49m.

Water may be obtained from a fine waterfall in Northwest arm, and, not so easily, at low water only, from a stream well stocked with fish at the head of Paris bay.

The coast.—Cape Brule rises in Gros Morne, at 600 yards westward of it, to the height of 577 feet. Cape Cania lies southeastward, distant 1,400 yards from cape Brule, the coast between forming a bight $\frac{1}{2}$ mile deep. A ledge extends northeastward 400 yards from cape Cania. Cape Cagnet, east-southeastward $2\frac{1}{2}$ miles from cape Cania, is white and prolonged by low rocks; it is the western entrance point of Confusion bay.

Confusion bay.—Brent Cove head lies about east-northeastward, distant nearly 3 miles from cape Cagnet, and from between them Confusion bay extends southward about $1\frac{3}{4}$ miles. The bay has two bights at its head; Grand cove, the western, 2 miles southward of cape Cagnet, is open to the northward; its shores are inaccessible, and boats must not be caught there with onshore winds.

Round harbor (le grand coup de Hache), the eastern bight, situated south-southwestward $2\frac{1}{4}$ miles from Brent Cove head, is small but safe. The beacon at the head of the harbor in line with Caroline point, bearing 171°, leads into the harbor between the shoals extending from Major and Blanche points. The inner anchorage is only 200 yards across and Crocodile shoal lies just within its entrance.

Tides.—It is high water, full and change, in Round harbor at 7h. 15m.; springs rise $5\frac{1}{4}$ feet, neaps 3 feet.

Brent cove (le petit coup de Hache) is a mile northeastward of Round harbor and separated from it by coup de Hache point, a high steep round hill sloping to a white point.

Brent Cove head is high, steep, and of a dull color; a reef lies about 300 yards off the coast just eastward of the head, and there is a

boat passage between. Cape Canaille, 2 miles eastward from Brent Cove head, is high and bold.

La Scie harbor, the entrance of which is eastward $1\frac{1}{2}$ miles from cape Canaille, extends southeastward about 1 mile, and is 200 yards wide; there is foul ground and shallow water for 800 yards from its head. The harbor is easy of access, but, being open to northwesterly winds which throw in a heavy sea, it is not recommended.

Anchorage.—The best holding ground is just within a small cove on the southwestern shore in 15 fathoms water, mud bottom.

The coast.—La Chesnais point, the eastern entrance point of La Scie harbor, has a red, rugged appearance, and is known also as Rouge point. The coast from La Chesnais point continues east-northeastward for $4\frac{1}{2}$ miles to North bill of cape St. John, and is moderately high, steep, and somewhat red in color.

Currents are very strong near cape St. John, and generally set southward.

CHAPTER VIII.

NEWFOUNDLAND, EAST COAST—CAPE ST. JOHN TO CAPE BONA VISTA.

The coast of the promontory of cape St. John turns south-south-eastward at North bill, and at the distance of $1\frac{1}{2}$ miles, with a bight between, is Middle bill. North bill and Middle bill end in remarkable peaked rocks. At a mile southward of Middle bill, and also separated from it by a bight, is South bill, which falls steeply from cliffs 244 feet high.

Notre Dame bay is 47 miles wide at its entrance between South bill of cape St. John and Fogo island. At the head of the bay are many islands and many inlets extending into the mainland; and amongst some of these navigation is not safe without a pilot.

Ice.—Vessels bound to Notre Dame bay in June, should proceed first to St. Johns and obtain a pilot familiar with Stag harbor and Change island tickles and with the conditions of the movement and prevalence of the ice, as the time when the Arctic current, 50 to 100 miles off Fogo island and its vicinity, is clear of heavy ice can not be foretold with any certainty; the ice may be passing in July, so that it is inadvisable to approach the bay from the eastward early in the season. By keeping near the land shelter may be obtained, and the ice may be avoided.

It is usual to find ice at cape St. John in June; occasionally it is clear and remains clear after the middle of May, but these seasons are not frequent. The ice is usually in strings or bodies, often several days apart: the strings may be avoided, but it is difficult to keep clear of ice that can not be seen over from the hills, and closes the coast as far as the eye can reach. Shelter must be sought, and therefore local experience is required. The cape has telegraphic communication with St. Johns, so that the state of the ice may be known to a certain extent: but the ice often travels fast in the southerly current. For days no ice may be visible from cape St. John, but in a few hours it may come in and close the bay: this occurs between the 1st and 28th of June, seldom later. It is, therefore, impossible to state a safe date, but it may be considered prudent for iron ships not to approach cape St. John before June 10, and wooden ships about June 1.

Within the bay the ice is often kept off the shore by the streams out of the deep arms. A northerly wind packs the ice into Fogo and

to Twillingate (Toulinguet): an easterly wind into cape St. John and Green bays.

Gull island, situated east-northeastward, distant $5\frac{1}{16}$ miles from South bill of cape St. John, is about $\frac{1}{2}$ mile long in an east-north-westerly and west-south-westerly direction, 600 yards wide, and 463 feet high: it is bold-to except on the northern side, a short distance from which are two rocks. A small indentation on the southern coast, at the bottom of the valley between the two hills, affords the best landing.

Light.—A circular tower, 43 feet high, and painted red and white in vertical stripes, on the summit of Gull island, exhibits, at 525 feet above high water, an intermittent white light showing thus: light, eleven seconds: eclipse, nine seconds: which should be seen from a distance of 26 miles in clear weather.

The keeper's house, which is painted white, is situated 112 feet west-southwestward from the lighthouse.

Signals.—The lighthouse is supplied with the International Code signals.

Breakers have been reported to bear 283° , distant about $\frac{1}{2}$ mile from Gull island, by the lightkeeper.

Shoal.—A patch, extending 600 yards in an easterly and westerly direction and 400 yards wide with a general depth of 17 to 20 fathoms over it and $10\frac{1}{2}$ fathoms over its shoalest head, lies with its shoal head bearing 32° , distant $4\frac{3}{16}$ miles from Gull Island lighthouse. There are depths of 60 fathoms close off its northern and southern sides. The sea breaks on the patch in heavy weather.

Bishop rock, lying $2\frac{3}{16}$ miles east-southeastward from South bill, is 30 feet high, small and bare, with a ledge of rocks extending a short distance southwestward of it, but otherwise steep-to.

Shoal rock, bearing 270° , distant 1,400 yards from Bishop rock, has $3\frac{1}{2}$ fathoms water over it.

The shore of Notre Dame bay from South bill trends southward for about $\frac{3}{4}$ mile; it then forms Manful bight $\frac{3}{4}$ mile across and $\frac{1}{2}$ mile deep. A rock with 2 fathoms water over it lies about 200 yards off Manful head on the southern side of the bight. Thence the shore bends southwestward for $3\frac{1}{2}$ miles to Shoe Cove point, the eastern entrance point of Shoe cove. Mad rock lies about 300 yards off the shore at $\frac{3}{4}$ mile from Manful head.

Cooper ledge, bearing 90° , distant $1\frac{1}{4}$ miles from Shoe Cove point and $\frac{1}{2}$ mile offshore, is a patch with 11 fathoms water over it, and 19 to 32 fathoms around.

Tilcey ledge, bearing 148° , distant $\frac{1}{2}$ mile from Shoe Cove point, and Wimbledon ledge, bearing 166° , 1 mile from the same point, are patches with 20 fathoms of water over them.

Shoe cove is an open bight 1 mile wide and 600 yards deep, which affords anchorage in 11 to 14 fathoms of water. A moderate north-westerly gale has been ridden out comfortably at this anchorage when it was impossible to remain at Tilt cove. Monks ground is a ledge extending a little more than 200 yards off the western side of the cove, with $2\frac{1}{2}$ fathoms of water over it. Several landslips mark the hills around this cove and show conspicuously on northerly bearings.

There is a small settlement at the cove.

Water may be obtained from the Brook, a small creek, which flows into the northwestern part of Shoe cove.

Communication.—The steamer on the Notre Dame bay route from Burnt bay calls at Shoe cove weekly in summer and autumn.

Shoe Cove rock, bearing 244° , distant $\frac{1}{2}$ mile from Shoe Cove point, has 8 feet of water over it.

Clearing marks.—Bishop rock, well open southward of the mainland, bearing 64° , leads southeastward; and the summit of Round Harbor head in line with Caplin Cove head, bearing 227° , leads north-westward of this rock.

Rocks.—Tilly ledge, bearing 308° , distant 533 yards from Shoe Cove rock, has $6\frac{1}{4}$ fathoms of least water over it; and Caplin Cove rock, bearing 238° , distant 600 yards from Shoe Cove rock, has 7 fathoms over it.

Lather ledge, bearing 200° , distant 1,600 yards from Shoe Cove point, is a patch with 18 fathoms of water over it; and Foggy ledge, bearing 207° , distant 1,900 yards from the same point, is a patch with 14 fathoms of water over it.

The shore from Shoe cove trends southwestward, forming several coves, for 3 miles to Tilt cove; it is fairly steep-to. Beaver cove grounds, a patch with 9 fathoms of water over it, lies 400 yards offshore at $2\frac{4}{10}$ miles southwestward of Shoe Cove point, and at 600 yards farther south-southwestward are Middle ground, with 18 fathoms water over it, at 600 yards offshore; and Mother Howe bank, with 16 fathoms of water over it, at 900 yards offshore.

The bay off Tilt cove is reported to have depths of not less than 28 fathoms. Its shores are steep-to, and, as the holding ground is bad, it is recommended that vessels having to communicate with the cove should remain under way.

Tilt cove extends 265 yards northward with a width of about 400 feet. A pier extends 186 feet from its western shore, with a depth of 28 feet at low water close to the outer end; the sea occasionally washes completely over this pier, but in ordinary summer weather vessels lie alongside in safety. An anchor should be let go in 9 fathoms of water, at a convenient distance from the pier, and then the vessel may be hauled alongside by hawsers secured to large ring bolts

let into the sides of the cove. A pier also extends from the western entrance point of the cove, and a small white buoy is moored off it. A white building, standing alone halfway up the hill and about 150 yards within the western entrance point of the cove, is conspicuous. Tilt cove is the shipping place of one of the most valuable copper mines in Newfoundland; the mine gives employment to about 500 miners. The village, a large settlement, with a church, is situated around Windsor lake, immediately northwestward of the cove, and contains over 1,000 inhabitants.

Communication.—The steamer on the Notre Dame bay route from Burnt bay calls at Tilt cove weekly during summer and autumn, and connects with the steamer on the northern route.

There is a telegraph office at Tilt cove.

Coal.—About 20 tons of coal may be obtained.

Round Harbor head lies about $1\frac{1}{10}$ miles southwestward from Scrape point, the southwestern entrance point of Tilt Cove bay. The shore forms a bight between Round Harbor head and Scrape point. Round Harbor head is the end of a promontory extending eastward 1,400 yards from the mainland, with a width of 400 yards and a height of 258 feet.

Round harbor is situated immediately westward of Round Harbor head; it is about 400 feet across, and its entrance is 120 feet wide, so it is available for small craft only. A sunken rock lies off the first fishing stage in on the northeastern side, another near the head, and a third just inside the southern entrance point. A heavy sea occasionally makes the entrance almost impassible, but the harbor is always safe.

Snooks arm extends west-northwestward $2\frac{1}{2}$ miles from between Round Harbor head and Pigeon island, which is almost joined to the eastern part of Snooks head and is situated $1\frac{4}{10}$ miles west-southwestward from Round Harbor head. The arm narrows gradually to the brook at its head.

Woody Point rock, bearing 148° , distant 200 yards from Woody point, which is situated $1\frac{7}{10}$ miles westward from Round Harbor head, has 4 feet of water on it.

Mad Moll rock, lying west-northwestward, 400 yards from Pigeon island and 100 yards from the southern shore of the arm, uncovers 3 feet at low water.

Anchorage.—The anchorage at the head of Snooks arm is limited, but the holding ground is good, in 28 fathoms of water. A small but conspicuous white hut on the beach at the head of the harbor, bearing 318° , indicates the middle of the harbor at the anchorage.

Tides.—It is high water, full and change, in Snooks arm at 7h. 12m.; springs rise 4 feet, neaps $3\frac{1}{2}$ feet.

Water.—The watering place is in the northwestern corner of the head of the arm.

Communication.—The steamer on the Notre Dame bay route from Burnt bay calls at Snooks arm weekly during summer and autumn.

The **shore** forms a bight between Pigeon island and Lower bill of Snooks head at 700 yards to the south-southwestward; it then turns to the west-southwestward for $\frac{1}{4}$ mile to Upper bill, and at $\frac{1}{4}$ mile farther is the eastern entrance point of Wild bight, close off which lies an islet 38 feet high. A rock with $2\frac{1}{2}$ fathoms water over it lies 100 yards south-southeastward of Lower bill.

Wild bight.—Mouse point, the western entrance point, is situated 1,700 yards west-southwestward from the eastern entrance point of the bight, and the bight extends northwestward about 1 mile from between them. The bight is open and the water in it is deep.

The **shore** from Mouse point, close off which is a rock with 10 feet water over it, trends westward for 1,700 yards to the eastern entrance point of Indian Burying Ground cove. At 1,300 yards from Mouse point The Harrys, a rock with $1\frac{1}{2}$ fathoms over it, lies 200 yards offshore; and at 265 yards farther westward, and 200 yards offshore, is Head rock, with $4\frac{1}{2}$ fathoms of water over it.

Indian Burying Ground cove is an open cove with a settlement round the shores; it is shallow, and the shoal water falls suddenly to a depth too great for anchorage. A cascade discharges the waters of a brook that flows down the valley at the head.

The **shore** from Indian Burying Ground cove trends west-southwestward for $\frac{1}{2}$ mile to Bobby cove, which is small and shallow; it then turns southward for 900 yards to the eastern entrance point of Buttonhole cove, 100 yards southeastward of which is a rock with $2\frac{1}{4}$ fathoms of water over it.

Mayes ground, a patch with 20 fathoms water over it, bears 90° , $\frac{1}{4}$ mile from the eastern entrance point of Buttonhole cove; West ice ledge, a patch with 10 fathoms of water over it, bears 124° , 1,150 yards, and a patch, with 18 fathoms of water over it, bears 194° , 1,200 yards from the same point.

Buttonhole cove is a small indentation with a store and wharf.

The **shore** from Buttonhole cove trends westward for 1,600 yards to the eastern entrance point of Betts cove. Betts island, 29 feet high, lies 100 yards offshore at 900 yards westward of Buttonhole cove. Budgells ground, a patch with 16 to 19 fathoms of water over it, bears 210° , distant 1,300 yards from Betts island.

Betts cove.—The entrance points of Betts cove bear southwestward and northeastward, distant 700 yards from each other, and the cove extends northwestward, nearly $\frac{1}{2}$ mile, narrowing gradually to its head; the water in it is deep till abreast the wharves, after which

it shoals suddenly; it is open to the southeastward, but the heaviest swell rolls in during and after northerly gales. A valuable copper mine, situated to the westward of the cove, is being worked, and there is a considerable settlement; wharves line both sides of the inner portion of the cove; the various buildings, such as smelting houses, are conspicuous; and a tramway connects the mine with the harbor.

Buoy.—A red buoy, to which vessels are temporarily secured, is moored in 26 fathoms of water, close southeastward of the wharves, and there are ringbolts (the position of each of which is shown by a whitewashed mark) in the sides of the cove, to aid vessels in hauling to the wharves.

Water.—A considerable stream flows into a rugged cove, close inside of the northeastern entrance point, from which water can be readily obtained.

Communication.—The steamer of the Notre Dame bay route from Burnt bay calls at Betts cove weekly during summer and autumn.

Betts head, situated south-southwestward, 1,200 yards from the southwestern entrance point of Betts cove, is 432 feet high: an islet 10 feet high lies close off it, 65 yards east-northeastward of which is a small bare rock nearly joined to the head, with a house standing close above it: between the islet and rock is a small bight, where lighters could load ore in fine weather. A waterfall runs into this bight. The land about Betts head is reddish in color.

Betts bight.—Green point lies west-southwestward 1,400 yards from Betts head, and between them is Betts bight, which is only 300 yards deep.

The shore from Green point trends west-southwestward, $1\frac{6}{10}$ miles to Harbor point: it is steep-to at the distance of about 100 yards. The land westward of Betts bight is grayish and partially wooded.

Nippers islands are a group containing six principal islands and several rocks.

Gull island, the eastern, situated southwestward, 1,400 yards from Green point, is about 300 yards long in an easterly and westerly direction, and 45 feet high. A ledge, with general depths of 13 to 19 fathoms over it, extends eastward 1,400 yards from the island, but over that part of it which is within $\frac{1}{4}$ mile from the island the depths are 5 to 8 fathoms. Gull Island ground is a patch on this ledge with 10 fathoms water over it. A patch with 18 fathoms water over it bears 80° , distant nearly 1 mile from Gull island.

Gull rock, 12 feet high, lies about 300 yards westward of Gull island, and between are some rocks above water which are joined together at low water. A shoal extends nearly 100 yards west-southwestward of Gull rock.

Alexander rock bears 228° , 400 yards from Gull rock, and a shoal, with a depth of $3\frac{1}{2}$ fathoms water, extends northeastward 150 yards from it.

Seal island, 80 feet high, lies southwestward, 600 yards from Alexander rock, and Riding, Fox, and Duck islands lie between, all being connected by shoal water and rocks.

Green island, 90 feet high, lies north-northwestward, a little over 100 yards from Seal island.

Light.—A square lighthouse, about 31 feet high and painted white, with one red horizontal band, on Seal island, exhibits at 111 feet above high water a fixed red light which should be seen from a distance of 17 miles in clear weather.

The light tower rises from the middle of the keeper's dwelling. The light is shown during the season of open navigation.

Nippers harbor.—The entrance to this harbor, between Harbor point and a point west-southwestward of it, is 250 yards wide, and the harbor extends thence northwestward for 400 yards, where it is crossed by an island, beyond which are two basins. The harbor affords anchorage for moderate-sized vessels in 10 to 12 fathoms water, mud bottom, and ringbolts have been fixed in the rocks for convenience in mooring. The shores are bold, with the exception of a rock about 65 yards westward of Harbor point and a rock close to the western entrance point.

The western basin has shoal water extending from a brook in its western corner, leaving an anchorage, with good shelter for small vessels, 100 yards across, with 5 to 6 fathoms of water in it. The eastern basin of Nippers harbor dries across the mouth at low water, but is 4 to 5 fathoms deep within the bar.

There is a small village with a church on the southwestern shores of the harbor, and a chapel, painted yellow, stands on a hill above the western entrance point.

Communication.—The steamer of the Notre Dame bay route from Burnt bay calls at Nippers harbor weekly during summer and autumn.

There is a telegraph station here.

Noble head, a promontory of dark gray rock, 200 yards in width, with a flat summit 215 feet high and covered with grass, extends eastward 700 yards from the shore line at $\frac{1}{4}$ mile southward of Nippers harbor entrance. A ledge on which there are two remarkable pinnacle rocks runs east-southeastward nearly 200 yards from its southeastern end, and, bearing 70° , distant 400 yards from the southeastern end, is a bank with 11 feet least water over it, from which there are depths of $3\frac{1}{2}$ fathoms for 200 yards westward.

Noble cove, on the northern side of Noble head, is fringed by rocks, open to easterly winds, and unfit for anchorage.

The shore.—Green head bears 233° , distant $1\frac{7}{10}$ miles from Noble head, and the shore between is high and steep-to at the distance of 200 yards.

Rogues harbor.—The entrance of Northwest arm and Rogues harbor lies between Green head and a point lying 600 yards southward from it. The arms divide inside the entrance.

A rock with 5 feet of water over it lies in the middle of the entrance, and a rock with 15 feet lies close northwestward of it. There is a depth of $4\frac{3}{4}$ fathoms between these rocks and Green head, but the best channel, with 17 fathoms of water in it, is southward of them.

Northwest arm extends west-northwestward about $\frac{1}{2}$ mile; it affords no anchorage for large vessels, but small craft shelter in 7 fathoms of water, off the shingle beach at the head.

Rogues harbor extends southwestward about 1,600 yards and, at about halfway in, the channel narrows to a width of 70 yards, with a depth of $4\frac{1}{2}$ feet in it at low water, but within this bar is a basin with 11 fathoms of water in the middle, decreasing gradually in depth to the head. Avoid anchoring in the eastern corner of the basin, as very heavy squalls sweep over the neck of the peninsula during northeasterly winds. There is a copper mine at the head of this harbor.

Green bay, the entrance of which is between the southwestern entrance point of Rogues harbor and Green Bay island, which is situated $2\frac{1}{10}$ miles to the southward, extends southwestward for 15 miles. Northwest and Middle arms branch off on the northwestern side, and the inner part is known as Southwest arm.

The shore of the bay trends southwestward from the southwestern entrance point of Rogues harbor for $1\frac{6}{10}$ miles to the northeastern entrance point of Stocking harbor. King island, 70 feet high, forms the southwestern side of the entrance to the harbor, and close eastward of it is Pigeon islet, 40 feet high. Burnt islet, 56 feet high, lies in the entrance at 200 yards eastward of Pigeon islet, and there is a 5-fathom patch at 200 yards eastward of it.

Stocking harbor is a bight, nearly a mile across at its entrance, extending northwestward about 1,200 yards, and a narrow and shallow arm runs in to the westward, $\frac{3}{4}$ mile within King island. The anchorages in it are available for small vessels only.

East Stocking harbor, where there are a few houses, is an inlet on the northeastern side of Stocking harbor, 500 yards in extent, and 135 yards wide, and the best place of refuge for small vessels, which anchor in 10 fathoms water at the entrance, or less water inside, the depth decreasing gradually to the head.

John Smith harbor, 500 yards westward of King island and northwestward of John Smith island, affords anchorage for small craft in 9 to 12 feet water.

Rock.—A rock, with $7\frac{1}{2}$ feet water over it, bears 226° , distant 800 yards from the southeastern point of King island. Seal island, open southward of the land southwestward of Rogues harbor, bearing 59° , leads close southeastward of this rock.

The shore from John Smith harbor trends west-southwestward for a mile to Young head, the northeastern entrance point of Northwest arm.

Northwest arm extends northwestward $1\frac{4}{10}$ miles from its entrance between Young head and a point 1,200 yards to the southwestward. It is an excellent harbor. A shoal extends about 300 yards off Rix point, on the northeastern side of the arm at 800 yards within Young head, and a patch of $4\frac{1}{2}$ fathoms bears 245° , distant 400 yards from the same point.

A rock, that uncovers 1 foot, lies 100 yards eastward from the northern entrance point of Winterhouse cove, a considerable bight on the western shore. There are houses in Winterhouse cove and Rix cove, which latter is situated on the northeastern shore at $\frac{1}{2}$ mile north-northeastward of Young head.

Anchorage.—Anchorage may be obtained as convenient in the northern part of Northwest arm, with good holding ground in 10 to 7 fathoms water, giving the shore a berth of over 300 yards.

Tides.—It is high water, full and change, in Northwest arm at 7h. 9m.; springs rise 4 feet, neaps 3 feet.

Communication.—The steamer of the Notre Dame bay route from Burnt bay calls at Northwest arm weekly during summer and autumn.

The shore from the southwestern entrance point of Northwest arm trends southwestward for $1\frac{2}{10}$ miles to the northern entrance point of Middle arm. Small gray cliffs line the shore, and are interspersed with beaches of shingle.

Lower island, 22 feet high, and Upper island, 24 feet high, are two bare rocks that are joined to this shore by bowlders covering at high water. The former lies $\frac{1}{2}$ mile and the latter $\frac{1}{10}$ mile from Northwest arm, and both show prominently against the dark, wooded shore.

A rock with 12 feet of water over it is situated 100 yards from the shore at a distance of 450 yards southwestward of Upper island.

Two patches of $4\frac{1}{2}$ fathoms lie at 215° , distant 1 mile, and at 220° , distant $1\frac{3}{10}$ miles, respectively, from the southwestern entrance point of Northwest arm.

Middle Arm rock, 1 foot high, and surrounded by shoal water, is situated close to the northern entrance point of Middle arm, about $\frac{1}{3}$ mile from the shore. There is a passage between the shoals and the northern shore, but it should not be used except in cases of emergency, as the sea rolls from the shoals to the shore in heavy weather.

Middle arm is 1,600 yards wide at its entrance, and it extends westward for 2 miles to the sandy spit at the end of the first reach, beyond which there is barely passage for a boat.

Anchorage.—At $1\frac{1}{2}$ miles within the entrance the arm narrows to 800 yards in breadth, and this is the eastern limit of the anchorage in 16 fathoms; for $\frac{1}{2}$ mile farther westward, there is anchorage in 14 to 10 fathoms water, good holding ground.

Southwest arm, the entrance to which is between the southern entrance point of Middle arm and Birchy Cove head, at about 1,400 yards to the southeastward, extends southwestward for $6\frac{1}{2}$ miles, and then turns southward for $2\frac{1}{2}$ miles. The water in the arm is generally deep.

Naked man, a pillar of rock 14 feet high, stands close to the southeastern shore at $2\frac{1}{2}$ miles southwestward of Birchy Cove head.

There are copper mines on each side of this rock, the localities of which are indicated by the houses on the shore: the mine situated next southwestward of Naked man has a wharf.

Anchorage.—Corner brook cove is situated on the western shore of the arm at $6\frac{3}{4}$ miles within the entrance. Stearin rock, a small islet 13 feet high, is on the southern side of the cove, and Rattling brook, a waterfall, descends into its northern side. Anchorage may be obtained here by small vessels in 18 fathoms water, but the holding ground is not good.

At $1\frac{1}{10}$ miles southward of Stearin rock is a point projecting slightly from the line of the coast. A shoal with 11 feet of water over it extends in a northeasterly direction nearly $\frac{1}{4}$ mile from this point.

Manful point is a projection of shingle on the eastern shore opposite Corner Brook cove. Anchorage for large vessels may be obtained, on a plateau extending from the shore southward of this point, in depths of 20 fathoms at the distance of 650 yards and 10 fathoms at $\frac{1}{4}$ mile, respectively, from the shore, with good holding ground.

King point, near the head of Southwest arm, is low and flat, with a few houses on it and some land under cultivation. The head dries 200 yards from the high-water line, and the depth increases suddenly beyond to 15 fathoms. South brook lies a mile east of the head and is a fine stream, draining the valley leading to Halls bay. The deposit from the brook dries at low water for a distance of 300 yards from the mouth, and the water deepens suddenly beyond.

Tides.—It is high water, full and change, in Southwest arm at 7h. 8m.

Telegraph station.—There is a telegraph station on the western shore, near the head of the arm.

Ice.—Southwest arm of Green bay freezes between December 25 and January 15, and the ice breaks up between April 15 and May 15.

The southern shore of Green bay eastward of Birchy Cove head rises to wooded headlands, the most conspicuous of which, Nicky nose, is a steep bluff 426 feet high.

Several coves indent the shore and afford anchorage for vessels, with shelter from offshore winds.

Birchy cove lies in the middle of the bight between Birchy Cove head and Western point of Jackson cove, at 1 mile to the east-north-eastward.

Jackson cove.—Eastern point of Jackson cove is situated about $\frac{1}{2}$ mile east-northeastward of Western point, and Jackson cove extends south-southeastward about 800 yards from between them. The cove is fringed by beaches of shingle, and some rocks with shoal water extend about 200 yards from the eastern side of Western point headland.

Fishing rock, with $3\frac{1}{2}$ fathoms of water over it, is the shoalest part of a bank lying off the mouth of Jackson cove, bearing 31° , distant $\frac{1}{3}$ mile from Western point.

Anchorage.—There is anchorage in Jackson cove, sheltered, except from northerly winds, in 13 to 16 fathoms, but the water shoals suddenly; the vessel must have room to swing clear of Fishing rock.

Communication.—The steamer of the Notre Dame bay route from Burnt bay calls at Jackson cove weekly during summer and autumn.

Harry head, the western entrance point of Salmon cove, lies east-northeastward, $2\frac{1}{2}$ miles from Eastern point of Jackson cove.

Rocks.—A rock awash at high water bears 258° , distant 400 yards, and a rock, with 8 feet water over it, 52° , 400 yards from the extreme of Nicky nose, which is situated eastward, $1\frac{1}{2}$ miles from Eastern point.

Salmon cove is 700 yards wide at its entrance and extends southward about the same distance: it is bordered by a shingle beach. A schoolhouse, with a flagstaff near it, stands on the highest part of the land between the cove and Western arm.

A shoal, with 4 fathoms water over it, lies just within Salmon rock, which is 16 feet high and situated at the eastern entrance point of Salmon cove.

The shore from Salmon rock trends east-northeastward, $1\frac{1}{10}$ miles to a point at the end of the promontory separating Green bay and Western arm.

Green Bay island, a little over 200 yards northeastward of the promontory, is 202 feet high, wooded and faced by dark gray cliffs:

rugged rocks lie all along its coasts, but there is deep water at 200 yards from the island, except between it and the promontory.

Green Bay rock, 9 feet high, bears 120° , distant $\frac{3}{4}$ mile from the northeastern point of Green Bay island, and is the middle of a reef 400 yards long in an easterly and westerly direction, over which the sea breaks in easterly gales.

Three arms, the entrances to which lie between Green Bay island and Little Bay head, are named Western, Middle, and Southern arms, respectively.

Brandies reef is a group of rocks, the highest of which dries 3 feet at low water, bearing 157° , distant 550 yards from the southeastern point of the promontory separating Green bay and Western arm; a shoal, with $1\frac{1}{2}$ fathoms water over it and a rock with less than 6 feet water over it at its end, extends east-northeastward 300 yards from these rocks, and for 300 yards farther east-northeastward there are depths of $5\frac{1}{4}$ to 10 fathoms. The southern entrance point of Rogues harbor, open eastward of Green Bay island, bearing 345° , leads eastward of these rocks.

Western arm extends about southwestward $4\frac{1}{2}$ miles from Blackberry head, its southern entrance point; it is generally about 600 yards in width, but at $2\frac{7}{10}$ miles within the entrance it narrows to 400 yards for a short distance; the arm affords anchorage in several of the coves that indent its shores.

Harry harbor, a shallow indentation on the northern shore with its entrance situated westward, $1\frac{3}{10}$ miles from Blackberry head, is suitable for small vessels, having only 9 feet in the entrance at low water.

Harry Harbor rock, with 1 foot water over it, lies in the fairway and just southward of the entrance; vessels entering should buoy the rock beforehand.

Shoal.—Windsor cove is situated a mile southwestward from Harry Harbor rock, and a rock awash at low water bears 130° , distant 400 yards from the southern entrance point of the cove. This rock is near the western side of a bank which extends 500 yards in an east-northeasterly and west-southwesterly direction, with a width of 265 yards, and has depths of $1\frac{1}{2}$ to 8 fathoms over it. A patch of $5\frac{3}{4}$ fathoms bears 100° , distant 500 yards, and a patch of 8 fathoms bears 124° , distant 350 yards, from the rock.

Bear Cove point, southwestward $\frac{9}{10}$ mile from Windsor cove, is the end of a promontory 185 to 239 feet high, on the northwestern side of which is Bear cove. This cove is about $\frac{1}{2}$ mile in depth and rather less than 400 yards in width, with 9 to 21 fathoms of water in it.

Rock.—A rock that dries 3 feet bears 245° , distant 600 yards from Bear Cove point, and shoal water extends northeastward and south-

eastward nearly 200 yards from it. A ledge connects this rock with the land to the westward; there are depths of 5 to 9 fathoms of water over it, but 200 yards off shore is a rock 1 foot high.

About 400 yards westward from Bear Cove point is a bank with a least depth of 5 fathoms water over it.

Clearing mark.—The southeastern side of the peninsula forming Harry harbor open southeastward of Bear Cove point promontory bearing 57° , leads close southeastward of the rock drying 3 feet and the shoal water southeastward of it.

Anchorage.—Windsor point lies west-southwestward, distant 1,400 yards from Bear Cove point, and anchorage may be obtained in depths of 20 to 17 fathoms, to the southwestward of Windsor point and near the head of the arm.

Dollond arm, a shallow indentation eastward of Dollond Arm head, a round wooded hill, 323 feet high, forming the southeastern side of the narrows, affords anchorage to small craft, off the entrance, in 15 fathoms of water.

Welsh cove, the entrance of which lies eastward 800 yards from the western entrance point of Dollond arm, is about 700 yards long eastward and westward, and 400 yards broad; its entrance is narrow, and the channel is contracted to 100 yards by a rock, with 11 feet of water over it, extending northward from the southern entrance point, and by shoal water extending a short distance from the northern entrance point.

There is a depth of 4 fathoms in the entrance channel, and the cove is about 8 to 13 fathoms deep at 135 yards off its shores; good anchorage may be obtained by vessels of moderate length in 12 fathoms of water, mud bottom. A buoy should be placed on the rock off the southern entrance point previous to entering.

The shore.—At 300 yards northward of the northern entrance point of Welsh cove is a copper mine, the shaft of which is close to the shore; the manager's dwelling-house, a conspicuous wooden building, is situated northward of the shaft.

The shore is foul for nearly 200 yards off it, from Welsh cove northward to the next prominent point, a distance of about 800 yards, but anchorage may be obtained westward of the mine, in 15 fathoms of water, mud bottom.

The shore from the point at 800 yards northward of Welsh cove trends northeastward for $1\frac{1}{4}$ miles, with foul ground extending rather more than 200 yards off it for about 1,200 yards northeastward of the point; the shore then forms a small bight and continues eastward for 800 yards to Blackberry head.

Blackberry head is an islet about 100 yards across and 44 feet high, lying close off the northern part of Western head, with which it is connected by a reef.

Hennessy and Three Arms islands lie in the entrance of Middle arm. The eastern end of Hennessy island lies eastward 2,300 yards from Blackberry head, and the island thence extends west-southwestward 1,800 yards. It is of very irregular shape and much broken up; its highest part is 205 feet high. Foul ground extends 200 yards off its coasts in places. Three Arms island extends from 150 yards southwestward of Hennessy island, 1,200 yards southwestward, and its width varies from 100 yards to 400 yards: its height is 150 feet.

Old Billy, a rock with 3 feet water over it, lies on a ledge which stretches eastward 300 yards from the northeastern end of Three Arms island.

The channel westward of Hennessy and Three Arms islands requires local knowledge for its navigation, as its narrowest part is only 150 yards in width, and a shoal extends over 100 yards from the western side of Three Arms island.

South Arm point, the southern entrance point of Middle arm, bears southward 750 yards from the eastern end of Hennessy island. At 100 yards off the southeastern shore of the arm, 700 yards westward of the point, is a shoal with 12 feet water over it, and at 800 yards farther west-southwestward Long rocks extend 100 yards off the shore. The channel between Long rocks and the shoal water southward of Old Billy is somewhat more than 100 yards wide.

Middle arm runs $1\frac{1}{10}$ miles in a west-southwesterly direction from the southern end of Three Arms island, with a width of about 300 yards, and it affords excellent anchorage in 10 to 15 fathoms of water, mud bottom. On its northwestern side, at 950 yards southwestward of Three Arms island, are a conspicuous stage and a few houses. The arm is clear of shoals at about 80 yards off its shores. A sunken bowlder about 50 yards off the southern shore, at 200 yards distant from the head, must be avoided in anchoring.

Directions.—When northward of South Arm point bring the stage on the northwestern shore of the arm just open southwestward of Three Arms island, bearing 244° ; keep this mark on until the western end of Hennessy island is just shut in by the eastern end of Three Arms island, bearing about 339° , and then in mid-channel to the anchorage.

Southern arm extends southwestward in nearly a straight line, $4\frac{1}{2}$ miles, from southward of South Arm point to its head, with a width of 600 to 200 yards.

Small island lies in the middle of the arm at $1\frac{3}{4}$ miles southwestward of South Arm point; a shoal with 1 to $\frac{1}{2}$ fathoms water over it, having a rock that dries 2 feet near its northern end, extends northward a little over 200 yards from the island, while at 150 yards

northwestward of the island is a 13-foot patch. Big island lies in the arm immediately southwestward of Small island.

The northern shore must be kept aboard in taking the passage northwestward of these islands, which is only 100 yards wide, and has a depth of 4 fathoms in it.

At $\frac{1}{2}$ mile west-southwestward of Little Bay head, Long rocks extend 150 yards off the southeastern shore of the arm; and in the narrows southeastward of Big island, and just northward of the northern entrance point of Shoal arm, a spit with 2 fathoms of water over it extends 100 yards into the channel.

Leading mark.—A low islet, 100 yards off the southeastern shore at 1,200 yards from the head of the bay, in line with the southeastern side of Dick head, a hill 137 feet high on the northwestern shore of the arm at about a mile southwestward of Big island, bearing 230° , leads through the channel between Big island and the spit extending from the southeastern shore.

Shoal arm, situated 3 miles southwestward of Little Bay head, is entered through a channel about 55 yards wide, in which is a depth of 13 feet of water, and has 7 to 9 fathoms within. A rock with 8 feet of water over it lies 100 yards distant from the middle of the eastern shore of this arm.

Communication.—The steamer of the Notre Dame Bay route from Burnt bay calls at Three arms weekly during summer and autumn.

Little Bay head falls in steep cliffs at the end of the slope from a conspicuous conical hill 657 feet high, situated southwestward 1 mile from its northeastern end. Close off Little Bay head is Little Bay Head islet, 31 feet high.

The shore of Notre Dame bay from Little Bay head trends southeastward for 400 yards to North bill, and thence southward $1\frac{1}{10}$ miles to South bill, the northern entrance point of Wild bight.

Wild bight, the shores of which are foul for the distance of about 150 yards, affords anchorage for small vessels, in 10 to 13 fathoms of water, with shelter from northerly and westerly winds, but the holding ground is not good. With light northeasterly winds a swell sets in, and when the wind is strong the whole of the bight appears to be breakers. Red island, 120 feet. and Red Island rock, 38 feet high, form the southern entrance point of Wild bight.

Ice.—Icebergs frequently drift into Wild bight during June, July, and August after the pack ice has left Notre Dame bay.

Indian bight.—The shore from Red island trends southwestward for $4\frac{1}{2}$ miles to the head of Indian bight; sunken rocks extend northward 200 yards from the southern entrance point of the bight, at 1,300 yards from the head.

There is a settlement at the head of the bight, and at its north-western end is a white church with a spire.

A wharf projects from the middle of the beach, and there is a depth of about 16 feet at low water alongside it, but a small rock, which dries 3 feet at low water, lies close northeastward of the wharf. The local steam vessels pass between the wharf and the rock.

Dog stones, two rocks awash at high water and surrounded by shoals, altogether nearly 400 yards long, east-southeastward and west-northwestward, are situated in the middle of Indian bight at 400 yards from the head; there is a narrow passage between the Dog stones and the shoal water extending from the western shore, but the best passage, 150 yards wide, is southeastward of them.

A valuable copper mine is situated in the valley between two hills on the southeastern side of the bight. A tramway runs from the mine to a wharf in Little bay and a road to the settlement at the head of Indian bight.

Anchorage, sheltered from offshore winds only, may be obtained by one or two small vessels, in $4\frac{1}{2}$ fathoms water, off the wharf, but a heavy sea rolls in with northeasterly winds.

Telegraph.—There is a telegraph office here.

Water can be obtained readily from a stream flowing into Shimmy cove, which lies immediately east-northeastward of Indian bight.

Otter island, 352 feet high, and densely wooded, lies at the entrance to Little bay and forms two passages to it. That westward of the island is nearly barred by rocks, but there is a narrow channel, with a depth of 13 feet in it at low water; the channel southeastward of Otter island, though only 60 yards wide, has 11 fathoms of water in mid-channel.

Little bay is situated southward of Indian bight, the dividing point being a small bluff.

There are large copper works and a wharf situated immediately southward of the western entrance, on the northwestern shore of Little bay, and vessels drawing 24 feet load alongside, or anchor off it in 13 fathoms water, but it is necessary to moor, as the space is limited; temporary anchorage may be taken up farther out in 22 fathoms.

Tides.—It is high water, full and change, in Little Bay wharf at 7h. 22m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Communication.—The steamer on the Notre Dame bay route from Burnt bay calls at Little bay weekly during summer and autumn.

Coal and supplies.—Cape Breton coal might be obtained from the mining company, which usually has some 50 tons in stock; vessels can coal alongside the wharf; provisions in small quantities can generally be obtained.

Shoal.—A shoal patch, with 15 feet water over it, lies 150 yards off the northwestern shore of Little bay, in a position bearing 215° , distant 1,550 yards from the southwestern end of Otter island.

Little Shellbird bight, the first deep bend on the southeastern shore of Little bay, is barred in its western approach by a shoal connecting the southwestern entrance point with Grassy islet and Little Shellbird island, which lies 1,900 yards southwestward of Otter island; and a shoal, with 15 feet water over it, extends southeastward 150 yards from Little Shellbird island, leaving a passage of that breadth between it and the southeastern shore of Little bay.

Shellbird bight, southward of Shellbird island, which is situated $\frac{1}{2}$ mile southwestward of Little Shellbird island, affords anchorage for small vessels in 7 to 8 fathoms water: it is entered from the westward, because a bar, with 16 feet water over it, connects the eastern side of the island with the mainland.

Shoal harbor is on the southern shore at $\frac{1}{2}$ mile west-southwestward of Shellbird island, where there is a mine; two islets, 35 and 70 feet high, respectively, form the western side of its entrance, in which there is a depth of 6 feet water; a rock that uncovers lies in the middle, and other rocks lie close northeastward of the entrance.

Little bay decreases in width to 200 yards at 1,200 yards within Shoal harbor and 1 mile from the head, and the available channel is still further narrowed to 100 yards by a shoal extending from the southeastern shore.

Anchorage may be obtained by small vessels at the head of the bay, in Northeast bottom, in 5 fathoms, or in Southeast bottom, in 9 fathoms of water.

Ice.—Little bay usually freezes between January 1 and 20, and is completely blocked with ice about 2 feet thick, but it is sometimes open in winter; the ice generally clears early in May; navigation has been closed as late as June 9. Field ice appears about January 10, and leaves early in May. The last vessel generally leaves early in January, and the first vessel arrives early in May.

Bay.—From between the northeastern end of Otter island and Beaver Cove head, at $1\frac{2}{10}$ miles eastward, a bay extends southward $1\frac{2}{10}$ miles.

Rock.—A rock with 13 feet of water over it lies 150 yards off the eastern coast of Otter island at 700 yards southward of its northeastern point.

Tom Cod rock, a small pinnacle that dries 3 feet at low water, bears 123° , distant 1,150 yards from the northeastern point of Otter island. A rock with 12 feet of water over it is situated 100 yards westward of Tom Cod rock.

Leading mark.—The apparent northwestern side of Little bay in line with its eastern entrance point, bearing 232° , leads northwest-

ward of Tom Cod rock and between it and the rock lying off the east coast of Otter Island.

Little Ward harbor extends west-southwestward 800 yards from the head of the bay between Otter island and Beaver Cove head and is 350 yards wide, but has only 13 feet of water in the entrance, and the anchorage is not available for vessels drawing more than 10 feet of water.

Beaver Cove rock, lying west-southwestward nearly 200 yards from Beaver Cove head, has 15 feet of water over it.

The coast from Beaver Cove head trends eastward for $1\frac{4}{10}$ miles to Hall Bay head, the northwestern entrance point of Hall bay. Little Bay island lies northeastward $1\frac{1}{10}$ miles from Hall Bay head, and the following-described islands and shoals lie in the channel between them:

Grassy island, which bears 345° , distant 600 yards from Hall Bay head, is 39 feet high. At 100 yards northward of Grassy island is Tub islet. These islands are situated on a bank with $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms of water over it, extending 100 yards northward and southward from them. A patch of 2 fathoms bears 138° , distant 400 yards from Grassy island, and there is a channel with 7 to 9 fathoms of water in it between them.

Fox islands are two islands 100 yards apart in an easterly and westerly direction, 50 and 65 feet high, respectively. The western island lies 1,700 yards northward from Hall Bay head. There is a rock with less than 6 feet water over it in the channel between these islands.

Red island, 58 feet high, is 500 yards south-southeastward of Fox islands, and there is a depth of 7 to 8 fathoms in the channel between them. A shoal spit extends southward 350 yards from Red island, and on the spit, near its southern end, is Compton rock, which is awash at low water. Copper island, 159 feet high, lies east-southeastward 800 yards from Red island. Merab ledge, with 3 fathoms of water over it, bears 349° , distant 200 yards from the northern extremity of Copper island, and a patch with $3\frac{1}{4}$ fathoms of water over it bears 165° , distant 350 yards from Copper island.

Little Bay island is $2\frac{2}{10}$ miles long in a northerly and southerly direction and about $1\frac{7}{10}$ miles broad: it contains two good harbors for small vessels.

Suleyann cove is on the southern side of the island between Iron and Hynes points, which bear west-northwestward and east-southeastward, distant about 1,600 yards from each other. A beach of shingle lines the shore of the cove, inside which is a small settlement containing several conspicuous white houses.

Some yellow rocks, the highest of which is 1 foot high, lie off the southeastern point of Suleyann cove, and foul ground extends southeastward and westward 200 yards from them. The summit of Little

Bay head in line with Hynes point, bearing 328° , leads midway between these rocks and Copper island. Shoal ground and rocks that cover extend 200 yards from the beach in Suleyann cove.

Communication.—The steamer from Burnt bay calls at Little Bay island weekly during summer and autumn.

North harbor, in the northeastern part of the island, is entered between North head and Harbor island through a channel 100 yards wide. There is a small cove in the southern shore, with a few houses around it, where anchorage may be obtained in 8 fathoms water, mud bottom.

The western fishing stage in the cove, half open northwestward of the eastern entrance point of the cove, bearing 233° , leads in mid-channel between the shoals. When the stage on the northern shore bears to the right of 330° , steer for the middle of the harbor and anchor as convenient.

Southern harbor, in the southeastern part of the island, is entered through a channel 70 yards wide, with a depth of 4 fathoms water in it, between Goat island, which is partially wooded and 86 feet high, to the northeastward, and Macks island, 140 feet high and faced by gray cliffs, to the southwestward.

The harbor, surrounded by a settlement, is 600 yards long and 500 yards broad, having depths under 3 fathoms, except in a space 350 yards northward and southward and 150 yards wide, situated immediately within the entrance.

Black rock, a bare islet 7 feet high, lies east-southeastward, 600 yards from Goat island.

Black Rock sunken, bearing 207° , distant 200 yards from Black rock, uncovers 2 feet at low water, and is generally shown by a breaker; and Black Rock ground bearing 176° , distant 400 yards from Black rock, is a patch with $6\frac{3}{4}$ fathoms over it.

Hall bay, a picturesque arm of the sea, extends southwestward 17 miles, with an almost even breadth of $1\frac{1}{2}$ miles; the land on the northwestern side is reported to contain large quantities of copper.

Communication.—A road will connect Hall bay with the Northern and Western railway, at a point 4 miles westward of Badger brook, the distance being about 44 miles. This road had not been completed at the close of 1908.

Saltwater Pond bay.—Saltwater Pond point, on the northwestern shore at $4\frac{1}{2}$ miles within the entrance of Hall bay, is the northeastern entrance point of Saltwater Pond bay, a bight extending 1,600 yards northwestward, from the head of which, Saltwater pond, a shallow arm of the sea, extends to within a short distance from Little Ward harbor.

The anchorage in Saltwater Pond bay is considered the best in Hall bay; the anchoring space is about 500 yards in extent, shoal-

ing gradually to the shores from 7 fathoms of water in the middle. No supplies can be obtained here.

Island Rock cove, on the northwestern shore at $11\frac{1}{2}$ miles within the entrance, has several houses on its shore: the mine wharf projects from the eastern part of the cove, and bearing 152° , distant nearly 200 yards from it, is a rock, awash at low water. The wharf, bearing 312° , leads northeastward, and the summit of Burnt island, shut in with the northwestern end of Green island, bearing 216° , leads southeastward of this rock and a bank extending southwestward from it to a small islet.

Lower Wolf cove, immediately southwestward of Island Rock cove, affords anchorage for small vessels close to the shore, but there is no secure position for a large vessel, since depths of 30 fathoms are found at 300 yards distant from the shore.

A steam sawmill and several houses are on the shores of Lower Wolf cove, and a small jetty has been built for shipping purposes. The settlement is named Springdale.

A steam sawmill stands on the northwestern side of Green island, southeastward of Lower Wolf cove, and is conspicuous from the southwestward, but only the exhaust steam and flagstaff are visible from the northeastward.

A shoal with 2 fathoms of water over it, bears 51° , distant 400 yards from Green island.

Burnt Island anchorage.—Small vessels anchor off the first cove southwestward of Burnt island, where the bank extends 335 yards from the shore to the depth of 10 fathoms, but the water deepens suddenly to 60 fathoms, while depths of less than 3 fathoms will be found 100 yards from the shore.

Dock point.—A conspicuous white house stands on Dock point, on the northwestern shore at nearly $2\frac{1}{2}$ miles from the head of the bay.

Riverhead brook, a considerable stream, flows into the head of Hall bay and the deposit from it has formed flats of sand that extend across the entrance and for $\frac{1}{4}$ mile to the southeastward from Eaton point, falling quickly to deep water.

Anchorage may be obtained in the southern part of the head of Hall bay in 10 to 23 fathoms water as convenient, the latter depth being $\frac{1}{3}$ mile from the shore, or when White point, where there are some houses, is in line with the northern end of Wolf head, bearing 59° . Small vessels shelter about $\frac{3}{4}$ mile east-northeastward of Eaton point; depths of less than 10 fathoms extend 300 yards from the shore, and deepen quickly to 24 fathoms.

Ice.—Hall bay freezes between the end of January and early in February, and the ice breaks up between April 20 and May 3.

Tides.—It is high water, full and change, in Hall bay at 7h. 16m.; springs rise $5\frac{1}{2}$ feet, neaps rise $3\frac{1}{2}$ feet, neaps range 2 feet.

Wolf cove, eastward of Wolf head, is 800 yards deep, 750 yards wide at the entrance, and 400 yards wide at the head: the depths range from 33 fathoms in the entrance to 8 fathoms close to the head, and the shoal water which fringes the shores falls steeply to depths suitable for the largest vessels.

Communication.—The steamer from Burnt bay calls at Wolf cove weekly during summer and autumn. There is a road from the cove to Little bay.

Boot harbor is situated on the southeastern shore at $7\frac{1}{2}$ miles north-eastward of Wolf head and immediately eastward of Boot Harbor head, a bold bluff surmounted by a wooded hill 250 feet high: here is a shingle mill worked by the water of a cascade falling into the harbor; also a wharf, having some white houses near it, and a rock, with 1 foot water over it, bearing 20° , distant 200 yards from its outer end.

Anchorage may be obtained in Boot harbor, in 12 to 15 fathoms water, at 400 yards from the shore; the best position is with the wharf bearing 149° , and the northern end of the largest wooded islet on the southwestern side of the harbor, 272° .

Sunday Cove island tickle, the passage between Sunday Cove island and the mainland, is not available for vessels drawing more than 12 feet, and even these should not attempt it at low water, for though the general depth over the bar toward the eastern end is not less than 13 feet, and there are one or two spots where bowlders rise above that level. The bottom is visible and, for vessels of suitable draft, the navigation is easy.

From the northwestward and having rounded the rock that dries off Mooring cove, steer a little northward of the middle of the channel so as to bring the end of Burnt head just open of the eastern point of Mooring cove. Keep this line until nearly abreast Shoal Arm point, and then steer to pass close to the rounded headland facing Woodfords arm.

The mail steamships of the Newfoundland coast service, drawing about 12 feet water, use this passage regularly.

There is good anchorage at the western entrance of Sunday Cove Island tickle in 6 to 10 fathoms; the chart is a sufficient guide.

Sunday cove.—Eastward of the tickle just described is a large bight known as Woodfords arm. Its shores are shallow for some distance off, but there is anchorage in the middle of the bight in 11 to 12 fathoms, mud bottom. Strong southwesterly winds blow across this bight in violent squalls from off the neighboring hills.

Eastward of Woodfords arm, Sunday cove narrows to 400 yards, and then continues for about 2 miles, when it opens into the extensive

water space separating Sunday Cove island and the mainland from Pilley island.

The navigation of Sunday cove presents no difficulty, and there are no shoals outside of those fringing the shores.

There is a wharf for shipping pulp wood on the southern side of the narrows in Sunday cove. On the northeastern side there are a few houses.

The mainland, forming the southern side of Sunday cove, is thickly wooded and rises to a height of upward of 500 feet. The shore is fairly steep, conspicuous, and cliffy, except in Haywards bight, a bay immediately westward of Haywards head. The shores of this bight are foul and rocky, and about the middle of it, 400 yards from the shore, is a small patch of rocks, the top of which is 1 foot high. Haywards head is steep-to.

Wellman cove is situated on the western shore of the northern part of Sunday cove island at $1\frac{1}{2}$ miles southward of Island point; there are some houses on its shores.

A shoal extends northward 200 yards from the southern entrance point, and the cove is foul generally to that distance offshore.

There is anchorage, for small vessels only, in 8 to 13 fathoms water off the houses, but the holding ground is bad, except in a small spot, where the local schooners moor.

Sunday Cove Island bight, on the eastern coast of the island, is completely open eastward; it is indicated by the houses and stages on its shingle beach; a heavy sea rolls in after gales, and the fishing stages are sometimes washed away.

A rock lies close eastward of the southern stage.

There is a mine on the northeastern side of this bight, and a temporary wharf with a magazine near it.

Burnt point is the easternmost point of Sunday Cove island: behind it the land, densely wooded, rises quickly to the height of about 400 feet, the hills sloping gently toward Sunday cove. In this ridge, at about 1 mile from Burnt point and a short distance from the coast, some copper deposits are worked.

Between Burnt point and Miles cove, a small bight southwestward $\frac{1}{2}$ mile from the point, there are several cottages and landing stages.

Pilley island, eastward of Sunday Cove island, and separated from it by a channel about 1,400 yards wide, is about 5 miles long, northward and southward, and 3 miles broad. There is a valuable mine of iron pyrites in the southern part of the island.

Long Tickle point is the northwestern point of Pilley island; from it the western coast of the island extends $4\frac{1}{2}$ miles southward to the entrance to Flat Rock tickle. The coast is densely wooded and, except off Short point at $1\frac{3}{4}$ miles southward from Long Tickle point, it is clear of shoals.

Short Point shoal is a detached patch of rocks, lying 200 yards off Short point, with depths of $2\frac{1}{2}$ fathoms between it and the shore. The outer part of the rocks dries 2 feet at low water.

Spencers dock is the name given to a series of small bights in the western coast of Pilley island at $1\frac{1}{2}$ miles from Short point. In these are several houses, and a good road leads to Pilley Island harbor.

Off the northern of these bights there is a small islet and some dry rocks, but there are no shoals except those fringing the coast.

Haywards Gull island, small, rocky, partially wooded and 178 feet high, fronts the entrance to Flat Rock tickle at a distance of $\frac{1}{4}$ mile from it. At 200 yards off its western end there is a rocky shoal, with a depth of only 3 feet over it, and the passage, with about 3 fathoms of water in it, between it and the island is narrow. The northern and eastern sides of the island are clear, but a small shoal extends about 50 yards off the southern side.

Between this island and the entrance to Flat Rock tickle, as well as off the adjacent coast of Pilley island, the water is deep and clear of shoals.

The coast from Haywards head trends southwestward forming several coves, the two largest of which, Moorey cove and Bear cove, have some houses and landing stages, but very little fishing is done in this locality, and the people are generally dependent for work on the pyrites mine at Pilley island. Most of the houses are surrounded by small patches of cultivated land.

Roberts arm lies in an angle on the coast southward of Bear cove. It is small but perfectly sheltered and affords excellent anchorage in 8 to 10 fathoms, mud bottom. It is not difficult of access if the directions are carefully followed. The northwestern portion of the harbor is occupied by flats of sand and mud, but the remainder is fairly clear.

Harbor islet, small and 35 feet high, lies off the southwestern side of the arm.

There are several houses around the arm and a steam sawmill and a building slip for small vessels southward of a small rocky knoll on the western side.

Three-quarters of a mile westward of Roberts arm there are some extensive ponds, on the shores of which copper deposits have been worked, and a road connects the nearest pond with the harbor. The mines have been abandoned for some years.

Shoals.—A low, wooded point forms the southern side of Moorey cove, and fronting the bight just southward of it is a small rock, 1 foot high. Bearing 180° , distant 400 yards from the same point, is a shoal with 2 feet water over it.

Nearly 600 yards west-southwestward of this shoal and upward of 200 yards from a low, woody head forming the outer northern en-

trance point to Roberts arm, is a rock with 7 feet water over it. These shoals can usually be seen when the sun is in a favorable direction.

Directly outside the entrance to Roberts arm there is a small, wooded islet, 15 feet high; its northern side is clear, but between it and the shore there are some rocks which dry.

Bearing 233° , distant 250 yards from this islet and in the fairway of the entrance, there is a patch of rocks, the top of which dries 1 foot, but shoal water extends from this a little toward the northwestern shore. Immediately inside the inner northern entrance point and nearly 100 yards from the shore, is a small rock which dries 1 foot at low water.

Directions.—Pass about $\frac{1}{4}$ mile westward of Haywards Gull island, steer southward and bring the end of Harbor islet just open of the northern inner entrance point bearing 245° , which mark leads to the islet outside the entrance. When near this islet sheer over toward the northern shore; pass very close to the bluff forming that side of the entrance; then steer a little toward the sawmill to clear the rock inside the inner northwestern entrance point, and anchor as convenient. Large vessels must moor.

The coast eastward of Roberts arm is bold and forms three small coves, of which Tilley cove, the easternmost, is the largest. There is a house at the head of Tilley cove.

Flat Rock tickle is the channel forming the western approach to Pilley Island harbor. It is about $1\frac{1}{4}$ miles long and nearly $\frac{1}{4}$ mile wide, but the navigable channel between Flat rock and Kelly head is less than 100 yards in width. Flat rock lies 800 yards within the entrance to the channel; its western part is 2 feet high and is almost steep-to, but a patch of rocks and foul ground extends eastward from it for a distance of 250 yards.

The southern shore opposite Kelly head is foul for 200 yards, and here there are some patches of rocks which dry; therefore vessels should not attempt the passage southwestward of Flat rock.

Northeastward of Flat rock and across the mouth of Kelly cove there is a rock which is awash at low water, but this is usually visible. Off the rounded point on the northern side of the channel, which is situated east-southeastward, nearly 600 yards from Flat rock, shoals extend for 150 yards, and between these and the eastern end of Flat Rock shoal is the most difficult part of the passage. With the exception of the foul ground fringing the shores and the islets on the southern side there are no other shoals.

Directions.—From the westward keep along the coast of Pilley island and when Flat rock opens steer to pass midway between it and the land, observing that during an east-going stream at spring tides there is likely to be a set toward Kelly cove.

Haul close round Flat rock, and keep the low green head, forming the western point of Tilley cove, just open off Kelly head, bearing 281° , to pass between Flat Rock shoal and the shoals off the point to the east-northeastward. When the islet, 30 feet high, on the southern side of the tickle bears 150° , steer to pass on either side of Fox island as convenient, using the chart as the guide.

Fox island lies across the eastern end of Fat Rock tickle: it is 100 feet high, wooded and steep-to on its northwestern and eastern sides. Shoal water extends a short distance from its southwestern point, and from its northeastern end a tongue of shoal water extends northeastward 350 yards, and near the end of it is a patch of dry rocks. Between this shoal and Pilley island there is a clear but narrow passage used by local steamers.

Margesson island is a small, wooded islet, 40 feet high, lying between Fox island and Raft tickle. It may be passed on either side at a reasonable distance.

Raft tickle, between the mainland on the west and Pretty island on the east, forms the southern and main entrance to Pilley Island harbor. Raft island, small, wooded, and 70 feet high, with some smaller islets and rocks extending from the southern shore, and also shoal water lying 100 yards off the coast of Pretty island, narrows this tickle to a little over 200 yards.

Pretty island rises to the height of 250 feet and is densely wooded. Its coasts, especially the southern, which is the highest, are generally bold: on its western side there is a shallow bight known as Pretty Island harbor.

Pretty tickle, the southeastern channel to Pilley Island harbor, is clear of shoals except close to the shore on its northeastern side, but its narrowest part is only 70 yards wide, with a depth of $5\frac{1}{2}$ fathoms. Its western entrance is obstructed by some dry and sunken rocks, owing to which it is generally used only by small vessels.

Pilley Island harbor, situated on the southern side of Pilley island, is available for vessels of large size, and though the approach is narrow and confined there is ample water in the channel.

An iron pyrites mine, situated close to the head of the harbor, was worked for some years, during which a large quantity of ore was shipped, principally to the United States. The mine was closed in 1900 and the population of the locality has consequently much decreased. In 1900 it was about 450. When the mine was in operation—and it is believed that work may again be resumed—12 to 14 steamers were annually loaded, taking on the average 38,000 tons of ore, valued at about \$180,000. Work had not been resumed here at the close of 1908.

Supplies, coal, repairs.—When the mine was worked, 200 to 300 tons of coal were usually kept in stock. Moderate quantities of

provisions and stores may be obtained. Small repairs to steamers have been executed, and castings have been made up to 20 tons, but as the works have been closed these can not be relied on.

There is a steam sawmill in the village at the head of the harbor.

Communication.—Steamers, from and to Burnt bay, call twice weekly during summer and autumn. (See p. 476.) There is an irregular overland mail service during winter. The nearest telegraph office is at Little bay, to go to or come from which a messenger takes about four hours in fine weather; the charge for delivery is \$3.

Outer anchorage.—There is anchorage in 18 to 20 fathoms, mud bottom, 500 yards eastward of the middle of Fox island, but the holding ground is not good. Avoid anchoring on Callaghans ground, which, with depths of 6 to 10 fathoms, extends about $\frac{1}{4}$ mile parallel to, and 200 yards distant from, the western side of Pretty island; on this the bottom consists of smooth rocks, and vessels are liable to drag.

Ice.—The first vessels arrive about the middle of May and the last usually leave about Christmas.

Buzzard shoal, over which the least depth is 2 feet, lies 300 yards southward of Bridges island and is separated from the shoal extending northeastward from Fox island by a channel 150 yards wide, with a depth of 6 to 8 fathoms in it.

Reynolds shoal, over which there is a depth of 11 feet, bears 110° , distant 325 yards from the southern end of Bridges island, and 61° , 350 yards from Buzzard shoal, with a deep channel between.

Ledrew rock is a small pinnacle with a depth of 18 feet over it, lying in the fairway of the harbor channel, directly off Penns cove.

Picnic and Graveyard islands mark the ship channel to the inner anchorage, both being nearly steep-to on their northwestern sides.

Directions.—When abreast Margesson island, bring the Salvation Army barracks, a long house with a red roof standing by itself, twice its own length inside the extreme of the western point of the Narrows, bearing 359° , to pass between Buzzard and Fox shoals. Then keep along the western side of Bridges island, at about 100 yards distant, until the Methodist chapel (to the right of the Salvation Army barracks) is just open eastward of Picnic island, bearing 359° , to clear Ledrew rock. Thence a mid-channel course, passing westward of the islands, leads to the anchorage.

Or keep along the coast of Pretty island until the southern point of Penns cove is in line with the southwestern end of Bridges island, bearing 327° , which mark leads between Buzzard and Reynolds shoals; round the southwestern end of Bridges island and proceed as above.

The space in the harbor is limited, and vessels should moor or lie at single anchor, with sterns fast to one of the numerous ringbolts

driven into the rocks, the positions of which ringbolts are indicated by whitewashed marks. Vessels loading ore lie alongside the pier, which is connected with the mine by a tramway.

The channels eastward of Bridges, Picnic, and Graveyard islands are only fit for small vessels.

Buoy.—A square, wooden buoy is moored southward of the pier for warping purposes.

Pilots.—A pilot can generally be obtained at Dunier lighthouse. (See p. 457.)

Tides.—it is high water, full and change, at Pilley Island harbor entrance at 7h. 0m.; springs rise 5 feet, neaps 3½ feet. The rate of the streams in the tickles of Pilley Island harbor does not generally exceed 1 knot, and the directions vary with the wind as well as with the tide; the streams usually set directly through the tickles, following the bends of the channels.

Little harbor is a narrow inlet, 800 yards in length; the entrance, which is northeastward of Bridges island, is narrow and encumbered with rocks, making the harbor only available for boats and very small craft.

Shoals.—The coast between Little harbor and Pilley tickle, which is situated about ½ mile to the east-northeastward, is foul and rocky, and must not be approached nearer than 150 yards, while off the eastern head of Little harbor and nearly in the fairway there is an extensive patch of rocks, the southwestern end of which dries 1 foot.

Between these rocks and Reynolds shoal there is a small patch with a depth of 15 feet on it.

Leading mark.—The high cliff eastward of Hussey cove in line with Raft head, bearing 219°, leads northwestward of Pretty Tickle shoals, but close to depths of 18 and 19 feet, and this range also leads southeastward of the shoals off Little harbor.

Pilley tickle, between Troytown and Pilley islands, is the northeastern entrance to Pilley Island harbor. The narrowest part of the passage, east-northeastward about 1 mile from Bridges island, is 100 yards wide, and carries a depth of 12 fathoms in mid-channel.

Northeastward of the narrow passage of Pilley tickle the space between Troytown and Pilley islands opens to a passage northward to sea. This channel carries deep water, but there are some shoals in it.

Just northeastward of the narrow part of Pilley tickle and on the northern shore there is a two-story white house with a small jetty or stage a few yards northeastward of it, and nearly off these, about 50 yards from the shore, there is a rock which dries 1 foot at low water.

Bumblebee cove.—Northeastward of the narrow part of Pilley tickle the western shore forms a small bay, with a few houses in it,

called Muddy hole; it then bends sharply westward into Bumblebee cove, a deep bight, the head of which is separated from Pilley Island harbor by an isthmus, 150 yards across. There are several rocks at the entrance to this cove, with a good passage between them and its northeastern point. A rock lies in the middle of the cove, and only small vessels should enter it.

Heads harbor.—Eastward of the narrow part of Pilley tickle the Troytown island coast forms some small rocky coves, fronted by shallow water, and then turns southeastward around a low and narrow projecting headland, making Heads harbor, a shallow bight with some houses round it. A small rocky islet, 5 feet high, used as a leading mark, lies off the headland.

Beyond Heads harbor the coast continues foul, and off this part of it, at a distance of 350 yards, there is a wooded islet, 65 feet high, also used as a leading mark.

Big island, densely wooded, generally cliffy, and 280 feet high, is close to the eastern side of the channel. Shoals extend 200 yards off its low, northwestern point, and as they lie in an angle of the channel, with a distance of only 400 yards between them and the shoals of Bumblebee cove, caution is necessary. The small islet off Heads harbor in line with the western point of the wooded islet southwestward of Big island, bearing 174° , leads in the channel between these shoals.

Northeastward of Big island the channel presents no special dangers until nearing Dogfish point. No-good island, small, wooded, and 75 feet high, lies off the western shore; its southeastern side is steep, but in the fairway between it and Troytown island there is a small rock with a depth of 15 feet over it.

Dogfish point bears northeastward $\frac{1}{2}$ mile from No-good island. It is thickly wooded and bold, but directly off it the channel, which here narrows to 500 yards, is obstructed by Dogfish rock, a patch of rocks over which the least water is 3 feet. The available passage eastward of Dogfish rock is consequently only about 100 yards in width, and, though the rocks may usually be seen, it requires caution.

A conspicuous white patch on the cliffs of Long island twice its own breadth open of the western tangent of the passage leads clear of the rock off No-good island, and between Dogfish point and rock, but close to the rock.

Northward of Dogfish point Pilley tickle is clear of shoals.

Stuckey cove, on the eastern side of Pilley island at about a mile north-northwestward of Dogfish point, is deep beyond 100 yards from its shores, and it affords anchorage in 10 to 20 fathoms water.

A densely wooded hill, 510 feet high, lies southwestward 800 yards from Stuckey cove, and on its western slope is a large and conspicuous pine tree.

Fox cove, northward 800 yards from Stuckey cove and separated from it by Stuckey point, has no convenient anchorage, as several rocks lie near its head.

Pilley cove.—Fox head is the northern entrance point of Fox cove, and at 1,600 yards northwestward of the head is Pilley cove, an inlet extending west-southwestward 400 yards, and 350 yards across, which affords anchorage to small vessels. Sunken rocks lie close to both entrance points and the southern side is foul, but the shingle beach at the head is bold-to. To enter, keep one-third of the distance between the entrance points from the northwestern entrance point, and anchor nearer the northern than the southern shore in 5 to 7 fathoms water.

Fresh water can be obtained from a cascade that falls over cliffs on the southern side of the cove.

Long Island tickle, northward of Pilley island and between it and Long island, is about $\frac{1}{4}$ mile wide in its narrowest part, deep, and clear of shoals, except a rock with 15 feet water over it at 1 mile eastward of Long Tickle point, the northwestern point of Pilley island, and close to the shore.

Long island is $6\frac{3}{4}$ miles long along its southern coast, and it extends northward $3\frac{1}{4}$ miles. The island is wooded at the summit, and its highest part is 721 feet high. The southern coast rises steeply from the sea and is bold-to. The only houses on this side are in Patrick Power cove.

Grassy islets, three islets and several rocks connected by shoal water, are situated 250 yards off the southwestern point of Long island, and there is a depth of 12 fathoms in the passage between. The western islet is 20 feet high, and the eastern, slightly lower, is surmounted by a small bush.

Lush bight is the deepest cove on the western coast of Long island, and several houses have been built around it. The anchorage is available for small vessels only, in depths from $2\frac{1}{2}$ to 4 fathoms, mud bottom.

Rocks.—A rock with $1\frac{1}{2}$ fathoms over it bears 245° , distant 300 yards from the north entrance point of Lush bight, and a rock with $4\frac{3}{4}$ fathoms over it, 228° , 450 yards from the southern entrance point of the bight. Lewis islet, 22 feet high, lies north-northwestward, 600 yards from the northern point of Lush bight; a shoal of 2 fathoms bears 90° , distant 150 yards; a rock, with less than 6 feet water over it, bears 340° , distant 300 yards; a rock, with 9 feet water over it, bears 290° , distant 500 yards, and a rock, with 2 fathoms water over it, bears 284° , distant 900 yards from the islet.

Oil islands, about 1,200 yards westward of the northern entrance point of Lush bight, are three wooded hills extending $\frac{9}{10}$ mile in an easterly and westerly direction. The western island, 221 feet high, is

joined to the middle part by a low neck of gravel, and the eastern is connected only at low water. Shoals extend in places about 200 yards off the islands, and a rock with less than 6 feet over it, bears 5° , distant 210 yards from the eastern point of the eastern island.

Suleyann rock, 9 feet high, bears 329° , distant 1,600 yards from the western point of Oil islands. A shoal, on which there is a rock above water, extends nearly 200 yards eastward and southeastward from Suleyann rock.

The coast of Long island from the peninsula forming Lush bight trends north-northwestward for 1 mile to its northwestern point; it then turns northeastward for $1\frac{1}{2}$ miles to Western head of Ward harbor. Flint islands, small and 50 to 75 feet high, with rocks lying 200 yards off them, are situated about 200 yards off the coast and 1,200 yards northeastward from the northwestern point.

Western Head rock, a patch with 6 feet water over it, bears 270° , distant 600 yards from Western head.

Ward harbor, around which there is a small settlement, is entered eastward of Western head, and affords good anchorage for vessels drawing less than 10 feet water: the passage is midway between Cross islet, small, castellated, and 32 feet high, in the middle of the entrance, and the eastern shore. A reef extends from the western side of the harbor southward of Cross islet, and a sunken rock lies close northward of the eastern entrance point.

Cutwell harbor, which has a small settlement on its northern side, lies between Giles and Otter islands. It is $\frac{3}{4}$ mile across, and the depth of water decreases gradually from 14 fathoms in the middle to the line of shoal water which lies about 50 yards from the shore.

Cutwell arm, an anchorage available for small vessels, is entered southward of Otter island; the passage, narrowed to a breadth of 40 yards by shoal water extending from either side, should not be attempted without a pilot.

Tides.—It is high water, full and change, in Cutwell harbor, at 7h. 6m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Hardrix or Seal island rises to several conspicuous cones covered with wood, the highest being 294 feet high.

Wild bight, southward of Hardrix island, affords no safe anchorage; there are some patches of 9 to 20 fathoms in it, but the only shoals are a few rocks close to the shore.

Southern head, the eastern end of Long island, rises in almost perpendicular cliffs to wooded hills, 437 to 513 feet high, and Southern Head islet, a bare rock 42 feet high, lies close to its northern side.

Light.—A white circular tower, 33 feet high, on Southern head, exhibits at 103 feet above high water, a fixed white light, which should be seen from a distance of 15 miles in clear weather. The keeper's dwelling, painted white, is connected with the tower by a

short covered way, and there is a white storehouse 40 feet to the southward of the dwelling.

Gull rock, situated $3\frac{1}{10}$ miles northward from Western head of Long island, and the northernmost of the group situated northward of that island, is round, bare, and 50 feet high; a small islet, about 5 feet high, lies close southeastward of it, and two rocks, that cover at high water, extend southward 100 yards from this islet.

Middle islands, the next southeastward, are a low group, the highest of which, situated at the northern end, is 32 feet high, and surrounded by rocks extending 200 yards from it.

Gunning rocks, next southeastward of Middle islands, are two small islets 6 feet high, with shoals extending 200 yards from them except on the southeastern side.

Old Bantam, a rock with $3\frac{1}{2}$ fathoms water over it, bears 67° , distant nearly $\frac{1}{2}$ mile from the highest of the Middle islands.

Stag island, the largest of these islands, situated near the middle of the group, is shaped like a wedge, falling steeply to the southeastern coast from a hill 233 feet high, covered with small wood.

North harbor is between the northeastern side of Stag island and Little Stag island, and affords good sheltered anchorage for small vessels in 5 fathoms water, mud bottom. North harbor rock, with 15 feet water over it, bears 281° , distant 200 yards from the northwestern end of Little Stag island.

A chain of islets extends southeastward $\frac{9}{10}$ mile from Stag island, and the southeastermost, named Gunning islet, is bare and 25 feet high.

Duck islands, the easternmost of the group, are three grassy islets, the highest, to the southward, being 62 feet high.

There are several other islets, rocks, shoals, and fishing banks in this group and between the group and Long island. They are shown on the chart.

Directions.—None of the channels through this group should be attempted except in fine weather, and the only passages available without local knowledge are those between Gull rock and Middle islands, between Middle islands and Gunning rocks, and between Duck islands and Gunning islet. The southern end of Little Bay island open northward of Middle islands, bearing 233° , leads between Gull rock and Middle islands.

The southern end of Little Bay island open southward of Middle islands and northward of Gunning rocks, bearing about 241° , leads between Middle islands and Gunning rocks.

The northern end of Middle islands, open northeastward of Crab island, bearing about 312° , leads between Duck islands and Gunning islet, until Hardrix island is completely open eastward of Gunning

islet, bearing 205° , but this mark leads close eastward of Jacobs rock, before approaching which steer for the middle of Hardrix island.

Troytown island.—From the entrance to Pretty tickle the southern coast of Troytown island extends east-northeastward for $1\frac{1}{4}$ miles to Servier point, and is densely wooded, cliffy, and very bold. Northward of Servier point is Butlers bight, behind which the wooded hills become lower. At one mile farther east-northeastward there is a small island, 70 feet high, separated from the shore by a narrow channel, which partially dries at low water, forming Cards harbor, where there is a fishing station and good shelter for boats.

The coast of the mainland, westward of Raft tickle, is high and thickly wooded for nearly a mile. It is fairly bold close in, but about 600 yards westward of Raft head and off a small projecting point, locally known as Hogs nose, there are some detached rocks. The inner rock, with a depth of 15 feet over it, is 550 yards from Raft head and 100 yards offshore.

The two outer rocks, with depths of 3 fathoms over them, bear 207° and 217° , each distant 400 yards from the same point.

Local pilots usually pass between these rocks and the shore.

Sops head, at $1\frac{1}{4}$ miles west-southwestward of Raft head, is a high, densely wooded, and conspicuous projection. Opposite to it, on the northern shore, there is a long, narrow inlet, available only for small vessels.

This inlet reaches to within 400 yards from the head of Tilley cove.

Tommys arm.—On the northern side of Sops head is the entrance to Tommys arm, which extends west-southwestward for nearly 2 miles and affords sheltered anchorage in 18 to 20 fathoms.

At 100 yards off the northern entrance point of the arm there is a small patch with a depth of 4 fathoms over it, and a rocky shelf extends 150 yards off Sops head, leaving a good passage in mid-channel. A small rock, 4 feet high, steep-to on its northern side, but with foul ground between it and the southern shore, from which it is distant 150 yards, lies $\frac{1}{4}$ mile inside the entrance.

In the middle of the arm is a wooded islet, 80 feet high, which is steep-to, except on its southwestern side, whence a patch with 18 feet water over it extends for nearly 200 yards. A rock, 5 feet high, lies west-northwestward, distant 300 yards from this islet; and a rock, 4 feet high, lies north-northwestward, distant 250 yards from the western end of the islet.

A quarter of a mile west-southwestward of the rock, 5 feet high, the arm narrows toward the entrance of a stream running southward from the large ponds behind Roberts arm. A small islet, 12 feet high, lies off the northern side of this narrow part, and from a place 200 yards eastward of the islet the water gradually shoals toward the mouth of the stream.

Directions.—It is usual to pass northward of the rock, 4 feet high, situated $\frac{1}{4}$ mile within the entrance, and southward of the islet in the middle of the arm, thence following the southern shore, and anchoring 300 yards southward of the 5 feet high rock.

The channel northward of the islet is straighter and there is more anchorage room off a bight in the northern shore, northwestward of the rock, 5 feet high, in about 11 fathoms.

Sops arm is an inlet extending about west-southwestward for upward of 2 miles on the southern side of Sops head. Along both its shores are some scattered houses and at the western end there is a steam sawmill, near which is the mouth of a small stream.

The entrance to the arm is partially occupied by a wooded island, 90 feet high, having a channel on either side of it, but that to the northwestward is obstructed by a patch with a depth of 2 fathoms over it. The southern channel is clear and should be used in preference. A rock, with a depth of 4 feet over it, bears 65° , distant 500 yards; and a rock, with 19 feet water over it, bears 62° , distant 1,300 yards, from the summit of the island.

Sops arm affords good anchorage near its head in depths of 12 to 15 fathoms, but during northeasterly gales it is rather open and the swell comes in.

Husseys cove, on the southern side of the entrance to Sops arm, extends nearly $\frac{1}{2}$ mile to the southwestward, but so narrow that it is only available for small vessels.

The coast from Husseys cove eastward is bold, except nearly opposite Raft tickle, where a rock, with depths of 3 to 12 feet over it, lies nearly 200 yards from the shore.

Burton harbor lies southward of Burton head, a cliffy headland opposite Pretty tickle; it affords temporary anchorage in 8 to 12 fathoms, but is open northeastward. A quarter of a mile inside a projecting point, on the western side of the entrance, the harbor divides into two small arms, both of which are shallow.

A rock, with 5 fathoms water over it, lies in the harbor approach, bearing 93° , distant $\frac{1}{4}$ mile from Burton head.

Sugarloaf islet, small and 90 feet high, lies northeastward of the entrance to Burton harbor and bears 68° from Burton head; it is covered with coarse grass and, being steep, may be approached closely.

Duck island, 145 feet high and wooded, lies just off the eastern end of the peninsula separating the channel leading to Sops arm from Badger bay; in the narrow channel between the peninsula and Duck island there are two small islets and a rock 1 foot high.

Between the eastern of these islets and Duck island there is a 4-fathom passage used by local schooners and boats. The northeastern end of Duck island is rocky and should not be approached nearer

than 400 yards. A cluster of small islets and rocks lies southward of the island and between them there is a passage about 200 yards wide which is navigable, but it is more prudent to leave the whole group to the northward.

Big island, about 400 yards in length northward and southward, and 199 feet high, is the northwestern of a group of islands and rocks on the northern side of Troytown island. From its eastern end, Cobbler rocks extend eastward to Cobbler island.

Cobbler island, about 400 yards eastward of Big island, is 1,400 yards long, eastward and westward, and 163 feet high.

Cobbler tickle, between Cobbler island and Dark Tickle island, is entered from the westward, and affords good anchorage in 6 to 17 fathoms water, the soundings decreasing gradually from the latter depth to the islets and rocks that fill its eastern end. Hynes rock, with 6 feet water over it, bears 207°, distant 600 yards from the western end of Cobbler island.

Dark Tickle island, southeastward of Cobbler island, rises to a round hill, 223 feet high; on the northern hill of the island are two conspicuous trees, 132 feet above the sea.

Dark tickle, the passage between Dark Tickle island and Troytown island, is clear, with the exception of White Ground shoal extending about 200 yards from the southeastern end of the island, nearly joined to the eastern end of Dark Tickle island, and a bank with 13 feet water on it, situated 150 yards northeastward from the first cove southeastward of the western narrows. The narrowest part of Dark tickle is 100 yards wide, and the depth of water is not less than 6 fathoms in midchannel.

Great Troytown harbor, entered between Dark Tickle point, the southern entrance point of Dark tickle, and Big Troytown island, extends southwestward for $1\frac{3}{4}$ miles, with several bends.

The head of Troytown harbor is divided into two coves by a wooded island 190 feet high and a promontory of Troytown island. West arm is available only for boats; Butler cove, the southern arm, suitable for small vessels only, is entered through a narrow channel between rocks extending from both entrance points.

Anchorage.—There is anchorage in 7 to 17 fathoms water in a cove situated on the eastern side of Great Troytown harbor and southward of a low sharp point rising to a wooded hill 185 feet high.

Water.—There are several houses in this cove, and water may be obtained from a brook close to the houses.

Communication.—The steamer from Burnt bay calls at Great Troytown harbor weekly during summer and autumn.

Little Troytown harbor, the western entrance of which lies east-southeastward 1,200 yards from Dark Tickle point, is 850 yards long

and 450 yards wide, and affords good anchorage in 9 fathoms water, sand bottom.

The northeastern entrance is 60 yards wide, and a rock with 15 feet water over it lies in mid-channel, but there is a depth of 5 fathoms close to the eastern shore.

There is a small settlement around the harbor.

Water may be procured from a brook discharging into a small cove on the southern shore.

Tides.—It is high water, full and change, in Troytown harbor at 7h. 5m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Ragged point is the northern end of the northeastern promontory of Troytown island.

Little Dunier island, east-northeastward $\frac{1}{3}$ mile from Ragged point promontory, is a wooded island about 600 yards in diameter, with a flat summit 220 feet high; the coast line is deeply fissured. Islets and shoals extending southwestward from the southern extremity of the island, and the islet 27 feet high with the shoal eastward of it off the eastern point of Ragged Point promontory, narrow the channel between them, in which there are depths of 11 to 14 fathoms, to a width of 150 yards.

League rock, northeastward, distant $1\frac{9}{10}$ miles from Little Dunier island, is in two parts, separated by a narrow cleft; it is about 40 feet high; shoal water extends 300 yards west-southwestward of the rock. A patch of rocks, 8 feet high, lies east-northeastward 300 yards from League rock, and there is a depth of $4\frac{1}{2}$ fathoms in the passage between them. The rocks are situated on a bank extending $3\frac{1}{4}$ miles in an easterly and westerly direction, having general depths of 20 to 50 fathoms over it, but with several patches of $6\frac{3}{4}$ to 19 fathoms, and a confused sea is produced in heavy weather.

Grand Dismal cove, southward of Ragged point promontory, must not be entered without a pilot, as rocks surround the shores, and the Sisters reef extends northeastward 250 yards from Sisters point, the southern entrance point. A small islet, 27 feet high, lies close to the northern entrance point, from which rocks extend east-southeastward for the distance of 200 yards.

Tom Cod rock, with 13 feet water over it, is situated in the middle of Grand Dismal cove, and bears 163° , distant 650 yards from the islet off its northern entrance point, and a bank, with $2\frac{1}{2}$ to 7 fathoms water over it, extends 256° , 750 yards from the rock.

Great Dunier island, 1,400 yards long in an easterly and westerly direction and 221 feet high, is situated southward about $\frac{3}{4}$ mile from Little Dunier island.

Light.—A fixed red light is exhibited from a wooden frame, 15 feet high, near the eastern end of Great Dunier island, at 210 feet

above high water, and it should be seen from a distance of 16 miles in clear weather. The light is shown between May 15 and December 31.

The Brothers reef, which uncovers 3 feet at low water, is situated on the northern side and near the western end of the channel between Dreat Dunier and Troytown islands; it narrows the passage between it and Great Dunier island to a breadth of 80 yards.

Nimrod island, 28 feet high, situated 300 yards westward of Great Dunier island and separated from Troytown island by a channel 95 yards wide, with 7 fathoms water in it, has low rocks extending westward 150 yards and shoal water extending eastward nearly 100 yards from it.

Nimrod harbor, a small boat cove in Troytown island, is situated to the northward of the eastern end of Nimrod island, and there are a few houses on the shore.

The coast of Troytown island from Nimrod harbor trends west-southwestward for $2\frac{1}{2}$ miles to the island forming Cards harbor; it is fairly steep-to. At $\frac{3}{10}$ mile west-southwestward of Nimrod island and about 100 yards offshore is Harbor Round island, which is 300 yards long, parallel to the coast; a reef extends 200 yards east-northeastward of it.

Badger bay extends southward about 6 miles from Duck island. Its western part is divided into five small bays and the central part is occupied by Gull island, which is 400 feet high, wooded, and conspicuous.

The northern and southern shores of the bay, as well as the western side of Gull island, are fairly clear, but the eastern side of this island has several rocks off it, and from its northeastern point some detached patches, with deep water between them, extend east-northeastward for $\frac{3}{4}$ mile, terminating in the Brandies, a small cluster of rocks awash at high water and generally marked by breakers.

Georgies rock bears 14° , distant about $\frac{1}{2}$ mile from the Brandies, and is $\frac{8}{10}$ mile from the eastern shore of the bay; its summit has a depth of 6 feet over it, and north-northeastward and south-southwestward there are depths of 4 and 5 fathoms for about 300 yards. This rock breaks with an easterly swell.

Leading marks.—A conspicuous conical mountain, far behind Shoal arm (to the southwestward), just open northwestward of Gull island leads northwestward of Georgies rock, and the Sugarloaf summit seen between two islets in the channel between Duck island and the mainland, bearing 318° , leads close northeastward of it.

Julies harbor is a small cove in the western corner of Badger bay; its entrance is very narrow and the space inside only affords sufficient room for very small vessels. There are several houses and patches of cultivated ground around this cove.

Bird Island cove.—At 100 yards off the southern entrance point of Julies harbor is Goat island, a small, wooded island 40 feet high, and between it and a long narrow promontory, terminating northeastward in Woody point and situated about 600 yards southeastward of the island, is Bird Island cove. It is often too open eastward to afford anchorage.

Bight.—On the southeastern side of Woody point promontory is a deep bight, the eastern side of the outer part of which is bounded by Gull island. Toward its head this bight contracts to a narrow channel, within which it opens out into Shoal arm, an extensive area almost filled with flats of sand, mud, and shells. A stream runs into the southwestern end of this arm, but in consequence of dams having been built across it for driving logs, the outflow is generally small.

A small islet lies just inside the narrow channel and from either end of it a floating boom reaches to the shore northeastward and southwestward; the logs driven down the stream are retained within the boom for the mill at Pennys brook.

Bearing 45° , distant 350 yards from the southern entrance point of the narrow channel and 150 yards from the shore, there is a rock with a depth of 3 feet over it. With this exception the bight is free from shoals, but it is open to the easterly swell which frequently prevails, and therefore it is not suitable for anchorage.

Anchorage.—The eastern part of the passage between the southern end of Gull island and the mainland is occupied by some small islands and rocks. Westward of these there is sheltered anchorage in 11 to 13 fathoms, mud bottom, in a space about 400 yards wide; it is easy of access from the westward, and is entirely sheltered, even during strong easterly gales.

This anchorage can also be entered from the eastward, but it is inadvisable to take that passage without local knowledge.

Beaver bight, southward of Gull island, is open and unfit for anchorage.

Wild bight is the southern part of Badger bay: the water is deep in it, and there are no shoals beyond a distance of 300 yards from the shore, though a small 7-fathom bank lies in the fairway of its approach.

Pennys brook, a small stream, flows into the western side of Wild bight; here there is a steam sawmill and several houses, off which fairly good anchorage may be had in 18 to 20 fathoms.

The eastern shore of Badger bay from Wild bight to Cannon head, a distance of $5\frac{1}{2}$ miles, is high, cliffy, and densely wooded, with deep water close to the rocks.

Lock harbor is a small bight lying $1\frac{1}{2}$ miles southwestward of White point, the eastern entrance head of Badger bay. Some low rocks lie off the entrance, and the space inside is very limited and

open to the northerly sea. There is a small settlement on the shore of this harbor.

White point, the eastern entrance head of Badger bay, is white limestone rock projecting from the cliffy shore and joined to it by a narrow neck. The point is 40 feet high and its summit is covered with grass, forming a conspicuous contrast to the dark, wooded hills behind it.

Seal bay is the large bight eastward of Badger bay; it extends southward for about 8 miles, and terminates in a shallow basin, fronted by some islets, into which a small stream flows.

The middle of the bay is deep and free from shoals, but a heavy sea rolls in during strong northerly winds. Indifferent anchorage may be found, as hereinafter described.

There are a few settlers in the bay, principally at Lockport on the eastern side.

Seal Bay head, the western entrance point of Seal bay, is a dark cliffy headland, 180 feet high, and broken by the action of the sea into several small coves. Immediately southward of the head is a small bight, and at 500 yards northeastward of Inner Seal head, its southern entrance point, is a patch of rocks, 9 feet high, with a clear channel between.

Wild bight is west-southwestward of Inner Seal head, and the water in it is deep and unfit for anchorage. A small rock, awash at low water, lies about 70 yards from the cliffs, at about 700 yards southwestward of Inner Seal head, and shoal water extends northeastward 150 yards and southward 100 yards from it. The head of the bight forms a cove, about 135 yards in width, in which there are some fishermen's houses which were unoccupied in 1901.

Gull island, south-southwestward $1\frac{4}{10}$ miles from Inner Seal head, is 184 feet high, with a bare grassy summit; its eastern and western sides are steep, but a rocky ridge of foul ground extends south-southwestward 600 yards from it, and terminates in a rock 12 feet high. There are two smaller islands, and some rocks which dry at low water, between Gull island and the shore of the bay, which is made up of wooded hills falling in steep cliffs. There is a fairly good passage between these islands and rocks and Gull island, but it is not recommended without local knowledge.

Side harbor is a deep indentation on the western side of Seal bay at 3 miles within Gull island. Its entrance is a good deal obstructed by shoals lying off the eastern side, but there is a fairly good passage, 300 yards in width, westward of the shoals. Inside the shoals there is anchorage in 15 to 21 fathoms, but the ground is rocky and northeasterly gales throw in some sea.

Mill cove, on the western side of Seal bay, at $\frac{3}{4}$ mile from its head, is narrow and shoal, but the only houses in this locality are on

its shores. Small vessels were occasionally built here, but the saw-mill was abandoned in 1901 for a more favorable site.

The group of islets off this cove extends to the flat which occupies the head of the bay. Between them there are several rocky patches, and bearing 28° , distant 350 and 550 yards from the northern end of the largest islet, there are two rocks with 2 feet of water over each of them.

Anchorage can be obtained in 19 to 21 fathoms, good holding ground, off the entrance to Mill cove, with some shelter close to the western shore, which must be kept close on board when approaching the anchorage to clear the two rocks which lie north-northeastward of the largest island.

The eastern shore of Seal bay, like the western, rises in thickly wooded hills nearly 500 feet. It is broken into several small coves and is generally free from shoals, but there is no sheltered anchorage, except for small vessels.

Lockport is a small harbor formed by a bight inside of an island on the eastern side of Seal bay. It is easy of access and sheltered, but, owing to rocky patches, the space available for anchorage is very limited, and the harbor is only fit for small vessels. A small rock, with 3 fathoms water over it, lies in the middle of the harbor.

The entrance is round the southern end of the island, which must be kept aboard, and when within the rocky spit extending about 200 yards northward from the southern shore of the harbor, anchor off a small bight in the island in about 7 to 9 fathoms.

The channel between the eastern side of the island and the mainland is shallow and rocky.

A few families live here, and a copper mine has been worked in the hills on the eastern side of the harbor.

Thimble head, conspicuous and cliffy, is the southeastern entrance point of Seal bay. The summit of the head is densely wooded, and the land gradually falls to the eastward and terminates in Thimble Tickle head, a rocky point, 62 feet high, which at high water is almost an island. The water is deep close to this coast.

Bays.—From Thimble Tickle head the shore bends sharply to the southward for $1\frac{2}{10}$ miles where a promontory, extending northward 800 yards, forms two small and shallow bights. From the head of the eastern of these bights, a promontory extends northeastward $1\frac{1}{10}$ miles eastward of which the shore trends north-northeastward $1\frac{3}{4}$ miles to Cumlins head. Glover harbor, and the channel leading to it, lie between.

Across the entrance to these bays there are three islands and several dry rocks surrounded by patches of foul ground, the passages between which are known as Thimble tickles. Inside these are sheltered

anchorages, but only the main or eastern channel is available without local knowledge.

There is a small settlement in a bight at 400 yards southward of Thimble Tickle head, and another in a small cove 800 yards farther southward.

Goat island, small and low, lies about 200 yards southeastward of this cove; there is sheltered anchorage southeastward of the island in 17 fathoms with the end of Thimble Tickle head a little open eastward of the island.

Gull island, about 200 yards across and 62 feet high, lies northward 900 yards from Thimble Tickle head; shoal water extends 70 yards westward and southeastward of the island, and a bank with 7 fathoms water over it stretches northeastward 300 yards from it.

Glover harbor entrance is 50 yards wide in its narrowest part, though a least depth of $5\frac{1}{2}$ fathoms can be carried through the channel. In the harbor within the narrows there is very good and perfectly sheltered anchorage.

Directions.—To enter Glover harbor or the bay westward of it, pass between Gull and Ward islands and close to the southern point of Ward island, which is steep-to; then steer for the cliffs over Cumlins cove. When past the northern end of a thickly-wooded island, which end rises to a sharp summit 164 feet high, steer southward through the main channel, keeping nearly midway between the island and the mainland, avoiding a shoal patch off Cumlins cove, and direct for the narrow entrance of Glover harbor, eastward of a wooded promontory terminating in a rocky point.

Keep close along the coast of this peninsula until almost abreast the northwestern end of a small wooded islet, 25 feet high, lying in the middle of the channel, when haul a little to the eastward to clear a rock, with 15 feet water over it, extending from some rocks, 1 foot high, on the western side of the channel.

With a favorable light the 15-foot rock can be seen, and when past it continue toward a small wooded islet, 13 feet high, adjoining a point extending from the southern side of the harbor, to clear a rock, with 15 feet water over it, lying a little eastward of the middle of the harbor. When 200 yards from the islet, turn to the eastward and anchor as convenient in 10 fathoms, mud bottom.

A few houses are situated around the shore of the harbor and some extensive ponds lie behind the shore ridge.

To enter the western bay, round the southern end of the island lying abreast of Cumlins cove, and, keeping in mid-channel, steer toward Goat island, anchoring southward of it in 17 fathoms.

The western tickle has several rocks in it, and it should not be attempted without local knowledge. The leading mark given in the

plan, the shoulder of a hill in line with the eastern end of Goat island, bearing 190° , if identified, leads through a clear channel, about 100 yards wide, between the outer shoals in not less than $5\frac{1}{2}$ fathoms; when distant 500 yards from Goat island, haul to the eastward to clear the shoals off the northeastern side of that island.

Man-of-war rock is a small rocky islet, 12 feet high, and steep-to. Eastward about 100 yards from it there is an extensive patch which dries at low water.

Ward island, northeastward, 400 yards from Man-of-war rock, is 900 yards long, in a northeasterly and southwesterly direction, about $\frac{1}{4}$ mile wide and 233 feet high. It is almost steep-to, except at its northeastern end, where shoal water of 21 feet connects it with Blackberry island.

Blackberry island, small and 38 feet high, is 150 yards north-eastward of Ward island; shoal water extends northeastward 300 yards from it.

Shoal.—A patch of $2\frac{3}{4}$ fathoms bears 48° , distant 550 yards from Blackberry island, and nearly 200 yards offshore.

Leading or Ladle tickles.—The coast from Cumlins head trends roughly north-northeastward $1\frac{7}{10}$ miles to the Ladle, and thence eastward nearly 2 miles to Wild Bight point; northward of it is a group of islands, and Leading or Ladle tickles are the passages between the several islands and the mainland. The southern passage is suitable for small vessels only.

Light.—A circular iron tower, 18 feet high, painted red and white in horizontal bands, on the southern headland of the eastern entrance to Leading or Lading tickles, exhibits, at 83 feet above high water, an intermittent white light, showing thus: Light seven seconds, eclipse three seconds; which should be seen from a distance of 10 miles in clear weather.

A dwelling and a store, painted white, stand a short distance westward of them.

Communication.—The steamer from Burnt bay calls at Leading tickles during summer and autumn.

Burnt island, the northwestern of the islands, is $1\frac{1}{4}$ miles long in an east-northeasterly and west-southwesterly direction, about $\frac{1}{4}$ mile wide, and 250 feet high; a ridge of rocks extends $\frac{1}{4}$ mile eastward of it.

Near the middle of the southern coast of the island is a small projection, about 100 feet high, on which is a flagstaff, and a bank, with two patches of 3 and $4\frac{1}{2}$ fathoms over them, extends southeastward 350 yards from this point. The southern side of Woody island in line with the northern end of Bear head, bearing 64° , leads southward of these shoals and very close northward of those northward of the western part of Cull island.

There is anchorage in the channel between Burnt and Cull islands in 12 to 15 fathoms water, sand bottom, sheltered except from north-easterly winds.

Thomas Rowsell island, about $\frac{1}{2}$ mile across, and 121 feet high, is separated from the western end of Burnt island by a passage 100 yards wide, with 4 fathoms water in it, which may be taken by keeping close to the coast of Burnt island. The passage between Thomas Rowsell island and the western end of Cull island is 300 yards wide and there are an islet and several shoals in it.

