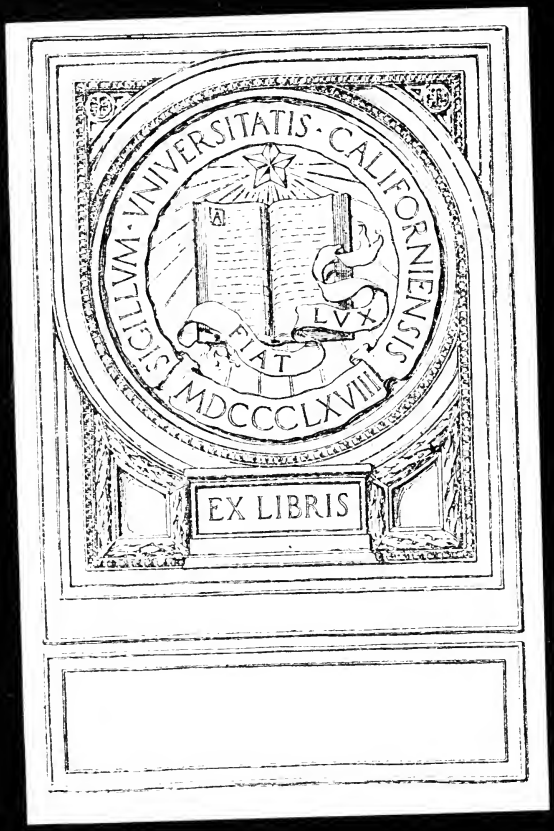
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DEPARTMENT OF THE NAVAL SERVICE

TEMPERATURES AND DENSITIES

OF THE

WATERS OF EASTERN CANADA

INCLUDING THE ATLANTIC FROM THE BAY OF FUNDY TO NEWFOUNDLAND; THE GULF OF ST. LAWRENCE, AND THE STRAITS CONNECTING IT WITH THE OCEAN

FROM INVESTIGATIONS BY THE TIDAL AND CURRENT SURVEY IN THE SEASONS OF 1894 TO 1896, AND 1903 TO 1911

W. BELL DAWSON, M.A., D.Sc., F.R.S.C., M.INST.C.E.,
SUPERINTENDENT OF TIDAL SURVEYS

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CONTENTS.

LISTS OF STATIONS IN THE DIFFERENT REGIONS.

TEMPERATURES AND DENSITIES

OF THE WATERS OF EASTERN CANADA.

From investigations by the Tidal and Current Survey.

The densities and temperatures of the water in the Gulf of St. Lawrence, the Bay of Fundy and other regions off the shores of Eastern Canada and Newfoundland, as here published, give the whole of the information of this character which has been obtained to date by the Tidal and Current Survey in these waters. The primary object in view in taking the observations, was to trace the currents and slower movements of the water by these characteristics; and in the various reports on currents issued by the Survey, some partial publication has been given from this point of view. But in the present comprehensive form, it may better serve to indicate the character of the waters themselves on these coasts of Canada, and their variations in regard to locality and to change with the progress of the season. This may also be of value in its bearing on the distribution of fish and other marine life; both locally and during the course of the season.

The density of the water as here given, is its actual specific gravity. It may be more usual to differentiate sea water in accordance with its salinity; but the specific gravity accords with the totality of dissolved salts which it contains, and it also affords a direct measure of the degree of dilution of standard sea water by fresh water from rivers, which is often a matter of primary importance. All the densities given are consistently determined by the same method in the different years indicated; and they are thus truly comparative throughout the various regions.

In the three earliest years, 1894, 1895, and 1896, the investigations were carried out with the lighthouse supply steamer *Lansdowne*, which was placed at the disposal of the Survey for a period limited to three months in each season. In these years, a general examination was made of the currents throughout the Gulf of St. Lawrence, including its connections with the Atlantic ocean through Belle Isle strait and Cabot strait. When the investigation of the currents was resumed in 1903, the surveying steamer *Gulnare* was commissioned for the work, and eventually equipped with adequate anchorage machinery for greater convenience; although appliances had already been used for anchoring at Stations in all depths met with, up to 250 fathoms. These investigations were made almost entirely under the personal direction of Dr. W. Bell Dawson, C.E., the Superintendent of the Tidal and Current Survey; with Messrs. H. M. Mackay, and S. C. Hayden successively, as chief assistant.

Instruments and Methods

Surface temperatures.—These were obtained with accurate thermometers of Fahrenheit scale, provided with a small "bucket" at the lower end, which retained the water around the bulb and protected it from exposure to the air till the reading was taken. They were checked by standard thermometers.

Deep temperatures.—For depths to about 30 or 40 fathoms, deep-sea registering thermometers were used. They were carefully checked by comparison with standard thermometers having Kew certificates; and any index error was allowed for. The results to the nearest quarter degree Fahrenheit are thus reliable. This type of thermometer is convenient and satisfactory, so long as the temperature of the water decreases continuously to the depth taken.

For greater depths, from 50 to 200 fathoms, a deep-sea inverting thermometer was used. This was essential for accuracy where there were layers of water at different temperatures, which was often the case. The thermometer is released by a fan which operates when the instrument begins to be raised through the water. To avoid premature release from the rolling of the vessel, the supporting line was passed over a six-inch pulley wheel, and motion allowed for by hand to keep the thermometer steady in the water at the depth taken, for the necessary time. Any discordant or suspected readings were rejected or the observation was repeated. At 50 fathoms, where the lowest temperature usually occurred, readings were often taken with both types of thermometer as a check.

Protection of thermometer bulbs.—Both types of thermometers have the usual protecting bulbs to obviate error from pressure at such depths. It had been customary for the outer bulb to be partially filled with alcohol; but in these thermometers, this was replaced by mercury which has a great advantage in transmitting the temperature more quickly to the inner bulb. Instead of keeping the thermometer for seven to ten minutes at each depth taken, the time was thus reduced to four or five minutes, which enabled much more work to be done in a day. Also, as the release was by a fan, two thermometers could be placed on the same line, 50 fathoms apart; which enabled certain depths to be checked twice by two different thermometers. Another combination suitable for the lesser depths, was to place a registering and an inverting thermometer on the same line, 10 fathoms apart.

Densities.—The samples were obtained at the depth desired, with a deep-sea water bottle with valves. As the water was often very cold, it was found best to bottle the samples at the time, and to allow their temperature to come to about 60° Fahrenheit before reading the density with a hydrometer. This reduces the temperature correction to a minimum, which is a distinct advantage; because it is large relatively to the variations in density that are being dealt with, and also because the amount of the correction differs appreciably for the various densities from pure sea water to diluted water, as found in the various regions.

The hydrometers were graduated to show specific gravity; and to obtain as open a scale as possible they were made in series with a small range on each. The total range from fresh water to standard sea water (1·0000 to 1·0260) was thus substantially subdivided, and adapted to the range of density in the region under investigation in each season.

Proceedure.—At the Stations where anchorages were made, the current might often be too strong to obtain temperatures and densities vertically downward. The tidal fluctuation was therefore taken advantage of, to obtain them when the current was least. In tidal streams which run both ways, they were taken at slack water; as this had the further advantage of showing whether there was any change in temperature with the direction of flow. On the longer temperature sections, there was greater facility, even with current, in measuring depths vertically because the vessel was free. On the other hand, in taking surface temperatures and surface samples for density, it was not necessary to stop.

Positions.—The location of Stations for anchorage was carefully selected for the purpose in view, and the position was fixed by bearings and angles so that the same spot could be occupied as often as desired. When temperatures and

densities were taken at successive points on a line, each point was given a number; and its position was carefully fixed by sextant angles or by log readings for distance along definite courses. The latter was the usual plan when it was unnecessary to stop in taking surface temperatures and surface samples of water. With the ends of such lines definitely fixed, and log readings for the intermediate points, all their positions could be located on the chart. Where the currents were strong, the mileage as given by the log reading is corrected for current, to give true distances.

Physical Conditions

Cold-water layer throughout the Gulf area.—The extended observations in Cabot strait, the Gaspé region, and the northeastern arm of the Gulf towards Belle Isle strait, agree in showing that there is a cold layer of water at a depth of 40 or 50 fathoms which remains practically at the freezing point to the end of the season. The warming of the surface water with the progress of the season does not therefore appear to extend beyond a depth of 30 fathoms.

In consequence of this, there are extensive bottom areas in the Gulf, running in belts parallel with the shore, which must remain at the freezing point throughout the year; as well as some of the banks which lie at a depth of 30 to 50 fathoms. This no doubt has a bearing upon marine life.

In the deeper channels in the Gulf area, in which the depth runs from 100 to 250 fathoms, the water is distinctly warmer as well as higher in density. This is shown clearly in the more comprehensive tables of deep temperatures and densities herein given.

Reduced density of currents in the Gulf area.—The current along the Gaspé coast in the mouth of the St. Lawrence estuary, and the out-flowing water around the north end of Cape Breton island, are of relatively low density. It can hardly be doubted that this low density is to be attributed to the outflow of the St. Lawrence; and we are thus able to trace the influence of this water as far as Cape Breton, where it finally mingles with the water of the ocean. In discussing the relation of the St. Lawrence to these currents, however, it is to be noted that the water of low density forms only a small part of the total volume which is in motion.

The discharge of the river St. Lawrence, including its principal tributaries, amounts to 240,000 cubic feet per second. This volume of fresh water will mingle with sea water for which we may assume a density of 1·0240; as this may be taken to represent either the mean density of Atlantic coast water to a moderate depth, or the density of the salter water in the Gulf itself. The surface water in either the Gaspé or Cape Breton currents is seldom lower than 1·0218 or 1·0217 near the shore; and the reduced density to a moderate depth may be taken as 1·0230 on the average.

The discharge of the St. Lawrence is sufficient to furnish a stream of water reduced from the density 1·0240 to 1·0230, which would be ten miles wide and 56 feet deep, moving with a speed of one knot per hour. This is a fair approximation to the extent and volume of the water of lowest density in the Gaspé current; and such a comparison may therefore serve to illustrate the way in which the conditions may be accounted for, if the data themselves were more closely known.

As regards the total volume, however, the St. Lawrence river is quite insignificant as compared with the outflow of the Gaspé current. On the best estimate that can be made from the data available, the volume of the Gaspé current is ninety-five times the volume of the St. Lawrence river. The volume of the Cape Breton current also, is probably much the same. It is thus quite erroneous to speak of these currents as St. Lawrence water; as the most that the river can do is to reduce their density towards the surface by an appreciable amount.

Wind disturbance.—In the temperatures of the water as here given, there are some examples of the effect of the wind in displacing the warmer water on the surface. After the surface water has warmed up with the progress of the season, this is more noticeable; as strong off-shore winds may drive the warmer surface water into the offing, and allow the cold under-water to come to the surface and replace it. Similar conditions may explain the belt of colder water which not infrequently occurs along the shore, which appears to be due to the off-shore direction of the prevailing winds. The amount of disturbance due to a given amount of wind, it may thus be possible to estimate from the water temperatures. This is fully discussed in "Effect of the Wind on Currents and Tidal Streams;" Trans. Royal Society of Canada, Section III, 1909.

In the case of constant currents, it appears that these can be altered in position by the wind more readily than they can be checked in velocity, even on the surface, by contrary winds. When such a current is of low density, as the Gaspé current, the amount of disturbance can be ascertained from the position of the water of low density.

Conditions in relation to fisheries.—The chief points in this connection, are the temperature of the water as it affects the spawn of fish and its hatching; and the dilution of sea water by fresh water, represented by its density, which affects some types of marine life. The consideration of these points will show the depth to which it is necessary to carry observations of temperature and density in this connection.

The spawn of most fish of commercial importance floats on the surface. It is thus directly related to the surface temperature. As to the effect of cold water on hatching, it is generally held by the authorities, that it provides more favourable conditions for the healthy larval development of marine fishes.

The chief bottom spawn is herring, and it does not probably extend beyond a depth of 10 or 20 fathoms. Investigations of the water to a depth of 20 fathoms might therefore be sufficient as there is rarely bottom spawn beyond this limit. The depth of 30 fathoms to which these observations of temperature and density were ordinarily taken, should thus be ample from this standpoint; as well as for the fresh water influence in ordinary bays and estuaries, which would have any appreciable effect upon shellfish or other marine life.

Explanation

Stations.—The Stations at which anchorages were made were designated by the letters of the alphabet in each season. Off southern and eastern Newfoundland and in the Gulf of St. Lawrence, the alphabetical letters have been reduced to three sets to avoid confusion. In the Gulf region, there is a set for Belle Isle strait and another for the Gaspé region, with a continuation to the end of the alphabet for Northumberland strait. These are widely separated, and the letters so far as repeated, will not be confused with each other. In the intermediate parts of the Gulf region, Roman numerals are used for distinction. In the Bay of Fundy, letters from the beginning of the alphabet are again used to designate the Stations.

Temperatures.—These are all given in degrees Fahrenheit.

Densities.—The values given for the density of the water are its actual specific gravity, reduced to the standard temperature of 60° Fahrenheit.

Depths.—The depths are in fathoms of 6 feet.

Distances.—All distances in miles are in nautical miles of 6,080 feet.

Directions.—All directions are bearings from true north, measured in degrees, in a right-handed direction, from 0° to 360°. When any magnetic bearings are given as well, they are always so indicated.

Positions.—The positions of all Stations and other points on the water, are thus defined by a direction and distance from some point on the land, or by their mileage along a line between definite points; so that they can readily be laid out on a chart or map.

Arrangement

The open waters of the Atlantic, off Nova Scotia and southeastern Newfoundland are given first; as they show the temperatures and densities in the ocean, and thus afford a term of comparison for those elsewhere.

The two passages which connect the Gulf of St. Lawrence with the Atlantic through Belle Isle strait and Cabot strait, are given next; followed by the open waters of the central portion of the Gulf, the entrance to the St. Lawrence in the vicinity of Anticosti island, and Northumberland strait. In these regions, the observations in different years are arranged in order of date during the season.

The central part of the Bay of Fundy and its offing as far as southern Nova Scotia, complete the regions examined.

Plates.

The location of the Stations at which anchorages were made, are shown in the accompanying Plates. The general map of the Gulf of St. Lawrence shows the Stations in the open Gulf, and in Northumberland strait. The Strait of Belle Isle and the Gaspé region are given in the next two Plates; followed by southeastern Newfoundland and the Bay of Fundy.

At the Stations thus shown, temperatures were taken at various depths during the season. These Plates also serve as maps to show the location of the lines of temperatures and densities, and the sections, which were obtained.

Tides and Currents.

A description of the behaviour of the currents and tidal streams in these various regions, is given in the following publications issued by the Tidal Survey:—

"The Currents on the South-eastern coasts of Newloundland", and the amount of indraught into the larger bays on the south coast.

"The Currents in Belle Isle strait", from investigations during two seasons.

"The Currents in the Gulf of St. Lawrence", including Cabot strait and Northumberland strait; and explaining the general circulation of the water.

"The Currents in the Entrance to the St. Lawrence", including the Anticosti region, and the Gaspé current; from investigations during three seasons.

"Tables of the Currents in the Bay of Fundy." Giving the direction and velocity of the tidal streams, hour by hour, and the time of slack water, throughout the region extending from St. John, N.B., to Cape Sable.

THE ATLANTIC OFF NOVA SCOTIA AND NEWFOUNDLAND.

The temperatures and densities of the Atlantic waters in the offing of Nova Scotia and southeastern Newfoundland, which were obtained so far as there was opportunity, may serve as a term of comparison with those in the Gulf of St. Lawrence and the Labrador current, where they are more or less influenced by the admixture of fresh water or by ice conditions. The amount of variation in the density of these open waters is also noteworthy, with relation to the amount of variation found elsewhere. The observations are taken in exactly the same way, as regards instruments and methods, as in the other regions; and they are thus truly comparative.

Off the southeast coast of Nova Scotia and the south coast of Newfoundland. On May 21 to 23, 1903.			Surface temperature.	Surface density.	Locality.
Surface temperature.	Surface density.	Locality.	37°	1·0241	At a series of seven points, midway between Cape Breton and the Miquelon Islands.
			36½	1·0242	
			37	1·0245	
			37	1·0244	
			37	1·0243	
			37	1·0242	
42°	1·0237	At a series of eight points, 5 to 15 miles apart, off the southeast coast of Nova Scotia, eastward from Halifax.	36½	1·0245	
43½	1·0238		Aver'e.	1·0243	
43½	1·0237				
43½	1·0236				
40½	1·0238		37°	1·0247	At eight points, 12 miles apart, off the south coast of Newfoundland, towards Cape Race.
42	1·0240		37	1·0248	
42½	1·0235		37	1·0248	
42½	1·0236		37	1·0251	
			37	1·0251	
Aver'e.	1·0237		36	1·0251	
			36	1·0250	
36½°	1·0238	At six points, 4 to 8 miles apart, off the eastern angle of Cape Breton island.	36	1·0248	
36½	1·0239		Aver'e.	1·0249	
36½	1·0240				
37	1·0240				
37	1·0240				
36½	1·0237				
Aver'e.	1·0239				

Deep temperatures, Nova Scotia to Newfoundland; on the same lines as those on which the above densities were taken. On May 21 and 22, 1903.

Off the southeastern coast of Nova Scotia; at three points 27 miles apart, at the offing of the 50-fathom line.				Between Cape Breton and St. Pierre island. At four points at distances of 19, 34, 79 and 99 miles respectively, from Scatari island.				
Surface.....	42°	40½°	42½°	Surface.....	36½°	36½°	37°	36½°
10 fathoms.....	—	39½	39	10 fathoms.....	36	37	36½	37
30 fathoms.....	37	36	37	30 fathoms.....	31½	33	33	—

Surface temperature.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.	Total depth of water.	Remarks.
—	1·0240	—	—	—	—	—	Deep densities at seven points along the southeast coast of Nova Scotia, from Liverpool to a point 23 miles beyond Cape Canso; at an offing corresponding approximately with the 50-fathom line. On June 30 and July 1, 1896.
—	1·0240	1·0243	1·0245	1·0246	—	50 Fath.	
—	—	1·0243	—	1·0245	1·0245	65 "	
—	1·0237	1·0243	1·0245	—	—	52 "	
—	1·0239	1·0243	1·0244	—	—	35 "	
—	1·0239	—	1·0243	1·0243	—	40 "	
—	1·0237	1·0239	—	1·0243	1·0243	85 "	

Temperatures and densities off southern Nova Scotia. In 1894 and 1896, between June 29 and July 3.

Year.	Surface temp're.	Surface density.	Locality.
1894	45°	1·0240	Off Grand Manan island.
	45	1·0245	
1894	55°	1·0240	At two points in the offing of Halifax.
	49	1·0237	
1894	48°	1·0234	Off Jeddore harbour.
	50	1·0234	Off Liscomb harbour.
1896	—	1·0242	At three points, 12 miles apart, in the Bay of Fundy between St. John and Brier island.
	—	1·0246	
	—	1·0245	
1896	—	1·0245	At four points off southern Nova Scotia; from the offing of Yarmouth to Shelburne.
	—	1·0244	
	—	1·0243	
	—	1·0242	

In Placentia bay, Newfoundland; from Placentia harbour to Cape St. Mary. On July 20, 1903.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	51°	1·0248	Off mouth of Placentia harbour.
3 "	50	1·0248	
6 "	50	1·0247	
9 "	50	1·0246	
12 "	49½	1·0247	(*Continued*)
15 M.	49½°	1·0249	(*Continued*)
18 "	50	1·0250	
21 "	49	1·0247	
24 "	49	1·0248	
27 "	48	1·0248	
30 "	48	1·0248	
31 "	—	—	At 1½ miles off Cape St. Mary.

Off southern Newfoundland, from Placentia bay past St. Pierre island and towards St. Paul island. On September 22 and 23, 1903.

0 M.	—	1·0245	At three points off Placentia bay.
3 "	—	1·0245	
6 "	—	1·0244	
0 M.	—	1·0243	At four points, 5 miles apart, off St. Pierre island.
5 "	—	1·0244	
10 "	—	1·0244	
15 "	—	1·0244	
0 M.	53°	1·0242	From western edge of St. Pierre bank for 50 miles westward towards St. Paul island.
5 "	53	1·0243	
10 "	53½	1·0243	
16 "	55	1·0242	
20 "	55½	1·0241	
25 "	54½	1·0242	
30 "	53½	1·0242	
35 "	54	1·0242	
40 "	53½	1·0241	
45 "	53½	1·0241	
50 "	54	1·0242	

Distance in miles.	Surface temp're.	Surface density.	Remarks.
0 M.	—	—	Surface densities for 18 miles southward from Cape Pine, on a line bearing 186°. On August 10, 1903. The distances are from the shore line at Cape Pine. (A temperature section to a depth of 30 fathoms was taken at the same time; given on page 16.)
½ "	47°	1·0248	
3½ "	48	1·0243	
8 "	51½	1·0246	
13 "	51	1·0246	
18 "	51	1·0247	

Distance in miles.	Surface densities.		Remarks.
	May 26	Aug. 11	
0 M.	—	—	Surface densities across the Labrador current from Cape Race to Grand Bank, on a line bearing 118°. The distances are from the shore line at Cape Race. On May 26 and August 11, 1903. (Temperature sections to a depth of 30 fathoms were taken on the same dates; given on page 15.)
2 "	1·0250	1·0245	
5 "	1·0251	1·0245	
10 "	1·0252	1·0245	
18 "	1·0252	1·0246	
26 "	1·0250	1·0246	
34 "	1·0251	—	

Distance in miles.	Surface temp're.	Surface density.	Remarks.
0 M.	—	—	Surface densities across the Labrador current eastward from Cape Spear, on a line bearing 85°. The distances are from the light-house on Cape Spear. On August 14, 1903. (A temperature section to 30 fathoms was taken at the same time; given on page 15.)
3 "	50°	1·0244	
8 "	50	1·0245	
13 "	51	1·0244	
0 M.	—	—	Surface densities across the Labrador current eastward from Fermeuse harbour, at right angles to the coast, to a point 10 miles off shore. The distances are from the northern head of the harbour. On August 24, 1903. (A continuous series of surface temperatures at every half mile were taken at the same time; given on page 19.)
½ "	34°	1·0251	
1 "	34	1·0250	
1½ "	34	1·0250	
2 "	34½	1·0249	
6 "	45½	1·0245	
7 "	44½	1·0246	
8 "	44	1·0245	
9 "	44½	1·0246	
10 "	44½	1·0245	

The densities of the water as above given, are all that were obtained in these regions; and density determinations were not continued during the investigations off the southeastern coasts of Newfoundland, because the temperatures of the water were found to be of most service there, in relation to the movements of the water. The tracing of these movements was the primary purpose in taking the temperatures and densities; and in the area of the Gulf of St. Lawrence, the density of the water was specially serviceable for this.

Stations off Southeastern Newfoundland in 1903.—The Stations at which temperatures were obtained, fall into two groups; those in the vicinity of Cape Race in the Labrador current on the eastern side of Newfoundland; and those off the bays on the south coast from Cape Race westward to St. Pierre and Miquelon.

Station P.—Off Cape Race. Position: from Cape Race, $1\frac{1}{2}$ miles 110°

Station J.—On the east side of Ballard bank, in 85 fathoms. Position: from Cape Race, 12 miles 89°.

Station K.—To the eastward of the Bantam banks, in 86 fathoms. Position: from Ferryland light, 7 miles 133°.

Station A.—Southeastward of Trepassey bay, in 26 fathoms. Position: from Cape Race, 8 miles 219°.

Station L.—South of Trepassey bay, in 46 fathoms. Position: from Cape Race, $16\frac{1}{2}$ miles 209°.

Station H.—Midway between Cape Race and Cape St. Mary, in 54 fathoms. Position: from Cape Pine, $17\frac{1}{2}$ miles 220°.

Station D.—Off the east side of Placentia bay, in 36 fathoms. Position: from Cape St. Mary, $5\frac{1}{2}$ miles 261°.

Station G.—Off Placentia bay, in 56 fathoms. Position: from Cape St. Mary, 17 miles 243°.

Station E.—In the middle of Placentia bay at the south end of Merasheen bank, in 66 fathoms. Position: from Placentia light, 19 miles 254°.

Station M.—Off the east side of Placentia bay, eight miles farther out than Station G, in 60 fathoms. Position: from Cape St. Mary, 25 miles 201°.

Station N.—Off the west side of Placentia bay, in 83 fathoms. In line with the deep gulley of 100 fathoms which runs up the middle of the bay. Position from Laun head, 29 miles 172°.