Cull island is $1\frac{7}{10}$ miles long in an easterly and westerly direction, and about 300 yards in width, except at its eastern part, where it is 1,200 yards; a wooded ridge, 197 feet high, extends along its western part; Bear head, its northeastern end, rises in dark perpendicular cliffs to the height of 205 feet.

A conspicuous wooded projection, 85 feet high, surmounted by a flagstaff, is situated in the middle of the southern coast of Cull island, separating a small boat cove to the westward, from Mooring cove to the eastward.

Small vessels anchor off Mooring cove, in 13 fathoms water, close to the shore, and larger vessels in 18 to 20 fathoms; in fine weather small vessels occasionally anchor southward of the channel between Cull and Thomas Rowsell islands in 12 fathoms water.

A bar with 11 feet water over it, extends from the southern end of Cull island to the mainland, from which it is distant 65 yards.

The Ladle, a square rock 28 feet high, stands on a beach of shingle on the mainland just eastward of the bar.

Butler cove, 800 yards eastward of the Ladle, affords anchorage for small vessels during fine weather, in 12 fathoms water at 200 yards from the shore, but the anchorage is unsafe with the heavy sea that rolls in during northerly gales. A beach of shingle, 350 yards long, forms the head, and several houses in the midst of green fields surround this cove.

Alcock island, 400 yards eastward of Cull island, is $1\frac{3}{10}$ miles long, in an east-northeasterly and west-southwesterly direction, about $\frac{1}{2}$ mile in width, and 326 feet high; it is densely wooded, and apparently flat, but there are in reality several ranges of hills on it.

In the channel between Cull and Alcock islands, bearing 247° , distant 250 yards from the northwestern point of the western end of Alcock island, there is a shoal of 3 fathoms; North Tickle bank, a patch with $5\frac{1}{2}$ fathoms water over it, bears 324° , distant 650 yards from the same point.

A small projection, 44 feet high, is situated near the middle of the southern coast of Alcock island, and is only 150 yards distant from the mainland to the southward. The channel between has a depth of $5\frac{1}{2}$ to 9 fathoms water.

There is anchorage to the westward of these narrows, in 12 to 17 fathoms water.

Red island, 37 feet high, is 200 yards off the southeastern point of Alcock island, and some rocks above water lie in the channel between. Harbor rock, a narrow ridge with $3\frac{1}{4}$ to 5 fathoms water over it, extends 112° , for 350 yards from the southeastern point of Red island.

Tinker island, small and 80 feet high, lies 200 yards northwestward of the northern part of Alcock island, and the channel between is occupied by shoals and Gunning rock, 9 feet high.

Woody island, northeastward of Tinker island and separated from it by a clear channel nearly 200 yards wide, is about 1,400 yards long, in an east-northeasterly and west-southwesterly direction, 100 to 300 yards wide, and 184 feet high. There are several peaked islets and sunken rocks close off the northern coast of Woody island, and Snaptail rock, with 3 feet water over it, bears 277° , distant 200 yards from its western end.

Green island, eastward 450 yards from Woody island, is in three parts, the middle and highest rising on all sides in dark gray cliff to a height of 155 feet, with its summit covered with grass.

Sunken rocks extend a short distance from this island, and an isolated rock, with 2 feet water over it bears 190° , distant 150 yards from the small islet lying off its eastern end. Sculpin island, open eastward of Green island, bearing 334° , leads eastward of this rock.

Sculpin island, northward 1,600 yards from Green island and the northernmost of this group of islands, is about a quarter of a mile long, in a northeasterly and southwesterly direction, 300 yards wide and 87 feet high; it is covered with grass.

Several bare rocks lie close to its southeastern coast and form a small creek in which landing from boats may be effected, except in very heavy weather. A rock, with 3 feet water on it, lies close to the southwestern end of the island.

A bank extends northeastward 500 yards from the southeastern part of Sculpin island, on which, bearing 115° , distant 150 yards from the northeastern point of the island, is a rock with 5 feet of water over it; and, bearing 81° , distant 265 yards from the same point, is a shoal with 3 fathoms over it.

Northeast rock, bearing 351° , distant 750 yards from the northeastern point of Sculpin island, is a patch with 4 fathoms water over it.

Banks.—Numerous banks lie off the islands forming Leading tickles, the positions of which are best seen on the chart.

Tides.—It is high water, full and change, in Leading tickles at 7h. 7m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Directions.—Large vessels pass between Thomas Rowsell, on the north, and Gull and Ward islands, on the south. The southern coast of Cull island must not be closed to less than 200 yards, and the southeastern end of Cull island, open northward of the end of a projection of the mainland southward of Mooring cove, bearing 64° , clears the shoals eastward of Blackberry island. Vessels drawing more than 11 feet water must not proceed eastward of Mooring cove.

Small vessels pass over the bar between the southeastern end of Cull island and the mainland by keeping in mid-channel.

Eastward of the Ladle the shores are steep-to at the distance of 100 yards. When near Red island, keep the Ladle open southward of Alcock island, bearing 262° , until Nosworthy point is open northeastward of Red island, bearing 318° which marks clear Harbor rock.

To pass between Thomas Rowsell and Burnt islands, in 4 fathoms of water, keep on the northern side of the channel; when going eastward, before the flagstaff on the projection of the southern coast of Burnt island bears 329° , bring the southern side of Woody island in line with the northern end of Bear head, bearing 65° , to clear the shoals lying off Burnt island, and when the flagstaff bears southward of 284° , keep in mid-channel.

To pass between Alcock and Cull islands, keep the summit of Green island open northward of Alcock island, bearing about 59° , till the eastern fishing stage in Butler cove is in line with the southwestern end of Alcock island, bearing 138° ; this latter mark leads clear of the shoals off the western end of Alcock island.

Wild bight extends southwestward about $\frac{3}{4}$ mile from between Wild Bight point and a point off which are Northwest rocks. It is divided at its head, by a projection rising to a conical hill 285 feet high, into two coves, where small vessels anchor during westerly winds.

Northwest rocks are two rocks, 20 feet high, situated within 300 yards from the eastern entrance point of Wild bight; shoal water extends northward 250 yards from the inner rock.

New bay is an extensive inlet extending southward from its entrance between Northwest rocks and New Bay head, which bear northeastward and southwestward, distant $2\frac{3}{10}$ miles from each other. It is divided into several arms with rocky shores and presents few obstacles to navigation. The land near the bay is of moderate elevation and, except where recently burnt, densely wooded.

There are a few scattered settlers in the arms, and in Northwest arm and Southwest arm there are timber mills. A large quantity of sawn timber is annually shipped, especially from Southwest arm.

Communication.—The steamer from Burnt bay calls at New bay weekly during summer and autumn.

Northwest arm extends southwestward for about 6 miles from the eastern end of the promontory within Northwest rocks. Its north-

western shore is generally steep-to, but on its southeastern side are numerous islets and shoal patches.

Tinker island, small, rocky, and 54 feet high, lies 400 yards off-shore at about 700 yards within the northwestern entrance point of Northwest arm: its southwestern end is foul and off the shore abreast of it there is a patch of rocks, but there is a good passage about mid-way between the island and the shore.

Lannings cove, a small bight northwestward of Tinker island, has some settlers' buildings and patches of cultivated land near it.

Long island lies near the middle of Northwest arm south-southwestward $1\frac{1}{10}$ miles from Tinker island: it is 65 feet high and wooded. A patch of rocks, which dries 1 foot at spring tides, bears 28° , distant 600 yards from its northern end, and is avoided by keeping the northwestern shore aboard.

Budgell harbor, rather more than a mile west-southwestward of Long island, is a bight fronted by 2 islands, the largest of which is separated from the mainland by a very narrow passage. There is some foul ground on the northern side of the harbor, to avoid which pass the small wooded island in the entrance close to.

There is good anchorage in the harbor in about 15 fathoms, but the space is very limited.

An extensive pond lies immediately back of the northwestern shore of this harbor, and a stream runs from it into the sea; there is also a small stream at the head of the harbor.

Mussel Bed island is small and densely wooded with spruce. It lies 100 yards off the northwestern shore of the bay at nearly 2 miles southwestward of Budgell harbor: between this island and the shore there is a shallow flat, with some rocks that dry, which continues 400 yards from the island on a bearing 31° . The southeastern side of the island is steep-to.

Mill cove is a small bight forming the head of Northwest arm. Its entrance is divided by an islet lying toward the southern shore. There is a good passage northward of this islet in mid-channel, but that southward of it is foul. There is good anchorage in the cove after passing the islet, which must not be approached nearer than 150 yards on its western side.

A steam sawmill stands near the head of the cove, into which an extensive pond empties.

West Hare island is on the southeastern side of Northwest arm abreast of Mussel Bed island. Between it and the entrance to Mill cove the shore is broken into several coves with off-lying islets, and from one of these, at 1,100 yards southwestward of West Hare island, a ridge of rocks extends northward 400 yards and to about 400 yards from the northwestern shore.

The shore northeastward of West Hare island is clear for nearly a mile and rises in high, precipitous cliffs; beyond that it is fronted by numerous islets and rocks which extend more or less to abreast Long island. Gull rock, the southwesternmost and outer of this group, is a large boulder, 2 feet high.

Passage.—There is a passage eastward of Long island but it is advisable to keep on the northwestern shore.

Besom island, small, flat, 42 feet high, and covered with grass, is the outer land of the southeastern side of the entrance to Northwest arm. There are several rocks between the island and the adjacent shore, and the passage should not be attempted without local knowledge.

Besom cove is entered 800 yards southeastward of Besom island and extends southwestward about $\frac{9}{10}$ mile; the water is 16 to 10 fathoms deep, but the anchorage space is very limited and the bottom is rocky. A patch of foul ground 400 yards in diameter lies close northeastward of the western headland.

Little Northwest arm extends southwestward $1\frac{3}{4}$ miles on the southeastern side of the peninsula which forms Besom cove, and its head is separated from Northwest arm by an isthmus a little more than 200 yards across. Here the arm is occupied by a group of islets and rocks.

There is indifferent anchorage in about 25 fathoms just inside the narrowest part of the arm, for which the chart is a sufficient guide.

Little Northwest Arm head, the southern entrance point of the arm, is steep, but a rock with 3 feet of water over it lies nearly 200 yards from the head, and there is a rock with 6 feet of water over it between this 3 feet rock and the head.

Ward head, a promontory forming the southeastern side of Ward cove, and lying southward $\frac{1}{2}$ mile from Little Northwest Arm head, is 125 feet high, steep, and clear of shoals; from the northward it shows as a detached conical summit under the higher land northwestward of it. Ward cove is small, narrow, and generally shallow.

Beaver Brook cove is a small bight southwestward $\frac{4}{10}$ miles from Ward head. The shore between is clear, except that shoal water extends southward 300 yards from a small islet, 10 feet high, lying south-southwestward, nearly 1 mile from Ward head.

A rock, with a depth of 4 feet over it, lies in the middle of the entrance of Beaver Brook cove.

There is a small water-power sawmill, with a few huts, on the northern shore of the cove.

West arm entrance is between Brimstone head, high, conspicuous, and cliffy, and the land northwestward $\frac{1}{2}$ mile from it, and the arm extends southwestward for about 3 miles. There is a group of islands at $2\frac{1}{4}$ miles inside of Brimstone head, and westward of them is a

good clear channel to the basin forming the head of the arm. A shoal extends southwestward 150 yards from the islet forming the eastern side of the entrance to the basin. This basin is clear of shoals, except for 300 yards off its head, into which Western brook flows, and except for a shoal which extends 200 yards southwestward from an islet, 25 feet high, situated 350 yards southward from the islet forming the eastern side of the entrance to the basin.

There is good anchorage in the basin in about 20 fathoms, mud bottom, with the islet, 25 feet high, bearing 56° , distant 700 yards.

There is a water-power sawmill in a small bay eastward of Western brook, which has an extensive boom across its mouth, confining logs which belong to the mill owners in Southwest arm.

Southwest arm extends southward from eastward of Brimstone head for a distance of about 4 miles. The inner and larger portion is less than $\frac{1}{2}$ mile in width, and contains some shoals, but the outer part is clear except near the shores.

A large water-power sawmill is situated on the eastern side at $\frac{1}{2}$ mile from the head of the arm, and here there is a wharf where vessels of considerable tonnage load. Several houses occupy the foreground on the western side, and most of them are surrounded by patches of cultivated land.

Passage rocks, some of which are above water and others dry, occupy a central position in Southwest arm at about $1\frac{1}{10}$ miles south-southeastward from Brimstone head, while abreast of them and 200 yards from the eastern shore is an extensive shoal with 3 feet water over its head. A small, wooded islet, 30 feet high, lies southward 1,100 yards from the northernmost of the Passage rocks, which is 1 foot high, and at 1,700 yards southward of the islet the ship channel is contracted to 150 yards by two shoals. One of these shoals extends 250 yards from the western shore, and the other, with a depth of 3 feet over it, lies near the middle of the arm. Southward of these the western shore is fairly clear, but some shoals extend 350 yards from the eastern side.

The eastern shore of the arm is low, thickly wooded, and generally fronted by shoal water to a distance of nearly 200 yards.

Directions.—From a position $\frac{1}{2}$ mile eastward of Brimstone head, steer to pass 300 yards eastward of the northernmost of the Passage rocks, and thence about 190° up the arm. In a favorable light the shoal in the middle of the arm can be seen, and should be left about 100 yards to the eastward; if the light is not good the shoal should be buoyed.

Anchor as convenient within the shoal in the middle of the arm in 10 to 12 fathoms.

The shore of New bay from an islet, 60 feet high, situated close to the shore nearly eastward of Brimstone head, trends northward

1 $\frac{1}{4}$ miles and thence northeastward 1 $\frac{1}{4}$ miles to a headland 250 yards off which is Strong island; it is fairly steep-to.

Strong island is a densely wooded island rising to a height of 375 feet, forming the point of separation between the approach to West and Southwest arms and South arm, which is the eastern arm in New bay.

This island is conspicuous on southerly bearings, on which the northern end appears as a bluff and cliffy face.

Strong Island sound, southward of Strong island, is a considerable water space, the entrances to which are on either side of the southwestern part of the island; both channels are fairly clear, but the western is the better. Just within the western entrance, and bearing 243°, distant 350 yards from the southern extremity of Strong island, is a rock 2 feet high, with shoal water extending 100 yards northward from it: while in the eastern passage a ridge, with depths of 4 fathoms over it, extends half way across the channel from the island.

A wooded island, 160 feet high, lies in the middle of the sound at 650 yards south-southwestward of Strong island. Its western side is clear, but at 100 yards off its eastern side there is a rocky patch which dries 2 feet. Within this island the sound is divided by a peninsula with an island 115 feet high close north-northeastward of it, both of which are densely wooded. Eastward of the peninsula a very narrow channel, with a least depth of 4 $\frac{1}{2}$ fathoms in it, gives access to a small basin forming the head of the sound.

There is anchorage on either side of the peninsula in 16 to 19 fathoms, on the eastern side just after passing the island, 115 feet high, and on the western side a little farther in. The channel into the basin is only used by small schooners which frequent the locality to load pulp and timber.

There are no settlers in this locality.

The outer part of the promontory on the southeastern side of the sound, abreast the southwestern part of Strong island, is almost an island, being nearly separated at high water by a shallow bight extending to within a few yards of Tea arm, a bay on its eastern side.

South arm extends 4 miles southward from a point eastward of Strong island. It then turns southwestward for $\frac{3}{4}$ mile. Here it expands considerably, and thence stretches southward for 3 miles farther, gradually narrowing and terminating in a long basin, which is nearly cut off at low water by projecting rocky points on either side of its entrance.

The western shore of the arm is bold for about 4 miles inside Strong island and then falls to comparatively level land. Here there are some settlers and a good deal of cultivated land. On the western side of the southern portion of the arm there are also a few settlers,

and from that locality there is a road across to the eastern side of Southwest arm.

The eastern shore of the arm is broken into several deep coves, from one of which there is portage to the bay of Exploits.

There is sheltered anchorage off Paradise cove, which is situated on the western shore at $2\frac{3}{4}$ miles within the eastern entrance point of Tea arm, in about 15 fathoms, and also off the island extending from point Pleasant, about 1 mile farther in on the same shore, in about the same depth. Anchorage may also be obtained in other parts of the inner arm, but the whole locality is subject to violent squalls during strong westerly winds.

Saunders cove is a small arm in the southeastern part of South arm, but there are several rocks about its entrance and it is unsuitable for vessels of any size. A deposit of copper has been worked on the shores of this cove.

Charles arm is a remarkable arm, extending south-southeastward, $1\frac{1}{2}$ miles from the southeastern corner of South arm. The arm at its entrance and for $\frac{1}{2}$ mile inside is only 100 yards wide; but immediately above it opens out into a small basin, then contracts again to less than 100 yards for a distance of 900 yards, and finally expands into a larger basin forming the head of the arm. The depth in the channel is about 3 fathoms, but the inner part is, at that depth, too narrow and winding except for light-draft vessels. The middle of the inner basin affords anchorage.

East Hare island, $\frac{1}{2}$ mile northward of the eastern entrance point of Charles arm, is 1 mile long, in a northerly and southerly direction, narrow and wooded; there is a passage for boats and small craft between it and the shore, about 150 yards wide.

A cluster of rocks, 3 feet high, having shoals extending 600 yards in a direction 165° from it, lies north-northeastward 500 yards from the northern end of the island.

Between these rocks and Indian point, which lies 1,200 yards northward from them, is the entrance to Ritters arm, and Indian and Little Indian coves.

Ritters arm, eastward of a promontory of the mainland which stretches parallel to and just inside of East Hare island, extends $1\frac{1}{8}$ miles in a south-southeasterly direction, and is the only one of these that a vessel can safely enter. There is anchorage in its outer part in 13 fathoms. Two small islands lie within $\frac{1}{2}$ mile southeastward of Indian point, and, bearing 236° , distant 335 yards from the southern point of the northern of these islands there is a rock with $1\frac{3}{4}$ fathoms over it, and depths of $3\frac{1}{2}$ to 5 fathoms between the rock and the island. A small island, 25 feet high, lies close northward of the promontory forming the western side of the arm, and a shoal on which are some

rocks above water, extends northwestward 250 yards from its northern point.

To enter the arm approach with the island 25 feet high bearing about 126° , pass 300 yards from the rocks 3 feet high, and between them and the rock with $1\frac{3}{4}$ fathoms water over it, then steer for the southern end of the islands southeastward of Indian point, and when 200 yards distant head about 160° into the arm. The arm should not be entered without local knowledge.

Indian and Little Indian coves lie northward of Ritters cove and eastward of Indian point. Indian cove is the more eastern, and from it there is a short portage to a pond, and from that another short portage to Exploits bay.

The shore of the bay from Indian point trends northward for 4 miles to Southeast Arm point, and there is deep water at the distance of 400 yards from it. There are several small coves, but nearly all of them are shoal.

Southeast arm runs in east-southeastward 1,600 yards on the northeastern side of Southeast Arm point and then turns northward for about $\frac{1}{2}$ mile; although its area is limited, it is the best anchorage in the locality for vessels of any size. A rocky shoal, with $4\frac{1}{2}$ feet over it, lies in the entrance at 400 yards northward from Southeast Arm point; to avoid it keep close to the point. A shoal extends 200 yards southward from Yates point, the low bluff head on the northern side of the entrance. Vessels may anchor within Yates point as convenient.

There are a few settlers around this arm, and a road connects it with Cuttle cove.

Cuttle island lies northwestward 335 yards from the northern end of the promontory which separates Southeast arm and Cuttle cove. The island is 550 yards long northwestward and southeastward, 300 yards wide, and 140 feet high; a reef on which there is a rock 4 feet high, extends northwestward 250 yards from the island, but it is otherwise nearly steep-to, and the channels between it and the mainland are deep and clear.

Cuttle cove lies southeastward of Cuttle island. A rocky shelf, near the outer end of which is a rock that dries 3 feet at low water, extends 200 yards off the northeastern side of the cove, to clear which keep toward the southwestern shore. This cove is open northwestward and is not recommended as an anchorage.

There are several settlers here and some patches of cultivated land.

Yellow Fox island lies close to the shore northeastward of Cuttle island. It is about 200 yards in length and 60 feet high.

Moore's cove lies inside of Yellow Fox island. In it are some houses and a wharf, but the cove is very shallow and fit only for boats.

Communication.—The post-office for the district is at Moores cove, and the mail steamer from Burnt island calls weekly.

Rowsell cove, 950 yards northwestward of Yellow Fox island extends eastward 335 yards, and affords good anchorage for small vessels in 12 fathoms or less water, sheltered except from southerly and southwesterly winds. A conspicuous wooded conical hill rises at the head of the cove.

Josiah Spencer cove, immediately northwestward of Rowsell cove and separated from it by a small headland terminating in a hillock, 80 feet high, extends northeastward 300 yards and affords anchorage, during offshore winds, for fishing craft in 4 to 7 fathoms water.

The shore of New bay from Josiah Spencer cove trends north-northwestward for $1\frac{9}{10}$ miles to New Bay head, and there is deep water at 100 yards off it.

Silver Buckle island is 550 yards offshore at $\frac{9}{10}$ mile northwestward of Josiah Spencer cove; it is 600 yards long in an easterly and westerly direction, 200 yards wide, and 155 feet high. The Silver Buckle, whence its name, is a mass of quartz near the northwestern end of the island.

Brandies rocks is the name given to a patch of rocky and foul ground extending 400 yards in a west-northwesterly and east-southeasterly direction and having in the middle an island, 14 feet high, which bears 280° , distant 1,300 yards from the northwestern end of Silver Buckle island.

New Bay head, the eastern entrance point of New bay, rises in steep cliffs to a height of 270 feet. New Bay rocks, 64 feet high, are situated close northward of the head, a channel 40 yards wide, with $3\frac{1}{2}$ fathoms water in it, lying between. Foul ground extends a short distance from the head.

Fleury bight, the entrance of which is 1 mile eastward from New Bay head, extends southeastward about $\frac{9}{10}$ mile, with a general width of 450 yards. There is a village at the head of the bight, where a hill rises almost vertically to the height of 435 feet. Abbott cove, an indentation on the eastern shore of the bight at 700 yards within its eastern head, is encumbered with rocks.

Fleury bight affords anchorage in 14 to 16 fathoms water, but a heavy sea rolls in with northwesterly and northerly winds, and it is then untenable, as the holding ground is not good.

Water can generally be obtained from a stream flowing into the western side of the head of the bight.

Woody island, separated by a narrow channel from the eastern entrance head of Woody Island bight, an open bay northeastward of Fleury bight, rises steeply to a flat wooded summit, 188 feet high: a rock with 10 feet water over it lies close westward of this island.

The coast from Woody island trends east-northeastward about 800 yards to Bagg head, and thence for $1\frac{3}{4}$ miles in a general easterly direction to Western head of Fortune harbor. Several patches, with 9 to 20 fathoms water over them and deeper water around, lie within $1\frac{1}{4}$ miles of the land between New Bay head and Western head of Fortune harbor.

Fortune harbor, a land-locked anchorage, is entered both eastward and westward of Sweeny island. The passage to the eastward of the island is only 30 yards wide and has a depth of 12 feet at low water. The western entrance is suitable for large vessels; if under sail, a commanding breeze is necessary, but the turns are sharp, the wind is often baffling in the approach, and the squalls are heavy, particularly with westerly winds.

Western head is a steep bluff, with a rocky pinnacle at the end, and bold-to. The land behind it rises in a long bare ridge, wooded on the slopes, to a sharp summit, 555 feet high, surmounted by a cairn, at 800 yards southwestward of the head.

Western Head rock, bearing 20° , distant 350 yards from Western head, has 12 feet water over it and is the summit of a bank extending 350 yards in a northwesterly and southeasterly direction, with a width of nearly 200 yards. The sea breaks heavily on all of the bank in gales, and the passage, 250 yards wide, between it and Western head must not then be taken, but in ordinary weather it is navigable. The southern fall of the cliffs of Upper Caplin Cove point, open northward of Gull island, bearing 96° , leads northward; and the eastern entrance to Fortune harbor, open eastward of Bellens point, bearing 184° , leads eastward of the bank.

Light.—A white circular iron tower, 18 feet high, on the western side of the entrance to Fortune harbor, exhibits at 114 feet above high water, a fixed white light, which should be seen from a distance of 11 miles in clear weather.

A white dwelling and store stand a short distance in rear of the tower.

Button island lies southward 200 yards from Sweeny island, and it is connected with the western shore of the harbor.

Northwest arm extends west-northwestward, 2 miles within the southeastern point of Button island; its channel is only about 100 yards in width in places, but small vessels enter it with the plan.

Southeast arm extends south-southeastward $1\frac{1}{4}$ miles within Button island, and it affords anchorage for large vessels.

A small cove, with a wharf and several stages in it, is situated on the eastern shore of this arm southeastward from Button island, and on the rising ground, eastward of the cove, is the white church.

Directions.—To enter Fortune harbor from the westward, observe the clearing marks for Western Head rock, and when the eastern

entrance to Fortune harbor is open eastward of Bellens point, bearing 184° , turn into the channel to Fortune harbor; when rounding the western end of Sweeny island, shut in the house with a diamond on the door at Davis point, with the northeastern end of Button island, bearing 118° , to clear a rock near the southwestern end of Sweeny island.

Steer in mid-channel between Sweeny and Button islands, and between Button and Jim Day islands; when past the latter, bring and keep the summit of Macarthy island over the western end of Jim Day island astern, bearing about 340° , and anchor in 10 to 15 fathoms water, with the church bearing 93° , or farther up Southeast arm, with the western points of that arm well open, to avoid Tiger rock.

Ice.—Fortune harbor freezes during December and the ice breaks up between May 1 and 15.

Tides.—It is high water, full and change, in Fortune harbor, at 7 h. 14 m.; springs rise 4 feet, neaps 3 feet.

Webber bight extends south-southeastward $\frac{3}{4}$ mile from between Snuffy point, the southeastern entrance point of Fortune harbor, and Indian Cove point, which lies northeastward, distant $\frac{1}{2}$ mile. The bight is open to northerly and northwesterly winds, which send in a very heavy sea, but is clear of shoals, except close to the shore; a small settlement is situated around a cove on the eastern side of the head.

Anchorage, with offshore winds, may be obtained in the bight in 10 to 16 fathoms water, but the holding ground is not good.

Gull island, northward 400 yards from the outer rock off Indian Cove point, is a bare rugged rock, 54 feet high, and bold-to on its southern side, but rocks and shoals extend northeastward and eastward 200 yards from it. Bed rock, with 9 feet water over it, bears 82° , distant $\frac{1}{4}$ mile from the northern end of Gull island; the sea breaks on the rock in heavy weather, and rolls to the shore over a shoal of $4\frac{3}{4}$ fathoms, lying between Gull island and Indian cove.

The shore of Notre Dame bay from Indian cove trends eastward for $2\frac{1}{4}$ miles to Northern head of bay of Exploits: it is broken into several small coves. There are some banks with depths of 13 to 20 fathoms within 2 miles of this shore.

Shoal ground, bearing 34° , distant 500 yards from Keogh island, which is a small bare rock 17 feet high; there is a shoal with $3\frac{3}{4}$ fathoms least water over it, on which the sea breaks in heavy weather. The cairn on the summit of Exploits Burnt island, open northward of Northern head, bearing about 126° , leads northeastward; and the cairn on the bare summit of Western head, open northward of Upper Caplin Cove point, bearing 253° , leads northward of this bank.

Bay of Exploits.—Western head of New World island bears 73° , distant $10\frac{3}{4}$ miles from Northern head, and at $1\frac{1}{4}$ miles southward of

this line are Exploits Burnt islands and Black islands, leaving three channels, $1\frac{1}{2}$, $1\frac{1}{2}$, and 2 miles wide, respectively, to the southward.

Bay of Exploits comprises several long arms and bays, in which there are numerous islands, lying southwestward and southward of Exploits Burnt islands and Black islands. The water in the bay is generally deep, and, excepting its eastern part, there are but few obstructions to navigation beyond those fringing the shores. The western arm extends from Exploits Burnt islands south-southwestward for 30 miles to the mouth of Exploits river, and it is navigable without difficulty as far up as Peter arm.

The mainland around the bay, and also the numerous islands in it, are thickly wooded, except in those parts where large fires have cleared the land. The forests in the Exploits valley are very extensive, and consist of pine, spruce, fir, larch, birch, and poplar; the soil of the valley is fertile, and produces, where cleared, good crops of root, potatoes, and hay.

There are several small settlements in the bay, those of Exploits Burnt islands, North harbor, Kite cove, Botwoodville (Peter arm), Lewisport (Burnt bay), and Campbellton (Indian arm), being the principal ones.

Tidal streams.—The tidal streams set fairly in and out of the deep channels of the bay of Exploits with a rate of about 2 knots at springs.

Fog is frequent but seldom lasts more than a few hours.

Communication.—The Newfoundland railway passes along the shore at the head of the western arm of the bay of Exploits, and Lewisport is connected by a branch line, 9 miles in length, from Notre Dame junction. Exploits station is close to Norris arm. Westward of Norris arm the line leaves the sea and crosses Exploits river by a steel bridge, 630 feet long, at Bishop's falls, 10 miles from the mouth of the river and $268\frac{1}{2}$ miles from St. John's.

A steamer leaves Lewisport twice a week with mails, passengers, and cargo. One trip is made westward to Tilt cove, calling at Exploits Burnt island, New bay, Leading tickles, Pilley island, Hall bay, Little Bay island, Little bay, Green bay, and Nippers harbor; and the other trip to Fogo, calling at Botwoodville, Exploits Burnt island, Morton harbor, Tizard harbor, and Twillingate (Toulinguet).

There are telegraph stations at Norris arm, Lewisport, and Twillingate.

Ice generally forms in the bay of Exploits early in January: at Peter arm and its vicinity it is sometimes a little earlier. The first vessels from sea arrive in the bay about June 1, and the last leave early in December.

Waldron cove.—The shore of the bay from Northern head trends south-southwestward for $1\frac{1}{6}$ miles to the head of Waldron cove, and

thence east-northeastward $\frac{3}{4}$ mile to Waldron Cove point. Waldron cove affords shelter, to small vessels only, off a small light on the southern side, which has several houses at its head.

Ship Run rock lies in Ship run, the western entrance to the bay of Exploits, and bears 136° , distant 1,600 yards from Northern head; the rock is about 200 feet across and there is a depth of 9 feet over it and 7 to 14 fathoms close around. In heavy weather the sea often breaks on the rock in such a manner that the breakers are scarcely distinguishable from the ordinary waves in its vicinity.

Western ground, a patch with 9 fathoms water over it, lies 200 yards southward of Ship Run rock, and there are several patches with depths of 14 to 20 fathoms over them within $\frac{1}{2}$ mile of the rock.

The shore of the bay from Waldron Cove point trends south-southeastward for nearly 2 miles to Little North harbor. North Harbor Gull island, which is about 350 yards long north-northwestward and south-southeastward and 91 feet high, is situated about a mile south-southeastward of Waldron Cove point, and is separated from the mainland by a narrow channel with a depth of 4 fathoms in it.

Little North harbor is a bight extending westward 900 yards with a width of 350 yards; it affords anchorage for small vessels near its head in 4 to 8 fathoms water. In entering keep the southern shore on board to clear the rocks stretching from the northern side nearly to mid-channel.

Exploits Burnt islands are two in number, lying about $1\frac{1}{4}$ miles eastward of the shore between Waldron Cove point and North Harbor head, and together extend about $3\frac{3}{4}$ miles northeastward and southwestward, with a greatest width of 2 miles: there are two small harbors in the channel between them. Man-of-War-hill, the summit of the western island, is 553 feet high and bare, with a large stone cairn on it. The western coast of the western island is steep-to at a short distance from it, and is indented by two small coves; Surgeon cove, the southern, is shallow and has numerous rocks in it; Burton cove, about 400 yards to the northward, affords sheltered anchorage for a few small craft during easterly winds. There is a road between this cove and Upper harbor.

Mad Moll head is the northeastern point of the western island, and Mad Moll rocks, a ledge with $1\frac{1}{4}$ to $2\frac{1}{2}$ fathoms over its outer part, extends north-northwestward, 400 yards from the head.

Lower harbor, the northwestern part of the channel between the islands, affords shelter for small vessels only, in 12 fathoms or less water. The entrance is encumbered with rocks and should not be attempted without a pilot.

Upper harbor, the southeastern part of the channel between the islands, affords secure anchorage for small vessels, but a bar on which are rocks with 6 to 7 feet water over them, extends from the eastern

shore at 300 yards within the entrance, leaving a narrow passage, with a depth of 19 feet water, between it and the shoal water in Butt cove, the southern bight in the western shore.

This channel should not be attempted without local knowledge, but there is temporary anchorage in the entrance in 9 to 16 fathoms water.

Lower and Upper harbors are connected by a passage 20 yards wide, with a depth of 6 feet in it at low water.

Tides.—It is high water, full and change, in Exploits Burnt Island harbors at 7h. 17m.: springs rise $4\frac{1}{2}$ feet, neaps $2\frac{1}{2}$ feet; neaps range $1\frac{1}{2}$ feet.

Settlement.—There is a large settlement around Exploits Burnt Island harbors, and small supplies may be obtained. Water can generally be procured from Butt cove.

Ice.—Exploits Burnt Island harbors generally freeze about January 1 and are completely blocked with ice between February 1 and April 1, but between April 1 and May 20 they are open at intervals. Field ice appears between the middle and end of January and disappears between May 1 and 20, between which dates the first vessel generally arrives. The last sailing vessel leaves about December 15.

Nanny Hole rock, with 9 feet water over it, bears 313° , distant 200 yards from Nanny Hole head, the northwestern point of the eastern island, which is situated eastward 1,400 yards from the entrance of Lower harbor, and is a precipitous bluff rising to a bare round hill 340 feet high.

High Gull island rises in light gray cliffs to a flat summit 122 feet high, and is situated $\frac{1}{2}$ mile northeastward of Nanny Hole head and northwestward of Gull Island bight, a rugged bay with a few houses around a cove in its southern part.

Two rocks are situated northwestward of High Gull island, the northern, with 3 feet water over it, being distant 200 yards.

Sloop run, the passage eastward of the eastern Exploits Burnt island and between it and Black island, is $1\frac{1}{2}$ miles wide. The following islands lie in the run:

Fish island, bearing 134° , distant $1\frac{1}{10}$ miles from Long point, the northeastern end of Exploits Burnt islands, is 250 yards long, northward and southward, 100 yards wide and 44 feet high. **Tarpaulin island**, bearing 102° , distant 900 yards from Fish island, is 300 yards long, northeastward and southwestward, nearly 200 yards wide and 58 feet high. **Double islet**, consisting of two rocks close together, the higher being 51 feet high, bears 162° , distant 400 yards from Fish island; bearing 130° , distant 600 yards from this islet is **Black rock**, small and 12 feet high, and bearing 250° , distant 100 yards from Black rock is a shoal, rather over 200 yards long, north-northeastward and south-southwestward, the highest part of which covers

at high water. A patch, with 6 to 8 fathoms water over it, bears 224° , distant $\frac{1}{4}$ mile from this shoal, with depths of 16 to 18 fathoms between.

Sculpin rock, bearing 266° , distant 600 yards from the southern end of Fish island, dries 2 feet at low water; and at a distance of 135 yards southwestward of this rock is Sculpin islet, small and 43 feet high.

Pig island lies southward 200 yards from Sculpin islet and is 350 yards long, about 100 yards wide, and 71 feet high; a shoal, on which is a rock 3 feet high, extends 100 yards southwestward of it.

Hare island, 200 yards southeastward of Pig island and the largest of the group, is nearly $\frac{1}{4}$ mile across and 197 feet high; there are some rocks above water and surrounded by shoals within 200 yards off its southwestern side, and at 200 yards farther south-southwestward is Gillott islet, a rock 38 feet high, with shoal water a short distance northward and southward of it.

Hare rock, bearing 140° , distant 300 yards from the northeastern point of Hare island, is about 100 yards across and has a depth of 7 feet of water over it.

Matthew Lane island, 1,300 yards south-southeastward of Hare island is 1,200 yards long, northeastward and southwestward, with a greatest breadth of $\frac{1}{4}$ mile and a height of 130 feet. There is a small boat harbor containing several rocks and sheltered by a rock 50 feet high on its southern side.

At 300 yards southeastward of the entrance of this boat harbor is an islet 50 feet high, with a rock 20 feet high, 250 yards west-southwestward of it; from this rock shoal water extends southward 100 yards, and both the islet and rock are surrounded for a short distance by a bank with $4\frac{1}{2}$ to 9 fathoms water over it, while bearing 140° , distant 400 yards from the western end of the islet is a rocky patch with 5 fathoms least water over it, and 10 to 20 fathoms around.

There is a rock 7 feet high in the channel between Matthew Lane island and the islet 50 feet high, from the eastern end of which it bears 358° , distant 200 yards; this channel appears to be otherwise clear.

Duck islands are a group of wooded islets separated by a deep channel, 400 yards wide, from the southeastern side of the western of the Exploits Burnt islands. Upper Duck island, the westernmost of the group, rises in a hillock, 160 feet. These islands inclose a bay at their southwestern end, wherein temporary anchorage may be obtained in 19 fathoms water, but the holding ground is not good.

Swan islands are a group of five islands and some rocks lying nearly a mile southeastward of Duck islands. Swan island, the largest and main island of the group, has an area of about 2 square miles; it is 340 feet high, and is densely wooded except at its north-

western part, where the land is low, and where, lying south-southwestward of the northern Swan island, there is a shallow boat harbor having a few houses on its shores.

Big bay islet, an islet southwestward of Swan island, and some rocks connected by shoal water, lie within 800 yards southwestward of the southwestern point of Swan island.

Twisty Ann's cove, eastward of the southwestern peninsula of Swan island, has a few houses on its shores.

Swan Island harbor is on the southern side of Swan island and between it and Little Berry island, which is 60 feet high and wooded. The eastern entrance is clear, but a reef extends west-northwestward about 200 yards from Little Berry island and narrows the western entrance to less than 100 yards. The harbor affords sheltered anchorage in a space about 400 yards in diameter and 15 to 17 fathoms deep.

Rocks.—A patch of rocks, the highest head of which is 8 feet high, lies 265 yards off the southeastern side of Swan island.

Framptons cove, on the eastern side of the island, has some houses on its shores; and on the shore of a small bight, southward of it, are the remains of an Indian burial ground.

Shoals.—An 18-foot patch bears 351° , distant 300 yards from the northern end of the northern Swan island. A small rock, 6 feet high, with shoal water extending a short distance northward and southward of it, bears 314° , distant $\frac{1}{2}$ mile from the southwestern point of Swan island.

Hornet island, 600 yards eastward of Swan island, is a mile long in an easterly and westerly direction, and $\frac{1}{2}$ mile wide; its surface is very uneven, and its highest point attains a height of about 200 feet. The northern and northwestern sides are generally cliffy.

A rock, with 12 feet over it, bears 272° , about 400 feet from the southwestern point of Hornet island.

A grassy islet, 20 feet high, lies west-northwestward, 400 yards from the northern extremity of Hornet island; at rather over 200 yards in a direction 209° from this islet and 200 yards off the northwestern side of Hornet island, is a rock which dries 2 feet, with shoal water extending southwestward nearly 200 yards from it; and at 200 yards in a direction 346° from the northern extremity of Hornet island is a patch of rocks, the head of which dries 2 feet. A rock, 5 feet high, lies northward, 700 yards from the northern extremity of Hornet island; the channel between this rock and the patch of rocks northward of the island is clear. Bearing 22° , distant 200 yards from the rock, 5 feet high, is a rock with 18 feet over it.

Long rock, bearing 11° , distant 1,300 yards from the northern extremity of Hornet island, is 10 feet high, and 600 yards westward from Long rock, is a shoal, with heads dry at low water, while from this shoal a series of rocky patches extends 1,400 yards to the north-

ward. A rocky patch with $4\frac{1}{4}$ fathoms over it lies nearly 400 yards north-northeastward of Long rock.

All these shoals are steep-to on their western sides, and are avoided by keeping near Swan island.

Leading mark.—The summit of Upper Duck island in line with the summit of North Harbor head, bearing 267° , leads northward of these shoals.

Long island, lying southward of Swan island and Hornet island, is $2\frac{7}{16}$ miles long, northward and southward, about 1 mile broad, 465 feet high, and densely wooded. It is fairly steep-to, except off its northeastern end where shoal water extends eastward 300 yards, and there are some rocks and shoals for $\frac{1}{4}$ mile off its southern end. Two rocky islets lie 800 yards northwestward of the southern end of the island; their western sides are steep-to, but the space southeastward of them is foul. An islet, 35 feet high, lies a little over 200 yards off a small bight near the middle of the western side of Long island.

Long island is visited by the inhabitants of the bay for firewood.

Hornet gut, the channel between Hornet and Long islands, is 300 yards wide at its western end, but it narrows to 50 yards at its eastern end, and it has a least depth of 4 fathoms in its fairway. The tidal streams at times set strongly through this passage, which is only suitable for very small vessels.

Shag Cliff islands are a group of small islands lying about a mile southeastward from the northeastern end of Long island.

Indian islands are a group of small islands lying southward of Shag Cliff islands. Both Shag Cliff islands and Indian islands have remarkable summits and steep cliffs facing eastward. There is no anchorage around either of these groups. Between them there is a small patch of rocks, awash at high water, and between these rocks and the largest of the Shag Cliff islands, but near the island, there is a good clear passage. There is also a passage between these rocks and Indian islands, but a rocky reef with 12 feet water over it extends from one of the smaller islands to near the middle of the channel, and therefore the passage northward of the rocks is the better.

Jock islands lie 1,200 yards eastward from the northern end of the largest of the Shag Cliff islands; they are small and covered with grass, the larger one being 35 feet high. A small rock, 3 feet high, lies 200 yards west-southwestward of the islands. Both rock and islands are steep-to, but bearing 276° , distant 350 yards from the largest island there is a rock with 2 feet over it at low water, which breaks when there is any swell.

Rudder island, lying $1\frac{1}{4}$ miles eastward from the southern end of Long island and about $\frac{1}{4}$ mile southwestward of Indian islands, is about 600 yards across and 210 feet high.

Spruce islands are two islands lying $\frac{1}{2}$ mile south-southeastward of Long island. The eastern island is 1,700 yards long, northward and southward, 900 yards wide, and 160 feet high; the western island, situated 200 yards southwestward of the western part of the eastern island, with a depth of 2 fathoms in the channel between, is 600 yards long, 400 yards wide, and 110 feet high. Foul ground extends westward 250 yards from the northern part of the eastern island. A rocky patch with 6 fathoms least water over it bears 268° , distant 600 yards from the northern point of the western island, and bearing 243° , distant 600 yards from the southeastern point of the western island, there is a rocky head with 25 feet over it.

Ochre Pit island, lying about $\frac{1}{2}$ mile westward from the southern end of Long island, is 800 yards long, eastward and westward, 500 yards wide, and 210 feet high. At 600 yards southeastward of Ochre Pit island is an islet, 100 feet high; and a shoal, with $1\frac{1}{2}$ fathoms water over it, bears 110° , distant 300 yards from its northern extremity.

There is a deposit of yellow ochre on Ochre Pit island, which was dug by the Indians formerly inhabiting this part of Newfoundland.

Tinker island, southwestward 600 yards from the rocks off the southwestern extremity of Swan island, is 500 yards long, northeastward and southwestward, nearly 200 yards wide, and 135 feet high. There is an islet close to its southeastern side, eastward of which at the distance of 100 yards is a rock with 5 feet of water over it.

Pond island, lying $\frac{1}{2}$ mile southeastward from the islet on the southeastern side of Tinker island, is 900 yards long, in a northwesterly and southeasterly direction, 400 yards wide, and 195 feet high; it is fairly steep-to.

Hummock island, southwestward $\frac{1}{2}$ mile from Tinker island, is nearly a mile long, in a northeasterly and southwesterly direction, about 600 yards wide, and 310 feet high. There is a remarkable sugar-loaf hill near its southern end, and on its southeastern side is a detached island, 70 feet high. Northwestward 300 yards from the southern extremity of the island is a rock, 30 feet high, with a rock, 69 feet high, close southward of it; these are connected with the southern part of the island by a shoal water and foul ground. From 200 yards southeastward of the rock, 69 feet high, three rocky islets, 20, 40, and 60 feet high, respectively, and close together, extend southeastward $\frac{1}{4}$ mile, and bearing 140° , distant 135 yards from the southern extremity of the southeastern one of these islets, there is a small rock with 19 feet water over it.

Upper Black island, south-southwestward $1\frac{2}{10}$ miles from the islets southward of Hummock island, is $2\frac{2}{10}$ miles long, in a northerly and southerly direction, about 1,600 yards wide, and 500 feet high.

It is densely wooded and is visited in autumn by people from Twillingate (Toulinguet) and Fogo for firewood.

Between Upper Black island and Hummock island there is a shelf on which the depths are somewhat irregular, and which has on it a shoal head of 8 fathoms bearing 228° , distant 600 yards from the southeastern of the islets southward of Hummock island: a rock with 26 feet of water over it bearing 11° , distant $\frac{1}{2}$ mile from the northeastern point of Upper Black island; and a rock with 16 feet of water over it bearing 22° , distant 265 yards from the same point.

A rock with 4 fathoms water over it bears 205° , distant 300 yards from the western of the southern extremities of Upper Black island, and there is a patch of 5 fathoms lying 450 yards off its southeastern coast at $\frac{1}{2}$ mile east-northeastward from the eastern of the southern extremities of that coast.

Tidal streams.—Between Upper Black and Hummock island the streams follow the coast of Hummock island and frequently cause eddies and rips over the shelf between them.

The western shore of the bay of Exploits from Little North harbor trends southeastward $\frac{1}{2}$ mile to North Harbor head, which is steep-to and rises to the height of 430 feet, with a conspicuous stone cairn on its summit, and thence south-southwestward, 1,400 yards to Dock point, the northern entrance point of North harbor.

North harbor is a bight extending about 1,400 yards westward from its entrance between Dock point and Birchy head, which are 400 yards apart in a northerly and southerly direction. The water in the harbor decreases in depth from 22 fathoms in the entrance to 8 fathoms near its head. A heavy swell occasionally rolls into the outer portion of the harbor, while the space in the inner part is very limited: small vessels, however, anchor here in 10 to 11 fathoms. There is a small settlement and some cultivated land around the harbor.

Muddy Hole point lies 1,100 yards south-southeastward of Birchy head, and there are two small coves between them. The point is low and prominent.

Great Muddy hole, lying $\frac{1}{2}$ mile west-southwestward of Muddy hole point, is a narrow bight, extending $\frac{3}{4}$ mile to the westward: it is well sheltered from the heavy ground swell that rolls up the bay during strong northerly winds, but owing to the small depth of water, it only affords anchorage to very small craft.

Little Grego island, lying southward 800 yards from the southern entrance point of Great Muddy hole and close to the shore, is about 300 yards in diameter and 145 feet high. A small rocky patch, with 19 feet water over it, bears 198° , distant 400 yards from

the southwestern point of the island, and less than 400 yards eastward of this patch the depth is upward of 50 fathoms.

Baptist cove, southwestward, rather over a mile from Little Grego island, is a small inlet only suitable for the small craft which occasionally visit it for firewood.

Lawrence harbor.—Lawrence head bears 166° , distant 1,600 yards from the southern entrance point of Baptist cove, and from between them Lawrence harbor extends southwestward $1\frac{1}{2}$ miles. A projection from the northern side of the harbor narrows it to 400 yards, and within this projection the harbor forms two bights, the southwestern of which is obstructed by a patch of rocks, which dries 2 feet. The northern bight is shallow at its head, but it affords indifferent anchorage in 18 to 20 fathoms, rock bottom covered with mud and sand. There are no settlers here.

Lawrence head, 210 feet high, is densely wooded and not very conspicuous as it is backed by higher land.

High Grego island lies southward 1,700 yards from the southern point of Lawrence head, and nearly $\frac{1}{2}$ mile offshore. It is about $\frac{1}{2}$ mile long northward and southward, 600 yards wide, 309 feet high, and the eastern side rises almost vertically, rendering it conspicuous. Two small rocks, 6 and 7 feet high, lie 265 yards northeastward of the island and 265 yards apart in an easterly and westerly direction. There is fair anchorage between the island and the mainland in 12 fathoms, sand bottom.

The shore southwestward of High Grego island is fronted by two islands connected at low water, and separated from the mainland by a narrow and shallow passage. Southwestward $\frac{1}{2}$ mile from these islands, and lying nearly 200 yards off the south-southwestern end of the peninsula of which Lawrence head is the northeastern end, is Granfer islet, about 400 yards long, eastward and westward, 100 yards wide, 75 feet high, and wooded.

Winter tickle.—At about $\frac{1}{4}$ mile westward of Granfer islet is an islet 90 feet high, situated close off the end of a peninsula of the mainland. The entrance to Winter tickle is between these islets, and the tickle extends thence northward $1\frac{8}{10}$ miles. There are several small islets in the tickle, and its shores are fronted by shoal water; toward its head the bottom is covered with thick weed. From the head of the tickle, a narrow channel, through which the tidal streams run with considerable strength, leads into a large salt water pond. There is a winter portage from the northern part of the tickle across the land to Indian cove of New bay.

There is good anchorage in the tickle in 10 to 11 fathoms 600 yards inside Granfer islet. In entering give the western end of the island a berth of 200 yards.

The shore between Winter tickle and Charles brook, at $2\frac{3}{10}$ miles to the southward, is broken into numerous bights and coves, and fronted by small islands and rocks above water, amongst which are several shoals. Mouse islet, southward, 900 yards from Granfer islet, is 40 feet high; there is a rock of the same height 200 yards southwestward of it, and bearing 252° distant 350 yards from this rock there is a rocky patch, the highest head of which dries 2 feet. Southwestward 1,700 yards from Mouse islet is a rock 12 feet high, with a rock 18 feet high rather more than 200 yards westward of it.

Burnt island, southward 600 yards from the rock, 18 feet high, is 400 yards long, east-northeastward and west-southwestward 200 yards wide, and 130 feet high. It is cliffy and wooded. There is a rock, with 7 feet water over it, bearing 7° , distant 200 yards from the northeastern point of the island, and bearing 10° , distant 235 yards from the western point of the island is a rocky patch with 27 feet water over it. A patch of 5 fathoms bears 183° , distant 250 yards from the western point of the island.

Sunday island, $\frac{1}{2}$ mile southwestward of Burnt island, is 700 yards long, northward and southward, about 200 yards wide, and 70 feet high; it is less than 200 yards off the mainland, the channel between being shallow and rocky; at 135 yards off the middle of its eastern side is a patch with 6 feet water over it.

It is advisable to keep eastward of Mouse, Burnt, and Sunday islands.

Charles brook is a small stream running into the bay westward of the southern end of Sunday island. Anchorage may be obtained off it in about 20 fathoms of water, but it is very indifferent and is not recommended.

Govers harbor.—South-southeastward, 1,200 yards from Charles brook and close offshore is an islet 30 feet high; Govers harbor is a bight of the mainland extending southward, 700 yards from this islet. Its entrance is clear, but the space available for anchorage inside is very small. Bearing 22° , distant 200 yards from its eastern entrance point, is a shoal with 2 fathoms water over it, and within 550 yards northward of the northeastern end of the promontory on the eastern side of Govers harbor are two rocks, 7 and 6 feet high, surrounded for a short distance by shallow water.

The shore from the northeastern point of the promontory eastward of Govers harbor trends south-southwestward for $1\frac{1}{2}$ miles and then south-southeastward for 1,300 yards, where an island connected with the shore projects northeastward 350 yards. At 300 yards northeastward of this islet is Indian Cove island, small, 50 feet high, and wooded. A shoal, on which are two rocks, 5 feet high, lies within 300 yards northward of the island.

Indian cove is situated northwestward of Indian Cove island; shoal water extends a short distance off its shores. Bearing 276° , distant $\frac{3}{4}$ mile from the northern extremity of Indian Cove island is a detached patch of rocks, the highest head of which dries 1 foot. The cove is quite open northward and the water is rather deep for anchorage, but sometimes large timber-laden sailing vessels outward bound use it temporarily.

The shore from Indian cove trends southward for $2\frac{1}{4}$ miles, and then turns southwestward for 3 miles to Philip head, a small stony projection. This shore is moderately high and shoal water extends only a short distance off it. Bay point extends a little from the shore line at $1\frac{1}{2}$ miles from Indian cove, and 600 yards southward of this point is Woody islet, a rock 55 feet high; Grassy islet, a rock 40 feet high, lies 400 yards farther southward. A rock awash at low water bears 220° , distant 265 yards from Woody islet.

Thwart island.—The northern extremity of Thwart island bears 120° , distant $1\frac{3}{4}$ miles from Granfer islet, and the island extends southward $5\frac{1}{2}$ miles with a general width of 2 miles, being the largest in the bay of Exploits. It is densely wooded, and has no permanent inhabitants, but during autumn it is resorted to for firewood, and small vessels are occasionally built on its eastern side during winter. The channel westward of the island is $1\frac{1}{2}$ miles wide, clear and deep, but eastward of it there are many small islands with passages between them, and a shallow bar connects the southern point of the island to the mainland.

The northwestern coast of the island has four coves.

Rendells cove, at $\frac{1}{2}$ mile from the northern end of the island, is very confined, and does not afford any shelter; Hoskins harbor, about 1,600 yards farther southward, is so occupied with sand, mud, and bowlders as to leave little space even for boats. Wild bight, the entrance of which is off Hoskins harbor, extends south-southeastward about a mile, with a width of $\frac{3}{4}$ mile; it affords anchorage in 9 to 11 fathoms at $\frac{1}{2}$ mile from its head, but it is open northward, and with strong northerly winds it is not a desirable place to be in. The outer part of the western side of Wild bight is formed by a narrow peninsula, 1,200 yards in length, westward of which is Cabbage harbor, a bight affording anchorage for small vessels only. The coast of the island from the southwestern entrance point of Cabbage harbor trends southward to its southern end, and there is deep water off it at the distance of 200 yards.

The northeastern coast of Thwart island is broken up into several bays and coves. A rock 8 feet high lies 600 yards eastward from its northern point, and bearing 187° , distant 265 yards from this rock is a rock that dries 1 foot, while there are two patches with 7 and $4\frac{3}{4}$ fathoms over them between these rocks and the island.

Lobster island, bearing 76° , distant $\frac{9}{10}$ mile from the northern extremity of Thwart island, is small and has a height of 20 feet. It is covered with grass and is steep-to on its northern and eastern sides, but shoal water extends 100 yards southwestward of it.

Rock.—Bearing 149° , distant 1,665 yards from Lobster island and 114° , distant $1\frac{1}{2}$ miles from Thwart island, there is a rock with 22 feet water over it.

St. Johns harbor.—At $1\frac{7}{10}$ miles southeastward of the northern point of Thwart island is an islet from the southern point of which shoal water extends southeastward for 265 yards; and 750 yards south-southeastward from this islet is an island 200 feet high, with a reef awash at low water, extending 300 yards northward of it. Two hundred yards south-southeastward of the island, 200 feet high, is a peninsula extending northward from an isthmus situated $1\frac{1}{10}$ miles to the southward. The southeastern end of this peninsula is a remarkable wooded conical hill 400 feet high. St. Johns harbor lies westward of the island 200 feet high and the peninsula. The northern part of the harbor, entered northward of the island 200 feet high, is clear of shoals and affords anchorage in about 13 fathoms, mud bottom. The southern part of the harbor is separated from the northern by a bay, over which there is a depth of 4 fathoms. Southward of the bar the depth increases to 8 and 9 fathoms, but the space is limited.

The entrance between the island 200 feet high and the peninsula has a depth of 4 to 5 fathoms in the middle, but it is narrow and suitable only for small craft.

Thwart Island harbor is a bight immediately westward of the wooded conical hill 400 feet high at the southeastern end of the peninsula forming St. Johns harbor. The middle of the harbor has a depth of 6 fathoms in it, but its shores are foul and there is little clear space.

The southeastern coast of Thwart island from Thwart Island harbor trends southeastward 3 miles to its southern point: depths of less than 5 fathoms extend nearly 600 yards off it in places, and a rock with 11 feet water over it lies 600 yards off this coast bearing 224° , distant $1\frac{7}{10}$ miles from the summit of the island, 210 feet high, forming the southwestern entrance head of Thwart harbor.

The western shore of the bay of Exploits within Philip head trends southwestward and rises to the Monkeys Lookout, a conspicuous hummock, southwestward of which the shore rises to some hills a short distance inland. A rocky ledge with general depths of 11 to 20 fathoms over it extends southeastward for 1,200 yards from Philip head, and on this ledge at $\frac{1}{4}$ mile from the head is a patch with $5\frac{1}{2}$ fathoms least water over it.

Northern arm is a bight about $1\frac{1}{4}$ miles deep and one mile wide, situated nearly 5 miles southwestward of Philip head. Muddy Hole brook falls into its western part. Shoal water extends from 300 to 600 yards off the shores of the arm, and a rocky spit, with 3 feet least water over it, runs northeastward into the arm from Evans point, the northern entrance point of Muddy Hole brook. The depth of water in the arm is otherwise from 10 to 6 fathoms, but its head is shoal.

The shore from Northern Arm point, the southern entrance point of the arm, trends southeastward for 1 mile to Mill point and is occupied by cottages and patches of cultivation.

Killick island lies 300 yards offshore on the edge of a shallow flat extending off the land between Northern arm and Mill points. It is small and 35 feet high, but it shows well, as the dark spruce trees with which it is covered contrast strongly with the cleared and burnt land southwestward of it.

Shoal.—A shoal patch, with $5\frac{1}{4}$ fathoms water over it, lies in the middle of the channel, bearing 84° , distant 1,200 yards from Killick island.

Mill point is low and sloping and there are some houses on it.

Peter arm, a bight lying southwestward of Mill point, is about $1\frac{1}{2}$ miles deep with a breadth of 1,400 yards; the depth of water in it is from 15 to 5 fathoms, but within 1,600 yards of its head there is a flat, the inner part of which dries at low water. A small stream which runs into the head of the arm is dammed a few miles above its mouth for the purpose of driving logs cut during winter in the surrounding forests, and a large boom for confining them occupies the southern part of the head of the arm. There are numerous houses around the shores of the arm, and a road, following the shore, connects Northern and Peter arms.

At 600 yards southwestward of Mill point is a sawmill, the buildings and chimney of which are conspicuous.

Wharves.—Near the mill there are two wharves, the southwestern one being used by large vessels, while the other is small and used chiefly by schooners and craft engaged in the local trade. The depth alongside the southwestern wharf is 15 to 22 feet, but the ground slopes off steeply and at a few yards from the wharf the water is much deeper.

Anchorage.—The best anchorage is a little south-southeastward of the southwestern wharf in about 15 fathoms, mud bottom.

Tides.—It is high water, full and change, in Peter arm at 7 h. 25 m.; springs rise $4\frac{1}{4}$ feet, neaps $2\frac{3}{4}$ feet; neaps range $1\frac{1}{4}$ feet.

Botwoodville, the settlement around Peter arm, has a population of 400 to 500 persons, the male members of which are employed in the sawmill worked by the Exploits Lumber Company.

The lumber company obtains its timber from extensive forests in the valley of Exploits river, and the logs are driven down the larger streams into the bay, whence they are towed to the sawmill. The principal wood exported to Europe is pine deals, but a large trade is done with St. Johns and other local ports in such building lumber as boards, palings, and scantlings. About three large sailing vessels and the same number of steam vessels load here annually for London.

Supplies.—There are two stores where general supplies may be obtained in small quantities, but the supply of fresh provisions can not be relied on.

Communication.—Frequent communication is kept up with Norris arm, 4 miles up the bay, where there is a station on the Newfoundland railway, by a small steamer belonging to the lumber company. The mail steamer from Lewisport calls at Botwoodville wharf twice a week, once when bound westward and again when returning. The nearest telegraph station is at Norris arm.

All-in-the-way islet, lying 1,600 yards eastward from Mill point, is small, 50 feet high, lightly wooded, and somewhat conspicuous. Shoal water extends northward 300 yards from the islet, and a long chain of detached shoals reaches $1\frac{1}{2}$ miles southward from it to Right-in-the-road, a similar islet, 35 feet high, from which shoal water extends to the eastern shore.

The western shore of the bay of Exploits from Little Peter point, the southern entrance point of Peter arm, trends south-southeastward for 2 miles to Wigwam point. At 1,400 yards south-southeastward from Little Peter point there is an old wharf and the site of a sawmill, which has been destroyed by fire, with some patches of grassy land around it.

Wigwam point, the northern entrance point of Exploits river, is conspicuous.

The eastern shore of the channel from the entrance of Burnt arm trends southward 2 miles to Gills point, a small projection; it then curves south-southeastward for nearly 2 miles to High point.

The channel above Peter arm is obstructed by large shallow banks of mud and sand with occasional patches of rock. Vessels of any size, therefore, can not go much beyond the anchorage at Peter arm.

From Wigwam point a long tongue of sand and mud extends northward $1\frac{1}{4}$ miles and occupies the middle of the water area; on it at 1,200 yards from its northern end is a patch of rocks that dries 6 feet.

A channel along the eastern shore leads to High point from the deeper water of Peter arm and carries a least depth of $2\frac{1}{4}$ fathoms

to within $\frac{1}{2}$ mile of the point, whence a bar, with $1\frac{1}{2}$ to 2 fathoms over it, extends to the point. This channel passes close westward of Right-in-the-way islet, and along the eastern shore to the bar.

Exploits river entrance, 1 mile in width, is southward of Wigwam point, whence a flat with less than 1 fathom of water over it, and with several patches dry at low water, extends to the southern shore. Southwestward of the flat the river channel has depths up to 15 feet for upward of 2 miles.

The river is navigable, at high water, for vessels drawing 6 feet, to the first rapids, at 6 miles above the entrance, and, for boats, to the falls, about 2 miles farther. Small boats are sometimes hauled over the falls to reach the stream above, where a good deal of lumbering is carried on.

Norris arm.—The entrance to this arm is between High point and the shore southward of it, and the arm extends northeastward for about 4 miles with an average width of $\frac{1}{2}$ mile. It is approached over the bar northwestward of High point, and carries depths of $1\frac{1}{4}$ to 2 fathoms to within $1\frac{1}{2}$ miles of its head, which is encumbered by shallow flats and patches of stones. A small stream runs in here, and there are some others on both shores, the largest being Eel brook, on the southern shore, at 1 mile from the head. On a slight projection of the southern shore, southeastward of High point, is a sawmill and plant of the lumber company, with a small wharf off it which has a depth of 9 feet at its head at low water.

Burnt arm extends northeastward $1\frac{8}{10}$ miles with a width of 600 to 1,200 yards; its entrance lies northeastward $1\frac{2}{10}$ miles from All-in-the-way islet. There is a depth of 3 to 4 fathoms in the inner part of the arm, which is approached by a channel with 4 to 6 fathoms in its fairway, but the entrance is almost blocked with shoals having 2 to $2\frac{1}{2}$ fathoms over them, and a detached shoal with 2 fathoms of water over it lies 600 yards outside the entrance.

The coast of the promontory, which has Burnt arm on its southeastern side, trends westward for 1,400 yards from the entrance point of the arm, and then turns northward for $2\frac{1}{2}$ miles to Lower Sandy point. Except near the arm, this coast is steep to at the distance of 200 yards up to within $\frac{1}{2}$ mile from Lower Sandy point, off which part the depth of 5 fathoms is distant 400 yards in places.

Kite cove, a bight about 1,600 yards eastward of Lower Sandy point, is 1,200 yards wide and extends southward for 1,400 yards, with a depth of water decreasing from 10 fathoms in its entrance to 5 fathoms at 350 yards from its head.

The settlement of Lawrencetown is on its shores.

The southern shore of the western arm from Kite cove trends northeastward for 4 miles to the point which forms the southern entrance of Southern passage, and which has Gillet islet, 90 feet

high, lying 300 yards to the westward. Shoal water extends about 300 yards off this shore in places, and there is a patch with 5 fathoms of water over it at 600 yards offshore and bearing 77° , distant $1\frac{1}{2}$ miles from Lower Sandy point.

Southern passage, between the southern end of Thwart island and the mainland to the southward, is 1,200 yards wide, but it is obstructed by shoals extending from both sides, and by a patch, with 2 to 3 fathoms water over it, lying in the fairway, and leaving only two narrow channels having depths of $4\frac{1}{2}$ and $5\frac{1}{2}$ fathoms.

Tidal streams.—Usually in Southern passage the flood stream sets west-southwestward and the ebb east-northeastward, but their directions and rates depend much on the wind. With strong northerly to easterly winds the rate of the west-going stream increases, and at springs reaches 2 knots; also, at many times, it overcomes the east-going stream and continues westward for many hours. With strong westerly winds the reverse is the case.

The southern shore eastward of the Southern passage trends east-southeastward for 3 miles to the western entrance point of Milord arm; included in this stretch is Browns arm, a shallow bight. Bearing 312° , distant 700 yards from the western entrance point of Browns arm, is a patch with 27 feet of water over it, and bearing 50° , $1\frac{2}{10}$ miles from the same point and 400 yards offshore, is an islet 100 feet high. Shoal water extends from 200 to 700 yards off this shore.

St. Johns bay lies eastward of Thwart island; it contains several small islands with passages between them, the navigation of which requires local knowledge.

Islets.—An islet 20 feet high bears 233° , distant 550 yards from the southeastern point of the islet, 210 feet high on western side of the approach to Thwart Island harbor, and an islet 55 feet high bears 203° , $\frac{1}{4}$ mile from the same point. From a point $\frac{1}{4}$ mile east-southeastward from the southern point of the western approach to Thwart Island harbor, three islets extend south-southeastward 1,200 yards; these islets are 75, 80, and 100 feet high, respectively; there is foul ground between them, and a rock with 7 feet water over it lies 100 yards north-northwestward of the northern islet, while there are depths of 27 to 30 feet at 600 yards westward of the southern islet.

Frying Pan island, southeastward of the conical hill 400 feet high, situated eastward of St. Johns harbor, with a clear passage 300 yards wide between, is 700 yards long, northward and southward, 100 yards to 400 yards wide, and 240 feet high; its coasts are steep-to. A small islet, 83 feet high, lies 200 yards east-southeastward of its summit.

James island, 400 yards northeastward of Frying Pan island, is 400 yards long, northward and southward, less than 200 yards

wide, and 80 feet high. Foul ground extends westward 250 yards from it and 100 yards southeastward. A rocky ledge with $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms of water over it extends northeastward from the northern end of the island, and it terminates, at 400 yards from the island, in a rock with 13 feet water over it. Bearing 126° , distant 400 yards from the southeastern end of the island, is a narrow shoal, extending 200 yards northward and southward, and having 2 fathoms of water over it.

These islands and islets are for the most part wooded.

Rock.—Bearing 34° , distant 1,400 yards from the northern end of James island and nearly in the middle of St. Johns bay, is a rock with 3 feet of water over it; this rock is almost steep-to, and approach to it is not indicated by the lead.

Leading mark.—The summit of the wooded ridge 430 feet high, westward of High Grego island, open northeastward of Lobster island, bearing 318° , leads northeastward of this rock.

Milord arm, in the southern part of the bay, is about $\frac{1}{2}$ mile wide and extends 1,600 yards to the southward; the depths in it gradually decrease from 10 fathoms at its entrance to its head, which is shoal. Two islets, each 25 feet high, lie about 200 yards off its eastern entrance point and bearing 22° , distant 500 yards from the northeastern of these islets, there is a patch of 4 fathoms.

Scissors cove, eastward of Milord arm, is the southeastern part of the bay. An inlet, in the mouth of which is a rock 20 feet high, extends south-southwestward and south-southeastward 1 mile from the cove, and it might afford shelter to boats.

The eastern shore from Scissors cove trends northward for $4\frac{1}{2}$ miles to a bluff, which is the eastern entrance point of St. Johns bay. At 2 miles northward from Scissors cove is Foulke cove, which extends 800 yards to the northeastward and is shallow. Bearing 311° , distant $\frac{9}{16}$ mile from the northwestern entrance point of Foulke cove and nearly 600 yards offshore, there is a patch of rocks, the summit of which is 5 feet high.

Sailor island lies 300 yards offshore and bears 325° , distant $1\frac{3}{16}$ miles from the northern entrance point of Foulke cove. This island is 450 yards long northward and southward, 65 yards wide, 80 feet high, and partly wooded. It is steep-to at the distance of 50 yards.

Southern head.—The bluff forming the eastern entrance point of St. Johns bay is cliffy and rises almost vertically from the sea to the height of 360 feet; it is densely wooded. The land from the bluff trends northeastward and slopes gradually for $\frac{1}{2}$ mile to Southern head. There are some banks with 14 to 20 fathoms water over them within about $1\frac{1}{2}$ miles eastward of the head, which cause occasional tide rips during spring tides.

Little Burnt bay lies between Southern Head peninsula on the west and a long narrow peninsula, off which is Birchy island, on the east. On the western side of the bay are some coves with a few cottages, inhabited by settlers, and there is a little cultivated land around them.

The southwestern part of the bay, and also its head, are shoal and encumbered by rocks.

There is anchorage in the bay in 16 to 18 fathoms water at about 800 yards southeastward of Big island, which is 70 feet high and conspicuous, but with strong northerly winds it is not safe.

Birchy island is separated from the mainland by Shoal tickle, a passage about 200 yards wide, and only deep enough for boats. The island is about 2 miles in length on its western side, and it has a greatest width of $\frac{1}{10}$ mile; it is 410 feet high, densely wooded, and inhabited only on its southeastern side, where Birchy Island tickle separates it from Sivier island.

A ledge with 3 fathoms water over it extends northward 200 yards from the northern end of Birchy island.

The passage between Spruce and Birchy islands is $\frac{3}{4}$ mile wide and deep, excepting this ledge and the rock southwestward of Spruce islands (p. 482), and it is used by the local steamers proceeding to and from Lewisport.

Tidal streams.—The tidal streams between Southern head and Spruce islands follow the directions of the channels, the main flood stream between Spruce and Birchy islands setting westward.

Passage island lies 300 yards off the northeastern coast of Birchy island; it is nearly 400 yards long east-northeastward and west-southwestward, 200 yards wide, 90 feet high, and steep-to, except on its southeastern side where there is a rock with 18 feet of water over it at the distance of 150 yards.

Birchy Island tickle is 300 yards in width at its narrowest part, which is abreast a shingle spit extending from its northwestern side, and there is a depth of 15 feet in the fairway of a tortuous channel through it. It is, however, used only by small coasting vessels.

Sivier island is of remarkable shape, is densely wooded, and rises to a conical summit 410 feet high. It is nearly divided into two parts by Eastern and Western harbors, which on their respective sides cut deeply into the island, leaving a neck 500 feet across.

Eastern harbor is shoal and it can only be used by small craft; there are a few houses on its shores. Western harbor is also shoal and its entrance obstructed by a ridge of rocks across it.

The northern side of Sivier island is fronted by three small islands and two rocks which dry. At 200 yards northward of the eastern rock there is a shoal with 9 feet water over it.

Camel island, 1,500 yards northward of Sivier island, is thickly wooded, clifly, and rises to a hill, the hump, 350 feet high, near its middle. Close off its southern end there is a small rock 10 feet high, with another 5 feet high at 500 yards westward of it. This rock of 5 feet in height is steep, and there is a safe passage between it and Camel island.

Camel Island passage, between the rock 5 feet high and the shoals off Sivier island, is used by the local steamers proceeding to and from Lewisport. Between the islet off Camel island and the shoal with 9 feet water over it off Sivier island, the passage is nearly 800 yards wide, but in the middle there is some foul ground with a least depth of 5 fathoms of water over it.

Leading mark.—The whole of Steering island open eastward of the eastern end of Sivier island leads through this channel in deep water.

Tinker island, 1,600 yards westward of Camel island, is small and round; it is quite steep-to and forms a good guide when using Camel Island passage.

The shore of the bay of Exploits from Shoal tickle trends southward for $4\frac{1}{2}$ miles to the western entrance point of Burnt bay; it is low, densely wooded, and there are several shallow coves in it, at each of which there are a few houses. This shore is generally foul to the distance of 300 yards, beyond which the water quickly deepens to over 20 fathoms; but a small bank, with 27 feet least water over it, lies off its northern part, bearing 244° , distant 1 mile from the southwestern point of Sivier island.

Anchorage.—There is anchorage off the western entrance to Birchy Island tickle in 15 fathoms water, well sheltered from westerly winds, which are strong in autumn.

Bearing 244° , distant $\frac{1}{2}$ mile from the southwestern point of Sivier island, is a bank of gravel and mud on which there is good anchorage in 12 to 15 fathoms. The points of Birchy Island tickle just closed lead over the bank, which is surrounded by much deeper water.

St. Michaels island, on the eastern side of the entrance to Burnt bay, lying eastward, distant 1,300 yards from the western entrance point of the bay, is 1,200 yards long northeastward and southwestward, with a greatest width of 500 yards; it is wooded, and rises to the height of 220 feet near its southwestern end. This island is the southwesternmost and largest of a group.

Light.—A white open framework, on the summit of St. Michaels island, exhibits a fixed white lantern light during the season of navigation, or from about May 20 to January 1.

Burnt bay, more generally known as Lewisport harbor, extends southwestward nearly 5 miles within St. Michaels island.

Cat, Freak, Rice, and Mussel islands are a group of small wooded islands extending northeastward and southwestward 1 mile and lying off the western side of the bay. Cat island, the northeasternmost of the group, bears 211° , distant 1,650 yards from St. Michaels island. Cat and Freak islands are steep-to on their eastern sides, but at 200 yards southward of Rice island the southwesternmost island of the group, is a rock with 18 feet water over it.

Clearing mark.—The bluff forming the southeastern side of the entrance to St. Michaels harbor just open eastward of Freak island, bearing 37° , leads southeastward of this rock.

Flat.—The space between Freak and Rice islands and extending to the shore within Mussel island is occupied by a shoal flat, part of which dries at low water.

Seal rocks, a patch of rocks 250 yards long, east-northeastward and west-southwestward, and 150 yards wide, lie in the fairway of Burnt bay, bearing 104° , distant 450 yards from Cat island. The western rock is 1 foot high and bold-to on its western side. The passage westward of these rocks is generally used, as it is well marked by Cat island, but there is a good passage eastward of them.

Rocks.—A patch of rocks, the highest of which is awash at high water, lies 400 yards off the southeastern shore of the bay, bearing 140° , distant $\frac{1}{2}$ mile from the eastern point of Freak island.

Shoal point, on the eastern side of the bay at $1\frac{1}{8}$ miles within Rice island, is a low projection, and a ridge of stones extends 200 yards northward from it. Foul ground also extends 200 yards westward from the point, and around the point at distances of 400 to 500 yards there are some heads with $3\frac{1}{2}$ to 5 fathoms of water over them.

Shallow water extends about 400 yards from both sides of the bay above Shoal point, and meets the flats which reach 1,400 yards from its head.

Anchorage.—The depth of water in the bay is moderate and anchorage can be obtained anywhere above Rice island. Off the wharves at Lewisport and a little southeastward of them there is good anchorage in 9 to 11 fathoms, mud bottom.

Settlements.—The village of Lewisport is on the western shore of the bay westward and southwestward of Shoal point; it has a post-office, custom-house, hotel, and two stores. The population in 1904 was about 500, and the value of the timber exported in 1903 was \$242,500. On the eastern side of the bay, near its head, there is a small settlement called South Side. It is connected with Lewisport by a fairly good road which crosses the stream at the head of the arm by a wooden bridge.

Communication.—See page 476.

Wharves.—The railway wharf at Lewisport has $3\frac{1}{2}$ to 4 fathoms alongside it and across its head; it is situated in front of the station.

A little northward of it is a large wharf belonging to the Timber Company, which is engaged in working the land around Red Indian pond. A branch line runs from near Winter station, on the Newfoundland Northern and Western Railway, to Millertown, about 20 miles to the westward, where are their headquarters. At the Timber Company's wharf several large vessels are loaded annually with sawed timber for European and other ports.

Supplies can be obtained, and Cape Breton coal can generally be purchased from the railway authorities.

Ice.—The bay usually freezes about January 15 and it opens about the end of April. The coastal steamer runs from about May 1 to January 10.

Tides and tidal streams.—It is high water full and change, at Lewisport at 7h. 30m.; springs rise 4 feet, neaps 3 feet. The tidal streams run fairly in and out of the bay, with an appreciable rate at spring tides in the narrow places, but they are scarcely noticeable at other times.

St. Michaels harbor, southeastward of St. Michaels island, is a little bight, suitable only for small craft. On its shores are a few houses and some cultivated land.

The shore from St. Michaels harbor trends northeastward for 2 miles and then turns eastward for $1\frac{1}{2}$ miles to the western entrance point of Indian arm.

Jobs island is a small wooded island, 20 feet high, lying half a mile offshore at about 1,700 yards north-northwestward of St. Michaels island. A reef with 1 to 2 fathoms of water over it extends southward 600 yards from it, and two reefs, each with 4 feet of water over it, bear, respectively, 12° , distant $\frac{1}{2}$ mile, and 62° , distant 400 yards from the island.

Mussel Bed rocks lie $1\frac{1}{2}$ miles east-northeastward of Jobs island. The largest of them is 5 feet high. These rocks are steep-to at a distance of 100 yards. Between Mussel Bed rocks and Berry island there is a similar cluster, 6 feet high, lying 500 yards from the shore, which is here fronted by a number of rocky patches which dry.

Duck and Berry islands lie off the western entrance point of Indian arm. Duck island is 26 feet high and covered with grass, and Berry island is wooded. The northern side of Duck island must not be closed nearer than 200 yards, and the shore southward of Berry island, being very foul, must be given a berth of 600 yards.

Indian arm.—Indian head, the eastern entrance point of this arm, lies about $2\frac{1}{10}$ miles east-northeastward of its western entrance point, and the arm extends about 2 miles to the southward. In it the water is of moderate depth, and, excepting a rocky patch, with 3 fathoms of water over it, bearing 110° , distant 700 yards from the southern

end of a wooded island near Campbellton mill, there are no shoals beyond 400 yards from its shores.

Indian head in line with the eastern end of Steering island leads clear of the 3 fathoms patch.

The eastern and southeastern shores of the arm are low and backed by wooded ridges.

Steering island is a small round islet, 40 feet high, lying $\frac{1}{2}$ mile off the shore southward of Indian head; it is steep-to, covered with grass, and conspicuous.

Anchorage.—Avoiding the rocky patch, there is anchorage in 7 to 13 fathoms, sand and mud bottom.

Campbellton settlement, on the western shore of Indian arm, is supported by the timber industry. It has a large steam sawmill, and near it there is a wharf where vessels, up to 100 tons, can load.

The river at the head of the arm runs out of an extensive series of ponds commencing about $\frac{1}{2}$ mile from the sea; here there is a dam to hold the water required for driving out the logs cut in the densely wooded country around the ponds, and at the mouth of the river there is an extensive timber boom.

Indian head is foul for a distance of 400 yards. Between it and Long point, at about $1\frac{3}{4}$ miles to the north-northwestward, is a bay extending nearly a mile to the eastward, in which there is anchorage during easterly winds. The head of this bay is only $\frac{1}{4}$ mile from Loon bay.

Long point, a projection separated from the shore at high water, is 5 feet high, and prominent only from the large boulders at its end.

Chapel cove, between Long point and Chapel head, is about a mile across at its entrance; the cove is foul and off it there are several rocks which dry. The shores of the cove are low and wooded.

Chapel head is a conspicuous bluff headland: at 400 yards westward of it there is a shoal patch with 4 fathoms water. The channel between the head and Camel island is $1\frac{3}{10}$ miles wide.

The shore of the bay of Exploits northward of Chapel head is clifty and irregular for 3 miles to Net Cove head, a wooded projection, which, with a similar but higher bluff immediately northward of it, is conspicuous.

Duck island, $\frac{1}{2}$ mile off this shore, is small and grassy, and 200 yards south-southeastward of it is a rock which dries 3 feet, while between the island and the land there are some rocks, which dry, surrounded by shoals. The western side of the island must not be closed to less than 200 yards.

Two very conspicuous hills rise steeply from the comparatively level and thickly wooded country eastward of Duck island.

Rock.—At 400 yards west-southwestward of Net Cove head there is a small rock with 13 feet water over it, and deep water around. Chapel head open westward of Duck island leads westward of this rock.

Comfort head.—The higher of the bluffs northward of Net Cove head forms the western side of a small bay, the eastern side of which is Comfort head, a steep wooded bluff. Off the head is Comfort island, steep and densely wooded, and there is a clear passage between them, the deepest water being near the head.

Knight island is 1,600 yards northward of Camel island, and between them there are two small wooded islets and some rocks which dry. There is a good passage between the southern of these islets and Camel island: a shoal with 3 feet water over it off the northern end of Camel island must be avoided by keeping toward the islet.

Knight island is thickly wooded and rises, near its northern end, to the height of 280 feet. Its western side is steep-to, but near the middle of its eastern side and 400 yards off, there is a shoal with 10 feet water over it.

A small shallow harbor is situated on the western side of the island, and there is another at its northern end: both are frequented by lobster fishermen during summer.

Yellow Fox island lies $1\frac{1}{2}$ miles northeastward from Knight island, and between them there are several small islets and rocks. Squire islet, nearly midway and the largest of these islets, is wooded except at its northern end, which is bare. There are clear passages on either side of Yellow Fox island, but the passage between Knight island and the islet southward of Squire is foul. Reefs extend south-southeastward and west-southwestward of Yellow Fox island: the southern side of the island must not be approached within a small wooded islet about 600 yards off it, or the western side within the same distance.

Sansom islands, lying about 1 mile north-northwestward of Yellow Fox island, consist of two large islands separated by a channel with an average width of 400 yards, and several small ones. The islands are of moderate height and densely wooded. Sugarloaf islet, the southernmost of the group, is 214 feet high, and its western side is steep and cliffy: there is a deep clear passage between it and the large island to the northward.

The eastern and southwestern sides of this large island are steep-to, but there are some shoal patches off its northeastern and western sides. There many rocks northward of the group and this locality should not be used for navigation.

Sansom tickle, the channel between the larger islands, has an average width of 400 yards: a patch of rocks, the highest of which is 10 feet high, occupies the western end, but there is a clear passage

on either side of it, the southern being the better. Vessels sometimes anchor in this vicinity, generally off the southern village, but it is not a desirable place except in very fine weather; a shallow ledge of rocks extending from a small islet off the southern shore must be avoided. On the shores of the tickle there are many fishermen's houses, and at the northern village is a post-office, from which weekly communication is made with Exploits harbor.

Tides and tidal streams.—It is high water, full and change, at Sansom tickle at 12h. 20m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet. The flood is the west-going stream, and the ebb the east-going, through the tickle; the stream going with the wind has some strength at springs during strong easterly or westerly winds.

Little Black island, about $1\frac{1}{4}$ miles north-northwestward of the northern large Sansom island, is 1 mile long in a northeasterly and southwesterly direction, and about 800 yards wide; near its northeastern end is a flat wooded hill 248 feet high. On the southeastern side of the island is Southern harbor, a shallow and open cove, in the entrance to which is a small black islet 20 feet high, and 200 yards northeastward of this islet is a rock with 15 feet water over it.

Black island, close northwestward of Little Black island and separated from it by Black Island tickle, is $1\frac{7}{10}$ miles long north-northeastward and south-southwestward, 1 mile wide, and 412 feet high. It presents a generally flat appearance, and on its western side, separated by a point close off which is Hamilton islet, a rock 27 feet high, there are two coves.

Sealing cove, the northern, is clear of shoals and affords anchorage for small vessels during easterly winds in $4\frac{1}{2}$ to 12 fathoms water; Parsons cove, the southern, is only suitable for boats.

Kiar cove, at the northern end of the island, is narrow and nearly filled with rocks.

Beacon.—A large wooden beacon stands on the summit of Black island, and indicates the locality of a pilot station.

Black Island tickle, the passage between Little Black and Black islands, is narrow and there are numerous rocks in it. It is used only by small fishing vessels, which enter its eastern entrance, passing on either side of a group of rocks that cover at high water.

Comfort cove, southward of Comfort head, affords anchorage in 15 to 20 fathoms, but the position is not safe with easterly winds which prevail in spring and autumn. There are some houses around this cove, and also a post-office, from which communication with Campbellton is made weekly by boat.

Cranberry island, fronting the western side of the entrance, is low and steep-to on its eastern side.

Loon bay extends southward for 7 miles within Cranberry island, and a large opening on its eastern side leads into Birchy bay and also to several channels, between rocks and islets, running north-north-eastward for upward of 10 miles.

The loon, after which the bay is named, is a sea bird, which frequents this locality in large numbers.

The western side of Loon bay is generally of moderate depth, decreasing from 45 fathoms at the entrance to 12 fathoms outside Loon harbor, at its southern end. There are but few shoals and there is usually anchorage anywhere around it.

The western shore, inside the entrance, rises steeply to a prominent wooded hill, 211 feet high, which descends northward to Comfort cove and southward to New harbor.

New harbor is an indentation $\frac{1}{2}$ mile deep and 300 yards wide, with depths of 5 to 9 fathoms, but flats of sand and mud extend off its western side and to a distance of 400 yards from its head. A shoal, with 15 feet water over it, extends 400 yards off its eastern entrance point. The harbor is only suitable for small vessels.

There is a small village at New harbor, and a road leads from it across the intervening neck of land, to Comfort cove.

Southward of New harbor the land becomes lower, and, at the distance of 3 miles falls back in a small bay, the head of which is only $\frac{1}{4}$ mile from Chapel cove.

Long point is the southeastern point of this small bay, and within the point the head of Loon bay forms a bight in which there is excellent anchorage in about 15 fathoms, stiff mud bottom.

Loon harbor, a basin at the southern end of Loon bay, is about $\frac{1}{2}$ mile across, with depths of 5 to 6 fathoms. Its entrance is narrow and obstructed by a patch with 3 fathoms of water over it, but vessels drawing 18 feet enter by keeping the eastern side on board. Between the heads the water is fairly deep and there is anchorage in the middle of the basin in 5 fathoms, mud bottom. The harbor is frequented only by small craft carrying timber.

A small village is situated around this basin, and a sawmill with a wharf off it lies on the eastern side. A road runs from the western side of the harbor to Campbellton, a distance of about 4 miles. Two streams fall into the harbor, one close to the sawmill, and the other on the southern side. The latter is the outlet of a series of lakes extending several miles.

The eastern side of Loon bay is rocky and does not afford good anchorage; at $1\frac{3}{4}$ miles from Loon harbor entrance there is reef with some rocks awash at low water, and in this locality there are some shoal patches.

South harbor, formed by two islands close to the shore, is only suitable for boats; there is a lobster-fishing station on the outer island.

Birchy bay, the bight eastward of Loon bay, extends southward for about 2 miles and there are several islands in it. The approach from Loon bay is contracted on the southern side by shoals extending from the northern end of the peninsula separating the bays, and from Green island, on the northern side. A steam sawmill is situated on the eastern shore of Birchy bay near its entrance. The bay is only visited by small craft carrying timber.

Green island, lying off the northeastern side of Loon bay, is small grassy, 30 feet high, and of turtle-back shape. An extensive flat of large stones and sand reaches from it to the southern point of Coal-all island, the eastern entrance point of Loon bay; this flat is very steep-to, and vessels drawing 12 feet or more water must keep on the western side until past the entrance to Birchy bay.

Islands.—Eastward of Cranberry island a small archipelago of islands and rocks extends between Coal-all and Farmer islands. The southwestern of these islands is 35 feet high, bare and grassy, except at its southern end, which is wooded, and steep-to on its western side; a small rock, 3 feet high, lies $\frac{1}{4}$ mile northwestward of this island; it is also steep-to, and there is a deep clear passage between it and Comfort island.

Dildo run.—The above-mentioned archipelago extends northeastward, the islets and rocks increasing in number, for a distance of 10 miles. Among the islets and rocks there is a narrow and very intricate channel leading to Change Island tickle, known as Dildo run. There is a depth of at least 12 feet water in this run, but the turns are so sharp that only small vessels can navigate it with safety. Schooners and other small craft proceeding to the bay of Exploits for firewood, or to avoid the ice on the outer coast during spring, use this passage. Fishermen acquainted with the channel are to be found at Tilton, Change island, or almost any of the harbors in the locality.

The shore of the bay of Exploits from Farmer island to Puzzle harbor, a distance of about 4 miles northward, has not been surveyed.

New World island.—Puzzle Harbor head, a round wooded hill 150 feet high, the northern entrance point to Puzzle harbor, is separated by a conspicuous marsh from the higher ranges inland.

Chance harbor, situated 1 mile north-northwestward of Puzzle Harbor head and entered through a passage 200 yards broad, extends eastward 2 miles, but a bar at 1 mile within the entrance obstructs the passage to all but small craft: the harbor dries for $\frac{1}{2}$ mile from the head.

Anchorage.—Large vessels anchor immediately within the entrance, in 21 fathoms water, but small craft proceed farther in and anchor in 5 to 9 fathoms.

Little Chance harbor, a bight in the northern shore immediately eastward of Chance Harbor head, is suitable for small vessels only. A

rock, with 5 feet water on it, lies 135 yards northwestward of the eastern entrance point; and a rock, with 8 feet water over it, 55 yards from the bluff point on the northwestern shore, leaving a passage 150 yards wide between the rocks. A deep valley to the northwestward of the apparently highest hill on Cottle island, in line with the summit of the Eastern Puzzle Harbor rock, bearing about 171° , leads through this passage to the anchorage in $4\frac{1}{2}$ fathoms water.

The head of this harbor is shallow as far south as the small islet on the western shore.

Water can be obtained from a small stream on the eastern shore.

Tides.—It is high water, full and change, in Little Chance harbor at 7 h. 13 m.; springs rise $4\frac{3}{4}$ feet.

Chance Harbor head, on the western side of Little Chance harbor, is 263 feet high. West rock, with $2\frac{1}{2}$ fathoms water over it, bears 192° , distant 1,200 yards from the southwestern point of Chance Harbor head. A group of rocks partly above water lies $\frac{1}{4}$ mile south-southeastward of the same point, and there is a group of rocks $\frac{1}{2}$ mile southward of Little Chance Harbor entrance.

Green island, $\frac{1}{4}$ mile northwestward of the northwestern point of Chance Harbor head, is about $\frac{1}{4}$ mile long, eastward and westward, 200 yards wide and 87 feet high. Killick Stone islet lies 400 yards northward of it, and at 400 yards east-southeastward of this islet there is a patch of $4\frac{1}{4}$ fathoms.

The passage between Green island and the islets off Black and Little Black islands is $1\frac{6}{10}$ miles wide and clear.

The western coast of New World island forms a bight between Chance Harbor head and Dicky head, at $1\frac{3}{10}$ miles northward; it then curves northward for $1\frac{3}{4}$ miles to Western head.

Big Gull island, about $\frac{1}{4}$ mile westward of the coast of New World island, $1\frac{1}{4}$ miles northward of Dicky head, is $\frac{1}{2}$ mile long northeastward and southwestward; narrow, and 100 feet high near its southwestern end. It is covered with grass, and its northwestern coast consists of black cliffs. There is a rock with 15 feet water over it in the channel between Big Gull island and New World island.

Little Gull island, close southwestward of Big Gull island, is a dark rock about 60 feet high, with deep clefts extending from its summit.

Hussey rock, 300 yards northeastward of Big Gull island, is 10 feet high.

Western head of New World island rises steeply to a bare mound 100 feet high, and Baldney rock, 11 feet high, lies close northeastward of the head.

Pearce harbor, about 600 yards eastward of Western head, is an inlet 600 yards in extent. Fishing vessels anchor in it in $3\frac{1}{4}$ fathoms water, sheltered except from northerly winds.

Morton Harbor head is $1\frac{1}{4}$ miles east-southeastward of the eastern entrance point of Pearce harbor, and Morton Harbor rocks extend a short distance off it.

Clearing marks.—Cuckold rock well open northward of Wild Bight head, bearing 62° , leads northward, and the Wesleyan church well open eastward of Morton Harbor head, bearing 186° , leads eastward of Morton Harbor rocks.

Mad Moll rock lies about 400 yards off the eastern side of the approach to Morton harbor and bears 98° , distant about 700 yards from Morton Harbor head: it has less than six feet water over it.

Clearing marks.—The northern stage in the western cove of Morton harbor, well open southeastward of Little Harbor head, bearing 205° , clears a rock off Wild Bight head and Mad Moll rock.

Morton Harbor entrance is southward of Morton Harbor head, between Neal islet, a small rock, 7 feet high, on the western side, and a peninsula, 175 feet high, surmounted by a tuft of trees, on the eastern side: the western side of the entrance is bordered by sunken rocks. Within the entrance the harbor extends northwestward and southeastward about $\frac{3}{4}$ mile, with a general width of $\frac{1}{2}$ mile. Some parts of it are shoal.

Little harbor, a small boat cove, is situated southward of the peninsula which bounds the eastern side of the entrance.

Directions.—When clear of Morton Harbor rocks and Mad Moll rock, steer for the entrance, keeping the eastern shore on board, and observing that West Shag rock (Twillingate island), well open eastward of Neal islet, bearing about 15° , leads close eastward of the rocks on the western side of the entrance. Inside the entrance turn southeastward, keeping in mid-channel, and anchor in the middle in 7 fathoms water; in a small vessel proceed nearer the head of the southeastern cove, and anchor in 5 fathoms water, mud bottom.

Tides.—It is high water, full and change, in Morton harbor at 7 h. 13 m.; springs $4\frac{3}{4}$ feet.

Settlement.—A considerable settlement surrounds this harbor, whence small supplies can be obtained, and water may be had from the head of the northwestern cove.

Communication.—A steamer from Lewisport calls at Morton harbor weekly during summer and autumn.

Wild Bight head, $\frac{3}{4}$ mile northeastward of Morton Harbor head, is the northern end of the peninsula on the eastern side of Morton Harbor approach.

Wild bight, eastward of Wild Bight head, is clear of shoals, and affords anchorage in 11 to 15 fathoms water near its head, but it has no shelter from northerly winds, which send in a heavy sea.

Webber bight lies between the promontory forming the eastern side of Wild bight and an isolated wooded headland 180 feet high, at

about 1,600 yards to the northeastward, which is connected by a low neck of land, with several houses on it, to Tizard Harbor head, a similar headland, 194 feet high, southeastward of it.

Berry island lies about 400 yards west-northwestward of the headland, 180 feet high, with which it is connected by rocks and shoals; it forms the northeastern side of Webber bight.

Cuckold rock, rugged and 14 feet high, is the outer of the rocks extending 400 yards northward from Berry island.

Toad Asses are three rocks, the highest 63 feet high, extending about 200 yards northeastward from the headland 180 feet high.

Tizard harbor, southward of Tizard Harbor head, extends 200 yards to the westward, and a large settlement surrounds it; it is entered southward of an island 35 feet high, with several houses on it, which is joined to the northern shore by reefs. The shore is foul for a few yards, and a rock, that uncovers 2 feet, lies close to the southern side of the channel, but small craft anchor in 6 fathoms water.

Communication.—A steamer from Lewisport calls at Tizard harbor weekly during summer and autumn.

Muddy Hole point is the southeastern end of the promontory on the southern side of Tizard harbor.

Chance Harbor island, lying $1\frac{2}{10}$ miles southward from Muddy Hole point and 135 yards off the northern entrance point of East Chance harbor, with which it is connected by shoal water, is a round wooded hillock 150 feet high; there is no passage for vessels west of this island.

East Chance harbor, an inlet extending westward about 1,200 yards, affords anchorage for small vessels in 10 to 19 fathoms water, but it is open to easterly winds.

Shoal rock, bearing 95° , distant 1 mile from the southern entrance point of East Chance harbor, has $1\frac{1}{2}$ fathoms water over it and deep water around.

Carter cove is 1 mile south-southeastward of East Chance harbor: there are some islets in the cove and shoals in its approach.

Virgin arm, the western entrance point of which lies eastward $1\frac{6}{10}$ miles from the southern entrance point of East Chance harbor and has a small islet 10 feet high off it, close northeastward of a beach of shingle, is a narrow inlet $1\frac{1}{2}$ miles long affording anchorage.

A rock that uncovers 3 feet at low water lies 100 yards from the western shore at $\frac{1}{4}$ mile within the entrance; and a rock, with 1 foot water on it, 100 yards from the eastern shore at 1,600 yards within the entrance.

To enter, keep near the eastern shore till the first of these rocks is passed, and anchor in the widest part of the arm in 17 fathoms water; small craft proceed to the head by keeping nearer the western than

the eastern shore till the second rock is passed and anchor in the middle of the arm in 11 to 7 fathoms.

Tilt cove is situated about 1 mile northeastward of the entrance of Virgin arm and southeastward of Tilt Cove island, and is entered through a channel, 70 yards wide, between a small islet on the western and rocks off the eastern shore. A rock 5 feet high lies in the middle of the cove.

The cove affords anchorage for small vessels in 6 fathoms water.

Squid cove, $\frac{1}{2}$ mile eastward of Tilt cove and sheltered by Crow Head island, affords excellent anchorage in 6 to 12 fathoms water. A round grassy islet 20 feet high, with a rock close to its northeastern end, lies in the middle of the western approach of the cove; a similar islet is situated 550 yards eastward of it; and a bare islet, 17 feet high, lies close to the western entrance point of the cove.

A rock, that covers at high water, lies a short distance northward of the eastern grassy islet; and a shoal, with 15 feet water over it, is situated 100 yards northeastward of the western entrance point of Squid cove.

The best entrance is between Sugarloaf and the islets eastward of Crow Head island, which in mid-channel is clear of shoals and leads to the anchorage.

Small vessels also enter from the westward, passing on either side of the western grassy islet, and then close southward of the eastern islet, so as to clear the shoal, with 15 feet water over it, at 100 yards southeastward of it.

Tides.—It is high water, full and change, in Squid cove at 7h. 15m.; springs rise 5 feet, neaps $2\frac{1}{2}$ feet; neaps range $1\frac{1}{4}$ feet.

Trump islands, a group of two large and several small islets on the western side of Friday bay, are separated by Trump Island tickle, a channel filled with islets and rocks.

Captain Pearce rock, square and 17 feet high, lies about 400 yards off the southwestern side of the northern island; sunken rocks extend southward 600 yards from it. In a large vessel pass westward of these rocks by keeping Tizard Harbor head shut in with Muddy Hole point, bearing north.