Deep Temperatures in the Labrador Current.—Temperature section from Cape Race across the deep gully to the edge of Grand Bank, on a line bearing 118°. The distances are from the shore line at Cape Race. (See densities at same dates, on page 13.)

Date, 1903.	Depth.	2 Miles.	5 Miles.	10 Miles.	14 Miles.	18 Miles.	26 Miles.	34 Miles.
May 26.....	Surface.	33°	33½°	34°	—	35½°	36°	36°
"	10 Fath.	33	32	33½	—	35	35	35½
"	30 "	—	32	32	—	35	35	35½
August 11.....	Surface.	50½	50	50½	51	50	50	—
"	5 Fath.	49	—	50½	49	—	50½	—
"	10 "	45	47	37	46	42½	45	—
"	15 "	39½	—	34	37½	—	—	—
"	30 "	—	32	—	—	31½	31	—
Total depth of water..	—	28 F.	42 F.	76 F.	91 F.	88 F.	84 F.	45 F.

Deep temperatures at Station K in the Labrador Current, off Bantam Banks; at the dates given, in the season of 1903.

Depth.	July 10	July 11	Aug. 13	Aug. 13
Surface.....	43°	43°	51°	51°
5 Fath.....	—	42½	51	51
10 "	42	41	45½	46
15 "	37½	36	34½	35½
20 "	35	35	—	—
30 "	31	34	30½	31

Temperature section eastward from Cape Spear, on a line bearing 85°. On August 14, 1903.

Depth.	3 Miles.	8 Miles.	13 Miles.
Surface.	50°	50°	51°
5 Fath.	50	49½	49
10 "	44½	46	37¼
15 "	34	36	38½
20 "	—	—	—
30 "	31½	31	30½

At Station J, off Ballard Bank; at the dates given, in 1903.

Depth.	July 7	July 8	Aug. 25*	Aug. 26*	Aug. 27
Surface.....	43°	43°	41°	46°	50°
5 Fath.....	41	—	40½	43½	49
10 "	36	36½	38	40	39
15 "	35	36	36	37	33½
20 "	34	35	—	—	—
30 "	31½	34	30½	30½	31

* On Aug. 25 and 26, surface water exceptionally cold, after offshore gales.

At Station L, south of Trepassey bay.

Depth.	July 15	Sept. 16*
Surface.	46°	47½°
5 Fath.	46	45
10 "	43½	39
15 "	40½	38½
30 "	—	31½

* Colder water on Sept. 16, due to veering of Labrador current to the westward of Cape Race, after heavy winds.

Temperature section southward from Cape Pine, for 18 miles, on a line bearing 186°. On August 10, 1903. The distances are from the shore line at Cape Pine. Also, surface temperatures from the end of this section, every 3 to 5 miles, on a line to Cape Race. (See densities at same date, on page 13.)

Depth.	½ Mile.	3½ Miles.	8 Miles.	13 Miles.	18 Miles.	Surface temperatures.
Surface.	47°	48°	51½°	51°	51°	Every 3 to 5 miles onward to Cape Race, as follows:—51, 51, 48½, 49, 50, 50, 50, 50½°.
5 Fath.	44	43	43	46½	—	
10 "	—	38½	36	38	—	
15 "	—	36	35	38	39	
30 "	—	—	32	33	33	

Deep Temperatures off Southern Newfoundland.—At the Stations indicated; in 1903.

Station.	Date: 1903	Surface.	Depth in Fathoms. 5 F.	10 F.	15 F.	20 F.	30 F.	Remarks.
Station H.....	June 30	43°	—	40½°	37°	35°	33½°	Off the south coast, between the meridians of Cape Race and Cape St. Mary.
" H.....	July 1	44	—	42	38	36	34	
" A.....	July 13	45	43°	42½	38	37	—	
" A.....	July 14	45	44½	42	38½	37	—	
" L.....	July 15	46	46	43½	40½	36½	—	
" P.....	Aug. 11	50½	49	45	39½	39	—	
" A.....	Aug. 29*	48	38½	34½	33½	33	—	
" L.....	Sept. 15	49	48	44½	35	—	31½	
" L.....	Sept. 16	47½	45	39	38½	—	31½	
Station E.....	June 8	39½°	—	36°	—	—	34½°	Off the south coast, in the region of Placentia bay; between the meridian of Cape St. Mary and St. Pierre island.
" E.....	June 9	39	—	37	—	—	34	
" G.....	June 20	42	—	41	35½°	34½°	32	
" G.....	June 22	43	—	40	37½	36½	32½	
" G.....	June 24	43	—	41	37	36	33½	
" N.....	July 24	52	51½°	43	42	35	34	
" M.....	Aug. 4	49	46	45½	39½	35½	32½	
" G.....	Aug. 4	48½	47	45	40	34½	31	
" D.....	Sept. 21	51	48	37½	32	—	30½	

* Lower temperatures at Station A on August 29, are due to the veering of the Labrador current to the westward of Cape Race, after heavy winds.

Temperature of surface water from Cape Race westward towards Trepassey bay. On May 26, 1903.

0 miles	34½°	Near Station P.
3 "	34	One mile off Cape Race.
6½ "	33½	
11 "	34	
14 "	34½	On east side of Trepassey bay.

Temperatures from Station D northward along the east side of Placentia bay, towards Placentia harbour. On June 3, 1903.

0 miles	—	At Station D.
1 "	37°	
6 "	37	
11 "	37	
16 "	37	
21 "	37	At 9 miles from Placentia harbour.

Temperature of surface water from Cape St. Mary to Station M. On July 20, 1903.

0 miles	48°	
1 "	—	At 1½ miles off Cape St. Mary.
5½ "	49½	
10 "	50	
15 "	50	
20 "	50	
25 "	50	
26 "	—	At Station M.

Date: 1903	Surface temp're.	At points indicated. (Not elsewhere described).
June 12	42°	On west side of Placentia bay, at 6 miles off St. Lawrence harbour.
" 13	42	
July 17	49	On east side of Cape St. Mary.
" 17	48	On west side of Cape St. Mary.
" 25	52	At Station N, in offing of Placentia bay.
Aug. 3	50	At Station G, off Cape St. Mary.
" 22	50	At Station K, Bantam Bank.
" 27	49½	At Station J. (Current southward).
" 27	50	At Station J. (Current S.S.E.)
Sept. 9	53½	In middle of St. Mary's bay.
" 9	54	In middle of St. Mary's bay.
" 21	50½	At Station D, off Cape St. Mary.
" 21	51	At Station D, off Cape St. Mary.

Temperatures south of St. Mary's bay, from Station M to Trepassey harbour. On August 7, 1903.

0	miles	50°	At Station M.
5	"	52	
10	"	50½	
15	"	50½	
20	"	50½	
25	"	50½	
30	"	51	
35	"	45*	About ½ mile off Cape Pine.
36	"	45	" " "
40	"	47	Near west shore of Trepassey bay.
42	"	50	Near west shore of Trepassey bay.
45	"	49½	In mouth of Trepassey harbour.

* The colder water near shore is probably due to off-shore winds, which drive off the warmer surface water.

Temperatures from a point 18 miles due south of Cape Pine, to Station P at Cape Race. On August 10, 1903.

0	miles	51°	From Cape Pine, 18 miles 186°.
6	"	51	
11	"	51	
16	"	48½	
21	"	49	
24	"	50	
27	"	50	
30	"	50	
32	"	50½	At Station P.

Temperatures every half mile from Station K to Aquafort harbour, east coast of Newfoundland. On August 22, 1903.

Warmer surface water driven off shore by 941 miles of wind, during 45 hours previously, from the westerly quarter. (See also August 24 on opposite page).

0	miles	50°	At Station K, off Bantam Banks.
2½	"	50	
3	"	49½	
3½	"	48	(The temperature of surface water over this area was 50° on the average at this season. See temperature sections from Cape Race and Cape Spear on August 11 and 14.)
4	"	46	
4½	"	45	
5	"	44	
5½	"	40	
6	"	39	
6¼	"	39	
6¾	"	38½	
7¼	"	39	
8	"	39	
8½	"	—	In mouth of Aquafort harbour.

Temperatures at Station A, between Cape Race and Trepassey bay. Showing recovery of the temperature of the surface water two days after heavy westerly winds, which drove the warmer surface water off shore.

Date 1903.	Surface temp're.	Remarks.
Aug. 28	39°	Successive temperatures in a period of four hours. Current westward during this time.
"	38	
"	40	
"	42	
"	42½	
"	43	
"	42½	
"	39	Temperature four hours later with current setting northward.

Temperatures from Aquafort harbour, along shore nine miles to Reneuse rock, and return to Fermeuse harbour. On August 24, 1903.

Distance in miles.	Outward.	Return.	Locality.
0 M.	—	—	At Aquafort.
1 "	35°	34°	
3½ "	34	34	
6 "	38	—	
7 "	38	—	
8 "	38	.....	At Reneuse rock.
10 "	36	36	

Temperatures from Fermeuse harbour to a point 10 miles off shore. On August 24, 1903.

0 miles	—	Fermeuse harbour.
½ "	34°	
1 "	34	
1½ "	34	
2 "	34½	(Warmer water driven
2½ "	35	off shore by a total
3 "	36	mileage of 1,312 miles
3½ "	36½	wind during the three
4 "	39½	days previous, from
4½ "	40½	directions between W.-
5 "	42½	N.W. and S.W. See
5½ "	45	also deep temperatures
6 "	45½	at Station J, August
6½ "	45½	25 and 26.)
7 "	44½	
7½ "	44½	
8 "	44	
8½ "	44	
9 "	44½	
9½ "	44½	
10 "	44½	
10½ "	44	

Temperatures on a line from Station J to Station A, in the vicinity of Cape Race. On August 27, 1903.

0 miles	50°	At Station J.
1 "	50	
2 "	49	
3 "	49	
4 "	48	
5 "	46	
6 "	44	
7 "	43	
8 "	39	
9 "	39	
10 "	36	Four miles off Cape Race.
11 "	39	
12 "	39	
16 "	40	
17 "	40	
18 "	38	At Station A.

(See also deep temperatures at Station A two days later, on August 29, on page 16.)

Average temperature of water off east coast of Newfoundland between Cape Race and Cape Spear, for comparison with the above series; before heavy winds of August 20 to 23.

Aug. 11	Cape Race to Grand Bank on width of 34 miles.....	50° to 50½°
" 12	At Station K.....	51°
" 13	" "	51°
" 14	Cape Spear to 13 miles out in the offing.....	50° to 51°
	General average for the region at this date.....	50·4

Temperatures from Station A to Trepassey harbour. On August 29, 1903.

0	miles	48°	At Station A.
1	"	48	
2	"	50	
3	"	50	
4	"	50	
5	"	50	
6	"	49	
7	"	49	
8	"	49	
9	"	48	
10	"	47	
11	"	47	Off mouth of Trepassey harbour.

Temperatures from Trepassey harbour to Station H, off St. Mary's bay. On August 31, 1903.

0	miles	50°	At mouth of Trepassey harbour.
2	"	50	
4	"	50	
6	"	50	
7¼	"	50	Off Cape Pine, ½ mile.
8	"	50	
9	"	50	
10	"	49½	
11	"	49	
12	"	48	
13	"	49	
14	"	51	
15	"	51½	
16	"	51½	
17	"	52	
19	"	53	
21	"	53	
24½	"	54	At Station H.

Temperatures from Trepassey harbour westward, across the mouth of St. Mary's bay, and up the east side of Placentia bay to Placentia. On September 2, 1903.

0	miles	50°	At mouth of Trepassey harbour.
2	"	50	
4	"	50	
6	"	51	At Cape Pine.
8	"	49	
10	"	48½	
12	"	48	
14	"	52	
16	"	53	
21	"	52½	
26	"	49	
31	"	55	
36	"	55	
37	"	54	Off Cape St. Mary.
38	"	53	
39	"	53	
41	"	50	
46	"	52½	
51	"	53	
56	"	53	
61	"	53	
66	"	54	At Placentia harbour.

Temperatures from Cape St. Mary to Station D. On September 3, 1903.

0	miles	54°	At Cape St. Mary.
1	"	54	
2	"	54	
3	"	54	
4	"	54	
6	"	53	
7	"	—	At Station D.

Temperatures from Trepassey harbour to Station L, off Trepassey bay. On September 15, 1903.

0 miles	46½°	At mouth of Trepassey harbour.
2 "	48	
4 "	49	
6 "	49	
8 "	49½	
10 "	49	
12 "	49	
14 "	48	
16 "	49	
17½ "	50	At Station L.

NOTE.—The temperatures of the water off the south coast of Newfoundland from St. Pierre and Miquelon westward, are included with the region of Cabot strait, which is given with the Gulf of St. Lawrence.

General Summary.—These observations of the density and temperature were taken with the primary object of tracing the movement of the water, as this method had proved so serviceable in the Gulf of St. Lawrence. The density of the water was taken at the surface only. The variation did not prove sufficient, however, to be relied upon as an indication of direction of movement. The temperature was taken to a depth of thirty fathoms; and more was expected from the temperature than from the density, as it was hoped it would serve to trace the course of the Labrador current. The depth of thirty fathoms was found sufficient, as the water was there at the freezing point throughout the region examined, both south and east of Newfoundland, during the whole season from May to September. All the change which took place during the progress of the season or from other causes, was between the surface and thirty fathoms. The change of the temperature of the water also afforded an interesting valuation for the amount of wind disturbance, and the depth to which it extended, under given conditions.

The general results, although they are of little value for the purpose of tracing the movement of the water by its temperature may be summarized as follows:—(1) The temperature of the water at 30 fathoms is practically at the freezing point in all parts of this region, from the mouth of Placentia bay to St. Johns. It varied only from 30½° to 34° Fahr., and there was no change from one month to another, from May to September. (2) The water of the Labrador current warms up quite as much on the surface as the surface water elsewhere in this region. The general increase of the surface temperature along the south shore, from St. Pierre to Trepassey, was from 36½° in May to 50° in September; and the surface temperature of the Labrador current rose from an average of 34½° at the end of May to 50¼° at the middle of August. Whether this increase of the surface temperature takes place during the progress of the current southward, or whether this warmer surface water flows over it from elsewhere, we have not sufficiently extended observations to determine. But for the guidance of the mariner, it is evident that lower temperature cannot be depended on, as an indication of the current-belt itself.

REGION OF BELLE ISLE STRAIT.

Seasons of 1894 and 1906.

In observing the currents in this Strait, the general procedure was to anchor the surveying vessel at selected stations, to serve as fixed points from which to take observations. As the current was strong when running, the deep temperatures could only be obtained at slack water when the direction turned. This was also the most advantageous time to ascertain whether the direction of the flow, from the ocean or from the Gulf of St. Lawrence, had any effect upon the temperature of the water. The following list shows the positions of stations where temperatures were taken in the season of 1894.

Stations.	Total depth in Fathoms.	Positions of Stations—1894.
A	42 F.	0·9 mile 296° from east end of Green island.
U	43 "	2·5 miles 359° from " "
B	38 "	6·8 miles 107° from west point of Loup bay.
C	32 "	3·7 miles 90° from " "
E	40 "	9·2 miles 264° from Férolle Point, Newfoundland.
F	36 "	1·3 miles 143° from Whale island in the Esquimaux islands.
G	33 "	19·4 miles 286° from Rich Point, Newfoundland.
H	37 "	11·5 miles 342° from Férolle Point.

Density of the water.—This was determined at the beginning of the season, to ascertain whether any definite variation could be detected; as a help in tracing the movements of the current. (See also, the eastern end of the Gulf of St. Lawrence.)

On July 6, from six samples of water obtained in Forteau bay, the mean corrected density was 1·02446.

On July 7, on a line across the Strait from Forteau bay to the south shore, the temperatures and densities of the water are shown opposite. Those marked with an asterisk (*) were near to ice which was passed. The mean corrected density across the Strait, omitting these, is 1·02433.

Date: 1894.	Surface temp're.	Density of surface water.
July 7	44°	1·02414
"	41½	1·02409
"	40½	1·02429
"	39*	1·02428*
"	39*	1·02438*
"	37*	1·02449*
"	37*	1·02439*
"	39	1·02428
"	44	1·02414
"	47	1·02439
"	47	1·02439

Character of the Current.—The current in Belle Isle strait is primarily tidal in its character. While under the control of the tide alone, it will turn regularly; the flood setting westward from the Atlantic towards the Gulf of St. Lawrence, and the ebb eastward in the opposite direction. But, in addition to this, the water has almost always a tendency to make through the strait in one direction more than in the other. A dominant flow may thus be superimposed upon the usual tidal elements. As the temperature may be influenced by these movements, the direction of the current is stated.

Station.	Date: 1894.	Surface temp're.	Depth in Fathoms.				
			10 F.	20 F.	30 F.	40 F.	
A	July 10	45°	42°	39°	37°	—	Ebb, setting eastward.
"	" 10	—	42	39½	37	—	Flood beginning to set westward.
"	" 10	43	41	37	34	—	On the flood, setting westward.
"	" 11	47½	45	41	36	—	At end of the ebb; the eastward stream.
"	" 11	46	45	37	32½	—	On the flood; the westward stream.
B	" 12	47½	42	35	32	—	At slack water after the flood.
"	" 13	46	42	37	34	—	At slack water after the ebb.
C	" 17	47	38½	37	33	—	After the ebb; dominant flow also eastward.
"	" 18	50	41	38	36	—	" " "
A	" 20	50	45	43	41	—	After the flood } Dominant flow
"	" 20	50	45	41	40	—	After the ebb } eastward, since
"	" 21	49½	47	43½	41	40°	After the ebb } July 16.
B	" 25	46	45	40	35	—	At slack water after short flood.
"	" 26	51	51	45	37	—	" " after the ebb.
"	" 27	51½	51½	39½	36½	35	" " after the flood.
"	" 28	52½	52	40	36½	35½	" " after the ebb.
E	" 31	53½	53½	41	32	—	Current setting north-northeastward
F	Aug. 1	52	45½	39	37	—	On the ebb, setting eastward.
G	" 2	51½	37½	32	31	—	" " setting eastward.
"	" 2	51½	38	—	—	—	Surface current only 7 fathoms thick.
"	" 3	52	39	33	—	—	On the ebb. Current about 10 fathoms thick.
H	" 4	52½	51	43	37½	—	At slack water after the flood.
C	Sept. 8	37	—	—	—	—	Lowest surface temperature observed; after a long westward flow of the current.

Date: 1894.	Point.	Surface temp're.	At 10 F.	At 20 F.	At 30 F.	At 35 F.	At 85 F.	Remarks
Aug. 1	1	51½°	51°	38°	34°	33½°	—	Temperatures on a line from St. John bay to Station F; to the westward of Belle Isle strait.
"	2	51	43	36	33°	32	—	
"	3	49½	49	41	38	32	30°	
"	4	53	51	41	39	35	35	

Date: 1894.	Distance in miles.	Surface temp're.	At 5 F.	At 10 F.	At 15 F.	At 20 F.	Remarks.
Aug. 3	Sta. G=0	52°	51°	39°	34½°	33°	Temperatures on a line from Station G to Station H; to the westward of Belle Isle strait.
"	5·7 M.	51½	51	42	38½	34	
"	9·8 "	51½	51	40½	37½	34	
"	15·1 "	51	50½	43	40½	34½	
"	20·2 "	51½	51½	47½	39½	35½	
"	25·2 "	53	52½	39	34½	33	
"	30·2 "	51	50½	45	41	35	
"	37·2 "	52	51½	51½	47	42	

At 25 F.	At 30 F.	
41°	37½°	At Station H.

Date: 1894.	Distance in miles.	Surface temp're.	At 10 F.	At 20 F.	At 30 F.	At 40 F.	Remarks.
Aug. 4	0·0 M.	53½°	53°	52½°	52°	—	Temperatures from Ste. Geneviève bay to Wood island; at the west end of Belle Isle strait.
"	6·2 "	54	53	51	43½	—	
"	9·3 "	53	52½	46½	41½	38½°	
"	12·3 "	53½	49	43	39	—	
"	14·3 "	52	40½	39	38	37½	

Date: 1894.	Distance in miles.	Surface temp're.	At 10 F.	At 20 F.	At 30 F.	At 35 F.	Remarks.
Aug. 6	0·0 M.	37°	37°	31½°	—	—	Temperatures from Wreck bay to Cape Norman; at the east end of Belle Isle strait.
"	3·2 "	41	41	30	30°	—	
"	6·1 "	41	41	30½	—	30°	
"	8·9 "	49	42	41½	35	—	
"	11·8 "	53	51½	44	—	—	

Date: 1894.	Distance in miles.	Surface temp're.	At 10 F.	At 20 F.	At 30 F.	At 40 F.	Remarks.
Aug. 7	0·0 M.	36½°	34½°	31°	—	—	Temperatures on a line from Château bay to Belle Isle (island) off the east end of Belle Isle strait.
"	3·1 "	—	38	33	31°	30°	
"	6·0 "	39	38½	32	30½	29½	
"	9·0 "	39	37½	32½	30	—	
"	12·1 "	42½	40½	32	—	—	
"	14·3 "	41	34½	31½	29½	—	
Aug. 9	0·0 M.	37°	35°	30½°	30°	—	Temperatures on a line from Belle Isle (island) to Cape Bauld; off the east end of Belle Isle strait.
"	3·1 "	42	35	32	30	29½°	
"	6·1 "	40	34½	32	30½	30	
"	9·0 "	42	42	34½	31½	30½	
"	12·0 "	51½	50½	43½	35½	32½	
1896.	0 miles	—	—	—	—	—	Temperature section across Belle Isle strait, from Amour Point to Green island. (The only temperatures in the season of 1896.)
Sept. 1	2 "	52°	46°	40½°	—	—	
"	5 "	52½	51	38	37°	—	
"	8 "	57½	55½	48	39½	—	
"	9½ "	56½	56	52	—	—	
"	—	52	41½	38	36½	34½°	Off Loup bay; on north side of the strait.

Station or date.	Distance in miles.	Surface temp're.	At 10 F.	At 20 F.	At 30 F.	Remarks.
Sta. A.	0·0 M.	45°	44°	41°	40°	Temperatures across Belle Isle strait from Station A to Station C; on September 12, 1894.
	2·6 "	39	39	37½	37	
	5·6 "	39	38½	37	37	
Sta. C.	8·0 "	39	39	37½	37	
1894.						
Sept. 13	0·0 M.	48½°	48°	46°	—	Temperatures on a transverse line to the westward of Belle Isle strait, from Ste. Geneviève bay to Wood island.
"	4·0 "	47	46	43½	37°	
"	7·0 "	44	42½	37	35½	
"	10·0 "	41	40	38	35½	
"	12·5 "	39½	38½	38	37	

Station.	Date: 1894.	Surface temp're.	Depth in Fathoms.				Remarks.
			10 F.	20 F.	30 F.	35 F.	
U	Sept. 11	40°	37°	37°	36°	35°	At slack water after the flood, setting westward.
"	" 15	40½	39	36	36	—	At slack water after the flood, setting westward.
"	" 15	40	39	37	36½	—	At slack water after the ebb, setting eastward.
C	" 17	39	38	37	36½	—	At slack water after the flood.
"	" 18	39	38½	37	36½	—	" " after the flood.
"	" 20	41	38	36	35½	—	" " after the ebb.
"	" 20	42	38½	38	36	—	" " after the flood.
—	" 25	47	45	37½	34	33½	At a point 17 miles 326° from St. John island, westward of Belle Isle strait.

In 1906, the whole season was given to Belle Isle strait. As it was found that the densities gave no definite indication in regard to the movement of the water or the direction of the flow, they were not taken during this season. Also, to determine more correctly than before, the thickness of the warmer layer of water near the surface, the temperature was usually taken every 5 fathoms as far down as 20 fathoms. Some further opportunities were also taken to test the fall of temperature in the vicinity of icebergs, by going around them in a boat within a few hundred feet.

The following list shows the position of stations at which anchorages were made in the season of 1906:—

Stations.	Total depth in Fathoms.	Positions of Stations—1906.
K	42	6·0 miles 8° from Cape Bauld lighthouse.
L	43	8·6 miles 283° from South light on Belle Isle.
N	28	7·7 miles 82° from Amour Point lighthouse.
P	39	6·6 miles 151° from Wiseman head.
Q	38	3·5 miles 154° from Carrol Point.
R	33	3·0 miles 335° from mouth of western of the two Half-way brooks.
S	47	7·5 miles 145° from Greenly island lighthouse.
T	30	7·4 miles 158° from Carrol Point.
U	43	2·5 miles 359° from east end of Green island.