Fools harbor, at the eastern end of South Trump island, is sheltered on the northern side by Fools Harbor islands, a chain of three islands extending about 800 yards northeastward from the northern point of the eastern end of South Trump island. These islands are connected together and with the point at low water, and from the northeastern island a spit extends south-southeastward about 300 yards.

Tilt Cove island, open eastward of Trump islands, bearing 196° , leads eastward; and the western end of South Berry island in line with the northern end of the southwestern Fools Harbor islands,

bearing, 307° , leads close southwestward of the spit. Small vessels enter Fools harbor and anchor in the middle in 8 fathoms water.

Mouse rock, north-northeastward 700 yards from North Trump island, is dark, peaked, and 17 feet high; two rocks awash at low water lie between the rock and the island. Christopher island, open northward of Mouse rock, bearing 62° , leads northwestward of these rocks.

Mouse island, northward 800 yards from Mouse rock, is small flat-topped, 85 feet high, and covered with scrub; it is steep-to. A rock, with 7 feet of water over it, lies in the channel between Mouse island and Mouse rock, bearing 160° , distant 300 yards from the island.

Matthews island, northward about 1,200 yards from Mouse island, with a clear channel between, consists of three rocky hillocks connected by low necks of land; the highest, at the southeastern end, is 78 feet high. Low rocks extend about 200 yards southward from the island, but the water deepens rapidly around it.

Twillingate (Toulinguet) islands, a group consisting of North Twillingate island and South Twillingate island, together with several smaller islands off them, are separated from New World island by Main tickle.

North Twillingate island is about 3 miles long, north-northwestward and south-southeastward, narrow at its southern end, but rather more than a mile wide at its northern end, and attains a height of 309 feet. Rocks and shoals extend to about 400 yards off its coasts in places. It is separated from South Twillingate island by Shoal tickle.

Back harbor, on the southwestern side of North island, is entered through a passage 300 yards wide, between Batrux island to the southeastward and Back Harbor head to the northwestward. The harbor is a basin about 700 yards in diameter, but the anchorage space is limited by shoals around it.

Back Harbor Gull island is a rock 96 feet high lying $\frac{1}{4}$ mile southwestward of Back Harbor head.

To enter the harbor pass southward of Back Harbor Gull island and then keep in mid-channel. The anchorage has from $4\frac{1}{2}$ to 7 fathoms water and is sheltered except from westerly winds. Gales from the westward send in a heavy sea.

A large settlement surrounds the harbor.

Lower head lies a mile northwestward of Back Harbor head, and thence the northwestern coast of the island trends about northeastward $1\frac{1}{4}$ miles to Long point.

Sleepy Cove Gull island, 149 feet high, lies 400 yards off this coast; a shoal extends northward 150 yards from it, and 100 yards

northeastward from the end of this shoal is Northeast rock, with 4 fathoms of water over it. Gunning rock, 33 feet high, lies close westward of the southern end of the island and is connected to it by shoal water. Friary ledge, bearing 230° , distant 300 yards from Gunning rock, has 2 fathoms of water over it, with $5\frac{1}{2}$ fathoms at 150 yards to the southeastward.

High Shag rock, 86 feet high, is 200 yards northwestward of Gunning rock; west-northwestward, about 200 yards from High shag, is West Shag rock, 33 feet high, 100 yards southeastward of which and connected by shoal water is Low Shag rock. There is deep water around the Shag rocks, but not between them; and there is a deep channel between Friary ledge and Sleepy Cove Gull island on the one side and North island on the other side.

Long point is the outer termination of a line of low bare rocks extending northeastward 600 yards from the northern end of North island; the Pinnacle, a conspicuous conical cliff 153 feet high, is at the inner end of the rocks.

Devils Cove head, close southeastward of Long point, is inaccessible from the sea, falling in steep cliffs to the water's edge except immediately under the lighthouse, where there is a landslip. Near the base of the landslip is a reddish rock, the only slab of that color on the outer coasts in this locality. The approach to the head is bold, and there is no appreciable change in the depth of water till within a short distance from it.

Light.—A red octagonal lighthouse, 49 feet high, with a square base and a circular lantern, on Devils Cove head, exhibits, at 331 feet above high water, a revolving white light that attains its greatest brilliancy every thirty seconds, and should be seen from a distance of 21 miles in clear weather. The keeper's dwelling, close to the lighthouse, is painted white, with a red roof.

Signals.—Devils Cove head lighthouse is supplied with the International code signals.

Cuckold point lies 1 mile southeastward from Long point, and the coast between is rocky and broken.

Twillingate harbor, entered through a passage 900 yards wide between Cuckold point and Burnt island, is a little more than 2 miles in length from the entrance, diminishing in width gradually to the head, where a canal through Shoal tickle, having a depth of about 10 feet in it at high water, is crossed by a drawbridge.

Wild cove is on the western side of the harbor at $\frac{1}{2}$ mile southward of Cuckold point and is bordered by shoal water to the distance of 200 yards. Wild Cove rocks, some of which are above water, are southeastward of the cove, the outer patch of 3 fathoms being nearly 400 yards offshore.

The western shore of the harbor within Wild Cove rocks is fairly steep as far as the government wharf, a distance of about 1,200 yards.

Wharf.—The government wharf is 175 feet long and has a depth of 22 feet water at its head. On its southwestern side the depth decreases gradually from the head to the landing steps, where it is 6 feet, and at 80 feet inside the head the depth is 12 feet. The northeastern side of the wharf is shoaler and not fit for berthing.

In 1907, this wharf and the lighthouse thereon, from which a fixed red light was formerly exhibited, were destroyed by storm.

The eastern shore.—Higgins islet lies on the eastern side of the harbor close northwestward of the northwestern point of South Twillingate island and bears 173° , distant 600 yards from the southwestern point of Burnt island; it is 21 feet high and grassy.

White ground, bearing 263° , distant 350 yards from Higgins islet, has 5 feet of water over it. Slade room, well open westward of Carters head, bearing 173° , leads westward of this shoal and of the rocks southward of the islet.

Jenkins cove lies south-southeastward of Higgins islet and Carters head is its southern entrance point.

Shoal water and several rocks above and below water extend off the western shore of Twillingate harbor within the government wharf, and off the eastern shore within Carters head, and join the shoal extending 800 yards from the head of the harbor.

Anchorage in Twillingate harbor is not good, as it is open to northerly winds that bring in a heavy sea, and the holding ground is indifferent. The best position is off the western shore, abreast of the point just northeastward of the church, in 6 fathoms of water, but to avoid the shoal water at the head of the harbor do not bring the church on North Twillingate island to bear northward of 261° .

Ice.—Twillingate harbor freezes over about January 22 and the ice, which reaches 2 to 3 feet in thickness, clears about May 6; it is, however, open at intervals between these dates. Field ice generally appears between February 10 and 20 and disappears about April 24. The first vessel usually arrives about May 25, and the last leaves about December 7.

Tides.—It is high water, full and change, in Twillingate harbor at 7h. 8m.; springs rise 4 feet, neaps $3\frac{1}{4}$ feet.

Twillingate (Toulinguet) town, the principal part of which is around the harbor southward of the government wharf, had a population of 3,542 at the time of the last census in 1901.

Supplies.—Water can be procured from a government well, near the road eastward of the church. A small quantity of coal, usually about 50 tons, and other supplies may be obtained from the trading firms here.

Communication.—A steamer from Lewisport calls here weekly during summer and autumn; there is telegraphic communication.

Burnt Island tickle, separating the northwestern end of South island from Burnt island, is a passage 500 yards wide, but there are so many rocks in it that it requires local knowledge for its navigation.

Burnt island is about $\frac{9}{10}$ mile long, in an easterly and westerly direction, $\frac{1}{2}$ mile wide, and 230 feet high. Its western and northern sides are steep-to, but a group of islets and rocks, connected by shoal water, extends $\frac{9}{10}$ mile east-northeastward from it.

The Rags, 23 feet high, is the northeasternmost islet of this group. Rags rock, with 11 feet of water over it, lies 100 yards northward of the Rags, and there are other shoals within the distance of 400 yards from the northern sides of the group. When approaching Twillingate harbor from the eastward, do not bring the northwestern end of Burnt island northward of 236° until French head is in line with the northeastern end of Burnt island, bearing 126° , then steer for the entrance.

Gull island, lying north-northeastward 1 mile from the northwestern end of Burnt island, is 161 feet high, with a flat summit, covered with grass, and its coasts are steep cliffs nearly all around. A peaked islet, 96 feet high, is separated by a narrow channel from its western side; sunken rocks extend a short distance from its southeastern point, and Gull Island rock, with 13 feet water over it, lies northward nearly 100 yards from its northern point.

Old Harry shoals are two rocky patches 200 yards apart, lying north-northwestward and south-southeastward of each other; the southern, with 16 feet water over it, bears 323° , distant $1\frac{3}{4}$ miles from the northeastern end of Gull island; the northern has $3\frac{1}{2}$ fathoms water on it.

Clearing marks.—Western head of New World island, well open northward of West Shag rock, bearing 207° , leads northwestward; Sleepy Cove Gull island, open northward of Lower head, bearing 210° , leads southeastward; the northeastern point of Burnt island, open westward of Gull island, bearing 146° , leads southwestward; and Carters head, just open west of Burnt island, 175° , leads eastward of these shoals.

Several banks, with 11 to 20 fathoms of water over them, are situated northward of North Twillingate island, but they only break in heavy weather.

South island is about 5 miles long, north-northeastward and south-southwestward, with an average width of 2 miles, and it attains a height of 311 feet. The features of the island are diversified, its northern part alternates in hill and dale, while to the southward the hills fall steeply to the east coast, and a low flat with numerous lakes extends from the hills to the west coast.

Durrels arm and **Farmers arm** are two coves, separated by a narrow peninsula, situated at the head of a bight eastward of Twillingate harbor. Rocks and shoals extend a considerable distance from the shores and there is no safe anchorage for a large vessel. Small craft, navigated by local fishermen, obtain shelter at the heads of the arms, but a heavy sea rolls in with northerly and easterly gales.

Ragged point is situated on the west coast, about 1,200 yards southward of Shoal tickle, and on its southern side is Rodney cove, which is small and has Rodney rock, with less than 6 feet of water over it, in its entrance.

Bluff Head cove lies southward of Rodney cove, and affords anchorage for small craft in 4 to 6 fathoms water, eastward of a small islet, 12 feet high, lying in the entrance. The best passage is north of the island, as foul ground extends westward from Bluff head, the southern entrance point to the cove.

The coast southward of Bluff head has several coves in it, where small craft obtain anchorage, with shelter from offshore winds; small islets lie off the entrance points. Local knowledge is necessary to enter them.

Moses point, off which foul ground extends about 400 yards, lies $1\frac{1}{2}$ miles southeastward from Bluff head, and at 1,200 yards eastward of the point is Kiddle cove, a shallow boat harbor, marked by a conspicuous white house; an islet about 30 feet high lies in the entrance.

Duck island is situated about 400 yards off Kiddle cove and it is connected by rocks and shoal water with the northern part of Black island, lying at a distance of $\frac{1}{2}$ mile to the southeastward.

Black island is about a mile long northeastward and southwestward, 600 yards wide, and its southwestern end is 243 feet high; a bare hill 135 feet high rises at the northeastern end, and falls to a low isthmus at the head of Black Island harbor. This harbor, situated westward of the northeastern end of Black island, is available for large fishing boats.

A rock, with 4 feet water over it, lies northward about 300 yards from the northeastern end of Black island.

Middle ground, bearing 311° , distant 1,200 yards from the western end of Black island, is a rock with 4 feet water over it. Back Harbor head, open westward of Bluff head, bearing 332° , leads westward of the rock.

Main tickle, the passage between South Twillingate island and New World island, is much frequented by fishing vessels to avoid the heavy sea northward of Twillingate islands when the wind is foul. It is $\frac{1}{4}$ mile wide at its southern entrance, between Vincent point and Indian Cove head, which is its narrowest part.

The western shore of Main tickle is bordered by rocks, some covering and others below water. Purcell harbor is situated on this shore,

and there is a large village around it, the northeastern house on the northwestern shore being under the slope of a hill on which is a flagstaff.

Main Tickle island, 92 feet high, lies in the middle of the northern entrance to the tickle, with a clear passage on both sides.

Little harbor, at the head of Little Harbor bight, northwestward of Big Head, the western entrance point of Main tickle, is available only for small vessels. Two rocks lie in the middle of the entrance, and the best passage is between them, but there is also a channel close to the western entrance point into the harbor. Local knowledge and fine weather are required to enter it.

Byrne and Little Byrne coves, around which there are a few houses, are situated in New World island at $\frac{3}{4}$ mile eastward of the northeastern end of Black island. Byrne Cove rocks lie off the entrance, and the southern of them, which uncovers 5 feet at low water, is situated 400 yards westward of the western entrance point to Byrne cove.

The entrance to the coves is southward of the islet, 7 feet high, or close to the western entrance point to Byrne cove. The heads of both the coves are foul, but there is anchorage in the entrance in 8 to 10 fathoms water.

Indian cove, divided from Little Byrne cove by a promontory, on which are two conical hills, 250 and 260 feet high, is clear, but shoal water extends 300 yards from its head.

The cove affords anchorage in depths decreasing from 19 fathoms at the entrance to 3 fathoms at $\frac{1}{2}$ mile within.

A shoal with 4 fathoms water over it bears about 227° , distant $\frac{1}{4}$ mile from the northern entrance point of Indian cove.

Lobster harbor, suitable for boats only, is a shallow inlet at the southern part of a small bight, on the eastern side of Main tickle. The bight affords anchorage in 8 to 12 fathoms water, and fresh water can be procured from a small stream on the southern side of the harbor.

Directions.—From the eastward steer for and pass Main Tickle island on either side in mid-channel; then continue in mid-channel; there are no shoals more than 300 yards distant from either shore.

Small vessels when past Vincent point can proceed westward in the channel between Black, Pigeon, and Duck islands to the southward, and South Twillingate island to the northward, avoiding the rock, with 4 feet water on it, northward of Black island, by keeping the northern end of Duck island open northward of Black rock, bearing 266° .

Large vessels pass southward of Black island, keeping Main Tickle island well open westward of Gull island, which is situated off the northern entrance point of Lobster Harbor bight, bearing 16° , to

avoid the shoal, with 4 fathoms water over it, westward of Indian cove. When approaching the southern end of Black island, keep the square rock point on that island well open southward of the red point bearing 38° , until the southwestern end of Duck island opens westward of Black island, bearing 345° : then steer about 294° , and when Back Harbor head opens westward of Bluff head, bearing 332° , which mark leads westward of Middle ground, steer northward through Friday bay.

From the westward, keep Back Harbor head open westward of Bluff head, bearing 332° , and when the southwestern end of Black island bears 103° , steer about 114° , keeping the western end of Duck island, open westward of Black island, bearing 345° , until the square rock point on Black island opens well southward of the red point, bearing 38° . Then steer along the southeastern coast of Black island, and when approaching Indian cove keep Main Tickle island well open westward of Gull island, which is situated off the northern entrance point of Lobster Harbor bight, bearing 16° , to avoid the shoal westward of Indian cove. Enter Main tickle and keep this mark open to clear Lobster Harbor rock, and when northward of Lobster harbor, the peninsula northward of that harbor open westward of Gull island (Lobster harbor), bearing 159° , until the northern end of Gull island (Merit harbor) opens northward of Tobacco islands, bearing 41° , clears the rock with 9 feet water over it. The southern entrance point of Main Tickle cove open eastward of Powderhorn rock, bearing 359° , clears Lowland rock. The passages on either side of Main Tickle island are clear in mid-channel, but there is a rock close northward of Tobacco islands.

Bacalhao island, situated $6\frac{1}{2}$ miles eastward from the Rags, is about 2 miles long, northeastward and southwestward, 800 yards wide, and its summit, near its southwestern end, is 324 feet high: the island is barren.

Light.—A cylindrical iron tower, 35 feet high, painted red and white in spiral bands, on Bacalhao island at about $\frac{1}{2}$ mile from its southwestern end, exhibits at 351 feet above high water an intermittent white light, thus: Light, three seconds: eclipse, three seconds, which should be seen from a distance of 13 miles in clear weather. The light being unwatched should not be implicitly relied on. The keeper's dwelling, situated 25 yards northward of the lighthouse, and the covered way connecting it, are painted white, but they are only partly visible from seaward.

Signals.—The lighthouse is supplied with the International code signals.

Bacalhao rock, lying eastward, distant about 1 mile from the northeastern end of Bacalhao island, is 4 feet high, foul all around, and should not be approached nearer than $\frac{1}{4}$ mile.

Joe rock, bearing 58° , distant 900 yards from the northeastern end of Bacalhao island, has 3 fathoms water over it.

Berry island, 1,400 yards southwestward of Bacalhao island, is about 1,600 yards long, northeastward and southwestward, narrow, 186 feet high, rocky, and barren; a rock, with 15 feet water over it, lies 200 yards northward of its northeastern end.

Starve head, a steep cliff, 239 feet high, bears southwestward from Berry island, and is separated from it by a channel 1,200 yards wide, in the middle of which is Clarke rock, small, covered at high water, and generally showing by a breaker; the passage between the rock and Berry island is clear, but that between it and Starve head is foul.

Starve harbor lies immediately southeastward of Starve head; its entrance is about 30 yards wide and 200 yards long, with 4 fathoms water; it opens out to a deep basin 400 yards wide and $\frac{1}{2}$ mile long; there is a reef on the northwestern shore just within the entrance, so that the island forming the southeastern head must be passed closely.

Goldson arm.—Herring neck, lying between the land of Starve and the promontory of Herring head, is the inhabited portion of the entrance to Goldson arm, a narrow inlet extending southwestward for $3\frac{3}{4}$ miles.

When proceeding up the arm, keep on the northwestern shore, which is steep to for $1\frac{1}{2}$ miles. A small vessel can anchor in Ship cove, just within the northern head; and on the same shore at $\frac{1}{2}$ mile farther up, is Starve cove, which has rocks a few yards off its entrance points, but affords anchorage for a small vessel. Both these coves are so small that a vessel seeking anchorage might not find room in them; in this case, as the depth in the main part of the arm off them is 30 fathoms, it would be necessary to run up about $1\frac{3}{4}$ miles within the entrance; in doing so, when the entrance to Burnt arm opens, keep on the northern shore, with the cliff northward of Herring neck open of the southeastern shore, to avoid a patch, with 3 fathoms water over it, that lies nearly in mid-channel, and when above the entrance to Burnt arm, anchor in 10 to 13 fathoms water, mud bottom.

Communication.—The steamer from Lewisport calls at Herring neck weekly during summer and autumn.

Goose islands, a small group lying midway between Berry island and Herring Head promontory, are steep all around.

Herring head, situated southeastward, distant $1\frac{1}{4}$ miles from the southwestern end of Bacalhao island, is steep and 264 feet high; it is the termination of a narrow promontory of New World island extending northeastward for $2\frac{1}{2}$ miles.

Herring islands, 400 yards off the head, are small, about 20 feet high, and steep all around.

Kiar reef, bearing 65° , distant $\frac{3}{4}$ mile from Herring islands, is awash at low water, and the sea generally breaks on it.

Blowhard rock lies westward 400 yards from Kiar reef, with deep water between, and even a moderate sea breaks heavily, but not continuously, over it.

For a distance of 3 miles northeastward of Kiar reef, in continuation of the line of Herring Head promontory, are some small patches of 7 to 14 fathoms water, which break at times during a heavy sea.

Red islet, situated southeastward, distant $\frac{1}{4}$ mile from Herring head, is small and low, and a reef extends 200 yards from its northeastern end; Haypook rock, bearing 190° , distant 400 yards from Red islet, has less than 6 feet water over it.

Duck island, situated southeastward, distant $1\frac{1}{2}$ miles from Herring head, is about 1,400 yards long, northeastward and southwestward, narrow, and 181 feet high. Two rocks lie 200 yards off its northwestern side, and the southwestern end is foul for 300 yards, but the southeastern coast is bold-to.

Moorham reef, bearing 38° , distant 1 mile from Duck island, is awash at low water, and the sea generally breaks over it.

Grassy islets, a low group, are separated from the southern part of Duck island by a narrow but deep channel. Grassy rock, northeastward 550 yards from the eastern end of Grassy islets, has 3 fathoms water over it; the northeastern deep saddle in Bacalhao island, open northeastward of Duck island, bearing about 331° , leads northeastward; and the northern point of Jacks island, open southeastward of Grassy islets, about 244° , leads southeastward of it.

Jacks island lies south-southwestward $\frac{3}{4}$ mile from Duck island, and its northeastern and highest peak, 235 feet high, is remarkable. Between Jacks island and New World island, to the westward, are three tickles leading into Cobbs arm: of these Long and Treenail tickles are only available for boats.

Southward of Herring head are Pikes and Little Cobbs arms; both are encumbered with rocks, and a heavy sea rolls in, rendering them of no value except for fishing boats.

Cobbs arm, southward $2\frac{3}{4}$ miles from Herring head, extends 3 miles with a breadth of 800 yards; there is indifferent summer anchorage in 13 fathoms water, off the narrow entrance of a shoal continuation of the arm: a swell rolls in after gales from seaward. Limestone can be obtained on the southern side of the anchorage, and in the continuation of the arm.

To enter Cobbs arm pass midway between Duck island and Red islet, and keep the northeastern end of Bacalhao island open eastward of Red islet, bearing about 2° , until close to Tinker island,

which is a small cone 60 feet high; from this to the anchorage, there are no shoals on the northwestern shore.

A rock, with $1\frac{1}{2}$ feet water over it, lies nearly in the middle of the arm at $\frac{1}{4}$ mile from the narrow entrance of the shoal arm.

Small vessels drawing 11 feet water enter the shoal arm, by keeping close to the northwestern entrance point, to avoid the rocky ground extending across the channel toward this point from the islet that lies in the middle of the entrance; when inside the point, approach the northwestern shore and anchor in smooth water; above the islet the deep water is on the southeastern shore, the northwestern being shoal and rocky.

Lobster islet, south-southwestward 1 mile from Jacks island, and $\frac{1}{4}$ mile off the nearest land, is small, 10 feet high, and foul all around for nearly 200 yards; **Brandies rock**, northeastward 600 yards from Lobster islet, is awash at low water.

Milliners arm, southwestward $\frac{1}{2}$ mile from Lobster islet, is rocky, open northeastward, and does not afford anchorage.

Dram island, southward, $1\frac{1}{4}$ miles from Lobster islet, is small and 30 feet high.

Nine-pin arm, west-southwestward a little more than 2 miles from Dram island, is full of rocks, and its eastern point is foul for the distance of 200 yards.

Currans Green Field island, immediately southwestward of Nine-pin arm, is small, low, and grassy; a shoal extends southward nearly 200 yards from it. There is fair anchorage in 8 fathoms water southwestward of the island.

Dildo run.—See page 501.

Beaver cove, situated in the mainland 2 miles southward from Currans Green Field island, is divided into two arms by a low rocky islet; the northeastern arm is full of stones; the southwestern is 400 yards wide and 800 yards in extent, with good anchorage in 3 to 6 fathoms water, mud bottom; a rock, that covers at a quarter flood, lies eastward 100 yards from the western point of this arm.

Beaver head, northeastward 1 mile from Beaver cove, is a steep bluff 180 feet high.

Little Beaver cove, northeastward $1\frac{1}{2}$ miles from Beaver head, extends southwestward $\frac{1}{2}$ mile with a breadth of 100 yards, and the water in it is 4 to 8 fathoms in depth, but it does not afford anchorage as there is no holding ground and a heavy swell sets into it from the northward.

Farewell Duck islands, northeastward $2\frac{3}{4}$ miles from the entrance point of Little Beaver cove, form a long rugged promontory, terminating in a small islet just awash at high water. **Farewell reef**, close off this islet, is 600 yards long, northeastward and southwest-

ward, and a moderate sea breaks on it. East Garden island in line with Indian Garden island, bearing 240° , leads northwestward; the southwestern end of Shag islets in line with the western end of Smoker island, bearing 348° , leads northeastward; and the entrance to the shoal arm of Farewell harbor, open of the northwestern shore of the harbor, bearing 218° , leads southeastward of this reef.

Indian Garden island, situated $1\frac{3}{4}$ miles westward from the northeastern Farewell Duck island, is small, rocky, and 49 feet high; a reef extends 400 yards northward from it, and off its southwestern end is a low rocky islet.

A rock, with 3 feet water over it, bears 204° , distant 1,300 yards, and another with the same depth bears 126° , distant 1,100 yards from Indian Garden island.

East Garden island, northward 800 yards from Farewell Duck islands, is flat and about 40 feet high.

Caution.—The coast between Beaver head and Farewell Duck islands should not be approached inside the line of East Garden and Indian Garden islands without local knowledge.

Garden rock, bearing 24° , distant $\frac{1}{2}$ mile from East Garden island, has 6 feet water over it.

Farewell Gull island, lying $1\frac{3}{4}$ miles southward from the northeastern Farewell Duck island and about 600 yards off Farewell head, is 100 feet high and conspicuous on northerly or southerly bearings. (Farewell head, see p. 531.)

Farewell harbor, immediately westward of Farewell Gull island, is 800 yards wide and 1,600 yards in extent, and affords anchorage in 4 to 8 fathoms water, mud bottom; northeasterly winds blow into the harbor with a fetch of $2\frac{1}{2}$ miles from the southern part of Change island; a shoal arm encumbered by bowlders extends inland about $1\frac{1}{2}$ miles from the harbor.

Dog reef, bearing 69° , distant 1 mile from Farewell Gull island, and northward 1,200 yards from Dog Bay islands, is $\frac{1}{2}$ mile long, eastward and westward.

Change island extends northward and southward for 7 miles with a general width of 1 mile. South end point of the island bears 117° , distant 2 miles from the eastern Farewell Duck island.

Light.—A white square pyramidal tower, about 30 feet high, on South End point of Change island, exhibits, at 43 feet above high water, a fixed red light, which is visible except where obscured by the land. The light is exhibited during the season of navigation.

The west coast of Change island affords shelter only for the small craft of the fishermen, except in Deep cove, $2\frac{1}{2}$ miles northward of South End point, which is 200 yards wide and 800 yards deep, with 3 to 6 fathoms water, sand bottom; the entrance is mid-

way between Wood islands on the north and Water Bears rocks on the south; these rocks, though they cover at high water, are generally visible.

Smoker island, bearing 326° , distant 3 miles from South End point and $\frac{3}{4}$ mile westward from the nearest rocks off Wood islands, is 20 feet high and flat; a rock over which there is a depth of 9 feet, bears 179° , distant 450 yards from the southern end of Smoker island.

Ragged islets, bearing 14° , distant 1 mile from Smoker island and the same distance offshore, are low, with many sunken rocks around them. Pipe rock, the outer, bears 258° , distant $\frac{1}{2}$ mile from the southern Ragged islet, has 2 feet water over it, and breaks in a moderate sea; South End point, in line with Smoker island, bearing 148° , leads southwestward of it.

Shag islets, north-northwestward $1\frac{1}{2}$ miles from Ragged islets, extend $1\frac{1}{4}$ miles, northeastward and southwestward, with a width of $\frac{1}{2}$ mile and a general height of 20 feet; Mile islet, the northeastern of the group, is distant about 1,200 yards from the west coast of Change island.

Shag rock, bearing 216° , distant 700 yards from the southwestern Shag islet, has 4 feet water over it and often breaks. South End point touching the eastern side of Smoker island, bearing 148° , leads 600 yards southwestward of it, but this mark leads only about 200 yards northeastward of Grassy rock (p. 514).

Change Island tickle, at the northern part of Change island, has a depth of 12 feet of water in its shoalest part, and is a safe and convenient harbor for a small vessel; the eastern entrance is available in any weather, but it is difficult to make out, unless the houses on its shores are seen.

On the northern side of this entrance are Tobacco island and several other islands inside of it, generally dome-shaped and 50 to 70 feet high, while on the southern side of the entrance is Ruth island, generally flat and about 20 feet high, with two islands southward of it, also generally flat.

A rock about 200 yards in extent, with 12 feet water over it, that breaks heavily, bears 64° , distant 200 yards from Ruth island; in light winds with a heavy sea pass southward of Ruth island, to give a good berth to this rock.

The passage between Tobacco and Ruth islands is clear in its fairway, and after passing between the two rocky islets to the northward and Ruth island to the southeastward, just close in the points of the tickle, bearing 241° , to clear White ground on the north and Skinner rock on the south; and when the western tickle on the north is open, bearing 345° . or Skinner cove bears 148° , open the points of the tickle, and anchor in 6 to 8 fathoms water, mud bottom.

Ice.—Change Island tickle and the sea from Herring head to the northern end of Change island, and from Tobacco island to Brimstone head fill in with northern ice and freeze; the ice usually breaks up between April 20 and May 10, but an easterly sea breaks it up earlier.

In May and June, when the ice is compact from Funk island to cape Fogo, partly owing to the ebb or east-going tidal stream setting out of Dildo run and the stream of Gander river, Change island and Stag Harbor tickles are often sufficiently clear to allow vessels to pass through them into Notre Dame bay.

Tides.—It is high water, full and change, in Change Island tickle at 7h. 20m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Communication.—The steamer from Lewisport calls at Change island weekly during summer and autumn.

North tickle, close within north end of Change island, has 3 fathoms water in the entrance and 6 feet in the shoalest part; it is open northward and affords no efficient shelter.

Sleepy ledge, bearing 325° , distant $1\frac{2}{10}$ miles from Tobacco island, is the northern end of the shoals extending northward from the islands westward of Tobacco island, and has a depth of 2 fathoms water over it. Island Harbor head in line with the eastern end of Shave island, which is a rock northwestward of Tobacco island, bearing 152° , leads northeastward of it.

Bacalhao island to Sir Charles Hamilton sound.—**Directions.**—Do not take the channel between Bacalhao island and Bacalhao rock, but pass $\frac{1}{4}$ mile eastward of the rock, and then between Kiar and Moorham reefs, steering toward the northeastern end of Duck island. When South End point is in line with Smoker island, bearing 148° , keep this mark on, round Smoker island on its eastern side at a distance of about 400 yards, and when southward of the rock lying southward of that island, bring the western end of Shag islets in line with the western end of Smoker island, bearing 348° . This mark on astern leads northeastward of Farewell reef, which is cleared when the entrance to the shoal arm of Farewell harbor opens southward of the northern shore of the harbor, bearing 218° . Then steer to pass about $\frac{1}{2}$ mile eastward of Farewell Gull island, keeping the southwestern point of Dog Bay islands open westward of the northwestern islet off them, bearing 168° , to clear Dog reef. From eastward of Farewell Gull island steer to pass a little eastward of Steering island to clear Vesuvius rock, see page 530.

Either of the channels between Bacalhao island and Starve head is navigable, Clarke rock in the channel between the head and Berry island being avoided.

Having passed between Herring head and Herring islands, keep the northeastern end of Berry island open northward of Herring

head, bearing 275° , until Tinker island is well open eastward of Red islet, bearing 204° , to clear the rock off Red islet, then steer to pass northward of Duck island, and as above directed.

Fogo island, about 2 miles eastward of Change island, is 14 miles in greatest length in an easterly and westerly direction, and $8\frac{1}{2}$ miles in breadth. Its coasts are rocky and deeply indented, affording, however, but indifferent harbors, except for small vessels and boats, and it is surrounded by numerous rocks, islets, and shoals.

Rogers point is the southwestern end of the western coast of Fogo island, and bearing 255° , distant $1\frac{8}{10}$ miles from the point, is Woody island, 132 feet high, with some rocks $\frac{1}{4}$ mile southwestward from it. Woody island is separated by a narrow channel from the southeastern end of Change island.

Hare island lies in the channel between Change and Fogo islands at $1\frac{1}{2}$ miles northward of Woody island; a patch of rocks lies nearly midway between it and Change island, and rocks and foul ground extend nearly 1,200 yards southward from the island.

Watch island, 1,200 yards southeastward of the southern part of Hare island, is small, with shoals extending about 800 yards northward and southward of it. There is only a very narrow channel between Hare and Watch islands.

Watch rock, which breaks in a moderate sea, bears 322° , distant $1\frac{1}{4}$ miles from Rogers point, and in mid-channel between Watch and Fogo islands. Noggin hill, on the mainland, open eastward of Indian lookout, bearing 175° , leads eastward: and open westward, bearing 171° , leads westward of it.

Island Harbor head, on the west coast of Fogo island at $2\frac{1}{2}$ miles northward of Rogers point, is a small but remarkable bluff, 101 feet high; there is an excellent boat harbor on its eastern side.

Hare bay.—Hare Bay head, northward, $3\frac{1}{2}$ miles from Island Harbor head and south-southwestward, 2 miles from Brimstone head, is 283 feet high; between Hare Bay head and Brimstone head is Hare bay, with Leveret islands, one of which is dome-shaped, on the southwestern side of its entrance: a rock, with 9 feet water over it, lies northward, distant 400 yards from these islands, leaving a channel 500 yards wide into the harbor.

Change lookout on Change island, open northwestward of Hare Bay head, bearing 224° , leads northwestward, and Burnt bluff, on the southwestern side of the bay, well open eastward of the islands, bearing about 159° , leads northeastward of the rock.

The bay extends 2 miles to the southeastward and affords good anchorage in 4 to 12 fathoms water, mud bottom: the southwestern shore is rocky, but the northeastern is clear and steep-to.

There is a snug anchorage for small vessels in 2 fathoms of water, in a basin between the southernmost Leveret island and the coast of Fogo island.

Tides.—It is high water, full and change, in Hare bay at 7h. 35m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Brimstone head is 272 feet high. Seal cove on its southern side is entered by a narrow passage between shoals. Brimstone rock bears 283° , distant 700 yards from the head and is awash at low water, and bearing 317° , distant 600 yards from this rock is Stone island from which shoal water extends eastward.

Black islet, bearing 249° , distant $1\frac{3}{4}$ miles from Brimstone head, is small and 12 feet high; a sunken rock bears 36° , distant 250 yards, Old Roger reef bears 24° , distant 1,200 yards, and a patch with 4 fathoms water over it bears 187° , distant $\frac{1}{2}$ mile, from the islet, while between it and Shoal Bay rock there are two rocks awash at low water. Shoal Bay rock, bearing 255° , distant $\frac{3}{4}$ mile from Black islet, has 3 fathoms of water over it.

Clearing marks.—Indian Lookout island, just open of Hare Bay head, bearing 179° , leads eastward of Old Roger reef; Watch island open, and Hare island just shut in, with the eastern end of Change island bearing 171° , leads westward of Shoal Bay rock.

Shoals.—Fogo rock, with less than 6 feet water over it, bears 332° , distant nearly 1,600 yards; Monkey rock, with less than 6 feet water over it, 345° , 1,400 yards; Prince's Horney rock, with 3 fathoms least water, 294° , 1,300 yards; and Old Horny rock, with 4 fathoms water, 315° , $1\frac{4}{10}$ miles, from the northwestern point of Fogo Head peninsula.

Leading mark.—The northern point of Simms island shut in by Barnes island, bearing 78° , leads southward of Prince's Horney and Old Horney rocks.

Fogo harbor lies eastward of Fogo Head peninsula, the bold and rocky peninsula at the northwestern end of Fogo island, and a line of islands, including Boatswain, Barnes, Simms or Lighthouse, and Rags islands, extend from Fogo head eastward across the mouth of the harbor to the coast northward of Lanes lookout.

These islands are 50 to 100 feet high, forming narrow entrances difficult of access at all times to a sailing vessel, and unapproachable with the heavy sea which rolls in during and after gales from seaward.

There are two principal channels into the harbor, with a least depth of 9 feet in the fairway of the eastern, and of 19 feet in that of the western, at low water; the harbor affords secure anchorage in 3 to 7 fathoms water, mud bottom.

The eastern entrance is between Rags and Simms islands; Rags rock lies northward 200 yards from Rags island, and Simms rock is

nearly 200 yards northward of the northern point of Simms island; both rocks are under water, but a moderate sea breaks on them.

Nanny rock, northward 400 yards from Barnes island, has 4 fathoms of water over it; a heavy sea breaks on the rock.

Light.—A white open framework tower on the western side of Rags island exhibits during the period of open navigation, from May to about the end of December, from a lens lantern at 82 feet above high water, a fixed white light, which should be seen from a distance of 8 miles in clear weather.

A small, white, flat-roofed building stands near the light tower.

Directions.—From the eastward, pass outside Dean rock, see page 522, and continue westward at about $\frac{1}{4}$ mile off the coast, until Slades West house (the house is conspicuous, and has a flag-staff near it) is over Pilly point and Simms island locked, bearing 230° , which leads 100 yards northwestward of Rags rock, and when the western end of Rags island bears 193° , steer for the entrance between Rags and Simms islands, passing close to Rags island. Within the entrance the channel turns sharply to the westward and is only 150 yards wide; do not hug Simms island closely, as a rock with 6 feet of water over it extends 65 yards southeastward of its eastern end. The southern end of Barnes island, just shut in with Fogo head, bearing 263° , leads through the channel southward of Simms island, and when Gappy island opens westward of Simms island, bearing about 356° , turn southward, keeping Gappy island in the middle of Middle tickle, bearing 356° , to clear Pilly rock on the east, and Harbor rock on the west. When the western end of Barnes island shuts in with Garrison point, bearing about 306° , anchor where convenient.

The western entrance between Boatswain island and the cliffs of Fogo head is 100 yards wide and narrowed by a rock, with 6 feet of water over it, which extends halfway across from Boatswain island. When entering, Fogo head must be kept close aboard, and with a heavy sea running there is a considerable rebound from the cliffs.

Within Boatswain island keep Barnes island aboard, as it is steep-to, and a bank, with 7 feet over it, extends half way across the channel northward of Garrison point; in turning toward the anchorage, keep Western island well open of Garrison point, bearing 297° , until the summit of Gappy island is in line with the northeastern end of Centre island, bearing 355° , which mark leads eastward of Harbor rock.

Ice.—Fogo harbor usually freezes over between January 9 and 19 and the harbor is completely blocked with ice about 2 feet in thickness until about April 23; field ice appears about January 14 and disappears between May 1 and June 1. The first steamer arrives about April 30 and the last leaves on January 19.

Tides.—It is high water, full and change, in Fogo harbor at 7h. 15m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Fogo town, situated around the harbor, is of considerable importance, being the depot for the surrounding fishing districts, and its population was 815 in 1891.

Communication.—The steamer from Lewisport calls at Fogo harbor weekly during summer and autumn.

Lions Den point lies 900 yards eastward from the northern point of Rags island, and Lanes lookout, a rocky hill, 385 feet high (the highest in the island), which falls steeply to the northward, is situated 1,200 yards south-southwestward from Lions Den point.

A rock awash at low water, bears 92° , distant nearly $\frac{1}{2}$ mile from Lions Den point.

Shoal bay, in the middle of the northern side of Fogo island, extends 3 miles southward, is $\frac{3}{4}$ mile wide, and open northward: it affords safe anchorage in summer in 8 to 10 fathoms water on the western side, near the head. Avoid approaching, in the line of their direction, the islands which run out from the middle of the head of the bay, and terminate in Steering island.

Bard island, on the eastern side of Shoal bay entrance, has a considerable village on it, but Bard cove, on the eastern side of the island, is only a boat harbor.

Dean rock, bearing 2° , distant $\frac{3}{4}$ mile from the northwestern point of Bard island, has a depth of 1 foot water over it; the sea generally breaks on the rock. Brimstone head seen through Fogo harbor entrance, bearing 239° , leads northward, and the western side of Bard island, bearing eastward of 176° , leads westward of this rock.

Joe Batts arm, the entrance of which is eastward about 1 mile from Bard island, is so full of rocks as to be unsuitable for navigation, though a vessel of 100 tons can be moored in it. There is a flourishing fishing village on its shores.

Ice.—Northern ice usually arrives at Joe Batts arm about January 3.

Brookes point is about 1 mile northward of the rocks at the eastern side of the entrance of Joe Batts arm, and Joe Batts point, about $\frac{1}{4}$ mile eastward of it, is low and shelving.

Light.—A white square pyramidal lighthouse, 27 feet high, on Brookes point, exhibits at 97 feet above high water an intermittent white light, thus: Light, seven seconds; eclipse, three seconds, which should be seen from a distance of 15 miles in clear weather. The light is obscured by Round head when bearing northward of 280° . On the southern side of the lighthouse are a flat-roofed one-storied dwelling and a store, both white.

^a Missionary reports give the following mean monthly temperatures at Fogo: January, $18^{\circ}.6$; February, $16^{\circ}.3$; March, $23^{\circ}.5$; April, 33° ; May, $41^{\circ}.8$; June, $53^{\circ}.4$; July, $59^{\circ}.7$; August, $61^{\circ}.3$; September, $54^{\circ}.6$; October, $44^{\circ}.4$; November, $33^{\circ}.2$; December, $25^{\circ}.3$ F.

Round head, eastward $1\frac{3}{4}$ miles from Joe Batts point and the northeastern point of Fogo island, is 199 feet high and conspicuous.

Rocks and islands northward and northeastward of Fogo island.—A belt of islands and rocks, with an average width of 2 miles, extends northeastward about 14 miles from Stone islet, which is situated $2\frac{1}{4}$ miles northward of Fogo head on a bearing 348° .

The channel between this belt and Fogo island is navigable, but there are numerous shoals in it, which are shown on the chart, and it is advisable to obtain the assistance of a local pilot to proceed through it. There are also deep water channels amongst the islands and rocks, for the navigation of most of which local knowledge is required.

Stone islet is small and 12 feet high. Penny rock, bearing 223° , distant about 800 yards from Stone islet, has less than 6 feet of water over it.

Gappy island, bearing 50° , distant $1\frac{1}{2}$ miles from Stone islet, is small, 83 feet high, and conspicuous. Harvey rock, with less than 6 feet of water over it, bears 165° , distant $\frac{3}{4}$ mile from the western end of Gappy island.

West Countryman, **East Countryman**, and **Long islands** are groups of islets, 10 to 30 feet high, which, with some patches of rocks that break, lie between Seals Nest islands and Gappy island.

Seals Nest islands, about 3 miles east-northeastward of Gappy island, are a group of islets, 10 to 30 feet high, which, with some rocks, extend northward and southward, nearly $1\frac{1}{2}$ miles.

Storehouse islands are about 1,200 yards north-northeastward of Seals Nest islands; the largest of the group is 140 feet high, and the islets eastward of it are steep-to.

Turr islands are a group east-northeastward 1 mile from Storehouse islands, with a clear channel $\frac{1}{2}$ mile wide between. These two groups of islands are the highest and most conspicuous of the belt. In passing through the channel between them, Round head of Fogo island open westward of Mile islet, bearing 154° , leads westward of Lots rock, which lies west-northwestward, nearly $\frac{1}{2}$ mile from the highest Turr island and is awash at low water. Mile islet, situated southward, $1\frac{1}{2}$ miles from the highest Turr island, is 12 feet high; shoals extend westward 600 yards and thence northward 600 yards from it; this islet requires a berth of $\frac{1}{2}$ mile.

Little Fogo islands, southeastward of Turr islands, are a group the eastern and highest island of which is 136 feet high.

Bishops islet, $\frac{1}{4}$ mile northeastward of Little Fogo islands and the easternmost islet of the belt, is small and 10 feet high; shoal ground extends northwestward 1 mile and eastward $\frac{1}{2}$ mile from it.

Ireland rocks, the eastern of which bears 47° , distant $2\frac{3}{4}$ miles from Bishops islet, are three separate sunken heads, on which the

sea generally breaks, with 30 to 70 fathoms of water close around them. This patch of rocks extends 1 mile westward of the eastern one.

Jacobs ledge, east-northeastward $1\frac{1}{2}$ miles from Ireland rocks, and bearing 30° , distant $8\frac{1}{2}$ miles from Round head, is a patch of small extent, with $5\frac{1}{2}$ fathoms of water over it, on which the sea breaks in heavy weather. This ledge is the northeastern shoal of the belt. The bottom around it is foul and irregular, and there may be other rocks in its vicinity.

Hard hat, bearing 297° , distant $1\frac{1}{2}$ miles from Jacobs ledge, is a patch of foul ground on which a depth of 11 fathoms has been found. This shoal breaks in bad weather, and the local fishermen report that there is a depth of 6 fathoms on it.

Green Bay bank, bearing 292° , distant $2\frac{1}{2}$ miles from Hard hat, and 355° , distant $3\frac{3}{4}$ miles from Bishop island, is a patch of rocks on which a depth of 10 fathoms has been found. It breaks in bad weather.

Drovers rock, bearing 350° , distant about 2 miles from Round head, is small and awash at high water.

Current.—The southerly current setting toward Fogo island, at about 2 miles off Fogo head, turns and sets eastward along the north coast of the island, and among the rocks and islands off it, at a rate of $\frac{1}{2}$ to $1\frac{1}{2}$ miles, but is much influenced by the winds, being accelerated by northerly and retarded by southerly winds, while before easterly gales it sometimes sets northward. The current is said to set either eastward or westward off Storehouse and Little Fogo islands.

A branch of the southerly current sets southward between Change and Fogo islands at a rate of about $\frac{1}{2}$ mile an hour, but it is lost before arriving at Stag Harbor tickle.

The east coast of Fogo island from Round head trends southeastward for 7 miles to cape Fogo.

Hennings islet, bearing 125° , distant 1,600 yards from Round head, and 900 yards offshore, is 6 feet high and steep-to.

Tilton harbor, southeastward $2\frac{1}{10}$ miles from Round head and $3\frac{1}{2}$ miles northwestward of cape Fogo, is an inlet about 700 yards across, open northward; Pigeon island lies close northward of it. There is a depth of 3 feet water, rocky bottom, in its entrance, so it can only be entered by boats. On the shores of the harbor is a considerable fishing village, which, with its church, is visible from a short distance seaward.

Light.—A square white tower, 17 feet high, on Sloans hill, on the western side of Tilton harbor entrance, exhibits between June 1 and December 15, at 91 feet above high water, a fixed red light, which is visible seaward except where obscured by Pigeon island. This light

is for the guidance of the small craft which visit Tilton harbor during the fishing season.

Cape Fogo, the eastern point of Fogo island, is a bold headland, 214 feet high.

Ice.—Northern ice usually arrives on the east coast of Fogo island between January 12 and 20, closing the coast with easterly winds. Sometimes the coast is clear in April, at others, with a prevalence of northerly winds, navigation is stopped during May, and even until July.

Current.—The current which has been described as turning eastward along the northern coast of Fogo island after passing Round head, takes a southerly direction, following the eastern coast: it is affected by the tidal streams, the ebb or southgoing stream accelerating and the flood or northgoing stream retarding it, so that occasionally at spring tides it is masked entirely.

Rocks eastward of Fogo island.—**Lanes rocks** are two rocks lying at distances of $2\frac{1}{2}$ and $3\frac{1}{2}$ miles from Round head along a line bearing 67° ; the western rock has 3 fathoms of water over it and the eastern rock has 2 fathoms.

Clearing marks.—Copper island, open eastward of cape Fogo, bearing 175° , leads eastward, and Fogo head, open northward of Joe Batts point, bearing 253° , leads northward of Lanes rocks.

Barracks islets are situated on a bank of foul ground, about $1\frac{1}{4}$ miles in extent, lying northeastward $1\frac{1}{4}$ miles from the eastern Lanes rock; the highest islet is 25 feet high. Pigeon ledge, eastward $1\frac{1}{2}$ miles from this bank, has 5 fathoms of water over it; and Inspector rock, with 3 fathoms of water over it, lies southeastward 1,600 yards from the bank.

Cromwells ledge, bearing 62° , distant $11\frac{1}{4}$ miles from Round head, is about $\frac{3}{4}$ mile in extent, with irregular rocky bottom. There are two patches, $\frac{1}{2}$ mile apart, northward and southward, with 6 fathoms water over them, and $\frac{1}{4}$ mile southward of the southern one is a sounding of $4\frac{1}{2}$ fathoms, which is the least-known depth on the ledge. The sea breaks on the ledge in heavy weather.

Snap rock, bearing 62° , distant $17\frac{1}{2}$ miles from Round head and 290° , distant 22 miles from Funk island, is a shoal having an extent of about $\frac{1}{4}$ mile, northeastward and southwestward, with a least depth of 5 feet over it. In calm weather there is little indication of its existence, but it breaks when there is any sea on. A current setting eastward is usually experienced in this locality.

Clerys ledge, on which there is a least depth of 5 fathoms, and which breaks in bad weather, bears 62° , distant 10 miles from Round head, and lies 1 mile west-southwestward of the $4\frac{1}{2}$ -fathom depth on Cromwells ledge.

Blakeys ground, bearing 5° , distant $3\frac{1}{2}$ miles from Snap rock, is a patch of foul ground, on which the sea breaks in heavy weather. Depths of from 9 to 10 fathoms have been obtained over this shoal.

Pigeon rock, bearing 64° , distant 5 miles from Pigeon island, has 2 fathoms water over it.

Clam rock, bearing 61° , distant $6\frac{1}{2}$ miles from cape Fogo, has 9 fathoms water over it.

The coast from cape Fogo trends west-northwestward for 7 miles to Burnt point, the eastern entrance point of Seldom-come-by harbor: it is bold, rocky, and indented by Cape, Kippin, and Wild coves, which afford no shelter.

Western Head rock, bearing 151° , distant $\frac{3}{4}$ mile from Western head, the headland $2\frac{3}{4}$ miles west-southwestward of cape Fogo, has 3 fathoms water over it; Burnt point, well open of Wild point, bearing 261° , leads southward of the rock.

Light.—An open framework structure on Burnt point exhibits at 25 feet above high water a fixed red lantern light, which should be seen from a distance of 2 miles in clear weather.

Fog signal.—A diaphone fog trumpet, placed in a building on Burnt point close northward of the light structure, sounds thus: Blast, five seconds: silence, one hundred and thirteen seconds: in thick or foggy weather.

The light and fog signal are discontinued from January 1 to April 1.

The fog-signal building, keeper's dwelling, and storehouse are one-storied flat-roofed structures, painted white with a black horizontal band around the middle of each building.

Seldom-come-by harbor, northwestward nearly a mile from Burnt point, is a cove about 800 yards across, which affords anchorage in 6 fathoms, mud bottom, and an inner harbor, which runs in westward 600 yards from the cove, with a width of 200 yards and a depth of 12 feet. Shoal water extends nearly 400 yards off Burnt point, and Black reef, which is 400 yards long, northward and southward, and partly dry, bears 250° , distant 1,700 yards from Burnt point.

The entrance to the harbor is between Burnt point and Black reef. There is a considerable village around the shore of the harbor, but no supplies except water can be obtained.

Seldom-come-by harbor is the first anchorage northward of Greens pond, from which it is distant 50 miles: it is consequently a much frequented stopping place for the Labrador fishing fleet on the way north, when detained by foul winds or ice: in June, under these circumstances, it is often crowded with vessels of 150 tons and less, with their closely packed freight of fishermen, women, and children: and again in the fall it is much frequented, though not by such large

numbers, the prevailing winds being more favorable for the return voyage.

Ice.—Seldom-come-by harbor freezes between January 1 and 10, and sometimes remains frozen till as late as June, but at other times the ice clears as early as the middle of February. Field ice usually arrives in the early part of February and sometimes remains till June.

Tides.—It is high water, full and change, in Seldom-come-by harbor at 7h. 13m.; spring rise $4\frac{1}{2}$ feet, neaps 3 feet.

Cann island lies 600 yards southward of a point of Fogo island at $1\frac{1}{4}$ miles westward of Burnt point, and is about 1,200 yards long, east and west, and 800 yards wide. A rock above water lies 300 yards eastward of the island, with which it is connected by shoal water, and a shoal flat with Mouse island and several rocks on it extends westward $\frac{1}{2}$ mile from the island. There is a rock, with $2\frac{1}{2}$ fathoms of water over it, in the channel northward of Cann island where the general depth is 4 fathoms.

Light.—A light tower rising from the gable of a house, together 39 feet high and painted white with red roofs, on Cann island, exhibits at 85 feet above high water a fixed white light that is visible through an arc of 270° and should be seen from a distance of 10 miles in clear weather.

Little Seldom-come-by harbor, a bay lying northwestward of Cann island, affords good summer anchorage in 6 to 10 fathoms water, mud bottom; the approach is clear, except the flat and islets westward of Cann island.

Stag Harbor tickle is the channel between Fogo island on the north, and the Indian islands and their adjacent islets on the south; it is narrow and intricate, but is preferred by coasting vessels to the passage through Sir Charles Hamilton sound.

Ice.—Stag Harbor tickle freezes solid in January, and the ice breaks up between May 1 and 10.

Stag harbor, an inlet on the south coast of Fogo island, whose entrance bears 258° , distant 3 miles from Cann island, being open to the eastward, is not available for anchorage.

The coast of Fogo island from the southern entrance point of Stag harbor trends southwestward for nearly a mile to South point; it then turns northwestward for $1\frac{1}{2}$ miles to Rogers point.

Stag rock, bearing 156° , distant 200 yards from South point, has less than 6 feet water over it.

Buoys.—Three nun buoys are moored in about $3\frac{1}{2}$ fathoms of water in the narrow part of Stag Harbor run, one on the southern side, painted red, and two on the northern side, painted black. The eastern black buoy is surmounted by a white flag. The channel between the red buoy and the black buoys carries the greatest available depth of water. Mariners are cautioned against the possibility that these

buoys may shift during heavy weather. They are removed annually at the close of navigation, but not later than January 1.

Grandfather island, situated $2\frac{3}{4}$ miles south-southeastward of Cann island. is nearly $\frac{1}{2}$ mile long, eastward and westward, low and flat, and 600 yards northward of it is Little Grandfather islet, from which a reef extends east-northeastward, nearly $\frac{1}{2}$ mile; between this islet and Cann island is the entrance to Stag Harbor tickle, about 2 miles wide.

East Indian island, 1 mile westward of Grandfather island and separated from it by a rocky channel, is about $2\frac{1}{4}$ miles long, eastward and westward, and $\frac{3}{4}$ mile wide.

West Indian island, the eastern end of which lies $\frac{1}{4}$ mile northward of the western part of East Indian island. is about $3\frac{3}{4}$ miles long, eastward and westward, $\frac{3}{4}$ mile wide, low and covered with moss and stunted trees; the northern coast of the island is rocky and foul for 700 yards off it in places; foul ground extends $\frac{3}{4}$ mile southward of the island, and also westward from it to Dog Bay islands.

Indian Island tickle, between East and West Indian islands, affords summer anchorage for small craft in 2 fathoms water, mud bottom.

Indian Lookout island, situated $1\frac{1}{2}$ miles westward of South point, is about 300 yards in diameter, and is surmounted by a remarkable cone, 127 feet high. Rocks and foul ground extend northward 800 yards and northwestward 1,300 yards from the islands, and Malcolm island lies 800 yards east-northeastward of its southern extremity.

Directions for Stag Harbor tickle.—Avoid the shoals extending northeastward from West Indian island, and bring the northern end of Mouse island in line with the first steep rise in the hills within Burnt point, bearing 62° , which mark leads through the fairway of the tickle. When Rogers point is well open westward of South point, bearing 309° , Stag rock is cleared; then steer through the channel between Indian Lookout island and Rogers point, giving a sufficient berth to a rock awash at low water, bearing 317° , distant nearly 400 yards from the middle of the northeastern islet of Indian Lookout group, which might not be seen in a very smooth sea.

Sir Charles Hamilton sound.—Ladle point, the southern entrance point of Sir Charles Hamilton sound, lies southeastward distant $5\frac{1}{4}$ miles from Grandfather island, and the sound extends westward 14 miles from between them. Indian islands with Yellow Fox and Goose islands to the southward of them, and also groups which extend from them toward the Dog Bay islands, on the northwestern side of Sir Charles Hamilton sound, should not be approached within $\frac{1}{2}$ mile, or to less water than 10 fathoms.

Ice.—Sir Charles Hamilton sound freezes over in January, eastward to a curved line from Seldom-come-by-harbor to East Indian, Goose, Grass, and Noggin islands; easterly winds fill the sound, winds between east-southeasterly and west-southwesterly clear it. Owing to the southerly current from cape Fogo, this locality and that of Copper island are often clear of ice.

Rocky bay.—Rocky point is situated west-southwestward $4\frac{1}{2}$ miles from Ladle point, and westward, 6 miles from Rocky point, is a headland off which are Grass islands. The entrance to Rocky bay is between Rocky point and Grass islands. In the middle of the entrance are Green and Noggin islands, connected by shoal water. White island lies a mile southeastward from Green island. The channels between Noggin and Grass islands, and also between Green and White islands, are clear.

The inner part of the bay is divided into four arms, of which Southwest and Middle arms are shallow and encumbered with islets and bowlders.

Northwest arm has in its middle part two rocks, with less than 6 feet of water over them, and there is a patch of $3\frac{1}{2}$ fathoms water, nearly midway between Noggin island and Noggin hill; in this arm keep near the western shore, having the upper points of the eastern shore open, to clear the rocks in the middle; when White island is shut in with the outer eastern point of the arm, bearing about 52° , the inner rock is past, and vessels may anchor in 4 to 6 fathoms, mud bottom.

Noggin hill, on the western side of Northwest arm, is wooded, 251 feet high, and conspicuous from being surrounded by low land.

Noggin cove, the westernmost cove of Rocky bay, is generally shallow.

Tickle island lies close off the mainland at $2\frac{1}{2}$ miles west-southwestward of Grass islands; it is separated on its northwestern side from Gander island by a channel about 600 yards wide.

Gander island, in the entrance of Gander bay, is $1\frac{1}{2}$ miles long, north-northeastward and west-southwestward, and about 600 yards wide; shoal water extends $\frac{1}{4}$ mile from its northern end, and a shoal, terminating in Duck islet, stretches southwestward 800 yards from its southern end.

Gander bay, the principal entrance of which is between Gander island and Dog point, which lies $2\frac{1}{10}$ miles west-northwestward, extends southward for $12\frac{1}{2}$ miles, and Gander river flows into its head.

Storehouse island, $\frac{1}{2}$ mile off the eastern shore of the bay at $2\frac{1}{2}$ miles within Duck islet, is flat, and 29 feet high; shoal water extends southwestward $\frac{3}{4}$ mile from it, and Robinson rock, the shoalest part

of this foul ground, bears 255° , distant 900 yards from the north-western point of the island. The western side of Gander island, open westward of Duck islet, bearing 27° , leads westward of Robinson rock.

Shoal bay, on the western side of Gander bay at about $1\frac{1}{2}$ miles within Dog point, has numerous islets and rocks in it. Farewell head, open eastward of Dog point, bearing 353° , leads eastward of them.

Fox island is $\frac{1}{4}$ mile off the western side of the bay, to which it is connected by shoal water, at $4\frac{3}{4}$ miles within Dog point, and Bussey point is a low promontory on the same shore at $3\frac{1}{4}$ miles farther in; shoals, having 12 to 15 feet of water over them, lie directly between Fox island and Bussey point; the point next above Bussey point, open eastward of it, bearing 196° , leads eastward of these shoals.

In the reach from Bussey point to Clark point, at $3\frac{1}{2}$ miles to the southward, keep Storehouse island open westward of Beaver point, bearing about 21° , until past the point next above Bussey point, to clear a long shoal, which stretches $\frac{3}{4}$ mile off a low point of the eastern shore of the bay. A shoal, with $3\frac{1}{2}$ fathoms of water over it, lies in mid-channel, bearing 168° , distant 1 mile from Bussey point.

Anchorage.—There is safe anchorage, bottom generally mud, in the bay above Fox island.

Ice.—Gander bay freezes about January 1 and the ice clears about May 1.

Tides and tidal streams.—It is high water, full and change, in Gander bay at 7h. 55m.; springs rise $\frac{1}{2}$ feet, neaps 3 feet.

At Clark point at springs the rate of the ebb stream reaches 2 knots, and there is a very weak flood for about three hours; at neaps there is no flood stream.

Gander river, a considerable fresh-water stream, flowing out of the lake of the same name, which is 33 miles from the head of the bay, is crossed, at 5 miles below the point where it issues from the lake, by the Northern and Western Railway.

Dog bay extends southwestward 7 miles from its entrance between Dog point and Farewell head, at about 3 miles to the northward. Dog islands, a group of islets and rocks, extend north-northwestward about $1\frac{4}{10}$ miles from Dog point.

Steering island, in the middle of the fairway into Dog bay, is small, 27 feet high, and steep-to. Charley island bears 249° , distant $\frac{2}{10}$ mile from Steering island, and a reef extends southwestward $\frac{1}{2}$ mile from it.

Vesuvius rock, bearing 70° , distant $\frac{3}{4}$ mile from Steering island, is awash at low water. Half of Goose island open southward of the southern Dog Bay island, bearing about 106° , leads southward, and Charley island, well open northwestward of Steering island, bearing 244° , leads close northward of the rock.

Gulnare rock, bearing 142° , distant 1,400 yards from Steering island, has less than 6 feet of water over it; Noggin hill open north-eastward of Gander island, bearing 131° leads northeastward, and the southeastern shore of Dog bay open northwestward of the northwestern Dog island, bearing 221° leads northwestward of this rock.

Directions. In entering Dog bay pass on either side of Steering island, observing the marks to clear Vesuvius and Gulnare rocks, and thence in mid-channel between the northwestern Dog island and Charley island. Within Dog islands the bay is clear of shoals at a moderate distance from its shores.

Anchorage.—There is anchorage above Double islet at $3\frac{3}{4}$ miles within Steering island, in 4 to 8 fathoms of water, mud bottom, between some islands and the northwestern shore; between the islands and the southeastern shore the bottom is foul.

Farewell head, the northern entrance point of Dog bay, is 243 feet high.

Dog Bay islands, the northern end of which bears 69° from Farewell head, is a group of islands and rocks extending north-northwestward and south-southeastward $2\frac{3}{4}$ miles, and having a general height of 20 to 40 feet, except the northern end of the northern island, which is a hill 133 feet high.

The channel between Farewell head and Dog Bay islands is about a mile wide and clear southward to Vesuvius rock.

Wadham islands, distributed through the quadrant between about 90° and 180° from cape Fogo, are seven in number, and, including East-southeast ground and Frampton rock, extend in an easterly and westerly direction for 13 miles, while between them and the mainland westward of Penguin islands, are numerous islets and reefs.

Ice.—The northern ice generally arrives between January 10 and 20.

Copper island, the western of these islands, is 192 feet high and the highest of the group.

Frampton rock, bearing 280° , distant $2\frac{1}{2}$ miles from Copper island summit, has 3 fathoms of water over it.

Duck island, east-southeastward $1\frac{1}{2}$ miles from Copper island, is generally low and rocky, with a small peak in its middle 69 feet high.

White island, northeastward, nearly 1 mile from Duck island, is remarkably barren, nearly flat-topped, 99 feet high, and of a white color. At $\frac{3}{4}$ mile eastward of White island is Shag islet, from which shoals extend eastward and westward.

Peckford island, southeastward 1 mile from White island, is the largest island in the group; at its northern end is a sharp peak 86 feet high.

Offer Wadham island, the easternmost island of the group, lies northeastward $3\frac{3}{4}$ miles from Peckford island, and is 62 feet high. Coleman and Small islands are situated between Peckford and Offer Wadham islands.

Light.—A circular red lighthouse, with its dome striped red and white vertically, 44 feet high, on Offer Wadham island, exhibits, at 100 feet above high water a revolving white light, showing a flash every thirty seconds, which should be seen from a distance of 12 miles in clear weather.

The keeper's dwelling close to the lighthouse is painted white, with a red roof.

Signals.—This lighthouse is supplied with the International code signals.

East-southeast ground, bearing 104° , distant $1\frac{3}{4}$ miles from Offer Wadham island lighthouse, is a shoal with 9 feet of water over it.

Tom Cod rock, with 12 feet over it, bears 149° , nearly 1 mile from Offer Wadham lighthouse, and with the peak of Peckford island in line with the northern cliff of Coleman island, bearing 244° .

South-southwest rock, bearing 156° , distant nearly 2 miles from Small island, is awash at high water.

Topsail rock, bearing 148° , distant $5\frac{1}{2}$ miles from Offer Wadham lighthouse, has 9 fathoms of water over it and is doubtful in position.

Bottle rock, bearing 103° , distant $5\frac{1}{2}$ miles from Offer Wadham lighthouse, has 9 fathoms of water over it.

Shark ledge and Scraggy rock are dangers of doubtful position, bearing 80° , distant about $6\frac{1}{2}$ miles from Offer Wadham lighthouse. The sea is reported to break here in heavy weather.

Channels.—There are several deep-water channels between Peckford island and the mainland; the widest is that immediately northward of North Penguin island and Edwards reef, but for this there is no leading mark; the southern points of Copper and Duck islands in line, bearing 298° , lead through the channel between Scrub rock and Schoolroom rock.

Funk island, the summit of which is in latitude $49^\circ 45' 29''$ N., longitude $53^\circ 10' 49''$ W., lies east-southeastward, distant $24\frac{1}{2}$ miles from Offer Wadham island; it is $\frac{1}{2}$ mile long in an easterly and westerly direction, about 300 yards wide, 46 feet high and nearly flat, with scanty vegetation and peaty soil on its highest part.

Landing can be effected in calm weather at Gannet head on the southern coast, and on the northern side of Indian gulch, which is southward of Escape (the northeastern) point, but not at the head of this gulch, as at all times the scend of the sea would make it unsafe for a boat in such a narrow place. On the northern coast, 200 yards westward of Escape point, is a steep cliff, up and down which the sea rises and falls without breaking, so that even in a high sea

landing may be made on the Bench, which is a shelf 4 feet wide, sloping up the cliff and quickly narrowing to a few inches broad, but keeping that breadth for some 10 feet, after which the ascent is steep with good holding.

Besides Brenton rock, which bears 240° , distant $5\frac{1}{4}$ miles from the island and has 5 fathoms water over it, the island is surrounded by shoals within distances varying from $2\frac{3}{4}$ miles to $\frac{1}{2}$ mile: these shoals are marked on the chart. Although on some of the patches there is a depth of as much as 15 to 16 fathoms, yet, through the sudden change in the depth of water, 60 fathoms being the general depth in the vicinity of the island, the sea breaks over them in heavy weather.

Current.—A strong southerly set is said to be sometimes experienced near Funk island.

Caution is necessary when in the vicinity of Funk island, especially at night or during foggy weather.

Tides.—It is high water, full and change, at Funk island at 7h. 0m.; springs rise 2 to 3 feet approximately.

Ice was encountered near Funk island and westward of it on June 21 to 23, 1899.

The coast of Newfoundland from Ladle point, the southern entrance point of Sir Charles Hamilton sound, trends east-southeastward for 10 miles to abreast Penguin islands: it is low and almost straight, and there are many shoals off it.

Ladle island, northeastward, 1,200 yards from Ladle point, is small and 34 feet high; a rock, with less than 6 feet of water over it, bears 277° , $\frac{1}{4}$ mile from the northern point of the island.

Ragged harbor is $2\frac{1}{2}$ miles southeastward of Ladle island; in its entrance is an islet 6 feet high, and bearing about 297° from the islet are two rocks with less than 6 feet water over them; the northwestern rock is distant about $\frac{1}{2}$ mile, and there is also a rock bearing 210° distant about 200 yards from the islet. The harbor affords good temporary anchorage for small vessels bound southward and detained by a southerly gale, instead of bearing up for Seldom-come-by harbor.

Bring the fall of a ridge of high land in line with White point, the first point inside on the northwestern shore, bearing 218° , and anchor off White point in 4 fathoms water, mud bottom.

Penguin islands are two flat islets about 20 feet high, bearing northwestward and southeastward $\frac{3}{4}$ mile from each other; the northwestern lies 5 miles south-southeastward from Peckford island.

Edwards reef, consisting of extensive patches on which are some small rocks about 10 feet high, lies west-northwestward of the islets.

Light.—A circular iron tower, 47 feet high, painted red and white in vertical stripes, on the northeastern end of North Penguin island, exhibits at 62 feet above high water, a fixed white light, which should be seen from a distance of 9 miles in clear weather.

The keeper's dwelling is attached to the eastern side of the lighthouse and painted in red and white vertical stripes.

Signals.—The light-house is supplied with the International code signals.

The coast from abreast Penguin islands trends east-southeastward for $16\frac{1}{2}$ miles to Cape Freels; it is generally low and flat, and without any distinguishing marks.

Deadman point bears 139° distant $6\frac{1}{2}$ miles from South Penguin island, and **Deadman rock**, 350° distant $1\frac{1}{2}$ miles from the point, has 15 feet of water over it.

Deadman bay, lying between Deadman point and a point at $3\frac{1}{4}$ miles southeastward, off which is Outer Cat island, 70 feet high, affords fair anchorage in 9 fathoms of water during summer, sheltered from westerly to southerly winds, in its western corner. The holding ground is good, but a shoal with 3 fathoms of water over it, bears 171° , distant $\frac{1}{2}$ mile from Deadman point. Several patches with depths of 5 to 9 fathoms water over them lie off Deadman bay, and break in heavy weather.

Cat harbor.—Inner Cat island lies south-southwestward 1 mile from Outer Cat island, and Cat harbor lies in the bight formed between them. It is small and dangerous, and only available for small vessels in fine weather. A 6-fathom rocky bank lies northeastward, about a mile from Inner Cat island.

Ice.—Cat harbor freezes between January 1 and February 1 and clears as soon as the ice leaves the coast.

Cape Freels, at the northern end of the great Bonavista bay, is low and rocky; it forms three points: North bill; Middle bill, east-southeastward, about 1 mile from North bill; and South bill, south-southeastward, $1\frac{1}{4}$ miles from Middle bill. Cape ridge, about a mile inland from them, is 183 feet high.

Ice.—The sea about cape Freels freezes between January 1 and February 1, and ice often remains near the cape in May and sometimes as late as June.

Gull island, eastward, distant $1\frac{1}{4}$ miles from South bill, has deep water around it. Gull rock, with 9 feet of water over it, bears 303° , distant $\frac{1}{2}$ mile from the island.

Bonavista bay.—South bill of cape Freels and cape Bonavista, the outer points of this bay, bear north-northwestward and south-southeastward, distant $36\frac{1}{2}$ miles from each other.

The bay is divided into two main branches by a group of islands extending northeastward, and terminating in Gooseberry islands. The northwestern portion is again divided into two main arms, separated by groups of islands and a portion of the mainland: they both trend southwestward for 28 miles, the northern arm terminating in Freshwater bay, the southern in Bloody bay.

The southeastern main portion of Bonavista bay, between Gooseberry islands and cape Bonavista, has one principal arm, Clode sound, which trends southwestward 45 miles. Besides this sound there are numerous smaller sounds, bays, and intricate channels among the islands of the archipelago inside of Gooseberry islands.

The entrance of the northwestern portion of Bonavista bay is 6 miles wide, between Shoe point and Gooseberry islands: it then divides into Locker and Cattel reaches.

Locker reach commences between Fair islands and Brandies rock; it is $1\frac{3}{4}$ miles wide, and its direction is southwestward for a distance of 11 miles on the north side of Deer and Locker Flat islands, when it receives the name of Content reach and continues in the same direction for 5 miles to the entrance of Freshwater bay. The Brandies and rocks off Deer islands are the only shoals in these reaches.

Pitt Sound reach is between Deer, Locker Flat, and Pitt Sound islands, and connects Cattel reach with Content reach.

Approaching Bonavista bay.—The outer points, cape Freels and cape Bonavista, are so low that they can not be seen beyond a distance of about 14 miles in clear weather, and it is necessary to give the rocks off Gooseberry islands a berth of 3 miles: it is also well to make the northwestern shore of Bonavista bay, about Greens Pond and Shoe point, which is comparatively free from shoals, or at night, to make Puffin Island light.

Ice.—The harbors in Bonavista bay freeze over at intervals between January 20 and March 20, and are closed at intervals by ice about a foot in thickness from January 20 to May 15. Field ice appears about February 15 and disappears toward the end of May. Coasters frequent the harbors throughout the year, but foreign vessels only between about May 1 and December 20.

The shore of Bonavista bay from South bill trends south-southwestward for 14 miles to Shoe point. The area off this shore, within lines drawn 110° , $8\frac{1}{2}$ miles from Middle bill, thence 183° , 5 miles, and thence to Shoe point, is encumbered with shoals, interspersed with low rocky islets, which make approach to it dangerous, especially during foggy weather, though in a moderate sea fishermen with local experience feel safe, as almost all the shoals show: but in a heavy swell, when the sea breaks in 7 to 10 fathoms of water, and it is all confused, only perfect knowledge and great experience would justify approach to it.

The chart and plan with the following directions afford sufficient information for the ordinary purposes of navigation, including the navigation of the outer channels between Flowers and Cabot (Stinking) islands, and northward, inside Middle and Charge rocks, during moderate weather, such as often prevails in summer when the fishing vessels are proceeding to Labrador.

Pincher island, southwestward 4 miles from Gull island, is about 1,600 yards long, northeastward and southwestward, and 800 yards wide: a square church on the highest part of the island is conspicuous. Pinchers bight, northwestward of the island, affords safe anchorage in summer for small vessels in $2\frac{1}{2}$ fathoms of water.

Pouch island, southward about $1\frac{3}{4}$ miles from Pincher island, is 80 feet high, and about $\frac{1}{2}$ mile long, north-northeastward and south-southwestward, with several islets and reefs around it; eastward $\frac{3}{4}$ mile from it are East reefs, the outer or eastern rock of which dries, and is generally visible.

Margery rock, bearing 66° , distant 1 mile from East reefs, has less than 6 feet water over it, and generally breaks.

Directions for Pinchers bight.—From the southeastward approach with Pincher Island church, well open northeastward of Hincks islet, which is 12 feet high and lies $\frac{3}{4}$ mile north-northeastward of Pouch island, bearing about 321° , and having passed the outer rock of East reef, bring and keep it astern in line with the northeastern end of Flowers island, a large island southward of Pouch island, bearing 180° , until Bundells Gaze, a remarkable granite lump on the mainland, is in line with Pound rocks, the outer rocks northward of Pincher island, bearing 311° . Keep on this line until Pincher Island church bears 239° , when sheer eastward to pass Pound rocks, the channel between which and the shoals to the northeastward is 800 yards wide: anchor in the bight within Pound rocks.

Ice.—The bays between Pincher island and Pools arm, 7 miles southwestward, all freeze between January 1 and February 1, and clear as soon as the ice leaves the coast.

Flowers islands, southward $1\frac{1}{10}$ miles from Pouch island, are two islands, with some small islets close northwestward of them: the southwestern island, 103 feet high, is the larger and higher; together they are about 1,200 yards in extent; a narrow channel, in which a few resident fishermen secure their boats, runs northwestward and southeastward between the islands.

Swains islands lie off the mainland at about 4 miles west-southwestward of Pincher island: there is a fishing village with a conspicuous square church, painted white with a dark roof, on the southern of these islands. Some sealing vessels lay up during summer in Swains tinkle, the channel nearest the mainland: the entrance to this tinkle is from the southward, but no directions can be given for it.

Catamaran reef, the easternmost of the shoals off Swains islands, bears 76° , distant 700 yards from Swains Shag rock, an islet 40 feet high.

Butterfly islets are a group of rocks about 30 feet high, with foul ground extending 300 yards northward of them, bearing 233° , distant $1\frac{1}{10}$ miles from Flowers island summit.

Black reef, bearing 352° , distant 800 yards from Butterfly islets, is a small rock about 10 feet high.

East Twin, a rock with 13 feet of water over it, bears 274° , distant 1,200 yards from Butterfly islets, and **West Twin**, a rock with 12 feet water over it, is situated 1 mile in the same direction from the islets.

Half rock, bearing 243° , distant $1\frac{1}{10}$ miles from Butterfly islets, has 9 feet of water over it.

Three rocks and Jacobs ground, south-southeastward $1\frac{1}{4}$ miles from Flowers island, cover an area 1 mile long in an easterly and westerly direction, and 1,400 yards wide, in which there are several shoal heads, with depths of 7 feet to 5 fathoms over them, and deep water among them.

Shoe point, in line with the northern side of Copper island, bearing 243° , leads southeastward; Shoe point, in line with the southern side of Newell island, an island lying northwestward of Copper island, bearing 248° , leads northwestward; Pouch Island summit, in line with the northeastern side of Flowers islands, bearing 326° , leads northeastward; and the main portion of Pouch island, open westward of Flowers islands, bearing 354° , leads westward of these shoals.

Stinking or Cabot islands, known as Stinking islands by the fishermen, are the outer of the low rocky islets lying off the shore between cape Freels and Shoe point; these two islands are about 400 yards apart northwestward and southeastward, 19 and 22 feet high, respectively, and bear 153° , distant $5\frac{1}{2}$ miles from Gull island.

Light.—A lighthouse, rising from the middle of a square building with flat roofs, 47 feet high, and painted red and white in horizontal bands, on the northwestern Cabot island, exhibits at 74 feet above high water, an intermittent white light, showing thus: Light, eleven seconds; eclipse, nine seconds, which should be seen from a distance of 10 miles in clear weather.

Signals.—The lighthouse is supplied with the International code signals.

Rocks.—Bleak islets, which are rocks 8 feet high, and Stevensons islets, which are rocks 14 feet high, lie between Cabot and Flowers islands; and halfway between Bleak islets and Cabot islands is a rock with 6 feet of water over it.

Stinking banks lie from $1\frac{1}{2}$ to 3 miles northeastward of Cabot islands, with depths of 12 to 16 fathoms between; the banks extend $1\frac{1}{2}$ miles east-northeast and west-southwest, with a width of $\frac{3}{4}$ mile, in patches having 7 to 9 fathoms of water over them; from the outer patch of 7 fathoms Cabot Island lighthouse bears 245° , distant 3 miles.

Middle rock, bearing 354° , distant 2 miles from Cabot Island lighthouse, is awash at low water, and the sea generally breaks over it.

A rock, with 4 fathoms over it, bears 28° , distant 600 yards from Middle rock.

Charge rock, lying with Gull island bearing 292° , distant $2\frac{1}{2}$ miles, and Middle rock in line with the western end of Cabot island, has 4 feet of water over it, and generally breaks.

Norris rock, lying with Gull island bearing 292° , distant $1\frac{1}{4}$ miles, has 5 fathoms of water over it.

Greens Pond island, lying north-northeastward about 2 miles from Shoe point, is $1\frac{1}{4}$ miles long northwestward and southeastward, $\frac{9}{10}$ mile wide, and 171 feet high, presenting a nearly flat summit; a chain of islets extends southeastward $1\frac{1}{4}$ miles from it, without navigable channels between them: the southeastern group of these islets are Copper, Pigeon, and Horse islands, which are almost connected. Copper island, the southwestern of this group, rises to a peak 115 feet high, and Black rocks and Black reef lie southeastward 400 yards from it; the rocks and reef are steep-to on the seaward side, in which direction the water deepens quickly to 100 fathoms. Bearing 48° , distant 300 yards from Horse island, is Horse rock, with less than 6 feet of water over it; and bearing 239° , distant 300 yards from Copper island, is Herring rock, with 12 feet of water over it.

Cookroom rock, bearing 93° , distant 400 yards from the southeastern point of Greens Pond island, has 12 feet of water over it.

Sealskin rock, with 15 feet water over it, bears 14° , and a rock, also with 15 feet over it, bears 31° , each distant 1,100 yards from Puffin Island light-house.

Puffin and Newell islands lie northwestward of Copper island. Puffin island, about 1,200 yards southeastward of Greens Pond island, is flat, and 55 feet high; bearing 48° , 200 yards from it, is Puffin rock, with 12 feet water over it; and bearing 53° , 800 yards from the island, is Puffin ledge, with 5 fathoms over it. Newell island, 38 feet high, is divided from Puffin island by a narrow rocky channel.

Light.—A light-house, rising from one corner of a granite building roofed with slate, 40 feet high, on Puffin island, exhibits at 85 feet above high water a fixed red light, visible over an arc of 270° , between the bearings 158° and 68° , which should be seen from a distance of 10 miles in clear weather.

Greens Pond harbor is the narrow gully on the southern side of Greens Pond island, between the island and the offlying rocks. Its entrance is between Cookroom and Puffin rocks. The harbor is used by sealing steamers and vessels, but on no account should approach be made to it without local knowledge.

The fishing town of Greens Pond is on the shores of the harbor, and it contains a church and mercantile establishments; during summer it is often without fresh water; the population in 1891 was 1,317.

Communication.—A steamer from port Blandford calls here weekly during summer and autumn.

Coal.—Generally about 20 tons of coal can be obtained.

Ice.—Greens Pond harbor freezes about January 18; it then is closed at intervals until February 8, after which it is generally completely closed by ice about 2 feet in thickness until March 9; field ice appears about March 11 and disappears about May 11. The first vessel usually arrives about April 28, and the last leaves about January 7.

Midsummer rock bears 228° , distant a little more than $\frac{1}{2}$ mile from the southwestern point of Copper island, has 2 feet water over it and a depth of 11 fathoms close-to. The western end of Greens Pond island open westward of Maiden island, bearing 340° , leads westward of the rock.

Anchorage.—There is anchorage in fine weather between Maiden and Greens Pond islands in 7 to 10 fathoms water. In proceeding to it pass westward of **Midsummer rock**.

The anchorage southward of Greens Pond island is indifferent, and as the bottom is chiefly rock with some patches of sand, care is necessary in selecting suitable ground: vessels should ride with a long scope of cable.

Pools harbor.—The entrance to this harbor, northward of Greens Pond island, is between Partridge, Grassy, and Odd islands, on the southwest, and Pools islands on the northeast.

South Pound islet, 47 feet high, lies north-northeastward nearly a mile from Greens Pond island. A rock, with 2 fathoms of water over it, lies southwestward nearly 200 yards from its western end.

North Pound islet, northeastward $\frac{1}{2}$ mile from South Pound islet, is 30 feet high, and a reef, on which the sea generally breaks, extends southwestward 400 yards from it.

A rock, with 5 fathoms of water over it, bears 51° , nearly 800 yards from North Pound islet.

North rocks, bearing 50° , distant from $\frac{1}{10}$ mile to $1\frac{1}{2}$ miles from the northeastern point of Newell island, are two rocky patches with 2 and 3 fathoms least water over them.

Liver ledge, bearing 59° , distant nearly 2 miles from Puffin Island lighthouse, has 7 fathoms water over it.

Leading mark.—The summit of Big Pools island, in line with the northeastern side of South Pound islet, bearing 305° , leads 600 yards northeastward of North rocks, and 550 yards southwestward of Liver ledge.

Big Pools island, northwestward nearly 1 mile from South Pound islet, is 114 feet high, with a round summit, and rather higher than the adjacent land. There are two flagstaves on the island.

Main Pools island lies about 200 yards northwestward of Big Pools island; its church, which has a spire and is painted white, is visible from a distance except when hidden behind Big Pools Island hill.

Midway rock, with less than 6 feet water over it, lies directly in the fairway of Pools harbor approach, bearing 236°, distant 800 yards from the western point of South Pound islet and between that islet and the shoals off Greens Pond island.

Rocks.—A rock, with 12 feet water over it, bears 42°, distant 400 yards from Grassy island: there is also a rock awash at low water, lying 100 yards northward of Odd island: the harbor is otherwise clear of sunken shoals, except close to the shore.

Benburry rock, bearing 217°, distant 65 yards from Benburry islet, and in the fairway of Pools harbor, has 9 feet of water over it.

Directions.—There are no leading marks for the channels between Pound islets nor for those northeastward and southwestward of them. The best channels are immediately southeastward and northwestward of South Pound islet, where in a moderate sea the shoals are generally visible: after passing South Pound islet, steer for Big Pools island, not opening Main Pools church westward of it, until the largest islet westward of Grassy island is open westward of that island, bearing about 225°, pass Odd island and anchor in 7 to 10 fathoms water, mud bottom, with the western side of Grassy island just touching the eastern side of Odd island, bearing 150°, and Main Pools church bearing 59°.

A slight swell sets in here during easterly gales, but it is not dangerous to shipping. There is anchorage with smooth water in 5 fathoms at $\frac{1}{2}$ mile farther up the harbor: and small vessels moor in the channel northwestward of Main Pools island, or in Puddingbag cove. Sealing vessels when lying up prefer the channel between Main Pools and Big Pools islands.

Ice.—Pools harbor freezes early in January and the ice breaks up toward the end of April.

Tides.—It is high water, full and change, in Pools harbor at 7h. 0m.; springs rise 4 feet, neaps 3 feet.

Communication.—The steamer from port Blandford calls at Pools harbor weekly during summer and autumn.

Loo cove, in the mainland west-northwestward about 1 mile from Greens Pond island, affords good anchorage; in running for it, when westward of Greens pond, keep Horse island just open southward of Greens Pond island, bearing 110°, until Pools church is well open westward of Partridge island, bearing 5°, to clear the ledge which stretches out nearly 300 yards from Greens Pond island. After passing Ford island, on the western side of the narrowest part of the channel, and where it is 400 yards wide, there is good anchorage in 11 fathoms water for $\frac{1}{2}$ mile to the northward.

The northwestern side of South Pound islet in line with the southeastern point of Partridge island, bearing 69°, leads between two

sunken rocks 200 yards apart, into Loo cove, where there is good anchorage in 5 to 7 fathoms of water.

General directions.—From the southeastward and bound to Greens Pond harbor, pass about 4 miles eastward of Shark rock (p. 545) and then steer for Shoe point; although this is not the most prominent point of the coast, there is a chance, should it be foggy, of the fog lifting as it is approached, but if the weather continues very thick beware of Midsummer rock.

Usually in navigating along this coast it is advisable to pass outside of Charge rock and Stinking banks.

To proceed through the channel between Stevensons and Bleak islets, which is 1 mile wide, pass eastward of Jacobs ground (p. 537), and give a sufficient berth to the shoal ground extending southwestward nearly 400 yards from Bleak islets; then steer 14° to pass between Middle rock (p. 537) and Cobblers Fishing rock; the western summit of Butterfly islets in line with the northwestern end of Flowers islands, bearing 218° , leads between these rocks; when this mark comes on keep it so until Middle bill of cape Freels opens northeastward of Lapstone rocks, which lie about 1 mile southward of Gull island, bearing about 318° , then steer for Gull island, passing southwestward of Charge and Norris rocks, and northeastward not less than 200 yards from Gull island.

By the passage inside Flowers islands, from $\frac{1}{4}$ mile southeastward of Big Pools island, steer 51° , and bring South Pound islet open westward of North Pound islet, bearing 215° ; keep this mark on to clear Half rock and the Twins, until Black reef is in line with the southern point of Flowers islands, bearing 90° . Then steer to pass $\frac{1}{2}$ mile northwestward of Flowers islands, and after passing these islands, bring Black reef just open northwestward of the islets off Flowers islands, bearing 234° , which mark leads between Stevensons islets and Margery rock; when northward of Stevensons islets, steer about 31° , to pass between Middle rock and Cobblers Fishing rock; then proceed as above directed.

These two runs, inside and outside Flowers islands, are the only channels that can be used without local knowledge; there are others nearer the shore used by fisherman who do not hesitate to take through them sealing vessels of 200 to 300 tons, which are so strongly built for contact with ice, that a bump on a rock in moderate weather neither hurts the vessel nor disturbs the pilot.

Shoe point, southwestward $2\frac{1}{10}$ miles from Puffin Island light-house, is flat and low, but the hills immediately behind it rise steeply to a height of 214 feet; the shore of the bay from the point trends westward for $1\frac{1}{2}$ miles to New harbor.

New harbor has a remarkable cliffy hill 200 feet high on its western side and two low islets close off its eastern entrance point; the

entrance is 100 yards wide: the harbor, which extends northward 1,200 yards, increases in width to 200 yards: there are a few small rocks close off its western shore, but with the exception of these it is clear, with good anchorage in 4 to 5 fathoms of water, mud bottom.

Indian bay, formed by the continuation of the shore from New harbor on the north and by Silver Fox island, 271 feet high, Brown Fox island, and the shore in continuation of them, on the south, trends westward for 8 miles, and then branches northwestward in Northwest arm for $1\frac{1}{2}$ miles and west-southwestward in Southwest arm for 1 mile.

Cat island, on the north shore of Indian bay, rises in a conical hill, 214 feet high, at its eastern end; immediately eastward of the island is a small islet 6 feet high, with a rock close eastward of it and rocks between it and Cat island.

Cat cove, northeastward of Cat island, is a favorite place of shelter for wind-bound sealing vessels: the anchorage is in 7 to 13 fathoms water, and its approach is clear, except the islet and rock eastward of Cat island: these are left on the port hand when entering, as there is no safe channel between them and Cat island.

Cutmans island, $\frac{1}{2}$ mile long, eastward and westward about $\frac{1}{4}$ mile wide and 77 feet high, is separated by a rocky channel $\frac{1}{2}$ mile wide from the western end of Brown Fox island and by a channel 600 yards wide from the mainland southwestward of it. The main channel of Indian bay, northward of Cutmans island and between it and Camel island, is $\frac{1}{4}$ mile wide.

Ship island, 1 mile westward of Camel island, is the largest of a group which extends $\frac{1}{2}$ mile across Indian bay from its northern shore.

North arm, northeastward of Ship island, affords good anchorage in 4 to 13 fathoms water, mud bottom.

The channel between the Ship island group and the southern shore of Indian bay is 600 yards wide, with a depth of $4\frac{1}{2}$ fathoms in mid-channel, 6 fathoms near the shore, and 7 fathoms near the southern island of the group.

Fair islands, southward of Brown Fox island, comprise a barren group of many dome-shaped isolated granite islands, varying in height from the low eastern islets to 300 feet. There is moderately good anchorage for small vessels on the northwestern side of the eastern island; the southern entrance is the best; it is 100 yards wide, with a rock awash at low water spring tides off the eastern point, therefore keep on the western shore when going in; the anchorage is in 6 fathoms water, off the houses on the island.

Pork island, the western of the Fair islands, is on the northern side of the entrance to Trinity bay.

Ice.—Fair islands anchorage freezes about January 11 and clears about April 13.

Communication.—The steamer from port Blandford calls at Fair islands anchorage weekly during summer and autumn.

Lewis island is about 1 mile west-southwestward of Pork island, and near the middle of its southern side there is a remarkably steep hill, 456 feet high, having several conspicuous bowlders on its summit. Frying-pan island, immediately under this hill, is dome-shaped, 149 feet high, with a clear channel 200 yards wide between it and Lewis island.

Trinity bay extends westward 7 miles from its entrance between Pork and Lewis islands.

Southwest island, in the eastern entrance to Trinity bay at 600 yards southward of Pork island, is 52 feet high, and steep to on its southeastern side, but rocks and shoal water extend 400 yards off its northeastern and western ends.

Saint island, midway between Pork and Lewis islands, and bearing 262° , distant 1,600 yards from Southwest island, is 119 feet high; close off its eastern point is a rock, and its western end is foul to the distance of 300 yards. A rock, with less than 6 feet water over it, bears 331° , distant $\frac{1}{2}$ mile from the eastern end of Saint island; the southern point of the eastern Fair island open southward of the eastern of the southern points of Pork island, bearing 79° , leads southward of it.

Ice.—Northern ice arrives about March 5 and remains until about April 25, and Trinity bay is usually covered with locally formed ice during February and March; the Northwest arm is generally frozen about the end of January or the beginning of February, and is clear about the middle of March; the Southwest arm freezes regularly from the middle of January to the middle of May.

Drake cove, southwestward of Drake island, which lies about 800 yards westward of Lewis island, affords fair anchorage in 7 to 10 fathoms of water; the northwestern shore is rugged, and rocks extend from the northern entrance point nearly to mid-channel between it and Drake island.

Trinity gut, the southern entrance to Trinity bay, is $\frac{1}{2}$ mile long and 400 yards wide; some rocks lie off its western shore, but there is a clear passage 7 to 12 fathoms deep in mid-channel.

The shore southwestward from Trinity gut, forming the northern side of Locker reach, is steep and straight for $2\frac{1}{4}$ miles to Chalky cove, which affords a convenient temporary anchorage for small vessels windbound, in 4 to 10 fathoms water, rocky bottom; a rock, with 1 foot water over it, lies 450 yards eastward of its western point.

Locker bay extends westward about $4\frac{3}{4}$ miles from Chalky cove; the outer part has an average breadth of $\frac{1}{2}$ mile, with depths of 20 to

30 fathoms: there is anchorage above Birchy head in 6 to 12 fathoms, mud bottom.

Locker rock, in the middle of the entrance of Locker bay, is awash at low water: Frying-pan island entirely open of Chalky head, bearing 59° , leads southeastward, and entirely shut in, bearing 63° , leads northwestward of the rock.

Hare bay is southwestward of Shoal bay on the northwestern side of Content reach, and Hare island, 198 feet high, lies in the entrance; the channels on either side of the island are clear, but the shores of the bay are low and rocky, and must not be approached nearer than 400 yards: there is good anchorage in 4 to 18 fathoms water, mud bottom, with Hare island bearing 93° .

Freshwater bay.—The entrance to this bay is $\frac{1}{2}$ mile wide, and Hen islands, near the middle, separate it into two channels; the northern is shoal, and only used by small vessels; the southern channel is clear, except a small shoal, with 4 fathoms of water over it, extending southward 200 yards from the eastern Hen island.

Within Hen islands, keep them bearing northward of 98° until Doctors island opens northward of Benmans island, bearing 236° , to clear a bank which stretches off the northern shore.

Benmans island lies westward $1\frac{1}{2}$ miles from Hen islands and 300 yards from the southern shore; the shore between it and the entrance is rocky and shoal; the middle of Traverse island in line with the northern end of Benmans island, bearing 273° , leads northward of this foul ground till about 600 yards from Benmans island.

Mussel bank, northward 150 yards from Benmans island, covers 3 feet at high water.

Butchers cove, on the northern shore immediately within the entrance of Freshwater bay, extends north-northeastward for 1 mile, with a width of 600 yards, and a depth in the middle of from 4 to 13 fathoms, mud bottom. To enter the cove, avoid the bank off the northern shore of the entrance of the bay as above directed, and steer up its fairway.

Doctors island, west-southwestward $1\frac{3}{4}$ miles from Benmans island and 800 yards from the southern shore, is small, and 25 feet high; the shore between the islands is rocky, and must not be approached within the line joining them.

Traverse island, situated at the southern edge of a rocky bank which stretches from the northern shore of the bay, is small and 15 feet high; shoal water extends eastward $\frac{1}{2}$ mile from the island, but only 200 yards into the channel of the bay; when $\frac{1}{2}$ mile from the island, keep Dale point (the land west of the island), just open southward of Traverse island, bearing 270° , pass the island at 600 yards distance, and then shut the northern side of the entrance in

with Benmans island, bearing 80° , which leads southward of the shoal up to Dale point.

Air island, west-southwestward $2\frac{1}{2}$ miles from Traverse island and near the middle of Freshwater bay, is 75 feet high; the main channel passes southward of it, and its southern coast is steep-to, but rocky islets, with shoal water, extend 600 yards off its northern and eastern coasts.

North of Air island there is a depth of 3 fathoms of water, but the shores are rocky, and that passage must not be attempted without local knowledge.

Gambo brook, at the head of Freshwater bay, has 6 feet water over the bar and 2 fathoms inside.

On the right bank of Gambo brook there is a steam sawmill, and on the left bank of a stream which falls into the brook at 3 miles above this mill, there is a water mill, the two being connected by a tramway.

Tides and tidal streams.—It is high water, full and change, in Freshwater bay at 7h. 30m.: springs rise 4 feet, neaps 3 feet.

In the entrance to Freshwater bay the ebb stream runs nearly 1 knot an hour, but the flood is weak.

Communication.—There is a railway station at Gambo, $\frac{3}{4}$ mile from the mouth of Gambo brook, and distant $192\frac{1}{2}$ miles from St. Johns; the railway crosses Gambo brook by a steel bridge, 80 yards long, with masonry piers.

Cat bay is reached through Cat gut, which extends southward from the head of Content reach: the entrance narrows to 100 yards at the inner end, where the depth is $3\frac{1}{2}$ fathoms: the bay then turns to the northeastward round Ballast cliff.

A rock, bearing 110° , distant 800 yards from Ballast Cliff point, has 3 feet of water over it.

Tidal stream.—In the narrows, at the entrance, the ebb stream runs $1\frac{1}{2}$ knots an hour, and the flood nearly 1 knot.

Offer Gooseberry island, southward, distant $6\frac{1}{2}$ miles from Copper island, is 118 feet high, and appears as a treble-peaked island; it is the outer and most conspicuous of a group of rocks and islands southeastward of Bloody bay and reach.

North Brown islets, 15 feet high, lie eastward, distant $\frac{3}{4}$ mile from Offer Gooseberry island, and South Brown rocks, 4 feet high, lie east-southeastward 1 mile from the same island.

Offer rock, bearing 79° , distant about $1\frac{3}{4}$ miles from the southeastern end of Offer Gooseberry island, is awash, and generally visible.

Shark rock, bearing 76° , distant $2\frac{1}{2}$ miles from the southeastern end of Offer Gooseberry island, breaks in a moderate sea.

Middle rocks bear 148° , distant about $1\frac{3}{4}$ miles from Offer Gooseberry island: the southwestern rock is awash: the other, northeastward 400 yards from it, has 9 feet water over it.

The above are the outer rocks off Offer Gooseberry island, and they can only be safely avoided by giving that island a berth of over 3 miles.

Rock.—A rock, with 19 feet water over, has been reported to lie with the northern end of Offer Gooseberry island, bearing 100° , distant $1\frac{1}{4}$ miles.

Inner, Gooseberry islands, southwestward 4 miles from Offer Gooseberry island, are flat, and 120 feet high: the space between Offer and Inner Gooseberry islands is so encumbered with rocks and shoals that it can not be safely navigated, except by the local fishermen. There is a fishing village on Inner Gooseberry islands, but no good harbor for a stranger.

Communication.—The steamer from port Blandford calls at Gooseberry island weekly during summer and autumn.

Malone rock, bearing 164° , distant $4\frac{1}{2}$ miles from Offer Gooseberry island, is 2 feet high, and situated at the northern end of a ledge, a mile long, north-northeastward and south-southwestward, on the southern part of which are depths of 2 to 3 fathoms.