Deep Temperatures.—Belle Isle Strait.—1906.

Station.	Date: 1906.	Surface.	Depth in Fathoms.					Remarks.
			5 F.	10 F.	15 F.	20 F.	30 F.	
N	June 14	38°	38°	37°	35°	—	—	Near west end of strait, and after the ebb.
P	" 19	35½	35½	—	35½	34½°	—	After the flood. Dominant flow westward.
P	" 21	35½	35½	35	—	35	—	" " " "
Q	" 28	38	38	35½	—	34½	—	At slack water after the ebb.
R	July 4	46	43½	42½	—	42½	—	On south side, after the long run of the ebb.
R	" 10	46	46	45½	—	44	—	" " " "
R	" 13	47½	47½	47	—	44	—	" " " "
L	" 21	42½	41½	33½	—	30½	31°	Midway between Chateau bay and Belle Isle.
K	" 26	46	43	40½	37½	33½	33	Midway between Belle Isle and Cape Bauld.
—	" 28	45	41	38½	—	33½	—	One mile off south end of Belle Isle.
Q	Aug. 1	47	46½	44½	—	38½	—	After the ebb; dominant flow eastward.
R	" 3	54	54	53	—	42	—	After short flood, and after long ebb; dominant flow being eastward.
R	" 3	54	54	53½	—	43½	—	
Q	" 4	50	46	40	—	33	—	After strong westward set during the night.
P	" 16	57	—	—	—	—	—	Highest temperature during the season.
P	" 18	45	45	41½	37	32½	31	After Northerly gale of the 17th.
U	" 28	45½	44	43	42	33	32	At slack water after the ebb.
Q	" 31	46	45	43	—	36½	—	" " "
C	Sept. 1	46½	45½	44	39	36	35½	After the short run of the flood.
—	" 8	45	45	44	—	39½	—	After gale. At 1½ miles off Red bay.
C	" 11	44	44	43	42	—	—	After continuous westward flow for 27 hours.
P	" 17	41½	40½	40	—	39	—	After the flood. Dominant flow westward.
P	" 18	41	—	—	—	40½	38½	After the long run of the flood.

Temperature of surface water at every five miles along the west coast of Newfoundland, from the Portland hills to Forteau bay. On June 7, 1906.

0	miles	40°	Off Portland creek.
5	"	40	
10	"	40	
15	"	42	
20	"	42	
25	"	41½	
27½	"	—	At 2 miles of Rich Point.
30	"	39	
35	"	39½	
40	"	40	
45	"	39	
49½	"	—	At Férolle Point.
50	"	39	
55	"	37½	
60	"	37½	
67	"	37	(*Continued*)
69	miles	36°	(*Continued*)
70	"	—	At centre of Belle Isle strait,
71	"	35	between Flowers cove and
73	"	35½	Greenly island.
75	"	35	At 2 miles off Amour Point.
76	"	34	

Temperatures of surface water off St. Johns bay, Newfoundland. On July 3, 1906.

0	miles	—	At one mile off Rich Point.
½	"	45°	
3	"	44½	
5	"	44½	
15	"	44½	
18½	"	44½	
22	"	44	In offing of Férolle Point.

Temperatures at outer end of Belle Isle strait, from Château bay to Station L. On July 19, 1906.

0	miles	42°	At Castle island, Château
1	"	41	bay.
2	"	42	
3	"	42½	
4	"	43	
5	"	43½	
6	"	43	
7	"	43	
8	"	42½	
9	"	43	At Station L.

Temperatures across the outer end of Belle Isle strait, from Château bay to Station K off Cape Bauld. On July 25, 1906.

0	miles	42½°	At Castle island, Château
2	"	44	bay.
4	"	43½	
6	"	44	
8	"	44	
10	"	44	
12	"	44½	
16	"	44½	
18	"	44	
20	"	44½	At Station K.

Temperatures of surface water from Forteau bay to Station S in the west end of the Strait, on August 6; and return from Station S to Forteau bay on August 8, 1906. (In both cases, the mileage is made to read out from Forteau bay.)

0	miles	51°	At the West point of Forteau bay.
2	"	52½	
3¼	"	53	(On August 6.)
5¼	"	53	
7¼	"	52½	
9¼	"	53	
10¾	"	57	At Station S.

0	miles	45°	At the West point of Forteau bay.
1	"	45½	
2	"	46½	(On August 8.)
3	"	47	
4	"	52	
6	"	55	
7	"	56	
8	"	57	
10	"	57	At Station S.

Temperatures of surface water from Red bay to Station P in mid-strait opposite this bay, before and after a heavy Northerly gale on August 17, 1906. The gale thus drove off the surface water and allowed the colder underwater to come up and replace it. The average remained low for some time, as shown by the following temperatures; but there was some recovery by the 24th.

0	miles	44°	At the mouth of Red bay.
2	"	50	
4	"	50	(On August 16.)
6	"	55	
8	"	56	
8¼	"	—	At Station P.

0	miles	45°	At the West point of Red bay.
1	"	45	
2	"	45	(On August 18.)
4	"	45	
5	"	45½	
6	"	45½	
6¾	"	45½	
8¼	"	45½	At Station P.

Temperatures of surface water from Red bay to Stations T and U to the southward and westward in the Strait. In all cases, the zero for distance is at the western point of Red bay. In 1906.

August 20		August 24		
Distance in miles.	Surface temp're.	Distance in miles.	Surface temp're.	
0 M.	44°	0	43°	Mouth, Red bay.
1 "	44	—	—	
2 "	44	2	44	
3 "	44	—	—	
4 "	44½	4	45	
5 "	44½	—	—	
6 "	44½	6	46	
7 "	44½	—	—	
8 "	—	8	49	
8¼ "	44½	8¼	—	At Station T.

August 27		September 5		
0 M.	44°	0	44°	Mouth, Red bay.
2 "	45	2	44	
4 "	45½	4	44	
6 "	45½	6	44	
8 "	45½	8	44	
9½ "	45½	10	48	
10½ "	45½	11	48½	
11½ "	45	12	47	
13½ "	45	13	46½	
14½ "	45½	14	46	
15½ "	46	15	46	
16¼ "	46½	16	47	At Station U.

Temperatures of surface water directly off Red bay for 9 miles out, beyond the middle of the Strait; immediately after a heavy northerly gale on September 7 to 8. Also from Red bay to Station P at the middle of the Strait. In 1906.

September 8		September 17		
Distance in miles.	Surface temp're.	Distance in miles.	Surface temp're.	
0 M.	42°	0	41½°	Mouth, Red bay.
1 "	43	1	41½	
2 "	45	2	42	
3 "	45½	3	42	
4 "	46	4	41½	
5 "	45½	5	41	
6 "	45	6	41½	
7 "	45	7	41½	
8 "	45	8¼	—	At Station P.
9 "	45			

Temperatures of surface water from Red bay to Station Q. During the days previous to the temperatures here given to P and Q (from September 10 to 13) there was a strong dominant flow to the westward.

September 13		
0 M.	44½°	At west point at mouth of Red bay.
1 "	44	
2 "	44	
3 "	43½	
4 "	44	
5 "	44	
5¾ "	44	At Station Q.

Temperatures of surface water from Forteau bay along the west coast of Newfoundland to Bonne bay, on September 25 and 26, 1906. (On comparison with the similar line of temperatures on this coast on June 6, the rise in average temperature is 11°).

0	miles	39°	At point at west side of Forteau bay.	36	miles	51°	(*Continued*)
2	"	39		38	"	50	
4	"	39		40	"	50½	
6	"	39		42	"	51	
8	"	39½		44	"	50	At Rich Point.
10	"	41			—	—	
12	"	43		0	"	51	
14	"	44		2	"	50	Off Cow head.
16	"	42		4	"	50½	
18	"	40½		6	"	51	
20	"	40½		8	"	50	
22	"	42½		10	"	50	
24	"	50	Off Férolle Point.	12	"	50½	
26	"	50		14	"	50½	
28	"	51		16	"	51	
30	"	50½		18	"	51	
32	"	50		20	"	51	At mouth of Bonne bay.
34	"	51	(*Continued*)				

Summary of Average Temperatures—Belle Isle Strait, 1906.

Average temperature of the surface water in the open strait, for periods of about a week; and average of a series of observations on the various courses run in the region.

Date: 1906.	Average temperature.	Remarks.
	°	
June 6....	39·4	On west coast of Newfoundland. From Rich Point to Férolle Point.
" 6....	36·4	From Férolle Point to Amour Point. (From 39° to 34°)
" 8–17....	35·6	Dominant flow both eastward and westward.
" 18–23....	35·3	" " westward throughout the week.
" 25–29....	37·9	" " " "
July 3....	44·5	From Rich Point to Férolle Point. Rise of 5° since June 6.
" 4–14....	45·9	Dominant flow eastward during this period.
" 16–18....	47·7	" " " these days.
" 19....	42·6	At mouth of strait on northern side from Château bay to Station L.
" 19–21....	43·0	At eastern end of the strait, north of Belle Isle. Station L.
" 25....	44·1	Across eastern end of the strait, from Château bay to Station K.
" 25–28....	44·7	At eastern end of the strait, south of Belle Isle. Station K.
July 30 to Aug. 4....	50·6	Dominant flow eastward since beginning of previous week.
" 6–9....	56·2	At western end of the strait. Station S.
" 16....	52·7	Average from Red bay to middle of strait at Station P.
" 16....	57·0	At the middle of the strait. Station P.
" 17....	—	Heavy gale, north-northwest and north-northeast.
" 18....	45·2	Average from Red bay to middle of strait at Station P.
" 18....	44·0	At the middle of the strait. Station P.
" 20....	44·3	Average from Red bay to middle of strait at Station T.
" 20–25....	44·9	Dominant flow westward throughout this week.
" 27....	45·5	From Red bay across strait to Station U near south shore.
Aug. 27 to Sept. 1....	46·1	Tidal streams only, without dominant flow. Temperature recovering.
" 3–4....	—	Heavy gale, northeast to north.
" 5....	45·5	From Red bay across strait to Station U near south shore.
" 5....	46·0	Near south shore, at Station U.
" 7–8....	—	Very heavy northerly gale.
" 8....	45·0	From Red bay, nine miles out, to middle of strait.
" 10–13....	44·0	Strong dominant flow westward during these days.
" 17....	41·6	From Red bay to middle of strait at Station P.
" 17–22....	41·0	Strong dominant flow westward during this week.
" 25....	40·8	From Amour Point to Férolle Point. (From 39° to 42½°).
" 25....	50·5	From Férolle Point to Rich Point. (From 50° to 51°). Rise in average temperature, 11° since June 6.

Surface Temperatures near Icebergs.

On a run of four miles while the surveying steamer was passing icebergs in Belle Isle strait in August, the successive temperatures of the surface water were as follows:—39½°, 41½°, 41¾°, 42½°, 44°, 43¾°, 41¾°. The nearest iceberg was two-thirds of a mile distant.

At distance of 100 feet around berg.

On Northeast side	35½°
" East side	35½
" South side	35½
" West side	35
" West side	35

In 1906, an iceberg about 500 feet long was aground in 38 fathoms about 1½ miles from Station P, where it remained for several days. On June 19 it was examined in a boat. The surface temperature in the strait at the time was 35½°, and the temperatures close around the berg are shown opposite. There was only ½° difference to be found near it, on the West side, where the water was tailing from it with the flood.

At 130 to 1,330 feet distant from berg.

Point 1.	Temperature	38°	Density	1·02330
" 2.	"	37	"	1·02330
" 3.	"	37	"	1·02330

In 1894, on August 7, an unusually large iceberg was aground in 57 fathoms off Château bay. An instrumental survey made in a boat, showed it to be 780 feet long, 290 feet wide and 105 feet high.

The temperature and density around it, at the distances indicated, are shown above. On that day, the water temperature off Château bay was 36½°, it was 39° half way between the bay and Belle Isle island, and 41° off the south end of that island. The temperature was lowered less than 2° therefore, in the proximity of the iceberg.

The next day, August 8, a small iceberg was aground in Château bay. The water temperature in the middle of the bay was 34° and at the mouth, 34½°. The lowest temperature close to the iceberg was 33½°, which shows a difference of not more than 1°, due to the iceberg.

It is evident that such small differences of temperature, found closer to icebergs than a steamer would willingly venture, cannot be relied upon as an indication of value. At times when the surface temperature is higher, more difference might be expected; but this usually occurs while the dominant flow is eastward, which prevents the bergs from coming in. There is thus also little opportunity to obtain observations, as the bergs are few.

It might be thought probable that when many icebergs come into the strait, the colder water of the Labrador current off its mouth would come in with them, and thus give a general indication of their presence. Broadly speaking, this is true; but when a gale can occasion the greatest change in the surface temperature which ever occurs, as has been pointed out, it is evident that this indication cannot be relied upon.

THE GULF OF ST. LAWRENCE.

The early investigations in this region had for their object the determination of conditions in the two straits by which the Gulf of St. Lawrence is connected with the ocean; as a basis for understanding the whole region. The main entrance is by Cabot strait between Cape Breton and Newfoundland; and the other is by Belle Isle strait. An examination of the Gulf area in general, showed that in the southwestern side the water was warmer and of lower density than in the northeastern arm running towards Belle Isle strait.

The density in the open Atlantic, from seven determinations made off the south and southeast coasts of Nova Scotia, was found to range from 1·0237 to 1·0242, which is practically the same as in this northeastern portion of the Gulf. It may, therefore, be stated broadly, with regard to these two divisions of the Gulf, that throughout the northeastern portion the average surface density ranges from 1·0235 to nearly 1·0245; while in the southwestern portion, the density is below 1·0235, ranging usually down to 1·0220, and falling in the Gaspé current itself to 1·0210.

The dividing line between these two portions of the Gulf runs approximately from Southwest Point, Anticosti, to a point in the middle of Cabot strait. The density in the northeastern portion is practically the same as in the open Atlantic. The lower densities found in the southwestern portion of the Gulf, correspond with the general set or drift across the Gulf in the direction of a line from Gaspé to Cape Breton. This set is most accentuated in the Gaspé current and in the outward current on the west side of Cabot strait.

Another general feature discovered, was an extremely cold layer of water, lying usually between the depths of 30 and 50 fathoms. The surface temperature in the summer season ranges from about 50° to 65°, and in proceeding downwards this temperature gradually falls, till at the depth indicated it is practically at the freezing point. Where the greater depths are met with, the water below this is appreciably warmer. The density of this deeper water at 100 and 150 fathoms, affords an explanation for the otherwise anomalous fact that the colder water at 50 fathoms is found to float upon it.

It is probable that this cold layer extends very generally over the Gulf area. In the vicinity of Belle Isle strait, the same low temperatures are found at the depths above indicated; although there the temperature towards the surface also remains low as a rule. Elsewhere the water becomes warmer during the progress of the season, but only to a moderate depth. This cold layer must have a relation to the fish and other marine life in the Gulf area; as the extensive banks at 30 and 40 fathoms are continually in this cold water. There is also a belt on the bottom at about this depth, which runs parallel to the shore, and often has a considerable width.

It is evident that the temperature and density of the water proved of value from the outset in tracing the movements of the water. These general explanations may also serve as a guide in following the details hereafter given.

In the following table, the temperature at 50 fathoms where the water is coldest, was usually taken with both types of thermometer already described, as a check for the minimum.

Temperatures and Densities in the Deep Channels, Gulf of St. Lawrence: 1894, 1895 and 1896.

At the positions described below. (See further tables of deep temperatures to 40 and 50 fathoms.)

I. In Cabot strait; at a point 10 miles 18° from North light, St. Paul island.
Q. In Cabot strait; between St. Paul island and Cape Ray; at three points 12 miles apart.
II. At a point 13 miles 255° from Cape Ray. (Magnetic, 13 miles W. by N.)
III. At a point 10½ miles 103° from Cape North. (Magnetic, 10½ miles S.E.)
IV. At the centre of Cabot strait; 21½ miles 78° from North light, St. Paul island.
R. On a line along the middle of Cabot strait, at three points 7 miles apart.
VI. In the Gaspé region; from Ellis bay, Anticosti, to Fame Point; at a series of seven points.
VII. At 29 miles 77° from Cape Gaspé. (Magnetic direction, E. by S.)
VIII. At 40 miles 85° from Cape Gaspé. (" " E.S.E.)
IX. At 11 miles 71° from south end of St. Paul island. (Magnetic direction, E. ½ S.)
X. At 31 miles 85° from Cape Egmont. (Magnetic direction E.S.E.)
XI. At 40 miles 40° from Heath Point at the east end of Anticosti island. (Magnetic direction, E.N.E.)

Year.	Date.	Location as above.	Surface.	At 10 F.	At 15 F.	At 20 F.	At 30 F.	At 40 F.	At 50 F.	At 100F.	At 150F.	At 200F.
1894	August 16.....	Q	58½°	42°	—	34°	32°	31°	31½°	37½°	40½°	39½°
			60	43½	—	37	34½	32½	33	38½	40½	—
			59	40½	—	36	33	33	—	40	40½	—
"	" 22.....	II	58	41	—	37	34	33	—	39	—	40½
"	" 28.....	II	—	—	—	—	—	—	32½	40	40½	39½
"	" 30.....	IV	63	—	—	—	—	—	34	40½	40	39
"	Sept. 27.....	R	52½	44½	—	37	36	33½	32½	37	38	40
			52	47	—	35	34½	33	32½	—	40½	39½
			52	48	—	34½	34	33½	32½	39	40½	39½
1895	June 29.....	VI	53	51½	45	42	36½	—	33½	—	—	—
			53	49½	43	36	33	—	32	33	—	—
			53	48	41½	38	34	—	32	36½	38½	—
			46	36	36	33½	32	—	31½	36½	38¼	—
			47½	38	35½	33	32	—	31¾	37¼	39½	—
			47	39	38½	35	33	—	31½	—	—	—
			44	43½	40½	38½	36	—	33	—	—	—
"	Sept. 23.....	VII	52	—	—	—	—	—	32½	37½	39½	—
"	" 23.....	VIII	53	—	—	—	—	—	33½	38½	40	—
"	" 24.....	IX	55	—	—	—	—	—	35½	39	40½	—
"	" 25.....	X	54	—	—	—	—	—	37	39½	40½	—
1896	July 10.....	XI	50	42½	—	34	31½	—	31	36½	—	—
	Average of deep temperatures.....								32·8	38·0	39·9	39·6

Year.	Date.	Point as above.	Density. — Surface.	At 50 Fath.	At 100 Fath.	At 150 Fath.	Locality.
1895	Sept. 12	—	1·0222	—	1·0258	1·0262	At 24 miles 11° from Fame Point.
"	" 13	—	1·0220	1·0248	1·0260	1·0261	At 11 miles 2° from Fame Point.
"	" 23	VII	1·0234	1·0248	1·0255	1·0259	(Position as above described)
"	" 23	VIII	1·0235	1·0251	1·0257	1·0258	(" " ")
"	" 24	IX	1·0221	1·0250	1·0257	1·0263	(" " ")
"	" 25	X	1·0229	1·0251	1·0256	1·0260	(" " ")
1896	July 10	XI	1·0234	1·0246	1·0253	—	At 40 miles 40° from Heath Point.
"	" 14	XI	1·0235	1·0247	1·0255	—	" " "
"	Aug. 24	XV	1·0225	1·0248	—	—	At 13 miles 134° from point at east side of Shecatica bay.
"	Sept. 28	—	1·0236	1·0244	1·0256	—	At 40 miles 294° from Cape St. George.
"	" 28	—	1·0235	1·0247	1·0254	—	At 25 miles 294° from Cape St. George.
	Mean densities.....			1·0248	1·0256	1·0261	

Region of Cabot Strait.—Seasons of 1894, 1895, 1896 and 1906.

The observations in the different years will be given as nearly as possible in order of date, from spring to autumn, to indicate the change with the progress of the season. The earliest temperatures across Cabot strait are as follows; on June 5, 1906.

0 miles	—	At 2½ miles off Cape St. Lawrence.	26 miles	41½°	(*Continued*)
½ "	46°		28 "	40½	
2½ "	46		30 "	40	
4¼ "	47		32 "	40	
6 "	45		34 "	40	
8 "	43		36 "	41	
10 "	42		38 "	41	
12 "	40		40 "	40½	
14 "	41		42 "	40	
16 "	42		44 "	40	
—	—	Off St. Paul island.	46 "	40	
18 "	42		51 "	40	
20 "	41½		56 "	40	
22 "	42		61 "	40	
24 "	41	(*Continued*)	63¾ "	—	At 4 miles off Cape Anguille, Newfoundland.

Temperatures of the water in Cabot strait from Sydney to St. Paul island. On July 4, 1894.			Temperatures of the water in Cabot Strait from Cape Ray to St. Paul island. On August 13, 1894.		
Series of points.	55½°	Off mouth of Sydney harbour.	Series of points.	58½°	Off Cape Ray.
"	56½		"	58½	
"	55½		"	58¼	
"	54½		"	58¼	
"	54		"	58	
"	53		"	58	
"	55		"	57½	
"	57	At St. Paul island.	"	59	Off St. Paul island.

Station or Point.	Date. — 1894.	Surface temp're.	Depth in Fathoms.							Remarks.
			5 F.	10 F.	15 F.	20 F.	30 F.	40 F.	50 F.	
I	Aug. 13	59°	55½°	40°	34°	33½°	33°	32°	32°	In the middle of Cabot strait; at 10 miles off St. Paul island.
I	" 15	59	57½	42½	36	32	31	31	31	
I	" 15	58½	—	38	—	32½	32	30½	—	
—	" 17	65½	—	63½	—	41½	37	34½	—	At 1½ miles off Cape Egmont.
III	" 24	63½	—	57	55	41½	34	33	—	At 10½ miles 103° from Cape North.
III	" 25	64	—	55	54	39	33½	32	—	" "
IV	" 29	63	—	40½	—	34	32	32	—	At the centre of Cabot strait.
IV	" 30	63	57	38½	36	34	32	32	—	" "
—	Sept. 1	64	—	41	—	38	34	33	—	At 25 miles 245° from Cape Anguille, in Cabot strait.

Distance in miles.	Surface temp're.	Depth in Fathoms.						Remarks.
		5 F.	10 F.	15 F.	20 F.	30 F.	40 F.	
0 M.	65°	64°	64°	60°	40½°	34½°	33°	Temperature section from a point 3½ miles off Cape North to St. Paul island. On August 17, 1894.
3 "	64½	—	60	—	40½	35	32½	
7 "	58	—	40	—	35½	34½	31½	
10 "	58	—	42½	—	36	35	34	
0 M.	51	49	49	49	49	38	34	Temperature section from a point 3½ miles off Cape North to St. Paul island. On September 27, 1894.
3 "	51½	47	47	45	45	38	35	
7 "	52	47	42	38	36	35	33½	
9¼ "	49½	45	41	35	34½	35	34	

Temperatures and densities every two to ten miles, from Cape North, Cape Breton island, across Cabot strait to St. George bay, Newfoundland. On July 4, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	55°	1·0228	Off North Cape.
1 "	55½	1·0224	
2 "	55½	1·0224	
4 "	56	1·0223	
6 "	56	1·0224	
8 "	56	1·0222	
10 "	53	1·0234	
12 "	49½	1·0238	
0 M.	—	—	St Paul island.
1 "	50	1·0240	
5 "	50½	—	
10 "	50½	1·0239	
15 "	50½	1·0240	
20 "	51	1·0239	
25 "	50½	1·0240	
30 "	51	1·0238	
35 "	50½	1·0239	
39 "	47½	1·0239	
40 "	45	—	Off Cape Ray.
41 "	47½	—	
50 "	53½	1·0238	
60 "	53	1·0240	Off Cape Anguille.
87 M.	50	1·0238	Mouth, St. George bay.

Temperatures and densities every three to five miles, from the offing of Cape Egmont across Cabot strait to Cape St. George, Newfoundland. On August 11, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	—	—	At a point 35 miles from the mouth of Sydney harbour, towards St. Paul island.
1 "	61°	1·0221	
5 "	61	1·0217	
10 "	60	1·0222	
14 "	58½	1·0229	
17 "	59	1·0227	At St. Paul island.
20 "	61	1·0217	
25 "	61	1·0217	
30 "	60½	1·0218	
35 "	61	1·0221	
40 "	59	1·0228	
45 "	58	1·0237	
50 "	57	1·0237	
55 "	57	1·0237	Off Codroy.
60 "	56½	1·0237	
65 "	57	1·0236	
70 "	59	1·0236	
—	—	—	Off Cape Anguille.
75 "	60	1·0235	
80 "	59	1·0238	
85 "	53	1·0238	
90 "	58½	1·0236	
95 "	58	1·0237	
100 "	57½	1·0238	
105½ "	57	1·0238	At Cape St. George.