Mole cove, in the western part of the northern coast of Cattel island, affords fair anchorage: in approaching from the northeastward keep Hare Cut point, the northern point of the cove, well open northward of a remarkable conical rock on the northwestern point of the largest Inner Gooseberry island, bearing 225° , which leads northwestward of the shoals between Inner and Offer Gooseberry islands, except the 19 feet rock, bearing 280° , distant about $1\frac{1}{4}$ miles from Offer Gooseberry island: give Inner Gooseberry islands a fair berth, and keep Offer Gooseberry island open northwestward of them, bearing about 59° , until Hunch island is between the northeastern end of Cattel island and the treble-peaked island close off it, bearing 127° , when steer into the cove, passing a moderate distance from Hare Cut point and the island off it, and anchor in 5 to 9 fathoms water, rock bottom.

Tides.—It is high water, full and change, in Mole cove at 7h. 37m.: springs rise $3\frac{1}{2}$ feet, neaps $1\frac{1}{2}$ feet.

Deer islands, which separate Pitt sound on the south from Locker reach on the north, are flat, about 100 feet high, and mostly covered with stunted brushwood; the southeastern and southwestern coasts are bold and clear, but northeastward of them are numerous rocks.

Angel head is the northeastern point of Deer islands, and on the coast $\frac{1}{4}$ mile northwestward of it is the Popple stone, a conspicuous white boulder.

The Brandies rocks, bearing 56° , distant $2\frac{1}{4}$ miles from Burnt island, the nearest of the Deer islands, break in a moderate sea.

The southern point of Locker bay, open northward of Deer end, the western point of Deer islands, bearing 245° , leads northward; and the summit of Brown Fox island, well open eastward of the eastern Fair island, bearing about 312° , leads northeastward of them.

Burnt Island rock, bearing 65° , distant $\frac{3}{4}$ mile from Burnt island, generally breaks.

Brag rock, bearing 42° , distant $\frac{3}{4}$ mile from the Popple stone, generally breaks. A patch with 12 feet water over it lies $\frac{1}{4}$ mile northeastward from Brag rock.

Shag islands, southwestward, distant 1 mile from Angel head and $\frac{1}{2}$ mile from the Deer islands, are small, and steep-to on the southern side; Deer Shag, the southwestern, is 35 feet high.

Pitt Sound island, southward, 2 miles from Deer island, is 4 miles long and about 1 mile wide: its wooded hills rise steeply from the coast to the height of 474 feet.

Man-of-war rock, 300 yards off the northern coast of Pitt Sound island and $1\frac{1}{2}$ miles from its northeastern point, is 5 feet high. Half a mile westward of it, on the island, are Pitt Sound gates, so named from the weathering out of white quartz on the black rock having the appearance of enormous gates.

Locker Flat island, $2\frac{1}{4}$ miles southward of Chalky head, is 3 miles long, about $\frac{1}{2}$ mile wide, and 40 feet high: its coasts are of shelving rock, and should not be approached nearer than $\frac{1}{4}$ mile.

Isis cove, **Great Content**, and **Little Content** are bights at the head of Pitt sound and in the mainland southward of Locker Flat island, which are open northward and afford no shelter.

Content islet, off Great Content, is 22 feet high, and steep-to on the east, but connected by a reef with the eastern point of Isis cove.

Lakeman islands are southwestward of Pitt Sound island and separated from it by Lakeman reach, which joins Bloody reach, on the southeast to Pitt sound on the northwest.

A rock, bearing 204° , distant 1,400 yards from the western point of Pitt Sound island and nearly midway between that island and Lakeman islands, has 6 feet water over it.

Dog cove, in the mainland southwestward of Lakeman islands, affords good anchorage for a small vessel. In entering it, approach the northern shore closely to clear a reef which stretches more than half way across from the islands on the southern side. The cove should be approached from the northwestward unless with local knowledge.

Cottel reach commences between Gooseberry and Deer islands, and it continues southwestward between Pitt Sound and Lakeman islands on the northwest and Cottel island on the southeast. Farther

southwestward it is named Bloody reach or the Cowpath, and it ends in Bloody bay.

Bloody reach or the Cowpath, at its entrance between Lakeman and Cattel islands, is 700 yards wide, but narrowed to 400 yards by shoal water which stretches off Cattel beach. The reach is clear of shoals for $1\frac{1}{4}$ miles, where on the northwestern side are White islets, off which shoal water extends northeastward 400 yards. Beaches head, open of the islets, bearing about 245° , leads clear of this shoal. There is a 3-fathom patch off the tickle southwestward of Cattel island. Wolf island open westward of Mouse island, bearing 225° , leads southeastward of White islets and northwestward of the 3-fathom patch.

Martin Shepherd islands are two islands on the southeastern side of the Cowpath southwestward of Cattel island; shoal water extends 300 yards off the northeastern island into the Cowpath. Between the eastern island and Cattel island is a clear channel, but the before-mentioned 3-fathom patch lies directly off it.

Between Martin Shepherd islands is a channel having 3 fathoms water on the northeastern and 8 fathoms on the southwestern side. The northeastern part of the western island is connected with Indian-look-out island, lying 600 yards to the eastward, by a bar of 9 feet water.

Broad island is on the southeastern side of the Cowpath in continuation of the line of Martin Shepherd islands; there is a clear channel between it and the southwestern Martin Shepherd island.

Mouse island, in the middle of the Cowpath, bearing 211° , distant $2\frac{3}{4}$ miles from the southern point of Lakeman island, is 63 feet high.

Bloody point, on the southeastern side of the Cowpath, southwestward of Broad island, is a steep bluff 346 feet high.

Beaches head, on the northwestern side of the Cowpath at $\frac{3}{4}$ mile southwestward of Lakeman island, is 271 feet high; beaches connect the three steep hills of which it is composed; northward of the highest hill is Beaches cove, small, and clear of shoals, which affords anchorage, in 3 fathoms water, within Woody islets on the southern side of the entrance: there is a clear channel on either side of these islets.

Rocky bay, westward of Beaches head, extends westward 4 miles; at $2\frac{1}{2}$ miles within Beaches head its entrance is $\frac{1}{2}$ mile wide, with Rocky islands on the southern side: this entrance is narrowed to 400 yards by Shag islet, a small dry rock with a reef 300 yards eastward of it, on the north, and a reef 400 yards long, eastward and westward, on the south. The northwestern side of the hillock forming the southwestern point of Cattel island, in line with the southern point

of Beaches head, bearing about 65° , leads between Shag islet and the reef.

Black Duck island, $\frac{1}{2}$ mile within Shag islet, has a small dry rock off its western point; Black Duck cove lies northward of the island; there is a depth of 11 fathoms in it, mud bottom, but it is rocky and should not be used without local knowledge.

For Northwest arm, after passing Shag islet, keep the channel between Martin Shepherd islands open southward of Black Duck island, bearing about 82° , until past the point westward of that island, then bring the southern end of Black Duck island in line with the point westward of it, bearing 84° , which leads between the reef off Ackworth island and a 2-fathom patch, and anchor in 9 to 12 fathoms of water northward of Ackworth island.

Bard islands, on the southeastern side of the bay, are low and rocky, and a reef stretches northward 400 yards from the eastern end of the eastern island; Beaches head in line with Shag islet, bearing 67° , leads northwestward of this reef; and when the eastern Bard island bears 149° , steer along the northern side of Bard islands and anchor southwestward of them in 9 to 13 fathoms water.

Bloody bay.—Wolf island, 153 feet high, is the southwestern point of the northwestern shore of the Cowpath, and from it Northwest arm of Bloody bay extends westward 3 miles; the outer part of this bay is clear of shoals, but shoal water extends off the shores to 200 yards beyond the outer points, and there is a depth of 3 to 5 fathoms off the mouth of Norton cove, which is at the inner end of the southern shore. The western continuation of the arm for a farther distance of 2 miles has $2\frac{1}{2}$ fathoms water in the entrance; within, it deepens to 8 fathoms in places.

Linton rock, in the middle of Northwest arm, westward $1\frac{1}{4}$ miles from Wolf island, is 3 feet high.

Middle arm.—The entrance to this arm extends southward for 1 mile with a width of 400 yards; the arm then opens out to a bay 3 miles long and $1\frac{1}{4}$ miles wide; the depth gradually decreases from 20 fathoms at the inner part of the entrance to the head.

A rock, just covered at high water, lies 600 yards from the northern shore and $1\frac{3}{4}$ miles within the bay.

Northeast arm is a continuation of the Cowpath eastward of Middle arm; it is shoal for 300 yards from either shore; there is anchorage in less than 10 fathoms water, at $\frac{3}{4}$ mile within the entrance, and the depth decreases rather quickly to the shoal entrance of an extensive arm, which is only navigable for boats at high water.

Saint rock, the outer shoal off the entrance to Willis reach, lies with the summit of Great Black island, which is 234 feet high, bearing 256° , distant $2\frac{8}{10}$ miles; and has 12 feet water over it.

Saturday ledge, lying westward, distant $\frac{3}{4}$ mile from Saint rock, has 4 fathoms of water over its shoalest part.

Flat islands, between Great Black island and Willis island, extend over an area $2\frac{1}{2}$ miles long, northwestward and southeastward, and $\frac{1}{2}$ mile wide; they are 80 to 140 feet high, and have a generally flat appearance. A few fishermen live on them, and their huts are on the middle islands of the group.

Bessy island, 284 feet high, appearing as a large rounded woody hill, is the largest of a group of islands lying eastward of the southeastern part of Willis island. There are no convenient anchorages among the Flat islands or in this group, and the channels among them should not be attempted without a pilot.

Shoals extend southeastward 2 miles from Great Black island and southeastward 1 mile from Flat islands; Ship rock, bearing 45° , distant $\frac{3}{4}$ mile from the northeastern end of Ship island, has 4 feet of water over it. Bakers Loaf island, open southward of Ship island, bearing 231° , leads southeastward of the shoals and rock.

Morris island, southward 1 mile from the western part of Willis island, is 279 feet high, and the western and largest of a group which extends eastward 3 miles from it and terminates seaward in Ship island, a conspicuous conical hill 257 feet high.

Cow head, southward $2\frac{3}{4}$ miles from Ship island, is a steep bold cliff 479 feet high; Gerrards hill, nearly a mile southward of it, is 629 feet high and the summit of the head separating the entrances to the northern and southern arms of Bonavista bay.

Sailors harbor, southwestward of Cow head, is formed by several islands which extend westward from Cow head on the north and by the land about Gerrards hill on the south. It is 1 mile long northeastward and southwestward, $\frac{1}{4}$ mile wide, and affords anchorage in 7 to 10 fathoms of water, rocky bottom.

The entrance is about 200 yards wide and barely 200 yards northward of the mainland; in the middle of the passage between the mainland and Seal rock is a 10-foot patch, from which Seal rock is in line with the western end of Sailors island, bearing 8° . The northern fall of West Shag island, in line with a conspicuous house, bearing 60° , leads through the entrance and southward of the 10-foot patch, in $3\frac{1}{2}$ fathoms of water; it also leads northward of a shoal with 6 feet of water over it, which lies off the first point on the southern side within the entrance.

Salvage bay extends southwestward 4 miles from its entrance between Sailors island and Bakers Loaf island, situated $1\frac{1}{4}$ miles to the westward; there is a depth of 22 fathoms in the entrance, whence it gradually shoals to the head, where there is fair summer anchorage in 5 fathoms of water, sand bottom.

Bakers Loaf island is 234 feet high and clifty. Bakers Loaf rocks extend south-southeastward 900 yards from the island; the outer patch has 9 feet of water over it. West Shag island, open northeastward of Cow head, bearing 97° , leads northward; and the break in the sand cliff at the bottom of Salvage bay, open south-eastward of Baldric head, bearing 228° , leads southeastward of them.

Damnabale bay extends westward about 2 miles from westward of Bakers Loaf island; the outer part is deep, but among the islets at the head the depth is moderate: there is no convenient harbor.

Morris channel stretches northwestward $5\frac{1}{2}$ miles to the Cowpath from between Bakers Loaf and Morris islands. Brown Store island, 68 feet high, bears 311° , distant 1,600 yards, and Athwart island, 83 feet high, bearing 340° , distant $1\frac{4}{5}$ miles from the northern point of Bakers Loaf island.

A rock, with 7 feet of water over it, bears 183° , distant 400 yards from the Coffee Pot, an islet southward of the western point of Morris island, and a rock with 9 feet of water over it, bears 194° , distant 800 yards from the same islet. Shag islands, open southward of Athwart island, bearing 101° , leads southward of these rocks.

Bruce Cove rock, with 5 feet of water over it, bears 70° , distant $\frac{3}{4}$ mile from Bruce Cove Gull island: it has deep water around it, but the channel northeastward of it is the wider; so approach Tinker island closely in passing.

Fair and False bay is on the southwestern side of Morris channel, and, with the arms northwestward of it, extends 4 miles from the line of the shore. Squid island, $1\frac{1}{2}$ miles southwestward of Morris island, forms the eastern entrance point; from it the shore, like the island, low, broken, and rocky, trends southwestward 2 miles into the bay; the depth of water in the bay is 10 to 22 fathoms. The northwestern side is formed by several islands extending as far as Bloody point; the channels among them are narrow and generally clear of shoals. Middle reach, the southeastern, stretches southwestward 1 mile, with a breadth of 200 yards, and then opens out to a basin $\frac{1}{2}$ mile across, with a depth of 13 fathoms, mud bottom; three shoal arms branch southward and westward from it.

Middle reach is separated by a rocky channel from Long reach, which latter extends northwestward to the eastward of Bloody point; Long reach is 200 yards wide, and in mid-channel is clear of shoals.

Pretty island, west-northwestward $1\frac{1}{4}$ miles from Squid island, shelters Bloomer harbor, the outer part of which is 600 yards wide, with a depth of 13 fathoms of water, mud bottom: the inner part has an entrance 300 yards wide, and it widens within to over 400 yards, with a depth of 8 fathoms, mud bottom.

Varket channel, between Willis and Flat islands on the north and Morris and the islands extending to Ship island on the south, runs westward for 5 miles to where it joins Willis reach on the north and Morris channel on the south.

Varket island is small and rises in two conical hills to the height of 70 feet; a sunken rock lies 50 yards off its southwestern point. A rock which dries 1 foot, lies 400 yards off the northeastern point of Morris island; and a rock, awash at high water, bears 262°, distant 1,600 yards from Varket island. Northward of this rock is a shoal with 3 fathoms of water over it.

Willis reach, northwestward of Willis island, extends west-southwestward 6 miles from its entrance between Great Black and Gulch islands; there are no shoals in the fairway through the reach, and the depth is 100 fathoms at the eastern end, shoaling to 8 and 10 fathoms at the western, where it branches into several channels leading into Cowpath, Morris, and Varket channels; these branching channels are shoal, and should not be attempted without a pilot.

Shag islands extend northeastward, nearly a mile from their southwestern end, which lies eastward, distant 1,700 yards from North point of Cow head; they are four in number and are 145 to 196 feet high.

Bishops harbor, immediately southeastward of Cow head and southwestward of Shag islands, is 400 yards across, with a depth of 5 fathoms, rocky bottom. The entrance is between rocks which extend from both sides of the mouth of the harbor, through a passage 50 yards wide and 18 feet deep. This passage is safe in ordinary weather, but only with local knowledge; with a heavy sea it must not be attempted. There is a fishing population around the harbor.

Broomclose harbor is an inlet extending west-southwestward $1\frac{1}{2}$ miles, with a width of 400 yards; its entrance lies between Southern and Broomclose heads, and a reef with 12 feet of water over it, on which the sea breaks heavily, extends eastward for 600 yards from the northern inner entrance head, and narrows the channel to 250 yards.

Little Denier island, the western end of which lies eastward, distant 1,400 yards from Broomclose head, is $\frac{1}{2}$ mile long, east-northeastward and west-southwestward, 300 yards wide, and 278 feet high: a line of rocks and shoal water extends off both ends of the island.

Light. -A circular lighthouse, painted red and white in vertical stripes, and 24 feet high, on the summit of Little Denier island, exhibits at 298 feet above high water a revolving white light every thirty seconds, which should be seen from a distance of 19 miles in clear weather. The light is obscured by a chimney when bearing 283°, from a distance of $1\frac{1}{2}$ miles.

Offer rock, bearing 51° , distant 1,600 yards from the northeastern point of Little Denier island, is awash, and always breaks. Tilley's hill, open southward of Little Denier island, bearing 244° , leads southward; Hammer head, open northwestward of Little Denier island, bearing 222° , leads northwestward; and the cliff at North point of Cow head over the southwestern end of West Shag island, bearing 273° , leads northward of it.

Middle rock, with 9 feet of water over it, and Inner rock, with 5 feet of water over it, lie between Offer rock and Little Denier island.

Barrow harbor is southwestward of Little Denier island. Richards island, a large flat mound, 289 feet high, steep to the eastward, lies on the southern side of the entrance. Keats island, the eastern end of which, known as Hammer head, is 259 feet high, forms the southern side of the harbor.

From Pulpit head, the northeastern point of Richards island, a reef extends northeastward $\frac{3}{4}$ mile: Outer Brandy rock, at its outer end, has 5 feet of water over it. The eastern end of Shag islands in line with the western end of Little Denier island, bearing 343° , leads eastward of it. As no mark can be given to lead between Outer Brandy rock and the shoal water off Little Denier island, this channel into Barrow harbor should not be taken without local knowledge.

The depth of water is great and the shelter indifferent in Barrow harbor, so it can not be recommended.

Tides.—It is high water, full and change, in Barrow harbor at 6h. 13m.; springs rise $4\frac{1}{2}$ feet, neaps $2\frac{1}{2}$ feet.

Ice.—Bishops, Barrow, and Sailors harbors freeze over in the middle of January, and the ice generally breaks up in April.

Newman sound lies between the highland stretching west-southwestward from Hammer head, on the north, and Long islands and the land stretching westward to mount Stamford, on the south; near the middle is Swale island, $4\frac{1}{2}$ miles long, east-northeastward and west-southwestward, and about a mile wide at its broadest part.

Halfway islet, 300 yards from the northern shore of Newman sound and 4 miles west-southwestward of Richards island, is 18 feet high; the shore between them is cliffy and steep-to.

Sandy cove, westward, 1 mile from Halfway islet, is an open bay $\frac{1}{2}$ mile wide, with a depth of 5 to 10 fathoms, sand bottom.

Holbrook head, west-northwestward, $2\frac{3}{4}$ miles from Halfway islet, is a salient point.

Happy Adventure bays, between Sandy cove and Holbrook head, are small and so narrow as to be available for boats only.

North Broad cove lies westward $1\frac{1}{2}$ miles from Holbrook head: there is a rock, that dries 1 foot at low water spring tides, at nearly 200 yards from its northeastern head, and also a rock, with 9 feet of

water over it, in the middle of the cove; the depth of water in the cove is from 29 to 13 fathoms, the latter being close to its head; on account of its great depth the cove is not recommended as an anchorage.

The northern shore of Newman sound from North Broad cove trends south-southwestward 1 mile to Shag islet, which is 10 feet high; Hall rock, southwestward 1 mile from Shag islet and nearly 400 yards offshore, covers at half tide.

Cold East rock, bearing 329° , distant $\frac{1}{4}$ mile from the western point of Swale island, dries 1 foot; the northeastern end of Swale island open northward of its northern part, bearing 70° , leads north-westward of it.

There are several islands westward of Swale island and at the western end of Swale tickle; the channel between Swale island and the islet westward of it is 100 yards wide, with a depth of $4\frac{1}{2}$ fathoms of water in it. White islets lie south-southeastward $\frac{1}{2}$ mile from the western end of Swale island.

South Broad cove, on the southern side of Newman sound and westward of Swale tickle, extends southward 1 mile, with a width of 400 yards; the depth in it decreases gradually from 20 to 3 fathoms, mud bottom; it is a good anchorage.

A rock, that covers 2 feet, lies 100 yards offshore at $\frac{1}{4}$ mile within the eastern head.

Minchin head, westward $\frac{3}{4}$ mile from South Broad cove, is a conical hill, 148 feet high; mount Stamford, at $1\frac{1}{2}$ miles farther in the same direction, rises steeply to a height of 658 feet; and Park Harbor hill and Oehre Pit hill lie between Newman and Clode sounds; these hills are conspicuous from seaward. The channel northward of mount Stamford and between it and Buckley point is 400 yards wide; westward of it the sound continues southwestward, with a breadth of $\frac{3}{4}$ mile, for $2\frac{1}{2}$ miles, where it receives the water of a considerable stream; the depth in this inner part of the sound is 20 to 29 fathoms for 2 miles, when it quickly shoals.

Buckley cove, westward of Buckley point, extends northward nearly $\frac{1}{2}$ mile and affords anchorage in 4 fathoms of water.

Caution is necessary in the southern part of Newman sound, as the water shoals rapidly within a depth of 15 fathoms.

Long islands, consisting of four islands, extend west-southwestward and east-northeastward for 5 miles.

Puttick rock, bearing 359° , distant 700 yards from the northern point of the easternmost of the Long islands, has 4 fathoms of water over it.

Chappel tickle, the channel between the two eastern Long islands, is rocky and only available for small vessels.

Middle tickle, between the two middle islands of the group, is short and narrow, but clear of shoals, except close to the shore on the eastern side; a patch, with 9 feet of water over it, lies southeastward, distant 400 yards on the same side.

Long tickle, the channel between the two western Long islands, is narrow and rocky.

Hurloc head, westward of Long islands and separated from them by a short, clear, and deep channel $\frac{1}{2}$ mile wide, is a steep bluff 230 feet high.

Copper island, north-northeastward 1,200 yards from Hurloc head, is 120 feet high and steep all around.

Western head, east-northeastward $5\frac{3}{4}$ miles from the eastern point of the easternmost of the Long islands, is the northern end of a bold barren promontory, about $\frac{1}{4}$ mile in width, steep-to on both sides and 443 feet high.

Rocks, having depths of 7 to 10 fathoms of water over them, lie around Western head at the distance of about 2 miles and cause a confused sea in heavy weather; at times the sea breaks on them.

Bacon Bone rock, bearing 245° , distant $1\frac{1}{4}$ miles from Western head and $\frac{3}{4}$ mile offshore, has 4 feet of water over it; and there is a patch, with 3 fathoms of water over it, at 300 yards north-northwestward of the rock.

Southern head, open northward of Western head, bearing 101° , leads northward; Deer island shut in with Long islands, bearing 239° , leads northwestward; and Arrow point, open westward of Red Cliff island, bearing 176° , leads westward of Bacon Bone rock and patch.

The shore of Bonavista bay from Western head trends south-southwestward for $3\frac{1}{4}$ miles to Arch Cliff point; it is steep and bold until off Tickle cove, eastward of Arch Cliff point, when it becomes low and rugged, with rocks extending 400 yards. Tickle cove is a fishing village without any harbor, and rocks extend 400 yards off Arch Cliff point.

Western rock, bearing 228° , distant nearly 800 yards from Arch Cliff point, is small, pointed, and 2 feet high.

The shore from Arch Cliff point trends southward for $3\frac{3}{4}$ miles to Plate cove; between is Open hole, a shallow bay with a considerable fishing village on its shores, but affording no anchorage.

Red Cliff island, southward 1 mile from Arch Cliff point and 300 yards offshore, is 50 feet high, and conspicuous from its red and yellow rocks.

Ice.—The sea about Open hole and Red Cliff island freezes about the middle of February and the ice clears during April, early or late in the month according to the season; northern ice generally arrives about the middle of February and leaves about the middle of April.

Plate cove extends southward nearly a mile with a width of $\frac{1}{2}$ mile. It affords good anchorage in 5 to 10 fathoms of water in the northeastern corner and fair anchorage in the southern corner. There is a considerable fishing village on its shores, and supplies can be obtained in small quantities. The watering place, situated in the northeastern corner, is good, and easily approached by boats.

Cutler head, west-northwestward, $3\frac{1}{2}$ miles from Plate Cove head, is a conical hill 397 feet high. The entrance to Southward bay, which stretches southward $9\frac{1}{2}$ miles, lies between these heads.

Indian arm, on the eastern side of Southward bay at 3 miles southward of Plate cove, has a small fishing village around its shores, but no convenient anchorage.

Seal cove, on the southeastern side of Southward bay at $3\frac{1}{2}$ miles south-southwestward of Indian head, is small and affords anchorage in 4 fathoms of water. The western side of the cove is rocky. There are few fishermen's houses on its shores.

Southward Bay head, on the western side of Southward bay at $2\frac{1}{2}$ miles southwestward from Plate Cove head, is a steep bluff 328 feet high. Kate harbor, westward of the head, has a rock in its entrance and no anchorage.

Cutler harbor is southward of Cutler head: its entrance is rocky and narrow, and should not be attempted without a pilot: Chance islet, open northeastward of Cutler head, bearing 307° , leads northeastward of the rocks off this harbor.

Chance islet, bearing 306° , distant $1\frac{1}{2}$ miles from Cutler head, is 35 feet high. Chance Harbor ledge, bearing 67° , distant $\frac{3}{4}$ mile from Chance islet, has 5 feet water over it.

Sweet bay extends southwestward 8 miles from Cutler head, and at $3\frac{1}{2}$ miles within the entrance it divides into northwest and southwest arms. There is anchorage at the heads of these arms in 10 to 16 fathoms of water. The land between the arms is rugged, Nut hill, the highest point, being 600 feet high, and conspicuous from seaward. Hunt, Gooseberry, and Hay islands, the latter small and 46 feet high, and all of them steep-to, continue this dividing land to the northeastward. Rocks extend 200 yards off the eastern shore of the bay abreast Hay island, and a rock, which covers 3 feet, lies 300 yards off the northwestern shore of the bay abreast the same island.

Gull island, 1 mile within Cutler head and 800 yards from the shore, is 46 feet high: Turfpook island, close southeastward of it, is conical and 165 feet high: sunken rocks extend southward about $\frac{1}{2}$ mile from Turfpook island.

Great Chance harbor, on the western side of Sweet bay, west-southwestward from Cutler head, stretches southwestward for 3 miles, and is 300 yards wide, with depths of 10 to 16 fathoms, mud bottom; the northwestern shore is steep. The southern side of the entrance

is formed by Woody and Mustard Gull islands, the latter being the eastern.

Brines rock, bearing 56° , distant about 600 yards from Mustard Gull island, has 2 feet over it at high water; Woody island open northward of Mustard Gull island, bearing 233° , leads northwestward; Chance islet well open, bearing 11° , or well shut in with Chance head, bearing 28° , leads eastward or northwestward of the rock, after passing which there are no shoals in Great Chance harbor.

Little Chance harbor, on the western side of Sweet bay, southward of Great Chance harbor, extends southwestward 1 mile with a breadth of 200 yards to the head which widens to nearly 400 yards with depths of 10 to 12 fathoms.

Clode sound.—Chandler reach, the entrance to Clode sound, commences between Long islands and Chance islet, and extends southwestward 10 miles to Connecting point, which divides it into Clode sound, extending west-southwestward, and Goose bay, extending south-southwestward.

The Narrows are situated west-southwestward nearly 11 miles from Connecting point; here shoal water and two islets, 12 and 8 feet high, stretch out from the southern shore, leaving a clear passage $\frac{1}{4}$ mile wide, with 8 fathoms water, along the northern shore.

After passing the Narrows the depth in the middle of the sound is too great for anchorage; the southeastern shore is steep-to; the northwestern shore is broken and rocky, with shoals extending fully $\frac{1}{4}$ mile off it.

Port Blandford.—There is good anchorage near the head of the sound in 3 to 15 fathoms of water, a convenient position being near the western shore, off the southern point of Northwest arm, which is at the western end of the sound and is very shoal. There is a settlement at port Blandford, and the land surrounding it is being rapidly brought under cultivation; the sea bathing is particularly good. The streams in the vicinity are well stocked with salmon and trout, and there are some fine mussel and clam beds.

Tides.—It is high water, full and change, in Clode sound at 7h. 37m.; springs rise $4\frac{3}{4}$ feet, neaps $2\frac{1}{2}$ feet.

Ice.—The deep arms and bays between Salvage bay and Clode sound generally freeze in the middle of December and the ice breaks up about April 15.

Communication.—There is communication by rail from Clode Sound station with St. Johns, distant $154\frac{1}{2}$ miles. See also page 41.

Lions den, on the northwestern side of Chandler reach, stretching westward 4 miles from Hurloc head, is very rocky and entirely unfit for anchorage.

Minchin island, $\frac{1}{4}$ mile off the northern shore of Chandler reach bearing 28° , distant $1\frac{6}{10}$ miles from Connecting point, is rocky all

around, flat topped, 83 feet high, and conspicuous. Ashley Baker island lies westward $\frac{3}{4}$ mile from Minchin island; the shore between them is broken and rocky; there is temporary anchorage, in 8 fathoms water, between these islands in fine weather, but the bottom is rocky and uneven.

Dumpling and Bread coves, at about 3 and 4 miles westward of Ashley Baker island, are both rocky, and afford anchorage, in 4 fathoms water, between the lines of their outer points, on a bottom strewn with bowlders.

Bryans Hole point is on the northwestern shore of Clode sound at 4 miles southwestward of Bread cove, and there is anchorage on either side of it.

Love cove, on the southern side of the sound at $1\frac{1}{2}$ miles eastward of the Narrows, affords anchorage in 8 fathoms water, and Bunyan cove, eastward 1 mile, has anchorage in $3\frac{1}{2}$ fathoms.

The southeastern shores of Clode sound and Chandler reach from Bunyan cove to Pudding cove, a distance of 15 miles, are steep-to and afford no anchorage.

Pudding cove is 200 yards wide, with a depth of 4 fathoms of water, mud bottom, and is a good watering place. There is an islet off its eastern entrance point.

Deer island, on the southern side of Chandler reach, at 1 mile westward of Chance islet, is 310 feet high; between it and the shore is a narrow channel with 6 fathoms water.

Goose bay is free from shoals, except close to the shore and within the line of the points of its bays, which are all shallow and rocky. There is good anchorage in 14 fathoms water at $\frac{3}{4}$ mile from Goose head, a bluff on the eastern side of the bay, and in less water from this to the head, a distance of 2 miles.

Tides.—It is high water, full and change, in Goose bay at 7h. 22m.; springs rise $4\frac{1}{2}$ feet, neaps $2\frac{1}{2}$ feet.

The shore of Bonavista bay from Western head to Southern head, lying $3\frac{1}{2}$ miles eastward, is much indented; rocky ground extends $\frac{3}{4}$ mile off it, and the eastern hill of Swale island should be kept open northward of Western head, bearing 266° .

Deep cove, eastward of Western head, is open and stretches southward for 1 mile; the eastern shore is foul.

Castle and Keels coves, about a mile eastward of Deep cove, are encumbered with rocks, and afford only a summer resort for fishing vessels. Keels is a considerable fishing village.

Communication.—The steamer from port Blandford calls at Keels cove weekly during summer and autumn.

Cary rock, bearing 26° , distant $\frac{3}{4}$ mile from Keels eastern head, and the outer shoal in the vicinity, has 12 feet water over it.

Backside cove, on the eastern side of Keels eastern headland, affords no shelter.

Ice.—Keels cove fills in with northern ice and freezes while the ice remains on the coast.

Southern head is a steep cliff rising to a hill 532 feet high.

Black Head bay.—Black head lies $7\frac{1}{4}$ miles eastward of Southern head, and Black Head bay extends southward $5\frac{1}{2}$ miles from between them; it is clear of shoals; some open coves in it have a few scattered inhabitants, but afford no shelter for ships.

Ice.—Black Head bay fills in with northern ice and clears when the ice leaves the coast.

Broad cove is immediately southward of Southern head; there is a village on its shores.

Broad head is a bluff, 317 feet high, with a front $\frac{3}{4}$ mile long, northwestward and southeastward, separating Broad cove from Kings cove.

Kings cove is small, 700 yards long, northeastward and southwestward, shoaling gradually from a depth of 20 fathoms at the entrance, which is 300 yards wide, to the beach, 150 yards wide, at the head. It is open to the northeastward, but is said to be a safe anchorage for small vessels, which, as the water shoals suddenly, do not drag inshore, but at times drift to sea.

Light.—A white cylindrical lighthouse, 37 feet high, on Kings cove northern head, exhibits at 176 feet above high water, a white group-flashing white light showing two flashes every five seconds, which should be seen from a distance of 14 miles in clear weather. The light being unwatched must be considered unreliable.

There is a store and keeper's dwelling, painted white with a black roof, close to the lighthouse.

Tides.—It is high water, full and change, in Kings cove at 7h. 15m.; springs rise $3\frac{1}{4}$ feet, neaps $2\frac{1}{4}$ feet.

Communication.—The steamer from port Blandford calls at Kings cove weekly during summer and autumn.

The shore trends north-northeastward for 5 miles from Black head to Green island, and between are Bonavista, Bailey cove, and Red cove, three small bays.

Bonavista is the southern of these coves, and the only one affording anchorage, the others being encumbered by rocks and more open. In approaching Bonavista from the eastward do not close the shore nearer than to have the western end of Gull island just open westward of Green island, bearing 37° , until Squarey islet bears 149° ; then pass close to that islet, to clear a shoal with $3\frac{1}{2}$ fathoms water over it, which lies nearly 200 yards southwestward of the islet, and anchor in 6 fathoms water; this cove is only available for vessels during summer. Squarey islet, the western of a ridge of rocks forming the northern side of the bay, is 43 feet high.

Light.—A square pyramidal white tower, 22 feet high, surmounted by an octagonal drum and lantern, on Squarey islet, exhibits from April 1 to December 31, at 57 feet above high water, a fixed red light, which should be seen from a distance of 9 miles in clear weather. The light being unwatched must be considered unreliable.

Tides.—It is high water, full and change, in Bonavista cove at 7h. 25m.; springs rise $3\frac{1}{4}$ feet, neaps $2\frac{1}{4}$ feet.

Bonavista town is the largest in Bonavista bay, having in 1901 a population of 3,696; there is excellent land, a large quantity of which is under cultivation, around the cove.

Communication.—The steamer from port Blandford calls at Bonavista weekly during summer and autumn; there is also telegraphic communication.

Green island, 69 feet high, lies westward of cape Bonavista, and is separated from the land of the cape by a channel 300 yards wide, with 2 fathoms least water in its fairway, which passes eastward of a rock nearly in mid-channel.

Stone island, 40 feet high, lies about a mile westward from Green island. The channel between is 1 mile wide and clear.

Shoals northward of cape Bonavista.—See page 561.

CHAPTER IX.

NEWFOUNDLAND, EAST COAST—CAPE BONAVIDA TO CAPE RACE.

Cape Bonavista is so low that it can not be seen beyond a distance of about 14 miles in clear weather.

Light.—A square lighthouse, 36 feet high and painted red and white in vertical stripes, with the lantern in the middle of the roof, on cape Bonavista, exhibits, at 150 feet above high water, a revolving light, showing two white phases and one red phase, the phases attaining their greatest brilliancy every thirty seconds, which should be seen from a distance of 15 miles in clear weather.

The light is reported to have been seen at a much greater distance, and the white light is reported to be visible further than the red light.

Signals.—Cape Bonavista lighthouse is supplied with the international code signals.

Harrys ground, northward of cape Bonavista, is $2\frac{7}{10}$ miles in length south-southwestward and north-northeastward, and $1\frac{1}{2}$ miles in breadth. It consists of several rocky patches with 7 feet to 16 fathoms of water over them, and 20 to 30 fathoms between them: within $\frac{1}{2}$ mile of the northern, eastern, and western sides of the bank the depth is 50 to 60 fathoms.

Old Harry, the southern rock of Harrys ground, bearing 357° , distant 4 miles from Cape Bonavista lighthouse, has 7 feet of water over it. Young Harry, the northern rock, bearing 6° , $6\frac{1}{2}$ miles from the lighthouse, has a depth of 4 fathoms over it. Kelp rock, with 15 feet of water over it, and Middle rock, with 3 fathoms over it, lie between them. Eastern rock, a patch with 7 fathoms of water over it, lies 1,400 yards eastward of Middle rock. The sea breaks on Old and Young Harry and also on Kelp rock.

Cape Bonavista lighthouse bearing 205° leads eastward of these shoals: and the lighthouse bearing 169° leads westward. When proceeding northward of Young Harry keep the angle between Largent hill and the western end of Green ridge less than 7 degrees. In foggy weather, with the position known, close Gull island, as there are no

shoals in the immediate vicinity of cape Bonavista to affect a ship in a moderate sea.

Note.—Rocks, with less than 5 fathoms of water over them, break with a moderate sea, those with 5 to 10 fathoms break with a heavy sea, and those with 10 to 15 fathoms break after heavy gales from seaward.

Gull island, northward 1,200 yards from cape Bonavista, is 117 feet high. A rock with 12 feet of water over it, lies southward 200 yards from the island, and a rock with less than 6 feet over it lies southwestward 400 yards from the cape, but close to the shore.

Aspect of coast.—From the eastward, Burnt ridge, a table-land 500 feet high, situated 4 miles southward of cape Bonavista, is remarkable; it is nearly 100 feet higher than the land in its immediate vicinity, and 300 feet higher than the general height of the land northward and southward of it. As the cape is approached Largent hill, Norther head, and lastly the cape and Gull island become visible. From the northward, Green ridge, which is the northern part of Burnt ridge, will be made in clear weather, but otherwise cape Bonavista lighthouse will probably be first sighted.

Caution.—In heavy weather, or at night, do not approach cape Bonavista from the northward nor the land between that cape and Catalina harbor, nearer than 7 miles.

The coast from cape Bonavista to Spillers point, a distance of 2½ miles to the southward, is of cliff, indented with several small bays, affording no anchorage.

Cape Largent, 1 mile farther southeastward, is a shelving point, with its end cut off from the mainland by a deep rent, and at a short distance off it is a small rock just above water. Largent hill within the cape is 433 feet high and remarkable, being separated from Burnt ridge by a deep valley, and rising over 200 feet above the flat cliffs of the coast.

Bird Island cove, 1 mile southward of cape Largent, affords no shelter, but it is a good base for boats engaged in cod fishing. Temporary anchorage may be obtained in about 7 fathoms of water, sand bottom, at the head of the cove, but within 100 yards of the shore: it is stated that, on account of the backwash, a vessel may ride at this anchorage securely, even in easterly winds.

North Bird island, 124 feet high, and South Bird island, 130 feet high, lie off Bird Island cove.

Dollarman bank.—The coast from cape Bonavista southward is bordered by Dollarman bank, an irregular rocky bank, considered a good fishing ground, and from a depth of 20 fathoms at its northern end, situated 5½ miles eastward of Cape Bonavista lighthouse, to the Haypooks, situated 6 miles eastward of North head, are numerous rocks with depths of 6 to 10 fathoms, and deep water close

around them, on which the sea breaks after an easterly gale; in heavy weather pass eastward of the Haypooks, the outer shoal.

This coast between South Bird island and Catalina North head is fringed by rocks. The outer one of these, Flowers rock, has less than 6 feet of water over it, and lies nearly $\frac{3}{4}$ mile from the shore. Cape Bonavista lighthouse, well open northeastward of cape Largent, bearing 318° , leads northeastward, and Green Island lighthouse open southeastward of Catalina North head, bearing 217° , leads southeastward of these shoals.

Little Catalina, westward of Cuckold head, is a boat harbor.

Catalina harbor entrance, situated southwestward $2\frac{1}{2}$ miles from North head, and between Shepherd point on the north, and Burnt point on the south, is barely 700 yards wide, with Charlton rock, having 6 feet of water over it, lying nearly in midchannel; further in, the entrance is narrowed to about 200 yards by shoals, with $2\frac{1}{2}$ and 2 fathoms of water over them, lying southward and eastward respectively, nearly 300 yards from Goodland point; and by White rock, with a depth of 4 feet, and Lowe rock, with 2 fathoms of water over it, lying northeastward and northwestward, respectively, about 200 yards from the turning point into Southeast cove.

Green island, southeastward of Burnt point, is rugged and rocky. Shoal water extends 400 yards from the northern, nearly 800 yards from the southern, and 200 yards from the other sides of the island.

Light.—A white lighthouse, from the middle of which rises the lantern with its dome painted red and white in vertical stripes, 41 feet high, on Green island, exhibits at 92 feet above high water, a fixed white light which should be seen over an arc of 157° to seaward, between the bearings of 246° and 44° , from a distance of 11 miles in clear weather.

Fog signal.—A fog horn gives one blast every fifty-nine seconds, thus: blast, fourteen seconds; silent interval, forty-five seconds, during thick or foggy weather. The service of the fog-alarm is suspended from January 15 until the opening of navigation about the end of April.

Signals.—Green Island lighthouse is supplied with the International code signals.

Rocks.—From Green Island lighthouse, Murphy rock, with 8 fathoms of water over it, bears 55° , distant $2\frac{7}{10}$ miles; Soldiers rock, with 9 fathoms, bears 72° , distant $3\frac{1}{2}$ miles; Joes rock, with 8 fathoms, bears 82° , distant $3\frac{1}{10}$ miles; and Feather shoal, with 6 fathoms, bears 103° , distant 4 miles. The sea breaks on these rocks in heavy weather.

Poor shoal, 1 mile long, northeastward and southwestward, within the contour line of 5 fathoms, and on which the sea breaks heavily in

easterly gales, is situated northeastward, between 1 and 2 miles from Green Island lighthouse, and has 22 feet least water over it.

Brandies shoal, which generally breaks, has three heads with 4 feet least water: it is 1,300 yards long, northward and southward, and about $\frac{1}{4}$ mile wide. The channel between the southern end of the shoal and Green island is 350 yards wide.

Anchorage.—Northeast arm of Catalina harbor affords anchorage for vessels drawing up to 9 feet of water, in a basin 400 yards across with a depth of 2 fathoms of water, mud bottom.

Southwest arm is $\frac{3}{4}$ mile long and $\frac{1}{4}$ mile wide at the entrance, narrowing gradually to the head, from which shoal water extends 600 yards: it affords anchorage in 4 fathoms of water, mud bottom.

Large vessels anchor off the mouth of this arm in 5 fathoms of water, mud bottom, with the eastern entrance point of Northeast arm open northward of Manuel islet, and bearing 3° to clear Lowe rock. A swell sets into the harbor and up Southwest arm after heavy gales, but it is not sufficient to endanger vessels.

Pilots.—The fishermen are trustworthy pilots, and are nearly always to be found near the harbor in daytime.

Directions.—As shoals extend eastward $8\frac{1}{2}$ miles from Catalina harbor, and most of them break after heavy easterly gales, approach to the harbor is then difficult. To enter Catalina harbor between the southern end of Brandies shoal and Green island, after clearing the outer shoals, steer in with Burnt point in line with the Episcopal church on the western shore of Northeast arm, bearing 290° , until Green Island lighthouse bears 239° ; then steer about 307° , until Burnt point bears about 262° ; then round the point at the distance of about 200 yards to pass southward of Charlton rock, and bring the Wesleyan chapel (situated on the slope of the hill which rises over Courage point) a little more than its own breadth open southward of the house on the rising ground behind it, bearing 264° , which mark leads in mid-channel between Lowe rock and the rock lying southward of Goodland point.

To enter the harbor northward of Brandies shoal, bring a square white house situated about 300 yards southwestward of the Roman Catholic church, a low white building with a red roof on the north-western shore of Southwest arm (which, however, is not readily distinguished, as it is almost hidden by houses), in line with Goodland point, bearing about 238° . Keep this mark on until South head is shut in with Green Island lighthouse, bearing 186° , then steer toward Burnt point, and when about 200 yards from it, proceed as directed in entering southward of the Brandies.

Ice.—Northeast arm of Catalina harbor freezes over about January 1, and thence to the middle of April it is generally completely closed: southerly to southwesterly winds often break the ice up.

Northern ice is irregular in its arrival, seldom appearing until January 15, and often not before February 10; it generally leaves between April 10 and 20, but it has remained up to June 10.

Tides.—It is high water, full and change, in Catalina harbor at 7h. 0m.; springs rise 6 feet, neaps 4 feet.

Communication.—The steamer from Clarenville calls at Catalina weekly, and the Labrador steamer calls fortnightly during summer and autumn. There is telegraphic communication.

Coal.—About 20 tons of coal might be obtained.

Ragged harbor, a boat cove situated nearly 2 miles southward of Green island, is sheltered by Ragged islands, a group of rugged rocks 40 feet high, from which sunken rocks extend in all directions. Morris rock, the northeasternmost of these and situated south-southeastward, distant nearly 1 mile from Green Island lighthouse, has 22 feet least water over it. Burnt point, open northeastward of Green island, bearing 315° , leads northeastward; and Dough-fig point, well open southeastward of South head, bearing 217° , leads southeastward of this shoal.

South head, a wedge-shaped point 130 feet high, is steep-to on its eastern side.

Low point, southwestward 4 miles from South head, is rugged and shelving; there are detached rocks and a rock with 6 feet of water over it at 200 yards off the point.

The coast between South head and Low point is a series of low bluffs, facing table-lands, backed by a long range of hills about 600 feet high, the southwestern termination of which, named Norther point, is a steep conspicuous bluff 580 feet high.

Horse Chops, southwestward, distant $5\frac{1}{4}$ miles from Low point, is an overhanging cliff, sloping from a saddle-shaped hill 265 feet high: Flat rock, a detached islet, 6 feet high, lies close off it.

The coast between South head and Horse Chops is foul, and should not be approached nearer than $\frac{1}{2}$ mile. Green Island lighthouse open eastward of South head, bearing 8° , leads eastward, and Bonaventure head open southwestward of Horse Chops, bearing 240° , leads southeastward of all the shoals.

Trinity bay trends south-southwestward for 50 miles from its entrance, which is 15 miles wide between Horse Chops on the north and Grates point on the south. It contains many good anchorages on both sides.

Caution.—After easterly winds a strong current runs up Trinity bay along the northwestern shore, and the fog hangs more over this than the opposite side of the bay.

Ice.—Trinity bay never freezes over, but field ice has been met with in December and has continued off the mouth of the bay until May. Icebergs come up the bay as early as the last week in May, and

some remain until the last week in August, but these latter icebergs are generally grounded; otherwise, with favorable winds, the bay would be clear by the end of June.

The shore of Trinity bay from Horse Chops trends west-north-westward for 3 miles to English head, northward of which is English bay.

Salmon cove, northwestward of English head, is separated from Robinhood bay by a peninsula terminating southward in Fox head and which is connected to the mainland to the northward by a narrow sandy neck. The cove is considered a good fishing place, and its shores are bold. There is a church on the eastern side of the cove.

Fox rock, southward 300 yards from Fox head, has 15 feet of water over it.

Robinhood bay.—Skerwink head lies west-southwestward, 1 mile from Fox head, and Robinhood bay extends northward $1\frac{3}{4}$ miles from between them, narrowing toward its head. Vessels frequently anchor in the bay in 7 to 17 fathoms of water for fishing purposes.

Skerwink rocks, about 200 yards southeastward of the eastern point of Skerwink head, are 40 feet high.

Trinity harbor, the entrance of which is between Skerwink head and a narrow peninsula extending northward $\frac{1}{2}$ mile from Salvage head and terminating in Fort point, is considered one of the best and largest in Newfoundland; it is surrounded by hills 200 to 380 feet in height. A rocky, irregular peninsula, rising in Rider hill to the height of 380 feet, extends from the western side of the harbor, dividing it into Northwest and Southwest arms, in each of which are several small bays and coves.

Light.—A white lighthouse, 43 feet high, situated southward 150 yards from Fort point, exhibits at 75 feet above high water an intermittent white light every $7\frac{1}{2}$ seconds, showing thus: Light $6\frac{1}{4}$ seconds, eclipse $1\frac{1}{4}$ seconds, which should be seen from a distance of 10 miles in clear weather.

Shoals.—At a quarter of a mile within Skerwink head, Herring rocks extend 100 yards offshore. Admiral island, northward 100 yards from Fort point, is 20 feet high, and Mussel rock, bearing 318° , 200 yards from this island, has 8 feet water over it; a shoal extends northwestward about 300 yards from the shore westward of the lighthouse.

Directions.—When entering the harbor keep in mid-channel, the least width of the channel being about 400 yards. Give Mussel rock, the discolored water over which may be seen, a good berth, and anchor where convenient.

Tides.—It is high water, full and change, in Trinity harbor, at 7h. 10m.; springs rise 4 feet, neaps 2 feet.

Ice.—Trinity harbor freezes over about January 31, and is closed at intervals by ice, about $1\frac{1}{2}$ feet in thickness, from that date to about April 29; field ice appears about April 19 and leaves about April 29. The earliest date of a vessel arriving is March 5, and latest of leaving January 21. A southerly wind clears the harbor sufficiently for vessels to enter in twenty-four hours. Between Horse Chops and Skerwink head there is often a straight edge of ice, and, if easterly winds prevail, the ice in the bight outside of Trinity harbor is held in for some time, but northwesterly or westerly winds clear it out.

The town of Trinity is on the lower part of the peninsula separating Northwest and Southwest arms, facing eastward; it has about 2,000 inhabitants, and there are several wharves along the shore.

Supplies can be procured here.

Communication.—The steamer from Clarenville calls at Trinity harbor weekly during the summer and autumn.

Bonaventure head, the northern entrance point to Smith sound, is a bold bluff 537 feet high; its southern side is bordered by several cliffy rocks. Ragged islands, on the southern side of the main entrance to Smith sound, are 115 feet high, and of a barren appearance; their eastern end bears 225° , distant $2\frac{1}{2}$ miles from the southern side of Bonaventure head.

Ragged rock lies with the eastern end of Ragged islands bearing 17° , distant $\frac{1}{2}$ mile, and dries 2 feet at low water. New Bonaventure church in line with the eastern end of Ragged islands, bearing 352° , leads eastward; and Wolf head in line with the western end of the islands, bearing 330° , leads westward of the rock.

Smith sound is 26 miles long from Bonaventure head to the bar at its head, which separates it from Northwest arm of Random sound, and it is from $\frac{1}{2}$ to $1\frac{1}{4}$ miles wide. In the lower reaches the depth of water is 50 to 80 fathoms, and the shores are so steep that no anchorage in it can be recommended except the small harbors near the entrance.

Ice.—Smith sound freezes in severe winters about February 10, and the ice breaks up from April 10 to 20.

Tides.—It is high water, full and change, in Smith sound at 7h. 8m.; springs rise $3\frac{1}{2}$ feet, neaps $2\frac{1}{4}$ feet.

Maiden point lies westward about 1 mile from the southern part of Bonaventure head; Maiden islet, about 200 yards eastward of the point, is small, flat-topped and inaccessible, with detached rocks extending southward 100 yards from it.

Old Bonaventure harbor extends north-northwestward about 1 mile from between Bonaventure head and Maiden islet to an anchorage for small vessels within two islets, the western of which is 20 feet high, and the eastern 10 feet, with a channel 100 yards wide on either side of them; the western channel has a depth of $\frac{1}{2}$ fathoms, the

middle 9 fathoms, and the eastern 6 fathoms. The anchorage is about 400 yards in extent, with 6 to 7 fathoms of water, mud bottom. Cat cove, northward of Maiden islet, is small, and affords no anchorage.

New Bonaventure harbor.—Between Maiden point and Wolf head, situated $1\frac{3}{4}$ miles to the westward, are New Bonaventure harbor, Broad cove, and Kerley harbor, all bights open southward. At the head of New Bonaventure and 300 yards from the shore, there is a shoal patch with 3 fathoms of water over it. The harbor is not at all times safe for shipping. New Bonaventure village is at the head of the bay on the eastern shore, and its church is in a commanding position and conspicuous.

Ice does not form so soon as, and breaks up earlier than, at Old Bonaventure.

Broad Cove rocks, on the western side of New Bonaventure, and in the entrance to Broad cove, dry 2 feet. New Bonaventure church bearing northward 25° , and well open of the point opposite the village, leads eastward of them.

Kerley harbor, an inlet extending northward $\frac{1}{2}$ mile, and 200 yards wide, with a depth of 23 fathoms at the entrance gradually shoaling to its head, affords good anchorage, but the space is confined.

The shore of Smith sound from Wolf head trends southwestward for $1\frac{1}{4}$ miles to British harbor point, a remarkable flat-topped cliff; midway along this stretch of coast there is a point which, from its artificial appearance, is named Battery point; inland from it are steep barren hills 600 to 700 feet high.

British harbor, between British Harbor point and West point, a small rocky promontory, steep-to, at $\frac{1}{2}$ mile to the southwestward, extends northward about 1 mile, and narrows to 200 yards with a depth of 7 fathoms at $\frac{3}{4}$ mile within the entrance: there is anchorage in a space about 300 yards across above these narrows in 10 to 12 fathoms of water, mud bottom. The head of the harbor forms into 3 little bays, on the shores of which are the houses of fishermen.

A rock, with 4 feet of water over it, lies outside the narrows and 100 yards from the eastern shore: to avoid it, keep the western shore aboard.

Communication.—The steamer from Clarendville calls at British harbor weekly during summer and autumn.

The coast from West point to Pope harbor, west-southwestward $1\frac{3}{10}$ miles, is broken and rocky; midway is Darby cove, where there are a few houses and fishing stages behind a small peninsula; and a rock, with 3 feet of water over it, lies 100 yards off a small cove at 600 yards eastward of Pope harbor.

Pope harbor.—At the entrance to Pope harbor there are two rocks above water, the western being 18 feet high: and there are other rocks uncovered, northeastward of them. The two western channels formed

by these rocks are about 200 yards in width, with deep water, but there is a rocky patch with $\frac{1}{2}$ fathoms of water over it bearing 211° , distant nearly 400 yards from the rock 18 feet high. Inside, the harbor is $\frac{1}{2}$ mile long, eastward and westward, and $\frac{1}{4}$ mile wide, with $\frac{1}{2}$ to 5 fathoms of water, mud bottom.

A sunken rock, with shoal water around it, lies 150 yards off the middle of the northern shore, and another sunken rock lies about the same distance off the northeastern shore. A large stream runs into the northern part of the harbor, draining a considerable tract of country, and good-sized spars are brought down by it.

Round harbor, on the western side of Pope harbor, is a snug basin 400 yards long, eastward and westward, 150 yards wide, and 3 fathoms deep; its entrance is narrow, with 2 fathoms water.

Indian lookout is a remarkable hill immediately over the southwestern shore of Pope harbor; its summit is a steep cliff 505 feet high.

Hickman islands, southward nearly $\frac{3}{4}$ mile from Pope harbor, comprise a group of islets and rocks extending about 1,400 yards parallel to the shore, the northeastern and highest being 98 feet high. The islets are separated from the northwestern shore by a channel 400 yards wide, carrying 20 to 29 fathoms of water, in which, at 100 yards from the mainland, are two rocks; one of these uncovers, the other has less than 6 feet water over it. Hickman harbor, a narrow inlet, fronted by islets, is 100 yards wide at the entrance, and 4 fathoms deep at 200 yards within, when it quickly narrows to 20 yards, and is choked with rocks.

Warwick harbor, southwestward $\frac{3}{4}$ mile from Hickman islands and on the western side of a small peninsula 45 feet high, has a narrow entrance, but within it is 500 yards long, eastward and westward, and 200 yards wide; much of this space is occupied by an islet with rocks in the channel on either side of it. A vessel drawing 6 feet water could be warped in.

Burn point lies southwestward $2\frac{1}{2}$ miles from Warwick harbor; the shore between, forming a slight bend, is steep-to and in some places is composed of cliffs. At $1\frac{1}{4}$ miles farther westward is a small bay with a stream running into it, and a rock, 8 feet high, lying close off its eastern point.

Irelands Eye island, the northeastern end of which bears 150° , distant 1 mile from British Harbor point, rises in several remarkable peaks; the highest, near the middle, is 440 feet high; the island is steep and rocky on all sides, and separated from the northeastern end of Random island by the Thoroughfare, a narrow channel.

Irelands Eye point, the northeastern end of the island, is a steep cliff, and at $1\frac{1}{4}$ miles southward of it is the entrance to Irelands Eye harbor; about midway is Jacobs cove, in which are several small

islets and rocks. Irelands Eye harbor is available for large boats, which lie alongside the fishing stages.

Ice.—Irelands Eye harbor freezes between January 1 and February 1, and the ice clears between March 10 and early in April.

Tray Town harbor is southwestward $\frac{1}{2}$ mile from Irelands Eye harbor, the coast between being rocky. This harbor trends north-northwestward for about 800 yards and then turns southward for an equal distance, with an average breadth of 150 yards; in the first reach the depth is 5 to 14 fathoms, in the second it shoals to 9 feet, eastward of an islet near the end of the reach, where it becomes narrow; southward of the islet the depth is 12 feet.

Gunner rock, southward about 400 yards from the entrance to Tray Town harbor, and 150 yards from the shore, is awash at low water. The harbor open, bearing about 323° , leads northeastward of the rock.

Round harbor, southwestward $\frac{1}{2}$ mile from Tray Town harbor, is a small basin with 9 feet of water, but, as its entrance is nearly dry at low water, it is of little value even to boats.

Black ledge bears 112° , distant 1,200 yards from the entrance to Round harbor; at 300 yards westward of it is a rock which dries 3 feet.

Communication.—The steamer from Clarenville calls at Irelands Eye weekly during summer and autumn.

Anthony Island lies about $\frac{1}{4}$ mile eastward of the entrance to Irelands Eye harbor, with a deep channel between. It is about 1,200 yards long, northward and southward, 900 yards wide, and 208 feet high.

Green island, south-southwestward, distant $5\frac{1}{4}$ miles from Bonaventure head, is 121 feet high, with a flat summit.

Duck island, southwestward $2\frac{7}{10}$ miles from Green island, is 139 feet high, slopes eastward, and is divided into two peaks by a valley running in the direction of its length.

Shag islets, extending north-northeastward 600 yards from the northern end of Duck island, are 30 feet high, and steep around.

The Thoroughfare, separating Irelands Eye island from Random island, is $1\frac{1}{2}$ miles in length, and at its southern entrance are several rocky islets: Thoroughfare rock, the eastern islet, is 11 feet high, and there is a channel, 100 yards wide, with 8 fathoms water, between it and the southwestern point of Irelands Eye island.

Indian islets lie within about $\frac{1}{3}$ mile westward from the northwestern part of Irelands Eye island; the outer and largest islet is 145 feet high.

Indian rock, lying with the northern end of the largest Indian islet bearing about 51° , distant 400 yards, dries 3 feet, and is the only rock in the Thoroughfare not always above water.

Directions.—From the southward, after passing Thoroughfare rock, bring it in line with the northern point of Duck island, bearing about 143° , which leads westward of Indian rock at the northern end of the channel. When Bonaventure head opens northward of Irelands Eye point, bearing 59° , which mark leads northward of the rock, proceed as convenient in Smith sound.

Random island separates Smith sound from Random sound: Ginpicker hill, its summit, situated 4 miles from the east and $1\frac{1}{2}$ miles from the north coast, is 843 feet high.

Haydon point, the northeastern end of the island, is bordered by rocks above water. Haydon island lies eastward 1,200 yards from the point: rocks extend southwestward $\frac{1}{4}$ mile, and there is a $4\frac{1}{2}$ fathoms patch bearing 53° , distant 250 yards from the island.

Long harbor, 1 mile southwestward of Haydon point, is a narrow inlet extending southward about $\frac{3}{4}$ mile, with depths decreasing from 8 to 2 fathoms of water at its head. An islet lies at the entrance, with deep water on either side: but a reef, which covers at high water, extends 100 yards from its southeastern point, narrowing the passage on that side.

Lower Lance cove, at $5\frac{1}{4}$ miles west-southwestward of Long harbor, is 600 yards wide, but it is open northeastward and the depth of water being 42 fathoms, there is no anchorage.

The coast between Lower Lance cove and Bluff point, about $2\frac{3}{4}$ miles northwestward, forms a bend to the southwestward, with several little coves separated by rocky points, where fishing stations have been established near small streams, the whole under the name of Britannia cove. As this locality is favorable for agriculture, a less migratory people than Newfoundland fishermen generally are have settled here.

Lance Cove rock, 400 yards off Upper Lance cove, bearing 281° , distant $1\frac{8}{10}$ miles from Lance Cove head, is small, with 6 feet of water over it, and 5 to 10 fathoms of water around.

Burgoyne cove, on the northern shore, northwestward of Tilton head, affords fair temporary anchorage in 12 fathoms of water at 300 yards from the shore: it is sheltered from the strong winds which generally blow up and down the reach.

Upper Rocky light, where there is a depth of 6 fathoms, rock bottom, at 600 yards from the beach, suddenly deepening to 30 fathoms, is situated west-northwestward, 4 miles from Burgoyne cove.

The coast of Random island from Bluff point to Snooks harbor, about $4\frac{1}{2}$ miles westward, is steep, in places clifty, with a few rocks 100 yards off. Snooks harbor is $\frac{1}{2}$ mile square within the line of the coast, and there is a depth of 12 fathoms of water, mud bottom, at $\frac{3}{4}$ mile from its head.

Smith point is on the northern shore of the sound, directly opposite Snooks harbor; there are a few houses at 1 mile eastward of the point, and 200 yards off them there are 4 fathoms of water, but it suddenly deepens to 10 and 20 fathoms.

The bar is the shallow channel connecting the head of Smith sound with the head of Northwest arm of Random sound, and toward which they both gradually shoal. At high water it is $\frac{1}{4}$ mile wide; at low water spits of sand and stone stretch off both shores, leaving a narrow channel 2 feet deep and $\frac{1}{2}$ mile long.

Bakers loaf, at the northeastern end of Random island, is a remarkable peak 546 feet high.

Northwest arm.—Westward of Connor islet, and separated about 100 yards from it, is Sullivan islet, 35 feet high, and between the latter and Silldown point, $\frac{1}{2}$ mile westward of it, is the entrance to Northwest arm. The western half of the entrance is obstructed by a bed of rocks, some of which are uncovered; the channel is between these rocks and Sullivan islet, and at the foot of Bakers loaf; and the anchorage, about $\frac{1}{4}$ mile square, is in 9 fathoms of water, mud bottom. Rider harbor is a small nook northward of Sullivan islet, with 2 fathoms of water.

A rock, with 6 feet of water over it, lies just off the southeastern end of Sullivan islet.

Little harbor.—The entrance to this small inlet is 400 yards wide, between the rocky islet southward of Silldown point and the opposite shore, which is bold, with a small rock above water off it. The inlet extends westward about $\frac{1}{2}$ mile and then turns southward for 400 yards, where it is narrow, with a depth of 4 fathoms.

The coast between Little harbor and East head, $1\frac{1}{2}$ miles south-southeastward, is composed of low cliffs; the hills over it are flat-topped, and the highest is 492 feet high. East head, which is a cliff 88 feet high, is the northeastern entrance point to Long cove and Deer harbor.

North Bird islet, 112 feet high, lies northward, 1 mile from East head and $\frac{1}{4}$ mile offshore; in the cove westward of the islet is a remarkable flat cliff, named Cold East Flake, from its supposed resemblance to a fish flake. South Bird islet, 121 feet high, lies northward, $\frac{1}{2}$ mile from East head and 300 yards offshore.

Long cove, westward 1 mile from East head, extends northward $\frac{3}{4}$ mile, with a width of about 200 yards, and shoals from 20 fathoms at the entrance to 2 fathoms at the head. At 400 yards eastward of Long cove a reef of rocks extends over 200 yards from the coast, and a little within the northwestern entrance point of the cove, and 100 yards from the western shore is a rock with 6 feet of water over it.

Deer harbor, 600 yards long, about 200 yards wide, with a depth of 5 to 9 fathoms of water, is about $\frac{1}{2}$ mile westward of Long cove; the

entrance is 100 yards wide, with a depth of 5 fathoms in it, between a small, low islet on the north and the rocks close off a point on the south.

Ice.—Deer harbor is frozen in February and the ice breaks up at the latter part of April.

Verge island, about 600 yards from the coast and nearly midway between East head and East Random head, is 204 feet high; rocky islets extend northward $\frac{1}{2}$ mile from its northwestern end and terminate in Black rock, small and 30 feet high; rocky islets also extend southward 600 yards from its southwestern end, Rat island, the largest, being 65 feet high. Copper islet, 130 feet high, lies 600 yards off the southeastern end of the island, with rocks between; and Verge rock, which dries, is situated 300 yards off the northeastern end of the island.

Deer rock, bearing 84° , distant nearly a mile from the northeastern end of Verge island, is small, has 4 feet of water over it, and is generally marked by a breaker, except at high water with a smooth sea.

Gun ledge, north-northeastward about $\frac{1}{2}$ mile from Deer rock, has 6 fathoms of water over it, with 21 fathoms between. Bonaventure head, midway between Duck and Green islands, bearing 26° , leads eastward; Bakers loaf in line with the western points of Bird islets, bearing 349° , leads westward of Deer rock and Gun ledge; and Gin-picker hill, in line with the northern entrance point to Deer harbor, 276° , leads northward of Gun ledge.

Random Head harbor, on the northern side of East Random head, is about $\frac{1}{2}$ mile square, with depths of 10 to 18 fathoms of water; the southern and western shores are much indented, and rocks extend 600 yards off them. The northern shore is bold, and here small vessels anchor in a bight, but with this exception the harbor is not recommended. Pigeon islet, on the northern side of the entrance, is flat and about 40 feet high; a reef extends southeastward 300 yards from it and terminates in Mouse rock, which is awash. The passage between Mouse rock and the southern shore is 600 yards wide.

Tides.—It is high water, full and change, in Random Head harbor at 7h. 8m.; springs rise $3\frac{1}{2}$ feet, neaps $2\frac{1}{4}$ feet.

East Random head, the southeastern point of Random island, is 512 feet high, and the termination of a range of hills which rises to the height of 808 feet; the eastern end of the head is composed of several quoin-shaped masses.

Light.—A circular lighthouse, 36 feet high and checkered red and white, on Motion island, close eastward of East Random head, exhibits, at 126 feet above high water, an intermittent white light every four seconds showing thus: Light, two seconds; eclipse, two seconds, which should be seen from a distance of 13 miles in clear weather. The

keeper's dwelling and a store, painted white with red roofs, stand close northward of the lighthouse.

Random sound.—The entrance to this sound is between East Random head and West Random head, which bear southwestward and northeastward, distant $3\frac{1}{2}$ miles from each other; at $5\frac{1}{2}$ miles within East Random head is Middle cliff, 357 feet high, where the sound divides into two branches.

Ice.—Random sound freezes, in severe winters, about February 10, and the ice breaks up between April 10 and 20.

Northwest arm.—At 3 miles westward of East Random head is a small islet 40 feet high, and 800 yards farther on another islet at the entrance to Salmon cove; these islets are separated from the shore by deep water.

Salmon Cove extends northward 800 yards, and at its head is a salmon fishing station.

Strong islands, on the northern shore of the arm at $2\frac{3}{4}$ miles within Salmon cove, are two principal islands, 123 feet and 146 feet high, respectively, with a few rocks above water. Running northward of these islands is Strong tickle, which is nearly $\frac{3}{4}$ mile long and 100 yards wide, with a depth of $\frac{1}{4}$ to 10 fathoms of water, except near its head, where there is $1\frac{1}{2}$ fathoms.

Quarry rock, bearing 217° , distant 400 yards from the southern point of the western Strong island, has 12 feet of water over it; the point just westward of Tolt point, open southward of Gooseberry islet, bearing 260° , leads southward of the rock.

Gooseberry islet, 66 feet high, lies nearly in mid-channel at $1\frac{1}{2}$ miles westward of the Strong islands, and from it the first reach of Northwest arm continues westward for $7\frac{1}{2}$ miles. The depth in mid-channel decreases from 90 to 60 fathoms, and the shore is steep-to and without anchoring ground.

The coast from Middle cliff, the eastern end of the promontory separating the two arms of Random sound, is steep cliff, and trends northwestward $1\frac{1}{4}$ miles to Passenger point, at 800 yards, beyond which is Holloway rock, close off a steep point. This point separates two coves, and $\frac{1}{2}$ mile westward of it is Pudding point, the rocky termination of a ridge of hills, which attains a height of 548 feet. At $\frac{3}{4}$ mile farther westward is Black Duck cove, $\frac{1}{4}$ mile deep, with 5 to 20 fathoms of water.

Hickman harbor, opposite Black Duck cove, is 600 yards wide at the entrance, and extends northward $\frac{3}{4}$ mile; on its northeastern shore is a bed of rocks with $1\frac{1}{2}$ to 6 feet of water over them, and elsewhere the depth is 8 to 18 fathoms, gravel and mud bottom. This harbor is 1 mile from the western Strong island, and on the coast between, at about 1,400 yards from the western Strong island, there are slate quarries.

Communication.—The steamer from Clarenville calls at Hickman harbor weekly during summer and autumn.

Maggotty cove.—At nearly $1\frac{3}{4}$ miles westward of Black Duck cove, on the southern shore, is the Tolt, a remarkable conical hill, 550 feet high. Maggotty cove, $3\frac{1}{2}$ miles westward of the Tolt, has 25 fathoms of water at 400 yards from the shore, and a large stream runs into it, at the mouth of which is a sawmill; the valley of this stream runs southeastward toward Hatchers cove in Southwest arm with low land right across.

Bald Nap and Forster rocks.—From South bight, at the western end of the arm, the sound is $2\frac{1}{2}$ miles across to Bald Nap and Forster points on the northeastern shore: these points are shelving and rocky, with patches of rock and shoal water for about 600 yards off them.

Gooseberry islet, just open southward of Lady point, bearing 89° , leads southward of these shoals: and Red Point hill in line with Bluff point or Red man, bearing 330° , leads westward of them.

Lower Shoal harbor, on the western shore, $4\frac{1}{2}$ miles northward of South bight, is a small inlet, the head of which dries.

Red point, on the western shore at $1\frac{2}{10}$ miles northward of Lower Shoal harbor, is a low cliff rising to Red Point hill, which is remarkable and 517 feet high; the arm here is only $\frac{1}{2}$ mile across to Brown Mead, a spit of sand a few feet high, covered with grass and brushwood.

Shoal harbor, on the western shore above Red point, is $\frac{3}{4}$ mile wide at the entrance, and at high water extends 1 mile within the line of coast, but the deposit from a large stream, which runs into it, dries outward $\frac{1}{2}$ mile; the depth gradually increases to 5 fathoms at $\frac{3}{4}$ mile from the dry bank.

There is a village and a sawmill at Shoal harbor, the logs for which are brought down Shoal Harbor river: supplies are scarce.

Communication.—There is railway communication. The stations are at Shoal harbor and Clarenville, which is a settlement a little below Lower Shoal harbor. There is a post-office at Shoal harbor, but the telegraph office is at Lower Shoal harbor. A small steamer, conveying mails and passengers, plies to and from the neighboring settlements. (See p. 37.)

Anchorage.—There is good anchorage from a line between Red point and Brown Mead northward to the bar, a space $1\frac{1}{2}$ miles long and $\frac{1}{2}$ mile wide. The depth decreases gradually from 24 fathoms toward the bar, but rather suddenly on either shore.

The most convenient berth for a man-of-war is with the white houses at the head of Shoal harbor open of the wooded point on the southern side of the harbor in 4 to 5 fathoms of water.

Southwest arm of Random sound extends west-southwestward, then westward for 14 miles from West Random head; it has an average breadth of 1 mile, and from a depth of 175 fathoms at the entrance the soundings decrease to 50 fathoms at 1 mile from the head of the arm.

West Random head is level and 291 feet high, and its eastern end is a high cliff, separated by a chasm from the main part of the head; rocks, mostly above water, extend eastward 200 yards from the head.

Fox islet, on the southern shore of the arm at $1\frac{1}{2}$ miles within West Random head, is steep, clifty on its northwestern side, and 93 feet high: the entrance, about 200 yards wide, to Fox harbor, is on the eastern side of the islet: within, the space is 400 yards in extent, but encumbered with rocks, and only suitable for large boats, which lie under the eastern head close to the shore.

Little Heartsease harbor, southwestward 2 miles from Fox islet, is clear of shoals, and has an average breadth of 150 yards; the depth decreases from 5 fathoms at the entrance to 2 fathoms at the head. A rock with 3 feet of water on it nearly closes the entrance of the first arm on the eastern shore.

Hodge hole, west-southwestward 2 miles from Little Heartsease, has an islet in the middle of it, on the southern side of which is a space about 200 yards square, where small vessels anchor.

Rocky harbor.—Southwest rock, 100 yards off the northern shore at $\frac{3}{4}$ mile southwestward of Middle cliff, is 8 feet high; and immediately westward of it is Rocky harbor, which extends north-northwestward $\frac{1}{2}$ mile, with a width of 300 yards. A rock, awash at low water, lies near the middle of the harbor, leaving a channel along the eastern shore, but the western shore is foul.

Long cove, west-southwestward 1 mile from Rocky harbor, is small, with 5 fathoms of water.

St. Jones Within harbor, westward $\frac{3}{4}$ mile from Long cove, is 800 yards wide at the entrance, off the eastern point of which is a small rock above water: the harbor trends northward for $\frac{1}{2}$ mile, with 20 fathoms of water, and then turns westward for $\frac{1}{2}$ mile to its head. This inner portion is 400 yards wide, and affords good anchorage in 5 to 7 fathoms of water.

Hatchers Cove, west-southwestward $2\frac{1}{2}$ miles from St. Jones Within harbor, affords anchorage for small vessels, in 5 fathoms of water, near its head.

North bight, on the northern shore at $1\frac{1}{4}$ miles eastward of the head of Southwest arm, is about 800 yards square, with 4 to 8 fathoms of water: the bottom is strewn with bowlders, particularly on the eastern shore, and a shoal, with 12 feet of water over it, extends east-southeastward 300 yards from the western entrance point.

Black brook runs into the head of Southwest arm, and there is anchorage in 3 to 10 fathoms of water, mud bottom, at $\frac{1}{2}$ mile from its mouth.

Long island, southward 1,200 yards from West Random head, is $\frac{3}{4}$ mile long, north-northeastward and west-southwestward, 350 yards wide, and 132 feet high.

Green islets, a little more than $\frac{1}{2}$ mile northeastward of Long island, with $3\frac{1}{2}$ fathoms of water between, and about the same distance southeastward from West Random head, comprise a group of flat-topped islets, 63 feet high.

Heartsease ledge extends east-southeastward $\frac{3}{4}$ mile from Green islets, and has $2\frac{1}{2}$ to 10 fathoms of water over it. The northern extreme of West Random head open northeastward of its northeastern end, bearing 277° , leads northward; and Duck island, open eastward of East Random head, bearing 30° , leads eastward of the ledge.

White rocks, southeastward $1\frac{1}{10}$ miles from the southern point of Long island, are 9 feet high, and a few yards in extent. At 200 yards westward of them is a rock on which the sea generally breaks, and at $\frac{1}{4}$ mile in the same direction the depth is less than 10 fathoms; on the northern and eastern sides the rocks are steep-to. Heartsease church, open southwestward of Long island, bearing about 315° , leads southwestward of the rocks.

Heartsease is an inlet extending southwestward about 2 miles, with depths decreasing from 24 fathoms at the entrance to shallow water at its head. Heartsease point, the northeastern entrance point, is a small peninsula connected to the mainland by a neck of shingle, 9 feet high, and a hundred feet up the hill northwestward of it is the church, in appearance an ordinary large house, isolated and conspicuous.

The breadth of the inlet, for nearly one mile within the entrance, is 400 yards, with depths of 10 to 18 fathoms, mud bottom; then about 200 yards, for another mile, with 7 to 10 fathoms, mud bottom. At the head of the inlet is a pond. The only shoals in the inlet are two rocks, each with 2 feet of water over it, on the northwestern shore opposite the southwestern entrance point. A swell sets into the entrance with northeasterly gales, but not with sufficient force to affect a vessel anchored off Ganny cove, on the northwestern shore at $\frac{1}{2}$ mile within the entrance.

Beaver rock, bearing 215° , distant nearly $1\frac{1}{2}$ miles from White rocks, has 3 fathoms of water over it. West Random head, open of the northeastern point of Long island, bearing 357° , leads eastward of the rock.

Bald head, southward 2 miles from the entrance to Heartsease, is a bold cliffy bluff, 489 feet high; a valley runs at its back parallel to the coast, giving it a remarkable semi-isolated appearance.

St. Jones head, south-southwestward about 2 miles from the southern part of Bald head, is 612 feet high, bold and cliffy, and about halfway between them is Round harbor.

Round harbor.—The entrance to this little harbor, about 100 yards wide, in the straight cliffy coast which extends on either side of it, is not easily recognized until close to the land, when the south head, a small peninsula 210 feet high, projecting northward, can be seen against the higher land behind it. The harbor is less than 400 yards long and 200 yards wide, with a depth of 3 to 5 fathoms of water, mud bottom.

The shore of Trinity bay from St. Jones head trends about west-southwestward for $\frac{1}{2}$ mile, and then southward for $1\frac{1}{10}$ miles to North head of St. Jones harbor.

Seal island, south-southwestward, about $\frac{1}{2}$ mile from St. Jones head and 100 yards from the shore, is in two parts, the northern 60 feet high and the southern 148 feet, joined by a low neck, on which are several rocky hummocks. A ridge, with 3 fathoms water over it, connects this island to the mainland.

St. Jones islet, bearing 125° , distant 1,300 yards from North head of St. Jones harbor, is 67 feet high and inaccessible; it is steep-to on the eastern side, but rocks extend 265 yards westward, and shoal water about 100 yards northward and southward from it.

St. Jones harbor is a narrow inlet which extends westward nearly 3 miles, and when on this bearing its steep shores appear as cliff behind cliff to the head. Crown hill, steep and rugged, rises to the height of 820 feet at the head of the harbor, and conical hills rise abruptly from the land northward of the harbor.

At $1\frac{1}{2}$ miles within the entrance the harbor narrows to 135 yards, and has a depth of $4\frac{1}{2}$ fathoms for about $\frac{1}{2}$ mile, when it opens out to the head, which forms two bays. There are some small islets and rocks for 135 yards off the eastern shore of the southern bay, leaving an anchorage, about 300 yards across, westward of them, with 4 to 7 fathoms water, mud bottom.

The western bay is about 600 yards long, northward and southward, and 400 yards wide, with 4 to 9 fathoms water, mud bottom.

Deer harbor, an extensive narrow inlet about 2 miles southward of St. Jones harbor, stretches westward about $4\frac{1}{2}$ miles, and has small arms and bays indenting its shores.

Deer Harbor head, the northeastern entrance point, is 432 feet high, and steep-to on its southeastern side; there are several rocky islets off the southern side of the headland between Deer Harbor head and

Robinson point, at 1 mile to the westward; Green islet, the easternmost, is 24 feet high, and Poor Boy islet, the westernmost, 20 feet high; shoals with 3 fathoms of water over them extend a little southward from Poor Boy islet, and broken ground, with $1\frac{3}{4}$ fathoms over it, skirts Robinson point to the distance of 300 yards.

Poor Boy ledge, bearing 157° , distant 400 yards from Poor Boy islet, is 200 yards in extent, with 15 feet water over it, and steep-to around.

Big rock, bearing 170° , distant $\frac{1}{2}$ mile from Poor Boy islet and nearly in the middle of the entrance between Green islet and Big island, is small, with $3\frac{1}{2}$ fathoms water over it, and steep-to around. The western end of the rocks westward of St. Jones island open eastward of Deer Harbor head, bearing 33° , leads eastward of Big rock.

Big island, on the southern side of the entrance, southwestward 1 mile from Green islet, is 218 feet high, and being separated by a narrow channel from the mainland, which is higher, it is not easily distinguished from seaward. Tea Cove point, $\frac{1}{2}$ mile northward of Big island, is shelving and steep-to; the distance between this point, on the southwest, and Poor Boy islet and the land of Robinson point on the northeast, is nearly $\frac{1}{2}$ mile and is the narrowest part of the entrance.

Southeast arm extends eastward 1,200 yards on the northern side of Robinson point from its entrance, which is between that point and Sophia head; it is generally about 200 yards wide, with depths of 4 to 12 fathoms.

Northeast arm.—Sophia head, which separates Southeast arm from Northeast arm, is 257 feet high. Northeast arm extends north-northwestward 800 yards, with a breadth of 300 yards, and a depth of 4 to 7 fathoms water.

Anchorage.—Grub island lies close off the southern shore of the harbor at $\frac{1}{2}$ mile within Tea Cove point, and there is fair anchorage for small vessels in the bay westward of the island, in 7 to 20 fathoms of water, over a space 600 yards long, northward and southward, and 400 yards wide.

Directions.—With a fair wind, bring Crown hill in line with the northern point of Grub island, bearing 311° , which mark leads between Poor Boy ledge and Big rock (Crown hill will soon be shut in behind the near range) until the northeastern end of Big island is in line with Tea Cove point, bearing 160° ; keep this mark on astern, and rounding Grub island, anchor as convenient.

When working in, pass westward of Big rock, with Sophia head open westward of Robinson point, bearing 336° , until the southern end of Poor Boy islet is seen between Green islet and Deer Harbor head, about 83° ; then steer in mid-channel about 313° , avoiding the

shoal extending from Robinson point, and when the eastern end of Big island is in line with Tea Cove point, bearing 160° , proceed as before.

When entering the inner portion of the inlet, avoid a rock with 5 feet of water over it, bearing 290° , distant 300 yards from the northern end of the islet, 128 feet high, on the southern side of its entrance, by keeping close northward of the islet; the channel then passes between Gooseberry islet and a patch of rocks 5 feet high, lying 300 yards to the northward; when within this islet and these rocks anchor as convenient in 4 to 10 fathoms of water. Two considerable streams run into the inlet, the banks of which dry outward $\frac{1}{4}$ mile.

Ice.—St. Jones and Deer harbors freeze during January and the ice breaks up at the latter part of April.

Tides.—It is high water, full and change, in Deer harbor at 7h. 49m.; springs rise $3\frac{1}{2}$ feet, neaps 2 feet.

Shoal bay, southwestward $\frac{3}{4}$ mile from Big island, extends about $1\frac{1}{4}$ miles west-southwestward, is narrow, encumbered with small islets and rocks, and is open to the northeastward; it has nothing to recommend it to the seaman.

Harbor rocks, southward $\frac{1}{2}$ mile from the southern end of Big island, are 37 feet high: a reef extends north-northeastward 300 yards from them.

Thames Harbor point is separated from Harbor rocks by a channel 200 yards wide, with 2 fathoms of water; the point is the northeastern end of a flat island 40 feet high, which has a channel between it and the mainland 100 yards wide, where large fishing boats lie in 2 fathoms of water, but the southern entrance dries at low water.

Goose cove, on the southern side of Shoal bay at 800 yards within Thames Harbor point, extends about 800 yards to the southward and is 200 yards wide, with 9 to 14 fathoms of water, rock bottom. Riff-raffs rocks extend northward 250 yards from the western point of Goose cove.

The shore of Trinity bay from Thames Harbor point trends south-southwestward for $6\frac{1}{4}$ miles to the northern entrance point of Bull arm. Copper island, south-southeastward about 1,200 yards from Thames Harbor point, is 82 feet high, and rocks extend southwestward 800 yards from it, the most distant of which is 15 feet high. A patch of slate rocks extends 300 yards from the land at 1 mile southwestward of the island, and thence, south-southwestward nearly to Squib point, a distance of 3 miles, the shore is bold and rocky. Niagara point, south-southwestward, 3 miles from Copper island, is the northern termination of a steep cliff.

Centre hill, the highest land in this locality, separates the head of Deer harbor from that of Bull arm; it is isolated, conical, and 1,081

feet high, rising 540 feet above an elevated broken plateau. It overlooks the isthmus of Avalon, and Placentia and Trinity bays, but although it is the highest land, the rocky hills in the foreground of less elevation, particularly Crown hill, and two cones, 786 and 878 feet high, northward of the head of St. Jones harbor, are more remarkable from Trinity bay.

Bull island, the northeastern end of which lies southeastward, distant 1,200 yards from Squib point, is $1\frac{6}{10}$ miles long northeastward and southwestward or parallel to the mainland 400 to 900 yards wide, 281 feet high, and partially wooded. On the northwestern side of this island and near its northeastern end, is an excellent little harbor for fishing craft, quite landlocked, with a sufficient supply of fresh water, and in stormy weather some 50 to 60 small schooners and boats can take shelter in it. A rock, awash at low water, lies near the southwestern side of its entrance, but it is avoided by keeping the gravelly point on the opposite shore close aboard.

Bull island is separated from the mainland by Bull Island tickle, a channel $\frac{1}{2}$ mile wide. Near the middle of the tickle, but rather toward the northeastern entrance, are Flat rocks, composing a ledge 6 feet high. Bearing 71° , distant nearly 200 yards, and bearing 184° , the same distance from the southern end of the ledge, are two rocks with 3 and 2 feet of water, respectively, over them; the northern side of the ledge is steep-to. The shores of the tickle are otherwise bold, but the best passage is westward of Flat rocks.

Anchorage.—There is temporary anchorage at 700 yards westward of Flat rocks, in 10 to 12 fathoms of water, coarse mixed bottom.

Tides.—It is high water, full and change, at Bull island at 7h. 22m.; springs rise $3\frac{1}{2}$ feet, neaps 2 feet.

Current.—A current, principally depending on the wind, sets through the tickle and sometimes attains a rate of $\frac{1}{2}$ mile an hour.

Rix harbor, in the mainland northwestward of the southern end of Bull island, has a depth of 7 fathoms, and affords good anchorage for small vessels. Chalk rocks, at the entrance to the harbor, are several heads, all of which are a few feet high, and about 100 yards in extent, northward and southward. Small vessels pass on either side of the rocks, as the shores are bold and steep-to.

Water is easily procured from the streams that run into the head of Rix harbor.

Bull arm.—The entrance to Bull arm is 3 miles wide between Bull island and Masters head which lies to the southwestward; the arm trends about north-northeastward for $7\frac{1}{4}$ miles, and thence west-northwestward for $2\frac{1}{4}$ miles, its width decreasing to 800 yards; there are no shoals in the arm at a moderate distance from either shore, nor is there good anchorage except at its head.

On the western side of Bull arm at $5\frac{1}{2}$ miles within Masters head is Great Mosquito cove, at 200 yards from the head of which there is a depth of 7 fathoms; several other smaller coves on this side of the arm are suitable for fishing boats; the largest of these is Little Mosquito cove, but a rock, with 5 feet of water over it, lies near the middle of the entrance.

Ice.—Bull arm freezes about the middle of January, and the ice breaks up about May 10.

Communication.—Whiteway station of the Northern and Western railway is situated about $\frac{3}{4}$ mile from the head of the arm.

Rantem cove, on the southwestern side of Masters head, has very deep water, but it affords anchorage and good shelter well in its northern and northwestern arms. Boulton islet, near the middle of this cove, and rather on the northern side, is 20 feet high. The shores of the cove are steep-to, but there is a rock, with 2 feet of water over it, bearing 116° , distant 300 yards, and a rock, with 5 feet of water over it, bearing 192° , distant 300 yards from Boulton islet.

The southern arm of the cove is too open northward for an anchorage. A fresh water stream running into it is considered excellent for trout fishing.

The shores of Rantem cove are well covered with wood of a sufficient size for making boats' masts and small studding-sail booms.

Communication.—La Manche and Rantem stations of the Northern and Western railway are situated about $1\frac{1}{4}$ miles inland from Rantem cove; there is also telegraphic communication.

Big and Little Chance coves, south-southeastward $1\frac{1}{4}$ miles from Rantem cove, are only available for small vessels during summer; the best shelter is in a small bay on the northern side of Little Chance cove; when entering either cove, the northwestern points must be kept aboard. A rock, with 6 feet of water on it, bears 341° , distant nearly 600 yards from Green head, the eastern point of Big Chance cove, and between it and Green head is a rock that dries. A few families reside around these coves.

Tickle bay.—Tickle Harbor point bears 75° , distant $4\frac{3}{4}$ miles from Green head, and Tickle bay extends southward nearly 3 miles from between them. The bay is an excellent place for fish; but though the water is comparatively shallow and the bottom good near its head it is not a safe anchorage, as a swell nearly always sets in, and with northerly to northeasterly gales it is very dangerous.

Colliers arm, where a few fishermen reside, is in the southeastern part of Tickle bay, at the entrance of a salt water lake; it is protected by a small islet and a reef of rocks, but the entrance is only 200 yards with 4 feet in it at low water. As the ebb stream is strong and sets over a sandy spit, local knowledge is required to enter this arm.

At $\frac{3}{4}$ mile from the eastern shore of Tickle bay a rocky bank runs parallel with the land for 1 mile; at the northern end of the bank,

and bearing 234° , distant 2 miles from Tickle Harbor point, is Hudson rock, with 15 feet of water over it.

Communication.—Tickle harbor station of the Northern and Western railway is situated southwestward 4 miles from the entrance of Colliers arm.

Tickle Harbor point is the end of a promontory extending northward 5 miles from the head of Trinity bay with a general width of $1\frac{3}{4}$ miles. The land near the point rises to the height of 432 feet, and the promontory with some undulations continues at about that height.

Cottier bay is on the eastern side of Tickle Harbor Point peninsula, at about $5\frac{1}{2}$ miles from the point: it is open, but affords anchorage in 10 fathoms of water, sand bottom, at $\frac{1}{2}$ mile from its head during offshore winds.

Long cove is separated from Cottier bay by Cottier point, the end of a promontory, 250 feet high, and it is open and clear of shoals.

Chapple bay.—Chapple head is the southeastern entrance point of Long cove and the northwestern entrance point of Chapple bay; McLeod point bears southeastward, distant $1\frac{4}{10}$ miles from it, and Chapple bay extends southward $3\frac{1}{2}$ miles from between them; its shores are steep-to at a short distance, and the bay affords no anchorage for large vessels.

A group of narrow islands and rocks extends northward 800 yards from a little promontory on the eastern shore at $1\frac{1}{2}$ miles within McLeod point, and shelters a small boat harbor. An islet, with rocks off its eastern and western sides, lies nearly a mile southward of the group, and near the head of the bay is Mooring island, small and steep-to. Small vessels anchor off the southern cove of the head in $3\frac{1}{2}$ to 12 fathoms water, according to their length, but the western cove is shoal.

Communication.—There is railway communication from Long Harbor station, which is situated south-southwestward, about 4 miles from the head of Chapple bay.

Spreadeagle bay, eastward of Chapple bay, is nearly 2 miles wide at its entrance, and divided into two bights by a point, from which a ledge, with 5 fathoms of water on the outer edge, extends nearly $\frac{1}{4}$ mile to the northward.

There is anchorage, sheltered from offshore winds, in the eastern cove to 12 fathoms water, sand bottom, and for small vessels in the western cove in 6 fathoms.

Dildo arm, the southeasternmost harbor in Trinity bay, lies eastward of Spreadeagle bay. The eastern entrance point rises to a round hill, 150 feet high, that shelters Dildo cove, just within the arm, where the settlement is situated. The arm, about 2 miles long

and 1 mile wide, with generally deep water, is divided at the head into two coves by a point from which shoal water extends for 300 yards; the western shore should not be approached within 300 yards.

Anchorage may be obtained off Dildo cove in 8 fathoms water, with shelter from northeasterly winds; or off the southeastern of the two coves at the head in 12 fathoms, with shelter except from northerly winds. The western of the two coves is shoal.

Dildo islands, a group 60 feet high, extend northward nearly a mile from a position about 1,400 yards northward of the northern end of the promontory forming the western side of the arm, and about the same distance west-southwestward of the eastern entrance point of the arm. Not more than 7 fathoms of water can be carried in mid-channel over the bar joining the islands to the northern end of the western point of the arm.

There is a cod hatchery on one of the Dildo islands, and the propagation of lobsters is carried on.

Ice.—Dildo arm freezes occasionally about the middle or end of February, and the ice clears about the middle or end of March. In 1884 the whole of Trinity bay southward of a line joining Tickle Harbor point and Hopeall head was frozen for about a week; and in 1887 an iceberg remained in this part of the bay till August 9, which is the latest known date. Northern ice arrives about every five years, and generally in April, but seldom remains a week.

Tides.—It is high water, full and change, in Dildo arm at 6h. 40m.; springs rise $4\frac{1}{2}$ feet.

Communication.—There is railway communication: the station is at Broad cove, southward 3 miles from Dildo.

New harbor.—The shore from the eastern entrance point of Dildo arm trends northward for $1\frac{1}{2}$ miles to the southern point of New harbor, which has a line of rocks stretching from the southern shore within which fishing craft find good shelter; a large village is situated at its head.

The shore from the head of New harbor trends northwestward and northward for 3 miles to Hopeall head, the western entrance point of Hopeall bay.

Hopeall bay extends $2\frac{1}{4}$ miles southeastward and is nearly $1\frac{1}{2}$ miles wide at the entrance, narrowing to the head, which is 1,300 yards broad and has a few houses around it. The water within the entrance deepens to 22 fathoms, and then shoals gradually to the head, where there is anchorage in 9 fathoms of water, sheltered from all except westerly and northerly winds.

Hopeall island, westward 700 yards from the northeastern point of Hopeall bay, is 75 feet high; the passage between the island and point should not be taken, but the island is bold-to on the northern and western sides.

Greens harbor, northeastward of Hopeall bay, extends southeastward $1\frac{1}{2}$ miles, with a width of 1,200 yards, and the water shoals gradually from 9 fathoms in the entrance to 5 fathoms at its head; it is open to northwesterly winds. Shoal water runs 400 yards off the northern end of the southern entrance point of the harbor.

There is a large village at the head of the harbor.

Tides.—It is high water, full and change, in Greens harbor at 6h. 44m.; springs rise $3\frac{1}{2}$ feet.

Black point is the end of a promontory, 50 feet high, that separates the entrance of Greens harbor from Witless bay; rocks extend northwestward some distance from it.

Black rock, bearing 268° , distant 1,400 yards from Black point, has 6 fathoms of water over it.

Witless bay, the northeastern point of which lies north-northeastward distant 2 miles from Black point, extends nearly $1\frac{1}{2}$ miles to the eastward.

Red rocks, bearing 234° , distant 1,400 yards from the northeastern entrance point of the bay, comprise a small cluster 110 feet high. Witless rock, bearing 153° , distant $\frac{3}{4}$ mile from Red rocks, has 4 feet of water over it, and is the highest part of a bank, which with less than 10 fathoms of water, extends eastward nearly $\frac{1}{2}$ mile from it.

Witless bay affords anchorage sheltered from offshore winds. The water shoals gradually from 17 fathoms in the entrance to 8 fathoms near the head, but the bank around Witless rock must be avoided.

The coast from the northern point of Witless bay trends northward for $2\frac{1}{2}$ miles to Long point. Shoal bay, at about $\frac{3}{4}$ mile from Witless bay, is an open bight, the southern entrance point of which is foul for some distance off it; there are a few houses around the bay.

Shoal rock, bearing 308° , distant 600 yards from the southern point of Shoal bay, has 9 feet water over it.

The coast from Long point trends northeastward for $1\frac{3}{4}$ miles to Heart's Delight; there are some rocks off Island cove, a shingle beach situated about $1\frac{1}{4}$ miles from Long point.

South rock, bearing 285° , distant nearly $\frac{1}{2}$ mile from the southern entrance point of Heart's Delight, has $3\frac{1}{2}$ fathoms water over it.

Heart's Delight is a snug harbor, $\frac{1}{2}$ mile across, which affords excellent anchorage, in 7 fathoms of water, just within the entrance. A shoal spit, with $2\frac{1}{2}$ fathoms of water on it, extends a little more than 400 yards from the northern shore near the head, leaving a passage only 300 yards wide between the end of the spit and a low point on the southern shore; shoal water also extends 300 yards from the southern entrance point.

There is a settlement with a church and schoolhouse here.

Gannet rock, bearing 257° , distant $1\frac{1}{4}$ miles from Gannet point, which is situated north-northeastward $2\frac{1}{2}$ miles from Heart's Delight,

is small and has 5 fathoms water over it. Sugarloaf, in line with Shuffleboard, bearing 32° , leads eastward of the rock.

Heart's Desire is an open cove affording anchorage, with offshore winds only, in 6 to 13 fathoms water. Gannet point is the southwestern entrance point, and a reef extends 200 yards from a low point in the middle of the southern side of the cove.

There is a settlement here.

Hanging hill, eastward $2\frac{1}{2}$ miles from Heart's Desire, is 650 feet high and remarkable from Trinity bay.

Ice.—Heart's Desire freezes in February or early in March, and the ice clears in March; field ice arrives about April 15 and leaves about May 8, arriving later and leaving earlier according to the season.

The coast from Shuffleboard, a conspicuous hill 422 feet high on the coast, close within the northeastern entrance point of Heart's Desire, trends north-northeastward $1\frac{3}{4}$ miles to Seal Cove head, which is 286 feet high, with a remarkable landslip to seaward.

Seal cove, northeastward 1,200 yards from Seal Cove head, is a small, open, rocky bight, and from it the coast continues northeastward 1,600 yards to Souther point, the western entrance point of Heart's Content.

Heart's Content.—The entrance to this harbor is 800 yards wide between Souther point on the western side and Norther point on the eastern side; thence the harbor extends southeastward $1\frac{1}{4}$ miles, and in the middle it is 1 mile wide, with soundings of 7 to 20 fathoms; it is open northward. The town lies along the eastern shore, and behind it is a lake, and Mizen hill, 670 feet high.

Light.—A circular light-house, 30 feet high and painted red and white spirally, on Norther point, exhibits at 83 feet above high water a fixed red light, which should be seen from a distance of 12 miles in clear weather. The light is visible seaward over an arc of $89\frac{1}{2}^\circ$, between the bearings 83° and $172\frac{1}{2}^\circ$, being shut in by the land from other directions. A small dwelling is connected to the southern side of the light-house by a covered way; the dwelling and covered way are painted white with black roofs.

Telegraph cables.—Six telegraph cables are landed at Heart's Content, and every spring, as soon as the harbor is clear of ice, three buoys, painted red and white, are laid down; two marking the north and south and the third the east and west lines of the cables.

Anchorage.—To avoid fouling the cables, vessels should anchor in one of the two clear spaces in the harbor, viz: To the northeastward of the line to the point, situated 1,100 yards southwestward of the church, bearing 155° , and northward of the line of the church bearing 104° , or to the southeastward of the line of the church bearing 48° .

Ice.—Heart's Content generally freezes over between the end of January and the middle of February, and the ice clears about the end of March. The northern ice usually arrives about the middle of April and leaves about the middle of May.

Tides.—It is high water, full and change, in Hearts Content, at 7h. 30m.; springs rise 4 feet, neaps $2\frac{1}{2}$ feet.

Communication.—The steamer from Clarendville calls at Hearts Content weekly during summer and autumn.