Temperatures and densities every five miles from St. Paul island to Sydney harbour. On August 4, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	—	—	St. Paul island; at south end.
5 "	61°	1·0212	
10 "	62	1·0213	
15 "	61	1·0220	
20 "	61	1·0220	
25 "	61	1·0220	
30 "	62	1·0216	
35 "	62	1·0218	
40 "	61	1·0230	
45 "	62	1·0231	
50 "	62	1·0224	Off Sydney harbour.

Temperatures in Inlets.

In Bonne bay, Newfoundland.—Deep temperatures in the North arm of Bonne bay. In the interior of this bay, the depths exceed 100 fathoms. On September 4, 1894.

Surface.....	54°	The deep water in this bay is isolated from the open Gulf. On a semi-circle of nine miles radius around the mouth of the bay, the depth is not over 30 fathoms. The temperatures compare with those in the open Gulf.
10 Fath.	47½	
20 "	39	
30 "	33½	
40 "	32	
50 "	32	
80 "	31	
95 "	30½	

Density section across the Cape Breton current, from Cape North to St. Paul island and eastward; at points 3 to 5 miles apart. On August 16, 1895.

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.	Locality.
0 M.	64½°	1·0222	1·0225	1·0240	—	—	Off Cape North.
2 "	62	1·0224	1·0232	1·0242	1·0247	1·0254	
5 "	62½	1·0223	1·0237	1·0243	1·0248	1·0254	
8 "	63	1·0225	1·0240	1·0247	1·0249	1·0254	
11 "	61	1·0224	1·0244	1·0249	1·0249	1·0253	
13½ "	—	1·0231	—	—	—	—	Atlantic cove, St. Paul island
15 "	—	1·0228	1·0247	1·0249	—	—	
19 "	60	1·0229	1·0244	1·0249	—	1·0254	
24 "	62	1·0228	1·0243	1·0248	—	—	
29 "	61½	1·0234	1·0241	—	1·0249	1·0252	At 14 miles past St. Paul island.

See general explanation at the top of next page, and further density sections following.

These sections, from the surface to 30 and 50 fathoms, were taken to ascertain the density of the warmer outflowing water, past the northeast side of Cape Breton island, from the Gulf of St. Lawrence to the open Atlantic; in relation to the water of higher density elsewhere in these regions. The results may be compared with similar sections of the water off the coast of Gaspé. (See also August 24 and 27 on opposite page.)

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.	Remarks.
0 M.	60°	1·0232	1·0239	—	—	—	Density section from Sydney northeastward, on August 17, 1895. The zero is off the mouth of Sydney harbour, and the direction of the line of points is N.57°E.
6 "	63	1·0229	1·0238	—	—	—	
11 "	63½	1·0228	1·0233	1·0224	—	—	
16 "	64	1·0227	1·0233	1·0243	1·0249	—	
21 "	63½	1·0228	1·0228	1·0247	1·0250	—	
26 "	63½	1·0224	1·0229	—	1·0250	1·0257	
0 M.	—	—	—	—	—	—	Density section from Sydney northeastward, on August 22, 1895. The zero is at the mouth of Sydney harbour, and the direction of the line of points is N.54°E.
2 "	—	1·0224	—	—	—	—	
7 "	58°	1·0224	1·0225	—	—	—	
14 "	58½	1·0226	1·0230	—	—	—	
21 "	58½	1·0229	1·0234	—	—	—	
28 "	58	1·0227	1·0237	—	1·0244	—	
33 "	58	1·0229	1·0239	—	—	1·0249	
38 "	60	1·0234	1·0236	—	1·0251	—	
43 "	60	1·0231	1·0232	—	—	1·0253	
48 "	—	1·0229	1·0233	—	—	—	

Surface densities from the extremity of the above line, northward across Cabot strait to Rose Blanche, at points five miles apart. On August 22, 1895.

Distance in miles.	Surface density.	Locality.	Distance in miles.	Surface density.	Locality.
0 M.	1·0229	At extremity of above line.	20 M.	1·0234	(*Continued*)
5 "	1·0230		25 "	1·0236	
10 "	1·0231		30 "	1·0240	
15 "	1·0233	(*Continued*)	42 "	1·0245	At 14 miles off Rose Blanche.

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 30 Fath.	At 50 Fath.	Locality.
0 M.	—	—	—	—	—	From Rose Blanche, Newfoundland, westward along shore to Cape Ray, and thence W.N.W. (true) to an anchorage at 12 miles 255° from Cape Ray, in 270 fathoms. On August 23, 1895.
9 "	—	1·0245	—	—	—	
14 "	—	1·0244	—	—	—	
19 "	—	1·0243	—	—	—	
25 "	58°	1·0242	1·0246	—	—	
30 "	58	1·0245	1·0247	—	—	
35 "	56	1·0241	1·0244	—	—	
40 "	58	1·0243	1·0243	—	—	
45 "	58	1·0240	1·0241	—	1·0254	

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.	Remarks.
58 M.	59°	1·0218	1·0219	1·0236	—	—	Density section across Cabot Strait from Port aux Basques to Cape North, on August 24, 1895. (The zero is at Port aux Basques, and 58 miles is at Cape North; but to correspond with other sections, it is made to read from Cape North outward.)
54 "	59	1·0224	1·0234	1·0235	—	1·0249	
51 "	59	1·0225	1·0225	1·0243	—	—	
48 "	57½	1·0229	1·0233	1·0245	—	1·0255	
45 "	55	1·0230	1·0232	1·0249	1·0251	—	
40 "	56	1·0230	1·0230	1·0248	1·0248	—	
35 "	59	1·0237	1·0237	—	—	1·0248	
30 "	59½	1·0237	1·0238	—	1·0250	—	
25 "	59	1·0235	1·0237	—	—	1·0252	
20 "	59	1·0238	1·0239	—	1·0249	—	
15 "	57	1·0240	1·0242	—	—	1·0252	
10 "	59	1·0240	1·0242	—	1·0252	—	
5 "	59	1·0241	1·0247	—	—	1·0253	
0 "	49½	1·0245	1·0249	—	—	—	
0 M.	60°	1·0224	1·0229	—	—	—	Density section from Cape North on a line 56 miles due north (N.1° E. true) to a Station midway between Cape Anguille and Bird Rocks, in 245 fathoms. On August 27, 1895.
2 "	60	1·0225	1·0231	1·0240	—	1·0247	
5 "	61	1·0227	1·0227	1·0241	—	—	
9 "	58	1·0224	1·0226	1·0246	—	1·0253	
14 "	55	1·0233	1·0235	1·0247	—	—	
21 "	55	1·0237	1·0240	—	—	1·0255	
28 "	55½	1·0235	1·0235	1·0249	—	—	
35 "	56½	1·0236	1·0238	—	—	1·0252	
42 "	58	1·0240	1·0240	1·0245	—	—	
49 "	58	1·0236	1·0240	—	—	1·0251	
56 "	—	1·0238	1·0238	1·0245	—	—	

From Cape Ray past St. Paul island to Cape North. (The mileage is counted from Cape North and from Cape Ray, towards St. Paul island.) On September 29, 1896.				Distance in miles.	Surface temp're.	Surface density.	Locality
Distance in miles.	Surface temp're.	Surface density.	Locality.	32 M.	55°	1·0225	Off north end of St. Paul island.
				30 "	55	1·0225	
				25 "	52	1·0236	
				20 "	51½	1·0238	
				15 "	50	1·0238	
0 M.	57°	1·0220	At Cape North.	10 "	47½	1·0241	
2 "	55	1·0224		5 "	47	1·0240	
5 "	55	1·0224		0 "	45	1·0243	At 4 miles off Cape Ray.
8 "	53	1·0229					
10¾ "	51	1·0230					
12 "	—	—	St. Paul island.				

Further density and sections were taken in continuance of these series, at the end of August and the beginning of September, 1895, from the west side of Cape Breton island to the Magdalen islands, thence to the east end of Prince Edward island, and further north to the Gaspé region. These are given with the observations in the open Gulf of St. Lawrence.

Change in Temperature with the Season.

The best observations to ascertain the amount of change in the temperature of the surface water with the season from month to month, were obtained in 1896 at a series of points, five miles apart, on the following lines:—(1.) From 30 miles off Heath Point, to Cape St. George on 6th July. (2.) From station C, off Cape Whittle, to the offing of Cape St. George, on 3rd August. (3.) Same line as No. 1, run a second time on 28th September. The results were as follows:—

(1.) July 6. From 49½° to 51½°. Average = 50°.93.
(2.) August 3. From 50° to 54°. Average = 52°.68.
(3.) September 28. From 52° to 54½°. Average = 53°.62.

From Richibucto northward along the New Brunswick coast, past Chaleur bay, and across the main passage from Gaspé to South-west Point of Anticosti. On June 26 and 27, 1895.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	—	—	At 1½ miles off Richibucto head.
5½ "	59°	1·0217	
18½ "	60½	1·0219	
31 "	60	1·0217	
47 "	59½	1·0214	
55 "	59½	1·0217	
64 "	59½	1·0213	At 10 miles East from Shippigan gully.
0 M.	53½	1·0202	At 5 miles North of Miscou island.
13¼ "	52½	1·0206	
18 "	55	1·0200	Off Cap d'Espoir.
0 M.	—	—	At 1½ miles off Percé Rock.
1 "	52°	1·0207	
4 "	54	1·0215	
7¼ "	55	1·0215	
10 "	56	1·0216	In offing of Cape Gaspé.
13 "	53	1·0210	
16 "	49½	1·0206	
19 "	53	1·0206	
22 "	54	1·0211	
25 "	54½	1·0211	
30 "	55	1·0211	
35 "	54	1·0214	
40 "	53½	1·0206	
45 "	53	1·0206	
50 "	52½	1·0212	
55 "	53½	1·0208	
60 "	51½	—	
62½ "	—	—	At South-west Point.

Temperatures from Birch Point at the north end of Miscou island, to Flat island at the south extreme of Gaspé bay. On June 3, 1911.

Distance in miles.	Surface temp're.	Locality.
0 M.	—	From Birch Point; 6½ miles, S.E. (true).
2 "	43°	
4 "	43	
4½ "	—	From Birch Point; 5 miles, East, (true).
7 "	42½	
10 "	42½	
13 "	44½	
16 "	45	(*Continued*)
19 M.	43½°	(*Continued*)
22 "	43	
25 "	43	
27 "	43	
30 "	43	
32 "	43½	
35 "	43½	
38 "	44½	
38½ "	—	Off Percé light.
43 "	44	
45 "	44½	
47¼ "	44	Off Flat island.

Off the west coast of Newfoundland, from Cape St. George to mouth of Bonne bay. On July 5, 1894.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	48°	1·0239	Off Cape St. George.
—	48	1·0239	
—	47	1·0242	
—	47	1·0242	
—	47	1·0242	
—	47	1·0239	
—	47	1·0237	
—	48	1·0234	
—	48	1·0234	
—	48	1·0232	
80 M.	50	1·0234	Off Bonne bay.

From Cape St. George across the Gulf to East Cape, Anticosti. On July 6, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	51½°	1·0238	At 1½ miles off Cape St. George.
5 "	50	1·0238	
10 "	50	1·0238	
15 "	50	1·0238	
20 "	49½	1·0238	
25 "	50¾	1·0237	
30 "	51	1·0235	
35 "	51¼	1·0235	
40 "	51½	1·0235	
45½ "	51½	1·0234	
50 "	51½	1·0234	
55 "	51½	1·0236	
60 "	51½	1·0235	
65 "	51½	1·0235	
70 "	51	1·0234	
75 "	53½	1·0234	
80 "	53½	1·0234	(*Continued*)
85 M.	51½°	1·0237	(*Continued*)
90 "	51½	1·0240	
95 "	51¼	1·0238	
100 "	50½	1·0234	
105 "	50	1·0232	At one mile off East Cape.
—	49	—	In Gull Cliff bay.

From the offing of Cape Whittle, on a line S. 4° W. (true) to St. Paul island. On August 3 and 4, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	50½°	1·0240	At 21 miles 158° from Cape Whittle.
5 "	50	1·0240	
10 "	50½	1·0239	
15 "	51½	1·0239	
20 "	52½	1·0239	
25 "	52½	1·0240	
30 "	53½	1·0239	
35 "	53	1·0237	
40 "	53½	1·0238	
45 "	53	1·0238	
50 "	53½	1·0239	
55 "	54	1·0239	
60 "	53	1·0236	
65 "	53½	1·0236	
70 "	53½	1·0234	
75 "	53½	1·0234	
80 "	54	1·0236	
—	—	—	Gap of 53 miles during the night.
133 M.	57°	1·0237	
140 "	56	1·0233	
145 "	56	1·0236	
150 "	56	1·0237	
155 "	55½	1·0238	
160 "	55½	1·0237	
165 "	56½	1·0232	
166¾ "	—	1·0232	At south end, St. Paul island.

From Table head, on the north side of Anticosti island near its east end, to Natashkwan. On July 7, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	50°	1·0233	At Table head.
5 "	50½	1·0232	
10 "	50½	1·0239	
15 "	49	1·0236	
20 "	50	1·0233	
25 "	49½	1·0233	
30 "	49	1·0232	
35 "	50½	1·0211*	
40 "	47	1·0233	Off Natashkwan harbour.

From Natashkwan to Station XI, a point midway between Heath Point and Cape Whittle. On July 8, 1896.

0 M.	45°	1·0208*	Off Natashkwan
5 "	47	1·0229	harbour.
10 "	49½	1·0217	
15 "	48½	1·0234	
20 "	48½	1·0226	
25 "	49½	1·0230	
30 "	48½	1·0232	
35 "	48½	1·0236	
40 "	48	—	
41 "	—	—	Station XI.

Deep Densities at Station XI, on July 10 and 14, 1896.

Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.
1·0234	1·0240	1·0243	1·0243	1·0246
1·0235	1·0239	1·0242	1·0245	1·0247

From Station XI to Heath Point. On July 15, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	—	—	Station XI.
10½ "	53½°	1·0235	
15 "	55	1·0235	
20 "	55½	1·0236	
25 "	55½	1·0238	
30 "	54½	1·0234	
35 "	55	1·0235	
38 "	55	1·0234	
39½ "	54½	1·0234	At East Cape, two miles from Heath Point.

From Heath Point to Station XII at 24 miles off that point to the East-southeastward. On July 15 and again on July 17, 1896.

0 M.	—	—	Off Heath Point.
1¼ "	55°	1·0235	
5 "	53	1·0235	(On July 15.)
10 "	56	1·0231	
15 "	55	1·0234	
20 "	57	1·0233	
24 "	55	1·0233	Station XII.
0 M.	55°	1·0236	At East Cape, two
5 "	54½	1·0236	miles from Heath
10 "	54½	1·0234	Point.
15 "	54½	1·0236	(On July 17)
20 "	55½	1·0235	
24½ "	54½	1·0236	Station XII.

* River water lowers the density here.

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	Remarks.
0 M.	59°	1·0217	1·0229	1·0242	Density section from Cap d'Espoir at the mouth of
5 "	59	1·0215	1·0230	1·0241	Chaleur bay on the north side, along a line bearing
10 "	58	1·0216	1·0230	1·0239	100° to Orphan bank; a distance of 48 miles. On
15 "	60	1·0211	1·0227	1·0245	August 6, 1895.
20 "	60	1·0216	1·0227	1·0240	
25 "	60	1·0213	1·0225	1·0244	
30 "	59	1·0216	1·0220	1·0244	
35 "	58	1·0219	1·0235	1·0245	
40 "	61	1·0212	1·0233	1·0244	
45 "	63½	1·0214	1·0232	1·0246	
48 "	61	1·0216	1·0228	1·0248	
0 M.	—	1·0209	1·0233	1·0242	At 50 Fath. — Density section from end of the above line,
5 "	60°	1·0212	1·0242	1·0247	northeastward to South Point of Anti-
10 "	62	1·0219	1·0240	1·0249	costi island. On August 7, 1895.
15 "	61½	1·0221	1·0239	1·0246	
22 "	62	1·0219	1·0245	1·0248	1·0251
29 "	61	1·0228	1·0244	1·0248	—
36 "	61	1·0236	1·0245	1·0253	1·0254
43 "	60	1·0238	1·0246	1·0250	—
48 "	58	1·0239	1·0245	1·0250	1·0254
53 "	56	1·0241	1·0246	1·0247	—
58 "	53½	1·0239	1·0246	1·0248	—

Surface densities beginning at 25 miles off Heath Point, Anticosti, on a line due south to the north end of the Magdalen islands. On August 8, 1895.

0 miles	1·0235	In offing of Heath Point.	40 miles	1·0234	*(Continued)*
5 "	1·0236		45 "	1·0233	
10 "	1·0235		50 "	1·0234	
15 "	1·0235		55 "	1·0231	
20 "	1·0235		60 "	1·0225	
25 "	1·0234		65 "	1·0223	
30 "	1·0232		70 "	1·0226	At 2 miles off Bryon island.
35 "	1·0233	*(Continued)*	75 "	1·0225	North end, Magdalen islands.

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	Remarks.
0 M.	—	1·0224	—	—	Density section from East Point at the north end of the Magdalen islands, to Cape St. Lawrence near the north end of Cape Breton island. On August 9, 1895.
6 "	63½°	1·0224	1·0228	—	
11 "	63½	1·0230	1·0241	—	
16 "	63½	1·0230	1·0239	1·0246	
21 "	64	1·0229	1·0245	1·0248	
26 "	64	1·0233	1·0246	1·0248	At 30 F.
31 "	63	1·0234	1·0246	1·0248	
36 "	63	1·0233	1·0243	1·0247	1·0247
41 "	65	1·0223	1·0227	1·0243	—
44 "	65	1·0220	1·0223	1·0239	—
0 M.	—	1·0220	At Cape St. Lawrence. (On August 10, 1895.)		
7 "	—	1·0221	Off High Cape.		
14 "	—	1·0220	Off Red Cape.		
21 "	—	1·0220	Off White Cape.		
28 "	—	1·0220	Off Presqu'île.		
35 "	—	1·0222	Off Enragé Point.		
41 "	—	1·0220	Off Chéticamp Point.		
0 M.	66°	1·0220	1·0222	—	Density section from Chéticamp island, on the west coast of Cape Breton island, to East Point of Prince Edward island. On August 10, 1895.
5 "	66	1·0220	1·0221	1·0238	
10 "	66	1·0219	1·0225	1·0241	
15 "	66	1·0220	1·0226	1·0243	
22 "	66	1·0225	1·0232	1·0245	
27 "	66	1·0225	1·0234	1·0245	
32 "	64	1·0221	1·0229	—	
					At 30 F.
0 M.	—	1·0220	—	—	Density section from East Point of Prince Edward island to a point 5 miles off the south end of the Magdalen islands. On August 12, 1895.
2 "	65½°	1·0220	1·0234	—	
6 "	64½	1·0221	1·0232	1·0238	—
13 "	63	1·0220	1·0235	1·0241	1·0243
20 "	64	1·0219	1·0235	1·0243	1·0244
27 "	65	1·0220	1·0240	1·0243	1·0246
32 "	65	1·0225	1·0243	1·0245	—
37 "	65	1·0227	1·0240	—	—
42 "	66	1·0224	1·0234	—	—

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	Remarks.
0 M.	65°	1·0223	1·0235	—	Density section from a point 5 miles off Entry island (one of the Magdalen islands) to White Cape on the west side of Cape Breton island, north of Chéticamp. On August 15, 1895.
5 "	65	1·0222	1·0236	—	
10¾ "	65	1·0226	1·0238	—	
15 "	65½	1·0224	1·0232	1·0245	
19 "	65	1·0226	1·0238	1·0243	
23 "	65	1·0223	1·0234	1·0243	
27 "	66	1·0222	1·0229	1·0239	
31 "	66	1·0225	1·0225	1·0242	
35 "	67	1·0226	1·0230	1·0242	
38 "	67	1·0221	1·0223	1·0240	
0 M.	—	1·0226	Surface densities from a point 2½ miles south of the Magdalen islands, along shore every 3 or 4 miles, around the east end of Amherst island into Pleasant bay. On August 13, 1895.		
4 "	—	1·0225			
8 "	—	1·0226			
10½ "	—	1·0228			
14 "	—	1·0229			
19½ "	—	1·0231			

Position of Stations at which anchorages were made in the season of 1896, numbered from XI to XVIII. (In each season, the letters of the alphabet were used to designate the stations; but to avoid confusion, those in 1896 are now replaced by Roman numerals. This leaves the original letters in Belle Isle strait, the Gaspé region, and Northumberland strait only; which are so widely separated that there is no fear of confusing them. The original letters are indicated for reference to the Reports of Progress of this Survey.)

XI. (A of 1896) From Heath Point; 40 miles 40° and from Natashkwan Point; 42 miles 138°. It is thus in the middle of the deep arm, north of Anticosti.

XII. (B of 1896) From Heath Point; 24½ miles 112° on the bank extending eastward from Anticosti.

XIII. (C of 1896) From Cape Whittle; 18 miles 154°.

XIV. (D of 1896) From south end of Great Mekattina island; 15 miles 158°.

XV. (E of 1896) From headland on east side of Shecatica bay; 13 miles 134°.

XVI. (F of 1896) From Rich Point; 10 miles 299°.

XVII. (G of 1896) From Cow head, to the north of Bonne bay; 12 miles 262°.

XVIII. (H of 1896) From Heath Point; 13 miles 112° on the line from Heath Point to Station XII.

Deep temperatures at Station XIV off Great Mekattina island. In August, 1896.

Depth.	Aug. 19	Aug. 20	Aug. 22
Surface.....	54°	54°	55°
10 Fath.....	49½	51	51
20 "	42½	44½	40
30 "	37	36	38½
40 "	33	31	35½

Deep densities at Station XVI, Aug. 28, 1896.

Depth.	After Food to the Northeast.	After Ebb to the West-north-west.
Surface.....	1·0236	1·0238
10 Fath.....	1·0241	1·0240
20 "	1·0245	1·0247
30 "	1·0248	1·0247

Deep densities at Station XIV, off Great Mekattina island. On August 21 and 22, 1896.

Depth.	Density.	Remarks.
Surface	1·0236	
3 Fath.	1·0236	Surface current East.
10 "	1·0237	Under-current W.S.W.
20 "	1·0242	
30 "	1·0245	
Surface	1·0236	
10 Fath.	1·0239	Surface current South-eastward. Under current S.S.W.
20 "	1·0244	
30 "	1·0246	

Distance in miles.	Surface density.	Locality.
0 M.	1·0239	Off Table Point, south of Hawke bay, Newfoundland; at points 15 miles to 4 miles from shore. On August 17, 1896.
4 "	1·0239	
9 "	1·0238	
12 "	1·0239	

From Hawke bay across the Gulf to Great Mekattina island. On August 18, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	60°	1·0221	At mouth of Hawke bay.
5 "	58	1·0239	
10 "	58	1·0239	
15 "	59	1·0237	
20 "	59	1·0238	
25 "	—	1·0238	
30 "	56	1·0240	
35 "	54½	1·0240	
40 "	55	1·0240	
45 "	54	1·0235	
50 "	57	1·0232	
55 "	54	1·0235	
58 "	54	1·0236	Great Mekattina island.

From Rich Point to Station XV; at three points near the Station. On August 26, 1896.

0 M.	—	—	Off Rich Point.
32 M.	—	1·0225	At 4 miles from Station.
34 "	—	1·0231	
36 "	—	1·0232	At Station XV.

On a line from Station XVI to Amour Point; at points from Férolle Point to mouth of Forteau bay. On August 29, 1896.

Distance in miles.	Surface density.	Locality.
0 M.	—	At Station XVI.
34 M.	1·0237	Off Férolle Point.
37 "	1·0239	
40 "	1·0239	
43 "	1·0240	
46 "	1·0239	
49 "	1·0240	
52 "	1·0239	
55 "	1·0239	Off Forteau bay.

0 M.	—		From Amour Point in Belle Isle strait westward to St. Margarets bay. On September 1, 1896.
1 "	1·0241		
5 "	1·0239		
10 "	1·0238		
15 "	1·0238		
20 "	1·0239		
24½ "	1·0238		

From Rich Point to Hawke bay. On September 2, 1896.