The coast from Norther point to Garlep point, 2 miles northward, consists of low cliffs, and should not be approached within 200 yards from the points. Bacon Cove head, a conical wooded hill, 132 feet high, is 1,100 yards from Norther point.

White rock, bearing 319° , distant $\frac{1}{2}$ mile from Norther point, has 6 fathoms of water over it. Sugarloaf, well open northwestward of Garlep point, bearing 32° , leads northwestward; and Hearts Content church, open southward of Norther point, bearing 122° , leads southwestward of White rock.

New Perlican, entered between Garlep point, which is steep-to, and Jeans head, a bold bluff sloping from a hill 280 feet high, separating it from Turks cove, has two coves in its southern side. Fitters cove, the western, extends $\frac{1}{2}$ mile to the southward, and is open, with shoal water skirting its shores. The eastern cove or harbor proper, situated eastward of Fitters cove, extends 700 yards to the southward and has a width of 400 yards, the entrance narrowing gradually to the head, from which shoal water extends 350 yards.

This harbor is only suitable for fishing craft, which anchor in 3 fathoms of water near the western shore, to avoid a rock with 4 feet of water over it, which lies a short distance off the first fishing stages on the eastern shore; larger vessels anchor off the entrances of these coves, in a depth of 8 fathoms, with Bloody point, that divides the coves, bearing 150° .

Tides.—It is high water, full and change, in New Perlican at 7h. 30m.; springs rise 4 feet, neaps $2\frac{1}{2}$ feet.

Turks cove is an open bight containing a few houses. The Sugarloaf, $\frac{1}{2}$ mile northward of Turks cove, is a conspicuous conical hill 415 feet high.

Scilly cove, one mile north-northeastward of Turks cove, and on the northeastern side of the Sugarloaf, extends southeastward 500 yards and is 400 yards wide at the entrance, narrowing gradually to the head; some rocks lie close off the northeastern point.

It is a fine boat harbor, though open northwestward, and a considerable settlement is situated around it.

The coast.—Kings head lies north-northeastward, distant 2 miles from Scilly cove, and the coast between Kings head and Salvage point, situated 8 miles to the northeastward, is so encumbered by

rocks, with deep water between them, that it should not be approached nearer than to have Grates point bearing 71° , until the Sugarloaf is well open westward of Kings head, bearing 198° .

Rocks.—The following rocks, the positions of which are shown on the chart, lie off this coast: Riff Ruffs, Knife rock, Hants harbor rock, White rock, Arthur rock, and Block rock.

The Tail of the bank has 6 fathoms of water over it, and there are several other rocks with 9 feet to 7 fathoms of water over them. All of them are dangerous with a moderate sea.

Hants harbor, northeastward $4\frac{1}{4}$ miles from Scilly cove, is 300 yards wide and extends 600 yards to the southward. It is open to the northward, and a heavy sea sets into it during and after gales, causing an undertow on the eastern side; but nevertheless a few vessels manage to lie here in safety during winter. The western point is low and rocky, with shallow patches extending north-northeastward $\frac{3}{4}$ mile from it.

Light.—A white octagonal tower, 30 feet high, on the eastern head of Hants harbor, exhibits, at 65 feet above high water, a fixed white light, which should be seen from a distance of 9 miles in clear weather.

Directions.—Approach with the lighthouse bearing 184° , which leads between the Tail of the bank and Riff Ruff's rocks; these rocks usually break. When Seal rock, off Seal Cove point, is in line with Seal Cove point, bearing 113° , steer about 156° for the highest coast hill between the harbor and Seal cove, to clear the shoal which extends from the western entrance point: when Seal rock is in line with Salvage point, bearing 57° , bring Hants Harbor church to bear 223° (appearing one-third across the entrance), and enter the harbor in mid-channel, anchoring near the western shore in 4 fathoms of water.

Ice.—Hants harbor is rarely frozen over: field ice appears about April 1, but the date of its disappearance is uncertain. The first vessel arrives about the middle of April, and the last leaves about December 25.

Tides.—It is high water, full and change, in Hants harbor at 7h. 13m.; springs rise 4 feet, neaps $2\frac{1}{4}$ feet.

Communication.—The steamer from Clarenville calls at Hants harbor weekly during summer and autumn.

Seal cove, northeastward $1\frac{3}{4}$ miles from Hants harbor, is about $\frac{1}{2}$ mile deep, but affords no shelter.

Salvage point, northeastward, $3\frac{1}{2}$ miles from Seal cove, is a rugged beach of stones around what appears to be a steep gravel cliff, behind which the hills rise to the height of 400 to 500 feet. Salvage rocks bear 7° , distant $1\frac{3}{4}$ miles from the point.

The coast from Salvage point trends southeastward $2\frac{1}{4}$ miles to Lance cove, a small rocky bight, whence it turns northeastward for 5 miles to Old Perlican.

Old Perlican is a summer anchorage for small vessels in 3 to 5 fathoms of water, to the southward of Perlican island, which is separated from the mainland by a channel 800 yards in width, but only fit for boats; a swell sets in with northerly gales. In entering give Perlican island a berth of 400 yards, to avoid the shallow ground extending from it, and anchor with its extremes bearing 296° and 15° .

Ice.—Old Perlican harbor usually freezes about January 15. The time of clearing varies, as during some years the ice only remains a week. Northern ice does not arrive every year, and when it does its date of appearance is variable, but is generally between March 1 and the middle of April; it seldom remains for any time after the latter date.

Tides.—It is high water, full and change, at Old Perlican anchorage at 6h. 46m.; springs rise $3\frac{1}{4}$ feet, neaps $2\frac{1}{4}$ feet.

Communication.—The steamer from Clarenville calls at Old Perlican weekly during summer and autumn.

The coast.—Grates point lies north-northeastward, $5\frac{1}{2}$ miles from Old Perlican, and thence the coast of the promontory separating Trinity and Conception bays trends about south-southeastward for 6 miles to Split point.

Baccalieu island, the southern point of which, $1\frac{7}{10}$ miles eastward of Split point, is 3 miles long, about $\frac{3}{4}$ mile broad, and almost inaccessible.

Light.—A circular red lighthouse, 34 feet high, on Baccalieu island at $\frac{1}{2}$ mile from its northern end, exhibits, at 443 feet above high water, a revolving white light which attains its greatest brilliancy every 20 seconds, which should be seen from a distance of 24 miles in clear weather.

The light is obscured by high land when the southern end of the island bears 358° , and is distant less than 8 miles.

The keeper's dwelling is a white square building with a red roof, connected to the lighthouse by a covered way.

There are also some buildings on the northern part of the island.

Note.—The light is often obscured by fog when the lower part of the island is clear.

Signals.—The lighthouse is supplied with the International code signals.

Fog signal.—A diaphone horn, in a building on the southern point of Baccalieu island, sounds thus: Blast, five seconds; silent interval, fifty-five seconds, in thick or foggy weather. The station comprises the fog-signal house, the keeper's dwelling, and a storehouse, all painted black and white in vertical stripes. The signal is not in use from January 15 till the opening of navigation in April.

Wall rock, bearing 289° , distant $1\frac{1}{10}$ miles from the southwestern point of Baccalieu island, has 5 fathoms of water over it.

The coast from Split point to Broad Cove head trends south-southwestward for $18\frac{1}{2}$ miles, and is clear with the exception of Job rock, bearing 87° , distant $1\frac{4}{16}$ miles from Gull island (westward of Job cove), and Puddy rock, bearing 23° , distant $\frac{1}{2}$ mile from Western Bay head, both of which have 5 fathoms of water over them.

Light.—A lantern hoisted on an open framework on Western Bay head, which is situated north-northeastward about 3 miles from Broad Cove head, exhibits a fixed green light which should be seen from a distance 3 miles in clear weather.

Fog signal.—An explosive fog signal, giving one report, is fired every fifteen minutes from a small white cabin at about 15 yards westward of the light support, in thick or foggy weather, between May 1 and December 31.

A vessel's alarm at sea is answered by two reports in quick succession.

At this station there are also a charging house with a slate roof; a keeper's dwelling, painted white, with a black roof, and a red building.

Conception bay, the entrance of which is between Broad Cove head and cape St. Francis, lying $11\frac{1}{4}$ miles to the eastward, extends southward for 28 miles to the head of Holy Rood bay; the western shore of the bay is indented by numerous smaller bays.

Ice.—Conception bay fills with ice between January 16 and March 1, and clears between the middle of March and April 20, but ice has remained till May 25; occasionally very little ice enters the bay.

Salmon Cove head lies south-southwestward, distant $4\frac{1}{2}$ miles from Broad Cove head, and from it the shore trends southwestward for 3 miles to Crockers point, being steep, in places cliffy, and the hills rising to the height of 490 feet. There are several small fishing villages on this shore; the principal are Clements, Freshwater, and Crockers, at the entrances of three ravines, respectively.

Several small islets and rocks lie off this shore. Harton rocks, a small chain of rocks or islets, form the southern side of Clements cove, and terminate in a rock awash at low water; they separate Clements cove from Freshwater cove. Bradley rock, nearly midway between the outer end of Harton rocks and Maiden island, and a little seaward of the line joining them, is small and above water.

Maiden island is 49 feet high, but being small and of the same appearance as the cliffs of the shore, it is not easily distinguished. Halfway between it and Crockers point, at 135 yards from the shore, are some rocks above water.

Carbonear island, south-southwestward, $2\frac{1}{2}$ miles from Salmon Cove head, is $\frac{1}{2}$ mile long, northeastward and southwestward, 300 yards broad, 169 feet high, and slopes to the southwestward; its coast is mostly cliff.

Mosquito point bears southwestward, distant $\frac{1}{2}$ mile from Carbonear island, but the channel is narrowed to the width of 200 yards by rocky reefs extending from the island and point.

Light.—A light tower rising from the gable of a house, 45 feet high, with the vertical parts painted white and the roof red, on the summit of Carbonear island, exhibits, at 195 feet above high water, a fixed white light, that should be seen from a distance of 16 miles in clear weather.

Carbonear bay, westward of Carbonear island, with its entrance between Crockers and Mosquito points, extends westward $1\frac{3}{4}$ miles, and is $\frac{3}{4}$ mile wide, with bold shores, except at the head, where it shoals gradually to a shingle beach. Saddle hill, 503 feet high and remarkable, is on the southern side of the bay.

Anchorage.—The anchorage in Carbonear bay is off the northern shore, in 7 to 10 fathoms of water, sand bottom; although open to the sea, which rolls in heavily with easterly gales, many vessels of about 100 tons winter safely at the wharves of the town. The middle and southern side of the bay should be avoided, as the sea there is heavy with northerly winds.

Directions.—From the northward, when entering Carbonear bay in ordinary weather, keep Broad Cove head open eastward of Folly rocks, bearing about 33° ; this mark leads southeastward of the rocks, which are all above water, lying offshore between Folly rocks and Crockers point. During heavy seas with easterly winds, Kane rock, bearing 1° , distant $\frac{3}{4}$ mile from Carbonear Island lighthouse, and which has 9 fathoms of water over it, and Saucy Joe rock, bearing 34° , distant 700 yards from the lighthouse, with 11 fathoms over it, break occasionally.

To proceed through the channel between Carbonear island and Mosquito point, in 4 fathoms of water, keep the Haypuk off Feather point just shut in with the cliff of Old Sow point, bearing 167° .

Ice.—Carbonear bay freezes only in severe winters, as the swell breaks the ice up.

Tides.—It is high water, full and change, in Carbonear bay at 7h. 20m.; springs rise $4\frac{1}{4}$ feet, neaps 3 feet.

Carbonear town, situated principally on the northern shore of the bay, had a population of 3,703 inhabitants in 1901.

Communication.—Carbonear has railway and telegraphic communication; there are roads to Heart's Content and Harbor Grace.

Mosquito cove, the entrance to which is between Mosquito point and Old Sow point, lying $\frac{1}{2}$ mile to the south-southeastward, extends about 1,600 yards to the southwestward; the water shoals gradually to its head, but it affords neither shelter nor safe anchorage.

Feather point, southward, distant $1\frac{1}{2}$ miles from Old Sow point and on the southern side of Harbor Grace entrance, is the termination of a ridge of hills: the Haypuk is a slate rock 20 feet high northeastward of and just disconnected from the point.

Harbor Grace islands, northeastward $\frac{3}{4}$ mile from Feather point, comprise a cluster of small islets and rocks extending north-northeastward about $\frac{1}{2}$ mile, with a width of 400 yards; the northeastern and principal islet is 105 feet high, and there is a summer fishing village on the southwestern islet. Between 200 and 400 yards northeastward of Harbor Grace islands are some islets or rocks, the outer of which is Eastern rock, 79 feet high: and at 400 yards northward of Eastern rock is White rock, consisting of rocky ground with 4 fathoms of water over it, on which the sea breaks.

Ragged rocks, at 400 yards westward of the southwestern Harbor Grace island, are 35 feet high, and between them and the shallow ground off Feather point is a channel 400 yards wide, with 3 to 4 fathoms of water, but this passage requires local knowledge, as there is no good leading mark for it.

Light.—A square white house, with a red roof, from the middle of which rises the lantern, 35 feet high, on the northeastern Harbor Grace island, exhibits, at 151 feet above high water, an intermittent white light, every four and one-quarter seconds thus: Light, two and one-eighth seconds: eclipse, two and one-eighth seconds, which is visible seaward over an arc of 180° between the bearings 352° and 172° , and should be seen from a distance of 15 miles in clear weather; the light being unwatched must be considered unreliable.

Harbor Grace extends southwestward $4\frac{1}{4}$ miles from between Old Sow and Feather points, with a breadth decreasing from $1\frac{3}{16}$ miles at the entrance to 600 yards near its head. The hills on either side rise to the height of 500 feet.

The town, situated on the northwestern shore of the harbor, is clean and well laid out, and has an abundant water supply from a lake a little inland from it. There are large stores for dried codfish, machinery for the manufacture of seal oil, and refining cod liver oil, also for preparing boneless codfish, tinning caplin, and making glue from skins and guano from bones of the fish. In 1901 the population was 5,184.

The Roman Catholic church, the northeastern of three churches, has two spires, which in line bear 60° and 240° .

Long Harry rock, close off the northwestern shore of Harbor Grace, at $\frac{3}{4}$ mile southwestward of Old Sow point, is 72 feet high.

Salvage rock, bearing 172° , distant 700 yards from Long Harry, is small and 53 feet high, with deep water around, but a heavy sea breaks 65 yards inside it.

Bar.—At about $1\frac{1}{4}$ miles southwestward of Feather point a bar stretches across the harbor; the greatest depth over it is 24 feet in the main channel, and the least depth 9 feet over a boulder bank forming the southeastern side of the main channel; there is a depth of 13 feet between this bank and the southeastern shore of the harbor. In heavy weather the sea breaks on the shoal part of the bar, but seldom in the 24-foot channel.

Light.—A white hexagonal lighthouse, 38 feet high, on point of Beach, a shingle point on the northwestern side of the harbor at $\frac{1}{2}$ mile inside of the bar, exhibits, at 40 feet above high water, a fixed red light, which should be seen from a distance of 6 miles in clear weather, but it is obscured by Salvage rock on the bearing 233° .

Buoys.—A white buoy is moored on the western edge of the Boulder bank.

A red buoy is moored on the southeastern edge of the shoal ground, extending off the northwestern shore, in 11 feet of water, with Point of Beach lighthouse bearing 240° , distant 400 yards.

As these buoys are moored with small anchors, their positions can not be relied upon; during winter they are replaced by spar buoys.

Anchorage.—The harbor is safe, and the best anchorage is on the northwestern shore, as at times the sea is rough on the southeastern side. Westerly winds are the strongest, and occasionally have much force.

Directions.—To enter Harbor Grace, bring the spires of the Roman Catholic church open northward of Salvage rock, bearing 242° , which mark leads about 400 yards northwestward of White rock, and, when Eastern rock bears 150° , steer in mid-channel, passing southward of Salvage rock. Then bring the lighthouse on point of Beach in line with Ship head, a hill 98 feet high on the same shore $1\frac{1}{8}$ miles within it, bearing 242° , which mark leads across the bar in 24 feet of water. When the western shoulder of Greens hill (443 feet high) is in line with the western spire of the Roman Catholic church, bearing 304° , the vessel is southwestward of the Boulder bank, and should then steer with Long Harry in line with the extreme of the land northeastward of it, bearing 41° , to clear the shoal water off the northwestern shore; point of Beach is steep-to on its southern side.

The channel northward of Salvage rock can be taken if desired.

When working in, Brennans hill, southward of Greens hill and 392 feet high, in line with the eastern spire of the Roman Catholic church, bearing 282° , leads northward, and the western shoulder of Greens hill, in line with the western spire of the same church, bearing 304° , leads southwestward of the Boulder bank. In crossing the bar, do not shut in the point northeastward of Long Harry with that rock.

and make short tacks between this line and the line of the leading marks, until Greens hill opens southward of the church, when the board to the southeastward may be prolonged. There is no tidal stream in Harbor Grace.

Ice.—Harbor Grace freezes over between January 10 and February 20, and is closed, at intervals, by ice 6 to 15 inches in thickness, between January 20 and the end of March, but the port has never been closed for more than six weeks at a time; the harbor ice sometimes disappears as early as March 1, and at other times remains as late as April 1. Vessels arrive and leave all the year, but are occasionally detained by field ice, which appears from January 20 to February 20, and disappears between May 1 and 20; in some seasons there is none.

Tides.—It is high water, full and change, in Harbor Grace at 7h. 25m.; springs rise $4\frac{1}{4}$ feet, neaps 3 feet.

Marine railway.—There is a marine railway at Harbor Grace, 90 feet long and 16 feet broad, which takes a vessel of about 200-ton burden and 110 feet long; the depth on the blocks at high water ordinary springs is 9 feet forward and 12 feet aft.

Communication.—Harbor Grace has railway and telegraphic communication. There is a good road to Carbonear.

Bryants cove.—The coast on the southeastern side of Feather point trends southwestward for $1\frac{1}{4}$ miles, where it forms Bryants cove, a bight 700 yards wide and extending about 800 yards to the southwestward, with several patches of rocks near the middle that dry 2 feet. A conspicuous hill, up the valley, open southeastward of a steep fall of the inner part of the northwestern shore of the cove, bearing 244° , leads southeastward of the rocks, but the cove is open northeastward and affords no shelter.

Spare point, the southern entrance point of Bryants cove, has several detached rocks above water near it; from the point the coast trends southwestward for 2 miles to Island cove, a rocky bight, fronted by an islet, and thence the coast continues southwestward for 1 mile to the northern entrance point of Spaniards bay.

Spaniards bay is 1 mile wide and extends west-southwestward $3\frac{1}{2}$ miles; its northern shore is generally clear of shoals at a short distance from it.

The only safe anchorage in the bay is on the northern shore northward of Green point, which is situated near its head and is 112 feet high, in 4 to 8 fathoms of water, with Green point bearing westward 195° to avoid a shoal patch with a depth of 9 feet over it. The southern side of the bay is exposed to a heavy sea, which sets in with northeasterly gales, and the eastern part has several rocks extending 200 yards from it; farther in the water is shoal for 200 yards off-shore and at the head of the bay for nearly 400 yards.

Tides.—It is high water, full and change, in Spaniards bay at 7h. 45m.; springs rise $4\frac{1}{2}$ feet, neaps rise 3 feet.

Communication.—There is a railway station at Spaniards Bay road, at the head of the bay.

Mad point is the northeastern termination of the peninsula, $3\frac{1}{2}$ miles long, separating Spaniards bay from bay Roberts. Mad rocks, 12 feet high, extend northeastward about $\frac{1}{4}$ mile from the northeastern side of the point, and the broken ground, with less than 10 fathoms of water over it, extends 1,200 yards farther southeastward, over which, during an easterly swell, the sea rolls up to the dry rocks, and breaks over them. In heavy weather the point should not be approached on southwesterly bearings nearer than 1 mile.

Bay Roberts, southward of the peninsula terminating in Mad point, and between it and the narrow peninsula, 4 miles long, terminating in Green point, is about $3\frac{1}{2}$ miles long and nearly 1 mile broad. Fergus islet, 134 feet high, with a round summit, lies 400 yards from the northern shore at about 1 mile within Mad point.

Roberts harbor, northward of Coldeast point, at the head of the bay, is a safe anchorage and easy of access; it extends west-southwestward 1 mile, with an average breadth of 400 yards, and the water shoals gradually from 10 fathoms at the entrance, mud bottom, and good holding ground. The town, with two churches and some fishing establishments, is on the northern shore of the harbor, and has a population of 2,226. Vessels drawing 12 feet of water lie at the wharves at any time of tide.

The southeastern shore of bay Roberts is foul for the distance of 200 yards off, and there is no safe anchorage on this side of the bay.

Ice.—Bay Roberts freezes occasionally, and then the bay fills with ice.

Communication.—Bay Roberts railway station is about 600 yards southwestward of the head of Roberts harbor. There is telegraphic communication.

Green point is the northeastern end of the peninsula, separating bay Roberts on the north from bay de Grave on the south. Southern rocks, close northward of the point, are 14 feet high, and broken ground extends 400 yards from the point.

Lights.—A circular lighthouse, 32 feet high and painted with two red and three white horizontal bands, on Green point, exhibits, at 56 feet above high water, a fixed white light, which should be seen from a distance of 8 miles in clear weather.

Beneath the principal light is a projecting lantern, which exhibits three lights. The two outer lights show white, and the middle light, in line with Southern rocks, bearing 197° , shows red.

A storehouse in rear of the lighthouse is painted white.

The coast of the peninsula from Green point trends southward 700 yards, and then turns southwestward for 1 mile to Blow-me-down head, which projects 200 yards beyond the line of coast, and is the northern entrance point of bay de Grave.

Bay de Grave extends southwestward $4\frac{3}{10}$ miles from its entrance between Blow-me-down head and Burnt point, which bears southward $1\frac{1}{10}$ miles from it, with an average breadth of $\frac{3}{4}$ mile. Ship cove lies westward 800 yards from the head, which affords it a little shelter; off the cove, small vessels anchor during summer in 10 fathoms of water, with Port de Grave church, which is midway between Ship cove and port de Grave, bearing 296° .

Port de Grave, westward $\frac{3}{4}$ mile from Blow-me-down head, has a depth of 6 to 9 feet. Off the village is a summer anchorage for small vessels, in 10 fathoms of water, at 135 yards from the shore, with the church bearing between 330° and 353° .

From the village of Bareneed, west-southwestward $1\frac{1}{2}$ miles from port de Grave, round the head of the bay to Cupids cove, on the southern shore, there are no offlying shoals, nor is there sheltered anchorage. North gut and South gut, two streams, flow into the head of the bay, one at the northwestern, the other at the southeastern corner of the beach; both can be entered by boats at high water, and are navigable for a considerable distance.

Cupids cove, on the southeastern side of Spectacle head, a remarkable bluff, 330 feet high, extends southwestward about $\frac{3}{4}$ mile and is about 400 yards wide; a shoal bar crosses the harbor from the eastern side of a shingle spit on the southeastern shore. There is anchorage here for small vessels, in 3 to 8 fathoms of water, mud and sand bottom; though open to seaward, but little sea sets in.

Burnt point, the southern entrance point of bay de Grave, is 181 feet high, with small coves to the westward and southward of it; Sopers rock, northward, distant 200 yards from the northern part of the point, has 2 feet water over it. On the southern side of the point, distant about 200 yards, are some rocks with 6 feet water over them, and some uncovered, and the point should not be approached within the distance of $\frac{1}{2}$ mile.

North head, the northern entrance point to Brigus bay, is $1\frac{1}{10}$ miles southward from Burnt point.

Light.—A circular tower, 24 feet high, painted with three red and three white vertical stripes, on North head, exhibits at 113 feet above high water, a fixed red light, which should be seen from a distance of 12 miles in clear weather.

The keeper's dwelling, which is attached to the lighthouse, is also painted red and white in vertical stripes.

Brigus bay stretches westward 1 mile, with an average breadth of 800 yards. The sealing vessels, belonging to Brigus, moor head and

stern in the western corner of the bay, and under Admirals island in the southern corner, but these anchorages should not be attempted without local knowledge.

The town of Brigus, with a population of 1,541, is picturesquely situated around the shores of a lake in a valley between steep barren hills, and is important on account of the early release of sealing vessels in the spring on account of the breaking up of the ice by the sea setting into the bay.

Ice.—Brigus bay freezes occasionally, and then the bay fills with ice.

Communication.—Brigus railway station is situated rather over 1 mile southwestward of Brigus town. There is telegraphic communication.

The coast from South point of Brigus trends southward nearly a mile to Seal head, a steep bluff at the end of the slope from the Twins, a peak 342 feet high situated $\frac{3}{4}$ mile inland.

Colliers bay entrance is between Seal head and Colliers point, the end of a peninsula separating Colliers and Gastries bays, and bearing southeastward, distant 1 mile from the head. The bay extends south-southwestward $3\frac{7}{8}$ miles, with a width of 800 to 1,200 yards. Turks head, on the western shore at $1\frac{1}{4}$ miles southward of Seal head, is a steep bluff 337 feet high, forming the eastern side of Turks gut, a narrow inlet bordered by a few houses. Harbor rock, awash at low water, bears 153° , distant 750 yards, and Bull rock, with 6 fathoms water over it, 54° , 1,100 yards from northern end of Turks head. Blue hills, seen over Dock head, bearing about 203° , leads eastward of these rocks.

The eastern shore is slightly indented, James cove, on that shore at $1\frac{1}{2}$ miles within Colliers point, is sheltered by a small projection 82 feet high; the next cove to the southwestward, at the head of which is a shingle beach bordered by houses, is filled with bowlders under water to the line of the points. Curtain rock, with 10 fathoms of water over it, lies 300 yards off the southeastern shore, under the first hill within the entrance, and a shoal, on which the depth is 7 fathoms, lies nearly in mid-channel, $1\frac{1}{2}$ miles southward from Turks head.

Dock head, a small peninsula 134 feet high, situated $2\frac{1}{2}$ miles within Colliers point, forms the southwestern side of a shallow cove, is bold-to on the northwestern side, and shelters the Dock, a small cove southwestward of the head.

Anchorage may be obtained southwestward of Dock head in 4 to 10 fathoms of water, gravel bottom, open only to northeasterly winds.

The coast from Colliers point trends southward for 2 miles to Bacon head, on the southern side of Bacon cove, an open bight containing several rocks.

Gastries bay extends southwestward $2\frac{1}{2}$ miles to a projection, ending in Cat rock, that divides the head into two coves.

Cat cove, the northwestern cove, is 1,600 yards in extent and 600 yards wide; Mouse rock, with 2 feet of water over it, lies at its entrance and nearly 200 yards from the northern shore. It affords anchorage for small vessels in 8 fathoms of water, sand bottom, off the church, but open to northeasterly winds.

Salmon cove, the southern cove, is $1\frac{1}{2}$ miles in extent and 1,200 yards wide at the entrance; the outer portion of the cove is clear of shoals at 200 yards from the shore.

Communication.—Salmon Cove railway station is situated south-southwestward, $2\frac{1}{2}$ miles from the head of Salmon cove.

Blue hills, west-southwestward, distant 2 miles from the head of Salmon cove, form a conspicuous range surrounded by a double top 839 feet high. Witch Hazel peak, northward $\frac{3}{4}$ mile from Blue hills, and the first conspicuous peak in that direction, is 598 feet high.

Gastries point, the northern end of the peninsula separating Gastries bay from harbor Main, should not be approached within 200 yards.

Light. A white, square, wooden tower, 24 feet high, with sloping sides, situated on Gastries point, locally called Salmon Cove point, exhibits, at an elevation of 104 feet above high water, an intermittent white light every 10 seconds, thus: Light 7 seconds, eclipse 3 seconds, which should be visible in clear weather 10 miles from all directions seaward.

A flat-roofed keeper's dwelling, painted white, stands 40 feet southwestward of the tower.

Harbor Main extends southward 2 miles from Gastries point and is clear of shoals, except a rock, with 12 feet of water over it, bearing 43° , distant 350 yards from the point just southward of the church. There is a considerable settlement on the western shore, and anchorage, in 12 fathoms of water, with the church bearing 330° , having swinging room of 250 yards, but open to northerly winds.

Holy Rood bay, situated southeastward of harbor Main, is 4 miles long and $\frac{3}{4}$ mile broad; the western shore is foul for 1 mile from the entrance, and should not be approached within 200 yards. A shoal, with 12 feet of water over it, lies off the mouth of Chapel cove, the first indentation on the western shore, within which the bay is clear, and the water is deep up to the entrances of the two coves at the head.

The western of these coves affords anchorage in 10 fathoms of water, sand bottom, and the eastern cove with the church bearing 285° , in 13 fathoms; both are open to northerly winds. There is a settlement on the western side of the eastern cove.

Tides.—It is high water, full and change, in Holy Rood anchorage at 7h. 28m.; springs rise $4\frac{1}{2}$ feet, neaps $3\frac{1}{4}$ feet.

Communication.—Woodford Railway station is situated west-southwestward about $\frac{3}{4}$ mile from the head of the western cove, and

Holy Rood station south-southeastward 1 mile from the head of the eastern cove of Holy Rood bay.

The shore of Conception bay from Holy Rood bay trends with a deep bend north-northeastward for 25 miles to cape St. Francis, and its southwestern part is a series of beaches backed by salt water ponds and skirted by shoal water nearly $\frac{1}{4}$ mile from the shore. There are several villages with churches on the shore, and this portion of the bay is one of the most picturesque in Newfoundland.

Communication.—The railway runs at a short distance within the shore from Holy Rood to Topsail, a distance of 13 miles, and there are stations at Duffs, Seal cove, Kelligrews, Manuels, and Topsail.

Portugal cove, 15 miles from the entrance of Holy Rood bay, is the deepest indentation on the shore, extending 800 yards, with a rock in the middle, and the depth of water decreasing from 20 fathoms in the entrance to 5 fathoms near the head. Princes Lookout, a conspicuous hill, 543 feet high, surmounted by a flagstaff, lies just eastward of the head of this cove. There is a fishing village at Portugal cove, and a good road connects it with St. Johns, which is distant 9 miles.

The character of the shore changes northward of this cove from gentle, partially cultivated slopes to steep, barren cliffs that attain the height of 880 feet in Ore head, situated about midway between Portugal cove and cape St. Francis.

Bell island, $5\frac{3}{10}$ miles long northeastward and southwestward, $1\frac{7}{10}$ miles wide, 495 feet high, and lying nearly parallel to the shore at the distance of 2 miles from Portugal cove, is so named from a remarkable conical rock, 220 feet high, situated near its western end, and named the Bell. The Clapper, a prominent rock, lies at the southern point of the island, and a considerable village with a church is situated about $1\frac{1}{4}$ miles eastward of it. Shoal water extends nearly $\frac{1}{4}$ mile from the northeastern end of the island, within which distance the island should not be approached.

There is an iron mine on the northwestern side of Bell island which has a large annual output. Two short piers extend to deep water from the southeastern side of the island; from the northeastern pier Portugal cove church bears 83° , and the western pier is 800 yards further southwestward; tramways connect them with the mine.

Bell rock, bearing 223° , distant 1 mile from the Clapper, has 15 feet of water over it; and from the rock a ledge, with a depth of 4 fathoms over it, extends north-northwestward $\frac{1}{2}$ mile.

Little Bell island, southeastward 2 miles from the Clapper, is 92 feet high, and skirted by foul ground for the distance of nearly 400 yards off it.

Kelly island, southward $2\frac{1}{2}$ miles from the Clapper, is 183 feet high; a shingle spit extends from its southeastern side, and the island should not be approached within $\frac{1}{4}$ mile.

Cape St. Francis, the southeastern entrance point of Conception bay, forms two low bills, off the western of which are two small islets.

Light.—A building with a flat roof, on which is a square block with the lantern above it, painted white and 45 feet high, on the eastern bill of cape St. Francis, exhibits, at 123 feet above high water, a fixed red light which should be seen from a distance of 12 miles in clear weather.

Fog signal.—A fog siren trumpet, placed in a white building with a flat roof attached to the lighthouse, is sounded every minute, thus: blast, five seconds; silence, five seconds; blast, five seconds; silence, forty-five seconds, during thick or foggy weather.

Signals.—Cape St. Francis lighthouse is supplied with the international code signals.

The Brandies are three rocks with 4 to 12 feet of water over them, which constitute the extreme of rocky ground extending from some islets and rocks southeastward of the cape, from which the outer rock bears 72°, distant 1,600 yards. Torbay point open of Black head, bearing 164°, leads eastward about $1\frac{1}{4}$ miles from the Brandies.

The coast from cape St. Francis trends southeastward for $4\frac{1}{4}$ miles to Black head, and thence southward $2\frac{1}{2}$ miles to Red head; it is generally steep cliff. Pouch cove, nearly 3 miles from cape St. Francis, is small and open; Black head, the southeastern point of this cove, is about 400 feet high.

Cliff rock, bearing 345°, distant nearly $1\frac{1}{4}$ miles from Black head, is a small patch with 8 fathoms of water over it.

Red head is 274 feet high and very conspicuous, being of a deep red color.

Flat Rock cove entrance is between Red head and Flat Rock point, which bear north-northwestward and south-southeastward, distant 1,400 yards from each other, and the cove extends south-southwestward $\frac{3}{4}$ mile, with a width of about 800 yards. A red house and three white houses, situated at an elevation of 455 feet on the hills about 1 mile westward from Flat Rock cove, also a red church, the steeple of which is 284 feet above the sea, on the western shore of the cove, show out prominently; but the church is obscured from the southeastward by the land sloping down to Flat Rock point.

Flat Rock point is low and barren. A ledge extends north-northeastward, nearly 400 yards from the point, at which distance there is a depth of $4\frac{1}{2}$ fathoms; there are rocky ledges on the eastern side of the point.

Tor bay.—Torbay point lies $2\frac{3}{4}$ miles south-southeastward from Flat Rock point, and Tor bay extends southwestward $2\frac{1}{2}$ miles from between them.

From Flat Rock point the cliffs rise gradually as Tor bay is entered, but, at about $1\frac{1}{2}$ miles southward from the point, they rise more

abruptly to the height of 446 and 444 feet, with two smaller cliffs, 282 and 72 feet high, respectively, about $\frac{1}{2}$ mile farther southwestward, and thence to Torbay bight, at the southwestern end of the bay, the shore line is broken by deep gulches.

Torbay bight, where there is a large settlement, is greatly used by fishermen, and landing can generally be effected. A quarter of a mile inland, southeastward from the head of the bight, there is a Roman Catholic church, which is a square stone building without a spire; and close to it are a convent and a temperance hall. These conspicuous buildings are nearly obscured when in line with a clump of trees over Snagge point.

There is anchorage in the bight, open eastward, in 12 fathoms, southward of a small beach on the northern shore.

The shore from Torbay bight to Torbay point is generally rugged, with broken cliffs between Middle and Outer coves; landing may be effected here except with northerly winds, which send in a heavy swell. The hills, at the back of Tor bay, are covered with houses, generally white.

Torbay point has a small summit, 287 feet high, just southward of it, and 800 yards farther southward the land rises to a hill 537 feet high.

Tantam shoals.—A rocky ledge, with depths of 5 to 30 fathoms of water over it, extends northward 1,700 yards from Torbay point. The outer patch, with 7 fathoms of water over it, bears 1° , distant $\frac{3}{4}$ mile from Torbay point, and Tantam rock, with 5 fathoms of water over it, bears 12° , distant 800 yards from the point. Tantam rock breaks with a moderate sea, and the 7-fathom patches break in heavy weather.

The coast from Torbay point trends south-southeastward for $1\frac{1}{10}$ miles to Redeliff head, which is bold with steep cliffs of a reddish color; there is a deep gulch on its northern side and another on its southern side, and one of these, depending on the light, is generally seen as a black band down the face of the cliff.

Redhead rock, bearing 20° , distant $\frac{1}{2}$ mile from Redeliff head, is small and has a depth of 5 fathoms of water over it.

The coast from Redeliff head trends southward for $1\frac{1}{2}$ miles to Logy cove.

Torbay hill, situated 1,400 yards southward from Redeliff head, and locally known as Flagstaff hill, on account of the old signal station connecting cape St. Francis and St. Johns having been situated on it, is 653 feet high, has bold cliffs in front of it, and a conspicuous yellow patch, nearly at the top of the cliff, just northward of the summit of the hill.

Logy cove, used by fishermen during summer, is a small cove with deep water. Boats land here in a small niche in the rocks, where

there are always fishermen to help if necessary. Roads connect this cove with St. Johns and Torbay.

On the eastern side of the cove is Devils point, on the small summit of which, 260 feet high, is a beacon of stones: from this the land trends southeastward about 1,200 yards to Sugarloaf head and gradually rises along a very rugged coast with several caves in it.

Sugarloaf head, 550 feet high, is most conspicuous. Its face is a sheer cliff, and from the northward it has the appearance of a gunner's quoin, while from the southeastward and eastward it makes as a cone-shaped hill. About a mile inland from Sugarloaf head there is a conspicuous conical hill, 577 feet high, but only visible from the northward.

Robin Hood bay, between Sugarloaf head and Small point, about 1 mile southward, is surrounded with high cliffs, has deep water, and no landing place.

Small point is rounded and rises to the height of 318 feet. Just southward of it is Skerrys bight, where landing may be occasionally effected. Between Skerrys bight and Quiddy Viddy harbor, which is distant 1 mile to the south-southwestward, is a very conspicuous cliff, at the foot of which is Bawdens hole, a large cave. The height of the summit at the back of the cliff is 472 feet.

Quiddy Viddy harbor has a rocky bar on which the depth is 3 feet and is only suitable for boats.

Cuckold head, on the southern side of Quiddy Viddy harbor, is 390 feet high and appears conical in all directions from seaward. Cuckold cove, on its southern side, has deep water. The coast from the cove trends southward for 1,300 yards to North head of St. Johns harbor, which is a steep headland 275 feet high.

Washballs rocks are awash and skirt the coast about 150 yards northward of North head; shoal water extends eastward about 100 yards from them.

St. Johns harbor.—The entrance to St. Johns harbor is between North head and South head, which bear north-northeastward and south-southwestward, distant 330 yards from each other, and thence a narrow channel trends westward for $\frac{1}{2}$ mile into the northeastern part of the harbor. The harbor is triangular in shape, its northeastern side being nearly 800 yards in length, and it extends southwestward for about a mile; the depth in the northeastern portion of the harbor is 16 fathoms and it decreases gradually to 2 to 3 fathoms at its head; the holding ground is excellent. Although small, the harbor is convenient and secure; and it has smooth water, being shut in by high land except at the narrow entrance.

Entrance channel.—**Signal hill**, northwestward 600 yards from North head, is 508 feet high, and on it there are a flagstaff, a blockhouse, and barracks.

White rock, 400 yards westward of North head and 40 yards off the cliff under Signal hill, has 7 feet of water over it.

Chain rock.—Chain Rock battery bears 276° , distant 850 yards from North head, and Chain rock, which almost covers at high water springs, bears 174° , distant 40 yards from the battery. Ruby rock, bearing 217° , distant 40 yards from Chain rock, has 3 fathoms of water over it.

Buoy.—A red spar buoy, moored in $3\frac{1}{2}$ fathoms, marks Ruby rock.

Seal rock, bearing 297° , distant about 120 yards from Chain Rock battery, covers at three-quarters flood. South head, well open of Chain Rock battery, bearing 117° , leads southward of it.

Light.—**South head**.—A white square lighthouse with a red roof, surmounted by a lantern, 39 feet high, at fort Amherst, about 125 yards west-southwestward of South head, exhibits at 134 feet above high water a fixed white light that should be seen over an arc of 135° to seaward, between the bearings 217° and 352° , from a distance of 12 miles in clear weather.

Fog signal.—A diaphone fog signal, operated by compressed air, sounds blasts of three and one-half seconds' duration, separated by silent intervals of sixty-six seconds, during thick and foggy weather.

The horn projects through the southeastern side of a white building with a flat roof, erected on the seaward side of the lightkeeper's dwelling.

Vestal rock, bearing 111° , distant nearly 100 yards from South head, has 12 feet of water over it. The Roman Catholic cathedral open northward of the land on the southern side of the entrance or Frederick battery well open northward of South head, bearing 278° , leads northward of the rock.

Pancake rock, bearing 285° , distant 700 yards from South head and about 40 yards off the southern shore of the channel, is awash at high water, and a spur, with 12 feet of water over it, extends north-eastward about 40 yards from the rock.

Buoy.—A black spar buoy is moored in 3 fathoms close northward of Pancake rock.

Little Pancake rock, bearing 282° , distant about 90 yards from Pancake rock, has 6 feet of water over it, and there is a depth of 6 feet at 50 yards northwestward of this rock.

Prosser rock, or Cahil rock, bearing 282° , distant about 275 yards from Pancake rock and 4° , distant 40 yards from the fishing stage at Cahil point, has 5 feet of water over it. South head, open northeastward of Frederick battery point, bearing 106° , leads northward of the rock.

Buoy.—A white spar buoy is moored in 3 fathoms close northward of Prosser rock.

NOTE.—The buoys may be removed without notice when ice is on the coast.

Merlin rock bears 249°, distant 150 yards from Chain rock, and has a least depth of 29 feet of water over it. The rock is 15 feet by 24 feet in size, with steep sides, excepting northward, where the slope is more gradual.

Leading marks and lights.—A lantern on a white mast with a white daymark, in rear of a brick building on King's wharf, on the northwestern side of St. John harbor, exhibits, at 54 feet above high water, a fixed red light.

A fixed red light is also exhibited, at 203 feet above high water, from the tower of the Congregational church, the spire of which rises to the height of 255 feet above high water, and is situated 342 yards from the preceding light mast on a line bearing 276°.

The Congregational church spire and the white mast, or the lights exhibited from the church tower and the mast, in line bearing 276°, lead through the fairway of the narrow entrance channel, but directly over Merlin rock.

Anchorage.—Vessels moor anywhere in the harbor as convenient.

Light dues.—Payable once in every calendar year, but not oftener than once in three months, viz:

Twenty-four cents per ton, up to and including 500 tons.

Twelve cents per ton additional on every ton over 500 tons up to and including 1,000 tons.

Five cents per ton additional on every ton over 1,000 tons up to and including 2,000 tons.

Not more than \$240 in any one calendar year or oftener than once in three months.

Vessels arriving for repairs, coal, or supplies, pay one-half of above rates.

The foregoing applies to merchant vessels.

Labrador, bank and coast fishing vessels and coasters pay no dues while engaged in those fisheries or trade. Should any such vessel proceed on any other than a fishing voyage, to any place outside the colony, such vessel shall be liable to pay once in each calendar year (but not oftener than once in three months) the rate of 6 cents per ton.

Water dues.—Five cents per register ton, not to exceed \$20: payable once a year.

Harbor master's dues.—With the exception of ships of war, coasters, and Newfoundland fishing craft, all vessels entering the port of St. Johns pay to the customs department harbor dues at the following rates, viz:

Vessels 60 to 100 tons register.....	\$2.00
Vessels 100 to 200 tons register.....	3.00
Vessels 200 to 300 tons register.....	4.00
Vessels 300 to 400 tons register.....	5.00
Vessels 400 to 500 tons register and upward.....	6.00

Payable once between January 1 and June 30, and once between July 1 and December 31.

Buoys.—A red buoy is moored in 12½ fathoms of water in a position bearing 88°, distant 350 yards from the light mast, and a black buoy in a position bearing 147°, distant 300 yards from the mast. Both buoys are for assisting steamers in hauling off the wharves and vessels should moor well clear of them.

Wharves.—Large vessels can moor securely at the wharves which line both sides of the harbor. Some of the wharves are from 220 to 360 feet in length and have depths of 18 to 32 feet alongside them.

Tugs.—Vessels off the harbor can obtain a steam tug by making the signal to the signal station on Signal hill or to Cape Spear light-house.

Towage rates, St. Johns.

[Gross tonnage.]

Vessels 60 tons and under.....	\$4. 00	Vessels from 301 to 350 tons....	\$24. 00
Vessels from 60 to 100 tons (10 cents per ton additional).		Vessels from 351 to 400 tons....	26. 00
Vessels from 101 to 125 tons....	10. 00	Vessels from 401 to 450 tons....	28. 00
Vessels from 126 to 150 tons....	12. 00	Vessels from 451 to 500 tons....	30. 00
Vessels from 151 to 175 tons....	14. 00	Vessels from 501 to 550 tons....	32. 00
Vessels from 176 to 200 tons....	16. 00	Vessels from 551 to 600 tons....	34. 00
Vessels from 201 to 225 tons....	18. 00	Vessels from 601 to 700 tons....	38. 00
Vessels from 226 to 250 tons....	20. 00	Vessels from 701 to 800 tons....	42. 00
Vessels from 251 to 300 tons....	22. 00	Vessels from 801 to 900 tons....	46. 00
		Vessels from 901 to 1,000 tons..	50. 00

Vessels requiring the steamer to go beyond limits as far as cape Spear to pay one-third additional, and any vessel requiring towage beyond the cape to the south or an equal distance to the northward will be charged by special agreement.

The above rates apply only to ordinary circumstances. Vessels in distress or otherwise disabled will have to make special contract for assistance. Vessels employing the steamer inwards will be taken outwards on their next voyage at two-thirds of the above rates. Vessels using the steamer's hawser to pay 10 per cent on towage rates for the same.

In addition to the above rates, one-third additional will be charged during winter months, commencing on December 10 and ending on April 10 each year.

Special rates will be charged during the ice season.

The owners are not responsible for any damage done by the vessel towed to themselves or others.

Pilotage.—All vessels are obliged to take or pay a pilot, excepting British government ships, vessels belonging to a royal yacht club, coasting vessels, and vessels that have not been boarded or spoken by a pilot until after they have entered the narrows; but the commissioners may award pilotage to any pilot who may offer his services

within the narrows when in consequence of heavy weather there would be danger to any boat going to sea.

Pilots.—The established number of pilots for the port of St. Johns is twelve. The pilot boats are painted black, with a yellow band under the upper streak. The number of the boat is shown in white on each bow, and the same number in black in the upper part of the foresail. Pilot boats also carry a burgee.

Pilots can be obtained by making the pilot signal to the signal station on Signal hill, or to cape Spear lighthouse.

Table of rates of pilotage of vessels in and out of St. Johns.

[New measurement.]

	<i>Rates Cy.</i>		<i>Rates Cy.</i>
On vessels under 80 tons-----	\$5.35	On vessels from 350 to 400 tons_	\$16.00
On vessels from 80 to 100 tons_	6.70	On vessels from 400 to 500 tons_	18.75
On vessels from 100 to 120 tons_	7.35	On vessels from 500 to 600 tons_	21.35
On vessels from 120 to 160 tons_	8.00	On vessels from 600 to 700 tons_	24.00
On vessels from 160 to 200 tons_	8.70	On vessels from 700 to 800 tons_	26.76
On vessels from 200 to 240 tons_	9.35	Over that size—for every 100	
On vessels from 240 to 280 tons_	10.00	tons additional-----	1.35
On vessels from 280 to 300 tons_	10.70	And on no sailing vessel is the	
On vessels from 300 to 350 tons_	13.35	pilotage to exceed-----	32.00

Steamers shall pay pilotage on their net tonnage, as in the case of sailing vessels.

Steamers employed in the fisheries of the colony shall be exempt, except when on foreign voyage.

Coastal steamers shall also be exempt.

Subsidized mail steamers, in connection with the colony, shall pay on the horsepower, at the rate of 8 cents for each horsepower.

All coasting vessels which may take pilots, to pay one-half of the above rates of pilotage in proportion to their tonnage.

The above scale of pilotage shall be payable on the register tonnage of all such vessels, as ascertained before going out of the harbor.

Soundings.—The soundings in the approach to St. Johns harbor are generally regular until within the 30-fathom line, when the bottom becomes uneven.

Cordelia deeps, with depths of 90 to 97 fathoms, extend northward from abreast North head of Motion bay, and may be useful in making St. Johns harbor during thick or foggy weather. They are about $1\frac{3}{4}$ miles wide off North head of Motion bay, and gradually widen to $3\frac{1}{2}$ miles abreast Sugarloaf head, and to 5 miles off Torbay point, where soundings of 100 fathoms are obtained on the inshore side of the deeps. Northward of this the Cordelia deeps widen out to the deep water off Conception bay.

The Riband, a narrow bank about $1\frac{3}{10}$ miles in length, northward and southward, and with depths of 26 to 30 fathoms, lies about a mile off Robin Hood bay.

St. Georges leads, lying about $\frac{3}{4}$ mile east-southeastward of the entrance to St. Johns harbor, is a patch about $\frac{1}{4}$ mile long, northward and southward, 200 yards broad, with 24 to 27 fathoms of water over its southern part, but there are depths of 15 and 16 fathoms over its northern part, with 25 fathoms close around.

Directions.—The entrance to St. Johns harbor is so narrow that in foggy or hazy weather, when the hills are indistinct, care is necessary not to mistake the opening into Quiddy Viddy harbor for it.

From a distance the land both northward and southward of the harbor appears hilly, bleak, and desolate, and it rises abruptly to heights of between 275 and 779 feet.

The entrance, having high land on either side, is not seen from a distance; but as the land is approached its position is well indicated by cape Spear, fort Amherst, and the buildings and flagstaff on Signal hill.

Approach the harbor on a westerly bearing, avoiding Vestal rock (page 603), and bringing the white mast and daymark carrying the lower leading light in line with the spire of the Congregational church (which will be seen just clear northward of the square towers of the Catholic cathedral), bearing 276°. This mark leads into the harbor, but over Merlin rock. When past Prosser rock, steer and anchor as convenient.

If the leading marks are not visible in daylight, pass 100 yards southward of North head and steer 276° into the harbor, leaving Pancake and Prosser rock buoys about 50 yards to the southward, and Ruby Rock buoy to the northward.

For a vessel of very deep draft it is customary to buoy Merlin rock with a boat.

Small vessels, with boats to tow, often beat in, but the unsteadiness of the wind renders this tedious and difficult.

At night bring and keep the two leading red lights in line, bearing 276°, and when in the harbor anchor as convenient; remembering, in a vessel of very deep draft, that the lights in line lead over Merlin rock, in 29 feet of water.

In fog or thick weather, the soundings in Cordelia deeps might be useful in assisting to determine a vessel's position.

Anchorage. There is temporary anchorage, with foul or baffling winds, in 15 fathoms, rock bottom, just within the heads, where a vessel can be taken in tow.

Ice.—St. Johns harbor is rarely frozen over in winter and is seldom closed for as long as a week during ordinary seasons, but in 1875 and 1882 access was very difficult for several weeks. The harbor ice disappears about the end of March. The prevalence of easterly winds in early spring drives heavy field ice upon the coast, and at times, even as late as August, icebergs drift into the narrows and

more or less block the channel. Field ice arrives from January to the middle of February, and is generally 6 to 18 inches thick; it leaves about April or May. Vessels come and go throughout the year.

Wintering.—The northern side, 200 feet long, of the north wharf, belonging to the Dock Company, where there is a depth of 22 feet at low water springs, is convenient for wintering, as it is out of the way of traffic and of vessels using the dock, and it is sheltered, with scarcely any swell, even during strong easterly winds.

Fog is less frequent at St. Johns than farther southward. It is stated that although there may be fog in the offing, it is frequently clear inside of cape Spear.

Tides.—It is high water, full and change, in St. Johns harbor at 7h. 30m.: springs rise $3\frac{3}{4}$ feet, neaps $3\frac{1}{4}$ feet. There is very little tidal stream in the entrance channel.

St. Johns.—The city of St. Johns, the capital of Newfoundland and the seat of government, covers the steep, hilly ground on the northwestern side of the harbor, and continues along the banks of the river, which flows into its head, and also lines the southeastern side of the harbor; it has several handsome public buildings, of which the most conspicuous is the Roman Catholic cathedral. Population, see page 30.

Consuls.—There is a consul-general for Belgium, and there are consuls or vice-consuls for the United States, Brazil, Germany, Italy, Portugal, Spain, Sweden, and Norway, at St. Johns.

Supplies of every kind can be readily obtained. Water is brought from Windsor lake, distant 4 miles, by the General Water Company; the supply is almost unlimited, and the water is soft, clear, and pure. Pipes are placed on the wharves for the supply of shipping.

Coal.—About 64,000 tons of coal are imported annually, and there are usually about 13,600 tons in stock at St. Johns. See also page 67.

Vessels can haul alongside the coal hulk, or coal from lighters, or go alongside wharves.

Docks. The dry dock at St. Johns is 558 feet long on the blocks, 630 feet long over all, and $85\frac{3}{4}$ feet wide at its entrance, and the depth of water over the sill at high water ordinary spring tides is 25 feet.

The dock can be pumped out in $2\frac{1}{2}$ hours; it has bilge blocks, which are worked by a chain from the top of the dock, thereby giving extra support to a vessel before the dock is dry.

The floating dock is 135 feet long over all and 49 feet wide; it is capable of taking vessels of 300 tons, and has $11\frac{1}{2}$ feet over the blocks when sunk. This dock is reported to be out of repair.

Repairs.—Messrs. Angel & Co. are prepared to carry out repairs to hull and machinery with dispatch, their plant being extensive and fit for heavy work.

The Terra Nova Company can also execute large repairs. They have a crane which lifts 40 tons.

Hospitals.—There is a large hospital at St. Johns available for seamen, a hospital for infectious diseases, situated on Signal hill, and a sailors' home.

Signals.—The International code of signals is used at Signal hill blockhouse.

Time signal.—A gun, near the blockhouse on Signal hill, 517 feet above high water, is fired every day at noon, St. Johns mean time, or 3h. 30m. 43.9s Greenwich mean time, but it is reported to be useless for the purpose of rating chronometers.

Position.—Chain rock battery, on the northern shore of the narrows of St. Johns harbor, is in lat. $47^{\circ} 34' 02''$ N., long. $52^{\circ} 40' 59''$ W.

Trade.—The chief business of St. Johns is the exportation of cod-fish and refining seal oil, but there is a large ropewalk of the Colonial Cordage Company, employing about 500 persons, where the bulk of the twines, lines, nets, and cables used in the fishing industry are made; there are also three iron foundries, a nail foundry, a machine shop, railway workshops, two biscuit bakeries, breweries, tanneries, furniture, tobacco, soap, and butterine factories, affording employment to a large number of people.

On the wharves there are numerous oil vats, from which the stench is very unpleasant in summer, and stages for drying fish are placed in every available spot.

Communication.—See page 37.

The coast from South head of St. Johns harbor tends southward for $1\frac{2}{10}$ miles, and is very steep and inaccessible.

Fresh Water bay, which is open northward, extends $\frac{3}{4}$ mile farther southward, with a width of about a quarter of a mile; at its head there are a few houses and a shingly beach; close within the beach is a large pond, about 10 feet above high-water level, and reported to have a depth of 10 fathoms.

There is anchorage in the middle of the bay, in 8 to 12 fathoms of water, over a bottom of mud covered with sand, and very good holding ground; small craft, which have missed St. Johns harbor have ridden out a northerly gale here.

Spriggs point, the eastern entrance point of Freshwater bay, is very sharp, with the land gradually rising and having cliffs on both sides. On the eastern side there are some small islets, 2 to 9 feet high.

Peggys bag, southward $\frac{1}{2}$ mile from Spriggs point, has a large noticeable pinnacle, separated from the cliff.

Deadmans bay, south-southeastward of Peggys bag, is small and of no use; there is a shingle beach at its head. **Cliff point**, eastward

of Deadmans bay, shows a square face of cliff to seaward, at the base of which a flat ledge extends a few yards into the sea.

Black Head bay, about $\frac{1}{2}$ mile eastward of Cliff point, is small and open, but used by fishermen; it shoals gradually and has a small pier where boats land; there is a church at its head.

Black head is a bold headland sloping down gradually to Black Head bay, on the western, and to Spear bay, on the eastern side; it has six caves in it, the largest one being in the middle.

Beacon.—There is a cairn on the head at 417 feet above high water.

Spear bay.—Cape Spear bears 117° , distant nearly a mile from Black head, and Spear bay, situated between them, affords temporary anchorage in 10 to 11 fathoms of water.

Cape Spear, bearing 136° , distant $3\frac{1}{10}$ miles from South head of St. Johns harbor, rises steeply to the height of 200 feet.

Light.—A lantern, rising from the middle of a white house with the roof painted red and white in horizontal bands, 38 feet high, situated southward 700 yards from cape Spear, exhibits, at 264 feet above high water, a revolving white light, that attains its greatest brilliancy every minute, and should be seen from a distance of 22 miles in clear weather.

Fog signal.—A fog trumpet at cape Spear, operated by compressed air, sounds thus: Blast, seven seconds; silent interval, twenty-three seconds, during thick or foggy weather.

The engine house, with a chimney 30 feet high, and two small buildings, one of which contains the trumpet, are all painted white, and stand at the extreme of the cape.

Signals.—Cape Spear lighthouse is supplied with the International code signals.

Old Haman rock, bearing 1° , distant 800 yards from cape Spear, has $4\frac{1}{2}$ fathoms of water over it.

Old Harry rock, bearing 57° , distant 800 yards from cape Spear, has 3 fathoms of water over it.

A rock, small in extent, with 4 fathoms of water over it, lies nearly midway between cape Spear and Old Harry rock.

Tinker rock, bearing 136° , distant 800 yards from Cape Spear lighthouse, has a depth of 5 fathoms over it, but a less depth has been reported.

Clearing marks.—Cliff point in line with Black head, bearing 262° , leads northward, and Tinker hill in line with North head, bearing 204° , leads eastward of the rocks off cape Spear.

The coast from cape Spear trends southward for $2\frac{6}{10}$ miles to North head of Motion bay, and is of moderate height, the highest hill, 323 feet high, on which is a small stone cairn, being situated nearly midway between them.

Cow and Calf ledge, on which the depth is 9 fathoms, extends about 600 yards from the shore at about 1 mile southward of cape Spear.

North head is a rugged headland, 210 feet high and of a jagged appearance; at its base there is a rock about 15 feet high and nearly isolated from the land, which, standing out from the head, is conspicuous from seaward.

North ledge, southeastward 1,400 yards from North head, has 11 fathoms least water over it; and White rock, southward 450 yards from North head, has 7 fathoms of water over it.

Motion bay.—Motion head bears 198° , distant $3\frac{1}{10}$ miles from North head, and Motion bay extends westward $2\frac{1}{10}$ miles from between them.

The shore of the bay from North head to Maddox cove, west-southwestward $2\frac{1}{10}$ miles, is generally low and faced by jagged rocks, which extend into the sea and prevent landing, except at Stoppers side, on the western side of North head, where there is a small beach; but boats landing here must be hauled up immediately. Three peak hill, 540 feet high, is on the northern side of Maddox cove.

Maddox cove, a bight extending northwestward about $\frac{1}{2}$ mile and of the same width, affords good anchorage off the entrance to Petty harbor. There are several white houses and a small pier, where boats land, at the head of the cove.

Petty harbor, on the southwestern side of Maddox cove, is a narrow gully between rocks, 400 yards long, 100 yards wide, and having a depth of 3 fathoms; it is an excellent fishing station, and there is a large settlement around it. Mad rock, on the northern side of the entrance, is nearly awash, and Anchor rock, at the head of the harbor, is above water. There are good roads to St. Johns and bay Bulls.

The shore from Petty harbor trends southeastward, rising, and continuing high for 1,200 yards, where there is a cove or gulch in the shape of a horseshoe, beyond which it is low, with a little cliff, to Seal cove, a distance of 1,700 yards.

Motion head, southeastward, distant 1 mile from Seal cove, is 71 feet high, with a hill, 150 feet high, close behind it; several large boulders are scattered about the land in the vicinity, and at a few yards southward of the head there is a conspicuous rock on the coast.

The general appearance of the coast in the vicinity of Motion head is rugged and barren, with the chief hills standing out well; Watch hill, westward about $1\frac{1}{2}$ miles from Motion head, is 705 feet high, and conical, and there are a beacon and a large boulder on its summit.

Motion rocks, 4 feet high, and over which the sea always breaks, lie east northeastward 150 yards from Motion head.

Bow and Arrow shoal, consisting of several pinnacle rocks, with depths of 3 to 5 fathoms over them, and deeper water between, extends northeastward about $\frac{1}{2}$ mile from Motion head, while there are depths of less than 20 fathoms for 1 mile northeastward of the head. In heavy weather the sea breaks over these ledges in 10 fathoms of water. Fishing boats are generally anchored on the edge of the shoals and along the 20-fathom contour line.

The irregular and broken ground off Motion head causes a heavy cross sea, which makes it advisable to give it a good berth.

Cape Spear lighthouse, well open eastward of North head, bearing 9° , leads eastward of the shoals off Motion head.

Bull head, 178 feet high, lies south-southwestward, distant $8\frac{1}{2}$ miles from Motion head. The coast between is made up of slate cliffs, and the land behind rises to the height of 899 feet; it is bold-to and clear of offlying shoals. At 4 miles northward of Bull head is the Spout, a natural phenomenon, most remarkable at high water and when there is much swell, caused by the rush of waves into a cavern under the surface of the water, from which a fissure in the rock allows its escape in jets of foam; it makes a roaring noise, and may be seen distinctly from a distance of 3 miles from the land.

Bay Bulls.—The coast from Bull head trends southwestward for 600 yards to Columbine point, and the entrance of bay Bulls is between this point and South head, which lies south-southwestward, distant $1\frac{7}{10}$ miles from it. The bay extends westward $2\frac{1}{2}$ miles, with a width of $\frac{1}{2}$ to $\frac{3}{4}$ mile, decreasing to 350 yards at its head; it is open eastward, but a slight change to the northwestward in the direction of its inner part adds to the protection of the anchorage, and the holding ground, sand and mud, is good. After heavy gales from the eastward a ground swell enters the harbor, but it is not sufficient to endanger shipping. When St. Johns harbor is beset with ice this bay is often clear.

Light.—A white cylindrical iron tower, 38 feet high, situated on the northern headland at the entrance to bay Bulls, exhibits, at an elevation of 205 feet above high water, an intermittent white light every ten seconds, thus: Light seven seconds, eclipse three seconds, which should be seen from a distance of 17 miles in clear weather.

A flat-roofed keeper's dwelling, painted white, stands about 60 feet westward of the light tower.

Bread and Cheese rock lies southward, 40 yards from Bread and Cheese point, on the northern side of the bay at about $1\frac{1}{2}$ miles within Columbine point, and has a depth of 7 feet of water over it.

Magotty rocks lie close off the western shore of the bay, bearing 276° from Bread and Cheese point; a shoal with 3 fathoms of water over it, extends northeastward about 150 yards from the rocks.

Directions.—Keep the northeastern shore aboard after passing the Bread and Cheese rock, and anchor where convenient; the northeastern side of the harbor is always the better sheltered from the ground swell.

Tides.—It is high water, full and change, at bay Bulls at 7h. 30m.; springs rise 5 feet, neaps 3 feet.

The inhabitants are principally engaged in the fisheries, and the ground is cultivated to some extent. Good ptarmigan shooting may be had in the vicinity during the season.

Water can be procured in abundance from the river at the head of the bay.

Communication.—There is communication with St. Johns, which is distant 18 miles, by an excellent road.

Witless bay, where there is a village and a large church, is southward 2 miles from bay Bulls, and too open to be recommended as an anchorage; for temporary purposes the best berth is in 8 fathoms of water, sand bottom, at $\frac{1}{2}$ mile above Bearcove point, from which a ledge of rocks, partly dry, extends southward $\frac{1}{4}$ mile.

Gull island, off the mouth of Witless bay, is 240 feet high, rocky, wooded, and steep-to, but too small to afford any shelter. Both this island and South head of bay Bulls have red cliffs.

Green island, lying southeastward $\frac{1}{2}$ mile from Witless point, the southern point of Witless bay, is flat and faced with cliffs 140 feet high; there are some dry slate ledges on its northwestern side, and Man-of-war rock, southeastward 100 yards from the island, has 6 feet of water over it.

Shoal water extends $\frac{1}{4}$ mile from Witless point, but there is a fair channel, with 5 fathoms of water, between it and Green island. When running through this passage keep in mid-channel, with South head of bay Bulls just shut in with Gull island, bearing 19° .

Mobile bay, in which there is a settlement, lies southwestward of Witless point; it extends northwestward $1\frac{1}{2}$ miles, but does not afford good anchorage.

Toad cove, a fishing station southward about $1\frac{1}{2}$ miles from Mobile bay, is protected by Fox, Spear, and Pebble islands; fishing craft anchor in the cove, but it is too open to be safe, except in fine summer weather.

Fox rock, bearing 15° , distant $\frac{1}{4}$ mile from the southern point of Fox island, has 4 fathoms of water over it; the other islands are steep-to.

Great island, an uninhabited island situated south-southwestward, distant 3 miles from Green island, is 300 feet high. It may be distinguished from the neighboring islands by having three hills. Great, Spear, and Pebble islands may be passed on either side.

Cape Neddick, south-southwestward, distant $2\frac{1}{2}$ miles from Great island, is a bluff headland, 260 feet high.

Offer rock, bearing 163° , distant $1\frac{1}{4}$ miles from Cape Neddick, has 6 fathoms of water over it, and should be avoided in heavy gales.

Brigus-by-South, southward, $2\frac{3}{4}$ miles from Cape Neddick and northwestward 1 mile from Brigus head, is a boat harbor with a church on its northwestern side, visible from seaward.

Broyle harbor extends westward $3\frac{3}{4}$ miles from its entrance between Brigus head and North point of cape Broyle, which bear north-northwestward and south-southeastward, distant $1\frac{7}{10}$ miles from each other. The harbor is open eastward and affords safe anchorage only in fine weather, the usual position then being in Admirals cove, in 11 fathoms of water, mud bottom; but there is more sheltered anchorage above Carrier point in a depth of 7 fathoms, mud bottom.

Saturday ledge, bearing 262° , distant $\frac{1}{2}$ mile from Admirals head, has 6 feet of water over it. Brigus head, well open southward of Admirals head, bearing 78° , leads southward of it.

Harbor rock, bearing 271° , distant 1,200 yards from Carrier point, and in a place above where vessels usually anchor, has 12 feet of water over it.

Tides.—It is high water, full and change, in Broyle harbor, at 7h. 20m.; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{1}{2}$ feet.

The land is fertile, and cows, sheep, and goats are kept by the inhabitants: good ptarmigan shooting may be had in the vicinity during the season. A church stands on the northern side near the head of the harbor.

Water can be obtained at the waterfall in Spout cove, northwestward of Carrier point.

Cape Broyle.—From North point the land trends south-southwestward for $1\frac{1}{2}$ miles, and forms the eastern front of Cape Broyle, a remarkable wooded headland rising abruptly to the height of 553 feet.

Horse rock, bearing 63° , distant 900 yards from North point of Cape Broyle, has 5 fathoms of water over it.

Old Harry rock, bearing 111° , distant $\frac{1}{2}$ mile from North point of Cape Broyle, has 12 feet of water over it. Ferryland Episcopal church open southward of Stone islands, which are situated close off the southern point of Cape Broyle, bearing 225° , leads southeastward of the rock.

Caplin bay, on the southern side of Cape Broyle, and stretching west-northwestward about 2 miles, is clear of shoals, and has good holding ground, but it is open eastward: the entrances on either side of Goose island are each about 800 yards wide. Goose island, 70 feet high, is steep-to except on the northern side, where, at the distance of 50 yards, are two rocks that cover and uncover.

Hares Ears open eastward of Bois island, bearing 157°, leads eastward of the shoal ground extending from Coldeast point and westward of Goose island.

Ferryland harbor, southward of Coldeast point, is small but easy of access, and has secure anchorage, with good holding ground, except in strong easterly gales, when a considerable swell enters the harbor at high water, between the rocky islets extending from Bois island to Coldeast point, on its northern side.

The entrance to the harbor between Bois island and Ferryland head is only 200 yards broad, but inside the harbor widens to 400 yards. The best anchorage, in 10 fathoms of water, sand and mud bottom, is on the line joining Coldeast point and Pool beach, and between two churches at the head of the harbor.

Ferryland head, 125 feet high, is joined to the mainland by a narrow isthmus, on the southern side of the harbor.

Light.—A circular red iron lighthouse, 46 feet high, on Ferryland head, exhibits, at 200 feet above high water, a fixed white light, that should be seen from a distance of 16 miles in clear weather. The keeper's dwelling, painted white with a red roof, is close to the lighthouse.

Signals.—The lighthouse on Ferryland head is supplied with the International code signals.

Directions.—Bring the Roman Catholic church, which is the southern one of the two churches, at the head of the harbor in the middle of the passage between Ferryland head and Bois island, bearing 273°, and run in upon this bearing; when through the entrance steer a little northward to avoid the shoal water off Pool beach.

Tides.—It is high water, full and change, in Ferryland harbor at 7h. 20m.; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{1}{2}$ feet.

Ice.—Ferryland harbor freezes, at intervals, generally during the first ten days of February; sometimes it freezes for one day only; but the ice never forms during strong westerly winds. Southwesterly to southerly winds break up the ice and clear the harbor; drift ice sometimes remains as late as June 20. Northerly winds fill the harbor with drift ice, which clears out as soon as the wind shifts southwestward. Northern ice arrives about February 23 and leaves about April 6. The harbors of bay Bulls, Broyle, Aquafort, Fermeuse, and Renewse fill with ice and clear at about the same times as Ferryland.

Communication.—Steamers from St. Johns call at Ferryland harbor weekly during summer and autumn.

There is a mail twice a week to St. Johns by road; and there is telegraphic communication.

Water is scarce in Ferryland, but can be obtained from Caplin bay.

Hares Ears, separated from the southeastern part of Ferryland head by a narrow boat channel, are two peculiarly shaped slate rocks, 50 feet high and steep-to.

Burns Head rock, bearing 168° , distant 300 yards from Burns head, the southwestern point of Ferryland head, has 15 feet water over it.

Crow island, between Ferryland head and the entrance to Aquafort harbor, is 70 feet high, and bearing 120° , distant 200 yards from its eastern end is Crow rock, nearly dry at low water.

Aquafort harbor.—North head of Aquafort harbor bears 253° , distant $1\frac{1}{10}$ miles from Burns head, and some rocks, which are steep-to, extend southward 100 yards from it. The entrance to Aquafort harbor is between these rocks and Spurwink island, 40 feet high, which lies $\frac{1}{4}$ mile to the southward and 100 yards off South head, and is bold-to; thence the harbor extends about westward for $2\frac{1}{2}$ miles between high steep hills. The anchorage is good, and vessels lie in safety in 9 fathoms of water, mud bottom, abreast of the small and outer chapel on the northern side, with generally smooth water; but little sea or swell finds its way up the harbor, except during heavy easterly gales.

A small rock lies 120 yards from the northern shore abreast of the Roman Catholic chapel, but no other shoals are known to exist in the harbor. The land is fertile and well wooded; salmon and trout abound in the two rivers which run into it, and water can be obtained easily; above the beach at the harbor head there is a small deep pool, where fishing craft winter.

The coast from South head of Aquafort harbor trends southeastward for 1,400 yards to Black head. Lawler bay lies between, and 150 yards off the shore of this bay, at 700 yards from South head, is a rock awash at low water.

Bald head, southward 1,600 yards from Black head, is a prominent headland 90 feet high.

Aquafort rocks, bearing 6° , distant 400 yards from the northern point of Bald head, are awash at high water springs; and Clear-cove rock, bearing 209° , distant 400 yards from the southeastern point of the same head, is also awash at high water.

Fermeuse harbor.—Situated $\frac{3}{4}$ mile southwestward of Bald head is Northern head of Fermeuse harbor. This harbor is 400 yards wide at the entrance, and extends west-northwestward $2\frac{1}{2}$ miles; it is a favorite fishing station, and more frequented than Aquafort, being less embayed, and has a more convenient anchorage.

The principal settlement is at Admirals cove on the northern side at 1,200 yards within Northern head; fishing vessels generally anchor in this cove on account of its being close to the sea, but there is more

roomy anchorage in Kingman cove, 1 mile farther in on the southern shore; the safest anchorage is above Sheep head, near the head of the harbor, in 6 fathoms of water, mud bottom.

Mad rock, 100 yards from the southwestern side of the entrance and bearing 198° from Northern head, has 4 feet water over it. Blow-me-down head, on the southern shore of the harbor, open northward of Traces point, bearing 287° , leads northward of Mad rock.

Bar shoal, bearing 102° , distant 450 yards from Sheep head, has 9 feet of water over it, rock bottom.

Water can be obtained at places on either shore.

The **coast** from Southern head of Fermeuse harbor trends south-southwestward for 2 miles to Sculpin point, but at about midway a headland, 40 feet high, projects 400 yards from the coast line. Bear-cove point is the northern point of this projection, and bearing 144° , distant nearly 400 yards from the point and 200 yards from the shore, is a rock with 3 fathoms of water over it; Sunker rock, bearing 192° , distant 400 yards from the southern point of the projection, has 4 feet of water over it.

Renewse harbor.—Northern head of Renewse harbor lies west-southwestward $\frac{1}{2}$ mile from Sculpin point, and Renewse head, the southern head of the harbor, lies southward, distant 1,400 yards from Northern head. Renewse harbor extends northwestward 2 miles from Renewse head; it is open eastward, and offers very indifferent anchorage even to small vessels; nevertheless, its convenient position with regard to the fishing ground renders it a resort during summer. There are many rocks in it, and in heavy weather the whole harbor is a mass of breakers.

Kettlebottom rock, bearing 0° , distant 900 yards from Renewse head, has 6 feet of water over it; Whale Back rock, bearing 313° , distant 350 yards from Kettlebottom rock, has less than 6 feet water over it; and a shoal, bearing 107° , distant 400 yards from Northern head, has 3 fathoms of water over it. Shag rock, in mid-channel at 1,400 yards within Renewse head, is 9 feet high, and west-northwestward of it are White Horse rock, with 6 feet of water over it; Black Horse rock, with 12 feet of water over it; and a patch with 12 feet of water over it.

Anchor rock, 15 feet high, bears 279° , distant $\frac{1}{2}$ mile from Northern head, and is close off a point on which there is a flagstaff.

The village, with its churches, is on the northeastern side of the harbor within Anchor rock, but it is not visible from seaward; the best anchorage in the harbor is off the village, bearing 299° , distant 300 yards from Anchor rock, in 4 fathoms of water.

Directions.—Enter the harbor, passing about 200 yards northward of Renewse head, on a west-northwesterly course to clear Kettle-bottom rock: keep along the southwestern shore, passing southwestward of Shag rock, White Horse rock, and the 12-foot patch, and anchor in 4 fathoms water, sand bottom.

Water can be obtained from a brook in the village.

Communication.—Steamers from St. Johns call at Renewse harbor weekly during summer and autumn: and there is a mail by road twice a week.

Bantam banks.—Bantam fishing banks lie from $2\frac{1}{2}$ to 5 miles off the coast between Bearcove point and Burnt point, which lies $2\frac{1}{2}$ miles south-southwestward of Renewse head: the banks extend northward and southward for a distance of 5 miles, with a width of about $\frac{1}{2}$ mile, and the soundings over them are irregular, the depths varying from 9 to 30 fathoms, rock bottom. Fermeuse Bantam, the northern bank, over which the least water is 11 fathoms, lies east-southeastward, distant $2\frac{1}{2}$ miles from Bearcove point, and about $1\frac{1}{2}$ miles from the southern banks.

Caution.—With these exceptions, all along the coast from St. Johns to cape Ballard, the soundings are deep, so that a depth of 90 fathoms is found at 6 miles from the land, and often 30 fathoms within $\frac{1}{2}$ mile of the rocks. On this account the lead is not a sure guide: nevertheless in approaching the land in fog, soundings should be frequently taken, compared with the chart, and considered.

Often when near the coast, especially under the lee of a point, during southerly and light easterly winds, a vessel will suddenly emerge from the fog, and the land will be distinctly visible.

The coast from Renewse head trends southward for $7\frac{1}{2}$ miles to cape Ballard.

Renewse islet, southward about $\frac{3}{4}$ mile from Renewse head, and separated from the land by a narrow boat channel, is a low rock.

Renewse rocks, bearing 165° , distant about 2 miles from Renewse head and $1\frac{1}{2}$ miles from the shore, are 6 to 10 feet high: a rock, with 6 feet of water over it, lies 100 yards east-southeastward of them; in heavy weather the sea breaks on the rocks. The passage between Renewse rocks and the land is navigable in fine weather, but it is not safe in a heavy sea. Cape Race lighthouse, open eastward of cape Ballard, bearing 213° , leads about 1 mile eastward of Renewse rocks.

Cape Ballard rises abruptly to the height of 290 feet, and has a bare round summit. The land falls on each side of the cape, and even in fog the fishermen recognize it by the fog hanging black and dense around its sides. The water is deep close to it.

The coast from cape Ballard trends southwestward for $9\frac{1}{2}$ miles to cape Race.

Chance Cove head, situated about 2 miles southwestward of cape Ballard, is composed of dark slate cliffs, 150 feet high.

Black rock, west-southwestward 1 mile from the head, and in front of Chance cove, is 15 feet high.

Chance cove is a small open bight extending northward for $\frac{1}{2}$ mile. It has a gravel beach at its head, and affords anchorage to coasting vessels in 4 fathoms of water, sand bottom, during northerly winds. There is a small fishing settlement on the western side of the cove; the boats and fishing stages are protected by a shoal of sand and stones, upon which the sea breaks.

Frenchman cove, southwestward about $\frac{3}{4}$ mile from Chance cove, is rocky.

Clam cove, 2 miles southward of Frenchman cove, and nearly 4 miles northward of cape Race, is the outlet of a shallow stream. In ordinary weather boats land in this cove safely.

The coast between Clam cove and Cape Race is cliffy and broken, with here and there a small cove where a boat might land in favorable weather.

Cape Race light, fog signal, etc., see page 84.

CHAPTER X.

SOUTHEAST COAST OF LABRADOR—CAPE ST. LEWIS TO LONG POINT—THE STRAIT OF BELLEISLE.

The coast of Labrador from cape St. Lewis to York point, nearly 30 miles southwestward, is composed of bare granite hills, which, excepting in the vicinity of Chateau bay, do not exceed the height of 700 feet, but appear much higher from their steepness. Several of the bays and inlets are large, with bold shores and very deep water. Navigation on this coast is not difficult on account of the islands or rocks off it, but the frequent fog, the heavy easterly swell rolling in from the Atlantic, and the icebergs, which almost always drift southward with the current, render caution and constant vigilance necessary.

Fisheries.—See page 36.

Climate.—See page 43.

Cape St. Lewis is a promontory rising in dark-red precipitous granite hills to the height of about 500 feet. Its southeastern point is a small rocky peninsula, and St. Lewis rock, small, low, black, and close to the shore, with deep water at 400 yards seaward of it, lies nearly 1 mile northeastward of this point.

The highest land over cape St. Lewis has a double summit, which falls abruptly to Fox harbor, and is partly wooded.

Position.—St. Lewis rock is approximately in latitude $52^{\circ} 21' 50''$ north, longitude $55^{\circ} 37' 15''$ west.

St. Lewis sound, the entrance of which is between cape St. Lewis and Great island, situated $\frac{1}{2}$ miles south-southeastward, is open to the eastward. A high and long rolling sea occasionally enters St. Lewis sound from this direction, and it is felt as far up as the entrance of St. Lewis inlet, around the islands, and up the bays of the mainland westward of them; it often comes in without wind, and breaks heavily over islets 30 feet high, with a roaring surf on the shore. This sea is far less dangerous to boats, and impedes them less, than the short breaking sea of the gulf of St. Lawrence. It prevents landing, but during its continuance every shoal with less than 4 fathoms has a breaker upon it. Boats must, however, be on their guard on such occasions, for on some of the shoals the sea only breaks occasionally.

and then in a sheet of foam, which would swamp any boat that might encounter it.

Tides.—It is high water, full and change, in St. Lewis sound at 6h. 40m.; springs rise $3\frac{1}{2}$ feet, neaps 1 foot.

Fox harbor, westward $1\frac{3}{4}$ miles from the southeastern point of cape St. Lewis, extends north-northeastward nearly 1 mile, and has secure anchorage in 5 to 8 fathoms, mud bottom. The entrance is only about 200 yards wide, with a depth of 3 fathoms, but the harbor is nearly $\frac{1}{2}$ mile wide within. Fishermen point, on the southern side of the entrance, is low, and there are several fishermen's houses upon it; a small rock above water lies close northwestward of the point and is joined to it by shoal water.

In entering, leave the rock not over 100 yards to the southward, for a reef, partly above water, extends southward nearly 200 yards from the point, that separates the harbor from the unsheltered bay westward of it, and forms the northern side of the entrance. The best anchorage is about 600 yards within the entrance.

Water can be taken from the streamlets and ponds, but wood is very scarce.

Shoals.—A bank, about 400 yards long, northward and southward, and 200 yards wide, with a least depth of $5\frac{1}{2}$ fathoms of water, lies with its southern end about 665 yards southwestward of Fishermen point.

A shoal, with 13 feet of water on it, lies 250 yards off the mainland at $1\frac{3}{10}$ miles westward of Fisherman point and nearly 1,200 yards southeastward of the boat channel into port Marnham.

Port Marnham.—Marnham island, which is narrow and of considerable height, extends westward, $1\frac{1}{4}$ miles from a point of the mainland at $3\frac{3}{10}$ miles west-northwestward of the southeastern point of cape St. Lewis. Port Marnham, northward of the island, is about $2\frac{1}{2}$ miles long, 800 yards wide, and quite landlocked. The eastern entrance, between the eastern end of the island and the mainland, is narrow, and only fit for boats. The entrance between the western end of the island and Deer point is 800 yards wide, with depths of 19 to 31 fathoms in the middle, and clear to the rocks on either side.

A shoal extends 300 yards from Danger point, at the middle of the northern side of the port.

Anchorage.—There is anchorage anywhere in the port in 8 to 18 fathoms, mud bottom; the best position is off a small creek on the northern shore in 9 fathoms, mud bottom.

There is also secure anchorage in a more convenient depth of water, but with less room for large vessels, in the western part of the port.

Water may be taken from the small streams, or ponds of rain water, near the shores of the harbor. There are a few small trees up the western cove, but firewood is scarce.

Long harbor is immediately southward of the promontory terminating in Deer point, which divides it from port Marnham. The harbor extends westward $4\frac{1}{2}$ miles, and is about $\frac{1}{2}$ mile wide, with deep water. There is anchorage near its head: but it is completely open to the eastward, and is not safe.

Bay point, the southern entrance point of Long harbor, situated $1\frac{1}{2}$ miles south-southeastward from Deer point, is composed of green feldspar.

Shag rocks, 6 feet high, lie from 600 to 1,100 yards eastward of Bay point.

St. Lewis inlet is about 1 mile wide at its entrance between Shag rocks and Anthony islands: about 1,200 yards between Captain Jack island and Bay Point promontory, where there are two islets and some rocks; and it becomes wider within. There are bays with several small islands in them on the southern side of the inlet, but because they are open to easterly winds, and on account of the great depth of water, there is no good anchorage until within Black Fly island, which is 9 miles from the entrance and the first island in the middle of the inlet above those at the entrance. The depth of water often exceeds 30 fathoms in the middle and 20 fathoms close to the shores on either side: and the bottom is everywhere mud. A small rocky shoal, always above water, lies 2 miles below Black Fly island, and must be left to the southward in running up the inlet. The inlet is otherwise clear of shoals in the fairway.

Black Fly island is about 700 yards long, partially wooded, and surrounded with bowlders which extend 600 yards from it down the inlet and also from the northern point of the island to the mainland, so that the channel southward of the island is the only one navigable. There is good anchorage on the southwestern side of this island, in 5 to 9 fathoms, over a bottom of mud and stones, and wood and water are abundant.

Navigation becomes intricate immediately above Black Fly island, but vessels not drawing over 18 feet can ascend for $5\frac{1}{4}$ miles farther, where a sand flat with bowlders, nearly dry at low water, extends across the head of the inlet and the mouth of St. Lewis river. Wood island, $1\frac{3}{4}$ miles above Black Fly island, is nearly 1 mile long, 600 yards broad, and it is surrounded with bowlders, leaving a very narrow channel with 2 fathoms of water southward of it, but the channel northward of the island is rather wider and has depths of 3 to 14 fathoms. The island and the shores on either side are thickly wooded with spruce and birch, supplying timber suitable for building schooners and boats.

The trees increase in number and size from the entrance to the head of the inlet, owing to the change of climate. On the coast the temperature of the sea is often at the freezing point, and the tem-

perature of the air not much higher at times, even in the warmest months. At the head of the inlet the weather is frequently inconveniently warm, and mosquitoes and black flies are innumerable.

The Newfoundland fishermen obtain the wood they require for fishing stages from this inlet, and they sometimes build boats there. The scenery is beautiful, the granite hills rising occasionally, on either side of the inlet, to heights of 700 to 800 feet. There are high clay cliffs at the mouth of St. Lewis river, at the head of the inlet.

St. Lewis river.—As there is not water enough for boats over the flats of sand and bowlders at the entrance of St. Lewis river, it has not been examined. The water, however, is quite salt off its mouth, so that it is probably, as fishermen report, but a small stream.

River islands, or Anthony, Duck, and Captain Jack islands, lie at the entrance to St. Lewis inlet.

Anthony islands are two small rocks, the northeastern wedge-shaped and bare, the southwestern pyramidal and covered with turf.

Shoal ground, with a least depth of $4\frac{1}{2}$ fathoms of water over it, is situated 600 yards northwestward, and a rock with 7 feet of water over it bears 61° , distant 600 yards from the northeastern Anthony island.

Duck and Captain Jack islands are each bare granite, 150 feet in height, with a perimeter of about 3 miles. Around and off the northeastern end of Duck island there are several small and bare islets.

A chain of rocks, the shoalest of which has a depth of 2 feet of water over it, extends east-southeastward 600 yards from the northeastern part of Duck island, and a shoal with $3\frac{1}{2}$ fathoms of water over it lies 800 yards farther in the same direction.

The channel between Duck island and Captain Jack island is filled with rocks and is not navigable; the passage between these islands and the mainland to the westward is from 12 to 53 fathoms deep, and, as a considerable swell rolls in, it is an insecure anchorage.

Club cape, a high point on the mainland, lies southwestward $4\frac{1}{10}$ miles from cape St. Lewis, and a reef extends 140 yards northeastward of it.

Kyer cove, $1\frac{1}{2}$ miles southwestward of Club cape, is open to the northeasterly swell and should not be entered.

Marley rocks, off the entrance to Kyer cove, and bearing 269° , distant $1\frac{2}{10}$ miles from Kyer Cove point, which is situated $\frac{1}{4}$ mile westward of Club cape, are about 600 yards long, eastward and westward, 200 yards wide, and have a least depth of 6 feet of water over them. Green island, open northward of Kyer Cove point, bearing 94° , leads northward of these rocks.

A small rock, with 10 feet of water over it, is situated 800 yards southward of Marley rocks, and 550 yards from the eastern shore of Kyer cove.

A small rock lies close to Lion's head, a projection on the eastern shore of Kyer cove at 1 mile southwestward of Kyer Cove point.

Shoal harbor, a bay of the mainland northwestward of Kyer cove, and about one mile southwestward of the southwestern end of Duck island, extends $1\frac{1}{2}$ miles southwestward and has two small islets and several rocks in it. There is a depth of 12 feet between these islets and the southeastern side of the bay, which is therefore only available for small vessels.

Mary harbor, at the head of a bay of the mainland, which is situated $1\frac{1}{4}$ miles northwestward of Shoal harbor, and on the southern side of Mary Harbor head, is small, with depths of 3 fathoms over a part of it, and is only suitable for small vessels. In the outer part of the bay there is more room and greater depths, but anchorage is rendered unsafe by the occasional easterly swell.

Tides.—It is high water, full and change, in Mary harbor at 6h. 40m.; springs rise $3\frac{1}{2}$ feet.

Gull rocks, in the middle of St. Lewis sound, lying about 2 miles east-northeastward from Club cape, are two islets close together and 25 feet high.

A bank of 5 fathoms lies $\frac{1}{2}$ mile to the northwestward, and a bank of 7 fathoms in the same direction distant 1,250 yards from the western part of Gull rocks.

Green island, eastward $1\frac{1}{4}$ miles from Club cape, is 51 feet high and covered with grass. A reef extends northward 400 yards from it, and a shoal, with $4\frac{1}{4}$ fathoms over it, lies westward 200 yards from the northern part of the island. Green Island bank, a large bank with a depth of 7 fathoms over it, is situated east-northeastward 800 yards from Green island.

Middle rocks extend southeastward about $\frac{1}{2}$ mile from Green island; there are spaces between the rocks and between the island and the rocks, but the group is almost connected, and should not be approached nearer than $\frac{1}{4}$ mile.

Banks.—Eskimo bank, Northern bank, Monday bank, Seventeen Fathoms bank, and Blake ground lie in the entrance to St. Lewis sound, and have depths of 10 to 17 fathoms of water over them. The sea is reported to break in 14 fathoms and less of water in winter gales.

Battle islands lie on the southern side of the entrance to St. Lewis sound. Great island, nearly round, about $\frac{1}{3}$ mile across, and 158 feet high, is the northernmost of these islands; it is unlike any of the others, being a black and precipitous rock, with horizontal white streaks seaward and a large white patch on its southwestern side.

Double islands, about 1 mile southeastward of the rest of Battle islands, are two in number and separated by a narrow channel. The

eastern island is $\frac{3}{4}$ mile long, north-northeastward and west-southwestward, about $\frac{1}{4}$ mile wide, and 130 feet high. The western island is the smaller, and is 125 feet high.

Light.—A cylindrical iron tower, 34 feet high, painted black and white in horizontal bands, with a white lantern, on the hill at about 200 yards southward of the northern end of the eastern Double island, exhibits at 126 feet above high water a fixed red light, which should be seen from a distance of 12 miles in clear weather.

The keeper's dwelling, a single-storied, flat-roofed building, is connected to the lighthouse by a covered way, and the storehouse is 100 feet southward of the dwelling; the covered way, dwelling, and store are white.

The light is exhibited from the opening till the close of navigation.

Shoals.—Several shoals lie eastward of Great island and northward of Battle island: the northeastern end of the eastern Double island opens southeastward of Gull island, bearing 148° , leads northeastward; and Caribou point open northward of Great island, bearing 249° , leads northward of them, but this line leads over North Ribb.

North and South Ribb are two ridges of rocks, on which the sea always breaks, about $\frac{1}{2}$ mile apart, north-northwestward and south-southeastward: each is about 400 yards across. South Ribb bears 18° , distant $\frac{3}{4}$ mile from Gull island.

Middle Ribb, a shoal with 14 feet of water over it, lies midway between North and South Ribbs.

Martin bank, with a least depth of 10 fathoms over it, bears 69° , distant 800 yards from the southern end of North Ribb; and Southern bank, with a least depth of 7 fathoms, bears 97° , nearly $\frac{1}{2}$ mile from South Ribb.

Mariners should pass eastward of these reefs, except perhaps with local knowledge.

Battle harbor, between Battle islands and the eastern part of Great Caribou island, is only suitable for small vessels, being about 60 yards wide in the entrance, 150 yards wide within, and $\frac{1}{2}$ mile long, with depths of 4 to 6 fathoms, mud bottom. Two round islets, each about 100 yards in diameter, lie, respectively, $\frac{1}{2}$ mile and $\frac{3}{4}$ mile southeastward from the western end of Great island; the southern islet is in the entrance of the harbor. There are depths of 12 to 15 feet close eastward and westward of these islets. The southern entrance is only available for boats.

In approaching the harbor pass westward of Great island and the other islands lying between it and Battle island and close on either side of the round islets southeastward of Great island.

Caution must be used by steamers in the herring season to avoid fouling their screws in the nets.

Battle harbor is reported to be secure during summer, but in autumn an undertow, or a heavy ground swell, is said to roll in between the islands, damaging vessels and fishing stages, and rendering the harbor unsafe. The harbor is generally crowded with fishing vessels and boats, which moor to the rocks on either side, and the shores are bordered with fishing stages and the houses of fishermen. A good house and store stand on Battle island, and also a high flag-staff, which is noticeable from seaward. There are some 200 people about this station during the fishing season, but the number of residents during winter is very much less. It has an Episcopal church with a small spire. The harbor is not visited by Eskimos, but some half-breeds come there occasionally.

Communication.—A steamer runs between Bay of Islands and Battle harbor weekly during summer and autumn, and the steamer from St. Johns to the northern Labrador ports calls fortnightly during July, August, and September.

A wireless telegraph station has been established by the government of Newfoundland at Battle harbor.

Coal.—Usually about 20 tons of coal may be obtained.

Hospital.—The Royal National Mission to Deepsea Fishermen has a hospital at Battle harbor with 8 beds for males and the same number for females.

Ice.—Battle harbor generally freezes about December 13 and opens May 16. The average time of the arrival of northern ice is December 31. Drift ice appears during February or March, and the coast in the vicinity is clear about the middle of April, except in an abnormal season, when ice sometimes remains as late as June 6.

Great Caribou island is the largest of the islands on the southern side of St. Lewis sound. There are two coves, with huts and fishing stages, in Great Caribou island, just westward of Battle harbor.

Caribou channel, leading to Assizes harbor, runs between Great Caribou island on the east, and Little Caribou, Hare, Copper, and Assizes islands on the west. Black head, the southwestern end of Great Caribou island, is 200 feet high: it falls steeply to the sea, but its northern side slopes gradually to a marsh a few feet above high water, which extends from Sand cove, on the western, to Cartridge bight, on the eastern side.

A shoal with depths of less than 3 fathoms over it, extends from the northern part of Black head across Sand cove, and there is a rock, with 2 feet of water over it, on its southern part, at 200 yards off-shore.

A narrow channel, with a depth of $3\frac{1}{2}$ fathoms in it, runs between this shoal and the ledge of Little Caribou island (see p. 629), but there is no leading mark.

A rock, with 15 feet of water over it, lies northwestward of this shoal, and bears 166° , distant 450 yards from the southern point of Indian island; a small shoal, with a depth of $4\frac{1}{2}$ fathoms of water, bears 190° , distant 300 yards from the same point.

Indian island, 75 feet high, covered with turf over reddish gray rock, and generally flat, is joined at low water to the middle of the western side of Great Caribou island by a bank of gravel on which are several low rocks.

Indian cove, the shallow channel between Indian island and Great Caribou island, affords good shelter for fishing craft, as far southward as the first narrows, beyond which only small boats can proceed. Numerous houses and fishing stages border this cove.

Mouse island, a small white rock, 14 feet high, $\frac{1}{2}$ mile northward of Indian island, is separated from Great Caribou island by a narrow channel, with a depth of 9 feet of water in it. A rock, with 6 feet of water over it, lies close to the northwestern end of Mouse island.

Caribou point, the northwestern point of Great Caribou island, rises to a circular hill, 130 feet high. The point has a striped appearance, caused by alternating black and white terraces of rock in vertical stratification.

Assizes island, one of the large islands on the southern side of St. Lewis sound and situated on the western side of the northern entrance to Caribou channel, is partly covered with turf and small wood; and the underlying rock, where visible, is white. A hill near the middle of the island, 280 feet high, generally flat at the summit, with a few small rises, falls steeply to Nimrod tickle on the northwestern and Assizes harbor on the southeastern side.

The Rags, a cluster of rocks, the highest of which is 8 feet high, lie close to the northern side of Assizes island; there is a depth of 5 fathoms at about 200 yards off them.

The eastern coast of Assizes island is indented by deep fissures, and fringed by Parsons ground, a bank, the northern portion of which has $7\frac{1}{4}$ fathoms over it.

A bank, with 9 fathoms of water, bears 78° , distant 1,300 yards from the Rags.

Copper island, on the eastern side of Assizes harbor, is wedge-shaped, and has its summit, 137 feet high, near the northern end. The northern side of the island falls steeply, and is cliffy in places. Near the southern part of its southwestern coast, there is a small green sward.

An islet, some 60 feet across and 15 feet high, lies close to the southeastern end of Copper island; and a rock, about 5 feet high, is attached to the southern end of this islet.

Hare island rises to a flat-topped hill, 192 feet high, near its northwestern end, and a peaked hill, 155 feet high, near its eastern end; it is separated from Assizes island by a channel 65 yards wide, which has numerous rocks in it, and should not be used.

Shoals, with depths of 10 to 18 feet, extend 300 yards eastward from the northeastern side of Hare island, and others fringe its southeastern coast for 150 yards. The eastern point of Tilcey island just open northeastward of the eastern point of Little Caribou island, bearing 143° , leads close northeastward, and the sharp peak at the western end of the range in the middle of Great Caribou island open northward of Indian island, bearing 78° , leads northward of these shoals.

On the western side of Hare island a rock, with less than 6 feet over it, lies with the western point of Dumpling island bearing 217° , distant $\frac{1}{2}$ mile. The space between Hare and Assizes islands, being foul ground and shoal water of 2 to 3 fathoms, should not be entered.

It is stated by local fishermen that the water between Dumpling island and the mainland to the southwestward is shoal.

Assizes rock, with 4 feet water over it, is the shoalest part of a bank 335 yards long north and south, and nearly 200 yards wide, situated 200 yards westward of the western part of Indian island. The eastern summit of Tilcey island (near its eastern end) in line with the eastern point of Little Caribou island, bearing 145° , leads southwestward; and cape St. Lewis, open westward of Caribou point, bearing about 13° , leads westward of this rock, and nearly over Mid rock.

A shoal with $4\frac{1}{2}$ fathoms water over it, bears 252° , distant 150 yards from the northern point of Indian island.

Mid rock, bearing 340° , distant 800 yards from the northern point of Indian island, has 8 feet of water over it. The eastern point of Little Caribou island, open westward of the southwestern side of Indian island, bearing 155° , leads westward; and the eastern summit of Hare island in line with the southern end of the islet southward of Copper island, bearing 209° , leads northwestward of this rock.

Assizes harbor trends westward 700 yards between Copper and Hare islands, with a breadth of 450 yards, and then turns sharply southwestward for 650 yards between Assizes and Hare islands, where it is 400 yards wide. It is entered from the northward by a channel, less than 100 yards in width, between Assizes and Copper islands, and from the southward, between Copper and Hare islands. There are a few houses on a promontory about 20 feet high, near the head of the harbor.