0 M.	—		Off Rich Point.
1 "	1·0239		
3 "	1·0238		
7 "	1·0238		In mouth of Hawke bay.

Station.	Date.	Surface temp're.	Depth in Fathoms.				Remarks.
			10 F.	20 F.	30 F.	40 F.	
XIV	1896, Aug. 20	54°	51°	44½°	36°	31°	After current setting southward.
XIV	" Aug. 22	55	51	40	38½	35½	During current setting southward.

Density section from Station XV, off Shecatica bay on the North shore of the Gulf, to Hawke bay, Newfoundland. On August 24, 1896.

Distance in miles.	Density. — Surface.	At 10 Fath.	At 30 Fath.	At 50 Fath.	At 75 Fath.	Total depth.	Locality.
0 M.	1·0225	1·0241	1·0245	1·0248	1·0252	100 F.	At Station XV.
7 "	1·0239	1·0240	1·0248	—	—	40 F.	
14 "	1·0239	1·0239	—	—	—	30 F.	
21 "	1·0235	1·0241	1·0248	—	—	67 F.	
24 "	1·0235	—	—	—	—	—	
27 "	1·0234	—	—	—	—	—	
30 "	1·0239	—	—	—	—	—	
32 "	1·0240	—	—	—	—	—	
37 "	1·0222	—	—	—	—	—	In mouth of Hawke bay.

Station or Point.	Date.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	Remarks.
(1)	1896, Sept. 1	1·0239	1·0240	—	1·0245	Deep densities in Belle Isle strait. At three points, 3 miles apart, across the width of the strait.
(2)	" "	1·0240	1·0240	1·0243	—	
(3)	" "	1·0239	1·0241	1·0244	—	
XVII	1896, Sept. 8	1·0238	1·0238	1·0240	1·0247	Deep densities at Station XVII, at 12 miles off Cow Head, Newfoundland. Total depth of water 38 fathoms.
"	" " 10	1·0240	1·0240	1·0242	1·0246	
"	" " 14	1·0238	1·0239	1·0243	1·0247	

Surface densities every five to seven miles from a Station at 56 miles due north from Cape North, to East Point at the north end of the Magdalen islands. On August 28, 1895.

0 miles	1·0238	30 miles	1·0228
8 "	1·0235	35 "	1·0229
10 "	1·0235	40 "	1·0230
15 "	1·0230	45 "	1·0230
20 "	1·0230	50 "	1·0231
25 "	1·0230	—	—

Surface densities from Cape St. Lawrence to a Station off the south end of the Magdalen islands. On August 29, 1895.

Mileage.	Surface.	At 10 F.
0 M.	—	—
10 "	1·0227	1·0229
20 "	1·0227	1·0238
30 "	1·0232	1·0242
40 "	1·0234	1·0235
53 "	1·0234	1·0236

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.	Remarks.
0 M.	—	1·0228	—	—	—	—	Density section from East Point at the north end of the Magdalen islands, to Cape St. Lawrence near the north end of Cape Breton island. On August 29, 1895.
5 "	55°	1·0229	1·0231	—	—	—	
12 "	53	1·0230	1·0239	—	—	—	
18 "	55	1·0231	1·0236	1·0246	—	—	
23 "	54	1·0233	1·0236	—	—	—	
29 "	54½	1·0230	1·0234	—	—	—	
34 "	54	1·0230	1·0234	1·0246	1·0249	—	
40 "	54½	1·0226	1·0229	1·0244	—	1·0250	
45 "	57	1·0226	1·0230	1·0244	—	1·0245	
0 M.	—	1·0234	1·0236	—	—		Density section from the above station off the south end of the Magdalen islands to East Point of Prince Edward island. On August 30, 1895.
4 "	55½°	1·0233	1·0233	—	—		
10 "	55	1·0233	1·0244	1·0247	—		
15 "	55	1·0233	1·0242	—	1·0248		
20 "	54	1·0235	1·0246	1·0248	—		
25 "	55	1·0232	1·0245	—	1·0247		
30 "	58	1·0221	1·0230	1·0243	—		
35 "	59	1·0219	1·0221	1·0240	—		
40 "	59	1·0220	1·0219	—	—		
0 M.	—	1·0221	Surface densities at three points, ten miles apart, at 9 to 12 miles from shore, off the east end of Prince Edward island. On August 30, 1895.				
10 "	—	1·0221					
20 "	—	1·0226					

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 50 Fath.	Locality.
0 M.	—	1·0233	1·0238	—	—	Densities to 10 fathoms, from a point at 3 miles south of Amherst island light (Magdalen islands) on a line westward for 20 miles and then north-eastward for 4 miles. On September 3, 1895.
6 "	—	1·0230	—	—	—	
10 "	—	1·0228	1·0238	—	—	
15 "	—	1·0222	—	—	—	
20 "	57°	1·0225	1·0228	—	—	
24 "	—	1·0221	—	—	—	
0 M.	55°	1·0226	1·0227	—	—	Temperatures and densities, every five to ten miles, from the north end of the Magdalen islands to South Point of Anticosti island. On September 4, 1895.
7 "	55	1·0223	1·0232	—	—	
14 "	54½	1·0226	1·0240	—	—	
24 "	54	1·0230	1·0234	—	—	
34 "	53½	1·0233	1·0236	—	—	
44 "	53½	1·0233	—	—	1·0251	
54 "	55	1·0235	1·0237	1·0247	—	
64 "	55	1·0235	1·0238	—	1·0253	
74 "	51	1·0237	1·0238	1·0246	—	
79 "	53	1·0235	—	—	—	
84 "	—	1·0236	1·0241	—	1·0250	
88½ "	—	1·0236	1·0236	—	—	
0 M.	52°	1·0236	1·0238	—	—	Density section from South Point of Anticosti island, to the north end of Orphan bank. On September 5, 1895.
7 "	52	1·0235	1·0239	—	—	
14 "	52	1·0235	1·0242	—	1·0251	
21 "	51½	1·0234	1·0237	—	1·0251	
28 "	53	1·0234	1·0236	—	1·0252	
35 "	53½	1·0233	1·0237	1·0246	—	
42 "	54	1·0231	1·0233	1·0246	1·0252	
49 "	—	1·0229	1·0234	1·0245	—	
56 "	—	1·0227	1·0235	—	—	
0 M.	—	1·0230	1·0234	—	—	Density section from the north end of Orphan bank, to a point 4 miles off Point Peter at the south side of Gaspé bay. On September 6, 1895.
5 "	52½°	1·0224	1·0226	1·0249	—	
10 "	51	1·0231	1·0237	1·0248	—	
15 "	52	1·0233	1·0237	1·0246	1·0253	
20 "	52½	1·0227	1·0232	1·0237	—	
24 "	52	1·0226	1·0227	1·0234	1·0255	
28 "	52½	1·0227	1·0229	1·0231	—	

From Bonne bay, Newfoundland, to Bay of Islands; and from Bay of Islands across the Gulf of St. Lawrence to Heath Point, Anticosti. On September 15 and 16, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	—	—	Off mouth of Bonne bay.
10 "	—	1·0238	
15 "	—	1·0237	
20 "	—	1·0239	
25 "	—	1·0239	Off mouth of Bay of Islands.
0 M.	—	—	At South head, Bay of Islands.
5 "	—	1·0237	
10 "	—	1·0237	
15 "	—	1·0239	
20 "	—	1·0239	
25 "	—	1·0239	
30 "	—	1·0237	
35 "	—	1·0238	
40 "	—	1·0238	
45 "	—	1·0237	
50 "	50½°	1·0237	
55 "	57	1·0239	
60 "	56½	1·0237	
65 "	56	1·0236	
70 "	56½	1·0235	
75 "	56	1·0235	
80 "	52½	1·0235	
85 "	53	1·0239	
90 "	52	1·0240	
95 "	53	1·0240	
100 "	52	1·0240	
105 "	51½	1·0240	
110 "	51½	1·0240	
115 "	50½	1·0240	
120 "	51	1·0240	At 13 miles off Heath Point.

From East Cape, Anticosti island, across the Gulf of St. Lawrence to Cape St. George, Newfoundland. On September 28, 1896.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	49°	1·0242	At 1¼ miles N.E. of East Cape.
5 "	49	1·0239	
10 "	49	1·0239	
15 "	48½	1·0240	
20 "	49½	1·0239	
25 "	49½	1·0238	
30 "	51½	1·0237	
35 "	53½	1·0235	
40 "	53	1·0237	
45 "	54	1·0237	
50 "	54	1·0238	
55 "	54	1·0236	
60 "	54	1·0237	
65 "	54½	1·0236	
70 "	53½	1·0235	
75 "	52	1·0237	
80 "	53	1·0237	
85 "	54	1·0237	
90 "	54	1·0232	
—	—	—	Cape St. George.

NOTE.—For the average temperature of the surface water on the long runs across the width of the Gulf of St. Lawrence, see page 42.

From Hawke bay along the Newfoundland shore to Station XVII off Cow head. On September 3, 1896.

Distance in miles.	Surface density.	Locality.
0 M.	—	Off mouth of Hawke bay.
7 "	1·0241	
12 "	1·0240	
17 "	1·0240	
22 "	1·0241	
27 "	1·0240	
32 "	1·0241	
35 "	1·0240	
38 "	1·0240	
41 "	1·0240	
44 "	1·0238	
47 "	1·0240	
50 "	1·0239	
53 "	1·0239	
56 "	1·0240	
58 "	1·0239	Station XVII, off Cow head.

Distance in miles.	Surface temp're.	Surface density.	Remarks.
0 M.	—	—	From Station XVIII off Heath Point to Prinsta bay. On September 17, 1896.
½ "	51°	1·0240	
3 "	51	1·0241	
6 "	51	1·0240	
9 "	52	1·0240	
12 "	52	1·0241	
15 "	52	1·0238	
18 "	52	1·0240	
0 M.	50°	1·0238	From 5 miles off Table head, near the east end of Anticosti island, to Natashkwan. On September 19, 1896.
5 "	50	1·0239	
10 "	50	1·0238	
15 "	50½	1·0239	
20 "	49	1·0240	
25 "	46	1·0241	
30 "	44	1·0242	
35 "	47	1·0241	
40 "	44	1·0240	
45 "	41	1·0221*	

* Density reduced by water from mouth of Natashkwan river.

Depth.	On Sept. 21 Current to the E.S.E.	On Sept. 22 Current to the W.N.W.	On Sept. 24 Current to the S.E.	On Sept. 25 Current to the West.	Remarks.
Surface....	1·0240	1·0240	1·0235	1·0235	Deep densities at Station XVIII, at 13 miles off Heath Point, Anticosti. In September of 1896.
10 Fath....	1·0244	1·0240	1·0238	1·0239	
20 Fath....	1·0246	1·0247	1·0247	1·0246	
30 Fath....	—	—	1·0247	1·0247	

Distance in miles.	Surface temp're.	Depth in Fathoms.					Remarks.
		10 F.	20 F.	30 F.	40 F.	50 F.	
0 M.	51°	49½°	41°	36½°	33°	—	Deep temperatures on a line from Whale island, in the Esquimaux islands, to St. John bay, Newfoundland; to the west of Belle Isle strait. On September 25, 1894.
6·5	45	43½	35	33	33	32°	
13·6	47	45	37½	34	33	32	
20·6	48½	46	40	35	33	—	

The Gaspé Region.—Seasons of 1895 and 1911.

This region comprises the entrance to the St. Lawrence as far in as Cape Magdalen; and includes the passage of some 40 miles in width between the Gaspé coast and Anticosti island, and Mingan strait to the north of Anticosti.

The Stations for anchorage were carefully selected for the investigation of the currents in this region; and were re-occupied in the same positions in the various seasons.

The water of less density in the Gaspé current is comparable with similar water of low density in the current around Cape Breton island in Cabot strait, where it finally leaves the Gulf of St. Lawrence. The densities as given are the specific gravity of the water reduced to the standard temperature of 60° Fahrenheit, as usual throughout.

Station A.—From Cape Magdalen; 4½ miles 7° (N. 34° E. magnetic).
Station B.—From Fame Point; 4½ miles 15° (N. 42° E. magnetic).
Station E.—From Fame Point; 11½ miles 12 ° (N. 39° E. magnetic).
Station D.—From Cape Henry, Anticosti; 17¾ miles 192° (S. 39° W. magnetic).
Station C.—From English Point, Griffin cove; 4½ miles 46° (N. 73° E. magnetic).
Station F.—From English Point; 11 miles 46° (N. 73° E. magnetic).
Station G.—From South-west Point, Anticosti; 16 miles 229° (S. 76° W. magnetic).
Station H.—From mouth of Pavillon river, Anticosti; 8½ miles 210° (S. 57° W. magnetic).
Station J.—From Bagot Point, Anticosti; 8¼ miles 128° (S. 25° E. magnetic).
Station K.—From Bagot Point, Anticosti; 6¼ miles 181° (S. 28° W. magnetic).
Station L.—The Lightship. From Heath Point; 8 miles 103° (S. 50° E. magnetic).
Station M.—From Heath Point, Anticosti; 13 miles 112° (S. 41° E. magnetic).
Station XIX.—From North Point, Anticosti; 4½ miles 24° (In Mingan strait).
Station XX. —From Esquimaux island; 7½ miles 200° (In Mingan strait).
The depth at these Stations ranges from 40 to 180 fathoms.

Lines of temperatures and densities across the main passage between the Gaspé coast and Anticosti; from Cape Gaspé to South-west Point; thence to Station B off Fame Point; and from Fame Point to Cape Henry at the mouth of Ellis bay, Anticosti. On June 5 to 17 in 1911. These are given first, as they are the earliest obtained in any season.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	—	1·0219	At Cape Gaspé.
½ "	—	1·0218	
4 "	—	1·0216	
6 "	43½°	1·0215	At ¾ mile off Cape
7 "	43	1·0213	Rosier.
8 "	43½	—	
9 "	43½	1·0213	
11 "	43	1·0224	
13 "	43½	1·0225	
15 "	43½	1·0225	(On June 5, 1911.)
17 "	43½	1·0223	
19 "	44½	1·0221	
21 "	44	1·0225	
23 "	44½	1·0224	
26 "	45	1·0218	
30 "	45½	1·0218	
34 "	45½	1·0224	
38 "	45½	1·0226	
42 "	45½	1·0226	
46 "	45½	1·0226	
48 "	44½	—	
49 "	43½	1·0235	
49¾ "	41	—	At South-west Point, Anticosti.
0 M.	42½°	—	At South-west
2 "	42	—	Point.
4 "	43	—	
6 "	45	—	(On June 7, 1911.)
8 "	46½	1·0224	
10 "	46½	—	
12 "	47½	1·0224	
14 "	46½	1·0226	
16 "	47	1·0228	
18 "	49½	1·0226	
20 "	50¼	1·0224	
22 "	50	1·0223	
24 "	50	1·0221	
26 "	49¾	1·0221	(*Continued*)
28 M.	49¾	1·0225	(*Continued*)
30 "	50½	1·0221	
32 "	50½	1·0220	
34 "	50	1·0220	
36 "	50½	1·0224	
38 "	49½	1·0226	
40 "	48	1·0225	
42 "	50	1·0224	At 4 miles off shore.
44 "	49½	1·0223	(Along shore)
45 "	—	—	Station B, 4½ miles off shore.
	—	1·0212	At a point 2 miles along shore from Fame Point.
0 M.	47°	1·0215	At 1 mile off Fame Point.
2 "	45½	1·0219	
4 "	45	1·0224	(On June 15, 1911.)
6 "	45	1·0225	
8 "	46½	1·0222	
10 "	47	1·0218	
12 "	49½	1·0218	
14 "	50	1·0216	
16 "	50½	1·0218	
18 "	51	1·0217	
20 "	52	1·0216	
22 "	52½	1·0215	
23¾ "	52	1·0215	
24 "	—	—	Station D. Middle of passage.
0 M.	—	1·0219	Station D.
3 "	—	1·0219	
7 "	—	1·0219	(On June 17, 1911.)
11 "	—	1·0218	
15 "	—	1·0217	
19 "	—	1·0220	Off Cape Henry.

From Station B off Fame Point, across the passage to South-west Point, Anticosti; and thence across to Cape Rosier. On June 22, 1911.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	47°	—	Station B, off Fame Point.
2 "	52	—	
4 "	52½	—	
6 "	52	—	
8 "	51½	—	
10 "	51	—	
12 "	51½	—	
16 "	52	—	
20 "	52	—	
24 "	52	—	
28 "	52	—	
32 "	51½	—	
36 "	51	—	
38½ "	49½	—	
40½ "	48½	—	
42½ "	47½	—	At Southwest Point.
0 M.	—	—	At 1⅛ miles off Southwest Point.
¼ "	47½°	—	
3 "	50	—	
6 "	50	—	
9 "	50	—	
12 "	52	—	
15 "	52	—	
21 "	52	—	
25 "	52	—	
29 "	52	1·0220	
31 "	52	1·0221	
33 "	52½	1·0220	
35 "	52½	1·0224	
37 "	52	1·0209	
39 "	52	1·0201	
41 "	52	1·0190	At 5¼ miles off Cape Rosier.

Temperatures from Cape Rosier to Cape Gaspé. On June 22, 1911.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	52°	—	At 5¼ miles off Cape Rosier.
1½ "	51	—	
3½ "	50½	—	
5½ "	50	—	
6¾ "	—	—	At ½ mile off Cape Gaspé.

Temperatures along shore on the Anticosti side, and on the Gaspé side of the passage. On June 28 and July 2, 1895.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	—	—	At South-west Point.
26 M.	53°	—	In offing of St. Mary cliff.
30 "	54	—	
35 "	54	—	
38 "	54	—	
45 "	53	—	
50 "	53½	1·0213	At 3¼ miles south of West Point, Anticosti.
0 M.	50¾°		At ¾ mile off Cape Gaspé.
—	51		
—	49		
7 M.	48½		Off Cape Rosier.
—	48		
—	48		
—	46		
—	46¼		
—	46		
—	45		
31 M.	47		At 6 miles off Fame Point.

Deep temperatures at Station E, 11½ miles off Fame Point. On July 5, 1895.

Surface.....	53°	15 Fath.....	37°
5 Fath.....	47	20 "	34½
10 "	45½	30 "	32½

From Station G in middle of the passage, to Cape Gaspé; and thence for 12 miles across the Gaspé current in the direction of Station J. On July 8 and 10, 1911.

Distance in miles.	Surface temp're.	Surface density.	Remarks.
0 M.	57°	—	At Station G.
3 "	58	—	
6 "	57	—	(On July 8, 1911.)
9 "	56½	—	
12 "	56½	—	
15 "	57	—	
18 "	55½	—	
21 "	55½	—	
22¼ "	—	—	At 4 miles off Cape Rosier.
23½ "	54	—	
24½ "	54	—	
26 "	54	—	
27½ "	55	—	
28¾ "	55	—	At 1 mile off Cape Gaspé.
0 M.	—	1·0191	At 1 mile off Cape Gaspé.
2 "	—	1·0192	
4 "	—	1·0204	
6 "	—	1·0203	(On July 10, 1911.)
8 "	—	1·0203	
10 "	—	1·0200	
12 "	—	1·0202	Twelve miles out.

Temperature of the water along the Anticosti shore, from the Lightship off Heath Point to Pavillon river. On July 15, 1911.

0 miles	56°	At Lightship, 8 miles off Heath Point.
3 "	54	
6 "	52½	
8¼ "	53	At 3¼ miles off Heath Point.
11 "	54	
14 "	54	
17¾ "	60	(On a line 4 miles from shore.)
20 "	59	
23 "	59½	
26 "	62	
29½ "	61½	Off Bagot Point, Anticosti.
32¼ "	60½	
35 "	61	
38 "	61½	
41 "	63	(On a line 2½ miles from shore.)
44 "	63	
47 "	63	
50 "	63	
53 "	62	
56 "	61	
61¼ "	62	Off mouth of Pavillon river.

Temperatures from Cape Gaspé to Station C at 4½ miles off English Point. On July 24, 1911.

0 miles	59½°	At ½ mile off Cape Gaspé.
2¼ "	59½	
5 "	59	
7 "	—	At 1¼ miles off Cape Rosier.
8 "	58	
10½ "	60	
13½ "	61	
17 "	—	At Station C.

Deep densities taken at the various Stations in this region, in 1895; between July 8 and August 2.

Year.	Date.	Station.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 40 Fath.	At 60 Fath.	Remarks.
1895	July 8	Sta. C.	1·0204	—	1·0212	1·0241*	1·0244*	
"	" 12	" F.	1·0227	—	1·0238	1·0244	1·0245	
"	" 13	" G.	1·0232	1·0237	1·0245	1·0247	1·0250	
		Miles from shore.						
"	" 13	3·8 miles	1·0206	1·0226	1·0241	1·0244	1·0253	From Cape Rosier towards Station G.
"	" "	6·8 "	1·0206	1·0231	1·0243	1·0251	1·0250	
"	" "	9·8 "	1·0205	1·0232	1·0243	1·0248	1·0249	
"	" "	14·5 "	1·0215	1·0235	1·0246	1·0247	1·0250	
"	" 16	Sta. XIX.	1·0232	1·0242	1·0245	1·0248	—	

Year.	Date.	Station.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.	
1895	July 19	Sta. XX.	1·0232	1·0247	1·0247	1·0242	—	†
"	Aug. 1	" E.	1·0206	1·0210	1·0233	1·0244	1·0248	‡
"	" 2	" D.	1·0208	1·0222	1·0237	—	—	

* These two densities are actually at 35 and 55 fathoms.

† After the tidal stream setting westward.

‡ After prolonged eastward current.

Mingan Strait.—Deep densities and temperatures.

From West Point of Anticosti across Mingan strait to the North shore. On June 28, 1895.

Distance in miles.	Surface temp're.	Surface density.	Locality.
0 M.	53°	1·0213	At 2½ miles west of West Point, Anticosti.
3 "	51½	1·0214	
8 "	49½	1·0215	
13 "	52½	1·0217	
16 "	50½	1·0217	
19 "	50	1·0216	
22 "	50	1·0221	At 5 miles S.W. of Magpie Point.

Surface temperatures and densities at the Stations in Mingan strait, for comparison.

Surface temp're.	Surface density.	Remarks.
51°	1·0232	At Station XIX. On July 16, 1895.
55	1·0232	At Station XX. On July 19.

Note.—For deep densities at Stations XIX and XX in Mingan strait, in July, see table of densities at the various Stations already given, on opposite page.

Station.	Date: 1895	Surface temp're.	Depth in Fathoms.				Remarks.
			10 F.	20 F.	30 F.	40 F.	
XIX	July 16	51°	42	36½°	34½°	33½°	At slack after flood, setting westward.
"	" 16	52	39½	37½	33½	32½	At slack after ebb, setting eastward.
"	" 17	52½	42	36½	35	33½	At slack after flood.
"	" 17	53	43½	37	32	32	At slack after ebb.
XX	" 18	54	47	40½	34	—	At slack after ebb.
"	" 19	55	42½	38	35	—	At slack after flood.

Distance in miles.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 50 Fath.	Remarks.
0·0 M.	1·0236	1·0241	1·0243	—	Density section from Mingan island across the strait to North Point of Anticosti island. On July 20, 1895.
3·1 "	1·0236	1·0246	1·0246	—	
6·0 "	1·0235	1·0240	1·0248	1·0251	
9·3 "	1·0233	1·0234	1·0241	1·0250	
11·7 "	1·0211	1·0231	1·0240	—	

	Surface	10 F.	20 F.	30 F.	50 F.	
0·0 M.	44½°	43°	39½°	—	—	Temperature section (returning across the strait) at the same points and on the same day. The points are given in the same order, to correspond.
3·1 "	49	45½	42½	—	—	
6·0 "	53	50	39½	37°	34½°	
9·3 "	53	49½	40	39	34	
11·7 "	56	49	42	—	—	

Temperature of the water from Cape Gaspé across the main passage to Bagot Point, Anticosti. On the night of July 29-30, 1911.

0 miles	58°	At 1 mile off Cape Gaspé.
2 "	58	
4 "	57	
6 "	57	
8 "	57	
10 "	57½	
12 "	57½	
14 "	57	
16 "	57	
18 "	57	
20 "	56½	
22 "	56	
24 "	57	
27 "	56½	
30 "	62	
33 "	63	
36 "	62	
39 "	62	
42 "	64	
45 "	62	
48 "	62	
51 "	—	
54 "	62	
57 "	61	
60 "	60	
63 "	60	
66 "	60	
69 "	60	
72 "	60	
75 "	64	
78 "	64	
80½ "	63	
84 "	62	
86 "	61½	At 2 miles off Bagot Point.

Temperatures along the Gaspé coast from Cape Gaspé to Cape Magdalen. On August 28, 1911.