The harbor has several shoals in it, lying nearly 200 yards off the northern coast of Hare island, and having depths of 10 to 15 feet over them. The northern part of Indian island in line with the southern end of the islet southeastward of Copper island, bearing 97° , leads northward, and the northwestern end of Copper island shut in with the eastern highwater line of Assizes island, bearing 21° , leads westward of these shoals.

The shores of the harbor are otherwise steep-to at the distance of 65 yards, with the exception of a small spit of rock extending from the eastern point of Assizes island. This spit extends into the channel between Assizes and Copper islands, but falls quickly to moderately deep water.

Water may be generally taken from a small stream running into the western part of the harbor.

Tides.—It is high water, full and change, in Assizes harbor at 7h. 5m.; springs rise $4\frac{3}{4}$ feet, neaps $3\frac{3}{4}$ feet.

Little Caribou island, 300 yards southeastward of Hare island, is 129 feet high, pyramidal in shape, and partially covered with turf over whitish rock and with stunted wood in the hollows. It is surrounded by a fringe reef, which with the shoal water off Hare island, narrows the channel between these islands to about 400 feet.

A ledge, situated northeastward 150 yards from the eastern end of Little Caribou island, is 335 yards long, 150 yards wide, and has a depth of 2 feet over it. The navigable channel between this ledge and Little Caribou island is only 200 feet wide, with a depth of $4\frac{1}{2}$ fathoms. In ordinary weather the shoal surrounding the ledge is visible, showing a white bottom, while the shoalest parts are covered with kelp, and the channel westward appears of a dark color.

A small shoal, with $3\frac{3}{4}$ fathoms water over it, bears 342° , distant 550 yards from the eastern point of Little Caribou island.

Directions.—For Assizes harbor from the northward, round Caribou point and steer for Copper island; then, observing the clearing marks for Mid rock (see page 628), round the islet off the southern end of Copper island at the distance of 200 yards, and anchor in the harbor in 6 to 9 fathoms water. For the western part of the harbor keep clear of the shoals off the northern coast of Hare island (see p. 628).

Proceeding southward through Caribou channel, after passing Copper island, keep cape St. Lewis open westward of Caribou point, about 13° , until the eastern point of Little Caribou island is midway between the eastern summit of Tilcey island and the eastern point of that island, bearing 143° , which mark leads midway between Assizes rock and the shoal water off Hare island. As there is no leading mark through the channel between Little Caribou island and the ledge northeastward of it, round the eastern point of Little

Caribou island at a distance of about 60 yards, and when the northern end of St. Charles Gull island opens southwestward of Black head the vessel is southward of the shoals.

From the southward, steer for Little Caribou island; round the eastern point of Little Caribou island at a distance of 60 yards, steering for the green sward on Copper island. Then keep the eastern point of Little Caribou island midway between the eastern summit and the eastern point of Tilcey island, bearing 143° , which leads between Assizes rock and the shoal water off Hare island, and when the sharp peak, at the western end of the range in the middle of Great Caribou island, opens northward of Indian island, bearing 78° , enter the harbor as above directed.

Proceeding northward through Caribou channel, when cape St. Lewis opens westward of Caribou point, bearing about 13° , steer to pass the islet off the southeastern end of Copper island at a distance of 200 yards, then haul to the northward and keep the eastern point of Little Caribou island open westward of the southwestern side of Indian island, bearing 155° , until the eastern summit of Hare island is shut in with the southeastern end of Copper island, bearing 209° , when Mid rock is cleared.

To pass between Little Caribou and Hare islands, keep about 100 yards from Little Caribou.

Water may be taken from ponds at the head of Sand cove, and firewood can be obtained by boats from the shores of St. Charles river.

Nimrod tickle, which lies between Assizes island and the mainland westward, and which leads into St. Charles river, is 435 yards wide in the narrowest part; rocks, partly above water, extend nearly 200 yards from all the points on the northern side of Assizes island. Therefore, keep the mainland side aboard, and keep a good lookout, for the channel has not been carefully examined.

St. Charles river.—There is roomy and landlocked anchorage in the mouth of this river, which is named the Lodge, and extends southwestward some $2\frac{1}{2}$ miles from Assizes island.

About 2 miles above the Lodge the river becomes narrow and intricate, though navigable for $1\frac{1}{2}$ miles farther; still farther up there is a depth of 6 feet in a narrow channel, in which there are many rocks. Wood and water are abundant.

Cape St. Charles is the eastern point of a promontory of the mainland, which extends eastward to the southwestward of Battle islands. St. Charles hill, round and 654 feet high, lies westward, nearly 1 mile from the cape, and is the highest land in this locality.

St. Charles Gull island is 160 feet high, $\frac{1}{2}$ mile long, about 600 yards broad, and lies eastward about 1 mile from the cape.

Fish rock lies eastward, 1,200 yards from St. Charles Gull island; there is deep water around it, but a rock awash at low water lies southwestward, 150 yards from its southwestern point.

Western bank, bearing 220° , distant 450 yards from the southern point of St. Charles Gull island, is a small rock with 17 feet of water over it, and steep-to.

St. Charles harbor lies inside of Wall, Tilcey, and Fox islands, which are situated along the northeastern side of cape St. Charles promontory, and are also known as the Seal islands. The anchorage, which is easy of access, is about 1,200 yards long, $\frac{1}{4}$ mile wide, and the depth ranges from 5 to 12 fathoms, mud bottom. Some swell rolls in with easterly winds, and therefore it is not considered a secure harbor for large vessels, except in the finest summer months.

Small vessels secure safely by making fast to the rock between Wall island and the mainland in 9 feet of water. There are houses and fishing stages both on the islands and the mainland.

Wall island, 200 feet high, is the southeastern island. There is an entrance to the harbor between Wall island and the mainland, but it is shallow and narrow, and only suitable for boats.

Three small rocks above water lie close off the western point of Wall island; they are steep-to.

Shoals.—Inner shoal, with a depth of 17 feet, bears 85° , distant 650 yards from the eastern point of Wall island; in the same direction at the distance of 1,250 yards is Middle shoal, with a depth of 4 fathoms; and at 1,850 yards, Wall shoal with a depth of 9 fathoms.

The western side of Gull island (Battle islands), shut in with the eastern end of Black islet, bearing 20° , leads between Wall island and Inner shoal.

Tilcey island, northwestward of Wall island, is 232 feet high, black, precipitous, and unlike the others near. The entrance to St. Charles harbor between Tilcey and Wall islands is 200 yards wide, with deep water close to the shores on either side.

The channel between Tilcey island and Fox island, which is 400 yards westward, is only 2 to 3 fathoms deep, and is rendered intricate by rocks. The channel between Fox island and the mainland is narrow and shallow, and only available for boats.

Directions.—From 200 yards northward of the eastern point of Wall island steer about 270° , and pass midway between Wall and Tilcey islands into the harbor. Leave the three small rocks above water off the inner point of Wall island to the southward.

Anchorage.—The best anchorage is off the mouth of a small bay of the mainland, in which there are a wharf and a flag-staff at the principal fishing establishment.

Settlement.—There are permanent residents in St. Charles harbor, and water can be obtained on the mainland.

Antill cove, situated in the mainland southwestward of Fox island, is 600 yards in extent, and clear of shoals at a short distance from the shore.

It is a whaling station, and there is anchorage near the head of the cove, in 11 to 14 fathoms of water, sheltered except from northerly winds.

St. Charles channel, between the mainland on the southern side and Great and Little Caribou, Hare, and Assizes islands on the northern side, is from $\frac{1}{2}$ to $\frac{3}{4}$ mile wide, and it extends from its entrance westward $3\frac{1}{4}$ miles to White Bear point. White Bear bay extends westward $1\frac{1}{4}$ miles, but it is full of rocks, and is open eastward. White Bear point, a narrow promontory jutting out about 1,200 yards, forms the northern side of the bay. On the northern side of the promontory, and connected with it by rocks and shoal water, lies Dumpling island, a small islet, from which rocks and shoal water extend eastward 250 yards. The channel between Dumpling and Hare islands, known as the Narrows, is $\frac{1}{4}$ mile wide, and has 14 to 18 fathoms of water in it.

From close southwestward of the southern end of Hare island a course of 295° for about 800 yards leads through the Narrows into the channel between Assizes island and the mainland, which is 1,200 yards wide, and over 20 fathoms in depth. See also pages 627, 628. From this channel a vessel may either proceed up the Lodge, or through Nimrod tickle into St. Lewis sound. There is anchorage throughout all this extensive and landlocked space, but usually in depths exceeding 20 fathoms.

Niger sound, on the southern side of St. Charles promontory, extends nearly 6 miles westward, and the water in it is generally deep. The entrance, between the southern point of St. Charles promontory and Camp islands, is $1\frac{2}{10}$ miles wide. Big Duck island, at $2\frac{1}{2}$ miles within, is 340 feet high. Little Duck island, much smaller and 50 feet high, lies 600 yards southeastward of Big Duck island.

Duck Island bank, with $5\frac{1}{2}$ fathoms of water on it, lies 200 yards northeastward of Little Duck island. Shoal water extends from both the eastern and western end of that island, and a shoal, with a least depth of 4 fathoms, connects its western end with Big Duck island.

Two shoals, with $4\frac{1}{2}$ and $4\frac{1}{2}$ fathoms of water over them, respectively, lie in the channel northwestward of Big Duck island, leaving a narrow passage on each side in the southwestern entrance to Islet bay, which is northward of Big Duck island.

Morgan shoal extends nearly 200 yards off the northern part of the eastern point of the mainland on the southern side of Niger sound.

There is good anchorage in Horn bay, at the head of the sound, and also in Islet bay. Wood and water are abundant.

Deer island, about 300 feet high, nearly round, and $\frac{3}{4}$ mile in diameter, lies close off the eastern point of the mainland on the southern side of Niger sound, and Chimney tickle, a narrow boat channel, with fishing huts and stages on its shores, passes between them.

Carrol cove, a small indentation of the mainland at $\frac{1}{2}$ mile westward of the tickle, has good anchorage, and is frequented by many vessels during the fishing season; there are fishing huts and stages on its shores.

Main tickle, the channel between Camp and Deer islands, is 400 yards wide and clear, but a bank, with 6 fathoms of water over it, lies in the middle of its northern part.

Camp islands comprise three bare granitic islands and two islets or rocks, lying close together northeastward of Deer island; there is a small cove on their southern side, with very indifferent shelter from southerly winds, where fishing vessels moor to the rocks, but the shelter for the boats of the fishermen is excellent, and their huts and stages border the shores.

Romsey rock, bearing 258° , distant 350 yards from the southwestern point of the middle Camp island, has a depth of 9 feet over it. The western point of Big Duck island open southwestward of the western Camp island, bearing 311° , leads southwestward of this rock.

The Horns, a bank with 5 fathoms of water over it, bears 94° , distant 950 yards from the southern point of Deer island, and Red Island bank, with 7 fathoms of water over it, bears 114° , distant 1,500 yards from the same point.

Goat islet, from which a rocky shoal extends northward 300 yards, lies $\frac{1}{4}$ mile southwestward of Deer island. An islet bears 198° , distant 1,400 yards from Goat islet; and Red islet, with a rock awash at 335 yards eastward of it, lies southward about 1,200 yards from Deer island.

Torrent point lies southward about $1\frac{3}{4}$ miles from Deer island, and the bay between them is open.

White Mica cove, southward $1\frac{3}{10}$ miles from Torrent point, is only suitable for boats.

Table head, southward about 1 mile from White Mica cove, is an isolated headland of basaltic columns upon sandstone, flat at the top, precipitous all round, 200 feet high, and very remarkable. Truck island lies northeastward of the head, but affords no shelter.

Peterel islands, so named because these birds breed upon them, are a group of low islets and rocks above and below water, the outer of which is situated southward, $1\frac{1}{2}$ miles from Table head.

St. Peter islands comprise a scattered cluster of small and low islets, with many rocks above and under water, the outer of which is situated south-southwestward, 3 miles from Table head. These islets and the Peterel group are cliffy and black, being for the most

part basalt and amygdaloid; there are three or four flat-topped iron-stone deposits.

Shoal water extends about 400 yards seaward from some of these islands.

Allen shoal, lying with the outer Peterel island, bearing 269° , distant $1\frac{3}{4}$ miles, has a depth of 8 fathoms over rocky bottom; the sea breaks on the shoal in heavy weather.

St. Peter bay, westward of St. Peter and Peterel islands and on the southwestern side of Table head, extends about 2 miles inland. It is completely open to the eastward, but the islets and reefs form a breakwater. The hills at the head of the bay are nearly 900 feet high, and extend, within St. Peter point, southwestward to Chateau bay. St. Peter point, the southwestern point of the bay, bears northwestward, distant 2 miles from the southern St. Peter island.

The depth in the entrance between St. Peter point and the inner islet is about 6 fathoms. This entrance is $\frac{3}{4}$ mile wide, but a shoal, with 13 feet of water over it, lies nearly 400 yards southwestward of the islet; and a reef extends eastward 335 yards from St. Peter point.

The channel between these shoals is about 800 yards wide; it is approached from the southward, passing westward of all St. Peter islands and giving them a berth of over $\frac{1}{4}$ mile.

Anchorage.—There is anchorage at $\frac{3}{4}$ mile from the head of the bay, in 13 to 20 fathoms, sand; it is, however, very indifferent, although it might be useful in necessity. Both wood and water can be obtained.

Sandwich point and cove lie about 2 miles southward of St. Peter point; the cove is only available for boats.

Bad bay, lying between Sandwich point and Seal point, the northeastern entrance point of Chateau bay, situated about 2 miles southwestward, is rocky and dangerous, and affords no shelter.

Seal islands are four islets, from 9 to 33 feet high, lying close around Seal point.

Henney shoal, southeastward 750 yards from the western part of the western of the Seal islands, is about 350 yards in length, westward and eastward, 300 yards in greatest width, within the depth of 10 fathoms, and has a least depth of 7 fathoms over it.

The coast from Seal point trends irregularly westward for $1\frac{1}{16}$ miles to Grenville point, and close off it, at about $\frac{9}{16}$ mile from Seal point, is an islet 23 feet high.

Henley island, close southward of this islet, is triangular in shape, and each side has a length of about 1,200 yards; its southern point rises steeply to the summit of the island, which is a remarkable basaltic cap with vertical sides and a flat top, 196 feet high. Two islets are joined by reefs to the middle of its southwestern side.

Castle island, the northwestern point of which is separated from the southern point of Henley island by American tickle, a narrow passage, is about $1\frac{3}{10}$ miles long, northward and southward, and from 600 yards to 100 yards in width. Its northern part rises to the summit of the island, which is a remarkable basaltic cap with vertical sides and a flat top, 198 feet high.

Chateau point, the southern point of Castle island, is steep to on its western side, but a shoal extends southward 150 yards from it.

Beacon.—A black cask on a pole stands on the middle of the island; from northwestward and southeastward it shows against the sky.

Castle ledge, bearing 168° , distant 300 yards from the northeastern point of Castle island, is a small rocky patch with $2\frac{3}{4}$ fathoms over it.

Chateau bay lies westward of Castle and Henley islands, its main entrance being between Chateau point and York point, which bear west-southwestward and east-northeastward, distant $1\frac{1}{10}$ miles from each other. The bay is indicated from seaward by its position with reference to Table head and St. Peter islands, by the high land in rear of it, by the straight and unbroken coast, free from islands, southwestward of it, and especially by the summits of Castle and Henley islands.

The bay has within it Henley, Antelope, and Pitts harbors, the two latter of which are quite secure and suitable for large vessels. The scenery in Chateau bay is bold. Pitts hill, on the western side of Pitts harbor, is 593 feet high, and Beacon hill, about 1 mile northwestward of it, is 752 feet high; from the latter the land falls rapidly to the northeastern shore of Temple bay. There is a remarkable hill, 832 feet high, on the southwestern side of Temple bay, which falls very steeply to the shore, and 2 miles to the southward of it is High Beacon hill, a ridge, which rises to the height of 978 feet.

There is hardly any grass on this part of the country, but there is plenty of the kind of moss that caribou and reindeer eat. The cranberry, called here the "Partridge berry," is also plentiful. There are some caribou in the hills not far from Chateau bay, and partridges are common at certain seasons.

York point.—There are some rocks off York point, and a rocky patch, with $4\frac{1}{2}$ fathoms of water over it, bears 44° , distant 600 yards from it, within which the point should not be approached. For in-draft westward of, see page 642.

Ice.—Chateau bay is generally frozen up about December 25 and open again about the first week in July.

Stage island lies westward of the southern part of Henley island; it is about 700 yards long, northwestward and southeastward, 35 feet high, and a reef extends 200 yards southward of it, and 300 yards westward of its southern end. On this reef at 200 yards westward of the southern end of the island is a rock, 2 feet high.

Whale island lies westward about 800 yards from Stage and Henley islands; it is 1,600 yards in length, eastward and westward, 1,100 yards in greatest breadth, and 336 feet high. Flat island, close southward of its eastern end, is 300 yards long, northward and southward, and 18 feet high.

Rocks.—Halfway rock, with $2\frac{3}{4}$ fathoms over it, bears 4° , distant 1,250 yards from York point, and is 600 yards offshore.

Twelve-foot rock, with 9 feet of water over it, bears 134° , distant nearly $\frac{1}{2}$ mile from the southern point of Flat island. A rocky patch of $3\frac{1}{2}$ fathoms lies northward 265 yards from Twelve-foot rock.

A patch, with a least depth of 19 feet over it, bears 72° , distant $\frac{1}{4}$ mile from Twelve-foot rock.

Flat Island rock, with $3\frac{1}{4}$ fathoms over it, lies 400 yards eastward of the summit of Flat island.

Freezers rock, with 9 feet over it, bears 243° , distant nearly 400 yards from Black point, the western point of Henley island. There are depths of $4\frac{1}{2}$ fathoms between this rock and the point.

Black rock, 2 feet high, off Black point, is steep-to and a good mark.

Henley harbor, between Stage and Henley islands, is about $\frac{1}{4}$ mile long and 200 yards wide, with depths of 4 to 12 fathoms; there is a swell in the harbor with strong southerly winds. It is only suitable for small vessels, and is frequented by fishermen, the majority of whom arrive from Newfoundland in June or July and remain until October: there are numerous stages along the shore on both sides of the harbor.

American shoal is a rocky patch, with 1 foot of water over it, lying in the fairway to Henley harbor, bearing 162° , distant 200 yards from the southeastern point of Stage island. It is, however, quite visible.

American tickle is the narrow channel passing between Castle and Henley islands and leading into Henley harbor: it is used by vessels drawing up to 15 feet.

Antelope harbor is on the eastern side of Chateau bay, between Henley island and Barrier point: this point, with the reef extending about 800 yards southwestward from it, separates Antelope harbor from Pitts harbor to the northwestward.

On Henley island, at the head of Antelope harbor, there are two or three houses occupied by fishermen who reside in this locality all the year round, except during the depth of winter, when they go to the head of Pitts harbor, where it is warmer and more sheltered from the wind.

The narrow channels between Henley island and the mainland, leading into Antelope harbor, are only available for very small craft.

Beacon.—Immediately eastward of Barrier point there is a bay, and on Grenville point, its southeastern entrance point, there is a cask beacon and a large whitewashed mark, either of which serves as a leading mark for clearing the rocks westward of Castle island.

Pitts harbor is far the best in Chateau bay, being roomy and well sheltered; it is about 1 mile long north-northwestward and south-southeastward, and from $\frac{1}{2}$ to $\frac{3}{4}$ mile wide, and in its central part there is a depth of 14 to 17 fathoms, mud bottom. A good anchoring berth is in 14 fathoms, with the northern end of Pitts point bearing 182° , distant 900 yards.

Water may be taken from a stream at the head of this harbor, and wood is plentiful.

Temple bay, northwestward from Whale island, extends northwestward for $3\frac{1}{2}$ miles from Temple pass, with a width of about $\frac{3}{4}$ mile; in the middle the depth is 20 to 45 fathoms, and as the shores are steep to there is no good anchorage. At the head of the bay there is a flat of sand and bowlders fronting the entrance to a river. At times large numbers of salmon are found in this river. Close southwestward of Temple pass, in the southeastern corner of the bay, is the fishing village of Chateau, off which small vessels anchor.

Considerable quantities of mica are found on the southwestern side of Temple bay, but the leaves are too small for commercial purposes. On the eastern side is a small outcrop of graphite.

Temple pass, the southern entrance to Temple bay, is 180 yards wide; the bottom is rocky, with large bowlders, and there is a least depth in the fairway of 3 fathoms. The ebb tidal stream runs through this pass at a considerable rate.

Milner's tickle, the northern entrance to Temple bay, is about 350 yards wide, but the shores on either side are foul for some distance off, and without a buoy the clear passage is not easily distinguished. The least depth in the fairway is 4 fathoms.

Directions.—From the southward, give York point a berth of rather more than $\frac{1}{2}$ mile and bring the cask beacon on Grenville point just open of Black point, the black, rocky western point of Henley island. Should the beacon be down, Grenville point is distinguished by the whitewashed mark on it, and by the black rock of the point showing out against the lighter background of the land behind. This mark leads 235 yards westward of Twelve-foot rock and nearly the same distance eastward of Flat Island rock, which latter is cleared when the northern end of Castle Island cap is well in on the southern point of Stage island.

For Antelope harbor, if not of very heavy draft, being on the leading mark and clear of Flat Island rock, steer to pass 100 yards off Black rock: this leaves Freezers rock less than 100 yards to the

westward; then turn into the harbor and anchor between Grenville point and the northwestern side of Henley island, where the harbor is 600 yards wide and the depth 15 to 18 fathoms, over mud bottom. Between this position and Grenville point there is a small mud bank having a least depth of 7 fathoms over it.

In a vessel of heavy draft follow the directions given below for Pitts harbor till past Freezers rock, or when Black point bears 83° , and the depth of water increases to over 10 fathoms; then turn north-eastward into the harbor.

For Pitts harbor, being on the leading mark and clear of Flat Island rock, haul gradually to the westward and bring the rock 2 feet high, on the reef at 200 yards westward of the southern end of Stage island, in line with the cask beacon on Castle island, bearing 136° astern, which mark leads westward of Freezers rock. Keep this mark on until the eastern extreme of Whale island is in line with the southwestern extreme of Castle island, bearing 155° astern, which mark leads, between the shoal off Pitts point and the long stony spit extending from Barrier point, direct to the anchorage.

The southern end of Henley island basaltic cap open southward of Black point, bearing 111° , leads southward of the spit extending from Barrier point.

Tides.—It is high water, full and change, in Chateau bay at 7h. 16m.; springs rise 4 feet, neaps $2\frac{1}{2}$ feet; neaps range $1\frac{1}{4}$ feet; in the autumn, with strong southerly winds, the spring range sometimes reaches 6 feet.

Tidal streams and current.—Inside of the bay, through the narrow channels, and off York and Chateau points, the tidal streams are perceptible, but outside of the bay the current sets almost always southward. During the survey in August and September, while the temperature of the water in Pitts harbor and Temple bay averaged 45° F., that of the sea outside the bay was never above 37° F.

Communication.—The coasting steamer from Bay of Islands calls at Chateau bay weekly during summer, anchoring alternately at Henley harbor and off Chateau village in Temple bay. The Labrador steamer from St. Johns proceeds fortnightly by way of Chateau bay to Battle harbor in summer.

Marine signal station.—A signal and telegraph station is established at Chateau bay, and it is included in Lloyd's system of reporting stations. The telegraph office is at Chateau village, and it is connected with Belle isle by cable, and by wireless telegraph. See page 41.

Wireless telegraph station.—Vessels can communicate with the marine signal station at Chateau bay by wireless telegraph. See page 42.

Belle isle, lying 17 miles eastward of Castle island and directly off the Atlantic entrance of the strait of Belleisle, is about $9\frac{1}{2}$ miles long north-northeastward and south-southwestward, and 3 miles wide, and is made up of a range of hills, bare of trees, which rises to the height of 680 feet. These hills are principally granite, alternating with clay and slate, and their sides form everywhere a steep coast, except at the northern end of the island, where two low points diverge to form Black Joke cove, a narrow creek which shelters very small fishing vessels during the finest summer months. Shelter may be obtained in Lark harbor, and in Valley cove at $2\frac{1}{4}$ miles southward of Lark 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 northeastward.

Black Joke cove, about 150 feet wide, with 12 feet of water, is inside of an islet joined to Belle isle at low water, and only affords secure shelter to two small vessels moored head and stern; but in heavy northeasterly gales, especially at high water of spring tides, the seas break heavily over the ledge of rocks, and render the cove unsafe.

Lark island, which is narrow and about 1,200 yards long, and 200 feet high, lies off the middle of the western side of Belle isle. Lark harbor, between Lark island and Belle isle, is only 400 yards wide, with deep water and indifferent holding ground; it is much exposed to northeasterly winds, but, as it has two entrances, vessels easily get to sea.

Valley cove affords fair anchorage and shelter during northeasterly winds; the bottom is sand, and between the line of the points the soundings are 17 fathoms, decreasing gradually to the shore.

The eastern side of Belle isle affords no anchorage and there is hardly a creek where a boat could find shelter.

Belle isle is frequented by English and French fishermen.

Rock.—A rock, with an estimated depth of 9 feet over it, and upon which the sea has been seen to break heavily, lies with the southwestern end of Belle isle bearing 140° , distant $\frac{1}{2}$ mile; this rock is probably that reported by the Ontario, in 1881, to exist at about 1 mile northwest of the southwestern point of Belle isle.

Light—Northeastern point.—A cylindrical red lighthouse, 55 feet high, on the northeastern point of Belle isle, exhibits, at 137 feet above high water, a flashing white light every eleven seconds, thus: Flash, half a second; eclipse, ten and a half seconds, which should be seen from a distance of 17 miles in clear weather.

Fog signal.—A diaphone fog horn, situated in a building near the edge of the cliff at about 67 yards northward of the light-house on the northeastern point of Belle isle and worked by compressed air, gives one blast of three and a half seconds duration every minute, during thick or foggy weather.

The fog signal building is rectangular in shape and painted red; and the fog horn projects from its northern side, pointing northeastward, and is about 90 feet above high water.

Lights—Southern point.—A circular white tower, 59 feet high, on the summit of the southern point of Belle isle, exhibits, at 470 feet above high water, an intermittent white light every ten seconds, thus: Light five seconds, eclipse five seconds, which is visible over an arc of 228° between the bearings 242° and 110° , and should be seen from a distance of 28 miles in clear weather.

The keepers' dwelling, painted white, is attached to the light-house.

A circular white iron lantern with a red roof, 23 feet high, situated on a masonry foundation below the high light-house, exhibits, at 124 feet above high water, an intermittent white light every ten seconds, thus: Light five seconds, eclipse five seconds, which should be seen from a distance of 17 miles in clear weather, except where obscured by the high land of Belle isle.

In fog the high light may be obscured when the low light is visible, or the reverse may be the case.

Fog signal.—A siren, situated in a small white building midway between the high and low lights at the southern point of Belle isle and 250 feet above high water, gives two blasts in succession, of a high note and a low note, respectively, every two minutes, thus: Low blast, two and a half seconds; silence, two and a half seconds; high blast, two and a half seconds; silence, one hundred and twelve and a half seconds, during thick or foggy weather. The siren is worked by compressed air.

Reserve fog signal.—The necessary apparatus for firing explosive bombs has been installed as a reserve fog signal. Should the fog siren at this station become disabled, cotton powder bombs will be exploded at intervals of ten minutes. If a vessel's fog signal is heard in dangerous proximity an additional shot will be immediately fired, and the firing will be continued at intervals of five minutes until the vessel has passed the station.

Marine signal station.—A signal and telegraph station is established at the southern point of Belle isle and it is included in Lloyd's system of reporting stations. Belle isle is connected by cable with Chateau bay and thus with the Canadian telegraph system. See page 41.

A blue light burnt at this station indicates to a vessel firing distinguishing rockets that her signals are recognized and will be reported.

Wireless telegraph.—Vessels can communicate with Belle isle signal station by wireless telegraph, and this system can be used for communicating between Belle isle and Chateau bay. See page 42.

Provision depot.—There is a depot of provisions for shipwrecked mariners at the low light-house on the southern point.

Northeast ledge, bearing 13° , distant $1\frac{1}{2}$ miles from the northeastern point of Belle isle, dries at low water springs; there is deep water in the channel between.

Strait of Belleisle.—The entrance of the strait of Belleisle, between St. Peter islands and Belle isle, is 13 miles wide, and that between Belle isle and cape Bauld is 14 miles wide; but the narrowest part of the strait is southeastward of Armour point, where it is $9\frac{1}{2}$ miles wide. The length of the strait from the southern end of Belle isle to a position 7 miles southeastward of Greenly island is about 73 miles.

From York point southwestward to cape Diable the northwestern shore is steep, and is composed of granite hills rising to flat-topped ridges and summits 1,000 to 1,300 feet high; and thence to Long point, at the western entrance of the strait, it is composed of sandstone lying on granite.

Outer soundings and Tooker bank.—See page 83.

Soundings.—The deepest water in the strait of Belleisle is on the Labrador side, but the line of deep water is not direct, nor continuous through the strait, and there is deep water beyond a distance of 2 miles off the Flower ledges on the Newfoundland side. The depth of water varies between 80 and 16 fathoms, and the bottom in some places is rock, and in others sand, broken shells, coral, or gravel.

With the exception of Maudit bank, near the eastern end, and some shoals off the Newfoundland coast near its western end, the strait is free from shoal obstructions to navigation in its fairway.

Maudit bank.—See page 363.

Fairway bank, lying southwestward about 14 miles from the southwestern point of Belle isle, is 2 miles in extent north-northwestward and south-southeastward and $1\frac{1}{2}$ miles northeastward and southwestward; the least water on the bank is 16 fathoms, but the general depth is 20 fathoms, with rock bottom.

Centre bank extends southwestward nearly 20 miles from a position 8 miles southward of the southern point of Black bay; the depths on the bank vary from 24 to 30 fathoms.

Tidal streams and currents.—See pages 54, 55.

The movement of icebergs is strong evidence of a preponderance, at times, of a southwesterly flow of the body of water on the Labrador side of the strait of Belleisle. During the summer of 1898 the number of icebergs in the strait was unusually small, due probably to the general persistence of westerly winds; but whenever icebergs were in the strait, they slowly and persistently pursued their course to the westward, keeping on the Labrador side. A gale from the westward might cause a slight drift back to the eastward, but as soon as it is over the westerly course would again be resumed, unless,

by grounding, they remain stationary, until by breaking up they are lightened sufficiently to drift again with the current.

All broken ice drifts ashore on the Labrador coast. It is stated that none ever reaches the Newfoundland coast, and no ice was seen in 1898 on that side. One small berg was observed a few miles northward of cape Norman, but apparently this berg drifted to the eastward and did not enter the strait.

As far as could be seen, the icebergs entering the strait passed between Belle isle and Labrador. The movements of the icebergs, since much of their volume is immersed, are necessarily due to the resultant flow of the whole body of water from the surface to the bottom. Many bergs were deep enough to ground in 55 fathoms.

Although persistent strong westerly winds frequently caused the surface current to flow continuously eastward, the few observations made on under currents showed that they were less affected by the prevailing winds than by the surface current; it is therefore possible, looking to the movement of the ice, that the body of the water on the Labrador side, taken as a whole, has a resultant flow to the westward.

The ice, as it broke up, always eventually drifted ashore on the Labrador coast; no noticeable indraft affecting navigation was, however, experienced anywhere, except southwestward of York point, where an indraft was frequently felt toward the land.

Toward cape Norman it was observed that there was a preponderance of easterly set; and, although farther southwestward this was not noticeable, it is probable that on the southern side of the strait there is a slight general preponderance of easterly set, and this seems to be borne out by the fact that this shore is everywhere thickly strewn with driftwood, while none is ever seen on the northern shore. It may be presumed that this driftwood comes from the St. Lawrence river.

The fishermen state that on several occasions bamboos have been washed up, in nearly every instance with a hole cut at the thick end, as if they had been used for fishing stakes, as in China. It is difficult to account for them.

About the end of July, 1898, a lumber vessel was reported to have been wrecked westward of Blanc Sablon, and shortly afterwards large quantities of floating timber were observed along the Newfoundland coast, and a quantity also came ashore at Green Island brook. None was seen on the Labrador side.

Temperature of the sea.—See page 56.

Icebergs.—See page 57.

Occasionally large pieces of icebergs drift into the anchorages on the northern shore of the strait, causing danger to the fishermen's nets, and sometimes making it necessary for vessels at anchor to get under way. No warning is given of the proximity of ice, as a rule, by

change of temperature of the sea. On one occasion, within 100 yards of a large berg, the temperature of the sea was 50° and its density 22, to windward; and temperature 49° and density 15, to leeward; while the normal temperature of the sea was 51° and density 23.

Fog.—During a period of 40 days in July and August, when simultaneous observations were made on both sides of the strait, fog, mist, etc., occurred on 60 per cent of the days on the Labrador side, and on 40 per cent on the Newfoundland side. See also page 46.

Landing.—After strong easterly winds, a heavy swell, lasting several days, sets through the strait and makes landing at most places on the coast of Newfoundland impossible.

Navigation.—Steam vessels navigate the strait from July to October, inclusive. See also page 64.

General directions.—From the eastward with clear weather, make Belle isle or its lights, and then keep in the fairway of the strait. When passing northward of the island avoid Northeast ledge.

In making the eastern entrance of the strait in thick weather, great caution is necessary and soundings should be frequently obtained. The position may possibly be ascertained by the fog signals on Belle isle, cape Bauld, and cape Norman. Midway between Belle isle and cape Norman the depths assist in estimating the position, since there is a gradual decrease in depth from the entrance until the bank, with depths of under 30 fathoms, which extends northward 15 miles from Pistolet bay, is passed, when the water deepens to from 30 to 50 fathoms.

In proceeding westward through the strait, if the vessel is in the middle, depths of 24 to 30 fathoms will be struck on Centre bank. Failure to strike this extensive bank indicates that the vessel has passed to one side of it, but as the soundings are much alike on both sides, it will be difficult to determine which. Some assistance may then be derived from the temperature of the surface water, which is generally, but not invariably warmer on the Newfoundland side than on the Labrador side, there being sometimes a difference of as much as 20° F. On the Newfoundland side it seldom falls below 50° during the season of navigation. When passing Amour point its fog horn may be heard.

From the westward in clear weather, make Greenly island, or its light, pass through the fairway of the strait and on either side of Belle isle. In thick weather observe that the soundings in the western approach are deeper on its northwestern than on its southeastern side. The position may possibly be ascertained by the fog signals at Greenly island and Amour point, after which there should not be much difficulty in getting to sea, assisted by the soundings and the fog signals at cape Norman, cape Bauld, and Belle isle. A sailing vessel

bound eastward through the strait, with a southerly wind and appearance of fog toward night, should perhaps, stand off and on under easy sail, tacking by the deep-sea lead, till daylight, if not to the eastward of Férolle point. If further advanced, it may be well to seek an anchorage. In a sailing vessel with light winds or calms, during foggy weather, it is better to bring up with a stream anchor anywhere in the strait rather than to drift about with the currents, but a lookout must be kept for drifting icebergs. See caution, page 73.

Anchorage.—In thick weather it may be advisable to anchor in one of the bays on the northwestern side of the strait rather than continue under way. Black bay might afford a temporary anchorage in summer for a steamer. Red bay is a good small harbor, but it can not be entered by a large sailing vessel with northeasterly winds. Pinware bay is the first anchorage available when proceeding westward with these winds, but then there is a heavy swell in the bay. Anse à Loup is the first good anchorage for a sailing vessel with these winds, but it is not worth while stopping there when bound westward, as then the strait is nearly cleared. Forteau bay is a fairly good roadstead, although a heavy swell sometimes comes in, and Blanc Sablon is considered a safe anchorage in summer. See pages 645, 656.

The coast from York point trends southwestward for 10 miles to Wreck point, and it is straight and bold.

Man-of-War rock, about 200 yards offshore at $4\frac{1}{2}$ miles southwestward of York point, is awash at low water.

Rock.—A rock, 200 yards off Wreck point, is awash at low water.

Wreck bay, which extends southwestward 2 miles from Wreck point, affords no shelter except for boats; a small river flows into its head and there are a couple of fishermen's huts on the northeastern side of the bay.

Bay shoal, a small patch of rocky ground with 11 fathoms least water, bears 180° , distant 3 miles from Wreck point. The fishermen in this vicinity say that occasionally, when the water is very clear, the bottom can be seen at the shoalest part of the patch. There is a heavy swell upon it in northeasterly gales, and frequently a great rippling.

Barge bay.—The eastern entrance point of this bay is situated southwestward about $2\frac{1}{2}$ miles from the southwestern point of Wreck bay. The bay, which is about $1\frac{1}{2}$ miles across its entrance and $\frac{3}{4}$ mile in extent, affords temporary shelter to small vessels in southwesterly and westerly winds. There is a waterfall and a small village at its head. A 3-fathom patch lies 500 yards offshore near the southern entrance point of the bay.

Barge point, on the southwestern side of this bay, is low.

Seal rocks.—Foul ground and rocks nearly awash extend to about 400 yards offshore from about 2 miles west-southwestward of Barge point nearly to Frys cove.

Frys cove, lying west-southwestward 3 miles from Barge point, is a little narrow inlet which affords shelter for small craft. There are two or three fishing huts near the head of the cove which show from the southward.

Black bay, 1 mile westward of Frys cove, is about 1 mile wide at the entrance, narrows to the head, which is 1 mile westward of the entrance. Small vessels occasionally anchor in the bay, but the bottom is sand and not very good holding ground, and the bay is open to the eastward. It affords a temporary summer anchorage for a steamer in case of a sudden fog. Anchorage should be taken in not less than 12 fathoms, as the water shoals suddenly at the head of the bay and rocks extend a considerable distance off its southwestern side. There are no inhabitants hereabouts.

The coast of Labrador from Wiseman head, the southern point of a small bay immediately southward of Black bay, southwestward to Pinware bay, is barren and made up of reddish granite rock and has a few indentations and some offlying rocks.

Gull island, southwestward about $1\frac{1}{2}$ miles from Wiseman head and $\frac{1}{4}$ mile offshore, is small, 20 feet high, moss covered, and rocky.

Thistle rock, with 3 feet of water over it, lies southwestward nearly $1\frac{1}{4}$ miles from Gull island, and bears 98° , distant 1,200 yards from the summit of the southern part of Twin island. When the sea is smooth the rock does not show.

Clearing marks.—Wiseman head, open southeastward of Gull island, bearing 50° , leads southeastward, and Cox hill, in line with the southern end of Twin island, bearing 289° , leads southward of Thistle rock.

Capstan Cove point is the end of a bare gray mound, 52 feet high, lying westward about $\frac{1}{16}$ mile from Gull island, and it shelters Capstan cove in easterly winds. Capstan cove is much used for anchorage by fishermen in the herring season.

Twin island consists of two hummocks, the northern being 40 feet high and the southern 32 feet, joined together except at high water springs. Several rocks extend westward from this island.

There is no passage for any vessel drawing more than 6 feet of water between Twin island and the mainland, nor between the eastern end of Saddle island and the mainland. A bar, with 15 feet of water over it, connects Twin and Saddle Island rocks.

Red bay is a good, though small, harbor formed by Saddle island and a bay in the mainland: and is divided into two parts, the northern being the basin and the southern the harbor. The passage from the harbor to the basin is 200 yards wide, with a depth of 7 fathoms of water in the middle, between Penney island and the eastern shore.

The eastern side of the harbor rises to a series of hillocks, 205 to 62 feet high, connected by marshes with ponds in them. The hills at

the head are densely wooded, and at $1\frac{1}{4}$ miles north-northeastward is a hill, 545 feet high, with several conspicuous bowlders at the summit. Southwestward of Moore point, the western entrance point to the basin, the hills fall steeply to the sea, occasionally in red granitic cliffs, over which a small cascade falls in ordinary weather. Tracey hill, immediately westward of the entrance to the harbor, is 505 feet high, and is surmounted by a cairn with a pole in it.

The settlement, containing a population of about 150 people, is situated principally on the northeastern shore of the harbor; at its northern end there is a hillock on which stands a flagstaff and a conspicuous red church with a white spire. The storehouse is on Penney island, and there are a few huts on Saddle island and Moore point. At the head of the basin are the winter houses, and a school with a flagstaff near it.

Shoal water extends 135 yards from the eastern shore and head of the basin, and a large shoal extends off the deep bight to the northwestward of Penney island. A bank of bowlders extends southeastward from Moore point, and the passage between that point and Penney island is only suitable for boats.

Saddle island is bare and rises to Cox hill, 97 feet high, at its eastern end, and to a hill, 101 feet high, at its western end. The western end has deep water within a few yards, but off the northern side shoal water extends 150 yards, and bowlders that dry at low water 100 yards from the middle of that coast.

Light.—A fixed white lantern light is exhibited from June to December on a white framework at about 100 yards within the western end of Saddle island.

Scab rock, with 16 feet of water over it, bears 166° from Cox hill, and is distant 350 yards from the coast of Saddle island.

Clearing marks.—Capstan Cove point, open southeastward of Twin island, bearing 53° , leads southeastward, and Tracey hill, well open westward of Saddle island, bearing 300° , leads southwestward of Scab rock.

Western arm is the open bay extending west-southwestward from the entrance to Red bay. Its shores are fairly steep except in the coves at the head, and it affords good anchorage with westerly winds in 14 fathoms of water or less, as convenient. The depth decreases gradually to the head, into which a small stream flows.

West point is the eastern end of the peninsula, about 62 feet high, that forms the southern shore of Western arm. Mad Moll, a rock that dries at low-water springs, bears 174° , distant 135 yards from West point.

The Louse, with 21 feet of water over it, bears 150° , distant 800 yards from West point, and Belles Amours shoal, with 5 fathoms of water over it, bears 173° , distant $1\frac{1}{4}$ miles from that point.

Directions.—Red bay is easy of access with a leading wind, but there is only room for small vessels to beat in or out, as the entrance between the shoal water off Saddle island and the bowlders and shoal water off Moore point is only 400 yards wide for them and 200 yards wide for large vessels.

From the eastward steer for the entrance, passing southward of Thistle and Scab rocks; see clearing marks, pages 645, 646.

From the westward bring a black-roofed house on the middle of Penney island in line with the western end of Saddle island, bearing 12° , which leads westward of Belles Amours shoal and midway between Mad Moll and the Louse. To pass eastward of these three shoals, keep Moore point in line with the western end of Saddle island, bearing 359° .

Round the western end of Saddle island at a distance of 200 to 300 yards, and bring and keep the church, bearing 46° , midway between the two summits marked on the plan 377 feet and 361 feet high, and situated about $1\frac{1}{2}$ miles to the northeastward. The church in line with the left-hand summit (377 feet), bearing 41° , clears the shoal ground northward of Saddle island; in line with the right-hand summit (361 feet), bearing 51° , clears the shoal ground off Moore point and Penney island. Then, when it comes on, steer for a prominent white house in line with the summit marked on the plan 195 feet in height, bearing 67° , and anchor in the harbor in 7 to 9 fathoms.

The harbor is almost invariably crowded with fishing schooners, and unless in a very small vessel it will probably be necessary to proceed into the basin, where there is plenty of room and there is less likelihood of being fouled by icebergs, which occasionally drift in.

To proceed into the Basin keep in mid-channel between Penney island and the eastern shore of the harbor. Anchor in 15 to 17 fathoms, but in order to clear the shoal on the southwestern side of the Basin do not shut in the stage in the middle of the northern side of Saddle island, with the wharf on the eastern side of Penney island bearing 164° .

The holding ground is good in the Harbor, and also in the Basin, for vessels with proper ground tackle, but in the heavy northerly gales of autumn which blow through it, small craft with inferior ground tackle frequently drag. With strong southwesterly winds it blows with great violence down Western arm and into the Harbor, and occasionally small steamers at anchor in the Harbor are compelled to seek shelter in the Basin.

Caution—Local magnetic disturbance.—The compass is considerably affected in the vicinity of Saddle island; the variation on the western summit of this island was observed to be $18^{\circ} 52' W.$, and on

the summit of Penney island $33^{\circ} 55'$ W., by the officers of H. M. S. Rambler in 1897.

Tides and tidal streams.—It is high water, full and change, in Red bay at 8h. 38m.; springs rise 4 feet, neaps $2\frac{3}{4}$ feet; neaps range $1\frac{1}{4}$ feet. The flood stream sets westward through the northeastern channel, and through the Harbor into the Basin; the ebb sets in the contrary directions, but the streams are generally weak unless influenced by strong winds.

Supplies—Small quantities of salt beef and flour might be obtained at Red bay.

Water can be taken, at high water, from the streams at the head of the Basin or of Western arm. Small quantities may be procured in smooth water from the stream under the cascade.

Ice.—The Basin freezes over about the end of November and the Harbor about the middle of December, and both remain frozen till the middle or end of May. Field ice remains till the middle or end of June, and icebergs may always be met with. Small bergs frequently drift into Western arm and occasionally into the Harbor.

Communication.—The weekly coasting steamer from Bay of Islands calls at Red bay during summer and autumn.

Red bay is connected with the Canadian system of telegraph lines. The telegraph office is near the western shore of the Basin.

The coast southwestward of West point is foul and should not be approached within $\frac{1}{4}$ mile. Teapot rock, with $4\frac{3}{4}$ fathoms of water over it, lies 400 yards from the shore at $1\frac{1}{4}$ miles southwestward of West point.

Carrol cove, southwestward about $2\frac{3}{4}$ miles from West point, is about 300 yards wide at its entrance and extends $\frac{1}{4}$ mile to the southwestward. One or two fishing vessels occasionally moor to the rocks in it, and there are huts and fishing stages on the shore.

Tides.—It is high water, full and change, at Carrol cove, at 8h. 20m.; springs rise $4\frac{1}{2}$ feet, neaps 2 feet; neaps range 1 foot.

Little St. Modeste islands, two in number, are small, low, and bare. Nelly island, the eastern of these islands, lies $4\frac{3}{4}$ miles southwestward of Carrol cove, and Lily island is 1 mile farther westward; both are close to the mainland northeastward of Pinware bay, but they afford no shelter to shipping. Lily island has some houses and a flagstaff on it.

Soldier rock, bearing 127° , distant $\frac{1}{2}$ mile from the eastern end of Lily island, is awash at low water; this rock is in the approach to Pinware bay from the eastward.

The Bank is some rocky ground, 600 yards in length northeastward and southwestward, lying with its outer extreme bearing 195° , distant $1\frac{1}{4}$ miles from Lily island. The least water found was 6 fathoms

on the extremes. Several other shoals with 6 to 9 fathoms over them lie between the Bank and the northern side of Pinware bay.

Pinware bay is $3\frac{1}{4}$ miles wide across the mouth from Lily island to St. Modeste island, and extends about 2 miles to the northwestward. The bay affords anchorage in 16 fathoms of water, sandy bottom, and although it is open to southeasterly winds it may be considered tolerably safe during summer.

Pinware river is at the head of the bay, and a sandy beach westward of it forms a spit on which there is a conspicuous house and flagstaff.

There is a shifting bar at the entrance to Pinware river, and vessels should not anchor very near it, as the water shoals suddenly. The best anchorage is in 16 fathoms, with the eastern point of Ship head, a conspicuous rocky peninsula in the northwestern part of the bay, bearing 243° , distant 800 yards, and a noticeable house on the sandpit bearing 6° .

In 1904 the pinnacle of H. B. M. S. "Charybdis" entered Pinware river and found a depth of 8 feet for the first mile or so; then the water shoaled and became rapid. The telegraph wire crosses the entrance to the river, and the vessel's mast had to be lowered to pass it. The river abounds in salmon and is netted. A pilot, capable of piloting a vessel of 8 feet draft into the river, lives at Ship head.

Rock.—A rocky patch, with a least depth of 2 fathoms over it, bears 178° , distant 800 yards from the eastern point of Ship head.

Tides.—It is high water, full and change, at Pinware bay at about 9h. 10m.; springs rise 4 feet, neaps $2\frac{3}{4}$ feet.

St. Modeste island is a small bare islet, 15 feet high, close to the western entrance point to Pinware bay; on it are several houses, and in the channel between it and the mainland fishing vessels moor to the rocks. This is known as the Tickle, and there is a large settlement on its shores.

Cape Diable, southward about $\frac{3}{4}$ mile from St. Modeste island, is a black, bold, cliffy promontory rising to a flat-topped hill, 740 feet high.

The coast northward of cape Diable is granite and southwestward of the cape, sandstone. The granite, however, shows occasionally at the water's edge under the sandstone at various points farther southwestward.

Diable bay, a small open bay southwestward about $2\frac{1}{2}$ miles from cape Diable, affords no anchorage; there is a small village at its head.

The coast between Diable bay and anse à Loup, about 3 miles to the southwestward, consists of cliffs of red sandstone about 350 feet high.

Anse à Loup.—This bay is about $1\frac{3}{10}$ miles wide and extends $1\frac{1}{2}$ miles northwestward between high table-lands of sandstone, covered

with green moss and grass, highest on the northeastern side, which is a continuation of the sandstone cliffs. There is a fine sandy beach, with the village on its western part, and a river, which small boats enter at high water, at the head of the bay.

Although this bay is quite open to the southeastward, yet vessels anchor here at all times during summer and find the holding ground very good. The best anchorage is in the northern part of the bay, in 10 fathoms, over sand bottom, about $\frac{1}{4}$ mile offshore, and with the entrance of the river bearing a little eastward of north. Shoal water extends in places about 200 yards from both sides of the bay. Vessels should not anchor in less than 10 fathoms of water.

Schooner cove, at the southern end of anse à Loup, is open to the northeastward, but fishing vessels anchor in it in 7 fathoms of water during summer. There is a fishing establishment and several houses at the cove, and on top of the entrance point, which is high, is a flagstaff.

Communication.—The weekly coasting steamer from Bay of Islands calls at anse à Loup in summer and autumn. There is a good road between Schooner cove and Amour point.

Supplies.—Milk, eggs, and a few vegetables can be procured at anse à Loup.

Amour point (corrupted from pointe aux Morts and locally known as cape Shallop), lies $2\frac{8}{10}$ miles southwestward of the southern point of anse à Loup. The point is low, but rises in a series of terraces, faced by cliffs, to a hill 190 feet high, at $\frac{3}{4}$ mile northward. There are several rocks within 200 yards off the point.

Light.—A circular white tower, 104 feet high, on Amour point, exhibits at 153 feet above high water an intermittent white light every twenty seconds, showing thus:—light sixteen seconds; eclipse four seconds, which should be seen from a distance of 18 miles in clear weather.

A white dwelling with a red roof is attached to the lighthouse.

Fog signal.—A horn, situated in a rectangular white building on Amour point, 55 yards southeastward from the lighthouse and operated by compressed air, gives blasts of seven seconds duration, with intervals of fifty-three seconds between them, during foggy weather, or in snowstorms.

The horn or diaphone, which is placed 40 feet above high water, projects from the southern side of the building, and points southeastward.

The engine house is on the western side of and adjoins the fog-signal buildings; it is rectangular, and painted white with a red roof.

Caution.—Reliance should not be placed on hearing this fog signal, as sometimes, from unexplained causes, the sound can not be heard, even from short distances.

Marine signal station.—There is a signal, telegraph, and wireless telegraph station at Amour Point lighthouse, and it is included in Lloyd's system of reporting stations. This is also an ice-report station. See pages 42, 66.

A blue light burning at this station indicates to a vessel firing distinguishing rockets that her signals are recognized and will be reported.

Forteau bay is 4 miles wide between Amour point, on the eastern side, and Forteau point, on the western side of the bay; it is said to be the best roadstead in the strait of Belleisle. The holding ground is good, and fishing vessels moor in it through the summer; but a heavy swell rolls in with southerly winds.

Anse aux Morts, immediately northwestward of Amour point, is an open bight with deep water close to the southeastern shore, but the northern side is foul for a short distance, and the water shoals rapidly to the head. The bight affords anchorage, sheltered from easterly winds only, in 10 to 6 fathoms, but in large vessels do not bring the large house on the eastern shore to bear southward of 102° , and anchor about 400 yards from the wharf.

On both sides of Forteau bay the land rises in terraces to hills about 590 feet high. Forteau point slopes upward to a hill 212 feet high at 800 yards inland, and thence the land rises gradually in long slopes, but faced by cliffs on the seaward side with an occasional deep gorge. Crow head, 240 feet high, on the northwestern side of anse aux Morts, and Chimney head, 144 feet high, on the western side of Forteau bay, are conspicuous lines of cliff. Overfall brook flows into the sea, just southward of Chimney head, from a height of 118 feet, with volume of water varying with the season and at times very small. A church with a spire, and several houses near it, stands close northeastward of English point, a small hillock 25 feet high in the northern part of the bay. From this point northwestward the water is shoal, and an inlet that nearly dries extends to the mouth of Forteau brook, by which the water from several lakes flows into the sea. Boats can reach the mouth of the brook at half tide, but care must be taken to avoid the numerous bowlders. Between the first and second lake is a waterfall that is occasionally visible from seaward.

The head of Forteau bay is a sandy beach, behind which are several houses and the school, a plain building painted white. The principal settlement is farther to the southward. Jobs Room, the southernmost cluster of conspicuous buildings, is situated immediately westward of the Flats, a flat ledge of rock that just covers at high water, and affords shelter to the boats. The post-office in summer is the northern house of this settlement.

The shores of Forteau bay are generally bold, and the water is deep beyond 200 yards from the shore, except at the head, where a shoal extends from the schoolhouse $\frac{1}{4}$ mile into the bay.

The best anchorage is in 14 to 10 fathoms in the northwestern part of the bay, with the northern stage at Admiral point, at the junction of the rock and sand, bearing about 270° .

Tides and tidal streams.—It is high water, full and change, in Forteau bay at 10h. 25m.; springs rise $5\frac{1}{4}$ feet, neaps 3 feet; neaps range $1\frac{1}{2}$ feet. The flood stream in calm weather sets northwestward on the northeastern shore and southward on the western shore and the ebb in the contrary directions, but the streams are so weak in the bay that a fresh breeze, unless blowing with or against them, changes their direction. Off Amour and Forteau points the streams are strong and very irregular, occasionally running in one direction with a rate of 4 to 5 knots close to the shore, and in an opposite direction a short distance off. In sounding off these points during the survey three distinct streams were met within a distance of 2 miles; the tide-rips were of considerable strength, and these irregularities continually changed from unknown causes.

Caution.—In approaching Forteau bay in foggy weather, great caution is therefore necessary.

Soundings.—Deep water extends so close to the shore that little warning is given by the hand lead in approaching Forteau bay, but the gully with 50 to 60 fathoms of water in it that stretches nearly across its entrance and extends to within $\frac{1}{2}$ mile of Amour point may indicate that the bay is near if deep soundings are taken.

Ice.—The bay freezes over about the middle of December, and the ice breaks up about the middle of May.

Settlements.—The resident population numbers about 150, who live inland from November to May and then return to prosecute the seal fishery till the end of June. About 300 Newfoundland fishermen arrive in June as soon as navigation is open.

Supplies.—Water may be taken from streams flowing down the hillside at the settlement on the western side of the bay, and at Jobs Room there is a pipe to which a hose can be attached for filling boats.

There is no large wood within 10 miles of the settlements.

Telegraph station.—There is a telegraph office at Forteau bay.

St. Clair bay (anse Éclair), 4 miles westward of Forteau point, is about $\frac{3}{4}$ mile wide across its entrance, nearly a mile deep, open to the southward, and affords no anchorage. An islet 8 feet high and a reef extend together about $\frac{1}{4}$ mile westward from the eastern entrance point. There is a fishing establishment close within this point, and also at the head of the cove.

The coast westward of St. Clair bay is composed of cliffs faced by large slabs of rock. Within the cliffs the surface features are generally flat-topped hills rising gradually to higher ranges inland.

Blanc Sablon (formerly anse Sablon), westward about $1\frac{1}{2}$ miles from St. Clair bay, is partly sheltered by Woody and Greenly islands, but southerly winds send in a heavy sea. Generally it is a safe anchorage during summer, when fishing vessels moor there.

The hills fall in cliffs on the northeastern side of the bay from heights of 402 to 253 feet, and on the northwestern side from a flat-topped hill 342 feet high that extends southwestward in a spur and terminates in a sharp bluff 167 feet high over Long point. There is a curious saddle-shaped hill 440 feet high at $1\frac{3}{4}$ miles northward of the head of the bay. The shores generally are of rock faced by boulders, but at the head there is a sandy beach on the western side of a projecting point 21 feet high on which are the conspicuous white houses and wharves of the establishment of Job Brothers & Co. (locally known as Jobs Room). Blanc Sablon river separates the point from the sandy beach and drains a long valley and some large ponds. The hills on the northeastern side fall in cliffs to the marshes in the valley, but the rise is gradual on the west.

Blandford shoals, on which the depths vary from 15 feet to 5 fathoms, are about 800 yards in extent and in the middle of Blanc Sablon. A rock, with 1 foot of water over it, lies 235 yards from the shore at $\frac{1}{2}$ mile northwestward of point St. Charles, the eastern entrance point, and a cluster of rocks extends $\frac{1}{4}$ mile southward from the Barachois, a small cove northeastward of Jobs Room. The entire northern part of the bay is shallow, with a rock awash at low water, 300 yards off shore.

The coast from Lazy point, the western entrance point of the bay to Long point for $1\frac{1}{4}$ miles westward, is bordered by rocks and shoals, and must not be approached within a distance of 800 yards.

Bank.—A bank with a least depth of 4 fathoms over it and about 300 yards in extent within depths of 5 fathoms, bears 198° , distant $\frac{1}{2}$ mile from Lazy point.

Gulch cove, a creek between two granitic spurs, is situated westward $\frac{3}{4}$ mile from Lazy point, and is frequented by fishermen during summer. It is a dangerous place to approach, being surrounded by rocks and so narrow that vessels are hauled in stern first, and moored by chains to the rocks on each side. Losses, however, are not of frequent occurrence.

Long point, the northwestern entrance point of the strait of Belleisle, has reefs and shoals extending nearly 800 yards southward from it.

Perroquet bank, with $4\frac{1}{4}$ fathoms over it, bears 248° , distant $1\frac{1}{4}$ miles from Long point.

Woody island (île au Bois) is 167 feet high, flat at the top, and generally covered with moss and coarse grass. Penneys Room is a large fishing establishment at the northwestern end of the island, and there are several other houses on its northeastern side.

Shoal water extends 300 yards from the northeastern coast of Woody island and the Breakers, ledges of rocks that dry at low water, extend $\frac{1}{4}$ mile off the southern end of the western coast, but there is deep water at 200 yards distant from the southeastern coast and from the northwestern point. When the boats can not land on the northeastern side of the island, they do so at the Cow House, a small square rock by the side of a small but deep creek on the western coast, close southward of the northwestern end of the island.

Greenly island (île Verte), westward $1\frac{1}{6}$ miles from Woody island, consists of two hillocks joined by a plateau between two coves; the northwestern hillock is 84 feet high and the southern 63 feet. The northwestern coast is bold, but off the southeastern coast are a rock, drying at low water, and shoals, which together extend southeastward $\frac{1}{4}$ mile. A large fishing establishment, owned by Job Brothers & Co., is situated in the northeastern cove. Greenly island is the resort of puffins, which appear in great numbers suddenly in June, and disappear as suddenly in October.

Light.—A white octagonal tower with a red lantern, 86 feet high, on the southern slope of the southern hillock of Greenly island, exhibits, at 116 feet above high water, a flashing white light, showing thus: Flash, one-quarter of a second; eclipse, two and a quarter seconds, that should be seen from a distance of 16 miles in clear weather.

The keeper's dwelling is attached to the lighthouse and is painted white, with a red roof.

Fog signal.—A diaphone horn, situated in a rectangular white building with a red roof located 232 yards southeastward of Greenly Island lighthouse and 20 yards from the sea, sounds blasts of five seconds' duration, with intervals of fifty-five seconds between them, during thick or foggy weather. The horn is operated by compressed air.

Directions.—Approaching Blanc Sablon from the eastward, keep at least $\frac{1}{2}$ mile off the land till near point St. Charles. Pass southward and westward of Blandford shoals with the fall of the cliff over Anse Éclair point open southward of the southern extreme of point St. Charles until the northern fall of the cliffs on the eastern side of Blanc Sablon river is just open westward of the western wharf of Jobs Room, bearing 344° . Keep the last mark on until about 200 yards northward of the following mark, the southeastern fall of the northwestern hillock of Greenly island in line with the

northwestern end of Woody island, bearing 230° , and anchor in 7 to 10 fathoms of water, sand bottom. This position is the best in the bay for large vessels, but small craft can go in to any convenient depth. Greenly Island lighthouse in line with the northwestern end of Woody island, bearing 219° , leads just southeastward of the shoal water at the head of the bay and the rocks extending from the Barachois.

Proceeding westward, round the northern end of Woody island at the distance of about $\frac{1}{4}$ mile till the fall of the hill over point St. Charles is in line with the northern end of Woody island, bearing 67° , and keep that mark on till northward of the northern point of Greenly island, to clear the bank between that island and the mainland, or proceed to the southward in mid-channel between Woody and Greenly islands.

Tides and tidal streams.—It is high water, full and change, in Blanc Sablon at 10h. 32m.; springs rise 5 feet, neaps $2\frac{3}{4}$ feet, and neaps range $1\frac{1}{2}$ feet. The flood stream usually sets westward through the anchorage and the channel between the islands and the mainland at an average rate of $1\frac{1}{2}$ knots, and the ebb stream sets in the opposite direction, but with wind prevailing from one direction the stream going with the wind sometimes attains a rate of $2\frac{1}{2}$ knots. With opposing wind and stream a very heavy sea is raised in the channel between the islands and the mainland, and occasionally boats are swamped there. It is particularly bad at the northwestern end of Woody island, where the tidal stream that passes between the islands meets the one that passes northward of them.

Fisheries.—There are about 200 residents in Blanc Sablon and the neighborhood. They hunt for seals in May and June and other fur-bearing animals during the winter. About 500 fishermen from the east coast of Newfoundland arrive in the spring and engage with the residents in the cod fishery. The catch in 1890 was about 20,000 quintals, and at that time 500 seals were killed annually.

Ice.—Blanc Sablon freezes over about the middle of December and the ice breaks up about the middle of May. The first steamers arrive about the end of May and the last vessel leaves about October 20. Northern ice usually arrives from December 26 to January 20. Field ice makes during the winter, but finally leaves about the middle of June. Icebergs may be met with at any time, but only a few reach as far westward as Greenly island.

Supplies.—A small stock of coal is kept by Messrs. Job Brothers & Co., of which it is possible that about 50 tons could be supplied to a vessel requiring it; the same firm can also usually supply ship's stores, such as flour, salt, and beef. Water can be taken, at high water, from Blanc Sablon river.

Communication.—The weekly coasting steamer from Bay of Islands calls at Blanc Sablon during summer and autumn. A steamer makes one trip a season to Blanc Sablon from Quebec. Blanc Sablon is connected with the Canadian telegraph system. The telegraph office is on the sandy beach westward of the river entrance.

Boundary.—The boundary line between Canada and Labrador runs northwestward from Lazy point to cape Chidley at the entrance of Hudson strait.

CHAPTER XI.

EAST COAST OF LABRADOR—CAPE ST. LEWIS TO CAPE CHIDLEY.

The east coast of Labrador is extremely barren and rugged, and is composed of Laurentian gneiss, with intrusive granite and many quartz veins. The hills rise steeply from the sea, often in cliffs, with rugged rocky points. The only sandy beach of any extent on the whole coast northward to Nain is the strand on each side of cape Porcupine.

From Davis inlet to Nachvak, the outer islands and coast appear to be fairly free from sunken rocks; but from Nachvak to cape Chidley the coast is fringed with small islets and sunken rocks to an average distance of some 5 miles.

From about port Manvers to cape Chidley the land is generally high; it attains its greatest elevation midway between Nachvak and cape Chidley, where the hills near the coast are estimated to be 5,000 or 6,000 feet high.

The nominal jurisdiction of the Newfoundland government extends from Blanc Sablon bay to cape Chidley, at the entrance of Hudson strait, but the actual control ceases at Holton harbor, the most northern settled Newfoundland fishing post. Yet the local mail steamer proceeds as far as Nain.

Northward of Holton harbor the cod fishery is prosecuted from schooners that "follow the fish," as it is termed, sometimes beyond cape Chidley, though the vicinity of Nain is the usual northern limit.

Eskimo half-breeds have established themselves at various places along the coast northward of Battle harbor, but there is no large settlement of them till as far north as Cartwright harbor in latitude $53^{\circ} 42'$, where some are congregated about a post of the Hudson Bay Company.

There is also a settlement in connection with the Hudson Bay Company at Rigoulette in Hamilton inlet.

The next native villages to the northward are at Makovik (see p. 731) and Hopedale, which are stations of the Moravian mission. Thence to cape Chidley, the natives, with a few exceptions, live at

the mission stations or at the posts of the Hudson Bay Company during winter, and fish along the coast in summer.

Intercourse is kept up occasionally, during winter, by dog sledges (locally komatik) between Rigoulette, Hopedale, Davis inlet, Zoar, Nain, Okkak, Hebron, Ramah, and Nachvak; and Eskimos from Ungava occasionally go to Nachvak during winter. In summer traveling can only be done by sea.

The Moravian mission stations are Makovik, Hopedale, Zoar, Nain, Okkak, Hebron, and Ramah. The headquarters are at Nain, where the superintendents, both of trade and mission work, reside.

The natives are spread over the coast from Makovik to cape Chidley.

The Indians from the interior come to the posts of the Hudson Bay Company in severe winters, but only when pressed by hunger, as a deadly feud exists between them and the Eskimos.

Refraction and mirage have caused great difficulty in attaining sextant altitudes at sea off the northern part of the coast of Labrador. This state of the atmosphere is said to be characteristic of the few fine days of summer.

Trade.—The exports from Labrador in 1905, consisting chiefly of dry codfish, salmon, cod and whale oils, furs, and lumber, were of the estimated value of \$3,082,503. This includes the exports of the Moravian missions, which were valued at \$48,442.

Table of the mean monthly temperature, Fahrenheit, at six Moravian mission stations.

[Observations taken at 8 a. m. during the number of years given.]

Month.	Hopedale (six years).	Zoar (six years).	Nain (six years).	Okkak (five years).	Hebron (seven years).	Ramah (five years).
January.....	−7.9	−12.8	−11.7	−9.9	−9.7	−7.9
February.....	−5.8	− 8.5	− 7.8	−8.1	−9.4	−7.8
March.....	6.4	2.6	3.4	2.3	2.5	2.5
April.....	21.2	19.0	18.3	18.5	17.0	20.1
May.....	33.2	32.3	32.0	32.5	32.3	34.5
June.....	42.9	42.4	41.5	42.1	40.1	42.1
July.....	50.9	49.8	47.1	47.3	46.6	49.3
August.....	50.7	50.5	48.7	47.6	46.4	46.9
September.....	42.1	41.7	40.8	40.1	38.6	38.6
October.....	32.9	32.3	31.1	31.8	29.5	30.7
November.....	19.6	17.6	18.1	17.9	18.3	19.7
December.....	3.0	− 0.6	0.7	0.8	2.1	2.5
Mean.....	24.1	22.3	21.9	21.9	21.2	22.6

The highest temperatures recorded by the maximum thermometer are, at Hopedale, 83°.6 on July 14, 1890; Nain, 77° on July 30, 1887; Hebron, 86°.2 on August 3, 1890; and the lowest temperatures recorded by the minimum thermometer are, at Hopedale, −36°.4 on February 11, 1888; Zoar, −38° on January 21, 1884; Nain, −36°.5 on January 21, 1884; and Hebron, −40° on January 17, 1891.

Landfalls.—If bound to the southern part of the Labrador coast, cape St. Michael, in latitude $52^{\circ} 41'$, is a good point to steer for, as the land is high and bold. There are several harbors in its locality.

South Wolf island is a good landmark, and the islands near it have each distinctive features.

Cape Harrison, in latitude $54^{\circ} 56'$, longitude $57^{\circ} 55'$ west, is the best landfall northward of South Wolf island, and should be sighted if bound northward, to prevent being entangled in the islands and shoals northward of it. It is a bold headland, and Webeck harbor lies close to it. Further northward the masters of the Moravian mission ships endeavor to make cape Aillik, but there are the Turnavik islands, and many off-lying rocks in its vicinity.

Cape St. Lewis.—See page 620.

Deepwater creek.—The coast within St. Lewis rock trends north-northeastward for $\frac{1}{4}$ mile, and then turns northwestward for 900 yards to the southeastern entrance point of Deepwater creek, a narrow inlet extending nearly $\frac{1}{2}$ mile to the southwestward, with steep rocky sides, and a few houses at its head. Landing from boats may be effected, even in a heavy sea, at the fishing stages, alongside which there is deep water.

Southern head of Petty harbor lies north-northeastward, distant 1,400 yards from the southeastern entrance point of Deepwater creek. It is 391 feet high and steep-to.

Petty harbor entrance is situated between Southern and Northern heads, which bear nearly northward and southward, distant $1\frac{1}{4}$ miles from each other. Northern head is the cliffy termination of a round hill, 343 feet high, and its northern part is marked by conspicuous white stripes.

The inner entrance to the harbor is on the northern side of a peninsula, 93 feet high, having some houses and a flagstaff on it, and projecting from the southern shore at $1\frac{6}{10}$ miles inside of Southern head. The passage into the harbor turns sharply around this peninsula, and should only be taken by a sailing vessel with a commanding breeze. The navigable channel has a depth of 4 fathoms, but is contracted to a width of 100 feet by a rock, with 9 feet of water over it, lying 150 feet off the southern shore just within the narrows. The harbor then expands to an average width of $\frac{1}{4}$ mile, and is 1 mile in length; the depth of water varies from 10 to 19 fathoms in the middle and the shores are bold-to, except in the northeastern part.

A rock, with 15 feet of water over it, and 13 fathoms close-to, is situated 100 yards off the western point of Hogan cove, an indentation in the northern shore.

Petty harbor affords good anchorage, and is available as a refuge. To enter, keep in mid-channed till the harbor opens, and then haul up close to the northern shore till the rock off the southern shore is passed. It is, however, desirable to have local knowledge.

Tides.—It is high water, full and change, in Spear harbor at 7h. 12m.; springs rise $4\frac{1}{2}$ feet, neaps $3\frac{1}{2}$ feet.

Barren bay, or Salmon bight, an open bay with a little shoal water at its head, extends northwestward $1\frac{1}{4}$ miles from between Northern head and Salmon Bight point, which lies 1,600 yards to the northward.

Between Salmon Bight point and the southern entrance point to Spear Harbor bay, distant 1,200 yards to the northward, are Paul Peters cove and Little Spear harbor, both open and wild.

Spear harbor, at the head of Spear Harbor bay, is entered between two islands, but local knowledge is necessary for the pilotage. North island, the larger of the islands, is 50 feet high, steep-to on the southern side, shoal on the northern, and having a ledge projecting 50 feet from its western end. West island is 52 feet high, and a reef stretches 50 yards from the northwestern end.

Ice.—The indraft occasionally carries icebergs into the entrance of this harbor, so as to block it completely until a westerly wind drives them out.

Tides.—It is high water, full and change, in Petty harbor at 7h. 22m.; springs rise $4\frac{1}{2}$ feet, neaps 3 feet.

Spear point, north-northeastward, distant 700 yards from the southwestern point of Spear Harbor bay, rises to the height of 190 feet; close off the point is a rock that covers.

Tinker bank, bearing 330° , distant $\frac{1}{2}$ mile from Spear point, has 4 fathoms of water over it. The summit of Jack Fling island, open northward of American island, bearing 287° , leads northward 200 yards from this shoal.

American island, northwestward $\frac{3}{4}$ mile from Spear point, is 67 feet high; it is separated from the coast by a channel a little more than 200 yards wide, in which is a rock with 10 feet of water over it, situated rather nearer the island than the mainland.

Jack Fling island, northwestward 600 yards from American island, is a conical, gray island, 99 feet high, and is in two portions that are nearly joined; a low, black rock lies off the southwestern end.

Fish island lies 800 yards northwestward of Jack Fling island, and between it and the land to the southwestward are Herringnet and High islands.

Sealing bight is a bay open northward, the entrance of which lies between Fish and Jack Fling islands. There are some white houses in the southeastern cove at its head; the water is deep, and in northerly gales a heavy sea prevents it being used as an anchorage.

Mad Moll, a rock with 6 feet of water over it, lies in the middle of the entrance, bearing 285° , distant 400 yards from the western point of Jack Fling island. Fling bank, bearing 21° , distant about 300 yards from the same point of Jack Fling island, has a depth of 6 fathoms over it.

The Scab, a rock with 9 feet of water over it, is at the end of the foul ground extending in a direction 285° for 300 yards from the western point of Fish island.

Murray harbor, westward 700 yards from High island, is an inlet extending 900 yards to the southward and having a width of 300 yards, with good anchorage in 4 to 5 fathoms water, gradually shoaling to the shores. Near the head, at 600 yards within the entrance, is an islet, southward of which the water is shoal.

The entrance is divided into two channels by Harbor island, which is about 100 feet high. The western passage is shoal.

A rock, with 1 foot of water over it, lies southward 100 yards from Harbor island, and is steep-to on the northeastern side. To enter the harbor, keep the eastern entrance point close aboard, and anchor in mid-channel, off the houses.

Salt Pond head, westward 335 yards from the northwestern point of Harbor island, is the northern point of the promontory dividing Murray harbor from Sophia harbor; it is bold and steep-to.

Soldier shoal, bearing 354° , distant 700 yards from Salt Pond head, has 15 feet of water over it and is the shoalest part of a bank extending northward and southward 600 yards, with general depths of $4\frac{3}{4}$ to 9 fathoms of water over it; its northern end falls suddenly to 19 fathoms.

Sophia harbor entrance is southwestward about 800 yards from Salt Pond head, and the harbor extends thence southward $1\frac{1}{4}$ miles; it then turns suddenly eastward and expands into Salt pond, a shallow basin nearly 1 mile long and $\frac{1}{2}$ mile wide. There are no shoals in mid-channel, and small vessels obtain good sheltered anchorage at the head, but it is not suitable for large vessels.

Mosquito cove, a deep open cove, westward of Sophia harbor, is divided into two parts by Aaron island, 59 feet high.

Chapel island, west-northwestward $\frac{1}{2}$ mile from Salt Pond head, is in two portions; the northeastern is a cliff-faced islet, 60 feet high, and the southwestern, green and sloping, 112 feet high. Fishing boats shelter in the channel between these portions.

Chapel Island rock, situated between the eastern points of the two portions of Chapel island, generally breaks.

Little harbor, northwestward about 700 yards from Mosquito cove, affords snug shelter for small vessels, but the entrance is only 100 yards wide, and the channel is further narrowed by shoal water off the southern shore. The harbor is a basin, 600 yards long and 200 yards wide, with a depth of $2\frac{1}{2}$ fathoms, mud bottom. There is good holding ground as far in as an islet 5 feet high. A depth of $2\frac{1}{4}$ fathoms can be carried in by keeping the northern shore close aboard.

The Wall, a shoal with $3\frac{1}{2}$ fathoms of water over it and 7 fathoms close-to, bears 84° , distant nearly 800 yards from the northern entrance point to Little harbor.

Salmon point, the northeastern end of the peninsula dividing Little harbor from port Charlotte, is steep and rises to a conical hill 157 feet high.

Tides.—It is high water, full and change, in Little harbor at 7h. 4m.; springs rise $4\frac{1}{2}$ feet.

Port Charlotte extends southwestward nearly 2 miles, and is entered by a narrow, foul channel, which should not be attempted without a pilot. It expands into a deep bay with good anchorage in 11 to 15 fathoms water. Road island, 17 feet high, lies in the entrance, and is nearly joined to the western entrance point by rocks and shoal water; a rock that covers lies off its southeastern side, and a reef extends southwestward, 450 yards from its southern end, with Gull rock lying midway between Road island and the end of the reef. Shoals with depths of 3 fathoms over them lie southward 300 yards from the southwestern end of the reef, and a rock, with 10 feet of water over it, lies 100 yards off Level point, the first point within the entrance on the southeastern shore.

Bottom arm, at the head of port Charlotte, is $\frac{3}{4}$ mile in length and affords anchorage in $6\frac{1}{2}$ fathoms of water, mud bottom, as far in as the narrows, about 800 yards from the mouth of the arm. Shoal water extends from either shore of the narrows, but 4 fathoms can be carried in mid-channel to the inner basin, where there is completely sheltered anchorage for small craft, with good holding ground, in 7 fathoms.

Mecklenburg harbor, westward of Chapel island, has an outer and inner anchorage, and is entered either northwestward or southward of Chapel island: the eastern side of the promontory northwestward of Chapel island, is indented by fissures 400 yards deep northward to Crowby head, a distance of 750 yards. The outer harbor, westward to Green island, is easy of access, clear of shoals, and affords well-sheltered anchorage in 13 to 18 fathoms.

The inner anchorage is southwestward of Green island, and a shoal bank, with 3 feet least water over it, extends from the northern shore, immediately within the island, half way across the entrance, and rocks which cover lie off the northern shore at about 1,200 yards west-southwestward of Green island. A bank, with 3 fathoms of water over it, is situated 150 yards off the southern shore just within the entrance. No natural marks clear these dangers, and the inner anchorage should not be entered without a pilot.

Water can be procured from a brook at the head of Man-of-war cove, the arm northward of Green island.

Double islands, northward distant about 1 mile from Fish island, are two bare, gray rocks, divided by a shallow channel 50 yards wide; the higher of these islands is 65 feet high.

Shoal water, on which is a rock that generally breaks, extends eastward 250 yards from the northern island, but otherwise these islands are bold-to.

Double Island bank, with 8 fathoms of water over it, bears 307° , distant 900 yards from the northern Double island; it is said to break in heavy gales.

Flat island, west-northwestward $1\frac{1}{4}$ miles from Double islands, is a black rock about 20 feet high.

The Skerries, a shoal with 8 fathoms of water over it, bears 43° , distant $\frac{3}{4}$ mile from Flat island; it is said to break in heavy gales.

Denbigh and Granby islands divide the large inlet between Mecklenburg and Fishing-ship harbors into three passages, that again converge to two inlets, Alexis river, the southern, extending inland 25 miles, and Gilbert river, the northern, 18 miles. These inlets contain numerous islands and rocks with channels between them, but they have been only partially surveyed, and should not be navigated without a pilot.

The southern side of Denbigh island is foul for $\frac{1}{2}$ mile off.

Granby island rises at $1\frac{3}{10}$ miles west-northwestward of its southeastern point to a conspicuous flat-topped hill, 461 feet high, and its southern coast is steep-to.

Fish rock, bearing 340° , distant $3\frac{1}{2}$ miles from Double islands, is 11 feet high, and separated by a narrow channel from the southeastern point of Granby island.

Copper island, about 600 yards southwestward of Fish rock and separated from the southern side of Granby island by a channel $\frac{1}{4}$ mile wide, is 186 feet high, grass-covered and flat-topped, with steep and bold-to coasts. Breaking rock, in the middle of the channel between Copper and Granby islands, covers 3 feet at high water.

Little Copper island, a small white islet, 35 feet high, lies just southwestward of the western end of Copper island.

Merchantman harbor, on the northeastern coast and near the eastern end of Denbigh island, is fronted by Shinnny island. It is entered on either side of this island, and it affords anchorage in 7 fathoms of water, but the head must not be approached nearer than 400 yards.

Williams harbor, on the southern side of Granby island and northward of Merchantman harbor, affords good anchorage for small vessels; several Eskimo families live on its shores.

St. Francis harbor, on the eastern coast of Granby island at $1\frac{1}{4}$ miles northward of Fish rock, is divided into two parts by a round hill 82 feet high, northeastward of which are Chain rocks, low and flat; southeastward of the hill there is a low islet, and Pigeon island, 43 feet high, with a watch-house and flagstaff on it, lies in the entrance at 300 yards farther southeastward.

The northern arm is small, the anchorage space being 400 yards long and 250 yards wide; there are stores and a house on its northern shore. To enter pass on either side of Pigeon island in mid-channel and northeastward of Chain rocks, then haul to the westward and anchor.

A rock, with 5 feet of water over it, lies nearly 100 yards off the shore eastward of the storehouses.

Round harbor, the southern arm, extends 600 yards to the westward with a width of a little less than 200 yards; it affords good anchorage for small vessels in $4\frac{1}{2}$ fathoms water, sand and gravel bottom.

Cape St. Francis, north-northwestward nearly $7\frac{1}{2}$ miles from Spear point and northeastward $\frac{1}{2}$ mile from Pigeon island, is the southeastern point of a flat-topped rocky island, 600 yards long, west-northwestward and east-southeastward, about 200 yards wide, 115 feet high, bold-to on all sides, and separated from the mainland by a narrow deep passage suitable for boats, except in a heavy swell.

Local magnetic disturbance.—Considerable disturbance of the compass, from local magnetic causes, has been observed on board vessels when near cape St. Francis. The principal area of disturbance lies within 1 mile seaward of a line drawn between cape St. Francis and the eastern end of Hare island.

Indian point, northwestward about 1,400 yards from Cape St. Francis island, is a steep bluff, 195 feet high; Fish cove, on its western side, is a deep inlet ending in a ravine.

Burke island (Jasper island), northwestward 250 yards from Indian point, is flat, 85 feet high, and is separated from Granby island by Shoal tickle, a narrow boat channel; there are several houses on the island. Westward of Shoal tickle are two flat rocks just above high water.

St. Francis Harbor bight, southwestward of Burke island, is 600 yards in extent and 400 yards wide. It affords anchorage southeastward of Flat islands, which lie northward within 250 yards from the western entrance point of the bight, in 10 fathoms of water, mud bottom, and sheltered from all winds.

Tides.—It is high water, full and change, in St. Francis Harbor bight at 6h. 40m.; springs rise 5 feet, neaps $3\frac{1}{2}$ feet.

Hare island, northward nearly 400 yards from Burke island, is about $\frac{3}{4}$ mile long, northwestward and southeastward, 800 yards wide, 356 feet high, dark and flat-topped, with a cliffy coast, and steep-to.

Red island, eastward, $\frac{1}{4}$ mile from the southern point of Hare island, is about 200 yards across, and 67 feet high. Shoal water, on which are rocks that generally break, extends south-southwestward 300 yards from it.

Red Island shoal, southeastward 400 yards from Red island, has $5\frac{1}{4}$ fathoms least water over it, and breaks in heavy gales.

East island.—Black point, the southeastern point of this island, bears northward, distant $\frac{9}{10}$ mile from the northern point of Hare island. East island is a mile long eastward and westward, 700 yards wide, 329 feet high, and separated from the mainland by a channel, the deep water in which is narrowed to less than 100 yards by a rock 3 feet high, with a sunken rock southwestward of it and nearly in mid-channel.

Middle island lies southwestward of East island, from which it is separated by Boyeans tickle, 65 yards wide, and nearly blocked by shoal water at each end. There is a passage through this tickle by keeping Middle island close aboard, but it is rarely attempted even with local knowledge.

West island, west-southwestward of Middle island, has foul ground off all the points, and should not be approached nearer than 200 yards. West tickle, separating this island from the mainland, is shallow.

Fishing Ship harbor is within these three Fishing Ship islands; the entrance, between West and Middle islands, is about 300 yards wide.

Northwest arm is a good anchorage 1,400 yards long and 600 yards broad, with depths of 7 to 14 fathoms of water between West island and the mainland; it is clear of shoals excepting a rock, with 6 feet of water over it, lying off the entrance to West tickle at nearly 200 yards from the shore; and a rock that covers 1 foot at high water, with shoal ground off it, at 200 yards from the western shore near the head. The northwestern point of West island should not be brought to bear less than 99° to clear the first of these rocks.

Hagan arm, a continuation westward of Northwest arm, is approached through a channel 100 yards wide, with 10 feet of water in it in mid-channel, and after passing the narrows the water deepens; local knowledge is required to enter it.

Directions.—To enter the anchorage within East and Middle islands from the southward, pass between Middle and West islands, and then between the Flat islets northwestward of Middle island, which are 8 feet high, and the round rock, 4 feet high, off the mainland; round the Flat islets at the distance of 200 yards, and anchor in 7 to 12 fathoms.

By the northern channel, round the northwestern point of East island at the distance of 200 yards, and then keep the mainland close aboard until past the sunken rock in the channel.

Tides.—It is high water, full and change, in Fishing Ship harbor at 6h. 54m.; springs rise $5\frac{1}{2}$ feet, neaps 4 feet.

Lance cove is an open bight, extending 700 yards to the westward, at 800 yards northward of Fishing Ship harbor; it should not be entered.

Sloop cove is a small cove lying northward, distant 700 yards from the northwestern point of East island; to enter it from the southeastward, round Black rock, an islet close to the shore, and keep the eastern shore aboard; on the western side of the entrance are three low rocks. The cove is suitable for small craft, which obtain good shelter off the houses at the head. Sloop Cove head lies eastward 300 yards from the entrance to the cove.

Caplin bay, northwestward of Sloop Cove head, extends 800 yards in a westerly direction; Pigeon island, 82 feet high, lies 100 yards off the northern entrance point. There is a basin with a narrow entrance in the southwestern part of the bay; it is 350 yards long, 200 yards broad, and boats find shelter at its head, and small craft in 9 feet of water. In the entrance to the basin is a rock, which is avoided by keeping the northwestern shore aboard.

Ship harbor.—Southern point of Ship harbor lies north-northwestward $1\frac{8}{10}$ miles from northern head of East island, and from the northern side of the point Ship harbor extends westward $1\frac{3}{4}$ miles; at 1,300 yards within the point the harbor narrows to less than 200 yards in width; it then opens to the width of $\frac{1}{4}$ mile for 1,200 yards, when it closes in again toward its head, which is shoal for 200 yards.

Russell cove, the second bight on the northern shore, is shallow and filled by bowlders to the distance of 200 yards from the beach; a rock, which covers, lies 150 feet off its eastern point.

Anchorage may be obtained off this cove in 16 fathoms of water, mud bottom, with good holding ground.

Ship Harbor head bears north-northeastward, distant $\frac{9}{10}$ mile from southern point of Ship harbor, and is a rugged promontory rising to the height of 721 feet, faced by steep bluffs with red patches, and steep-to on all sides.

The coast from Ship Harbor head trends northwestward $1\frac{1}{2}$ miles to White point, and is intersected by ravines extending 200 yards inshore. Good cove, the third of these ravines northwestward of Ship Harbor head, extends southeastward rather over 100 yards within a low point, and is the only place where landing can be effected in ordinary weather, or with even a light northeasterly swell.

Rock.—A rock, with 4 fathoms of water over it, bears 10° , distant $\frac{1}{2}$ mile from Ship Harbor head; cape St. Michael, open westward of Twin islands, bearing 332° , leads southwestward; and open eastward, bearing 316° , leads northeastward of the rock.

Twin islands, north-northwestward about 1 mile from Ship Harbor head, are two islands separated by a narrow channel; the eastern island rises in two conical grass-covered mounds to the height of about 60 feet; the western is a narrow black rock, about 400 yards long and 32 feet high.

A shoal, with $5\frac{1}{2}$ fathoms of water over it, bears 292° , distant 550 yards from the northern point of the western Twin island, and lies in mid-channel of the northern entrance to Occasional harbor.

Occasional harbor, the entrance to which is between White point on the southern side and Northern head, lying northwestward, distant $\frac{1}{2}$ mile from the western Twin island, on the northern side, extends southwestward $5\frac{1}{2}$ miles from Twin islands, and is clear of shoals. For 3 miles within the entrance the average width of the harbor is 700 yards, and the water is too deep for anchorage; it then opens into Delaney cove on the southern side and French and Trout coves on the northern side. Delaney cove, extending $\frac{1}{4}$ mile to the eastward, is separated from the head of Ship harbor by a neck of land 700 yards across; rocks lie some 80 yards off the northern point of this cove. French and Trout coves each extend 500 yards to the northward, and vessels requiring to dry fish haul close to the shore in either cove, but the water is shoal for 100 yards off the point separating them.

Southwestward of Trout cove a projecting point from the northern shore, with rocks extending 150 yards from it, narrows the harbor to 300 yards. Arch cove, westward of this projection, is a secure anchorage 800 yards across, with 5 to 12 fathoms of water. Mercer island, 3 feet high, is 100 yards off the southern shore southwestward of the anchorage and marks the eastern limit of the shoal water, which bars, except to small craft, the entrance to a basin about $\frac{3}{4}$ mile in length, with depths of 6 to 14 fathoms.

Anchorage can be obtained in the harbor off the entrance to French cove; in Delaney cove in 10 fathoms; or southward of the point separating French and Trout coves, in 11 to 14 fathoms water.

Water can be taken from many places along the shores, but the most convenient place is on the shore southward of Arch cove. Firewood is abundant.

Tides.—It is high water, full and change, in Occasional harbor at 6h. 48m.; springs rise 5 feet, neaps $3\frac{1}{2}$ feet.

Cape St. Michael is the eastern end of the promontory separating Occasional harbor from St. Michael bay, and it extends from Northern head northwestward $2\frac{1}{4}$ miles to First point. The coast is steep and bold-to; Hole-in-the-wall, a remarkable ridge with a hole through, lies north-northwestward 800 yards from Northern head, and Main cape, which terminates in a low peninsula, is 600 yards farther northwestward.

False cape, northwestward $\frac{1}{2}$ mile from Main cape, is the outer end of the western side of Cape cove, which extends 800 yards to the southward; is open and wild, and has a deep valley at its head. A small rock lies off False cape, and it is bold-to.

First point is west-northwestward $1\frac{1}{4}$ miles from False cape, and between these points are deep coves; Island cove, the nearest one to False cape, has a white islet, 65 feet high, in the entrance; it is 350 yards in extent and shoal within the island, and affords indifferent shelter for boats.

St. Michael bay—Scrammy bay, the first bight westward of First point, is partially sheltered, except from the northward and northeastward, by Pinsent island, 67 feet high, which lies off it; this bay is much resorted to for drying fish. Vessels generally anchor southwestward of and between Pinsent island and the mainland, and southeastward of Scrammy island.

Lazy bank, with $5\frac{1}{2}$ fathoms of water over it, lies north-northeastward, 350 yards from Pinsent island.

Pinsent rock, situated northwestward 300 yards from Pinsent island, is 2 feet high and bold-to on the northwestern side. Hussy rock, with 10 feet of water over it, lies eastward 200 yards from it.

Lump rock, southwestward 800 yards from Pinsent rock and 200 yards offshore, is awash at low water. George cove, southwestward of this rock, is clear and affords good shelter for boats.

Pinsent arm, west-southwestward 2 miles from Pinsent rock, is clear outside the narrows. The southern shore rises to mossy hills, backed by the highest range on the southern part of the eastern coast of Labrador, the summit of which is 895 feet high. The northern shore is a peninsula 56 feet high, with an islet 35 feet high at its northeastern end.

The narrows lie between two hillocks, the northern 58 feet and the southern 46 feet high. At the summit of the northern hillock is a flagstaff, at the base a white house, and off it are two low islets. Off the southern hillock is a rock that covers 3 feet, narrowing the entrance to 100 yards. The channel is foul, and it must not be attempted without a pilot, but good anchorage for small craft may be obtained in $5\frac{1}{2}$ to $7\frac{1}{2}$ fathoms of water, sand bottom, near the northern shore just within the house.

Long island, westward $1\frac{1}{4}$ miles from First point, is 192 feet high and appears as a cone from the southeastward, but as two hummocks from the southwestward, the southeastern being 106 feet high. An islet is joined at low water to the northern part of its northwestern end, northwestward 250 yards from which is a rock that covers at half tide, northwestward 500 yards a bank with $5\frac{3}{4}$ fathoms, and east-southeastward distant nearly 200 yards a shoal with 12 feet of water over it.

There is anchorage in $8\frac{1}{2}$ to 12 fathoms of water, coral and rock bottom, on a bank that extends 500 yards off the eastern cove on the eastern coast of this island.

Pigeon island, northward $\frac{1}{2}$ mile from the middle of Long island, is 22 feet high.

A bank, having two shoal patches with 12 and 16 feet of water over them, lies westward 600 yards from Pigeon island; there are depths of 10 fathoms close-to on all sides. False cape, open northeastward of Pigeon island, bearing 122° , leads northeastward of these shoals.

Pigeon Island rock, bearing 122° , distant 400 yards from Pigeon island, has 7 feet of water over it, and is steep-to.

Burnt island, joined at low water to the southwestern point of Square island, and separated from Pigeon island by a clear channel 750 yards broad, is 173 feet high. Between it and Square island is a bay with a small islet in it, off which shoal water extends southeastward 150 yards.

White Bear arm extends northwestward 15 miles from Burnt island, and the fishermen state that the arm is so encumbered by rocks and shoals that there is only one narrow channel navigable to the head. It must not be entered without an experienced pilot, who may be obtained during summer from Square Island harbor, Pinsent arm, or Scrammy bay.

Square island, which divides St. Michael bay into two parts, is bare and rises to a double hill 497 feet high. The coasts are bold and intersected by numerous ravines: the northeastern point ends in Sugarloaf hill, a truncated cone 221 feet high, about 200 yards northward of which is Gull island 49 feet high. An islet 7 feet high is nearly joined to the northeastern side of Gull island, and from it a reef extends northeastward 100 yards. Snapper cove is a deep indentation southward of Sugarloaf, having in it Upper rock, on which the depth is $4\frac{1}{2}$ fathoms, and Northward rock, with 5 fathoms of water over it, small, steep-to, and close to the shore.

Square Island harbor, a cove 400 yards in extent at the southeastern end of Square island, is sheltered by East and West islands and approached by three channels. The southwestern channel is marked by Motion island, 30 feet high, round and faced by cliffs, and nearly joined to Square island by a low rock. The middle channel is between East and West islands and the eastern channel between East and Square islands. Both these channels are clear.

Harbor point, southward of the harbor, has a rock close off it, and a rock that covers lies in the cove on the northern side. Harbor rock, 11 feet high, is situated off the northeastern point.

There is not room in the harbor for vessels to swing, and though one or two might anchor in 12 fathoms of water and moor to the

shore, they would have to leave before an easterly gale came on. It is convenient, however, for fishing craft and boats, as the water is deep to the shore.

Tides.—It is high water, full and change, in Square Island tickle at 7h. 14m.; springs rise $4\frac{1}{2}$ feet, neaps $3\frac{1}{2}$ feet.

Communication.—The Labrador steamer to and from St. Johns via Battle harbor calls at Square Island harbor fortnightly during summer.

West island, northward $1\frac{1}{4}$ miles from First point, is round, and the summit, a steep bluff 272 feet high, is immediately within the southern end. A little shoal water lies close to the northwestern coast of this island.

The Sisters, two small islets, lie southward 250 yards from West island, with a clear channel between. The western or eastern end of the islets should not be approached nearer than 200 yards.

Mad Moll, a rock situated east-southeastward, distant $\frac{1}{2}$ mile from the Sisters, has 7 feet of water over it, is about 100 yards across, and steep-to on all sides. Twin islands, open eastward of cape St. Michael, bearing 152° , leads northeastward of Mad Moll, and shut in, bearing 141° , leads southwestward of it.

East island, separated from West island by a clear channel 300 yards wide, is 200 yards from Square island. Icebergs frequently drift through the north channel in summer, as the water is very deep.

Anchorage, with good shelter, may be obtained near the northwestern end of the channel, between East and West islands in 15 fathoms of water. This is the only place in the locality available for a large ship.

The Ribs, bearing 85° , distant a little more than 1 mile from the northern end of East island, are two rocky patches with 12 feet of water over them.

Several fishing banks lie northward of the Ribs, but none are dangerous.

Ship Harbor head, open eastward of Twin islands, bearing 178° , leads well eastward of all these shoals.

White point lies westward about $\frac{1}{4}$ mile from Sugarloaf hill, and there is a rock, with 9 feet of water over it, at 150 yards northeastward of the point.

Nowlan harbor, westward about $\frac{1}{2}$ mile from White point, is suitable for small craft; at high water a depth of 8 feet can be carried in, but local knowledge is necessary, as the channel near the southeastern shore is intricate. There are several houses on the shores of this harbor, and a deep valley extends inland to a chain of ponds.

Bar and Cashman coves, westward of Nowlan head, do not afford shelter.

Red Island cove is situated southwestward 450 yards from Red island, which bears west-northwestward, $1\frac{1}{4}$ miles from Sugarloaf hill; the cove affords indifferent shelter for boats, as a considerable swell sets in after easterly winds.

Schooner cove, southwestward 700 yards from Red island, is clear of shoals and affords anchorage for two or three small craft, off a cove with a shingle beach on the southeastern shore.

Woody cove, westward 1 mile from Red island, is about 250 yards square, and open to northeasterly winds, but affords good anchorage in $6\frac{1}{2}$ fathoms of water during westerly winds.

Dead islands, separated by a clear channel 1 mile wide from the northern side of Square island, are a group covering an area about 2 miles square; there are two large and several smaller islands, inclosing between them a good anchorage.

West island, the largest, is $1\frac{3}{4}$ miles long, eastward and westward, $\frac{3}{4}$ mile broad, and 247 feet high. The southern coast is cliffy and steep-to, and the northwestern coast is separated by a narrow channel from a group of islands. An islet, 16 feet high, lies in this channel, northwestward 100 yards from which is a shoal with 13 feet of water over it.

In taking this passage keep in mid-channel when entering, and pass close northwestward of the islet, steering for the northwestern end of Dead islands.

A cove, having an extent of 600 yards, with a breadth of 300 yards, is situated on the eastern side of West island, and affords good anchorage for small vessels in $3\frac{1}{2}$ fathoms of water, sand bottom, though the shores are fringed by rocks that cover at high water.

Bull island, the southeastern of the Dead islands, is 127 feet high and has a conspicuous quartz vein on its seaward side; it well marks the entrance to Dead Islands harbor.

Butler island, connected by rocks and shoal water to the western side of Bull island, is 98 feet high.

Harbor island, northwestward 250 yards from Bull island, is 100 feet high.

Dead Islands harbor may be entered by the channels on either side of Harbor island; the latter one is between it and Bull island.

Harbor rock, awash at high water and always showing, lies just inside the entrance. It is skirted by shoal water, and a rock, over which is a depth of 7 feet of water, lies southwestward 65 yards from it.

Anchorage may be obtained in 10 to 12 fathoms of water as convenient, but icebergs drift in continuously during the early part of summer. Large vessels, by not proceeding so far as to bring Stowe Tickle point, which is northeastward of the cove, to bear 234° , will clear a shoal lying off some rocks that cover 2 feet at high water and extend 300 yards from that point.