—	57½°	Gaspé bay; 1½ m. inside the Cape.
0 miles	56	At Cape Gaspé.
1 "	56	
2 "	56	
3 "	56	
4 "	55	
5 "	54½	
6 "	55	
6½ "	54	At ¾ mile off Cape Rosier.
10 "	54	
13¾ "	54	Off English Point.
17 "	55	
20 "	54	
23 "	54½	
26 "	56	
29 "	56	
30 "	56½	
30¼ "	—	At ¾ mile off Fame Point.
32 "	57	
34½ "	57	
37 "	56	
39½ "	58	
42 "	57	
44½ "	58	
47 "	58	
49½ "	56	
52 "	58	
55 "	58	
58 "	58	
60½ "	58	At 1¼ miles off Cape Magdalen.
61 "	58	
62 "	57	
63¾ "	57	At Station A, 4½ miles off Cape Magdalen.

Distance from shore.	Surface density.	Remarks.
1 M.....	1·0208	Line of surface densities from Fame Point, at right angles to the shore, for ten miles out. On July 31, 1895.
4 "	1·0205	
7 "	1·0206	
10 "	1·0205	

Density sections across the main passage between the Gaspé coast and Anticosti, in 1895. All the sections as given, begin on the Gaspé side. The zero of mileage and the final mileage are at the shore lines on the two sides, to fix the sections in position.

Distance in miles.	Surface temp're.	Density. — Surface.	At 10 Fath.	At 20 Fath.	At 30 Fath.	At 50 Fath.	Remarks.
0 M.	(Shore)	—	—	—	—	—	From Fame Point to Cape Henry at the mouth of Ellis bay, Anticosti. On July 26, 1895.
3 "	—	1·0214	1·0227	1·0241	1·0247	1·0253	
6 "	—	1·0208	1·0232	1·0243	—	1·0251	
9 "	—	1·0213	1·0231	1·0244	1·0248	—	
12 "	—	1·0207	1·0228	1·0235	—	1·0250	
15 "	—	1·0208	1·0223	1·0233	1·0245	—	NOTE.—The mileage is from shore to shore at the two sides of the passage.
18 "	—	1·0208	1·0220	1·0235	—	1·0244	
21 "	—	1·0209	1·0230	1·0237	—	—	
25 "	—	1·0205	1·0229	1·0239	—	1·0247	
32 "	—	1·0218	1·0233	1·0242	—	1·0251	
39 "	—	1·0225	1·0242	—	—	—	
42 "	(Shore)	—	—	—	—	—	
0 M.	(Shore)	—	—	—	—	—	From Cape Gaspé across the main passage to the Beacon at Salt Lake bay, Anticosti; situated at 15 miles eastward of South-west Point. On August 3, 1895. (The last point, at 45 miles, is 1¼ miles off shore from the Beacon.)
3 "	57°	1·0218	1·0235	1·0244	—	—	
6 "	58	1·0217	1·0243	1·0250	—	—	
10 "	57	1·0217	1·0243	1·0248	—	1·0253	
14 "	56	1·0220	1·0240	1·0249	—	1·0253	
19 "	56	1·0218	1·0243	1·0248	—	1·0253	
24 "	57	1·0223	1·0243	1·0249	—	—	
28 "	58	1·0224	1·0244	1·0248	—	1·0253	
33 "	57½	1·0228	1·0242	1·0246	—	—	
39 "	58	1·0226	1·0245	1·0248	—	—	
45 "	59	1·0230	1·0246	1·0249	—	—	
0 M.	(Shore)	—	—	—	—	—	From Cape Gaspé across the main passage to the same Beacon as above, at Salt Lake bay, Anticosti. On September 7, 1895. (The last point, at 45 miles, is 2 miles off shore at the Beacon.)
1 "	52°	1·0224	1·0225	—	—	—	
3 "	52½	1·0223	1·0227	1·0234	—	—	
7 "	52	1·0225	1·0233	1·0245	—	1·0249	
11 "	51½	1·0232	1·0238	1·0245	1·0246	—	
16 "	50	1·0232	1·0242	1·0245	—	1·0250	
20 "	51½	1·0230	1·0235	1·0242	1·0248	—	
25 "	52	1·0233	1·0240	1·0247	—	—	
31 "	52	1·0232	1·0238	1·0247	—	1·0256	
38 "	50	1·0234	1·0237	1·0244	1·0250	—	
42 "	—	1·0239	—	—	—	—	
44 "	—	1·0237	1·0244	1·0246	—	—	
45 "	—	1·0236	—	—	—	—	
0 M.	(Shore)	—	—	—	—	—	From Fame Point for 36 miles out, towards Ellis bay, Anticosti. On September 14, 1895. (The last point, at 36 miles, is at 5½ miles off Cape Henry at mouth of Ellis bay.)
1 "	51°	1·0218	—	—	—	—	
3 "	52	1·0222	1·0223	1·0236	1·0246	—	
6 "	51	1·0220	1·0223	1·0235	—	1·0248	
9 "	51½	1·0217	1·0222	1·0230	1·0242	—	
12 "	52½	1·0220	1·0220	1·0231	—	1·0246	
17 "	50	1·0214	1·0217	1·0228	1·0240	—	
22 "	52	1·0217	1·0221	1·0233	—	1·0245	
26 "	49	1·0220	1·0233	1·0237	1·0244	—	
31 "	50	1·0218	1·0231	1·0242	—	1·0247	
36 "	—	1·0219	1·0232	1·0241	—	—	

Temperatures along shore from Cape Rosier to Cape Gaspé. On July 28, 1911.

0 miles	58½°	At ½ mile off Cape Rosier.
1 "	58½	
2 "	60	
3 "	59	
4¼ "	58	
5½ "	58½	
6¾ "	57	At ¼ mile off Cape Gaspé.

Temperatures along shore from Cape Gaspé to Fame Point, and thence out to Station B, 4½ miles off this point. On August 7, 1911.

0 miles	65°	At 1 mile off Cape Gaspé.
2 "	64½	
4 "	65	
6¾ "	64½	Off Cape Rosier.
9 "	61	
11 "	58	
13 "	55½	
14¾ "	60	Off English Point.
17 "	57	
20¾ "	58	Off Fox river.
23 "	58	
25 "	56	
27 "	57	
29 "	57	
31 "	56	
33¼ "	57	At one mile off Fame Point.
35 "	59	
37 "	63	At Station B.

Temperatures from Cape Gaspé to Station C at 4½ miles off English Point. On August 13, 1911.

0 miles	57°	At ¾ mile off Cape Gaspé.
1¾ "	57½	
3½ "	57½	
5 "	57	
7 "	57	Off Cape Rosier.
9 "	56	
11 "	57	
13 "	57	
15¼ "	56½	
17¼ "	55	At Station C.

Temperatures from Cape Gaspé, on a line close to shore, to Station B off Fame Point. On August 21, 1911.

0 miles	54°	At one mile off Cape Gaspé.
3 "	55	
7¼ "	54	Off Cape Rosier.
9 "	54	
11 "	54	
13 "	55	
14¼ "	—	Off English Point.
15 "	53	
17 "	52	
19 "	54	Off Fox river.
21 "	53	
25 "	53	
27 "	54½	
31 "	54	
35¾ "	54	At 2¾ miles off Fame Point.
37½ "	55	At Station B.

From Cape Gaspé, across the direction of the current, to a point 5 miles eastward. (Bearing 69° from Cape Gaspé.) On August 25, 1911.

0 miles	55½°	At ¾ mile south of Cape Gaspé.
1 "	56	
1¾ "	59	
2½ "	59	
3¼ "	58	
4¼ "	55½	
5 "	55½	At 5 miles off the cape.

From Cape Gaspé to Station E, at 11½ miles off Fame Point. On September 4, 1911.

0 miles	54°	At 1¼ miles off Cape Gaspé.
1 "	54	
1¾ "	52	
2½ "	53	
3½ "	52½	
4½ "	53	
5½ "	52½	
7 "	52½	At 1¼ miles off Cape Rosier.
10 "	51	
13 "	50	
15¾ "	50	
19 "	49	
20 "	—	At 3 miles off Fox river.
22 "	49½	
25 "	49½	
28 "	50	
31 "	50	
34 "	50	
37 "	51	
40 "	51	At offing of Station E.
42 "	51	Station E.

From Cape Gaspé to Station F, at 11 miles off English Point. On September 7, 1911.

0 miles	52°	In mouth of Gaspé bay.
½ "	49½	At ¾ mile off Cape Gaspé.
1 "	49	
2 "	50	
3 "	49½	
4 "	49	
5 "	49	
6 "	49	
7 "	49	
7¼ "	49	Off Cape Rosier.
8 "	49½	
10 "	49	
12 "	49	
14 "	49	
16 "	48½	
18 "	48	
20 "	48	
21¼ "	48	
22 "	48	Station F.

From Cape Gaspé to Station C, at 4½ miles off English Point. On September 11, 1911.

0 miles	53°	At ¾ mile off Cape Gaspé.
1¾ "	51	
2½ "	51	
4 "	51	
5½ "	53	
7 "	53	At 1½ miles off Cape Rosier.
9 "	54	
11 "	54	
13 "	54	
14¾ "	53	At 3¾ miles off English Point.
17 "	51	
18 "	51	At Station C.

NORTHUMBERLAND STRAIT.

Season of 1908.

In this strait, it seemed probable that the temperature of the water might show some relation to the direction of the strong tidal flow in opposite directions, where this occurs. The density of the water was not taken, as the water in this Strait is uniformly of the lower density prevalent on the southwestern side of the Gulf of St. Lawrence.

The deep temperatures were taken to 15 fathoms only, for comparative purposes; as there are few parts of the Strait where the total depth admits of going further. It is probably because of this relative shallowness, that the water attains so high a temperature with the progress of the season; and because the water itself changes slowly, although it makes on the whole in an eastward direction, in accord with the general movement on the southwestern side of the Gulf. Apart from the fluctuation of the tidal streams, there is thus a gradual movement of the water to the eastward.

The observations are grouped in five periods, which correspond approximately with five successive months; to show more conveniently the change with the progress of the season. Also, for better distinction, the letters originally used for the Stations in 1908, which ran from A to G, are changed to others near the end of the alphabet.

Station S.—In the deepest part of the Strait between Pictou island and the opposite shore of Prince Edward island. From Wood island light, $7\frac{1}{2}$ miles 109°. (S. 48° E. magnetic.)

Station T.—In the middle of the Eastern narrows to the west of Pictou island. From Wood island light, $6\frac{1}{2}$ miles 224°. (S. 67° W. magnetic.)

Station U.—In the middle of the Central narrows off Cape Tormentine. From Point Borden, $3\frac{1}{2}$ miles 226°. (S. 69° W. magnetic.)

Station V.—In the middle of the Western narrows. From West Point of Prince Edward island, $5\frac{1}{2}$ miles 235°. (S. 78° W. magnetic.)

Station W.—In the mouth of George bay. From Cape George, $8\frac{1}{4}$ miles 35°. (N. 60° E. magnetic.)

Station Y.—Off Souris. From Souris head, $7\frac{1}{4}$ miles 157°. (S. 2° W. magnetic.)

Station Z.—In the eastern end of the Strait. From East Point of Pictou island, 6 miles 130°. (S. 26° E. magnetic.)

Deep temperatures in Northumberland Strait.—June 4 to July 5, 1908.

Station.	Date: 1908.	Surface temp're.	Depth in Fathoms.			Total depth.	Remarks.
			5 F.	10 F.	15 F.		
Station S.	June 5	41½°	40½°	39°	—	14 F.	On the Flood.
" S.	" 6	44	39½	38½	—	—	After the Ebb.
Station W.	" 8	46½	44½	37	31½°	24 F.	At Low Water. Currents here, not strong.
" W.	" 9	48½	40	33	31½	"	At Low Water " "
" W.	" 9	58½	44½	33½	31½	"	At High Water. " "
" W.	" 10	49½	42	34	31	"	At Low Water. " "
Station Y.	" 11	46	36½	—	35½	17½ F.	At High Water. " "
" Y.	" 11	48	39½	39	36½	"	On the Flood. " "
" Y.	" 12	50	43	39¼	38	"	On the Ebb. " "
" Y.	" 13	—	45	38½	36	"	After the Flood. " "
Station T.	" 16	50	40	39½	—	18½ F.	At slack after Ebb; setting eastward.
" T.	" 17	48	44	40	—	"	At slack after Ebb.
" T.	" 18	49	46	42	—	"	At slack after Ebb.
" T.	" 19	44	40½	39	—	"	At slack after Flood; setting westward.
" T.	" 20	45½	43½	42	—	"	At slack after Ebb.
Station V.	" 23	51½	51	51	—	12 F.	At slack after Ebb; setting northward.
" V.	" 24	52	50½	50	—	"	At slack after Flood; setting south-eastward.
" V.	" 24	52½	51	50¼	—	"	At slack after Ebb.
" V.	" 24	53	50½	50	—	"	At slack after Flood.
" V.	" 25	53	50½	50	—	"	At slack after Flood.
" V.	" 25	55	50½	51	—	"	At slack after Ebb.
" V.	" 26	53	52	51½	—	"	At slack after Flood.
" V.	" 26	53	52	52	—	"	At slack after Ebb.
" V.	" 27	55	52	51½	—	"	At slack after Flood.
Station U.	" 29	56	56	55¾	—	13 F.	At slack after Flood; setting south-eastward.
" U.	" 29	58	57	56½	—	"	At slack after Ebb; setting north-westward.
" U.	" 30	58	57	57	—	"	At slack after Flood.
" U.	July 1	59	57½	57½	—	"	At slack after Flood.
" U.	" 1	60½	57¾	57¾	—	"	At slack after Ebb.
" U.	" 2	60	58½	58¼	—	"	At slack after Flood.
" U.	" 2	60	59	58½	—	"	At slack after Ebb.
" U.	" 3	60	59	59	—	"	At slack after Flood.
" U.	" 3	62½	59	59	—	"	At slack after Ebb.

NOTE.—For the difference of temperature in the Flood and Ebb directions, see the valuations given in the notes below the tables on pages 77 and 80.

Temperatures from Pictou harbour to Station S, north of Pictou island. On June 4, 1908.

0 miles	45½°	At Light, mouth of Pictou harbour.
2 "	43	
4 "	43	
6 "	42½	
8 "	43	
10 "	42	
12 "	43	
14 "	42½	
16 "	41½	At Station S.

Temperatures from Pictou harbour to Station W, in the mouth of George bay. On June 8, 1908.

0 miles	46½°	At Light, mouth of Pictou harbour.
2 "	45½	
4 "	45½	
6 "	43½	
8 "	44	
10 "	44	
12 "	45	
14 "	45	
16 "	44½	
18 "	44½	
20 "	44	
22 "	43½	
24 "	44	
26 "	44	
28 "	45	
30 "	47	
32 "	46½	Off Cape George.
34 "	45	
36 "	46	
38 "	46	
39½ "	46	At Station W.

Temperatures from Station W, in the mouth of George bay, to Station Y, in the offing of Souris. On June 10, 1908.

0 miles	49½°	At Station W.
2 "	49	
4 "	49½	
6 "	50	
8 "	50	
10 "	50½	
11½ "	50	
14 "	49	
16 "	48½	
18 "	48	
20 "	48	
22 "	47	
24½ "	47	At Station Y.

Temperatures from Station Y, in the offing of Souris, to Pictou harbour. On June 13, 1908.

0 miles	47½°	At Station Y.
2 "	48	
6 "	48	
8 "	48	
11½ "	50	
13½ "	49½	
15½ "	49	Off Cape Bear.
18 "	50	
20 "	49	
22 "	50	
26 "	50	
28 "	50	At Pictou island light.
32 "	50	
34 "	50	
36 "	54	
37¾ "	55	At Hospital Point; mouth of Pictou harbour.

Temperatures from Pictou harbour to Station T, in the middle of the Eastern narrows. On June 15, 1908.

0 miles	59°	At Light, mouth of Pictou harbour.
2 "	56	
4 "	52	
6 "	52	
8 "	52	
10 "	53	
12 "	53	
14 "	54	
16 "	54	
18½ "	55	At Station T.

Temperatures from Station T as above, to Point Prim at mouth of Hillsborough bay. On June 20, 1908.

0 miles	43°	At Station T.
2 "	43½	
4 "	45	
6 "	47	
8 "	46½	
10 "	49	
12 "	48½	
14 "	48½	
15 "	50	At buoy, 2½ miles off Point Prim, on east side of Hillsborough bay.

Temperatures from mouth of Bedeque bay to Station U, in the Central narrows off Cape Tormentine. On June 29, 1908.

0 miles	60°	At buoy off Miscouche sands; at mouth of Bedeque bay on west side.
2 "	60	
3 "	59	
5 "	56	
7 "	56	
9 "	56	At Station U.

Temperatures from Hillsborough bay westward to Station V, in the Western narrows off West Point of Prince Edward island. On June 22, 1908.

0 miles	58°	At entrance buoy, middle of Hillsborough bay, opposite Governor island.
2 "	56	
4 "	55	
6 "	55	
8 "	56	
10 "	56½	
12 "	56½	
14 "	56½	
16 "	57	
18 "	55½	
20 "	55	At buoy, off Tryon shoal.
22 "	56	
24 "	57	
26 "	57	
28 "	55	
30 "	55	
32 "	54	
34 "	54	
38 "	54	
40 "	55	
42 "	56	
44 "	57	
46 "	57½	
48 "	56	Off Cape Egmont.
50 "	55	
52 "	54	
54 "	53	
56 "	53	
58 "	53½	
60 "	52	
62¾ "	51½	Off West Point of P.E.I.
65 "	51	At Station V.

Temperatures from Station V, in the Western narrows off West Point, to the mouth of Bedeque bay. On June 27, 1908.

0 miles	55°	At Station V.
2 "	55½	
4 "	56	
6 "	57	
8 "	56½	
10 "	55½	
12 "	55	
14 "	55	
16 "	56	
18 "	58	
20 "	60	
21¼ "	—	Off Cape Egmont.
22 "	60	
24 "	61	
26 "	61	
28 "	60	
30 "	60	
32 "	60	
34 "	61	At buoy off Miscouche sands; at mouth of Bedeque bay.

Temperatures from Station U, in the Central narrows off Cape Tormentine, to the mouth of Hillsborough bay. On July 4, 1908.

0 miles	61°	At Station U.
2 "	61½	
4 "	62	
6 "	62	
8 "	64	
10 "	63	At Tryon shoal buoy.
12 "	64	
14 "	66½	
16 "	65	
18 "	66½	
20 "	67	
22 "	65½	
24 "	67½	Off St. Peter island
26 "	68	" " "
28 "	68	
30 "	70	At entrance buoy; middle of Hillsborough bay, opposite Governor island.

Deep temperatures in Northumberland Strait.—July 6 to 31, 1908.

Station.	Date: 1908.	Surface temp're.	Depth in Fathoms.			Total depth.	Remarks.
			5 F.	10 F.	15 F.		
Station U.	July 7	65½°	60½°	59½°	—	13 F.	At slack after Ebb; setting north-westward.
" U.	" 7	68	61½	60½	—	"	At slack after Flood; setting south-eastward.
" U.	" 8	65	61	56½	—	"	At slack after Ebb.
" U.	" 8	65½	61	59	—	"	At slack after Flood.
" U.	" 9	64	62½	57¾	—	"	At slack after Ebb.
" U.	" 9	65	62	61	—	"	At slack after Flood.
" U.	" 10	65	62	58	—	"	At slack after Ebb.
" U.	" 11	63	61	57	—	"	At slack after Flood.
Station V.	" 13	58	57	56	—	12 F.	At slack after Ebb; setting northward out of the Strait.
" V.	" 14	60	57½	56	—	"	At slack after Ebb.
" V.	" 15	55	54	54	—	"	At slack after Flood; south-eastward into the Strait.
" V.	" 15	59	58½	57	—	"	At slack after Ebb.
" V.	" 16	55	54	54	—	"	At slack after Flood.
" V.	" 16	59	58	57	—	"	At slack after Ebb.
" V.	" 17	61	57	55½	—	"	At slack after Flood.
" V.	" 17	59	58	57	—	"	At slack after Ebb.
" V.	" 20	61	57	56½	—	"	At slack after Flood.
" V.	" 21	60½	58½	58	—	"	At slack after Ebb.
" V.	" 21	61	57	57	—	"	At slack after Flood.
" V.	" 22	60½	59	58½	—	"	At slack after Ebb.
" V.	" 22	58	57½	57½	—	"	At slack after Flood.
" V.	" 23	63	60	59	—	"	At slack after Ebb.
" V.	" 23	58½	57½	57	—	"	At slack after Flood.
" V.	" 24	58½	58	58	—	"	At slack after Flood.
" V.	" 25	59	58½	58	—	"	At slack after Flood.
Station W.	" 27	63	62½	51	—	24 F.	At Low Water. Currents here, not strong.
" W.	" 28	62½	58½	50½	46°	"	At High Water. " "
" W.	" 28	63½	63	49½	45	"	At Low Water. " "
" W.	" 29	63	63	50½	46½	"	At High Water. " "
" W.	" 29	64	60½	49½	47	"	At Low Water.
" W.	" 30	63	62½	50	46	"	At High Water " "
" W.	" 30	65	61	50½	46	"	At Low Water. " "
" W.	" 31	64	63	50½	46	"	At High Water. " "
" W.	" 31	—	63	50½	46	"	At Low Water. " "

NOTE.—For the difference of temperature in the Flood and Ebb directions, see the valuations given in the notes below the tables on pages 77 and 80.

Temperatures from Hillsborough bay to Station U in the Central narrows off Cape Tormentine. On July 6, 1908.

0 miles	67½°	At entrance buoy, middle of
2½ "	66	Hillsborough bay.
4½ "	64	Off St. Peter island.
6 "	66½	
8 "	65	
10 "	65	
12 "	64	
14 "	64½	
16 "	65	
18 "	64½	
20 "	65	Off Tryon shoal.
22 "	65	
24 "	64½	
26 "	63	
28 "	63½	
30 "	63	At Station U.

Temperatures from Station U in the Central narrows to the mouth of Bedeque bay on July 11, and from there on July 13 to Station V in the Western narrows.

0 miles	63½°	At Station U.
2 "	62½	
4 "	63	
6 "	65	
8 "	68	
10 "	71	At buoy off Miscouche sands
—	—	at mouth of Bedeque bay.
10 miles	69½°	At same buoy (on July 13.)
12 "	67½	
14 "	68½	
16 "	69	*(Continued)*
18 miles	68½°	*(Continued)*
20 "	66	
20½ "	—	Off Cape Egmont.
22 "	64	
24 "	62½	
26 "	60	
28 "	63	
30 "	62	
32 "	59	
34 "	59½	
36 "	60½	
38 "	62	
39 "	63	At Station V.

Temperatures from the mouth of Bedeque bay to Station V in the Western narrows off West Point. On July 20, 1908.

0 miles	64°	At buoy off Miscouche sands,
1 "	64	at the mouth of Bedeque
5 "	64½	bay.
7 "	64½	
9 "	65	
10¼ "	65	Off Cape Egmont.
12 "	65	
14 "	63½	
16 "	62	
18 "	60	
20 "	59½	
22 "	59	
24 "	58	
26 "	59	
27¼ "	59	At Station V.

Temperatures from Station V in the Western narrows, to the mouth of Hillsborough bay. On July 25, 1908.

0 miles	59°	At Station V.
2 "	59	
4 "	59½	
6 "	60	
8 "	60½	
10 "	61	
12 "	61	
14 "	61½	
16 "	63	
18 "	65	
19¼ "	65	Off Cape Egmont.
21 "	65	
23 "	64½	
24 "	65	
26 "	64½	
32 "	64½	
34¾ "	65	Off Sea Cow head.
36 "	63	
38 "	63	
40 "	62½	
42 "	63	
44 "	63	
46 "	63	
48 "	63½	
50 "	63½	
51¼ "	64	Off Tryon shoal.
54 "	64½	
56 "	64½	
58 "	64½	
62 "	64½	
64 "	65	
64½ "	65	At St. Peters reef buoy; west side of Hillsborough bay.

Temperatures from the mouth of Hillsborough bay to Station W in mouth of George bay. On July 27, 1908.

0 miles	62°	At buoy off Point Prim.
2 "	62	
4 "	62	
6 "	61	
9 "	61	Off Rifleman reef.
12 "	62	
13 "	62	At Indian rocks buoy.
14 miles	61½°	(*Continued*)
16 "	61½	
18 "	60½	
20 "	61	
22 "	62	
24 "	61	
26 "	61	
28 "	63	
30 "	62½	
32 "	63	
36 "	62	
38 "	62½	
40 "	62	
42 "	63	
44 "	62	
46 "	62	
48 "	62½	
50 "	62	
52 "	62	
53½ "	63	At Station W, mouth of George bay.