Tides.—It is high water, full and change, in Dead Islands harbor, at 6h. 51m.; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{1}{4}$ feet.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Dead Islands harbor fortnightly during summer.

North island, $1\frac{1}{2}$ miles long, northwestward and southeastward, and 220 feet high, is separated by a narrow channel from the northern side of West island. In the northwestern side of the island there is a cove 500 yards in extent, which is clear of dangers.

Stowe tickle, between West and North islands, is available for small vessels, with a commanding breeze, but not without a local pilot. A rock, awash at high water, lies in mid-channel at the narrows, where the passage is only 100 yards wide from shore to shore, and is connected by shoal water to West island. Shoal water also extends northeastward 150 yards from the rock.

Anchorage may be obtained off the northwestern entrance to Stowe tickle in 7 to 14 fathoms of water, mud bottom, in a space 750 yards long and 400 yards broad, which is sheltered from all winds.

Gull island, northward of North island, is 281 feet high, conical, dark, and conspicuous. An islet, with shoal water of 4 fathoms running southward, about 400 yards from it, lies eastward about 400 yards from the southern point of the island. A shoal, with $4\frac{3}{4}$ fathoms water over it, bears 110° , $\frac{1}{4}$ mile from the eastern point of the island. A rock, with 12 feet water over it, lies 135 yards from the northern point, and a reef nearly 200 yards long, with $1\frac{1}{2}$ feet of water over the shoalest part, lies 100 yards from the southwestern coast of Gull island. When passing through the channel between North and Gull islands, keep about one-third of the breadth from North island.

Triangle harbor is entered northward of Triangle island, which bears northwestward $\frac{1}{2}$ mile from the northern end of Gull island, through a passage 45 yards wide, which opens into two coves $\frac{1}{4}$ mile deep and 200 yards broad, affording good anchorage for small craft in $6\frac{1}{2}$ fathoms of water, mud bottom. The shores, on which are several houses, are bold-to, except at the southern turning point into the eastern cove, close off which is a rock. The entrance is sometimes completely blocked by an iceberg.

Cape Bluff harbor is entered northeastward of Pigeon island, which lies northward, distant 800 yards from the northern end of Gull island and westward 1 mile from the southern end of cape Bluff; the harbor extends inland $1\frac{1}{2}$ miles nearly, with a breadth of about 700 yards, and then divides into two arms. The southwestern arm is 250 yards across and a long shallow inlet runs southeastward from it; it affords good anchorage for small vessels in 9 to 12 fathoms of water, mud bottom. The northern arm is narrow and $\frac{1}{3}$ mile long.

Harbor islets, a small group, the highest of which is 56 feet high, lie in the middle of the harbor at 1,350 yards from the entrance; foul ground extends northwestward a short distance from them, falling suddenly to deep water. A rock, with 10 feet of water over it, lies eastward 65 yards from the islets, and a shoal, on which the depth is 15 feet, lies in mid-channel between these islets and the southwestern shore of the harbor.

There is anchorage for large vessels in 16 to 20 fathoms of water, northwestward of Harbor islets, which is reached by the eastern channel, keeping nearer the mainland than the islets.

Cape Bluff, a prominent headland situated northward, distant 9 miles from Main cape of cape St. Michael, rises steeply to a double-peaked hill 719 and 695 feet high, ending in steep cliffs. The southern end of the cape is a small rocky peninsula 110 feet high, that shelters an open cove 300 yards in extent.

The coast from cape Bluff trends northward $3\frac{1}{4}$ miles to Southern head.

Gull island, northward $1\frac{3}{4}$ miles from cape Bluff, is 70 feet high, white in color, and shows well against the dark cliffs of the mainland. A rock, that covers 3 feet at high water, lies 100 yards southeastward of Gull island, and there is shoal water for a short distance southeastward of it.

Shoals.—Gull rock, with 7 feet water over it, bears 99° , distant 1,250 yards, and Matthews bank, with 3 fathoms of water over it, bears 127° , distant 1 mile from Gull island; these are small pinnacles with deep water around.

Long Point bank, with 10 fathoms of water over it, bears 48° , distant $\frac{3}{4}$ mile; Small Skelligs, with 8 fathoms of water over it, bears 40° , distant $1\frac{1}{10}$ miles; and Large Skelligs, with 7 fathoms of water over it, bears 34° , distant $1\frac{1}{8}$ miles, respectively, from the summit of Gull island; all these banks break in heavy weather.

Snug harbor, entered westward of Murray point, the end of a small conical hill 78 feet high and situated northwestward 1 mile from Southern head, affords only indifferent anchorage, the water being 24 fathoms deep in the wide part of the harbor and shoaling only near the rocks. The entrance is 250 yards wide, inside which the harbor expands into a basin 600 yards across, from the southeastern end of which an arm, 250 yards broad, extends 900 yards. The southwestern side of the basin is encumbered with islets and shoals, the latter extending in a bar from the first point on the western shore within the entrance to the southwestern islet, and rendering that portion of the harbor unfit for anchorage. Icebergs frequently drift in.

A rock, with 12 feet of water over it, lies southwestward nearly 100

yards from Murray point, and a rock, with 6 feet of water over it, lies 100 yards off a small indentation on the western shore abreast it.

There are several houses on the shores of the harbor, and large sea trout can be caught.

Cooper island, situated $3\frac{3}{4}$ miles northward of cape Bluff, is $1\frac{1}{2}$ miles long, northward and southward, about $\frac{3}{4}$ mile broad, and 474 feet high. The southern end is the Coopers block, a square rock, which, with the eastern side of the island, is steep-to.

Delaney cove extends south-southwestward $\frac{1}{2}$ mile into the eastern side of the island and is $\frac{1}{2}$ mile wide at the entrance; it narrows gradually to the head, and affords shelter for a few boats only, under the lee of the fishing stages erected at the head, but a heavy swell rolls into it with northeasterly gales. There are some houses at the head of this cove, and also at Green cove on the western coast; the latter being an open beach with a few low rocks lying close to the shore.

Gray rocks, awash at high water, lie 300 yards off the northern coast of Cooper island, and are nearly joined to it by a ledge, with 9 feet of water over it, at the southern end.

Gray Rock shoal, with 11 feet of water over it, bears 17° , distant 350 yards from Gray rocks, and in the fairway between Snug harbor and Venison tickle.

Banger island, separated from the western side of Cooper island by a channel $\frac{1}{4}$ mile wide, is 97 feet high; rocks extend a short distance both from the eastern side and the southeastern point.

Pot rock, with $4\frac{1}{2}$ fathoms of water over it, lies nearly 200 yards from Cooper island and between it and the southeastern point of Banger island.

Dark Tickle island is separated from the northern side of Banger island by a shallow channel 100 yards wide. A small black rock lies off the eastern point, and a small rock, that covers 3 feet, lies 150 yards off the island, bearing south-southeastward, distant 450 yards from its northern point.

Lord arm, entered southwestward of Dark Tickle island and between it and the mainland, is an open bay, 700 yards across, with depths of 19 to 25 fathoms of water, from which a shallow cove extends northward and an arm southwestward. The arm is nearly 1 mile long and 150 yards wide at the entrance, expanding to 500 yards within. There are two small rocks that cover 4 feet, close off the northwestern shore at $\frac{3}{4}$ mile within the entrance, and a fringe of bowlders, that covers at high water, on the southeastern shore at $\frac{1}{2}$ mile from the entrance.

Macy tickle, northward of Dark Tickle island and between it and the mainland, is 150 yards wide, and clear in mid-channel. Two small spits of rock which cover extend a short distance from the mainland.

An island, 55 feet high, lies north-northeastward, 600 yards from the northern entrance to Macy tickle, and several rocks lie between this island and the mainland to the westward.

Macy island, 53 feet high, lies northeastward 400 yards from the northern point of Dark Tickle island.

Car-na-bhus (the crooked mouth) island, about 100 feet high, lies northeastward 300 yards from Macy island. Shoals extend northwestward 400 yards from this island; the points of Macy tickle open, bearing 223° , leads northwestward of them.

The Knob, a small rock with $5\frac{1}{2}$ fathoms of water over it, bears 138° , distant 200 yards from the eastern end of Car-na-bhus island.

Deepwater island, northwestward, $\frac{1}{2}$ mile from Car-na-bhus, is 87 feet high and small, and there is a low islet off its southwestern side.

Stony island, northward about 1 mile from Cooper island, is $4\frac{1}{2}$ miles long, northward and southward, with a greatest width of about $2\frac{1}{4}$ miles. The summit, 670 feet high, is at the northern end of the island and northward of the entrance to Wild bight; there is a hill 656 feet high southward of Wild bight and northwestward of the entrance to Cox cove. Cooper head, the southern end of the island, rises to a cone 403 feet high; a reef extends nearly 200 yards from the head.

Black rock, 250 yards off the southeastern side of Cooper head, is 2 feet high, and a rock that covers lies close to its southern end. Shark rock, with 7 feet of water over it, lies northward 300 yards from Black rock and south-southwestward nearly 600 yards from White island.

Tub harbor, on the southwestern side of Stony island and northwestward 1 mile from Cooper head, is small, but affords snug anchorage to vessels of less than 200 tons: it has two entrances, but both are intricate and should not be attempted without a pilot. There are several fishing stages to which vessels moor.

A rock awash lies off the southern entrance; a rock, which always shows, at the northern side of the southern entrance; and a short distance northwestward of the latter is a rock which only breaks in heavy weather.

Venison tickle.—**Venison island**, on the eastern side of Stony island, is 1,400 yards long, northward and southward, about $\frac{1}{4}$ mile wide, and 224 feet high. On the summit is a flagstaff, about which is a conspicuous white boarding.

Venison tickle, the narrow passage between Venison and Stony islands, is sheltered from all winds and is much used by fishing craft, both as a channel and anchorage. The southern entrance is 50 yards wide, and $2\frac{1}{2}$ fathoms water can be carried through it, but it should not be attempted in a vessel drawing more than 12 feet. The depth at the northern entrance is 8 fathoms, whence the water gradually shoals to $2\frac{1}{2}$ fathoms at the southern end.

There is a large fishing establishment in the tickle, with a wharf, alongside which there is a depth of nearly 3 fathoms.

Tides.—It is high water, full and change, in Venison tickle at 6h. 47m.; springs rise $5\frac{1}{2}$ feet, neaps 4 feet.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Venison tickle fortnightly during summer. There is a wireless telegraph station at Venison tickle, which can receive from a distance of about 100 miles.

Cod rock, with 7 feet of water over it, bears 285° , distant 400 yards from the southern point of Venison island. The western points of the tickle, just open off the eastern points, so that the tickle is seen through, bearing 15° , leads westward 135 yards from Cod rock.

King rock bears 79° , distant 900 yards from the southern point of Venison island, and breaks in moderate weather.

Queen rock, bears 168° , distant nearly 200 yards from King rock, and has 15 feet of water over it.

The southern end of White Shot island open eastward of Sculpin island, bearing 22° , leads eastward of the King and Queen.

Fox and Pigeon islands, which are almost connected, lie eastward of the northern end of Venison island.

Gun rocks, just southward of Fox island, are low, black, and bold-to.

Sculpin island, eastward of Fox island, and separated from it by a clear channel 350 yards wide, is 69 feet high, and steep-to on the western and eastern sides. A rock lies off the southern point, and rocks and reefs extend northward, 300 yards from the island.

White Shot island, north-northeastward $\frac{1}{4}$ mile from Sculpin island and midway between that island and Eddystone island, is 18 feet high.

Shoals extend northwestward nearly 200 yards from the island.

Eddystone island, northeastward $\frac{1}{4}$ mile from White Shot island, and the northeasternmost of the group extending from Venison island, is 20 feet high and appears as a round black lump. A rock, awash at high water, lies close southwestward of Eddystone island, and a shoal, with $4\frac{1}{2}$ fathoms of water over it, bears 158° , distant 150 yards from its eastern end.

The passages between Sculpin and Eddystone islands should not be used for navigation.

Hen island, 20 feet high, from which Chickens rocks extend north-northeastward nearly 200 yards, lies west-northwestward, 600 yards from Eddystone island.

The Skerries, a rocky bank with 4 fathoms least water over it, bears 17° , distant 1 mile from the eastern point of Eddystone island.

Venison island flagstaff in line with the southern end of Hen island, bearing 228° , leads 200 yards southeastward of the Skerries;

and Fox and Hen islands, touching and bearing 203° , lead between the Skerries and White point.

Wild bight, situated on the northern side of White point, affords shelter for a few boats, but a heavy sea rolls in there with easterly winds, destroying the fishing stages, and even sweeping away the houses on its shores.

Red island, north-northeastward, distant 1 mile from White point, is 83 feet high, and has a double summit.

Hawke island, separated from the northern side of Stony island by a channel 1,200 yards wide, rises in several craggy hills of dark rock, the highest of which are 532 to 477 feet high, with numerous bowlders over both summits and slopes.

Hawke harbor, on the southern coast, affords good anchorage in 10 fathoms of water, mud bottom, within some rocks that lie across the passage about $\frac{1}{4}$ mile from the head. The western channel is clear, but the eastern is shallow.

Styles harbor, at the southeastern end of the island, is within a small peninsula 80 feet high, joined by a narrow neck to the mainland. The harbor extends northwestward 200 yards, and then turns sharply southwestward for 500 yards, with a breadth of 100 yards, and it affords excellent sheltered anchorage for fishing craft in 2 fathoms of water.

The Pig, a rock 1 foot high, bears 220° , distant $\frac{1}{2}$ mile from the entrance to Styles harbor; and Harbor island, 14 feet high, lies southeastward 300 yards from the same entrance.

Mad Moll, with 6 feet of water over it and deep water around, bears 197° , distant 450 yards from Harbor island. The white islet at the western entrance point to Hawke harbor in line with Pig rock, bearing 287° , leads southward; the western end of Transport island, open westward of Harbor island, bearing 19° , leads westward; and open eastward of Harbor island, bearing 359° , leads eastward of this rock.

Black rock, bearing 87° , distant 400 yards from Harbor island, is 8 feet high, and steep-to.

In entering or leaving Styles harbor pass on either side of Harbor island or Black rock.

Styles rock, with 3 fathoms of water over it, bears 160° , distant 700 yards from Black rock, and the water deepens quickly southeastward and northwestward of it. White point, well open eastward of Red island, bearing 202° , leads eastward; and the toll on White point, open westward of Red island, bearing 205° , leads westward of this rock.

Transport island, separated from the southeastern end of Hawke island by a channel 50 yards wide, through which a depth of 12 feet can be carried, is 116 feet high.

Musket islet, a white bare rock, 25 feet high, lies northeastward 400 yards from Transport island. Low rocks extend southwestward, and a reef southeastward a little more than 200 yards from it.

Outer Musket rock, with 9 feet of water over it, bears 76° , distant 450 yards from Musket islet.

Holloway bight, northwestward $\frac{1}{2}$ mile from Transport island, is 1,650 yards deep, $\frac{1}{2}$ mile wide at the mouth, and open to easterly winds that in early summer nearly fill it with icebergs, as the water is deep. There is no anchorage except with westerly winds, and these sweep down in heavy squalls.

A group of islets extends northward from off this bight to the eastern end of Hawke island, and no attempt should be made to pass between them and that island, except with local knowledge.

Upper Bird island, 29 feet high, flat and bare, is situated close off the northern point of Holloway bight. Low rocks extend northwestward and northeastward, and a sunken rock, bearing 31° , distant 350 yards from Upper Bird island, ends the group.

Deepwater island, north-northeastward $1\frac{1}{4}$ miles from Transport island, is two bare rocky hillocks joined by a low neck across which the sea breaks: the western and higher hillock is 47 feet high. Southeastward of this island is a low black rock with a rock awash close to its northeastern end: two small islets lie close southwestward.

Bird island, northwestward of Deepwater island and separated from Hawke island by a narrow channel through which only boats can pass, is a bare dark round hill, 66 feet high. A small cove on the southeastern side of the island affords good shelter for boats, and small vessels find fair summer anchorage southwestward of this island in $3\frac{1}{4}$ fathoms of water, but a heavy sea rolls in with easterly gales. An islet, 8 feet high, lies southeastward 200 yards from Bird island, and a rock that covers at high water lies close northwestward of the island.

Black rock, northwestward 200 yards from Deepwater island, is 1 foot high, and shoal water extends northeastward and southwestward 100 yards from it.

Beckett rock is 4 feet high, with deep water southeastward and northeastward of it.

In proceeding to Bird island anchorage pass close northwestward of Deepwater island, and then in mid-channel between Bird island and the islet close southeastward of it.

Kennedy island, the highest of a group nearly joined to one another, and separated by a narrow shoal channel from Penguin head, the northeastern point of Hawke island, is 77 feet high.

Turr rocks comprise a brown bare islet in two parts, 16 feet high, lying northeastward 700 yards from Penguin head, and a black islet 7 feet high, bearing 92° , distant 335 yards from the brown islet.

A rock, with 4 feet of water over it, bears 219° , distant 550 yards from the eastern Turr rock. Bear island, open on one side of the western Turr rock, leads westward, and open on the other side, leads eastward of it. A shoal, with 6 fathoms of water over it, bears 121° , distant 250 yards from the eastern Turr rock, and a rock with 12 feet of water over it bears 28° , distant 200 yards from the western Turr rock.

Scrape cove, northwestward 700 yards from Penguin head, is 1,100 yards deep and 700 yards wide at the entrance. The shores are bold crags and the water is too deep for anchorage: rocks that cover lie in the cove at 200 yards from the northwestern entrance point.

Penguin harbor, northwestward about $\frac{1}{2}$ mile from Scrape cove, is divided into two arms by Greens island, a rugged dark cliffy conical hill 124 feet high. The southeastern arm is open, but the northwestern arm is $\frac{1}{2}$ mile deep, 150 yards wide and affords anchorage for fishing craft in 3 to 5 fathoms of water: there is also excellent shelter for boats.

Harper island, northwestward 1,100 yards from Greens island, and separated from Hawke island at high water by a narrow channel filled with boulders, is 216 feet high.

There is anchorage, in 8 fathoms, off a small islet northwestward of the channel between Hawke and Harper islands.

Bear island, the southeastern island of a group lying parallel to the northeastern coast of Hawke island, is 88 feet high. A bare flat rock just above high water lies close off the southeastern end.

A rock, with 7 feet of water over it, bears 137° , distant about 600 yards, and a rock, with 4 feet of water over it, bears 182° , distant 400 yards, from the rock at the southern end of Bear island. Harper island, well open southward of Stag island, bearing about 284° , leads southwestward; the eastern point of Holloway bight seen between Turr rocks, bearing 196° , leads eastward; and Fish point, well open northeastward of Bear island, bearing 309° , leads northeastward of these rocks.

Stag island lies westward 150 yards from Bear island, with a clear channel between; its summits are two hills, separated by a deep ravine, the eastern 294 feet and the western 291 feet high. Duck cove, near the northwestern end, is shallow and suitable for boats only.

Old Jeff island, westward 100 yards from Stag island, rises steeply to its summit, which is flat and 135 feet high. A white house stands a short distance up the hill on the northeastern side. Boulders extend a short distance off the eastern side, and a bank, with less than 3 fathoms of water over it, extends 135 yards from the southeastern point.

Boulter Rock anchorage.—Boulter rock, small, flat, and bare, with a red house at the top, lies just eastward of the northern part of, and is joined at low water to, Old Jeff island. The anchorage northwestward of this rock and between Stag and Big islands affords shelter from all winds, during summer, in 4 to 9 fathoms of water, but during the heavy gales of autumn it is not safe with winds between northwesterly and northeasterly directions.

A rock lies close to the shore under the cliff northeastward of the anchorage.

Big island, close northwestward of Old Jeff island, rises in three ranges divided by deep valleys, the summit, 254 feet high, being at the southwestern end of the middle range.

Northeast rock, with 12 feet of water over it, lies 135 yards northeastward of the eastern point of Big island and 150 yards from the northwestern coast of Flat island. The white house on Old Jeff island, well open southeastward of Big island, bearing about 227° , leads southeastward; and Red island, open northward of Flat island, bearing 104° , leads northward of this rock.

Locks rock, with 3 fathoms of water over it, lies 135 yards off the northern point of Big island.

A rock, with 1 foot of water over it, bears 182° , distant 550 yards, from the western point of Big island, leaving a clear passage, 250 yards wide, between it and the island.

Caplin bay, entered between Stag and Harper islands, is connected with Hawke bay by Deer pass (locally Squasho run, a channel between Hawke island and the mainland).

Off the northwestern point of Hawke island or the northeastern entrance point of Deer pass there is a small island, and bearing 300° , distant 200 yards from the northwestern end of this island, is a rocky shoal 15 yards across, with 2 feet of water over it and steep-to.

Deer pass.—There is fair anchorage in a small cove on the western shore of this pass, just within the entrance from Caplin bay, in 15 fathoms of water, mud bottom.

Hill harbor, a bight in the mainland northwestward of Big island, is 800 yards deep, 250 yards broad, and clear except near the head; it affords good anchorage in 4 to 10 fathoms of water, mud bottom.

The Hump, a shoal with $4\frac{3}{4}$ fathoms of water over it, bears 47° , distant 800 yards from the northern point of Big island, and is distant 550 yards from the mainland.

The Feather bed, a rocky patch with two heads and 7 feet least water over it, bears 47° , distant 1,400 yards from the northern point of Big island and 700 yards off shore.

Bear island, open eastward of Red island, bearing about 168° , leads eastward of the Hump and Feather Bed.

Salt pond, northeastward $1\frac{3}{4}$ miles from Hill harbor, is a creek extending northward 500 yards from the narrow entrance, with a breadth of 65 yards. It is suitable for small vessels. The entrance is clear, but the violent squalls and eddying winds that sweep down from the surrounding hills should be prepared for.

Cox head, northeastward 1,100 yards from Salt Pond entrance, is the southern slope of a conspicuous dark wedge-shaped hill, the summit of which, 282 feet high, falls steeply eastward to the sea.

Comfort head, the northern slope of the wedge-shaped hill, has numerous rocks and shoals lying within a distance of $1\frac{1}{2}$ miles off it, and this area after northeasterly gales appears a mass of breakers. Black rock, the northeasternmost of this group of rocks, is 16 feet high, and surrounded by banks, all of which break in heavy weather. The positions of these rocks and shoals are marked on the chart. In fine weather there is a good channel for moderate-sized vessels inside all.

Rocks—Clearing mark.—The summit of Hawke island over the channel between Bear and Stag islands, bearing 205° , leads eastward of the rocks and shoals lying off Cox and Comfort heads.

Comfort bight is the deep inlet between Comfort head and Partridge head, which bears 355° , distant $1\frac{1}{4}$ miles from it. The bight contains a large bay, and two good harbors for small craft sheltered by small islands, and much frequented by fishing vessels.

Sprackling island, close northwestward of Comfort head, is 83 feet high, dark and conical, with two small islets westward of it, all connected together and to the mainland by shoals and rocks.

George harbor, southwestward of the two small islets, is 600 yards in extent and nearly 200 yards wide at the entrance, narrowing gradually to the head. A rock with 6 feet of water over it lies just within the western head in the line of the western points; otherwise the harbor is clear except close to the shore.

The harbor affords anchorage in 4 fathoms of water, mud bottom, but a heavy sea rolls in with the autumnal northerly gales.

Owl Head island is 194 feet high; its coasts are steep cliffs, except the southwestern, from which it rises gradually. There is a flag-staff on the island.

Burke island, southwestward of Owl Head island, and separated from the mainland on the southern side by a narrow channel suitable for small craft only, is 112 feet high, and dark.

Penny Harbor entrance, between Owl Head and Burke islands, is 150 yards wide, and from it the harbor trends southward between Burke island and the mainland westward of it, but, as there are several rocks in this part, do not anchor southwestward of a small black rock, just above high water, lying close under a conical hill 150 feet high on the northwestern shore. Harbor rock, that covers

about 2 feet at high water, is situated about 50 yards off Burke island, and Black rock shut in northward of Owl Head island, bearing about 88° , leads northward of it. This mark leads to the anchorage in $5\frac{1}{2}$ fathoms of water, over mud bottom and good holding ground.

Saunders island lies north-northwestward, distant 300 yards from the western end of Owl Head island, and a point of the mainland projects partly between them.

Rocky bay extends west-southwestward about 1 mile from Saunders island, and is 600 yards wide at the entrance, and somewhat wider inside. The bay is clear except at a short distance off the islands at the head and near the shores. At the head are two coves, the southern of which is shoal.

The bay affords anchorage, sheltered except from easterly winds, in 14 fathoms mud bottom, in the middle, and for small vessels in the western cove, at the head, in 9 fathoms.

Three islands are three islands extending north-northeastward 600 yards along the northern entrance head of Comfort bight, northward of Owl Head island; a shoal, with $1\frac{1}{2}$ fathoms of water over it, lies southward about 300 yards from the southwestern of these island.

The Sugarloaf, a dark conical island, 163 feet high, lies 400 yards southeastward of the southern point of Partridge head, and is surrounded by shoals, except at the southern point, which is bold-to.

Tommy rocks are three shoals on a bank extending south-southwestward nearly 800 yards from a position 200 yards off the western end of the Sugarloaf. The channel between this bank and Three islands is narrowed to 300 yards. The western point of Hiscock island, touching Partridge head, bearing about 23° , leads between Tommy rocks and the mainland.

Bobby rocks, bearing 104° , distant 900 yards from the southern end of the Sugarloaf, are two round islets and some small and flat rocks, the highest being 15 feet high.

Directions.—Approach Comfort bight in heavy weather with the summit of Hawke island open eastward of Bear island, until Bobby rocks are in line with the summit of the Sugarloaf, bearing 293° . Pass northward of Bobby rocks and southward 200 yards from the Sugarloaf, to clear Jersey bank, which bears 149° , distant about 400 yards from the Sugarloaf, has 8 fathoms of water over it, and breaks in heavy weather. Thence steer for Owl head and enter George harbor, Penny harbor, or Rocky bay. In moderate weather, with local knowledge, vessels pass southeastward 200 yards from Black rock, steering for Owl head, but Planter shoal, with 3 fathoms of water over it, on the northern side of the track, and a shoal with $1\frac{1}{2}$ fathoms over it, bearing 25° , distant $\frac{1}{2}$ mile from Comfort head, on the southern side, must be avoided.

Tides.—It is high water, full and change, in Comfort bight at 7h. 3m.; springs rise $5\frac{1}{2}$ feet, neaps $2\frac{3}{4}$ feet.

Partridge head rises steeply to a remarkable table-topped hill, 551 feet high. The northern part of the head is a sharp conical hill, 406 feet high, separated from the main hill by a deep valley which shows well from the southeastward.

American cove, north-northwestward about 1 mile from the southern end of Partridge head, is a narrow boat creek, with some houses around its shores.

Partridge bay, the entrance to which is northward about 600 yards from American cove, extends southwestward about $1\frac{1}{2}$ miles, and an arm runs northwestward $2\frac{1}{2}$ miles from it. The survey of the bay is old and incomplete.

The northern entrance point of the bay is a low grassy hummock, 24 feet high, rising gradually to a high wooded summit. A rock, with 7 feet of water over it, lies southwestward 100 yards from this point.

Red island, north-northeastward $\frac{1}{2}$ mile from the northern end of Partridge head, and the westernmost of a group of islands covered with grass over reddish rock, is small, 55 feet high, and bold-to on the northwestern and southwestern sides.

A low black islet lies close to its eastern end, and at 100 yards farther northeastward is a similar islet, from which is a rock, with 8 feet of water over it, bearing 5° , distant 100 yards.

The channel between these islets is deep, and ordinarily used by the local fishing craft. Bobby rocks seen between the two black islets, bearing about 166° , clears the 8-foot rock.

Flat island, eastward $\frac{1}{4}$ mile from Red island, is 65 feet high, and a small round islet lies eastward a short distance from its southeastern point.

A shoal, with $4\frac{1}{2}$ fathoms of water over it, bears 180° , distant nearly 200 yards from the southern point of Flat island; and Flat Island bank, with 6 feet of water over its shoalest part, northeastward 150 yards from the northern point.

Flat Island rock, with 5 feet of water over it, bears 112° , distant $\frac{1}{4}$ mile from the southern point of Flat island and nearly in midchannel between that island and Duck islands.

Duck islands, eastward 600 yards from Flat island, consist of three principal and several smaller islands and rocks, with no navigable passage between them, except with local knowledge.

Duck island, the largest, has a round hill, 99 feet high, at its northeastern end: the island rises in steep cliffs to the southeastward, and form rugged points on the northwestern side.

Little Duck island, the northeasternmost and darkest of the group, is 51 feet high. A rock, awash at low water, lies southeastward nearly 200 yards from Little Duck island, and a shoal, with 7 feet of water over it, southward 100 yards from the rock.

Hiscock islands comprise a group situated northward of Duck islands, with a good channel between.

Eastern islands, the eastern part of this group, are three bare rocks, the northernmost and highest of which is 24 feet high.

A rock, with 9 feet of water over it, bears 74° , distant 150 yards from the highest island.

Fling islands are situated 200 yards from Eastern islands, the highest being 141 feet high.

Webber rock, with 13 feet of water over it, lies eastward 250 yards from the southern point of these islands.

Big Pig island, 86 feet high and bare, lies northward 300 yards from Fling islands; and Crocker island, small and low, is close eastward of it.

Mad Moll lies in mid-channel between Fling and Big Pig islands, and covers 1 foot at high water. Small vessels pass in the middle of the passages on either side of this rock.

Hiscock island lies westward about 200 yards from the Fling islands, and its eastern coast rises in a dark serrated cone, to the height of 147 feet; there is a small cove on the northern coast, where a few fishermen are established; the channel between Hiscock and Fling islands is clear.

Walker island, the northwesternmost of the group, separated from Hiscock island by a narrow shallow channel, is 107 feet high, dark, and pyramidal in shape; the northern coast is steep-to.

Nancy island, lying westward 350 yards from Hiscock island, with a clear passage between, is 12 feet high and flat.

Hare island, west-northwestward, 350 yards from Walker island, is 209 feet high. A rock, that covers, lies a short distance off a cove on the southern side, and a small narrow islet, 22 feet high, lies close off the northeastern side. Inside of this island some rocks extend off Hare island.

Little Hare island lies close northwestward of Hare island; and Green islands, northward, nearly 400 yards from Little Hare island, comprise a long rock and a conical mound 22 feet high, joined by rocks, and covered with grass, with foul ground extending 100 yards from all sides except the northeastern. The passage between these and Little Hare island should not be taken.

An islet, 12 feet high, lies westward, 600 yards from the western side of Hare island: it is bold-to, except that a reef extends north-northeastward nearly 100 yards from it.

Gulnare islands are two islands separated from the mainland westward of Hare island by a clear channel 150 yards wide. The southern island is 107 feet high, and a small white islet lies close off its southwestern point.

The northern island is barren in patches and rises in two dark conical hills, the northwestern of which is 157 feet high.

A bay, situated westward of the northern of these islands, extends $\frac{1}{2}$ mile to the westward, narrowing gradually to the head from a width of 900 yards at the entrance, and affords good anchorage in 10 fathoms of water, mud bottom.

A bank, about 200 yards across, with 6 feet of water over it, lies in the middle of the bay, bearing 300° , distant $\frac{1}{4}$ mile from the northern point of the northern Gulnare island, and there is no passage for a large vessel southwestward of it. A shoal, with $4\frac{1}{2}$ fathoms of water over it, bears 194° , distant 150 yards from the northeastern entrance point.

Tickle island, northward about 400 yards from the northern Gulnare island and with its northern end joined to the mainland at low water, rises to a dark hill, 66 feet high, near the northern end, and steeply to a lower hill near the southeastern end. Between these hills is a low marsh, joining the heads of two shallow coves that enter each side. A rock, that covers, lies 100 yards off the western side, and a shoal lies a short distance off the southern point, but the eastern side is steep-to.

Frenchman run is the passage between Gulnare islands and the mainland, on the northern and western sides, and Hare, Copper, and the islands northward to Corbet island, on the southern and eastern sides. This channel, much used in the early part of summer when ice blocks the outer tracks, is well sheltered and contains several anchorages.

Tides.—It is high water, full and change, in Frenchman run at 7h. 13m.; springs rise $5\frac{1}{2}$ feet, neaps 3 feet.

Frenchman harbor, the entrance to which is immediately north-eastward of the northern end of Tickle island, extends 800 yards northward, and is 400 yards wide at the entrance. It narrows gradually to the head, and is clear of shoals except close to the shore. It affords anchorage for small vessels in 6 to 12 fathoms of water.

The coast of the mainland eastward of the harbor is fringed by bowlders, and rises at 600 to 800 yards inland to a barren round hill 282 feet high. At about 1,200 yards from the harbor is a steep bluff, rising to a peaked hill 188 feet high, and here the coast turns northward.

A rocky bank about 100 yards across, with 2 feet of water over it, lies southeastward 300 yards from the bluff.

Anchorage can be obtained, in 14 fathoms of water, between Copper island and the mainland.

Copper island.—The western end of Copper island lies about 200 yards eastward of Tickle island, and Copper island extends thence east-southeastward for $1\frac{1}{2}$ miles, with an average width of $\frac{1}{2}$ mile;

it rises in a range of hills, the summit of which, near the northeastern end, is a small cone above the general flat outline and 193 feet high. The eastern end rises abruptly in a reddish cliff. Rocks lie a short distance off the points.

Fish island, eastward about 200 yards from the eastern point of Copper island, is 91 feet high, and rocks, 1 to 12 feet high, lie at the distance of about 150 yards around its northwestern end.

Sugarloaf islet, 92 feet high, is nearly joined to the northeastern side of Copper island, leaving a passage between only suitable for boats.

Seine island, north-northeastward 300 yards from Sugarloaf, is conical, 47 feet high, covered with grass, and nearly divided by two coves, around the southern of which are a few houses.

Frenchman island, northwestward 200 yards from Seine island, and separated by a passage through which $4\frac{3}{4}$ fathoms of water can be carried, is 80 feet high at the southern end, and there is a gray round hill about 50 feet high at the northern end.

Sullivan island, separated by a shallow channel, 100 yards wide, from the northern part of the eastern side of Frenchman island, is 82 feet high. The passage between this and the islands to the eastward is clear.

Seal islands, a group $2\frac{1}{2}$ miles long in a north-northwesterly and south-southeasterly direction, lying eastward of Fish, Seine, and Sullivan islands, comprise three principal and numerous smaller islands and rocks.

The Ravens, the southeastern islands of the group, are several low rocks; the highest being 18 feet high. No-man-land shoal, with 16 feet of water over it, bears 154° , distant 250 yards from the southwestern Raven, and shoals extend from the other rocks.

There is a clear passage northwestward of the Ravens and close to Long island.

The Pippies are three shoals situated $\frac{3}{4}$ mile southward of the Ravens. The middle shoal, with $6\frac{1}{4}$ fathoms of water over it, bears 196° , distant 1,300 yards from the southeastern Raven; and from the middle shoal the northwestern shoal, with 8 fathoms of water over it, bears 284° , distant 300 yards, and the southeastern shoal, with 9 fathoms of water over it, bears 135° , distant 500 yards.

Long island lies northwestward of the Ravens, and its flat summit, 104 feet high, is near the southern end; there are several smaller elevations toward the northern end; its coasts generally are steep-to.

Crow island, 50 yards off the northeastern end of Long island, is 78 feet high, and appears as a sharp cone on northerly and southerly bearings; there are some sunken rocks close off its southern end.

Crow island rocks are two shoals, with 11 feet of water over them, lying eastward 300 yards from Crow island, and 135 yards apart, northward and southward.

Pollo rock, lying 700 yards eastward of the middle of Long island, is round, black, and 9 feet high.

Pollo sunkers, south-southwestward 100 yards from Pollo rock, are always marked by breakers.

American island, westward of Long island, has some flagstuffs and several white houses on the shores of a cove on its eastern side: this cove affords anchorage for small vessels in 3 fathoms of water, sand bottom; a shoal lies close off the northern point of the cove. A rock lies a short distance westward of the southern point of the island, and a rock, awash at low water, off the northwestern point.

American tickle, the passage between Long and American islands, is about 100 yards wide at its narrowest part and may be taken by vessels drawing less than 18 feet of water by keeping close to Long island.

Seal island, north-northwestward of American island, is covered with ranges of dark hills, the highest near the southern end being 135 feet high. On the northern hill is a flagstaff, 98 feet above high water.

Wireless telegraph.—There is a wireless telegraph station at Seal island.

Seal Island harbor, a bight in the southern coast of the island, is only suitable for small vessels, which lie within a peninsula, connected to the western side of the bight by a narrow isthmus. Rocks, with 2 feet of water over them, lie off the northern point of the peninsula, leaving a narrow passage on each side of the rocks, with a depth of 15 feet in the southern, and 9 feet in the northern. A shallow lagoon close within the head of the harbor enters the sea on the western coast of the island. Several white houses, occupied by permanent settlers, surround this harbor.

Hills harbor, on the eastern coast of Seal island at $\frac{1}{2}$ mile from its northern end and within one large and several smaller islands, is only adapted for a few small vessels. The southern entrance is barred by rocks, but the northern is clear.

Gull island, 27 feet high, lies southeastward about 400 yards from the southern entrance to the harbor. There is a small rock close to its southeastern side.

The Brandies, eastward, nearly 200 yards from Gull island, is a rocky bank, 300 yards long, in a north-northwesterly and south-southeasterly direction, with two heads, each with 7 feet of water over it. A small rock bears 92° , distant 500 yards from Gull island, and has 12 feet of water over it.

Matthews tickle, with 3 fathoms of water, and a snug place for a few small craft, is formed by two islands at the northern end of Seal island; a rock lies close off the western side of the larger island.

A bank, with $4\frac{1}{2}$ fathoms of water over it, lies northward, distant 250 yards from the northern end of Seal island.

Pike island, 40 feet high and dark in color, is nearly joined to the western point of Seal island, and forms a sheltered place for fishing boats.

Parsons island, 250 yards off Seal island, and northward 450 yards from Little Pig island, is 26 feet high, and covered with grass over gray rock. Anchorage may be obtained southeastward of this island, in 11 fathoms, sheltered from northerly winds, and between the reef off Seine island and Frenchman island, in 11 to 16 fathoms of water, sheltered from all other winds.

Davis rock, with 7 feet of water on it, bears 11° , distant 350 yards from the northwestern Seal islet (westward of Seal island). Seine island, open westward of these islets, bearing 177° , leads westward; and Black rock, touching the southern point of Dog island, bearing 45° , leads northwestward of this rock.

Flat island.—Several islands lie eastward of the northern end of Seal island, the two western islands being 45 and 59 feet high. Flat island, the third from Seal island, is 46 feet high. Sculpin rocks, which cover 3 feet at high water, and nearly always show by breakers, represent the termination of a chain of rocks extending south-southeastward 600 yards from Flat island. Sleepy island, about 200 yards northeastward of Flat island, is 40 feet high.

Local craft, proceeding to the anchorage, westward of Seal island, pass between Sculpin rocks and the Brandies, and thence, keeping near Seal island, in mid-channel between Pig and Seal islands.

Fox islands, the two eastern islands of the group eastward of the northern end of Seal island, and about 265 yards eastward of Flat and Sleepy islands, are both faced by whitish cliffs, and are flat in outline. The southwestern island, 85 feet high, is skirted by rocks 100 yards from the points on the southwestern side. There is no passage between it and Sleepy island, as a rock, awash at high water, lies nearly in mid-channel. The northeastern island is about 70 feet high, and separated by a clear channel 100 yards wide from the southwestern island.

Tides.—It is high water, full and change, at the Seal islands at 6h. 39m.; springs rise $5\frac{1}{2}$ feet, neaps 4 feet.

Sloop harbor, an inlet of the mainland, the entrance of which bears 261° , distant $\frac{3}{4}$ mile from the northern end of Seal island, extends westward for 1,450 yards; the entrance is 350 yards wide and the head opens to 800 yards. A low islet lies near the southern shore with a black rock close off it, and a rock, with 5 feet of water over it,

lies northward 100 yards from the southern entrance point. A low point juts out from the northern shore at 600 yards from the mouth; vessels must not proceed within this point, but should anchor in 6 fathoms of water, eastward of it, except with local knowledge.

A round island, about 30 feet high and covered with grass, lies in the middle of the harbor, and there are depths of 3 fathoms on the southern side of the harbor up to it. Anchorage for small craft may be obtained off the cove southward of the island in 3 fathoms of water, mud bottom.

Funchbowl, an inlet, whose entrance lies north-northwestward, 1 mile from Sloop harbor, and has a channel about 50 yards wide, with rocks a short distance off its northwestern shore, extends south-southwestward and southward for 1,400 yards. Rocks stretch off the southern entrance point immediately within the narrows, and the inlet affords excellent anchorage for small vessels drawing 7 feet or less, in any part of the harbor, the bottom being soft mud from the middle to the western shore, but rocky near the eastern side.

Anchorage for larger vessels, in $3\frac{1}{2}$ to 5 fathoms, may be obtained from the entrance till the point, on which the houses are situated, bears 323° . Inside of this limit the water shoals suddenly.

Tides.—It is high water, full and change, in Punchbowl at 6h. 59m.; springs rise $5\frac{1}{2}$ feet, neaps $4\frac{1}{2}$ feet.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Punchbowl fortnightly during summer.

Dog island, with a flat summit 188 feet high, lies $\frac{1}{4}$ mile off the mainland between Sloop harbor and Punchbowl. A narrow islet, 7 feet high, lies 200 yards off the western side of Dog island; the water between is shallow, and a shoal extends from Dog island, the outer part, with 10 feet of water over it, being southwestward 150 yards from the islet. The fishing stage in the cove between the two parts of Corbet island, open westward of the islet, bearing about 5° , leads westward of this shoal. The northern point of Dog island is a low hillock with a flagstaff on it.

Big Pig island, northeastward of Dog island, is 130 feet high, conical in shape, cliff-faced on the northwestern side, and bold to within a short distance from the eastern and southern sides.

Harbor rock, bearing 289° , distant 600 yards from the northern point of Big Pig island, is 1 foot high, and midway between this rock and the northwestern point of Big Pig island is a rock, with 10 feet of water over it. The bay formed by the northwestern point of Big Pig island and the islands off the northern part of Dog island is foul.

Rogers island, the northern of two islands lying off the northern point of Dog island and distant 400 yards from that point, is 34 feet high; the islands are connected together and to Dog island by shallow

water and rocks, and shoal water extends a short distance westward of the two islands.

Corbet island, northward about 1,400 yards from Dog and Big Pig islands, is $1\frac{1}{10}$ miles long, eastward and westward, with an average width of about 1,400 yards, and is in two parts joined by a low neck about 40 yards wide. The summit of the eastern part is flat and 232 feet high. The western part is 152 feet high, and nearly subdivided by a deep cove that extends to within 65 yards of Orleans arm.

Solomon rock, with 2 feet of water over it, is at the end of a ledge extending 150 yards from the western coast of Corbet island. The summit of Green island in line with the southeastern end of the eastern Deepwater island, bearing about 16° , leads westward of this rock.

Keefe island, about 40 feet high, lies 200 yards southward of the middle of Corbet island, and is nearly joined to it by rocks; it is on the western side of Corbet harbor. A rock, with 7 feet of water over it, lies southwestward 100 yards from the southern point of Keefe island.

Bryan island, 82 feet high, is on the eastern side of Corbet harbor, and nearly joined to Corbet island, but there is a narrow channel, with 3 fathoms of water in it, between them.

The Sisters, small islets 8 feet high, lie close off the northeastern point of Corbet island, and are bold-to on the northeastern side.

Tom Cod rock, bearing 120° , distant 200 yards from the Sisters, covers 1 foot, and is skirted by shoal water; Bantam rock, bearing 123° , distant 350 yards from the Sisters, has 11 feet of water over it.

Herring cove, 300 yards wide, 450 yards deep, and open, is on the northern side of Corbet island.

Orleans arm, westward of Herring cove, almost separates Corbet island into two parts; it runs 1,200 yards to the southward, is 200 yards wide at the entrance, and narrows gradually to the head. It is rarely used, even by fishing craft, as a heavy sea sets in with north-easterly winds.

Webber harbor lies westward of Orleans arm and is separated from it by a peninsula and Lea island; this island is situated close northward of the peninsula, and is 105 feet high, dark, cliffy, and bold-to. The harbor extends south-southeastward 900 yards, with a width of 135 yards, and it affords indifferent anchorage for fishing craft, in 5 fathoms of water, opposite the opening between Lea island and the peninsula, or farther up in $1\frac{1}{2}$ fathoms.

North Crow island, 106 feet high, lies 150 yards from the eastern point of Corbet island. An islet, 5 feet high, lies close off its southwestern point, and a sunken rock lies in the fairway of the channel between Corbet and North Crow islands, leaving a narrow passage close to North Crow island.

Bradbury island lies eastward 135 yards from Bryan island, and is 152 feet high; the channel between these islands is clear and 5 fathoms can be carried through it.

East Bradbury island, eastward from Bradbury island, with a clear channel 100 yards wide between, is 92 feet high, and generally of dark rock curiously striped with white bands on the seaward face. An islet 4 feet high, with a sunken rock, bearing 166° , distant 100 yards from it, lies southeastward 200 yards from East Bradbury island, and there is a patch of rocks at about 200 yards northward of the island.

Little Black rock, southeastward $\frac{1}{4}$ mile from East Bradbury island, is about 20 feet high, and there is a sunken rock at about 100 yards southward of it.

Black rock, north-northeastward, 250 yards from Little Black rock, is 66 feet high, dark, conical, and bold-to on the northeastern and northwestern sides, but a rock, with 12 feet of water over it, lies between Black and Little Black rocks.

Herring island, eastward $\frac{1}{4}$ mile from North Crow island, is small, about 30 feet high, round, black, and bold-to. A bank, with 16 feet of water over it, lies between it and East Bradbury island. Herring Island rock, bearing 76° , distant 350 yards from Herring island, has 10 feet of water over it.

Pigeon island, northeastward, 400 yards from North Crow island, is 56 feet high, round and dark, with rocks close to its southern end. A rock, with 9 feet of water over it, lies southeastward 200 yards from Pigeon island, and a rocky bank 400 yards long, northward and southward, with 3 feet to 3 fathoms of water over it, and steep-to on its eastern side, lies with its southern end bearing 70° , distant 200 yards from Pigeon island.

A rock 2 feet high, with shoal water a short distance northwestward and southward of it, lies eastward, distant 700 yards from Pigeon island.

Red island, eastward, distant 1,400 yards from the Sisters, is 49 feet high, and a small islet lies close northwestward of it.

White rock, eastward, distant 1,300 yards from Red island, is 30 feet high, and shoal water runs a short distance off the northern and southern ends.

South Black rock, northward, distant 700 yards from the Sisters, is 7 feet high. It has shoal water off the western side, and a shoal, with 12 feet of water over it, lies southeastward 200 yards from it.

Flat island, northeastward 465 yards from Lea island, is 19 feet high, bare, rugged, and skirted by shoal water. The Pancake, a flat rock that covers 2 feet, lies southwestward 100 yards from it.

North Three islands, northward 400 yards from Lea island, form a small harbor where boats shelter. The largest island is 110 feet high toward its southwestern end.

There are some shoals to the northeastward of these islands. Caleb shoal, the northeasternmost, has 3 fathoms of water over it, and bears 59° , distant 1 mile from the northeastern of the North Three islands.

Deepwater islands, two small islands, 200 yards apart, situated northwestward of North Three islands and separated from them by a deep channel 350 yards wide, are round and bluff: the eastern is 55 feet high and the western 102 feet high.

Gurney island, southward, 300 yards from the western Deepwater island, is 21 feet high.

American rock, north-northeastward, 800 yards from the eastern Deepwater island, is 3 feet high, and bold-to on the southeastern side.

Green island, north-northeastward $\frac{9}{10}$ mile from the eastern Deepwater island, is 54 feet high, and a dark seam runs down its northern side: a group of rocks, 10 feet high and nearly steep-to, lies close to the southwestern end. A bank with 5 fathoms least water over it bears 356° , distant 400 yards from the northeastern point of Green island.

Walker island, northwestward, 400 yards from Green island, is 40 feet high: a rock lies nearly in mid-channel between the islands; Walker rock, northwestward, 200 yards from Walker island, is 2 feet high and skirted by shoal water.

A bank, with $5\frac{1}{2}$ fathoms of water over it, bears 334° , distant 700 yards, and a shoal, with $4\frac{1}{2}$ fathoms of water over it, bears 306° , distant 865 yards from Walker rock.

North Black rock, bearing 75° , distant 1,650 yards from Green island, is 4 feet high and steep-to.

Middle ground, with 15 feet of water over it, bears 292° , distant 850 yards, and Eastern rock, with 3 fathoms of water over it, bears 359° , distant 450 yards from North Black rock.

Shoal bay, the southern entrance point of which lies $1\frac{1}{2}$ miles northwestward of Punchbowl entrance, extends southwestward about $1\frac{6}{10}$ miles, with a width of some 1,200 yards, and from its inner part arms run northwestward and southward. It affords anchorage, but it has several shoals and it has been but cursorily examined.

Shoal Bay island, northward about 200 yards from the northern entrance point of Shoal bay, is 79 feet high, and two islands, 30 feet high, lie close off its northeastern side, and shelter a small cove. A shoal nearly 200 yards long, northward and southward, with 10 feet of water over it, lies southeastward $\frac{1}{4}$ mile from these islands.

Goss island, 30 feet high, is the eastern of some low rocks extending northeastward from the northern of the two islands off Shoal Bay island, and the ground westward of Goss island is foul.

A shoal, with 3 fathoms of water over it, bears 6° , distant 265 yards, from the western end of Goss island.

Pigeon island, bearing 303° , distant 1,200 yards from Goss island, is 29 feet high and flat; some low islets lie southward of it, and shoal water surrounds it for a distance of 200 yards.

A shoal, with $4\frac{1}{2}$ fathoms of water over it, bears 67° , distant nearly 300 yards, and Taylor bank, with 5 fathoms water over it, bears 10° , distant 750 yards from Pigeon island.

Black Bear bay.—The entrance to this bay lies between Pigeon island and Salter island, which is distant nearly a mile to the northward, and the bay extends westward about 3 miles, narrowing toward its head. It affords good anchorage in a depth of 14 fathoms, with a small waterfall on the northern shore bearing 356° . There is deep water to the head of the bay, where there is a small settlement off which vessels can anchor. The bay has been only cursorily examined.

A rapid river falls into the head of the bay, and water can be obtained from the waterfall.

Bed head divides Black Bear and Open bays. Salter island, close off this head, is 55 feet high, and nearly joined at its western side to the mainland by rocks and shoal water, but fishing craft find good sheltered anchorage, in 2 fathoms of water, between the island and Bed head.

Run island, 55 feet high, lies 600 yards north-northeastward from the northern point of Salter island, and the channel between carries 5 to 7 fathoms of water and affords anchorage sheltered from westerly winds. Run island is connected by shoal water to Sandy islands, which lie $\frac{1}{4}$ mile to the northeastward.

Sandy islands comprise one large island, 88 feet high, and several smaller islands, on the eastern side of which is Sandy Islands harbor, a rocky bight completely open to easterly winds. In entering the harbor, keep the southern island close aboard, and, when inside, anchor in 5 fathoms water, coral bottom.

A cove, extending 350 yards to the southward, with a white sand beach at its head, on the northern side of the large island, gives good shelter for fishing boats. A considerable settlement is formed here during summer.

The southeastern island is 65 feet high, and separated on its western side from the largest island by a channel just wide enough for boats to go through at half tide.

A rock, with 6 feet of water over it, bears 111° , distant 250 yards from the southeastern end of the islands.

A large fishing bank, with numerous shoals that break in heavy weather, extends northwestward and northeastward of Sandy islands. Gushue rock, the eastern shoal, with 3 fathoms of water over it, bears 87° , distant $1\frac{1}{2}$ miles from the northeastern point of Sandy islands.

Open and Porcupine bays, northwestward of Sandy islands, have been but cursorily examined.

American point, the northern entrance point of Open bay, lies northward, distant 3 miles from the northwestern point of Sandy islands, and is bold-to.

Sandy bay extends northwestward $1\frac{3}{4}$ miles from American point, and is shoal for $\frac{1}{2}$ mile from the head, but affords anchorage off a cove on the southwestern shore in 10 fathoms of water, open to southeasterly winds.

Herring bank, with $4\frac{1}{2}$ fathoms least water, lies eastward, distant 650 yards from American point.

Roundhill island, whose eastern point bears 15° , distant 9 miles from White rock, is 174 feet high. It is a series of hummocks with deep indentations between, and there is a low islet close to the eastern side.

Saddle or Double islands, west-southwestward, $1\frac{3}{4}$ miles from Roundhill island, consist of two groups. The three islands of the eastern group are connected by shoal water: the highest island, 148 feet high, makes as a saddle on northwesterly bearings. The western group consists of three black islets, the northern and highest being 48 feet high. The channel between the groups is 800 yards wide.

A rock, with 1 foot of water over it, bears 64° , distant 900 yards from the northern end of the eastern group, and a rock, with 5 feet of water over it, bears 109° , 1,100 yards from the same point.

O'Neale rock, with 12 feet of water over it, bears 109° , distant nearly 1,400 yards from the southeastern end of the eastern group.

A rock, with 3 feet of water over it, bears 171° , distant 200 yards from the southern end of the western group; and bearing 149° , distant 700 yards from the same point, is a shoal with 3 fathoms of water over it.

Mark islands lie southwestward, $1\frac{3}{4}$ miles from the western group of the Saddle islands, and there is a clear passage between them, which is frequently used.

The southwestern and highest of the Mark islands is flat, and 121 feet high: and Cosgrave rocks, 8 feet high, lie eastward 400 yards from it.

A shoal, with 4 fathoms over it, and deep water close-to, bears 22° , distant $1\frac{1}{2}$ miles from Hat island, the northernmost Mark island.

Queer island, lying 1 mile westward from Mark islands, at the entrance to Sandy bay, is surmounted by a remarkable round hummock 132 feet high; the passage between it and the mainland is only suitable for boats.

Toole rock, with 6 feet of water over it, bears 129° , distant 500 yards from the northeastern point of Queer island. Fish island summit, in line with the eastern end of Bombproof island, bearing 16° , leads between the rock and the island.

Paine island, eastward 1,100 yards from Queer island, is surrounded by shoal water, which extends 350 yards southward of it.

Green island, east-northeastward 800 yards from Queer island, is surrounded by shoal water to the distance of rather over 200 yards, except on its eastern side, which is bolder.

A black rock lies southward 200 yards from the island.

High Rat rock, with 2 fathoms of water over it, bears 84° , distant 650 yards from the southern point of Green island.

Shag rocks, bearing 39° , distant 400 yards from the northern point of Green island, extend $\frac{1}{4}$ mile in an easterly and westerly direction.

An island lies westward $\frac{1}{4}$ mile from Green island: shoals extend about 200 yards northward and southeastward from it. The passage between this island and the eastern entrance point of Bateau harbor is less than 200 yards in width and has a depth of 4 fathoms in it.

Bateau harbor, northwestward of Queer island, affords excellent anchorage for small vessels in 4 fathoms of water, and there are wharves at its head, alongside which large schooners load. The only safe passage into the harbor is eastward of Queer island, and westward of Toole rock with the leading mark (see above) on; and when the black rock off Green island is in line with Hat island, the northernmost of the Mark islands, bearing 98° , steer for the harbor.

Communication.—The Labrador steamer to and from St. Johns via Battle harbor, calls at Bateau fortnightly during summer.

Bombproof island, north-northwestward, 650 yards from Green island, is conical, 69 feet high, and conspicuous.

A large group of islands, with rocks and shoals among them, lies north-northeastward of it, and should not be approached without a pilot. Fish island, 41 feet high, the easternmost and outer island of the group, lies nearly northward, $2\frac{1}{2}$ miles from Mark islands.

Carrol island, northwestward 800 yards from Fish island, is dark, round, and 157 feet high.

Black tickle, a narrow sheltered passage between the northern end of the island northward of Carrol island and the Island of Ponds, is much frequented by fishermen: to enter it, pass close southward of Carrol island, and then keep the western coasts of that island and the island northward of it aboard. Vessels drawing 12 feet of water load here.

Domino run is the passage between Spotted and the adjacent islands and the northeastern coast of the Island of Ponds. It has a width of 900 to 1,100 yards, and a depth of $4\frac{1}{4}$ fathoms can be carried through it. The entrance is between Southeast point of Spotted island and Domino point, which latter bears 292° , distant 5 miles from Roundhill island, and lies about 1,200 yards eastward of Black tickle.

The coast from Domino point trends northwestward for $1\frac{7}{10}$ miles to Mistaken point.

Domino harbor extends southward on the western side of Mistaken point; it is 800 yards in extent and 150 yards wide. The western side of the harbor is steep-to, and fishing vessels moor alongside in 13 feet of water, but an isolated rock, with 7 feet of water over it, lies close off the eastern shore at half way up the harbor. A shoal, with 9 feet least water over it, bears 25° , distant 200 yards from Tatters point, the western entrance point of the harbor. There are some houses on the shores of the harbor, the most conspicuous being on the western side of the entrance.

Communication.—The Labrador steamer to and from St. Johns via Battle harbor calls at Domino harbor fortnightly during summer.

Wireless telegraph.—There is a wireless telegraph station at Domino harbor.

Penny Hook cove is a shallow bight, situated westward about 1,200 yards from Domino harbor.

Wild bight.—Gunning point lies west-northwestward, distant $2\frac{1}{10}$ miles from Mistaken point, and Wild bight, southwestward of Gunning point, is $\frac{1}{2}$ mile deep southeastward. It is foul and shoal, and the sea breaks across it in northeasterly gales.

Entry island, northwestward 1 mile from Gunning point, is 900 yards long in an east-northeasterly and west-southwesterly direction, 300 yards broad, and 205 feet high. The passage between the point and the island is generally shoal, but there is a channel, 300 yards wide, with depths of 3 to 4 fathoms in it.

Red point, westward, distant $2\frac{1}{10}$ miles from Gunning point, is a red cliff 50 feet high. From this point the coast continues westward for about 1,400 yards, and then turns southwestward, forming the southeastern shore of Rocky bay.

Green island lies in the eastern entrance to Domino run, bearing eastward, distant $\frac{2}{10}$ mile from Mistaken point, and is a cone 64 feet high. A group of dark rocks, the highest of which is 15 feet high, is situated 265 yards southeastward of it.

Black rocks are two low rocks 200 yards apart in an easterly and westerly direction, situated northeastward, distant 950 yards from Green island; the eastern one is 4 feet high, and the western is 2 feet high.

The passage between Green island, with the group southeastward of it, and Black rocks is not safe, since there is a shoal, with 15 feet of water over it, bearing 39° , distant 300 yards from Green island. But the channels northward, of Black rocks and westward of Green island are clear.

Spotted island, on the northern side of Domino run, is $4\frac{2}{10}$ miles long, west-northwestward and east-southeastward, with an average

width of $1\frac{1}{2}$ miles, and its summit is 310 feet high. There is an alternation of black and white cliffs on its eastern coast.

Castle Dermot is a cliffy islet close off the eastern coast at 700 yards from Southeast point, and Ready rocks, the highest of which is 48 feet high, lie 800 yards off the same coast at $\frac{3}{4}$ mile farther to the northward.

Southeast point of Spotted island, bearing 11° , distant $1\frac{9}{10}$ miles from Domino point, rises to a conical hill 205 feet high.

Shoal point lies west-southwestward, distant 1,600 yards from Southeast point, and the bay between Shoal point and South Black head, situated 1 mile westward from it, is $\frac{1}{2}$ mile deep and affords open anchorage in 7 fathoms of water during offshore winds. Spotted Island harbor is a good boat harbor close under the conspicuous white houses at its head.

The coast of Spotted island, from South Black head, trends west-northwestward for $2\frac{1}{2}$ miles to North Black head, and is foul for 600 yards offshore. Green island, open southward of South Black head, bearing 112° , leads close southward of the shoal water.

At North Black head the coast gradually turns north-northeastward for about $1\frac{3}{4}$ miles to Back Cove point, whence it trends east-southeastward, $\frac{2}{3}$ mile to the northwestern entrance point of Griffin harbor. This coast is steep-to.

Harbor rock, with $3\frac{3}{4}$ fathoms over it, bears 45° , distant 300 yards from the northwestern entrance point of Griffin harbor.

Griffin harbor extends 800 yards southwestward with a width of 300 yards, and affords excellent anchorage at its head, in 4 fathoms of water, except in northeasterly winds.

Farmer cove, east-southeastward, about a mile from Griffin harbor, extends nearly $1\frac{1}{4}$ miles southward; it is open northward and rarely used as an anchorage. Harbor island lies in the entrance.

Farmer ledge, with 3 fathoms of water over it, bears 7° , distant $\frac{2}{3}$ mile from the eastern headland of Farmer cove.

Wedge or Shag island, north-northwestward, $1\frac{6}{10}$ miles from the eastern headland of Farmer cove, is 89 feet high at its northwestern end. A shoal, with 4 fathoms of water over it, bears 20° , distant 300 yards from Wedge island summit.

Dooley ledge, with 6 fathoms of water over it, bears 22° , distant 1,400 yards from Gull Battery rock, and is said to break in heavy weather. Gull Battery rock, 11 feet high is 200 yards north-northeastward from the northeastern point of Spotted island.

Duck island, westward, $\frac{2}{3}$ mile from the western point of Spotted island, is $\frac{2}{3}$ mile long, northwestward and southeastward, and 122 feet high. Grappling islet, 18 feet high, lies eastward 300 yards from Duck island, and a rock, awash at low water, lies southward 200 yards from the islet.

Trusty rock, with 16 feet of water over it, is the shoalest part of a bank extending southwestward nearly 400 yards from Duck island. Mustering point, the extreme of the land northwestward of Domino harbor, shut in with the rocks off the eastern end of Entry island, bearing 123° , leads southwestward of this rock.

Grog island, southwestward 850 yards from Duck island, is about 400 yards long northwestward and southeastward, and 100 feet high. It is surrounded, except on the northern part of its eastern side, by a bank of shoal water, the depth of 5 fathoms being distant $\frac{1}{4}$ mile from the southwestern side of the island.

Little Duck island, west-northwestward, 600 yards from Duck island, is about 300 yards across, and 94 feet high.

Fawn rock, with 7 feet of water over it, bears 315° , distant 800 yards from Grog island, and there is a shoal, with $3\frac{1}{4}$ fathoms of water over it, situated 200 yards southward of this rock. The southwestern end of Entry island, open southwestward of Grog island, bearing about 132° leads southwestward of these shoals.

Centipede rock, with 2 feet of water over it, bears 246° , distant 600 yards from the southern end of Little Duck island, and shoals, with $4\frac{1}{2}$ fathoms least water over them, extend in a direction 310° , about 400 yards from the rock.

White island, northward 300 yards from Little Duck island, is $\frac{3}{4}$ mile long, west-northwestward and east-southeastward, and is nearly separated into two parts, of which the eastern is 196 feet high, and dark and steep.

A cove extends south-southeastward, 600 yards between these parts, and there is a settlement at its head. Pigeon island is southwestward $\frac{1}{2}$ mile from White island. Shoal water stretching southward from White island and outlying banks almost fill the channel between White and Pigeon islands, and there is no passage between White, Little Duck, and Pigeon islands.

A shoal, with $5\frac{1}{4}$ fathoms of water over it, bears 302° , distant 800 yards from the northwestern end of White island, and is said to break in heavy weather: two other banks on the same bearing, and distant 335 and 1,000 yards from the island, have depths of 7 and 9 fathoms of water over them, respectively.

Directions.—Having entered Domino run by the channel northward of Black rocks, or that westward of Green island, steer for a position in mid-channel between South Black head and Mistaken point: thence keep the northern extremity of Pigeon island in line with the southwestern side of Duck island, bearing 300° , which leads in the deepest water between the Island of Ponds and Spotted island.

The passage between Grappling islet and Spotted island is clear, except the rock southward of the islet.

In proceeding southwestward of Grog island, pass between it and Entry island, keeping at a distance of over 400 yards from Grog island; bring and keep the southwestern fall of the hills over Domino harbor in line with the southwestern end of Entry island, bearing 120° astern, until Back Cove point opens northward of Duck island, bearing 75° , then steer about 330° , and bring the northeastern end of Entry island open northeastward of Grog island, bearing 120° , to clear the ledge of rocks off Salmon point.

Tides.—It is high water, full and change, in Domino harbor at 7h. 4m.; springs rise $5\frac{1}{4}$ feet, neaps $3\frac{1}{4}$ feet.

It is high water, full and change, at Grog island, in Domino run at 7h. 23m.; springs rise $5\frac{1}{4}$ feet, neaps $3\frac{1}{4}$ feet; neaps range $1\frac{1}{2}$ feet.

Salmon point bears 283° , distant $1\frac{1}{2}$ miles from the southern end of Pigeon island; shoals extend east-southeastward $\frac{1}{4}$ mile from the point, and a bank, with 7 fathoms of water over it, bears 108° , distant $\frac{1}{2}$ mile from the point.

Baillie or Lynch island, north-northeastward 1,700 yards from Salmon point, is about $\frac{1}{4}$ mile across and 130 feet high. Rocky ground, which breaks in places, extends southwestward $\frac{1}{4}$ mile from the island.

Deer island, northwestward $1\frac{1}{10}$ miles from Lynch island, is 1,300 yards long northwestward and southeastward, and 146 feet high. A shoal, with about 3 fathoms of water over it, bears approximately 215° , distant 400 yards from the northwestern end of Deer island.

Fish rock, awash at low water, lies in mid-channel between Lynch and Deer islands.

Indian island, northwestward 1 mile from Lynch island, is about 2 miles long northwestward and southeastward, 1 mile wide, 360 feet high, and conspicuous. Indian head, the northern point, is a steep bluff, 260 feet high, and bold-to.

Crab rock, with 9 feet of water over it, bears 41° , distant nearly 600 yards from American cove, on the eastern side of Indian island.

Indian tickle, between Indian island to the northeastward and Musgrave land to the southwestward, affords anchorage, in a bay on the western side of Indian island, in 4 fathoms of water, sand bottom. The anchorage is safe in ordinary summer weather and convenient for fishing vessels, but the holding ground is bad, and a heavy swell rolls in after northeasterly winds.

Rocky ground extends some distance from Terra Nova, the southeastern point of the bay, and at about 1,200 yards farther southeastward are St. Mary island and rock, connected with Indian island by shoal water. Rover island, 40 feet high, lies on a bank extending off Musgrave land, and the southern channel, with 3 fathoms of water in it, between St. Mary island and Terra Nova, on the northeastern side, and the bank off Rover island, on the southwestern side,

is narrow and requires local knowledge for its pilotage. Breakers extend nearly 400 yards from the northwestern point of Indian island on the northwestern side of the bay.

Warren cove, in the northwestern side of Indian island, is a well-sheltered anchorage for fishing boats, and the small islands in the tickle afford excellent places for fishing stages and curing fish, being sheltered from winds and sea.

Water is abundant and the watering place is convenient for boats, but the wood on the mainland is scanty.

Tides.—It is high water, full and change, in Indian tickle at 6h. 37m.; springs rise 6 feet, neaps 4 feet.

Communication.—The Labrador steamer to and from St. Johns via Battle harbor calls at Indian tickle fortnightly during summer.

White point is the point of Musgrave land at the northwestern end of the tickle. It lies westward, distant $1\frac{2}{10}$ miles from Indian head, and shoals lie about 350 yards off the coast northeastward and eastward of it.

Light.—A white square tower with sloping sides 29 feet high, on White point, exhibits at 72 feet above high water an intermittent white light every ten seconds, thus: light, seven seconds; eclipse, three seconds, which should be seen from a distance of 12 miles in clear weather. The light is exhibited during the season of navigation.

A flat-roofed, one-story dwelling and a store stand on the northern side of the lighthouse. The dwelling and store are painted white.

Ferret islands, east-northeastward 2 miles from Indian island, are three small islands about 180 feet high, connected by shoal water, and having three islets $\frac{1}{4}$ mile eastward of them.

A small rock, which covers 3 feet, bears 184° , distant 700 yards from the western point of these islands.

The coast from White point trends west-northwestward for 2 miles to Red island, which is separated from the mainland by a channel nearly 100 yards wide, and passable by boats except within an hour of low water.

A rock, with 5 feet of water over it, bears 120° , distant 1,400 yards from the eastern end of Red island.

Cape Greep, west-northwestward, $3\frac{1}{2}$ miles from Red island, rises in a conical mound, 177 feet high. The bay between Red island and cape Greep is foul and shoal.

Black rocks are three in number: two, the highest of which is 37 feet high, lie close together, and the third, about 20 feet high, bears 165° , distant 1,600 yards from them; the northern rocks bear 350° , distant $2\frac{1}{2}$ miles from White point.

Old King, a shoal with 7 feet of water over it, bears 243° , distant 600 yards from the southern Black rock.

Sand Hill cove, westward, $2\frac{3}{4}$ miles from cape Greep, affords good summer anchorage for fishing vessels, and is much frequented; but shoals extend from its shores and render it unsuitable for large vessels.

South Wolf island is one large island with some smaller islands close northward and southward of it, the group being $2\frac{3}{4}$ miles in length northward and southward; the highest and main island, in the middle, rises in a flat range, and on its summit, which is 311 feet high and lies north-northeastward 6 miles from Indian head, is a conical bowlder. On its southern side is a cove in which there is very good shelter for fishing vessels. The best entrance is southward of an islet 27 feet high, lying between the main and southern islands; after passing it keep the eastern side of the cove aboard to the head. Rocks, with 9 feet of water over them, lie on the western side of the cove, but there is a clear passage 200 yards wide to the head.

The two northern islets, which are joined except at high water springs, are separated from the main island by a channel 150 yards wide, with a depth of $3\frac{1}{2}$ fathoms close along the northern shore. Shoal water extends northward nearly $\frac{1}{2}$ mile from these islets.

North Wolf rock, lying northward, $1\frac{1}{2}$ miles from South Wolf islets, is 38 feet high, bare, dark, and steep-to around.

Little Wolf island, bearing 214° , distant 2 miles from North Wolf rock, is small and 157 feet high.

North Wolf island, westward 1 mile from South Wolf island, is flat-topped and 135 feet high; a group of islets close to its southeastern and southwestern sides forms a good boat harbor on the eastern side. The eastern islet is dome-shaped, and the harbor is entered on either side of it, but in the middle of the eastern entrance is a rock with 3 feet of water over it, and 9 fathoms close-to. The most sheltered anchorage is at the western end in 2 to 3 fathoms of water, off a deep cleft in the main island.

Round Wolf island, southwestward about 1 mile from the North Wolf group, is 245 feet high.

Offer Red island, westward $1\frac{1}{2}$ miles from Round Wolf island, is flat-topped and 200 feet high, with red cliffs on the northwestern side.

Halfway island, west-northwestward $4\frac{1}{2}$ miles from Offer Red island, is 278 feet high, and makes as a flat-topped cone.

The coast from Sand Hill cove trends northwestward for $4\frac{1}{4}$ miles to South head of Table bay.

Devils Lookout, east-northeastward 1 mile from South head of Table bay, is 384 feet high, and rocky patches, with 12 feet of water over them, lie 200 yards off its eastern side.

The channel between South head and Devils Lookout has not been examined, and it should not be used for navigation.

Quakers Hat island lies in the channel at about $\frac{1}{4}$ mile off South head.

Lookout rocks, situated northwestward, about 1 mile from South head of Table bay, are two flat islets which should not be approached within $\frac{1}{4}$ mile.

Collingham island, northward 1 mile from Devils Lookout, rises in a conical hill, 333 feet high, and its eastern coast is steep bluffs. Some low islets lie about $\frac{1}{2}$ mile northward from the island, and the channel between must not be taken.

Bird islands, lying northwestward about $2\frac{1}{2}$ miles from Halfway island, are two in number; the western island is 170 feet high and conical; the eastern island is 77 feet high and flat-topped. There is a low black rock off the western point of the eastern island, and a rock, that breaks, lies westward 300 yards from it.

South Flat island, lying west-northwestward, distant $1\frac{3}{4}$ miles from the western Bird island, is about 50 feet high, and in two parts, which are nearly joined together; the ground for 300 yards northwestward and southwestward of the island is foul.

North Flat island, lying northwestward rather more than 1 mile from South Flat island, is about 70 feet high.

Table bay.—North head of Table bay bears north-northwestward, distant 4 miles from South head, and from between them Table bay extends westward for 11 miles, narrowing gradually to the head.

Entry or South Duck island lies south-southeastward, distant about $1\frac{1}{4}$ miles from Table Bay point, the eastern point of North head; a reef extends westward about 600 yards from the island.

Ledge island lies in the middle of the bay at $3\frac{1}{4}$ miles within Entry island, and a reef extends westward $1\frac{3}{4}$ miles from its western side. The passages, both northward and southward of the island, are narrow. There is only a depth of 4 fathoms in the southern passage. A shoal, with 3 fathoms of water over it, bears 319° , distant rather more than $\frac{1}{2}$ mile from the northeastern point of Ledge island, and a sunken rock lies in mid-channel bearing 257° , distant $1\frac{7}{10}$ miles from the western point of Ledge island in the northern passage.

South road.—Anchorage in 15 fathoms of water can be obtained in South road, southward from the middle of Ledge island.

Table harbor, at the head of the bay, affords good anchorage in 7 to 11 fathoms of water; it is approached from either side of Ledge island.

A shoal extends southward about 200 yards from the northern entrance point of this harbor, and all the points in the harbor are foul for a short distance. Between the second point inward on the northern shore (off which there is a small islet) and the opposite

point on the southern shore the water shoals to 3 fathoms; it then deepens to 7 fathoms for about 200 yards, when it shoals again to $4\frac{1}{2}$ fathoms.

Within the narrows the water shoals suddenly to a depth of 3 feet.

North harbor, situated northwestward of the western end of Ledge island, affords good anchorage in 5 to 7 fathoms of water, mud bottom. The eastern side of this harbor is formed by two islands joined to each other and the mainland by shoal water.

Mullins cove, on the northern side of North head, extends $1\frac{1}{2}$ miles to the westward; it affords anchorage at the head in 3 fathoms of water, well sheltered from northwesterly winds, and is much frequented by fishing vessels.

Black island, northwestward 1,600 yards from North Flat island, is nearly white, and makes as a flat ridge with a sharp peak at either end, the eastern 217 feet and the western 190 feet high.

Black Island harbor, a narrow cove at the northern point of the island, with excellent shelter for fishing craft, is entered by keeping the southern shore aboard.

Offer Wolf island, lying east-northeastward $1\frac{1}{4}$ miles from the northern end of Black island, is 222 feet high, and wedge-shaped; the northeastern side rises in steep cliffs to the summit.

Halfway rock, between Offer Wolf and Black islands, is 15 feet high, and shoal water extends 200 yards around it; a rock, awash at low water, lies in mid-channel between Offer Wolf island and Halfway rock.

The Wolves islets lie east-southeastward $\frac{1}{2}$ mile from Offer Wolf island; the highest is 81 feet high.

A shoal, with 4 fathoms of water over it, bears 266° , distant 1,050 yards from the southern Wolf islet, and a rock, with 6 fathoms of water over it, bears 238° , distant 1,500 yards from the same islet.

Johnny Paul rock, with 3 fathoms of water over it, bears 111° , distant $1\frac{3}{4}$ miles from the southern Wolf islet.

Offer Wolf island, open northward of the southern Wolf islet, bearing 283° , leads close northward; or open southwestward, bearing 300° , leads southwestward of the rock.

Gready island, northwestward 1,200 yards from Black island, is $2\frac{3}{4}$ miles long, north-northeastward and south-southwestward, about $\frac{3}{4}$ mile wide, and 362 feet high. There is a large cairn of stones on its summit. On the western side is a ridge facing Gready anchorage, within which is a large pond that debouches at Watering cove, a small bight on the southwestern side, where water can always be taken.

Hare island, separated from the northeastern part of Gready island by a channel 200 yards wide, through which there is a passage for small craft only, is 224 feet high, cliffy and steep-to.

Cross island, 129 feet high, lies 300 yards off the southwestern point of Gready island, with 10 to 12 fathoms of water in mid-channel between: an islet, 13 feet high, lies about 150 yards from the eastern point of Cross island.

Little Gready island is separated from the western side of Gready island by a channel 200 yards wide, through which a depth of 3 fathoms can be carried by keeping close along the coast of Gready island, and thus avoiding a rock that covers at high water near the northeastern entrance. On this island there is a large fishing establishment.

A rock, with 4 fathoms of water over it, bears 38° , distant 400 yards, from the southwestern end of Little Gready island.

Stunk island, westward 800 yards from Little Gready island, is round-topped, 277 feet high, and steep on all sides.

Mad Moll rock, bearing 165° , distant 400 yards from the southern point of Stunk island, to which it is nearly joined by shoal water, covers 5 feet.

Anchorage can be obtained off Watering cove in 10 to 14 fathoms of water, with the northeastern end of Stunk island shut in with the southwestern end of Little Gready island bearing about 339° .

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Stunk island fortnightly during summer.

Coal.—About 20 tons of coal may be obtained here.

Current.—Between Gready and White Bear islands, and at the entrance to Hamilton inlet, a strong outset has been experienced in spring.

Ice.—Field ice remains in the proximity of Gready anchorage until about the middle of July, soon after which the fishing fleet is enabled to sail northward.

Gannet islands lie northwestward, $7\frac{1}{2}$ miles from the northeastern point of Gready island. The western island, 226 feet high, is steep on the northeastern side and slopes gently to the southwestward, and there is a little foul ground off it. The eastern group consists of two islands and several rocky islets, the southern and largest of which is 184 feet high: vessels must not pass between the islets of this group.

A rock, with 3 feet of water over it, bears 308° , distant about 600 yards from the western point of the southern island, and a shoal, with 12 feet of water over it, bears 52° , distant 250 yards from the southeastern end of the same island.

West Gannet rock, bearing 221° , distant $1\frac{1}{2}$ miles from the southeastern end of the western Gannet island, is 12 feet high, and a rock, that breaks in moderate weather, bears 288° , distant 400 yards from it.

East Gannet rock, bearing 105° , distant $2\frac{1}{2}$ miles from the south-eastern end of the southern Gannet island, is 55 feet high, and a rock, that breaks in a moderate sea, lies northward 350 yards from it.

Outer Gannet island, bearing 17° , distant $3\frac{1}{2}$ miles from the northern point of the western Gannet island, is about 800 yards long, eastward and westward, 104 feet high. The island is flat; its sides have been smoothed by the action of ice.

Boulton rock, bearing 283° , distant $4\frac{1}{10}$ miles from Outer Gannet island, breaks in moderate weather, and there is a depth of 21 fathoms at the distance of 200 yards around it.

The coast from the northern entrance point of Mullins cove trends northwestward for $3\frac{1}{4}$ miles to cape North, and it rises gently to a flat-topped range of hills.

Cape North, an isolated hill with a double summit, 323 feet high, is connected to the mainland by a flat marsh between two shallow coves.

An islet, 69 feet high, and steep-to, lies close northward of the cape, but it is seldom distinguishable as an islet.

Cape North cove is the shallow bight southward of the western part of cape North, and it extends 800 yards eastward. An islet with a house on it, situated 500 yards within the entrance nearly fills the cove. A rock, 2 feet high, lies south-southeastward 500 yards from the northern entrance point, and a shoal, with 9 feet of water over it, lies southwestward 200 yards from the rock. Small vessels enter the cove with the northern shore aboard, and anchor in 5 fathoms.

The **Sisters** are two islands, the southern of which lies northwestward, distant 1,300 yards from the northwestern point of Cape North promontory. The islands are separated by a shallow channel 300 yards wide, and each is about 750 yards long, eastward and westward. The southern island is 55 feet high. A bank, with $6\frac{1}{4}$ fathoms of water over it, bears 311° , distant 650 yards from the northwestern point of the southern island, and Pudding bank, with 8 to 9 fathoms of water over it, bears 294° , distant about 200 yards from the $6\frac{1}{4}$ fathom bank.

The coast between Cape North cove and Curlew head, at $2\frac{1}{2}$ miles west-southwestward, is barren and foul, and must not be approached nearer than $\frac{1}{4}$ mile.

Curlew island, close westward of Curlew head, is 21 feet high; it is the northern entrance point of Curlew harbor.

Curlew harbor extends east-southeastward for 2 miles from a position southward of Curlew island, with depths decreasing gradually from 15 fathoms to the head. The bottom is mud and makes good holding ground, and the shores are barren. A shoal, with $4\frac{1}{2}$ fathoms least water over it, bears 238° , distant 550 yards from Curlew island.

Large vessels anchor in 12 fathoms of water, with the northeastern end of Long island in line with the southwestern end of Curlew island, bearing about 330° . Smaller vessels anchor, in 6 to 9 fathoms, at about 200 yards off a steep bluff, 175 feet high, on the southern shore, on either side of which is a long deep valley.

Water can be obtained.

Tides.—It is high water, full and change, in Curlew harbor at 6h. 40m.; springs rise $5\frac{3}{4}$ feet, neaps $4\frac{1}{4}$ feet.

Green island, west-northwestward, $\frac{3}{4}$ mile from Curlew island, is 1,300 yards long, eastward and westward, 700 yards wide, and 145 feet high. Pigeon island and a long ridge of rocks, awash at high water, lie between Green and Round islands (p. 707), and close the passage except to those with local knowledge.

The southern shore of Curlew harbor continues west-northwestward to Toomie point, which is distant 2 miles from Curlew island. This is known as the Goat shore.

Isthmus bay extends south-southwestward for $1\frac{3}{4}$ miles from Toomie point, and it then turns southeastward for $2\frac{1}{4}$ miles; the shores are barren except at the head, where, northward of a hill 424 feet high, are swamps and lakes with small timber around them.

Cartwright island.—Cartwright point, the northeastern point of this island, lies northward, $\frac{1}{2}$ mile from Toomie point, and the island extends south-southwestward $1\frac{1}{2}$ miles, with a width of 700 yards. Its summit is a square hummock 199 feet high. The island is on the western side of the outer part of Isthmus bay and is separated by a channel 700 yards wide, but narrowed to 400 yards by rocks, from Toomie point, through which $4\frac{1}{4}$ fathoms is the deepest water that can be carried. Three rocks lie within 400 yards south-southwestward of the island.

Anchorage.—There is anchorage off the southeastern coast of Cartwright island with good holding ground. A large vessel can anchor anywhere inside Toomie point.

Southeast cove, the entrance to which is between Toomie and Hanrahan points, which lie nearly northward and southward from each other and are 1,200 yards apart, extends 1 mile to the eastward. The deepest water between the points is $7\frac{3}{4}$ fathoms, and the water shoals gradually to the shore, but rapidly to 2 fathoms toward the head. Vessels can anchor in the cove during summer, although the holding ground is not very good.

Indian head, southward, 265 yards from the rocks south-southwestward of Cartwright island, rises in a grassy conical hill 127 feet high, and is connected at low water with the peninsula southward of it.

A rock, with 12 feet water over it, bears 24° , distant 100 yards from the northern end of Indian head, and a shingly spit, with 3

fathoms of water over its end, extends in a direction 60° for 400 yards from the eastern point of the head.

Bull gut, the channel between Indian head and the rocks off Cartwright island, is narrowed by the shoals to 100 yards, with a depth of $4\frac{1}{2}$ fathoms water.

Blackguard bay, extending southwestward $1\frac{1}{2}$ miles from Indian head, is foul and shoal, and should not be entered within Bull gut.

Pinch-Gut island, northwestward $1\frac{1}{2}$ miles from the western entrance point of Blackguard bay and 300 yards offshore, is 13 feet high.

Pinch-gut bank, with 15 feet of water over it, bears 72° , distant 1,650 yards from Pinch-gut island.

Round island, situated westward $\frac{3}{4}$ mile from Green island, is 1,700 yards long, eastward and westward, about 800 yards wide, and 222 feet high. There is a fishing settlement on its southern side, in which the principal house has a belfry. Cobbler shoal, with 2 fathoms of water over it, lies westward 600 yards from Salmon point of Round island.

Clearing mark.—Duck island, a little open northward of Round island, bearing 77° , leads northward of Pinch-Gut bank and Cobbler shoal.

Long island, the southwestern end of which lies northeastward, distant 800 yards from the eastern end of Round island, is $1\frac{1}{4}$ miles long, north-northeastward and south-southwestward about 200 yards wide, and 231 feet high.

Duck island, about 200 yards off the western side of Long island, at 600 yards from its southwestern end, is about $\frac{1}{4}$ mile across and 101 feet high.

Black rock, westward 600 yards from the western end of Duck island, is 6 feet high, and a shoal extends southeastward nearly 200 yards from it.

There is no passage, except with local knowledge, between Long and Round islands.

Tinker island, north-northeastward, $1\frac{1}{2}$ miles from the northeastern point of Long island, is flat and 56 feet high, with numerous bowlders on its summit. There is deep water at the distance of 200 yards from the island, except on its southern side, where shoal water extends for 300 yards.

Tinker rock, bearing 204° , distant 650 yards from the southern end of Tinker island, has 3 fathoms of water over it and is steep-to.

Budget rock, north-northeastward, distant 1,100 yards from Tinker island, is 4 feet high.

Budget bank, bearing 7° , distant 700 yards from Budget rock, has 3 fathoms of water over it and is steep-to.

Directions.—For Isthmus bay, after passing Curlew island, steer in mid-channel between Green island and the Goat shore until the summit of Stunk island is shut in with the southern end of Green island, bearing 69° . Keep this mark on until the western side of Tinker island just overlaps the northeastern point of Long island, bearing 24° , which mark on astern leads between the shoal water off Toomie point and that off Cartwright island. Anchor in the mouth of Southeast cove, or farther up Isthmus bay in mid-channel, not bringing the islet near the head of the bay to bear less than 142° .

Sandwich bay.—Horse Chops island lies west-northwestward, distant 12 miles from Pinch-Gut island, and the entrance to Sandwich bay, in which there are several islands, lies between them. Sandwich bay extends southwestward and 10 miles from the entrance to two narrow channels, and thence southward 15 miles, with an average breadth of 6 miles, to several streams at the head.

Hare islands, westward $1\frac{1}{2}$ miles from Pinch-Gut island, are two in number, and both are high, conical, and steep-to, except off the southwestern point of the western island.

Anchorage can be obtained southward of these islands in 10 fathoms of water.

Hare rock, bearing 326° , distant $\frac{1}{2}$ mile from the northeastern end of the western Hare island, has 7 feet of water over it: sometimes the sea breaks on this rock, but at other times its position is not shown in any way.

Pompey island, northwestward, distant 2 miles from Pinch-Gut island, is 145 feet high, round and barren, and an islet, 20 feet high, lies off its northeastern end.

Pompey rock, bearing 0° , distant nearly 2 miles from the middle of Pompey island, breaks at low water, and there are depths of 11 to 17 fathoms close around it. The summit of cape North in line with the northeastern point of Long island, bearing 105° , leads 400 yards southward; and the northern end of Independent island, open northward of Seal islet, bearing 293° , leads 500 yards northward of the rock.

Seal islet, northwestward $4\frac{1}{4}$ miles from Pompey island, is 35 feet high and surrounded by shoals and rocks to the distance of $\frac{3}{4}$ mile.

Red island lies westward about 1,600 yards from Pompey island.

Passages.—The passage between Seal islet and Independent island should not be attempted until it has been further examined. The passage between Pompey and Red islands also requires caution, as depths of 5 to 6 fathoms have been obtained in it, besides a depth of 4 fathoms at about a mile southwestward of Pompey island and southwestward of Red island. H. B. M. S. "Scylla" passed between Pompey and Red islands in 1905 and obtained a least depth of 5 fathoms.

Huntingdon island, westward $1\frac{3}{4}$ miles from Pompey island and in the middle of the entrance to Sandwich bay, is $6\frac{1}{2}$ miles long, eastward and westward, and about $1\frac{3}{4}$ miles wide; Huntingdon flats, a chain of islands and shoals, among which there is no passage, extend southwestward between Huntingdon and Diver islands.

A rock, awash at low water, lies about 300 yards off the north-eastern end of Huntingdon island, and northwestward 1,600 yards from this rock is an islet, with shoal water a short distance off it.

Dog islands, northwestward about a mile from the above-mentioned islet, are two islands separated by a narrow shallow passage; the northeastern island is 176 feet high.

Egg island, a small rock, lies off the mouth of Egg harbor, an anchorage for small vessels on the southern side of Huntingdon island.

Diver island, southwestward $2\frac{3}{4}$ miles from Huntingdon island, is separated from the northwestern shore of Sandwich bay by Sandwich or Main tickle, $\frac{3}{4}$ mile wide from shore to shore, but narrowed to 400 yards by shoals. It is reported that this tickle is practically closed, even to small craft.

Earl island lies southward about $\frac{1}{2}$ mile from Diver island, and Diver tickle, which runs between them, is shallow.

Cartwright harbor lies at the bottom end of the channel, between Earl island and the mainland to the eastward, and southward of a small peninsula named Curlew point. Merlin point, the southwestern end of the peninsula, is foul for $\frac{1}{4}$ mile. The harbor is surrounded by hills, the sides of which are covered with small spruce trees, and it is well sheltered. There is an establishment of the Hudson Bay Company at Cartwright, on the southern side of the peninsula; the settlement has large buildings and a wharf.

The anchorage is in 7 fathoms of water, mud bottom, with the wharf bearing 42° .

Tidal streams.—The tidal streams in the channel between Earl island and the mainland, at the entrance to Cartwright harbor, are strong, and attention is necessary at the helm.

Communication.—The steamer to and from St. Johns, via Battle harbor, calls at Cartwright harbor fortnightly in summer.

Favorites tickle is the narrow passage between Earl island and the mainland at $2\frac{3}{4}$ miles within Merlin point. There is an islet in the tickle, with some rocks above water northeastward of it. The passages eastward of this islet are reported to be unsafe by the local fishermen, but a depth of 4 fathoms of water can be carried through the passage on the southwestern side of the islet by keeping in mid-channel at the northern end and two-thirds of the width of the channel away from Earl island at the southern end. H. B. M. S. "Scylla" passed both into and out from Sandwich bay by this passage.

The passage must not be taken except at slack water, as the tidal streams are very strong.

Muddy bay, close southeastward of Favorites tickle, affords anchorage in 10 to 17 fathoms.

A shoal extends off the entrance to East or Dykes river, which flows into the channel between Earl island and the mainland, southward of the southern point of Muddy bay.

East arm, southward about 5 miles from Longstretch point, the southern entrance point of the channel between Earl island and the mainland, affords anchorage, in 6 to 15 fathoms of water, at 2 miles from the head of the arm, which is shoal.

Hinchinbrook bay, at the head of Sandwich bay, is entered through a narrow channel, southward of which anchorage can be obtained in 8 to 16 fathoms of water. East (locally Paradise) river, running eastward from this bay, and afterwards turning westward, is shoal, but a steam launch may ascend it nearly to the lake at its head, a distance of some 5 miles.

Several islands and rocks, that should not be approached within $\frac{1}{2}$ mile, are situated off the western side of Sandwich bay. Lumpy island is the northernmost of them.

H. B. M. S. "Scylla" anchored 1 mile northwestward from Lumpy island.

Eagle river, the entrance to which is westward about 2 miles from a peninsula westward $\frac{1}{2}$ mile from Lumpy island, flows into the bay from the southwestward. The river is tidal, and navigable for small boats for about 3 miles above Separation point, the western entrance point. There are then $1\frac{1}{2}$ miles of rapids and pools up to the falls, some 40 feet high. The entrance to the river is very shallow, and a steam launch could not get within $\frac{1}{2}$ mile of Separation point.

Swallow bank, off the entrance of Eagle river, bearing 320° , distant $1\frac{3}{4}$ miles from Lumpy island, is a detached shoal about 400 yards in extent, with 6 feet of water over it. There is deep water northeastward of this bank, but shoal water begins at less than $\frac{1}{2}$ mile southwestward of it. Mariners are recommended not to proceed southwestward of the line joining Lumpy island and Swallow bank.

White Bear or West river flows into the bay on the northwestern side of Separation point, and a narrow channel, with 3 fathoms of water, leads into it. The river is tidal and navigable for small boats for some 4 miles above Dove point, the western entrance point. There is then about $\frac{1}{4}$ mile of nontidal water, with falls 80 feet high at its head.

Mealy mountains, a range attaining the height of 1,482 feet, extend from Sandwich bay to Hamilton inlet, and are conspicuous.

Newfoundland island (Henrietta island), northward nearly $1\frac{1}{2}$ miles from Huntingdon island, is undulating in outline, with a bold bluff 316 feet high at the northeastern end. A shoal, with 13 feet of water over it, is situated 135 yards from the base of this bluff. The southwestern side has not been examined.

Two islets lie off its eastern point. Flat island the southern, is flat, 32 feet high, and separated by a channel 350 yards wide, in the middle of which is a rock with 4 feet of water over it. Farrels island, the northern, is joined to Newfoundland island at low water; there are some houses on it.

Independent island, nearly 400 yards eastward of Newfoundland island, is rugged and cliffy on the east coast, but rises gently from the west coast; it has several peaks, the highest, about 250 feet, being on the northeastern side.

A grass-covered islet, 70 feet high, lies between the western end of Independent island and the northeastern part of Newfoundland island. The passage on the western side of this islet is shoal. In the passage on its eastern side a rock with 7 feet of water over it lies close to the islet, but by keeping Independent island close aboard 14 feet of water can be carried through: it is, however, only 100 yards wide.

Independent harbor, between Independent and Newfoundland islands, affords good anchorage in $4\frac{1}{2}$ to 8 fathoms of water, northward of Farrels island. To enter keep midway between Independent and Flat islands, but only $4\frac{1}{2}$ fathoms of water can be carried in.

Tides.—It is high water, full and change, in Independent harbor at 6h. 51m., springs rise $5\frac{3}{4}$ feet, neaps $4\frac{1}{4}$ feet.

Packs Harbor islands.—Situated 800 yards northward from the northwestern point of Newfoundland island are two narrow islets with conical hills, the southern and higher being 215 feet high: between them is a harbor, which is entered at its southwestern end, the northeastern end being blocked by rocks. There is good shelter for fishing vessels in 3 to 4 fathoms of water.

A rock, with 3 feet of water over it, lies a short distance off the western point of the southern island, and a rock with 3 feet of water over it lies in the middle of the southwestern entrance and may be avoided by keeping the northern island close aboard.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Packs harbor fortnightly during summer.

Grappling island, small and 133 feet high, lies northeastward of the southeastern Packs Harbor island.

Tinker island is small and lies about $\frac{1}{4}$ mile northward of the eastern end of the northwestern Packs Harbor island.

Black rocks, lying west-northwestward, distant 1 mile from the northern point of Independent island, are three small rocks, the highest being 3 feet high.

Yellow rock, lying northeastward, distant $2\frac{1}{2}$ miles from the northern point of Independent island, is 45 feet high, isolated and bare. A rock that breaks lies off its southern side.

Double islands, northwestward about $1\frac{1}{2}$ miles from Independent island, are two islands, the highest of which is 158 feet high.

Long island, northwestward, $\frac{3}{4}$ mile from the western Double island, is 157 feet high.

Flemming rock, bearing 80° , distant $\frac{3}{4}$ mile from Long island, is awash at low water. The western point of Independent island, open eastward of Double islands, bearing 176° , leads $\frac{1}{4}$ mile eastward; and the eastern side of Independent island, just shutting in with Double islands, bearing 145° , leads the same distance southwestward of the rock.

Ragged rocks, the highest of which is 28 feet high, lie northward $\frac{3}{4}$ mile from Tinker island. There is no passage between them and Long island.

Handy Harbor islands, westward about 600 yards from Ragged rocks, make up a group inclosing an excellent boat harbor with numerous passages to it, but none available for larger craft.

Shag island, northwestward, about $\frac{3}{4}$ mile from Long island, is 220 feet high. A rock above water bears 328° , distant 600 yards from its northeastern end, and close northwestward of this rock is a sunken rock.

Haypook island, lying north-northwestward, $1\frac{1}{4}$ miles from Shag island, and at the northwestern edge of the group, rises to a conical hill, 254 feet high. A rock that breaks lies 300 yards westward of the island, and between it and Green island is a shoal with 9 feet of water over it. Green island lies $\frac{1}{4}$ mile northeastward of Haypook island, and is 130 feet high.

Farmer ledge, a rocky bank with 3 feet of water over it, bears 180° , distant 2 miles from the southwestern end of Green island. The summit of Packs Harbor islands open westward of Handy Harbor islands, bearing 150° , leads 600 yards southwestward of the ledge.

Black rocks, bearing 4° , distant $3\frac{8}{10}$ miles from the northern point of Independent island, comprise a group of rocks the highest of which is 20 feet high.

Bird rocks, bearing 15° , distant $1\frac{1}{4}$ miles from Black rocks, are two islets about $\frac{1}{4}$ mile apart northward and southward, and 49 and 43 feet high, respectively.

Horse Chops island, which is situated $\frac{1}{2}$ mile westward of Packs Harbor islands, has numerous cliff-faced hills on it. The summit is 398 feet high, and there is a remarkable, high bluff, northeastward of it, 389 feet high. Black Duck cove, a shallow bight, with an islet in the entrance, is in the middle of the northern coast.

Munden island, low and flat, is nearly joined at low water to the northwestern point of Horse Chops island.

Partridge Harbor islands lie northwestward of Munden island, and between them is Partridge harbor, where fishing vessels anchor in 4 fathoms of water, sheltered except from northeasterly winds. A rock, with 6 feet of water over it, lies 200 yards off the northeastern point of the northwestern island. West of Partridge Harbor islands are three islets, between which the water is shoal.

Pigeon island, northwestward 1 mile from Partridge Harbor islands, is 146 feet high.

Cape Porcupine, north-northwestward, distant $2\frac{3}{4}$ miles from Pigeon island, is a promontory $\frac{1}{2}$ mile wide, jutting out $2\frac{1}{2}$ miles from the mainland and rising to a double-peaked summit 343 feet high. The beaches on both sides of cape Porcupine are sandy.

Gull island, 63 feet high, is joined to the northeastern end of the cape at low water.

Black rock, bearing 35° , distant $5\frac{3}{4}$ miles from cape Porcupine, is isolated and 22 feet high.