Temperatures from Station W to the mouth of Hillsborough bay. On August 1, 1908.

0 miles	64°	At Station W.
2 "	64	
8 "	64	
10 "	63½	
14 "	63½	
16 "	63	
18 "	64	
19½ "	64	
21 "	64	
23 "	63	
—	—	
33 "	63	
35 "	62	
37 "	61½	
38½ "	61	
40 "	62½	
41¼ "	62	At Indian rocks buoy.
42 "	63	
44 "	63	
46 "	62½	Off Rifleman reef.
48 "	63	
52 "	63½	
55½ "	64	At buoy off Point Prim.

Deep temperatures in Northumberland Strait.—August 7 to 30, 1908.

Station.	Date: 1908.	Surface temp're.	Depth in Fathoms.		Total depth.	Remarks.
			5 F.	10 F.		
Station Z.	Aug. 7	60°	59½°	55½°	14 F.	At slack after Ebb; setting north-eastward out of the Strait.
" Z.	" 7	61½	61½	55	"	At slack after Flood; setting westward into the Strait.
" Z.	" 8	60	58	54	"	During the Ebb.
" Z.	" 8	61	60½	55	"	During the Flood.
Station T.	" 10	65	61	57	18½ F.	At slack after Ebb stream; setting eastward.
" T.	" 11	64½	53	51	"	At slack after Flood stream; setting westward.
" T.	" 11	67	62½	51	"	At slack after Ebb.
" T.	" 12	64	55	51	"	At slack after Flood.
" T.	" 12	60½	—	49½	"	At slack after Ebb.
" T.	" 13	61	56	51	"	At slack after Flood.
" T.	" 14	63½	54½	50	"	At slack after Ebb.
" T.	" 14	63	55	49½	"	At slack after Flood.
" T.	" 15	—	53½	49½	"	At slack after Ebb.
Station Z.	" 17	62	60	57	14 F.	At slack after Flood; setting westward.
" Z.	" 18	60	59	56½	"	At slack after Ebb; setting north-eastward.
" Z.	" 18	61	59	54½	"	At slack after Flood.
" Z.	" 19	60	59½	55	"	At slack after Ebb.
" Z.	" 19	61	59½	55	"	At slack after Flood.
" Z.	" 20	60	59½	56	"	At slack after Ebb.
" Z.	" 20	60	59½	53½	"	At slack after Flood.
" Z.	" 21	59½	59	53½	"	At slack after Ebb.
" Z.	" 21	61	60	54½	"	At slack after Flood.
" Z.	" 22	60	60	56½	"	At slack after Flood.
Station U.	" 24	64	63½	63	13 F.	At slack after Ebb, setting north-westward.
" U.	" 25	65	64	64	"	At slack after Flood, setting south-eastward.
" U.	" 25	64½	63	62½	"	At slack after Ebb.
" U.	" 26	65	64½	64	"	At slack after Flood.
" U.	" 26	64	62½	62	"	At slack after Ebb.
" U.	" 27	64	64	63½	"	At slack after Flood.
" U.	" 27	64	63	62½	"	At slack after Ebb.
" U.	" 28	63	62½	62½	"	At slack after Flood.
" U.	" 28	64	63	63	"	At slack after Ebb.
" U.	" 29	62½	62	62	"	At slack after Flood.

NOTE.—For the difference of temperature in the Flood and Ebb directions, see the valuations given in the notes below the tables on pages 77 and 80.

Temperatures from Hillsborough bay to Station Z, east of Pictou island. On August 7, 1908.

0 miles	64°	At entrance buoy, middle of
1¾ "	62	Hillsborough bay.
4 "	61	At buoy off Point Prim.
8 "	61	
12 "	61	
16 "	61	
18 "	61½	At Indian rocks buoy.
20 "	61½	
22 "	61½	
24 "	62	
26 "	62½	
28 "	63	
30 "	62	
32 "	61½	
34 "	62½	
36 "	60	
37¾ "	60	At Station Z.

Temperatures from Pictou harbour to Station T in the middle of the Eastern narrows. On August 10, 1908.

0 miles	63°	At Light, mouth of Pictou
2 "	63	harbour.
4 "	61½	
6 "	60½	
8 "	63	Off Caribou light.
10 "	65	
12 "	66	
14 "	65	
16 "	66	
18 "	64	
18¾ "	65	At Station T.

Temperatures from Station T as above, to Pictou harbour. On August 15, 1908.

0 miles	57°	At Station T.
2¼ "	57	
4¼ "	60	
6¼ "	61	
8¼ "	60	Off Caribou light.
10¼ "	61	
12¼ "	62	
13¾ "	63	At Hospital Point, mouth of
		Pictou harbour.

Temperatures from Pictou island to Station Z to the eastward. On August 17, 1908.

0 miles	63°	At Pictou island light.
4 "	62	
8 "	62	
12 "	62	At Station Z.

Temperatures from Station Z, east of Pictou island, to Hillsborough bay. On August 22, 1908.

0 miles	60°	At Station Z.
2 "	60	
4 "	59½	
8 "	59½	
12 "	57	
14 "	56	
16 "	55	
18 "	56	
20 "	58	
22½ "	59	Off Indian rocks.
24 "	59	
26 "	59½	
28 "	59½	Off Rifleman reef.
30 "	59½	
32 "	59	
34 "	61	
36 "	63	
38 "	63	At buoy, off Point Prim.

Temperatures from Hillsborough bay to Station U in the Central narrows off Cape Tormentine. On August 24, 1908.

0 miles	62°	At entrance buoy, middle of Hillsborough bay, off Governor island.
2 "	61	
5¼ "	63	
6 "	62½	
8 "	64	
10 "	63	
12 "	63	
16 "	63	
18¼ "	64	At Tryon shoal buoy.
20 "	64	
22 "	63½	
24 "	65	
26½ "	64	At Station U.

Temperatures from Station U in the Central narrows to Hillsborough bay. On August 29, 1908.

0 miles	63°	At Station U.
2 "	62	
4 "	62	
6 "	64	
8 "	64	
10 "	64½	
11¼ "	65	At Tryon shoal buoy.
14 "	65	
16 "	65½	
18 "	65	
22 "	65	
24 "	64	Off St. Peters reef.
26 "	64	
28 "	63½	
29½ "	63½	At entrance buoy, Hillsborough bay.

Deep temperatures in Northumberland Strait.—September 1 to 25, 1908

Station.	Date: 1908.	Surface temp're.	Depth in Fathoms.			Total depth.	Remarks.
			5 F.	10 F.	15 F.		
Station T.	Aug. 31	60°	60°	56°	—	18½ F.	At slack after Flood stream; setting westward.
" T.	Sept. 1	59	58	55½	—	"	At slack after Ebb stream; setting eastward.
" T.	" 1	60	59	56	—	"	At slack after Flood.
" T.	" 2	59	58½	56	—	"	At slack after Ebb.
" T.	" 2	59	57½	56	—	"	At slack after Flood.
" T.	" 3	59	58½	56	55°	"	At slack after Ebb,
" T.	" 3	59	57	56	—	"	At slack after Flood.
" T.	" 4	59	58	56½	53	"	At slack after Ebb.
" T.	" 4	59	58	55	50½	"	At slack after Flood.
" T.	" 5	60	59½	55	51	"	At slack after Ebb.
" T.	" 7	61	57	54	51	"	At slack after Ebb.
" T.	" 8	60	57½	52½	52	"	At slack after Ebb.
" T.	" 10	58½	56	54½	52	"	At slack after Flood.
" T.	" 10	58½	56	53	52½	"	At slack after Ebb.
" T.	" 11	58	56½	53½	52	"	At slack after Flood.
" T.	" 11	56	56½	54	53	"	At slack after Ebb,
" T.	" 12	61	56	54	53	"	At slack after Flood.
Station Z.	" 16	60	59½	59½	—	14 F.	At slack after Ebb; setting north-eastward.
" Z.	" 16	61	59½	59½	—	"	At slack after Flood stream; setting westward.
" Z.	" 17	61	60	59½	—	"	At slack after Ebb.
" Z.	" 17	61	60½	60	—	"	At slack after Flood.
" Z.	" 19	60	60	59½	—	"	At slack after Ebb.
Station T.	" 22	58	57½	57	57	18½ F.	At slack after Flood stream; setting westward.
" T.	" 22	58	57½	57	57	"	At slack after Ebb stream; setting eastward.
" T.	" 24	59½	58	57½	—	"	At slack after Flood.
" T.	" 24	59½	58	57½	57½	"	At slack after Ebb.
" T.	" 25	59½	58	57½	57½	"	At slack after Flood.
" T.	" 25	59½	58	57½	57	"	At slack after Ebb.

NOTE.—In this series at Station T during September, the temperature on the flood and ebb directions of the current, does not differ more than ¼° on the average at the various depths. The general average for all depths, shows no appreciable difference of temperature between the flood and ebb directions of the tidal streams.

Temperatures from Hillsborough bay to Station T, in the Eastern narrows. On August 31, 1908.

0 miles	60°	At entrance buoy, Hillsborough bay.
2 "	60	
4 "	60	At buoy, off Point Prim.
6 "	60	
8 "	59	
10 "	59	
12 "	59½	
14 "	59½	
16 "	60	
18 "	59	
20 "	60	
22 "	60	At Station T.

Temperatures from Station T towards Pictou harbour. On September 5, 1908.

0 miles	61½°	At Station T.
2 "	62	
4 "	62	
6 "	62	
8 "	60½	
8½ "	61	Off Caribou light.

Temperatures from Station T to Hillsborough bay. On September 12, 1908.

0 miles	61°	At Station T.
2 "	61	
4 "	60	
6 "	59½	
10 "	59½	
14 "	60½	
16¼ "	61	At buoy, off Point Prim.
18 "	62	
20½ "	62	At entrance buoy, Hillsborough bay.

Temperatures from Hillsborough bay to Station Z, east of Pictou island. On September 14, 1908.

0 miles	62°	At entrance buoy, middle of Hillsborough bay, off Governor island.
2 "	61½	
4 "	61	
6 "	59½	
8 "	58	
12 "	57	
14 "	58	
15¼ "	58	Off Rifleman reef.
18 "	57	
22 "	58	
24 "	59	
26 "	58	
28 "	59	
31½ "	60	At 1¼ miles off Caribou light.
34 "	60	
38 "	59	
40 "	59	
42 "	60	At Station Z.

Temperatures from Caribou island to Station T, in the Eastern narrows. On September 21.

0 miles	58°	At Skinners buoy, two miles east of Caribou light.
1 "	58	
2¾ "	58	Off Caribou light.
3½ "	57½	
5½ "	58	
7½ "	57½	
9½ "	57	
10½ "	57½	
11½ "	57½	At Station T.

Temperatures from Station T in the Eastern narrows, to Hillsborough bay. On September 22, 1908.

0 miles	59°	At Station T.
2 "	59	
4 "	58	
6 "	58½	
8 "	58½	
10 "	59½	
12 "	60	
13½ "	59½	
15 "	59½	At buoy, off Point Prim.
18¾ "	60	At entrance buoy, Hillsborough bay.

Temperatures from Hillsborough bay to Station T, in the Eastern narrows. On September 24, 1908.

0 miles	60°	At entrance buoy, Hillsborough bay.
2 "	60	
4 "	60	At buoy, off Point Prim.
6 "	59½	
10 "	59	
12 "	58½	
14 "	59	
16 "	59½	
18 "	59½	At Station T.

Temperatures from Station T to Pictou harbour. On September 26, 1908.

0 miles	60°	At Station T.
2 "	60½	
4 "	60	
6 "	59½	
8¾ "	59	Off Caribou light.
10 "	59	
11 "	60	At Skinners buoy.
13 "	60	At mouth of Pictou harbour.

Temperatures from the vicinity of Pictou to Station U in the Central narrows off Cape Tormentine. On September 29, 1908.

0 miles	59½°	Off Caribou light.
2 "	59½	
4 "	59	
6 "	59	
8 "	59	
11 "	59	
14 "	59	
16 "	58½	
18 "	58½	
20 "	59	
22 "	59½	
24 "	60	
26 "	60	
28 "	60½	
30 "	60½	
32 "	60½	
34 "	60	
36 "	60	
38 "	60	
39½ "	60	At Tryon shoal buoy.
44 "	60	
46 "	60	
48 "	61	
48½ "	61	At Station U.

Temperatures from mouth of Bedeque bay to Station U, as above. On October 5, 1908.

0 miles	55°	Off Sea Cow head, at the mouth of Bedeque bay on the East side.
2 "	58	
4 "	59	
6 "	59	
7¼ "	59	At Station U.

Deep temperatures in Northumberland Strait.—September 30 to October 17, 1908.

Station.	Date: 1908.	Surface temp're.	Depth in Fathoms.		Total depth.	Remarks.
			5 F.	10 F.		
Station U.	Sept. 30	61°	60½°	60½°	13 F.	At slack after Flood stream; setting south-eastward.
" U.	" 30	61	60	60	"	At slack after Ebb stream, setting north-westward.
" U.	Oct. 1	61	60	60	"	At slack after Flood.
" U.	" 5	59	55½	55½	"	At slack after Ebb.
" U.	" 5	59	52½	52	"	At slack after Flood.
" U.	" 6	59	58½	58	"	At slack after Ebb.
" U.	" 6	59	58½	58	"	At slack after Flood.
" U.	" 7	59	58½	58	"	At slack after Flood.
" U.	" 7	59	58½	58	"	At slack after Ebb.
" U.	" 8	58	57	57	"	At slack after Flood.
" U.	" 8	58	57½	57	"	At slack after Ebb.
" U.	" 9	57½	57	57	"	At slack after Flood.
" U.	" 9	58	57½	57	"	At slack after Ebb.
" U.	" 10	57½	57	57	"	At slack after Flood.
" U.	" 14	56	56	55½	"	At slack after Flood.
" U.	" 15	55	55	55	"	At slack after Ebb.
" U.	" 16	54½	54	54	"	At slack after Ebb.
" U.	" 17	54½	54	54	"	At slack after Ebb.

NOTE.—This affords a good series at Station U for the determination of any difference in the temperature of the water in the Flood and Ebb directions. The best comparison is up to October 10; as after that, only one of the slacks of the day is obtained, and the water is growing colder with the progress of the season. The difference is less than ½° at any depth. The observations in June give a more marked result; the average difference for all depths being nearly ¾° between the two directions.

At Station V in the Western narrows, where the Strait connects with the open Gulf of St. Lawrence, the result is more pronounced; as the average difference for all depths is almost 1° between the two directions.

The difference at Station T at the eastern end of the Strait, is distinctly less, as already indicated under the table of the September observations.

THE BAY OF FUNDY.

SEASONS OF 1904 AND 1907.

This region includes the outer part of the Bay of Fundy as far up as St. John, N.B., with the vicinity of Grand Manan island, together with the waters off the Nova Scotia coast as far as Shelburne. The Stations at which anchorages were made, are situated in the passages and on the lines of ocean and coastal navigation in the region; and they are thus within an offing of 20 or 25 miles from the coast of the mainland.

The observations of both years are grouped together in successive periods, to make them correspond in general with the progress of the season. Because of the strong currents, the distances between points as obtained by the ship's log, may be greater or less than a measurement on the chart; but the relative positions of all points will be correct. The anchorage Stations are definitely fixed in position; and several of them were occupied in both years. The letters which indicate them, correspond with the publication on Currents in this region. The position of the Stations is defined by a bearing and distance from some convenient landmark, so that they can readily be laid down on a map or working chart.

Stations in the lower Bay of Fundy and its entrance, as far as Brier island.

Station A.—In the middle of the Bay, nearly on the meridian of St. John, N.B. From Cape Spencer light, $13\frac{3}{4}$ miles 188° (S. 26° W. magnetic.).
Station B.—From Prim Point light, $20\frac{1}{4}$ miles 278° (N. 64° W. magnetic).
Station C.—From Petit Passage light, $9\frac{3}{4}$ miles 314° (N. 28° W. magnetic).
Station D.—In Grand Manan channel. From Quoddy Head light, $4\frac{1}{2}$ miles 179° (S. 17° W. magnetic).
Station E.—Off Grand Manan island. From Gannet rock, 5 miles 114° (S. 48° E. magnetic).
Station F.—From Brier island light, 15 miles 279° (N. 63° W. magnetic).
Station G.—From Brier island light, $5\frac{1}{2}$ miles 247° (S. 85° W. magnetic).
Station W.—Off the coast of Maine. From Moose Peak light, 6 miles 114° (S. 48° E. magnetic).

Stations off Southern Nova Scotia, from Brier island to Shelburne.

Station H.—From $1\frac{1}{2}$-fathom patch on Lurcher Shoal, $6\frac{1}{4}$ miles 75° (S. 87° E. magnetic).
Station J.—From Cape Forchu light at mouth of Yarmouth harbour, $4\frac{1}{2}$ miles 261° (N. 81° W. magnetic).
Station K.—From Cape St. Mary light, $18\frac{1}{2}$ miles 252° (W. $\frac{1}{4}$° S. magnetic).
Station L.—From $1\frac{1}{2}$-fathom patch on Lurcher Shoal, 10 miles 243° (S. 81° W. magnetic).
Station M.—From Cape Forchu light, 17 miles 219° (S. 57° W. magnetic).
Station P.—From Blonde rock off Pubnico, 5 miles 176° (S. 14° W. magnetic).
Station Q.—From Cape Sable light, 12 miles 180° (S. 18° W. magnetic).
Station R.—From Cape Sable light, $3\frac{1}{2}$ miles 184° (S. 22° W. magnetic).
Station S.—From Brazil rock off Baccaro Point, 6 miles 84° (S. 78° E. magnetic).
Station T.—From Cape Roseway light off Shelburne, 11 miles 111° (S. 51° E. magnetic).

Deep temperatures, Bay of Fundy region.—June 13 to 29 in 1904 and 1907.

Station.	Date: 1907.	Surface temp're.	Depth in Fathoms.					Total depth.	Remarks.
			5 F.	10F.	15F.	30F.	50F.		
L.	June 13	42°	41°	41°	—	39°	—	54 Fath.	At High-water slack.
"	" 13	41	41	40½	40½°	40½	—	"	At Low-water slack.
M.	" 17	42	41	41	40½	40½	—	47 Fath.	At High-water slack.
"	" 18	42½	42	40½	40	40½	—	"	At Low-water slack.
"	" 20	43½	42½	42	41½	40½	—	"	At High-water slack.
"	" 21	43½	43	40½	40½	40½	—	"	At Low-water slack.
S.	" 25	48	44½	39	37	34	—	51 Fath.	At slack after Ebb; setting north-eastward.
"	" 26	47½	40½	37	36½	34½	—	"	At slack after Flood, setting westward.
"	" 27	47	43½	41	37	35	—	"	At slack after Flood.
"	" 27	46	45½	40½	39	35½	—	"	At slack after Ebb.
	1904.								
F.	June 23	46½°	45½°	44½°	44°	43½°	43½°	105 Fath.	At Low-water slack.
"	" 23	51	49½	49	47½	45	—	"	At High-water slack.
"	" 24	47	48½	47	47½	45½	—	"	At High-water slack.
"	" 24	47	44½	44½	44	44	—	"	At Low-water slack.
"	" 25	50	49	48	48½	45	44	"	At High-water slack.
"	" 25	50	48	46½	45	44	43½	"	At Low-water slack.
"	" 27	53	50½	50	50	46	44½	"	At High-water slack.
"	" 27	54	48	45	44½	44½	44	"	At Low-water slack.
"	" 28	52	51	49½	49½	44½	42½	"	At High-water slack.
"	" 28	51	46½	45½	45½	44½	44	"	At Low-water slack.
"	" 29	52	49½	49	47½	45½	43½	"	At High-water slack.

Temperatures of the surface water, from mouth of Yarmouth harbour southwards towards Station N; for a distance of 27 miles to the offing of Seal island. Temperatures taken every 15 minutes, approximately two miles apart. On June 7, 1904. Mouth of Yarmouth harbour 44°, 43½°, 43°, 43°, 41°, 42°, 41°, 41°, 41°, 41°, 41°, 41°, 41°, 41°, 41°, 41°, 40°, 40° in offing of Seal island. General average, 41°·4

Temperatures from Yarmouth to Station L, west of Lurcher shoal. On June 11, 1907.

0 miles	44°	At bell buoy, at the mouth of Yarmouth harbour.
2 "	43	
4 "	42	
6 "	41	
8 "	41	
12 "	41	
16 "	41	
20 "	41	
22 "	41	
22¼ "	—	At Station L.

Temperatures from Yarmouth to Station M in the offing. On June 17, 1907.

0 miles	—	At bell buoy, Yarmouth harbour.
1 "	45°	
3 "	43½	
5 "	42½	
7 "	43½	
8¾ "	43	At fairway buoy, off Chebogue.
11½ "	42	
13½ "	42	
15½ "	42	
16¾ "	42½	At Station M.

Temperatures from Station L as above, to Yarmouth harbour. On June 15, 1907.

0 miles	—	At Station L.
2 "	42°	
4 "	42	
6 "	41½	
7½ "	—	Off Lurcher shoal.
10 "	42	
12 "	42½	
14 "	43	
16 "	42½	
18 "	42	
20 "	43	
22 "	44½	
23¼ "	—	At bell buoy, Yarmouth harbour.

Temperatures from Station M as above, to Yarmouth harbour. On June 22, 1907.

0 miles	—	At Station M.
2 "	44°	
4 "	44½	
6 "	43½	
7¾ "	—	At fairway buoy, off Chebogue.
8 "	44	
10 "	44	
12 "	44	
14 "	44½	
16 "	46	
16¾ "	—	At bell buoy, Yarmouth harbour.

Temperatures off southern Nova Scotia from the vicinity of Seal island to Station S off Baccaro Point. On June 25, 1907.

0 miles	44½°	In offing of Mud island.
2 "	45½	
4 "	45½	
4¼ "	—	2½ miles west of Seal island light.
6 "	46	
8 "	45½	
10 "	44½	
12 "	44	
14¼ "	43½	At Blonde rock buoy.
16 "	43	
18 "	42½	
20 "	42	
24 "	41	
26 "	40	
28 "	39½	In the offing of Cape Sable.
30 "	39½	
32 "	42	
34 "	43	
36 "	46½	
38 "	46½	
40 "	46½	
41 "	47	
43 "	47½	
43¾ "	—	At Station S.

Temperatures from Station S to Barrington bay. On June 29, 1907.

0 miles	—	At Station S.
¼ "	47°	
2¼ "	46½	
4¼ "	46	
6¼ "	44½	
8 "	43½	At buoy off Baccaro Point.
9½ "	43½	In Barrington bay.
11 "	50	" "
12½ "	49½	" "
14½ "	—	Barrington lightship.

Temperatures from Barrington to Station Q off Cape Sable. On July 1, 1907.

0 miles	—	At Barrington lightship.
1 "	47°	
3 "	49½	
5 "	44	
7¾ "	43½	Two miles off Baccaro Point.
9 "	44	
11 "	43	
13 "	43½	
15 "	44½	
17 "	43	
19 "	44	
21 "	44	
21½ "	—	At Station Q.

Deep temperatures, Bay of Fundy region.—July 1 to 15 in 1904 and 1907.