Mid-channel rock, with 5 feet of water over it, bears 120° , distant $2\frac{1}{4}$ miles from Black rock.

Grappling island, open eastward of Green island, bearing 177° , leads eastward of Mid-channel rock.

South Stag island, northward $4\frac{1}{2}$ miles from cape Porcupine, rises in two flat hummocks, 90 feet high, and covered with grass, with a saddle between: reefs extend 600 yards from its southeastern side.

North Stag islands, northwestward $3\frac{1}{2}$ miles from South Stag island, are two islands, with some islets and rocks in the channel between them, through which a depth of 6 feet of water can be carried. The southern island is a dark conical hill, 125 feet high; the northern is flat and 120 feet high and has a deep ravine on its northern side.

Anchorage can be obtained westward of the channel between the islands in 7 to 14 fathoms of water, sand bottom.

Soundings of 9 fathoms have been obtained with North Stag island summit, bearing 271° , distant about 2 miles.

Tumble-down Dick island, north-northeastward, distant $3\frac{3}{4}$ miles from North Stag islands, is 355 feet high, and conspicuous, with a round hillock at its summit. Small rocks fringe the island, and a reef lies 200 yards off the middle of the northwestern side, but they are all bold-to.

Little Tumble-down Dick island, situated 800 yards southwestward from Tumble-down Dick island, is 70 feet high; the channel between is clear in its fairway.

Track.—H. B. M. S. "Scylla," in August, 1905, when proceeding from Cartwright harbor to Indian harbor, having passed between

Red and Pompey islands, left Dog islands, 600 yards to the northward, and continued in mid-channel between Huntingdon and New Foundland islands, between Horse Chops and Packs Harbor islands, and between North and South Stag islands: the track then passed westward of Tumble-down Dick and Herring islands.

Fish Cove point or West Bay head, at the end of the sandy coast extending northwestward from cape Porcupine, from which it is distant $14\frac{1}{2}$ miles, is faced by dark cliffs, and rises to the height of 133 feet.

West bay extends southwestward 2 miles on the northwestern side of Fish Cove point, but it dries for 1 mile from the head, and is shallow for 1,200 yards farther out. Pottles Cove head, on the northern side of West bay, is the eastern end of a narrow neck of land.

Pottles cove, on the northern side of West bay at 800 yards from Pottles Cove head, has an extent of 400 yards, and there is anchorage off its mouth in $5\frac{1}{2}$ fathoms water. A reef extends 200 yards from the middle of the cove, and the western side is rugged and foul for a short distance off, but otherwise there is a depth of 2 fathoms of water close to the shore.

The cove is used by fishing vessels, being sheltered by Old Man island.

Tides.—It is high water, full and change, in Pottles cove at 6h. 57m.; springs rise 6 feet.

Fish cove, southwestward of Pottles cove, affords sheltered anchorage to small vessels in $2\frac{1}{2}$ fathoms of water.

Old Man island, situated eastward of Pottles cove, is 89 feet high: the channel between Pottles Cove head and the island is 300 yards wide, but narrowed by rocks extending off both sides: to pass through it keep one-third of the distance across from Pottles Cove head.

Shoal.—A shoal, with $3\frac{1}{2}$ fathoms of water over it, bears 75° , distant 1,400 yards from Old Man island.

New harbor, on the northwestern side of the neck of land ending in Pottles Cove head, is shallow, but affords fairly sheltered anchorage for fishing craft in $2\frac{1}{4}$ to 3 fathoms of water, under an island 30 feet high, that forms two passages into the harbor: the anchorage is about 400 yards across. The western passage is filled by rocks and shoals, and should not be used. The eastern passage is clear on the eastern side, but a rock that covers lies off the island, and there is also a rock 50 yards off the southeastern side of the island.

Tub island, northwestward $1\frac{3}{4}$ miles from Pottles Cove head, is 179 feet high, and conspicuous: it rises in two mounds, the eastern being in the shape of an inverted tub, and it is the southern entrance point to Hamilton inlet.

Tub harbor, westward of Tub island and between it and some islets and the mainland, affords good anchorage in 5 to 8 fathoms of water, sand bottom, and is much frequented by fishermen.

Drakes island, eastward 1,200 yards from Tub island, is 27 feet high; Bakers ledge extends northeastward 600 yards from it; the highest rock of the ledge is 8 feet high.

Mad Moll, a shoal of two rocks, 100 yards apart, that cover 5 feet at high water, bears 89° , distant 1,600 yards from Drakes island; a shoal, with 4 fathoms of water over it, bears 91° , distant $2\frac{1}{10}$ miles, and a rock, with 15 feet of water over it, bears 96° , distant $3\frac{4}{10}$ miles from Drakes island.

George island, the southern end of which bears northeastward, distant $4\frac{3}{10}$ miles from Tub island, is in two parts; the southern part, 750 feet high, trends northwestward $2\frac{1}{4}$ miles to a low neck, whence the northern part, 720 feet high, trends northeastward for the same distance; the width of the southern part is nearly a mile, and that of the northern 1,200 yards. The coasts of the island are steep to at the distance of 600 yards. The cove on the eastern side is 1,300 yards wide at the entrance and 1 mile deep, open eastward, narrows gradually, and affords anchorage in 6 to 8 fathoms of water, sand bottom, sheltered except from easterly winds between the directions northeastward and south-southeastward. The southwestern shore of the cove is clear, but shoals extend 600 yards from the northwestern shore. Gull island, close southward of the northern entrance point, is 49 feet high, and an islet, 23 feet high, lies 200 yards southward of it; a rock, with 7 feet of water over it, lies close eastward of this islet.

Round Head island is a small truncated cone, 180 feet high, nearly joined to the southwestern point of the entrance to the cove, and fishing boats shelter westward of it.

Rock.—Bearing 139° , distant $1\frac{1}{10}$ miles from the northeastern point of George island, is a rock with less than 6 feet of water over it.

Norman reef, bearing 86° , distant $3\frac{1}{10}$ miles from the southeastern point of George island, has 1 foot of water over it, and is the summit of a rocky bank extending eastward nearly 5 miles from the southern part of George island. Bearing 136° , distant $1\frac{1}{2}$ miles from Norman reef, there is a shoal with $6\frac{1}{2}$ fathoms of water over it.

Black rocks lie southwestward about $1\frac{1}{4}$ miles from George island, and the channel between is said to be clear, but the channels between these rocks and the Duck islands and the mainland must not be attempted without a pilot.

Hamilton inlet (Ivucktoke or Grosse Water bay) is entered between Tub island and Pompey island, which are 15 miles apart in a northerly and southerly direction. It extends west-southwestward 35 miles to the Narrows, the intervening space containing several islands.

Within the Narrows, which are 700 yards wide, the inlet extends southwestward for 90 miles, opening to the width of 18 miles in lake Melville, and narrowing again at its head, into which flows Hamilton river, a large stream.

Cuff harbor, west-northwestward about $2\frac{1}{2}$ miles from Tub harbor and between Cuff islands and the mainland, is much frequented by fishermen.

Two islets, lying about $\frac{1}{4}$ mile apart, northeastward and southwestward, are situated west-southwestward 4 miles from Pompey island (page 719) and $1\frac{1}{2}$ miles from the northern shore of the inlet.

Saddle island, lying westward 14 miles from George island, rises steeply to a double summit about 400 feet in height.

Shag rocks, a group of low islets, lie southwestward at a distance of $2\frac{3}{4}$ miles from Saddle island. A sunken rock and some islets lie between these rocks and the shore to the southward.

Catos island, west-northwestward, 5 miles from Saddle island, with Little Black island lying between, is about 80 feet high, and rises gradually; a reef of rocks extends $\frac{1}{2}$ mile from its southern and southwestern sides, a portion of which covers at high water. A rock above water lies about a mile southwestward of Little Black island.

Big island, southwestward, 3 miles from Catos island, rises abruptly to the height of about 200 feet from its southeastern side, but gradually from its northwestern side, and it appears wedge-shaped on westerly bearings.

Pompey island lies northward $\frac{1}{2}$ mile from Big island; the water between them is said to be shoal.

East Sister, lying southwestward, distant $\frac{1}{2}$ mile from Big island, is about 140 feet high, with a rounded summit; **West Sister**, lying southwestward, $\frac{1}{2}$ mile from East Sister, rises in three hummocks, the middle and highest being about 100 feet high.

Nats Discovery point, about $1\frac{1}{4}$ miles south-southeastward of West Sister island, is a small projection of the mainland. Anchorage, sheltered from offshore winds, can be obtained in 12 fathoms of water, off a sandy beach just southwestward of the point.

Ticoralak head, westward, $4\frac{1}{2}$ miles from West Sister, is 450 feet high, dark colored, steep on its southeastern side, and conspicuous.

Cullinghams cove, on the southern shore of the inlet southward of Ticoralak head, is considered a good anchorage, with black mud bottom. There is a depth of 13 fathoms in the entrance, gradually decreasing to the head of the cove, the deepest water being on the northeastern side.

Smith island, a mile off the southern shore at about 9 miles west-southwestward of West Sister island, is small and very low.

Man-of-war rock, with a depth of about 4 feet of water over it, is reported to be situated nearly in mid-channel at the eastern entrance of the Narrows, midway between Smith island and the eastern entrance point to la Double Mare, which is an inlet 50 miles in extent.

The southeastern end of Saddle island, open northward of Turner head, bearing about 80° , leads northward of the rock, and the apparent northwestern side of the Narrows, open northwestward of Leicester point, the apparent southeastern side, leads northwestward.

Rigoulette, on the shore of a small cove situated southwestward $3\frac{1}{4}$ miles from the southwestern entrance point to la Double Mare and on the western side of the Narrows, is the headquarters of the Hudson Bay Company's trading stations on the coast of Labrador northward to capé Chidley. Owing to the strong tidal streams the Narrows seldom freeze over.

The eastern shore of the Narrows opposite Rigoulette is a long sandy beach, off which at the distance of about 200 yards there is a reef which uncovers at low water.

The western side of Rigoulette cove is a mud and sand flat extending nearly 400 yards offshore; it is covered with bowlders, the highest of which is awash at high water.

Dart rock, with 5 feet of water over it, lies with the southeastern side of the officer's dwelling house in line with the outer end of the wharf, bearing 229° , distant 100 yards.

Shoal water extends northeastward, a distance of 200 yards from the wharf, to the depth of 3 fathoms.

Buoy.—A white buoy is anchored about 100 yards northward of Dart rock.

Anchorage can be obtained in Rigoulette cove off the houses, in 4 to 7 fathoms of water, mud bottom, but a vessel of moderate size should moor with the anchors north-northeastward and south-southwestward, and the inner anchor near Dart Rock buoy. This berth is out of the stream, which runs strongly over the hard bottom, and makes the anchorage insecure.

Directions.—The precautions usual in unsurveyed waters should be taken when navigating Hamilton inlet, as it has been only cursorily examined. In entering the inlet it is recommended to pass northward 2 miles from George island, and then steer 266° . This course should lead about $\frac{3}{4}$ mile southward of Saddle island; about $\frac{1}{2}$ mile northward of Shag rocks; and between West Sister island and Nats Discovery point. From between West Sister island and Nats Discovery point steer to pass southeastward of Ticoralak head, keeping the northern shore abroad and avoiding Man-of-war rock, until southwestward of the entrance to la Double Mare, when proceed in mid-channel to Rigoulette.

The following track, which is locally known as the Ship track, is followed by the mail steamers from Indian harbor: Pass between Double island (page 719) and Tinker island (the island west-north-westward of it): nearly mid-way between Puffin and Green islands; between Little Black and Catos islands; between East Sister and Big islands, then southeastward of Ticoralak head, and as above directed.

Vessels should not proceed beyond Rigoulette without a pilot.

Tides and tidal streams.—It is high water, full and change, at Rigoulette at 7h. 37m., approximately; springs rise 4 feet, neaps $3\frac{1}{2}$ feet. The tidal streams run in mid-channel for $3\frac{1}{2}$ hours after high and low water on the shore, and at springs attain a rate of 6 to 7 knots an hour, with very little slack water.

Communication.—The Labrador steamer to and from St. John's, via Battle harbor, calls at Rigoulette fortnightly during summer.

Water can be taken at high water from a brook at the head of the bight, and there is wood in abundance.

Rock.—A sunken rock is reported to lie in mid-channel at the eastern entrance to the channel between Caravalla head and Henrietta island, about 3 miles above Rigoulette.

Herring islands, east-northeastward $6\frac{1}{4}$ miles from the northeastern point of George island, comprise a group of three islands and some rocks. The highest and southeastern island is 184 feet high; the channel between it and the northeastern island should not be taken.

Leeming rock, bearing 152° , distant $4\frac{1}{4}$ miles from the highest Herring island, has about 1 foot of water over it, and is steep-to.

A rock, 4 feet high, has been reported to bear about 297° , distant 1400 yards from Leeming rock; its existence is doubtful, as it is possible that it was ice which was seen.

Southeast rocks, bearing 88° , distant 17 miles from the southeastern point of George island, and 328° , distant $17\frac{1}{2}$ miles from Outer Gannet island, comprise a group of 3 bare rocks, the highest being 30 feet high. A bare rock, 32 feet high, bears 345° , distant $2\frac{1}{4}$ miles from the southern group. These rocks are steep-to.

Breakers are reported to have been seen at a distance of $4\frac{1}{2}$ miles from the southeastern Southeast rock, on a bearing of 35° .

Tom Cod rock, bearing 226° , distant $3\frac{1}{10}$ miles from the southeastern Southeast rock, is awash at low water, and a shoal, with 3 fathoms of water over it, lies eastward 300 yards from it.

An islet, 7 feet high, with a sunken rock off its northwestern side, bears 307° , distant $4\frac{3}{4}$ miles from the bare rock which lies at 345° , distant $2\frac{1}{4}$ miles from southeast rocks.

Tommy rocks.—The middle and principal of these rocks is 64 feet high, and lies northward, distant $4\frac{1}{4}$ miles from the northeastern of the Herring islands; the two eastern rocks, close together and 29

feet high, lie eastward $\frac{1}{2}$ mile from the middle rock, and Bulldog rock, the western, 8 feet high, lies westward $\frac{1}{2}$ mile from the middle rock.

Duck islands are two grass-covered islets faced by gray rock, the eastern being 100 feet high, and the other at $\frac{1}{2}$ mile to the westward, 80 feet high. The eastern Duck island bears 288° , distant $1\frac{2}{10}$ miles from Bulldog rock.

Shoal water extends about 300 yards from the western end of the eastern Duck island, and a shoal, with 3 fathoms of water over it, bears 193° , distant a little more than 1 mile from the summit of the western Duck island.

Double islands, westward, $1\frac{1}{2}$ miles from the western Duck island, are two islands about 60 feet high and nearly joined by rocks and shoal water; a reef extends southeastward about 400 yards from the western island.

Tinker island, west-northwestward $\frac{9}{10}$ mile from the western Double island, is a bare reddish rock, 55 feet high, and steep-to.

Pompey island, east-southeastward $\frac{3}{4}$ mile from the northern point of the entrance to Hamilton inlet, is conspicuous, flat-topped, and 335 feet high. The channel between has not been examined, but is reported to be clear in the fairway. There are some trees on this island, but none on those to the northeastward.

A small islet, about 30 feet high, lies 800 yards eastward of the island, and a rock, with 4 feet of water over it, is situated nearly in mid-channel between them.

Puffin island, southward $1\frac{1}{2}$ miles from Pompey island, is about 150 feet high.

Green island, east-southeastward $1\frac{9}{10}$ miles from Puffin island, is flat and 70 feet high.

Little harbor, north-northeastward $1\frac{1}{4}$ miles from the north-western end of Pompey island, is within some islets and only suitable for a few small craft that moor to the rocks.

An islet, 42 feet high, lying northwestward $\frac{1}{2}$ mile from Little Harbor islands, is surrounded by shoals for the distance of 200 yards, but the channel between it and Little Harbor islands is otherwise clear.

Pottles bay, extending westward about 15 miles from this island, has not been examined.

Alliuk bight extends northward about $3\frac{1}{2}$ miles from its entrance, which is situated northeastward 2 miles from the islet 42 feet high; it is shallow, and its head is separated by a narrow neck of low land from Little Holton harbor. The bight has not been examined.

Run by Guess island, the summit of which is a peak, 378 feet high, is separated from Little Harbor islands by a channel 400 yards wide, through which a depth of 6 feet can be carried. A small cove,

situated southward of its northeastern point, is filled with bowlders to the line of the points, but temporary anchorage can be obtained off the entrance in 10 fathoms of water, mud bottom. The southeastern coast of the island is foul and should not be approached within $\frac{1}{4}$ mile.

Run by Guess, the channel separating Run by Guess and Ice Tickle islands, is the best passage through this group of islands, being $\frac{1}{2}$ mile wide at its narrowest part and almost clear, so that sailing vessels have no difficulty in beating through. There is excellent anchorage between Run by Guess island and the mainland in depths of 14 to 17 fathoms.

A small islet, 17 feet high, with a black rock off its eastern end, bears 37° , distant 1,400 yards from the northwestern end of Run by Guess island, and a shoal, with 10 feet of water over it, bears 287° , distant 600 yards from the islet.

Tides.—It is high water, full and change, in Run by Guess, at 7h. 5m.; springs rise $5\frac{3}{4}$ feet.

Ice Tickle island, rises to the height of 320 feet on the southern side, and to two peaked hills with cliff fronts, 307 and 303 feet high, on the western side. Pinch-Gut islet, 101 feet high, is nearly joined to the northwestern point.

Ice tickle, between Ice Tickle island and Rodney Mundy island, is so named on account of the ice remaining there longer than in any other place in the locality. The anchorage in the tickle, in 5 to 7 fathoms of water, eastward of Boxer island, is secure and convenient for vessels proceeding northward. A cove on the eastern side forms a convenient harbor for fishing vessels and for curing fish.

The southern entrance is clear at 200 yards off Ice Tickle island, but the northern entrance, between the northeastern end of Ice Tickle island and Marks island, has several rocks, sunken and awash, in it. In July, 300 vessels, on their way northward to fish, have been at anchor in Ice tickle at one time.

Tides.—It is high water, full and change, in Ice tickle at 6h. 20m.; springs rise 7 feet, neaps 4 feet.

Black rocks, southward 1,300 yards from the southern point of Ice Tickle island, are steep-to. The best fishing ground is off these rocks in 14 fathoms of water.

Rodney Mundy island, on the eastern side of Ice tickle, is of very irregular shape, about 2 miles long, northward and southward, and 300 feet high.

Edwards harbor, on the western side of Rodney Mundy island, and southeastward of Ice tickle, is only suitable for small vessels, and a sunken rock lies in the entrance. There is good salmon fishing with nets in Salmon bight, to the southeastward of Edwards harbor, during May and June.

Indian harbor, between the southern side of Rodney Mundy island and Indian island, is sheltered from the eastward by Pigeon island, and although small, affords accommodation for eight or ten vessels under 15 feet draft of water, if moored. The water in the harbor is smooth, the bottom sand and weed, and at high water 16 feet can be carried into it by the northeastern and eastern channels, and small vessels enter also by the southwestern channel. It is a most convenient harbor for fishermen and for curing fish, and fishing stages are erected along its shores. This was the northern fishing station on the coast of Labrador in 1826.

Temporary anchorage, in 10 fathoms of water, open to the eastward, can be obtained southward of Pigeon island, off a cove lying between the northeastern part of Indian island and the western part of Ponsonby island, but the cove is shoal for 400 yards from the channel at its head.

Tides.—It is high water, full and change, in Indian harbor at 6h. 20m.; springs rise 7 feet, neaps 4 feet.

Water can be procured with a little trouble, but there is no wood.

Communication.—The Labrador steamer to and from St. John's, via Battle harbor, calls at Indian harbor fortnightly during summer.

Wireless telegraph.—There is a wireless telegraph station at Indian harbor.

Hospital.—There is a hospital of the Royal National Mission to deep-sea fishermen at Indian harbor; it is a wooden building of two stories, and has a dozen beds for patients. It is open for the sick in June and is closed in October when the fishing is over.

Marks island, northeastward of Ice Tickle island, and northward about 400 yards from Rodney Mundy island, has a deep narrow cove on its northwestern side and two coves on the southeastern side; it is flat, partially wooded, and 170 feet high.

Green islet is a small grass-covered rock, 25 feet high, lying close off the northern end of Marks island, and a rock, with 7 feet of water over it, lies northwestward 200 yards from the islet.

Smoky tickle, between Marks island and Cut Throat island, which lies about 1,200 yards to the eastward, is available for vessels of 12 feet draft, but a pilot is necessary.

Cut Throat island has a flat summit 447 feet high, situated near the northwestern end of its northeastern side. Splitting Knife bight, an inlet extending 800 yards to the southward on the northern coast, affords fairly sheltered anchorage for small craft near the head. A bay on the southern side of the island has no shelter; Cut Throat harbor, on the southeastern side of the island and separated from the bay by a narrow neck, is a creek extending northeastward and giving fair shelter to the schooners that frequent it.

Foxy islands.—The northeastern Foxy island lies southeastward 600 yards from the southeastern point of Cut Throat island, and is a conical mound 96 feet high; the southwestern island lies south-southwestward 900 yards from the northeastern, and is a similar mound 65 feet high.

A sunken rock lies southwestward 300 yards, and a rock, 7 feet high, lies east-southeastward 800 yards from the northeastern island.

Bacalhao island, eastward, distant 1,400 yards from East point of Ponsonby island, is a curved ridge of basalt, 140 feet high, and steep-to. An islet, 35 feet high, lies close westward of its western end, with a sunken rock close westward of it.

Big island, north-northeastward, nearly 2 miles from Bacalhao island, is a dark pyramid 240 feet high.

A shoal, with 13 feet of water over it, bears 74° , distant 1,500 yards from Bacalhao island, and a shoal, with 3 fathoms of water over it, bears 242° , distant 900 yards from the western end of Big island, both shoals being in the channel between the two islands.

Lewis rock, bearing 82° , distant 1 mile from the eastern end of Big island, covers 5 feet, and there is a shoal, with 6 feet of water over it, southwestward 250 yards from the rock.

Entry island, eastward about 1,200 yards from Cut Throat island, with Cut Throat Tickle lying between, rises in several hummocks, the highest, on the eastern side, being a sharp peak 207 feet high.

Little Entry island is separated by a narrow and shoal channel from the southwestern end of Entry island, and there is a flagstaff on it; Jigger island, close eastward of the southeastern end of Entry island, is 66 feet high, and there is a rock bearing 197° , distant 400 yards from it. Reefs and rocks border the southern side of Entry island, which should not be approached nearer than 800 yards.

Five islands comprise a group lying eastward 1,200 yards from Entry island; the northwestern and highest island is 135 feet high. A small harbor between the islands is entered from the westward by keeping close to the southern coast of the northwestern island, or from the eastward between the northwestern and eastern islands. The summit of the eastern island is 105 feet high, and has the appearance of a knob. Shoal water extends northeastward from the southwestern island, and in passing between the southwestern and eastern islands, the eastern island must be kept aboard to the anchorage, in 9 fathoms water, off the fishing stages.

A reef, awash at low water, which generally breaks, bears 273° , distant 900 yards from the southern end of the southwestern island, and rocks border the outer coasts of the group to the distance of 300 yards.

Jigger island, east-southeastward 1 mile from the eastern end of Five islands, is flat, 53 feet high, and reefs extend 300 yards off its western side.

The Cubs, eastward, $\frac{1}{2}$ mile from Jigger island, are two bare islets, 42 and 46 feet high, and steep-to, with a small rock between them.

White Bear islands constitute the group of islands at the eastern end of the chain of islands extending eastward from the mainland at the northern entrance to Hamilton inlet.

North island, northeastward $\frac{1}{2}$ mile from the Cubs, has a sharp peaked summit 263 feet high; it is bold-to except at the northeastern end, 250 yards off which is an islet 27 feet high; bearing 96° , distant 200 yards from the islet is a sunken rock, and bearing 79° , distant 350 yards from the islet, is a shoal with 13 feet of water over it; both these shoals break in a heavy swell.

Middle island, southeastward, 1,200 yards from North island, is barren and rugged, rising in two flat hills, 190 feet and 180 feet high, respectively; it is steep-to, except on the southwestern side, off which a rocky spit extends into the western entrance of the harbor.

South islands are two islands, 125 feet and 93 feet high, respectively, lying close together in an easterly and westerly direction at about 400 yards southward of Middle island. Gull islet, a rock 54 feet high, lies southwestward 250 yards from the western South island.

White Bear harbor, between Middle island and South islands, is small, and affords partially sheltered anchorage in 14 fathoms of water, sand and gravel bottom, off the stages where vessels moor for the fishery. An islet 28 feet high lies in the eastern entrance to the harbor, and there is a shoal, with 6 feet of water over it, bearing 158° , distant 350 yards from the islet, and nearly in the fairway of the entrance; to avoid it keep the southern shore aboard.

Pigeon island lies east-southeastward $\frac{1}{2}$ mile from Middle island; it is small and 120 feet high. Immediately southward of Pigeon island is an island 110 feet high, close south-southwestward of which is Chapel island, 72 feet high. A group of three rocks, about 30 feet high, lies eastward 200 yards from Chapel island.

Grappling island, east-southeastward $\frac{1}{2}$ mile from Pigeon island, is 108 feet high; a rock lies 200 yards northwestward of the island, and there is a rock close off the southeastern side of the island.

East rock, east-southeastward, $\frac{9}{10}$ mile from Grappling island, and the outer of the group, is 42 feet high, and bold to seaward.

A rock, with 7 feet of water over it, bears 338° , distant $\frac{1}{4}$ mile; and a shoal, with 9 feet of water over it, bears 248° , distant $1\frac{6}{10}$ miles from East rock.

Bulldog island, bearing 355° , distant 17 miles from East rock, is an isolated barren rock about 40 feet high, with reefs extending a short distance northward and southward from it.

Shoal.—Bearing about 223° , distant $\frac{1}{2}$ miles from Bulldog island is the northwestern end of a chain of rocks and shoal water, which may be considered to extend thence in a direction 147° for 6 miles; it is supposed that there is a depth of 11 feet of water over it, and breakers are reported to have been seen on the bank; its position and extent are approximate only. This locality requires caution, as it has not been examined.

Double island.—Man-of-war point lies north-northwestward, distant $1\frac{1}{10}$ miles from Marks island (p. 721), and Double island, 137 feet high, is situated about eastward 1 mile from the point. The channel to the northward between the point and island is almost blocked by rocks and shoals, so that even fishing boats are rarely able to use it.

Thomey island, eastward 600 yards from Double island, is 110 feet high, and a rock, that dries at low water, lies northwestward 200 yards from its southwestern end.

Fairy island, southeastward 1,300 yards from Thomey island, is 139 feet high.

Pigeon island, northeastward 700 yards from Fairy island, is 120 feet high; a rocky ledge extends southeastward 350 yards from it, the outer rock being 2 feet high. A rock, that covers $\frac{1}{2}$ feet, bears 242° , distant $\frac{1}{4}$ mile from the southern end of the ledge. Green islet, open southward of fairy island, bearing 259° , leads southward of the rock.

Isolated rock, with $3\frac{1}{2}$ fathoms of water over it, bears 88° , distant $2\frac{1}{4}$ miles from the southeastern end of Pigeon island. Big island, well open westward of Entry island, bearing 178° , leads westward; and the southern end of Double island, open southward of Pigeon island, bearing 276° , leads southward of this rock.

Little Brig island, northward $\frac{1}{2}$ mile from Pigeon island, is 115 feet high. At its southwestern end is a red house and a flagstaff, and there are several houses on its northwestern side. Rocks extend 300 yards off the southwestern point, and a rock with 3 feet of water over it bears 102° , distant 900 yards from the southwestern point and nearly $\frac{1}{4}$ mile offshore. The northeastern summit of Double island, in line with the northeastern end of Thomey island, bearing 268° , leads southward of this rock.

Brig Harbor rock, with 6 feet of water over it, bears 121° , distant 1,400 yards from the eastern end of Little Brig island. White Cockade island, open eastward of Sloop island, bearing 339° , leads eastward, and the southwestern side of the passage inside Sloop island in line with the northeastern end of Little Brig island, bearing 318° , leads southwestward of the rock.

Brig harbor, between Brig Harbor island and Little Brig island, is shallow and unsafe. Several vessels anchored there have been wrecked at various times. At the best and deepest place for anchorage there is only 9 feet of water: the harbor is encumbered by rocks, and the swell rolls in with any breeze from the northeastward.

Brig Harbor island, northwestward, 400 yards from Little Brig island, is 335 feet high.

Tea cove, an open bight in the northern side of Brig Harbor island, does not afford any shelter. Tea Cove head, its northwestern point, is a steep bluff.

Sloop island, separated from the northeastern end of the southeastern coast of Brig Harbor island by a channel 350 yards wide, passable for boats only, is 173 feet high.

Sloop harbor extends southwestward $1\frac{1}{2}$ miles between Sloop and Brig Harbor islands, with a width of 600 yards, and affords good summer anchorage in 3 to 8 fathoms of water, sand bottom. The harbor is clear of shoals except at a short distance from each shore, and dries about 200 yards from the head, toward which the water shoals gradually.

White Cockade island, north-northeastward 1,400 yards from Brig Harbor island, with a clear passage between, is 265 feet high, and conical, with a bluff at the southeastern end.

A reef bears 102° , distant 1,200 yards from the southeastern point of White Cockade island: it covers at high water and is steep-to.

Coffee island, west-northwestward $1\frac{1}{4}$ miles from the western end of White Cockade island, is a yellow rock, with a conical mound, 35 feet high at its northern end.

A reef 400 yards in extent, that covers 2 feet at high water, lies northwestward 400 yards from Coffee island.

Teapot island, northwestward $\frac{1}{2}$ mile from the northwestern side of Brig Harbor island, is 85 feet high.

Taylor rock, with 3 feet of water over it, lies northwestward 300 yards from Teapot island and is steep to seaward.

A reef, that covers 1 foot, bears 282° , distant 800 yards from the western point of the island. Chance island, open northward of Flat island, bearing 291° , leads northward of Taylor rock.

Duck islands, southwestward 700 yards from Teapot island, are a cluster of bare rocks, the highest being 51 feet high, which should not be approached nearer than 400 yards.

Harbor rock, awash at low water, bears 135° , distant 1,100 yards from the western Duck island. The southeastern end of Coffee island, open eastward of Teapot island, bearing 19° , leads eastward of the rock.

Fox island, southwestward 1 mile from Teapot island, is a barren island, 125 feet high, with a flat summit falling steeply at the southwestern end. The passages between Fox island and the mainland, Teapot island and Duck islands, are encumbered by rocks and must not be attempted.

Emily harbor is on the western side of Brig Harbor island and between it and Camel island, a bare mound 130 feet high. The harbor entrance is between Brig Harbor island and Deadman island, a round barren rock 100 feet high, within which keep Brig Harbor island aboard to the wharf, where vessels moor alongside in 4 fathoms of water; the harbor will accommodate three or four vessels. The only shoals in the approach are Harbor rock and the two rocks off the northwestern side of Brig Harbor island. There is no passage from the westward.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Emily harbor fortnightly during summer.

Dark Tickle harbor, southwestward of Emily harbor, and on the western side of the southern end of Brig Harbor island, and between it and Butt and Camel islands, is entered between Thomey, Double, and Brig Harbor islands, and affords good shelter for small vessels in 6 to 8 fathoms of water, mud bottom.

Horse harbor, located along the northwestern side of the island northwestward of Dark Tickle harbor, is shallow, and only suitable for small craft which moor to the shore. This is one of the principal fishing centers on the coast. In 1905 about 2,000 tons of fish were dried here. There is a store for supplying the people during the fishing season.

Black rock, bearing 320° , distant 1,400 yards from the northeastern end of Fox island, is 29 feet high, round and barren, with a reef a short distance off the southern side.

Flat island, northeastward 600 yards from Black rock, is 21 feet high, and shoal water extends 200 yards southward of it.

A shoal, with 13 feet of water over it and steep to on its northeastern side, bears 304° , distant 400 yards from Flat island.

Green island, bearing 282° , distant $2\frac{1}{2}$ miles from Coffee island, is 49 feet high, flat and surrounded by rocks to the distance of 400 yards, but shoals extend between the island and the land south-southwestward.

Holton harbor, lying south-southwestward of Green island, extends 1 mile to the southward, and is $\frac{3}{4}$ mile wide at the entrance, 400 yards at 800 yards within, and thence of that width to the head.

The entrance to this harbor is very foul, and must not be taken without a pilot, except in an emergency, when proceed thus:

Bring the northern fall of the cliffs on White Cockade island in line with the summit of Coffee island, bearing 89° , and keep this

mark on to pass between the reefs off the eastern entrance point of the harbor and the shoal off the mid-channel rocks, and when the inner points of the harbor open, bearing 211° , round in and steer up the middle of the harbor, anchoring in 5 to $6\frac{1}{2}$ fathoms of water, sand bottom.

A rock, that covers, lies close to the eastern shore northeastward of the first fishing stage, and a bank, with $1\frac{1}{2}$ feet of water over it, extends 150 yards from the western shore, just beyond the first white house within the entrance; the water shoals to 3 fathoms at 800 yards from the head.

Tides.—It is high water, full and change, in Holton harbor at 6h. 44m.; springs rise $5\frac{3}{4}$ feet, neaps 4 feet.

Holton island, northwestward $1\frac{1}{2}$ miles from Green island, is generally flat, with a truncated cone, 316 feet high, toward the western end. The coasts are rocky, and should not be approached nearer than $\frac{1}{4}$ mile, nor should the passage between it and Chance island be attempted without local knowledge. There is a St. Johns fishing station at Holton island.

Chance island, south-southwestward 1,200 yards from Holton island, is 229 feet high. A reef, awash at high water, lies $\frac{1}{4}$ mile west-southwestward of the island, and there is a rock, that covers 6 feet at high water, lying nearly midway between Chance island and the western point of Holton harbor.

Little Holton, westward about $1\frac{1}{2}$ miles from Holton harbor, is a shallow anchorage separated by a narrow neck of land from Alliuk bight.

Ice—Northward to cape Chidley.—As a general rule the sheltered waters between Holton harbor and cape Harrigan, which lies 135 miles to the northwestward, freeze in November, but not sufficiently to prevent navigation before the 15th of that month, except during early seasons. The navigation of the inside channels closes between the 1st and 20th of December, and soon afterwards the ice usually reaches out beyond the islands, and all navigation ceases. Navigation opens toward the end of June or in July.

In the summer of 1880, at cape Harrigan, Paul island, and Hebron, the northern ice finally left the shore on the 31st of July, up to which day it was reported that Hebron was interruptedly blocked. In the latitude of Nain the harbors occasionally freeze over in October and are frozen hard in November. It is also stated, on reliable authority, that the coast from Nain northward to cape Chidley is seldom clear of field ice before the last week in July, though the local ice may break up in the early part of June.

Icebergs may be encountered at any time, but are most numerous from June till August, when they are occasionally found in great numbers, consisting often of huge cubes, and not as a rule presenting

the picturesque shapes they assume when seen farther southward at a later date.

Some navigators have considered that the great number of icebergs, instead of being an annoyance, are of much assistance. Usually it can be seen if the bergs are aground, and shoal water is often indicated by several small bergs being close together with detached pieces of ice floating away to leeward.

The coast from Little Holton trends northwestward to the eastern point of Byron bay, a distance of about 10 miles; it is fringed with rocks, and should not be approached within 2 miles.

Tinker island, northwestward, 6 miles from Holton island, is rugged, cliffy, and 201 feet high. Numerous islets and rocks extend southwestward from it to the mainland.

Quaker hat, situated northeastward $3\frac{7}{10}$ miles from Tinker island, is 125 feet high, and **Quaker reef**, situated east-northeastward, distant $2\frac{1}{4}$ miles from Tinker island, is 20 feet high. The channels on either side of the reef are clear, but that southwestward of it is generally used.

Ship Harbor head, on the northwestern side of Byron bay, situated 13 miles westward from Tinker island, rises in a conical hill to the height of about 500 feet, and shelters Ship harbor from the southward.

False cape, northward about 6 miles from Ship Harbor head, is the end of a saddle-shaped hill 900 feet high; a deep bay extends southward between False cape and cape Harrison, which is situated north-northwestward distant 6 miles. There is a low islet, that is steep-to to seaward, off False cape.

Bear island, southeastward, distant $2\frac{1}{4}$ miles from cape Harrison, is about 150 feet high, reddish and steep-to on the northeastern side.

Cape Harrison (Uivaluk of the Eskimo) is a bluff rising to the height of 1,065 feet, fringed by steep reddish cliffs, and conspicuous.

Webeck harbor, whose name is a corruption of Uivuk, a cape, lies between Webeck island, on the northwestern side, and the mainland of cape Harrison, on the southeastern side, and has been for some years a great rendezvous for fishermen. Morison island lies in the northeastern entrance and shelters the harbor from the northeastward. The harbor is $1\frac{1}{2}$ miles in length, 1,200 to 450 yards in width, and affords safe anchorage for vessels of large size, but is too exposed for fishing vessels. There are no fishing stages, though the fishing grounds around the island, and under the cliffs of the mainland in 14 fathoms of water, are good.

Webeck island, about 280 feet high, with a few hills on its northwestern part, is flat and interspersed with lakes in the middle. The formation of the island is chiefly of gneiss, though veins of quartz

exist, as well as masses of boulder. There are also rocks of trap formation standing in columns.

The main channel to the harbor is between Webeck and Morison islands. Clinker channel, between Morison island and the land terminating in cape Harrison, is reported to have a rock in it, but its existence has not been verified. Western channel is not recommended.

The anchorage is in 5 to 6 fathoms of water, sand and mud bottom, southwestward of Harbor rocks, two flat rocks 7 feet high.

Tides.—It is high water, full and change, in Webeck harbor at 6h. 21m.; springs rise 7 feet, neaps about 4 feet.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Webeck harbor fortnightly during summer.

Water can be procured from Webeck island, but the watering place is inconvenient for boats. Wood is scarce on the island and consists only of stunted gnarled roots from the sheltered valleys, but it is more abundant on the mainland.

The coast.—Cape Strawberry lies west-northwestward, distant 41 miles from cape Harrison. There is a deep bay between these capes, the shores of which rise in conical hills to the height of 1,500 to 2,400 feet. The bay contains several groups of islands.

The inshore track, close to the mainland points of this bay, is clear of shoals.

Jigger island, west-southwestward $3\frac{1}{2}$ miles from Webeck island, is about 200 feet high; Jigger tickle is southward of the island.

Double island, westward, $7\frac{1}{2}$ miles from Jigger island, is about 450 feet high, and terminates northeastward in a low rocky point. Its northwestern side is steep-to. A rock, 60 feet high, lies northeastward about 1,400 yards from the island.

Southward of Double island is a deep bay, and southwestward of Double island there is a wedge-shaped island, about 150 feet high, and also several islets joined to the mainland at low water. The mainland west-northwestward from this is indented with some deep bays, and rises steeply in high conical hills from the sea.

Westward 4 miles from Double island is an island 100 feet high.

Dog islands, westward 9 miles from Double islands, are about 300 feet high: the eastern consists of 2 hills joined by a low beach, and the western, which lies west-northwestward 1,600 yards from the eastern, is flat-topped, with steep sides. A rocky islet, 20 feet high, lies off its western end.

Conical island, northwestward 4 miles from Dog islands, is the western Adlavik island (see p. 729). An island lies south-southwestward one mile from Conical island, and bearing 174° , distant $1\frac{3}{10}$ miles from Conical island is a rock.

Manak island (Mannox), situated $4\frac{1}{4}$ miles northwestward from Conical island, rises to a sharp-peaked hill on its southern side. Some islets lie close northward of it. There are several islets and rocks northeastward of the line between Manak and Conical islands.

Pomiadluk point, northward 7 miles from Manak island, is low and sharp. Between the islands off Manak island and Pomiadluk point are several islets that should be left to the eastward; and near the shore at south-southeastward $1\frac{3}{4}$ miles from Pomiadluk point is a group of low rocks, with a sunken rock off the southeastern end. The passage is close to the shore inside these rocks.

Cape Strawberry (Umiakkoviktanuk) rises to the height of 1,235 feet, and is the end of a high range extending southwestward to Altaigaiyavik (Monkey hill), a conical mountain, 2,170 feet high. The cape is faced by terrace-like cliffs, with deep ravines between them.

Cape Mokkovik bears northwestward, distant 6 miles from cape Strawberry, and between them is Mokkovik bay, an inlet reported to extend 20 miles. At the entrance to the bay is a group of low black islets and sunken rocks almost blocking the channel northwestward of them. Southeastward of these rocks, under cape Strawberry, is Strawberry harbor, formed by a small island.

Cape Mokkovik is a steep bluff rising to the inland ranges. The northern points of the cape are foul for the distance of 400 yards. Two islets lie eastward of the cape; there is no passage between them and the land, but vessels pass between the islets, or eastward not less than 200 yards from them.

Ragged islands (Kingnitaksoak) comprise a group of four principal and numerous small basaltic islets and rocks. The southeastern islet is situated west-northwestward, 8 miles from cape Harrison. The third islet from the southeastward rises in perpendicular cliffs to the height of 640 feet, and is conspicuous. The western island is also high, with two round mounds, and is the largest of the group. Two rocks, about 10 feet high, lie southward, distant $\frac{3}{4}$ mile from the western island. Fishing craft anchor in the passages between these islands, but the anchorages are not good.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Ragged islands fortnightly during summer.

Adlavik islands, a large group extending northwestward about 13 miles from about $2\frac{1}{2}$ miles northward of Dog islands, are nearly all high and much indented; the channels between them, in which there are small islets and rocks, are narrow and intricate, but they have not been examined, and the greatest caution is necessary in navigating in them.

Tikacralik (Wheel), situated $18\frac{7}{8}$ miles westward from Webeck island, is a sharp peaked islet about 400 feet high. An islet lies

southward, about 1 mile from Tikaoralik, and there is a rock above water between them. A small islet, 20 feet high, lies close northward of Tikaoralik, and there is a narrow channel between, through which 3 fathoms of water can be carried.

Rock.—A rock is reported to bear 90° , distant $4\frac{1}{2}$ miles from Tikaoralik, but this position is doubtful.

Kikkertavak is the southernmost and largest of the group. Rogers harbors lie at its northeastern end and west-northwestward, 2 miles from Tikaoralik. These harbors lie southwestward of an islet, and the entrance is deep and narrow between low rocks on either hand; the anchorage is in 12 fathoms of water. There is a passage between the islet and Kikkertavak from harbor to harbor.

Two ledges, that cover at high water, lie off the northeastern harbor; to clear them, keep the shore aboard till the channel northwestward of Rogers harbor opens. This description is old and not quite clear.

The northwestern Adlavik island rises to a round hill which has a cairn on it, and between this island and Kikkertavak is an islet with three hills.

Anauiat, lying north-northeastward $3\frac{1}{2}$ miles from Kikkertavak, and west-northwestward 11 miles from Ragged islands, is a flat island about 200 feet high. Between it and Adlavik islands are several small islets and rocks.

Mortimer shoal, awash at low water, bears approximately 286° , distant $4\frac{1}{2}$ miles from Anauiat; its extent has not been ascertained.

Kidlialuit, northwestward, $6\frac{1}{4}$ miles from Anauiat, is a narrow island, $4\frac{1}{2}$ miles long, northward and southward, about 250 feet high, almost divided by a fall in the hills and having a steep cliff at the northern end. An island and some small islets lie southwestward and southward of Kidlialuit; the inner of these are named Iron-bound islands by the fishermen.

Uigoklialuit, lying northward $4\frac{1}{2}$ miles from Pomiadluk point, is the northern island of a group and is about 200 feet high. Nearly a mile southward of it is an island of somewhat the same height and shape, but the northern island is distinguished by having a portion at the extreme almost detached.

Mission station.—The southern station of the Moravian mission is at Makovik, the position of which is not given, but it appears to be in the vicinity of cape Mokkovik. It is on the shore of a spacious bay, with sloping hills on three sides, fairly well covered over considerable areas by small spruce trees. There is a large building, containing under one roof a dwelling house, church, and workshops. A pier was in course of construction in 1905. Fuel is plentiful. A small craft has been built here. The station was founded in 1899, and 150 natives are attached to it.

Aillik bay.—Cape Aillik lies westward, distant 2 miles from cape Mokkaik, and Aillik bay runs southward 5 miles from between them. The bay is fringed by bowlders on the eastern side, where there is a lagoon which is dry at low water, but the western shore is steep-to for about $2\frac{1}{4}$ miles inward, where is the trading post of the Hudson Bay Company. A bank with 3 fathoms of water over it, which breaks in bad weather, extends southward 1 mile from a position about 300 yards off the trading post.

There is good anchorage in Summer cove, the first indentation on the western shore, in 10 fathoms of water, mud bottom, but westerly winds are accompanied by heavy squalls. Anchorage may also be obtained off the houses of the trading post, in 6 fathoms of water, sand and rock bottom, with the two points on the western side of the harbor touching, bearing 22° .

Tides.—The tidal rise is 7 feet at springs.

Fishery.—Net seal fishery has been prosecuted at Aillik for many years, the principal varieties taken being the harp, crested, and bearded seals. They generally precede the body of ice passing southward.

Water can be procured abundantly from a lake behind the houses, and the boats lie on a smooth gravel beach, where a hose may be led into them. Wood can also be obtained.

Ice.—The harbors begin to freeze out to the deep water after the middle of November and the northern ice arrives about December 10. At the end of that month a straight edge, known as the "fast ice," is formed from island to island several miles offshore, outside of which ice flows continuously southward from December to June or July, and the residents along the shore drive with komatiks and dogs to the eastern edge to hunt for seals in the pools of the body as it passes along. Toward the middle of January sheet ice appears, flowing southward in the same manner, occasionally rafting 5 to 20 feet above the sea. Small bergs are sometimes seen about this time. Westerly winds prevail in winter, but there are occasional changes, usually of short duration, to northerly and easterly winds, and sometimes southeasterly; and a gale from the latter direction will cast the ice offshore for a few hours, but it will return as soon as the wind slackens or changes its direction.

Cape Aillik is a small islet 80 feet high, steep-to on its northern side.

Ice was reported here on August 24, 1875.

Turnavik islands comprise a group situated northwestward $1\frac{1}{2}$ miles from cape Aillik. The largest and northern island is about 300 feet high toward its northeastern side, off which is a low islet. A cluster of islets and rocks is situated southeastward of the largest island and eastward of the southern; there is no passage between

them. The track to be followed is southward of this cluster and close to the eastern end of the southern island. Gull rock (*Nauyaktikilik*), the eastern of the group, is about 40 feet high, and may be approached on the eastern side to within 400 yards. Reefs, which generally break, lie between Gull rock and the low islet northeastward of the northern *Turnavik* island.

There is a harbor on the southwestern side of the northern island, formed by an islet point, within which about fifty vessels moor side by side.

A rock, that breaks in heavy weather, bears 25° , distant $2\frac{3}{4}$ miles from the northwestern point of the northern *Turnavik* island.

Communication.—The Labrador steamer to and from *St. Johns*, via *Battle harbor*, calls at *Turnavik* islands fortnightly during summer.

Kaipokok, a remarkable hill 895 feet high, is situated west-southwestward, 10 miles from cape *Aillik*. Southeastward of this hill an inlet extends southwestward about 30 miles, and at its head is a post of the *Hudson Bay Company*. Several small harbors are situated in the vicinity of *Kaipokok*, but they have not been examined; the approaches to them pass among numerous rocks and islets, and should not be navigated without local knowledge.

Ukalluktok (*Hares islands*) comprise a group of islands lying $8\frac{1}{2}$ miles west-northwestward from *Turnavik* islands. There are several sunken rocks between these groups, but there is a passage between the rocks and another just southward of them. *Striped island*, the southernmost island of the *Ukalluktok* group, is 288 feet high, curiously striped in nearly horizontal black and white bands, and an excellent mark.

Tikkerasuk (*Tickle Arichat of the fishermen*), westward, $1\frac{1}{2}$ miles from *Ukalluktok*, and off a promontory on the mainland, is an island 91 feet high. The channel between the island and the mainland is shallow, but it affords excellent anchorage for fishing vessels. Some low islets lie off the southeastern side of *Tikkerasuk*, and temporary anchorage can be taken up within them; the northeastern point of the island is steep-to, and there are some islets, that shelter the anchorage, northwestward of the tickle.

The islands and rocks between *Tikkerasuk* and *Hopedale* are numerous, and so many are alike that it is impossible to identify them from description; only those bordering on the track are described herein.

Canairiktok, a bay, the entrance of which is west-southwestward, distant 9 miles from *Tikkerasuk*, is reported to extend south-southwestward about 15 miles.

Kayaksuatilik, westward about 8 miles from *Tikkerasuk*, is an island with a sharp peak; at its northern end are long points, each

rising to a conical hill from 300 to 400 feet in height, on the western and eastern of which are cairns. From off the northern of these to Hopedale is a straight run.

Nanuaktok (White Bear island), bearing 328° , distant $8\frac{1}{4}$ miles from the northern Turnavik island, is flat and about 50 feet high, and is fringed by low rocks.

Uyarazuksulik (Two stones), west-northwestward, distant $6\frac{1}{2}$ miles from Nanuaktok, is so called from two remarkable blocks of stone on the southeastern side; it is separated from Gull island to the west-northwestward by a channel $\frac{9}{10}$ mile wide, in which is a rock that breaks. Rocks extend eastward $\frac{9}{10}$ mile from this island.

Gull island (**Nauyaksigaluk**) is 210 feet high, and faced by cliffs. The outer islets are two low islets lying northeastward $3\frac{1}{2}$ miles from it, with sunken rocks northeastward, northwestward, and southwestward of them. Rocks lie southwestward $\frac{1}{2}$ mile from Gull island.

Two low islets are separated by a channel 1,600 yards wide from the northwestern end of Gull island, and a rock lies halfway between them and the outer islets off Gull island.

Some difficulty has been experienced in distinguishing the islands shown on the chart between Gull island and Kingitok.

Kingitok are two remarkable islands lying southwestward, 7 miles from Gull island; both are dark and basaltic; the eastern island, 370 feet high, appears conical from all directions; the western, 330 feet high, shows conical only from northeastward and southwestward; they are excellent marks.

Hopedale harbor, westward about 9 miles from the western Kingitok island, is a small bay in the mainland protected from the eastward by the islands of Anniowaktook (Big Snow hill), 468 feet high, and Anniowaktorusek (Little Snow hill), 122 feet high.

The bay is about $\frac{1}{2}$ mile in extent, with rather uneven bottom of sand, gravel, and, here and there, rock. The approach from the southeastward is clear; but a rock awash lies about 200 yards eastward of Seneraluk, a white rock 2 feet high, which is situated eastward, 200 yards from the northern entrance point of the harbor.

Anchorage in 6 to 10 fathoms of water, with good holding ground, can be obtained off the Moravian missionary settlement; it is a convenient temporary anchorage for fishing vessels.

Tides.—It is high water, full and change, at Hopedale, at 5h. 38m.; springs rise 7 feet, neaps 4 feet.

Mission station.—The Moravian mission settlement at Hopedale, which was founded in 1782, is on the northern shore of the harbor. Three missionaries were stationed here in 1905. The church can accommodate 300 people. About 100 Innuït natives occupy 25 houses,

and about 150 others live in the district. A few stunted trees grow at the settlement. The natives state that caribou, formerly plentiful, are now rare within 40 miles of Hopedale. Timber is also less abundant than it was, in consequence of destructive forest fires.

Ice.—The harbor freezes over occasionally in the first week of September.

Water is abundant, but the watering place is inconvenient for boats. Wood is scarce and must be brought from a distance of 8 to 10 miles.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Hopedale fortnightly during summer.

Winds.—The prevailing winds on the coast in the vicinity of Hopedale are off the land or from the southwesterly quadrant. Strong northwesterly to westerly squalls, which last an hour or two, occur during August, and occasionally there is a thunder storm with much rain.

The barometer is generally low, and may not indicate the approach of bad weather. The weather has been fine with the barometer at 29.45 inches, and on wind and rain setting in the barometer has risen.

Current.—The current on the coast almost invariably sets south-eastward, unless counteracted by southeasterly and easterly gales.

Deep inlet.—The northwestern arm of this inlet, which lies south-eastward of Hopedale, is reported to be about 20 miles long, with deep water throughout, to the mouth of a fine river flowing into its head.

There is a small hut at the mouth of the river, used by a fisherman who nets the salmon there. Salmon of 40 to 50 pounds in weight go up the river.

Tracks—Caution.—Mariners are warned that this coast, with the islands off it, is only partially surveyed, and that every precaution should be taken when navigating in the vicinity.

Holton to Aillik, by the inner track.—From eastward about $\frac{1}{2}$ mile from Holton island, steer to pass between Tinker island and Quaker reef, and thence direct to cape Harrison, passing close north-eastward of Bear island.

From cape Harrison steer to leave both Smoky islet and Webeck island about $\frac{1}{2}$ mile to the southward, and then to pass close north-westward of the small islet, 60 feet high, off Double island. From this islet a course of 248° , for $7\frac{1}{10}$ miles, leads north-westward of Double island and south-eastward of the next islet, when steer to pass between Dog islands and the mainland. Round the islet, just westward of the western of the Dog islands, and steer to pass north-eastward of the island with two summits and the grassy islet off it, and southwestward of Conical island. From Conical island steer 349° , which course leads, at the distance of 7 miles, to the north-eastward of the islets off Manak island; at 9 miles, westward of a double

islet; and at 11 miles, to the narrow passage between the mainland and some low rocks. Then keep a reasonable distance off the coast to Pomiadluk point, whence, to the islands off cape Mokkaik, the course is 320° for $8\frac{1}{4}$ miles.

By the outer track.—Pass northeastward of Ragged islands, and thence northward of Kidlialuit and Uigoklialuit, and then northward of the islets off cape Mokkaik.

The track from southwestward of Ragged islands to the northward of Kidlialuit has been taken.

By the middle track.—From northwestward $\frac{1}{2}$ mile from Webeck island, pass northward about $\frac{1}{2}$ mile from Jigger island and then steer to pass northward of Tikaoralik, bearing in mind the rock reported to lie between this island and Ragged islands (p. 730): then steer about 295° and keep close to the northwestern part of the northeastern end of Kikkertavak till the first channel northwestward of that island is open: then stand offshore until Pomiadluk point is well open northeastward of the Adlavik group, bearing about 303° , when steer to pass between Pomiadluk point and some low islets, avoiding Mortimer shoal, and thence direct to Cape Mokkaik. This route must be used with great care, as the soundings are very irregular.

Cape Aillik to Hopedale—By the inner tracks.—From Aillik a 281° course, for $3\frac{1}{4}$ miles, leads southward of the southeastern islets of the Turnavik group to the southern island, which round, on its northeastern side, at the distance of 200 yards. Then steer 286° for 11 miles, to Striped island, passing southward of the numerous rocks and breakers, and northward of the archipelago of islands in this reach. Pass between Striped island and an islet, 5 feet high, $\frac{9}{10}$ mile southwestward of it, then southward of the Ukallukok group, and northeastward of Tikkerasuk. From this steer 283° for $5\frac{3}{4}$ miles, and pass southward of a brown islet, 15 feet high, then 314° , for $2\frac{1}{4}$ miles, to an islet about 50 feet high; passing, after running $1\frac{7}{10}$ miles, southwestward of an island 70 feet high. Thence steer for the point under Niachungoat, the southeastern conical hill at the northeastern end of Kayaksuatilik, passing between an islet and a rock, 3 feet high, just southeastward of the islet.

Keep the northern points of Kayaksuatilik close aboard, to pass southward of a rock, with 3 feet of water over it, at 800 yards west-northwestward of Niachungoat, and avoid a rock, with 7 feet of water over it, bearing approximately 70° , distant 1 mile from the northwestern point of the island. From off Nuvuksoakuluk, the northwestern conical hill, a 292° course for $5\frac{1}{2}$ miles leads to Hopedale.

Or from Tikkerasuk pass about 1 mile southward of the brown islet, 15 feet high: then steer 247° for six miles to a narrow passage southeastward of a conical islet about 300 feet high, eastward of the southern end of Kayaksuatilik, and northwestward of some remark-

able cliffy hummocks; a sharp bend southwestward and another northwestward, each about 1 mile long, lead into an open channel, whence steer 359° , to an islet 120 feet high in Hopedale approach.

By the outer track.—From cape Aillik pass northeastward of Gull rock, then northeastward 800 yards from the reefs situated between Gull rock and the islet off the northern Turnavik island; thence steer 320° to $\frac{3}{4}$ mile northeastward of Nanuaktok, passing, after running 5 miles, southwestward $\frac{3}{4}$ mile from a rock that breaks. From Nanuaktok, steer to pass northward of the reef off Uyara-zuksulik and Gull island. From close northward of Gull island steer 219° for $2\frac{1}{2}$ miles, thence 258° , for 11 miles, through the passage northward of Kingitok between two large groups of islands, and to Hopedale approach.

The track from Nanuaktok northeastward of the first group of islets northeastward of Kingitok, and thence as above, has been taken.

Hopedale to Nain.—From Hopedale northward to Windy tickle, and thence to cape Harrigan, either keep quite outside, or inside the islands. The islets and rocks are so closely studded together, and so many breakers show with even a moderate sea, that, until surveyed, navigation among them is dangerous.

From Hopedale pass through the narrow channel northward of the anchorage, and westward of Achvitoaksoak, a dark-cliffed island; then steer 337° for $3\frac{1}{2}$ miles and pass westward of Napakataktalik, a dark cliffy island, and between it and a small black rock 3 feet high. From Napakataktalik steer about 359° for $10\frac{3}{4}$ miles and pass between a round islet, 120 feet high, on the east, and Multa, a high sharp-peaked island on the west. The above course passes at 3 miles from Napakataktalik close eastward of an islet 10 feet high and at 4 miles eastward of a cliff-faced island. From the islet, 120 feet high, a 377° course for $2\frac{1}{4}$ miles leads to the entrance of Windy tickle.

If, after passing the cliff-faced island at 4 miles from Napakataktalik, the ice be close in, a 305° course for 3 miles leads southwestward of Napatalik, which has a peak 500 feet high, and thence a mid-channel course between the mainland and the group of islands, of which Napatalik is the southern, leads to Windy tickle.

Kikkertaksoak islands, northeastward about $6\frac{1}{2}$ miles from Napatalik, are two in number and are the only prominent islands seaward of the above-described tracks; they have two sharp peaks, each about 250 feet high, and reefs stretch from and lie off them in all directions.

Two rocks, the southern of which is 10 feet high and the other awash at high water, bear 8° , distant 1 mile and 2 miles, respectively, from the northern end of the northeastern Kikkertaksoak. Between

the northern of these two rocks and the southwestern of those off Farmyard islands there is a good passage.

Nanuktok (Bears), or Farmyard islands of the fishermen, are two principal and several smaller islets, situated eastward 13 miles from cape Harrigan. Many shoals, that break after a strong breeze, lie between these islands, cape Harrigan, and Kikkertaksoak, and navigation there is dangerous.

Nunaksáluk (Big piece of land) is the outer point of Windy Tickle group. The islands forming it are about 620 feet high, falling in a series of conical hummocks to the northern point. No examination has been made of the outer harbors.

Windy tickle (Ikirasuluk) is the channel between Windy Tickle islands and the mainland, which trends west-northwestward for 2 miles and then westward for 2 miles farther. In the southeastern reach a shoal extends off the first bight on the northeastern shore, and there is a clear track along the southwestern shore. On the northwestern side of the southwestern bend is a deep bay with an islet in the middle, making two anchorages. The water is shoal nearly out to this island from the shore, deepening suddenly from nearly dry to 10 fathoms. Vessels should not anchor in less than 12 fathoms of water, nor attempt to go inside the island. The western bend of Windy tickle is shallow from an islet lying southwestward of the islet in the middle, and the passage is in mid-channel, but not more than $1\frac{1}{4}$ fathoms can with certainty be carried through at low water. With winds from westward to northwestward violent squalls blow down the southeastern reach.

Cape Harrigan (Tagaulik), an island $\frac{1}{2}$ mile across, with a sharp black summit, about 300 feet high, forms the northern part of Nunaksáluk; it has a steep face with deep water close-to. Cape Harrigan is in latitude $55^{\circ} 51'3''$, longitude $60^{\circ} 20'$ west of Greenwich.

An island, 60 feet high, lies southeast, distant $3\frac{1}{2}$ miles from cape Harrigan, and there appears to be deep water between this island and Nunaksáluk.

Bearing 137° , distant $1\frac{3}{4}$ miles from cape Harrigan, is the northwestern point of a cove, in which there is anchorage.

Cape Harrigan harbor, in which several schooners can anchor, is situated on the northern side of Nunaksáluk, and southward of cape Harrigan. The head of the harbor is a sandy beach.

The main entrance is southeastward of cape Harrigan, but there are also two passages for small craft to the southwestward of the cape, on either side of an island 50 feet high.

Two rocks, one of which dries and the other of which has less than 6 feet of water over it, bear 241° , distant $\frac{1}{2}$ mile and 1 mile, respectively, from the northwestern point of cape Harrigan.

Umi a vik (Wrecked boat island), bearing 286° , distant 4 miles from cape Harrigan, has a conspicuous conical summit, 250 feet high.

Kutallik (Kettle island), or Massacre island of the fishermen, lies westward, distant $8\frac{3}{4}$ miles from cape Harrigan, and is about 200 feet high.

Boulders which dry at low water, and a shoal, extend south-southwestward of Kutallik. Mountaineer rock in line with the hollow southwestward of Post hill, Davis inlet, bearing 286° , leads southward of this shoal, and 600 yards northward of North Tikiráchuk (Narrow point).

Mountaineer rock (Adláuyavik), bearing 129° , distant 2 miles from Entry island, and 264° , $1\frac{1}{2}$ miles from the southwestern end of Kutallik, is 5 feet high. Its northern side may be approached to a distance of 400 yards.

Entry island, situated in the eastern entrance to Davis inlet at $4\frac{1}{2}$ miles from the Hudson Bay Company's post, is small, round, 120 feet high, and bold-to on all sides.

Flat island, north-northwestward, distant 1,400 yards from Entry island, is about 30 feet high and flat. There is a good passage in mid-channel between Flat island and Entry island; the water is shoal between Flat island and Ukasiksalik, to the northwestward.

Davis inlet was the name originally given to Jack Lane bay, the entrance to which is southeastward of Kutallik, but it is now applied to the water between Ukasiksalik (Freestone) island and the mainland. This inlet, which was cursorily examined westward as far as the Hudson Bay Company's post, situated on the southern side of Ukasiksalik, has an average width of 1,200 yards. The Rattle passage, to northwestward of Ukasiksalik, at about 2 miles westward of the post, is narrow and tortuous, and the streams are rapid. Newfoundland fishing schooners, however, occasionally use it, when taking the inside runs, to avoid the ice.

Pigeon islet, 1,400 yards southwestward from Entry island, is in two parts, each 30 feet high. There is a passage for large vessels between Pigeon islet and Entry island by keeping nearer the latter.

Smooth Land point, bears 283° , distant $1\frac{1}{4}$ miles from Pigeon islet.

Red island, westward, distant 1,400 yards from Smooth Land point, is 20 feet high, and joined to the shore by stones, which only cover at high water springs. The summer residence of one of the families who trade with the Hudson Bay Company is on this island.

Red Island rock, with 6 feet of water over it, bears 57° , distant 800 yards from Red island.

Vessels should pass between this rock and Ukasiksalik; for leading mark see page 741.

Twelve o'clock mark, westward $1\frac{9}{16}$ miles from Red island, is a conspicuous vein of dark rock extending up to the summit of the

cliffs of lighter colored rock. It derives its name from bearing nearly south (true) from the Hudson Bay Company's post, and thus serves to indicate noon.

A bank is reported with its northwestern edge, bearing 58° , distant $\frac{3}{4}$ mile from Twelve o'clock mark.

The Post of the Hudson Bay Company consists of several white houses, off which is a wharf. A small staff is maintained here, who are visited by the steamer Labrador on her way to Ungava bay, and again on her return to Rigoulette. Furs, seal oil, and salted trout are the chief exports. Wood and water can be obtained here.

Post hill, 855 feet high, slopes to the southwestern end of Ukasiksalik, and is situated north-northwestward 1,200 yards from the Post.

Tidal streams.—The flood stream in the inlet sets westward, and the ebb in the contrary direction, with a rate of 2 to 3 knots an hour at springs.

It is reported that a strong tide rip and overfall prevails at the entrance to this inlet, and that sailing vessels should not take the passage except at slack water and with a commanding breeze.

Newfoundland harbor, a small bay on the eastern side of Ukasiksalik, is reported to contain good anchorage, and is occasionally much resorted to by fishing craft.

Solomon islands are two large islands, separated by a channel $\frac{1}{4}$ mile wide. A small island, 50 feet high, lies off the southwestern end of the western and larger island and bears east-northeastward, distant 1 mile from Entry island.

Akpalik (Tinker island), the northeastern of two small islands, lying northeastward, distant 1,000 and 800 yards, respectively, from the northern end of the eastern Solomon island, is small, tub-shaped, white, and 50 feet high.

A rock, awash at high-water springs, bears 2° , distant $1\frac{1}{4}$ miles from this island.

Katáuyak, an island with a double summit, lies eastward, distant $1\frac{3}{4}$ miles from Akpalik.

A small dark sharp-topped rock, 10 feet high, bears 39° , distant $\frac{1}{2}$ mile from the middle of this island.

Between Katáuyak and Kutallik are three other islands, the middle one of which has a sharp, dark summit, about 150 feet high.

Clinker rock, with less than 6 feet of water over it, is reported by the master of the Moravian mission ship Harmony to lie in latitude $55^\circ 57\frac{1}{2}'$, longitude $60^\circ 5\frac{1}{2}'$ west of Greenwich. This position was determined by observations and independently of the land.

Nunaksuk (Little land), bearing 343° , distant $11\frac{1}{4}$ miles from cape Harrigan, is 100 feet high, and bold-to on the southeastern and northeastern sides: there are three lumps on its summit.

Directions—Cape Harrigan to Davis inlet.—From cape Harrigan a course of 261° , followed for $8\frac{3}{4}$ miles, leads to the southern end of Kutallik, to clear the shoal of which see page 739. When within $\frac{1}{2}$ mile of Mountaineer rock, steer to pass northward at a distance of 400 yards from it. Then steer for Entry island, and pass it at the distance of 400 yards on either side. When near Red Island rock, bring the northern fall of Kutallik open northward of the summit of Entry island, bearing 98° , which mark leads between Red Island rock and Ukasiksalik, and when Red island bears 180° , proceed up the inlet, keeping nearer Ukasiksalik than the mainland to avoid the reported bank.

After passing Bar rock, there is good anchorage off the Post.

The least water found by the Labrador on this track was $5\frac{3}{4}$ fathoms.

From the northeastward pass southeastward 400 yards from Nunaksuk, and steer for Entry island, passing between the rock, awash at high water, and an island 100 feet high, situated east-northeastward, distant $\frac{1}{2}$ mile from the eastern end of Ukasiksalik. A sharp dark rock, 20 feet high, lies a short distance eastward from the island 100 feet high, and 50 yards farther in the same direction is a small rock awash. Pass between Entry and Flat islands, and proceed as above directed.

From the western entrance of Windy tickle a course of 292° , followed for $10\frac{3}{4}$ miles, crosses the mouths of Jack Lane and Jem Lane bays and leads to Entry island; in passing southward of Kutallik, and the shoal extending from it, observe the clearing mark at page 739: Mountaineer rock is passed 400 yards on its northern side, after which proceed into the inlet as above directed.

Davis inlet to Zoar.—To proceed northward, round the small island lying southwestward of Solomon island, and keep about 400 yards off the coast of Ukasiksalik till its northeastern end is reached, whence there are two tracks. The southern is convenient as being free from field ice at an early period of the season, and the fog rarely fetches in, but the northeastern is more direct and is on the seaboard.

Keep along the northern coast of Ukasiksalik, which has deep bays with cliffy sugarloaf hills forming the points, and then pass southward of some smooth-sloped, greenish islands, the southern point of which is foul for a short distance off. Merrifield mountain, a square hill, about 1,700 feet high, lies some 5 miles inland from these islands. From the foul point a course of 295° , followed for 5 miles, leads between a dark, cliffy island on the southwestern side, with rugged points, ending in islets, and some low islands on the northeastern side, through the channels between which the outer islands can be seen. Then pass southwestward of an island about 200 feet high, and a low, black islet lying northwestward of it; some sunken rocks lie northwestward of this islet.

From westward of this low islet a course of 313° , followed for 5 miles, leads southwestward of Tunungayualuk, a large island with steep tree-covered sides, to a narrow tuckle, passing northeastward of a group of conical and mound-shaped islets. Round the western point of Tunungayualuk at a distance of at least 400 yards, to clear a shoal stretching off it, and leave some low islets to the southwestward. Two channels then open: the western is narrow, with only 2 fathoms of water in it, and at its northern end is the bay, on the western shore of which Zoar, a Moravian missionary station, is situated. From the northern end of this channel steer to leave Tuktuinak (the island between the two channels) $\frac{1}{2}$ mile off, to avoid a rock that breaks, and then 30° , for 3 miles nearly, to pass eastward of a low island promontory, on the northeastern end of which is an Eskimo hut.

By the deeper channel, keep midway between Tunungayualuk and Tuktuinak, until the second channel running northwestward is open.

Tuktuinak has a steep cliff at its eastern end, that rises to a hill 600 feet high, and in the northwestern part of the island, separated by a deep gully, is a sloping greenish hill.

Tunungayaksoak, northeastward of Tuktuinak, is wedge-shaped, the summit being near its southwestern end, off which, close-to, is a shoal. Proceed between Tuktuinak and Tunungayaksoak, passing northeastward 200 yards from an islet 5 feet high. From the northwestern end of this channel steer 320° to the low island promontory, on which is the Eskimo hut. From Zoar bay the land trends north-northwestward and is made up of high green hills with raised terraced beaches on the slopes, surrounding deep indentations. From northeastward of the island promontory pass close westward of Achpitok (an island with a deep cove, that affords anchorage in 12 fathoms of water), and between it and the mainland. Continuing northward, pass eastward of an islet about 30 feet high, then turn northwestward and pass close southwestward of Nuasornak (Dog), a conical island 400 feet high, and northeastward of a dark islet, 40 feet high, to the coast of Kikkertavak, a large island 600 feet high.

Keep about 400 yards distant from Kikkertavak till the narrow channel between it and Taktuk is reached; passing southwestward of Nochalik, a high island with a deep ravine through the northwestern part, which it nearly disconnects; westward of Nukasusutok, a dark island about 800 feet high, falling in cliffs on the northwestward; and southwestward of Niatak, an island with two prominent hills about 300 feet high, smooth slopes on the southern side, and deep bays with cliffs on the northern.

Taktuk (Fog) is a small island, about 150 feet high, with its southwestern coast fringed by bowlders; there is an Eskimo hut at the

southwestern end; the coast of Kikkertavak immediately opposite has some low rocks a short distance off it.

From the western end of the narrow channel between Taktuk and Kikkertavak, steer about 336° for 3 miles, passing eastward of Palungatak, an island about 600 feet high, with a nearly detached mound at the southeastern end. Boulders extend nearly half-way from the northeastern side of the island to the opposite shore, and the channel between must be navigated with great caution: 4 fathoms of water can be carried through by keeping nearer the northeastern than the southwestern shore.

Tunnulusoak (Pownal or Paul island), situated northward and eastward of Palungatak, is $16\frac{1}{2}$ miles long, and nearly divided by two deep inlets running from the northeastern and western ends. Off the southern side abreast Palungatak is a small promontory ending in a rocky mound, with deep bays on each side filled with boulders.

Ford harbor, at the eastern end of Tunnulusoak, is an inlet, open eastward, on the northern side of a flat promontory forming a series of terraces, and the harbor is visible from the southwestward over the marsh which joins this promontory to the mainland. Boulders fringe the shores of the harbor, but the water deepens quickly outside of them.

The harbor affords anchorage in the bay at its head in 13 to 16 fathoms of water, mud bottom, with good holding ground.

Tides.—It is high water, full and change, in Ford harbor at 6h. 46m.; springs rise $6\frac{1}{2}$ feet, neaps 4 feet.

Palungatak to Nain.—From the western end of the channel between Palungatak and Tunnulusoak, keep the coast of the latter distant about $\frac{1}{2}$ mile, steering a general northerly course for $4\frac{1}{2}$ miles, when the southern entrance point of Nain will bear about 225° , distant 400 yards. Round this point and anchor off the Moravian mission station at Nain in 13 fathoms of water, mud bottom.

As a general rule the water on this coast deepens suddenly from the line of the boulders.

Beacons.—Two pairs of small white beacons stand on the shores of Nain; one pair in line leads just clear of the boulders off the southern shore, and the other pair in line just clear of those on the northern shore.

Tides.—It is high water, full and change, in Nain harbor at 7h. 9m.; springs rise $6\frac{1}{2}$ feet.

Nain is the headquarters of the Moravian mission on this coast, and the station was founded in 1771. The buildings are substantial and commodious. There is a very good jetty and landing stage. A wood of spruce and larch extends from behind the station for a mile or 2 up the valley, and the trees are some 30 feet high. The mission gardens grow turnips, carrots, lettuce, cabbage, and beetroot, besides potatoes, which require to be screened from the frost.

The most common fur is that of the fox, the skin of which is of no value between April and October; the marten is rather scarce, and the polar bear, lynx, and mink are not common.

Communication.—The Labrador steamer to and from St. Johns, via Battle harbor, calls at Nain fortnightly during summer.

Nain to Ford harbor.—Proceed southward between the mainland and Tunnulusoak and through the shallow channel between that island and Palungatak. Then keep in mid-channel between Tunnulusoak and Taktuk, Niatak, and Kugjautak (Wedge), a general easterly direction for $13\frac{1}{2}$ miles, to Amushavik, an islet which lies 800 yards off the southeastern point of Tunnulusoak. Pass between Tunnulusoak and Amushavik and thence along the coast of Tunnulusoak to Ford harbor.

From Ford harbor, by the inner route, a good passage leads northward of Kugjautak and northwestward of Nukasusutok. Rounding this latter island, steer for Nochalik, taking care to avoid the rock in this channel off the low islets southwestward of Nukasusutok.

Windy tickle to Ford harbor by the outer track.—Proceed to the eastern end of Ukasiksalik as already directed, and from this steer 348° , for 4 miles nearly, to the western point of Ayagatot, which is a barren island with a round summit about 230 feet high, having a rock lying southward about 400 yards from it. A small island, which has a sunken rock near its southwestern end, lies southeastward of Ayagatot. From the western point of Ayagatot steer 357° for 9 miles, which leads to Kikkertaksoak, but pass a little farther off the islets, nearly in the track, than the direct course leads, to avoid any spurs stretching off them.

Kikkertaksoak (Spracklings island) has two sharp peaks, 465 feet high, at the southern end, and a high mound at the northern end. There is a small harbor on the eastern side sheltered by some islets.

Uvingiayuk (Lopsided island), west-southwestward, distant $2\frac{1}{2}$ miles from the southwestern end of Kikkertaksoak, is a dome-shaped rock about 400 feet high.

Ukallik (Hare island), east-northeastward, distant 5 miles from the northeastern end of Kikkertaksoak, is an island with a double summit about 200 feet high; it is usually made by the Moravian mission ship when going to Zoar, or to Nain.

Kidlits (Outside islands) lie east-northeastward, distant 10 miles from the southeastern end of Kikkertaksoak and northward, $9\frac{1}{2}$ miles from Nunaksuk: the western and higher of these islands is about 100 feet high; the eastern island is 40 feet high, divided into two parts, and may be approached to $\frac{1}{2}$ mile.

Two rocks, 30 feet and 50 feet high bear, respectively, 330° , distant $1\frac{7}{10}$ miles, and 344° , distant 3 miles, from the western Kidlit.

Kikkertaksoak to Zoar.—From off the middle of the western side of Kikkertaksoak, a course of 294° , for 5 miles leads northward of a group of small islets, the western of which, named Pakertuk, is 140 feet high. Thence steer 277° for $5\frac{3}{4}$ miles to the northern point of Tunungayualak, a little hillock joined to the main island. Keep about $\frac{1}{2}$ mile off the coast of Tunungayualak, steering southwestward for 5 miles in mid-channel between that island and Aklatalik and Tunungayaksoak, to the northwestward, the former island being about 500 feet high with numerous conical mounds, and passing close to an islet about 60 feet high. Proceed through the channel between Tuktuinak and Tunungayaksoak as already directed.

Kikkertaksoak to Ford harbor.—The natives report that there is a clear passage between these places, to navigate which steer 327° for 15 miles from the southwestern end of Kikkertaksoak (Spracklings island) to another island named Kikkertaksoak (Big island), about 300 feet high and flat in outline, thence 2° , 4 miles to Sioralik (Sandy island), so named from the color. Keep the western point of Sioralik close aboard to avoid a shoal, whence a course of 316° for 6 miles leads to Ford harbor.

Flat rock, bearing 356° , distant $9\frac{1}{2}$ miles from the eastern Kidlit, is 40 feet high, in two parts, lying northeastward and southwestward of each other, and the northeastern side is bold-to.

Negro island, the northern end of which lies south-southwestward, distant 2 miles from Flat rock, has three hillocks, the middle one of which, 150 feet high, is round and very black, contrasting strongly with the remainder of the island, which is light in color.

Pyramid island, north-northwestward, distant $4\frac{1}{2}$ miles from Negro island, is about 200 feet high and appears as one pyramid on southwesterly bearings and as two pyramids on northwesterly bearings.

A breaker lies north-northeastward, distant $\frac{1}{4}$ mile from the northern end, and the outer of three rocks bears east-southeastward, distant 1 mile from the southern end of Pyramid island. This outer rock is 40 feet high and has a large boulder on its summit.

Hen and Chickens, the eastern rock of which lies northward, distant $3\frac{1}{4}$ miles from Pyramid island, make up a chain of seven rocks which are above high water and lie in a line bearing nearly eastward and westward. The middle rock, which is the highest, is about 40 feet high and is situated in latitude $56^{\circ} 29'$, longitude $60^{\circ} 36'$ west of Greenwich.

Three Brothers, bearing 327° , distant 9 miles from Hen and Chickens, are three islets, the southern and highest of which is about 60 feet high.

A small round island, 100 feet high, lies northward, distant $2\frac{1}{2}$ miles from Three Brothers, and a rock, 20 feet high, bears 139° , distant $\frac{1}{4}$ mile from it.

Sentinel rock, bearing 10° , distant 10 miles from Three Brothers, is an isolated dark gray rock, about 80 feet high, steep on its north-eastern side, sloping gradually to its southwestern side, and apparently bold-to.

A long and narrow island with a broad summit, 400 feet high, near the southwestern end, is situated southwestward, distant 3 miles from Sentinel rock.

Southwestward, distant 9 miles from Sentinel rock, is the north-eastern end of an island, about $1\frac{1}{2}$ miles across, with three summits, each about 400 feet high.

Two small white islets, about 70 feet high, are situated southwestward, 2 miles from this island.

Notch rock, bearing 281° , distant $3\frac{1}{2}$ miles from Sentinel rock, is about 60 feet high, and a remarkable gap in its southeastern part shows on southwesterly bearings.

Bearing 310° , distant 9 miles from Sentinel rock, are three islands situated close to what is apparently the northeastern end of a large, high island.

Neither islands nor appearances of shoal water have been seen to the eastward of any of the rocks and islands above described.

Caution.—The coast northward of Nain has only been very roughly examined and the charts are unreliable, and several unmarked shoals are said to exist. Every precaution should therefore be taken when navigating in its vicinity.

Mount Thoresby, situated westward about 7 miles from the northern end of a large island west-northwestward of Notch rock, is 2,733 feet high; its northwestern side rises steeply in three steps, and there is a long smooth slope to the southeastward, terminating in a steep fall to low land.

It is said that iron ore occurs largely in mount Thoresby, as well as the adjacent land.

Port Manvers, northwestward of mount Thoresby, is a safe and commodious harbor: the entrance is about a mile wide between Medusa bluff on the eastern side and Thalia point on the western side. Numerous islands lie northeastward of the entrance, of which the nearest are Manby, Bouverie, Saddle, and Trio islands.

Nearly midway between the entrance points and about $\frac{1}{2}$ mile seaward of a line joining them are Willis rocks, which are above water. The other rocks in the entrance, being of white appearance, show at some distance. The water is so clear that the bottom with 8 fathoms of water over it can be seen. A patch of rocks, which seldom breaks,

lies westward about 1 mile from Saddle island, and there is a ridge of rocks between Bouverie and Manby islands.

In the fairway into the port there is a depth of not less than 14 fathoms, and in the middle of the port a depth of 44 fathoms. Medusa bay, on the southeastern side of the port, is convenient for obtaining wood and water, and it affords anchorage at 600 to 800 yards offshore; Caplin bay, on the western side, is not so convenient, but the bottom is soft and good for anchorage.

Directions.—Pass southeastward at about 200 yards from Willis rocks, then steer about 239° into the port, keeping Bouverie island open northwestward of Medusa bluff, bearing about 71° to clear the sunken rocks off Fletcher point, at $\frac{3}{4}$ mile southwestward of Medusa bluff. When the bluff point of Mount Thoresby opens westward of Fletcher point, bearing about 189° , steer for the anchorage on either side of the port.

Tides.—It is high water, full and change, in port Manvers at 6 hours; springs rise 5 feet.

Kig la pait is the high land to the northwestward of port Manvers, the hilltops on the northwestern portion of which have a jagged appearance. The highest part is a broad round summit, not less than 2,000 feet high; both southeastern and northwestern ends of this coast range fall sharply to low land.

Saddle island, situated in latitude $57^{\circ} 35'$ north, longitude $61^{\circ} 19'$ west of Greenwich, is about 500 feet high.

The Stirrups, bearing 126° , distant 3 miles from Saddle island, are two rocks, 100 and 50 feet high, respectively.

Okkak is situated on the shore of a landlocked bay in the northwestern end of an island which bears about 278° , distant some 25 miles from Saddle island, and which is separated from the mainland to the northwestward by a channel. The bay is surrounded by high bare hills.

There is a shoal, with but little water over it, in the northwestern part of the bay and off the mission station. It is marked by a mooring-shaped red buoy, which is left to the northwestward.

A white cross on the side of the hill in line with the church, bearing 258° , leads clear of the shoal.

There is anchorage off the mission station in 13 fathoms, over mud bottom, and here the width of the bay is about 800 yards.

Tide.—The rise of the tide is about 7 feet.

Mission station.—The buildings of the Moravian mission consist of a church and dwelling house, under one roof, large and substantial stores, and a hospital. There are also some native houses. The population amounts to 350, and it is the largest Innuvit center. In 1904, the natives got some 1,200 seals, and shot 500 to 600 caribou.

Hospital.—The hospital has seven beds for adults and two cots for children. It is provided with an operating room, dispensary, out-patients' room, and the usual requisites.

Ice.—A boat got into Okkak through the ice on the 21st of June, 1905.

Mosquitoes are numerous and very troublesome at Okkak.

Ogua lik (Cod island) lies with its southern extremity, distant 12 miles from Saddle island in a direction 300° . Table hill at its southeastern end rises abruptly from the sea to the height of 2,000 feet, and there are two dome-shaped hills near its northeastern side. This side is indented by several deep narrow bays, and the southern of these, immediately northward of Table hill, is reported to afford good shelter.

A rock, some 7 feet high, lies about 1 mile southward of Ogua lik.

Nanuktut (White Bear island), improperly named cape Mugford by some of the Newfoundland fishermen, lies northeastward about 3 miles from the northern end of Ogua lik, and is remarkable and unmistakable; it rises to a number of apparently inaccessible peaks, the three highest of which are situated at the northern, western, and eastern ends, respectively, and are probably not less than 1,500 feet high; that at the eastern end is isolated, rising perpendicularly from the sea, and sloping steeply on the northwestern side to a low neck 30 feet high, by which it is connected to the remainder of the island.

A bight, about 400 yards across, is situated between this hill and the outer peak at the northern end. The eastern side appears bold-to, but the northwestern coast is more shelving, with boulder beaches at intervals. This island is lighter in color than the land westward of it.

Na nu ya tuk is a small island, about 100 feet high, lying southwestward a little more than 1 mile from the southeastern end of Nanuktut.

Bishop's Mitre, situated west-southwestward, about 7 miles from Nanuktut, is a remarkable mountain, about 3,000 feet high; the gap in its summit is open except on southwesterly bearings.

Mugford tickle runs westward of Ogua lik and between it and Bishop's Mitre; the length of this channel is about 4 miles, and its least width is 1,300 yards in the middle. H. B. M. S. "Scylla" passed through this tickle in 1905, and the least depth obtained with two machines constantly going was 55 fathoms.

The cliffs on each side are almost perpendicular and attain heights of 1,000 to 1,500 feet. Their lower half is hard gray rock, and the upper a dark friable formation which is disintegrating into fine grit.

Trees.—The northern limit of trees on the coast is between Okkak and Hebron and approximately in latitude 58° .

Cape Mugford slopes northward from Bishop's Mitre, and is the southeastern head of a deep narrow inlet, extending some miles south-southwestward. A small conical island lies at the mouth of this inlet.

Finger hill, situated at about 8 miles northwestward of cape Mugford and at the end of the high projecting land, is about 2,500 feet high, and similar in shape to Table hill at the southeastern end; some peculiar finger-shaped rocks show when bearing between south-southwestward and southwestward.

An inlet extends southward some distance from Finger hill, and at its entrance is a small conical island.

Ice.—The remarks on the ice at Aillik (p. 732) are applicable to cape Mugford, excepting that the arrival of northern and sheet ice is probably a week or ten days earlier. In 1887, between August 1 and 15, from a hill about 1,000 feet high on the shore of Saglek bay, the sea was seen to be entirely covered with ice, which did not leave until August 20.

Watchman island, lying northwestward, distant 22 miles from the northeastern part of Nanuktut, is about 700 feet high.

The dark round summit of the island is at its northeastern end, which is remarkably white on northwesterly bearings, and is a good mark in making Hebron. The island is apparently bold-to on its northeastern and northwestern sides. Near Watchman island is a smaller island, about 200 feet high, and also four islets, ranging from 30 to 50 feet in height, of which the eastern is the lowest. Fishing vessels are said to anchor under the western side of this island.

Current.—In the summer of 1880, the current set southeastward at the rate of $\frac{1}{2}$ mile an hour off Watchman island.

Hebron bay is situated on the mainland just within the eastern entrance point of a deep inlet, the entrance to which is within a few islands lying westward some 12 miles from Watchman island. The entrance to the bay is 1,200 yards wide and is clear; the bay extends northward about 2 miles, with a general width of a mile, and it affords excellent anchorage in 19 fathoms, mud bottom; it is reported to be well sheltered except in southerly gales. The Moravian mission station of Hebron lies on the western side of the bay. It was founded in 1834, and has a population of 183 persons. The mission premises are commodious and substantial, but the natives live in houses built of timber, stone, and earth. Traders do not frequent the district; the nearest trading station is that of the Hudson Bay Company at Nachvak.

Ice.—See pp. 727, 732.

Mosquitoes are numerous and exceedingly troublesome at Hebron.

Kikkertaksoak, bearing 309°, distant 14 miles from Watchman island, is 300 feet high, and has a smooth round summit sloping like a whale's back, with small, deep gulches on the northeastern side.

An island, bearing 281° , distant 5 miles from Kikkertaksoak, is about the same size and 150 feet high.

Uivuk, lying northwestward, distant 21 miles from Watchman island, is a cape which forms the southern entrance point of Saglek bay; it rises steeply from the sea, and then gradually to its broad conical summit, from which it slopes to the southwestward. The summit southwestward about $\frac{1}{4}$ mile from the cape is about 1,000 feet high.

The **Domes** are two conspicuous round hills about 2,000 feet high, situated west-southwestward 5 miles from Uivuk.

I guk shuak (Galley island), a small island situated close northward of Uivuk, is 300 feet high.

Saglek (Low island) bay, so named from the principal anchorage being southwestward of an island of that description, lies northwestward of Uivuk, and has two entrances, one on either side of Kikkertaksoak (Big) island, the northwestern being the broader.

The Hudson Bay Company formerly carried on business at Lamsin, the principal anchorage in the upper part of the bay.

The northern point of Kikkertaksoak is a remarkable conical head, 700 feet high, rising perpendicularly from the sea.

Anchorage cove, on the southeastern side of Kikkertaksoak island, is reported to afford good shelter from most winds. The northeastern head of this cove is a conspicuous bluff having a broad band extending from the sea to beyond the top of the cliff on its northeastern face.

Kangalasiórvik, an island 300 feet high, is situated south-southwestward about a mile from the northwestern entrance point of Saglek bay.

Iti gai ya vik (Cold Feet cape), on the northern side of the northwestern entrance point of Saglek bay and in latitude $58^{\circ} 43'$ north, and longitude $62^{\circ} 54'$ west of Greenwich, is marked by broad bands of dark rock.

The coast outside Saglek bay is characterized by numerous trap dikes which extend vertically through the lighter colored rock. This feature ceases at 3 miles northward of Iti gai ya vik.

Mount Blow-me-down, northwestward 8 miles from Iti gai ya vik, and 2 miles inland, is remarkable, square topped, and not less than 3,000 feet high.

Shug vi luk, a bay situated northward 3 miles from mount Blow-me-down, has a conspicuous island in the middle 100 feet high.

Nullataktok bay (Blowhole for seals), sometimes named Slate bay, is situated to the northwestward of Shug vi luk, and expands into several narrow long arms. The Moravian mission station of Ramah is situated on the shore of the southern arm.

A jagged group of mountains, 3,000 to 4,000 feet high, is situated southwestward of Ramah and Shug vi luk.

Communication.—The Labrador steamer makes two trips to Ramah in summer.

Naksarektok (Gulch cape), situated north-northeastward, distant 37 miles from Uivuk, rises steeply on all sides to a dome-shaped summit about 1,000 feet high, and a low neck connects it to the adjoining high land, over which the komatiks (dog sledges) pass in winter.

Current.—A southeasterly current, with a rate of 2 miles an hour, has been experienced close off this cape.

The coast trends west-northwestward from Naksarektok to Kamasuk (Hut point), the southern entrance point of Nachvak bay.

Nachvak bay has an average width of 1 mile as far as the Hudson Bay Company's post, situated about 15 miles from the entrance, but the bay is reported to extend about 10 miles farther up. The land on either side is high, and the cliffs in some places rise almost perpendicularly to the height of about 1,000 feet.

Passage reef, a rock with little water over it, and on which the sea sometimes breaks, bears 89° , distant 2 miles from Kamasuk, and $\frac{1}{2}$ mile offshore, abreast a conspicuous round beach and gap in the coast cliffs. The passage into Nachvak bay is southwestward of this reef and between it and the shore, which should be kept aboard. There is no leading mark through the passage.

The eastern end of Razorback point in line with the eastern end of Nanutok, bearing 350° , leads over the reef.

Southeast rock, a shoal with less than 3 fathoms of water over it, bears 67° , distant $4\frac{1}{2}$ miles, and Big reef, a rock which dries at low water, with breakers extending southeastward $\frac{1}{2}$ mile from it, bears 44° , distant $2\frac{1}{2}$ miles, respectively, from Kamasuk.

The Hudson Bay Company's post, in latitude $59^{\circ} 4'$ north, and longitude $63^{\circ} 51\frac{1}{2}'$ west of Greenwich, is visited once a year by the steamer Labrador, which lands a year's supplies (including firewood, as there is none in this vicinity), and takes away the furs, seal oil, and trout obtained during the past year.

Eskimo occasionally come here from Ungava bay in winter with their komatiks (dog sledges), performing the journey sometimes in less than two days.

Trout are numerous in the bay, and they attain a weight of $17\frac{3}{4}$ pounds, and a length of 34 inches.

Anchorage.—There is excellent anchorage, in 7 to 8 fathoms of water, in Tin ya vik (Shoal Water bight), the second cove on the southern side, westward of Kamasuk; also off Ak la vik (Black Bear cove) in the same depth.

Water can be obtained in Tin ya vik.

Directions.—No vessel should pass between Big reef, Southeast rock, and Passage reef. The passage between the land and Passage reef is safe for a steamer or sailing vessel with a commanding breeze, but no breakers have been seen, even during a heavy swell, off the northwestern shore between the entrance and Razorback point.

Pass close to Kamasuk, and after rounding it keep in the middle of the bay till the Hudson Bay Company's post is reached. There is fair anchorage off the post, but the water is deep, and the squalls are heavy at times.

Silver waterfall, eastward, $2\frac{1}{2}$ miles from the Hudson Bay Company's post, is very conspicuous.

Tides.—It is high water, full and change, in Nachvak bay at 7h. Sm.: springs rise 5 feet, neaps $3\frac{3}{4}$ feet. The tidal streams are weak in this bay, the rate probably seldom exceeding 1 knot.

North head of Nachvak bay is a bluff, bold-looking, and comparatively low point opposite Kamasuk.

Between North head and Razorback point is a small sandy cove.

Naked Man point, southwestward $1\frac{1}{2}$ miles from North head, is so named from a statue-like stone, some 20 feet high, standing on it near the sea, and visible on northeasterly bearings.

Razorback point, situated northward, distant 7 miles from Kamasuk, rises to a sharp ridge, culminating in Mount Razorback, a peak about 3,000 feet high, the southeastern side of which slopes smoothly, and the northwestern is a succession of steps.

A rock, 15 feet high, with a reef extending southward $\frac{1}{2}$ mile from it, bears 27° , distant 2 miles from Razorback point.

The White Handkerchief, covering about 2 acres, and extending from the sea to some 500 feet above it, is a very conspicuous square of light-colored rock situated at the northern end of the deep circular bight northwestward of Razorback point. The White Handkerchief and mount Razorback are good marks.

Nanuktok (White Bear cape), bearing 350° , distant about 6 miles from Razorback point, is a projecting light-colored cliffy headland, rising perpendicularly to a sharp apex, about 1,000 feet high.

Davidson rock bears about 61° , distant $5\frac{1}{2}$ miles from Nanuktok, and has less than 3 fathoms of water over it. North head of Nachvak bay, open southeastward of Razorback point, bearing 204° , leads southeastward; and mount Blow-me-down, open eastward of Nak-sarektok, bearing 176° , leads eastward of this rock and Alexander shoal.

Alexander shoal, with about 3 fathoms of water over it, bears 350° , distant 10 miles from Davidson rock, and 71° , about the same distance from the northern entrance point of Kamaktorvik bay.

Kamaktorvik (Louse bay) is said to be a good harbor, and Newfoundland fishing craft anchor in it, but the approaches do not look inviting.

Southwestward of this bay at some little distance inland is a high, broad mountain, about 4,000 feet high.

Four peaks are four very high mountains situated between Kamaktorvik and Eclipse harbor, the northern peak being separated from the others by a deep valley. This is the highest land on the coast of Labrador, being from 5,000 to 6,000 feet high, and it is very noticeable.

Eclipse harbor is situated at about 4 to 5 miles within the northern inlet at Aulezavik island, in latitude $59^{\circ} 48'$ north, and longitude $64^{\circ} 7\frac{1}{4}'$ west of Greenwich. The inlet has a width of from $\frac{3}{4}$ mile to 2 miles, and it is said to afford excellent anchorage in 4 to 12 fathoms, with good holding ground.

It was named by the United States expedition which visited the harbor for the purpose of observing the total eclipse of the sun on July 18, 1860.

Ice formed in Eclipse harbor on July 14. Part of the western shore had an ice pool 3 to 4 feet thick, which remained during the stay of the expedition; and there were immense fields of ice on the sides of the mountains, with streams of water running constantly from them.

Tides.—The rise of the tide is 5 feet at springs.

Headland.—At about halfway between Eclipse harbor and cape Chidley is a square headland that falls steeply on its northeastern side and is noticeable on northwesterly bearings.

Bank.—A line of soundings, with depths of 54 to 97 fathoms, extends eastward nearly 70 miles from Razorback point, and a curved line of soundings, with depths of 70 to 87 fathoms, extends between 10 miles eastward of Razorback point and cape Chidley, attaining northeastward of Eclipse harbor a distance of nearly 30 miles from the shore; these soundings indicate the existence of a large bank, but its limits have not been ascertained.

McLelan strait is a passage that enters the land at some 12 miles southward of cape Chidley and leads through the Chidley peninsula into a bay about $2\frac{1}{2}$ miles southward of port Burwell, a distance of about 10 miles. The western part of this passage was examined by the navigating officer of H. B. M. S. "Scylla" in 1905, who found a shoal with 3 fathoms least water over it, at about 2 to 3 miles from its eastern entrance, but otherwise it was clear. The Atlantic or eastern part and entrance were not examined. The width of the passage at its western end is about 200 yards, and its sides are steep dark hills of bare rock.

The rate of the tidal streams in the passage is estimated to be about 7 knots, and the eddies and whirlpools are bad except at slack water. Small icebergs with more draft than any ship would have are said to pass through.

Rocks.—Three rocks bear 160° , distant $5\frac{1}{2}$ miles from cape Chidley. The middle and highest one is about 50 feet high, and the others are about 30 feet high.

An isolated rock, 30 feet high, bears 170° , distant 3 miles from the southeastern part of Kikkertaksoak; it is the northern of the outlying rocks which skirt the coast southeastward to Nanuktok.

Cape Chidley (Kidlinek).—Kikkertaksoak island, 1,500 feet high, is the southeastern of two high islands, apparently bold-to; on northwesterly bearings, it makes, as an island with two lumps, the western being the higher; cape Chidley, the northeastern end of the island, is in latitude $60^{\circ} 33'$ north, and longitude $64^{\circ} 14'$ west of Greenwich.

The northwestern of these two islands is about 1,000 feet high. The whole Chidley peninsula seems to consist of a number of islands separated by narrow channels or tickles of deep water.

Tidal streams.—The tidal streams off cape Chidley are rapid.

Ice.—It is recorded that a vessel was beset by ice off cape Chidley on August 11, 1905, but that there was very little ice off the cape on the 19th of the same month.

Fog was experienced off cape Chidley on August 11. Sometimes it lifted a little and allowed the land, $\frac{1}{4}$ mile distant, to be seen; and at other times everything was obscured. On this coast, dense fog often covers only a small, sharply defined area.

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