Station.	Year and Date:	Surface temp're.	Depth in Fathoms.				Total depth.	Remarks.
			5 F.	10 F.	15 F.	30 F.		
Q.	1907, July 2	43½°	39½°	39½°	39°	39°	34 Fath.	At High-water slack.
"	" " 3	41½	40½	40½	40½	40	"	At Low-water slack.
"	" " 3	43½	41	39	39	38½	"	At High-water slack.
"	" " 4	43½	41	40¾	40½	40½	"	At Low-water slack.
"	" " 4	44	41	40	40	39½	"	At High-water slack.
"	" " 5	45½	42	41½	40½	40½	"	At Low-water slack.
"	" " 5	—	41½	40½	40	40	"	At High-water slack.
"	" " 6	45½	43½	41½	40¼	40¼	"	At High-water slack.
P.	" " 8	43½	43	43	43	—	26 Fath.	At Low-water slack.
"	" " 9	—	43	42	42	—	"	At High-water slack.
"	" " 9	44	43	43	43	—	"	At Low-water slack.
"	" " 10	43½	43	43	42½	—	"	At High-water slack.
"	" " 10	44	43½	43½	43½	—	"	At Low-water slack.
"	" " 11	43	42½	42½	42½	—	"	At High-water slack.
"	" " 11	44	43½	43½	43½	—	"	At Low-water slack.
"	" " 12	42½	42	42	42	—	"	At High-water slack.
"	" " 12	44½	43½	43½	43½	—	"	At Low-water slack.
"	" " 13	44½	43½	43½	43	—	"	At Low-water slack.
W.	1904, July 1	45°	45°	44°	44½°	43½°	42 Fath.	At High-water slack.
"	" " 1	45½	45	44	44	43¾	"	At Low-water slack.
"	" " 2	45	45½	44	44½	44	"	At Low-water slack.
"	" " 2	45½	44½	44	44	—	"	At High-water slack.
L.	" " 8	52	47½	46½	45½	44½	54 Fath.	(At 3 Fath. 50°) At L. W. slack.
"	" " 8	52½	52	50½	50½	44	"	At High-water slack.
"	" " 9	54	49	47	46½	44½	"	(At 3 Fath. 51°) At L. W. slack.
"	" " 9	51	49½	48½	47	45½	"	At High-water slack.
T.	" " 13	50	45½	37½	35	35	36 Fath.	After the Flood stream.
"	" " 13	50	43	38	36½	35	"	After the Ebb stream.
"	" " 14	51	44	38	36½	34	"	At the middle of the Ebb.
"	" " 15	52	45	36	35½	34½	"	After the Flood stream.

Temperatures from Station Q off Cape Sable to mouth of Pubnico bay. On July 6, 1907.

0 miles	47½°	At Station Q.
2 "	46	
4 "	45	
6 "	43	
10 "	46	
12 "	46½	
14 "	46½	
16 "	48½	
18 "	47	
20 "	53	
22½ "	53	
23 "	—	At north end St. John island, off Pubnico bay.

Temperatures from Pubnico bay to Station P south of Blonde rock. On July 8, 1907.

0 miles	—	At Pubnico light.
1½ "	52½°	
3½ "	50½	
5½ "	48½	
7¼ "	46	
9 "	44	
11 "	42½	
13 "	44	
15 "	43½	
17 "	43	
19 "	43½	
21 "	43	
22¾ "	43½	At Station P.

Temperatures from Station W off Moose Peak light, Maine, across the Bay of Fundy to Brier island. On July 5, 1904.

0 miles	46°	At Station W.
2 "	46	
4 "	46½	
6 "	46½	
8 "	47½	
9 "	48	
10 "	51	
12 "	50	
14 "	—	
16¼ "	51	
18 "	51	Off Grand Manan bank.
20 "	51	
22 "	50½	
24 "	50½	
26 "	51	
28 "	51	
30 "	52	
32 "	52	
34 "	52	
36 "	52	
38 "	51½	
40 "	51	
42 "	50½	
44 "	49	
46 "	48½	
48 "	48½	
50 "	48	
51¼ "	—	At 3 miles S.W. from the north end of Brier island.

Temperatures from Brier island to the Lurcher lightship, and thence to Station L to the south-westward. On July 6, 1904.

0 miles	48°	At 1½ miles off Brier island light.
3 "	48	
4½ "	48½	
6 "	48½	
7½ "	49	
9 "	49	
10½ "	49½	
12 "	50	
15 "	50½	
18 "	50	
19½ "	49½	
21 "	49	
22½ "	48	
24 "	48	
25½ "	50	
28¼ "	—	At Lurcher lightship.
29 "	51	
31 "	51	
33 "	52	
35 "	53	
36¼ "	54	At Station L.

Temperatures from Station L as above, to Yarmouth harbour. On July 9, 1904.

0 miles	52°	At Station L.
1¼ "	51	
3 "	51½	
5 "	49½	
7 "	51½	
9 "	52	
11 "	51½	
13 "	50½	
15 "	48½	
17 "	52½	
19 "	53	
21 "	51½	
23 "	50½	At Cape Forchu light, mouth of Yarmouth harbour.

Temperatures from Yarmouth, southward and eastward, on a line well off shore, to the offing of Cape Sable. On July 12, 1904.

0 miles	57°	At bell buoy, at the mouth of Yarmouth harbour.
¼ "	53	
½ "	51	
2½ "	51	
4½ "	50	
6¾ "	49½	
9 "	50	
10 "	54	
11 "	54½	
12 "	55	At fairway buoy, off Chebogue.
13 "	55	
15 "	56	
17 "	56	
21 "	55	
23 "	55	
25 "	54	
27 "	49	
29 "	48	
33 "	47	
37 "	47	
38¼ "	—	Direction changed to due East.
39 "	47	
41 "	47	
43 "	48	
45 "	48	
47 "	46	
49 "	46	
51 "	47	
53 "	47½	
55 "	47	
57 "	46	At 10½ miles off Cape Sable.

Temperatures from Station T towards Shelburne. On July 16, 1904.

0 miles	52°	At Station T.
½ "	51	
2 "	50	
4 "	50	
6 "	50	
8 "	50	
10 "	51	At 1½ miles East of Cape Roseway.

Deep temperatures, Bay of Fundy region.—July 17 to 31 in 1904 and 1907.

Station.	Year and Date:	Surface temp're.	Depth in Fathoms.				Total depth.	Remarks.
			5 F.	10 F.	15 F.	30 F.		
K.	1907, July 17	46½°	46°	45°	44°	43°	57 Fath.	At Low-water slack.
"	" " 17	46	45½	45	44½	43½	"	At High-water slack.
"	" " 18	46½	46	46	44	43	"	At Low-water slack.
"	" " 18	47½	46	45	44½	44	"	At High-water slack.
"	" " 19	50½	46	45	44	43½	"	At Low-water slack.
"	" " 19	49	48	45½	44½	43½	"	At High-water slack.
"	" " 20	46½	46	45	45	44	"	At High-water slack.
"	" " 20	48	45	44	45*	43½	"	At Low-water slack.
A.	" " 23	55½	49½	44	43½	43½	55 Fath.	At High-water slack.
"	" " 23	54½	49	44½	44	43½	"	At Low-water slack.
"	" " 24	55½	—	44	44	43½	"	At High-water slack.
"	" " 24	56½	49	44	44	44	"	At Low-water slack.
"	" " 25	55	50½	44	44	44	"	At High-water slack.
"	" " 25	55	50	44½	44	44	"	At Low-water slack.
"	" " 26	55	46½	44½	44½	44	"	At Low-water slack.
"	" " 26	55	50½	44	44	44	"	At High-water slack.
M.	" " 29	49½	48½	47½	45½	45	47 Fath.	At Low-water slack.
"	" " 29	50½	47½	46½	45½	45	"	At High-water slack.
"	" " 30	50½	48½	46½	46	45	"	At Low-water slack.
"	" " 30	51½	47½	46½	46	45½	"	At High-water slack.
"	" " 31	49½	47½	46	46	45	"	At Low-water slack.
"	" " 31	51	47½	46½	46½	45½	"	At High-water slack.
Q.	1904, July 19	49°	41½°	38½°	37½°	37°	34 Fath.	At High-water slack.
"	" " 20	41	40	40	39¾	39	"	At Low-water slack.
"	" " 20	53½	39½	38	38	37	"	At High-water slack.
"	" " 21	41½	40½	40½	39½	38½	"	At Low-water slack.

* This reading specially checked, as it is higher than at less depth.

Temperatures from Yarmouth to Station K to the northwest of Lurcher Shoal. On July 16, 1907.

0 miles	50°	At bell buoy at the mouth of Yarmouth harbour.
2 "	48½	
4 "	49½	
6 "	48½	
8 "	48	
10 "	47½	
12 "	49½	
14 "	48½	
15¼ "	—	At Lurcher lightship.
16 "	48	
18 "	48	
20 "	46½	
24 "	46½	
24¾ "	46½	At Station K.

Temperatures from Station K as opposite, to Yarmouth. On July 20, 1907.

0 miles	48°	At Station K.
2 "	49	
4 "	50	
6 "	49	
8 "	47½	
10 "	49	
12 "	50	
14 "	50	
16 "	51	
18 "	50½	
20 "	47½	
22 "	49	
24 "	50	
24¾ "	—	At bell buoy, Yarmouth harbour.

Temperatures from Shelburne harbour to Station Q off Cape Sable. On July 18, 1904.

—	52°	In Shelburne harbour.
0 miles	51½	At 1½ miles off Cape Roseway.
2 "	51	
4 "	51	
6 "	53	
8 "	53	At 2¼ miles off Negro island.
10 "	52	
14 "	50	
16 "	49	
18 "	48	
20 "	47	
21 "	45	At Brazil rock buoy.
25 "	45	
27 "	43	
29 "	42	
30 "	41	
32 "	43	
34 "	45	
34½ "	49	
35 "	52	
35½ "	—	At Station Q.

Temperatures from Shag harbour to Station P south of Blonde rock. On July 25, 1904.

0 miles	45°	At bell buoy, Shag harbour.
1 "	44	
3 "	43	
7 "	43	
8 "	43¼	
10 "	43½	
14 "	43½	At a point 7 miles East of
16 "	44	Station P.
20 "	44½	
21¾ "	45	At Station P.

Temperatures off Cape Sable, from Station Q to Station R, at right angles to the direction of the tidal streams. On July 21, 1904.

0 miles	52°	At Station Q.
½ "	52	
1 "	51½	
1½ "	51½	
1¾ "	51	
2 "	48	
2¼ "	47	
2½ "	46½	
2¾ "	46	
3 "	45	
3¼ "	45	
3½ "	45½	
3¾ "	46	
4 "	47	
4¼ "	47½	
4½ "	48½	
4¾ "	50	
5 "	51½	
5¼ "	52	
5½ "	52	
5¾ "	52	
6 "	52	
6¼ "	—	
6½ "	52	
6¾ "	51½	
7 "	51	
7¼ "	50½	
7½ "	50	
7¾ "	49½	
8 "	49½	
8¼ "	49½	
8½ "	48½	At Station R.

Comparison of surface temperatures during the flood and ebb periods at Stations Q and R, off Cape Sable.

At Station Q, from July 18 to 21, 1904:—
During the Flood, setting westward; mean of 10 observations..... 48°·3
During the Ebb, setting eastward; mean of 11 observations..... 47°·1

At Station R, from July 21 to 23, 1904:—
During the Flood, setting westward; mean of 4 observations..... 48°·0
During the Ebb, setting eastward; mean of 8 observations..... 44°·9

Temperatures from Station P south of Blonde rock, to Yarmouth. On July 13, 1907.

0 miles	43½°	At Station P.
3½ "	44	
7 "	46	
8½ "	—	At 2½ miles off Seal island.
10 "	47	
13½ "	46	
16½ "	—	Direction changed to
17 "	46	N.N.W. (true).
20 "	46½	
23 "	46½	
26½ "	47	
30 "	46½	
33 "	47½	
34¼ "	—	At bell buoy, Yarmouth harbour.

Temperatures from Station P south of Blonde rock, to Yarmouth. On July 30, 1904.

0 miles	45°	At Station P.
½ "	46½	
1 "	47	
3 "	47	
5 "	46	
6 "	47	(Direction, 0 to 18 miles,
8 "	47½	W.N.W., true.)
10 "	48	
12 "	48½	
13 "	49	
14¼ "	49	
16 "	50	
18 "	51	Direction changed to N.N.E
20 "	52	
22 "	52½	
24 "	53½	
26 "	54	(Direction, 18 to 38 miles,
28 "	53½	N.N.E. and N.E. by E.,
31 "	53	true.)
33 "	52	
35 "	52	
37 "	51½	
38 "	—	At fairway buoy. Direction
39½ "	50½	changed.
40 "	50	
42 "	50	
44 "	50½	
45 "	50	
46 "	50	
47 "	51	
48 "	53	
48¾ "	54	
49 "	54½	At bell buoy, Yarmouth harbour.

Temperatures from Digby to Station A in middle of the Bay of Fundy. On July 22, 1907.

0 miles	—	At Prim Point light, at entrance to Digby gut.
½ "	57½°	
1½ "	56½	
2½ "	56	
4½ "	56½	
6½ "	56½	
8½ "	57	
12½ "	57	
16½ "	56	
17¾ "	—	At Station A.

Temperatures from Station A as above, to Digby. On July 26, 1907.

0 miles	55°	At Station A.
2 "	52½	
4 "	51½	
7½ "	52	
9½ "	50½	
11 "	49½	
13 "	46	
15 "	46½	
17 "	47½	
18 "	—	At Prim Point light.

Temperatures from Digby, along shore, to Brier island. On July 27, 1907.

0 miles	—	At Prim Point light.
1 "	47½°	
6 "	46½	
11 "	47½	
15 "	47½	
19½ "	48	
24 "	47	
32½ "	47	
34 "	—	At north point of Brier island.

Temperatures from Brier island to Station M, in the offing of Yarmouth. On July 29, 1907.

0 miles	48°	Off Gull rock, south of Brier island.
1 "	48	
3 "	47½	
5½ "	47½	
8 "	47½	
10 "	47½	
12 "	47½	
14½ "	48	
17 "	48	
19 "	48	
21 "	48	
23½ "	48	At Lurcher lightship.
26 "	48	
30 "	48	
32½ "	49½	
35 "	49½	
37 "	49½	
39½ "	49½	At Station M.

Temperatures from Station M, as above, to Yarmouth. On August 1, 1907.

0 miles	—	At Station M.
½ "	48½°	
2¼ "	48½	
4 "	47½	
6 "	46½	
8 "	47	
8¼ "	—	At fairway buoy, off Chebogue.
10 "	47½	
12 "	48½	
14 "	50	
16 "	49½	
18 "	50½	At bell buoy at the mouth of Yarmouth harbour.

Deep temperatures, Bay of Fundy region.—August 8 to 19 in 1904 and 1907.

Station.	Date: 1904.	Surface temp're.	Depth in Fathoms.					Total depth.	Remarks.
			5 F.	10F.	15F.	30F.	50F.		
G.	Aug. 8	52°	51°	—	49½°	47°	—	50 Fath.	At High-water slack; after Flood stream inward from the ocean.
"	" 8	50	49½	49°	—	48	—	"	At Low-water slack; after Ebb stream outward from the Bay of Fundy.
"	" 9	51	49½	49½	49	48	—	"	At High-water slack.
"	" 9	50	49	48½	48	47½	—	"	At Low-water slack.
	1907.								
B.	Aug. 9	53½°	49°	47½°	46°	45°	—	68 Fath.	At High-water slack, after the inward stream.
"	" 9	53½	50	49	46	44½	—	"	At Low-water slack, after the outward stream.
"	" 10	52	48	47	47	45½	—	"	At Low-water slack.
"	" 10	53½	50	47	46	44½	—	"	At High-water slack.
"	" 12	51½	47½	46½	45½	43½	—	"	At High-water slack.
"	" 13	52	50½	47	45	44	—	"	At Low-water slack.
"	" 13	52	51½	47½	45½	44½	—	"	At High-water slack.
"	" 14	53	49	45	45	44	—	"	At High-water slack.
"	" 15	52½	49½	47	45	44	—	"	At Low-water slack.
"	" 15	52	49	47½	46½	44½	—	"	At High-water slack.
"	" 16	51½	47	46½	46	44½	—	"	At Low-water slack.
"	" 16	52½	51	48	45½	45	—	"	At High-water slack.
	1904.								
F.	Aug. 16	53½°	51½°	49½°	47°	46°	—	105 Fath.	At Low-water slack; after Ebb stream outward from the Bay of Fundy.
"	" 16	54	53	52	51½	48½	—	"	At High-water slack; after Flood stream inward from the ocean.
"	" 17	53½	49	48	47	47	45½°	"	At Low-water slack.
"	" 17	56	53½	53½	51½	48½	47½	"	At High-water slack.
"	" 18	55½	54	51	49	47	45½	"	At Low-water slack.
"	" 18	56½	55½	54½	53½	50	47	"	At High-water slack.
"	" 19	54	51½	50	49	49	46	"	At L. W. slack. (At 45 Fath. 46½°)
"	" 19	55	54	53½	52	49	—	"	At H. W. slack. (At 45 Fath. 48°)

Temperatures to Station B in the middle of the Bay, from the Nova Scotia coast opposite. On August 9, 1907.

0 miles	—	Off Sandy cove, on west side of Digby neck.
1 "	49½°	
3 "	49	
5 "	49½	
7 "	52½	
9 "	52	
11 "	50½	
13 "	51½	
14 "	—	At Station B.

Temperatures from Station B as above, to the mouth of Digby gut, on August 13, 1907; and return to the Station on August 14.

0 miles	52°	At Station B.
4 "	51½	
6 "	51	
9 "	52½	
11 "	51½	
13 "	53½	
16 "	53½	
17½ "	53	
19 "	49	
20½ "	51	At Prim Point light, at mouth of Digby gut.

0 miles	—	At Prim Point light.
1 "	49½°	
3 "	49½	
5 "	50	
7 "	51½	
11 "	52	
13 "	51½	
17 "	52½	
20½ "	52½	At Station B.

Temperatures from Station B to Yarmouth. On August 17, 1907.

0 miles	—	At Station B.
1 "	50°	
3 "	53	
7 "	50	
11 "	49	
15 "	50	
17 "	49½	
19 "	48½	
23 "	48½	
26 "	—	At north point of Brier island.
29 "	49½	In south entrance, Westport
31 "	50½	harbour.
35 "	50½	
37 "	51½	
39 "	52	
40 "	—	At 2 miles off Cape St. Mary.
43 "	52½	
45 "	53	
49 "	51	
51 "	51½	
55 "	51	
57 "	51½	
59 "	52	At bell buoy, mouth of Yarmouth harbour.

Temperatures from Yarmouth to Station K, north of Lurcher shoal. On August 19, 1907. Directions of lines, W.N.W. and N.N.W., true.

0 miles	—	At bell buoy, Yarmouth
1 "	51½°	harbour.
3 "	50½	
5 "	49½	
6 "	—	At fairway buoy off Cape
9 "	49½	Forchu.
14 "	48½	
17½ "	48½	
21 "	48½	
24 "	49	At Station K.

Deep temperatures, Bay of Fundy region.—August 19 to 31 in 1904 and 1907.

Station.	Year and Date:	Surface temp're.	Depth in Fathoms.				Total depth.	Remarks.
			5 F.	10F.	15F.	30F.		
K.	1907, Aug. 19	50°	48°	48°	47°	46°	57 Fath.	At Low-water slack, after Ebb stream.
"	" " 20	48½	48	47	47	46	"	At High-water slack, after Flood stream.
"	" " 20	49	48	47½	47	46	"	At Low-water slack.
"	" " 21	49	47½	47	47	46½	"	At High-water slack.
"	" " 21	48½	47½	47½	47½	46½	"	At Low-water slack.
"	" " 22	48½	47½	47	47	46	"	At High-water slack.
"	" " 22	48½	48½	48½	48	46	"	At Low-water slack.
"	" " 23	50	49	49	48½	46½	"	At High-water slack.
"	" " 23	49½	48½	47½	47½	46½	"	At Low-water slack.
M.	" " 27	50½	49	46½	46½	46½	47 Fath.	At Low-water slack, after Ebb stream.
"	" " 27	50	47½	47	47	47	"	At High-water slack, after Flood stream.
"	" " 28	51	48½	47	46½	46½	"	At Low-water slack.
"	" " 28	50	47½	47½	47	46½	"	At High-water slack.
"	" " 29	50½	49	47	47	46½	"	At Low-water slack.
"	" " 29	49	48½	47½	47	46½	"	At High-water slack.
"	" " 30	50½	49	48	47	46	"	At Low-water slack.
"	" " 30	50½	49	47½	47½	46½	"	At High-water slack.
"	" " 31	50½	49	48	47½	46½	"	At High-water slack.
E.	1904, Aug. 23	50°	49°	—	48°	—	45 Fath.	At High-water slack.
"	" " 23	53	50½	50°	50	46½°	"	At Low-water slack.
"	" " 24	52	49½	49	48½	47½	"	At High-water slack.
"	" " 24	51½	50	50	49	47	"	At Low-water slack.
"	" " 25	51	49	48½	48½	48	"	At High-water slack.

Temperatures from Station F at the mouth of the Bay of Fundy, towards Yarmouth. On August 20, 1904.

0 miles	—	At Station F.
1 "	54°	
2 "	53	
3 "	52	
4 "	52	
5 "	51	
6 "	51	
7 "	50	
8 "	51	
9 "	51	
10 "	50	
12 "	50	
14 "	50	
15 "	51	Off Gull rock, south of Brier
16 "	51	island.
17 "	52	
18 "	52	
21 "	53	
24 "	52	
27 "	54	
27½ "	—	Off Trinity rock.
30 "	53	
33 "	53	
36 "	52	
38½ "	—	At fairway buoy, off Cape Forchu.

Temperatures from Yarmouth to Station E off Grand Manan island. On August 22, 1904.

0 miles	54°	At bell buoy at the mouth of
1½ "	54	Yarmouth harbour.
3 "	53	
4½ "	53	
5 "	—	At fairway buoy off Cape
6 "	53	Forchu.
7½ "	53	
9 "	54	
10½ "	53	
12 "	53	
13½ "	52	
15 "	52	At Trinity rock buoy.
17 "	54	
19 "	54	
21 "	53	
23½ "	52	
26 "	53	
28 "	55	
28½ "	—	Off Gull rock.
30 "	50	
32 "	51	
37 "	52	
39 "	51	
42 "	52	
44 "	52	
46 "	52	
48 "	51	At Station E.

Temperatures from Station K to the northwest of Lurcher shoal, to Yarmouth. On August 24, 1907.

0 miles	49½°	At Station K.
2 "	49½	
3 "	49½	
5 "	48½	
9 "	48	
9½ "	—	Off Lurcher lightship.
11 "	48	
13 "	48	
15 "	48½	
17 "	49	
19 "	48½	
21 "	48½	At fairway buoy off Cape
23 "	49	Forchu.
25 "	51	
26¼ "	—	At bell buoy at the mouth of Yarmouth harbour.

Temperatures from Yarmouth to Station M in the offing. On August 26, 1907.

0 miles	52½°	At bell buoy, Yarmouth
2 "	50½	harbour.
4 "	50	
6 "	48½	
8 "	48	
12 "	50½	
15¼ "	51½	At Station M.

Temperatures from Station M towards Yarmouth. On August 31, 1907.

0 miles	50½°	At Station M.
2 "	50½	
4 "	50½	
6 "	49	
7½ "	46	
9½ "	46½	
9¾ "	—	At fairway buoy off Chebogue; found 3 miles North of true position.

Deep temperatures, Bay of Fundy region.—September 2 to 27 in 1907.

Station.	Year and Date:	Surface temp're.	Depth in Fathoms.			Total depth.	Remarks.
			5 F.	10 F.	15 F.		
H.	1907, Sept. 2	51½°	49°	49°	48½°	31 Fath.	At Low-water slack, after Ebb setting southward.
"	" " 3	47	46½	46½	46½	"	At High-water slack, after Flood setting northward.
"	" " 9	47½	46½	46½	46½	"	At High water slack.
"	" " 9	48½	47½	47½	47	"	At Low-water slack.
"	" " 10	49	48½	48	47½	"	At Low-water slack.
"	" " 10	48	46	46	46	"	At High-water slack.
"	" " 11	49½	48½	47½	47½	"	At Low-water slack.
"	" " 11	47½	47	46½	46½	"	At High-water slack.
J.	" " 13	48½	47½	47½	47½	23 Fath.	At Low-water slack, after Ebb setting southward.
"	" " 13	49	48	48	47½	"	At High-water slack, after Flood setting northward.
"	" " 14	48½	47½	47½	47½	"	At Low-water slack.
H.	" " 16	50	48½	48	48	31 Fath.	At Low-water slack.
"	" " 16	50½	48	47½	47½	"	At High-water slack.
"	" " 17	48½	48½	48	48	"	At High-water slack.
"	" " 19	49	48	48	48	"	At High-water slack.
"	" " 19	49½	48½	48	48	"	At Low-water slack.
"	" " 20	48½	47½	47½	47½	"	At High-water slack.
"	" " 20	49½	48	48	48	"	At Low-water slack.
J.	" " 23	48½	48	48	48	23 Fath.	At High-water slack.
"	" " 27	49½	49	49	49	"	At Low-water slack.
"	" " 27	49	48½	48½	48½	"	At High-water slack.

Temperatures from Yarmouth to Station H east of Lurcher shoal. On September 2, 1907.

0 miles	51½°	At bell buoy at the mouth of
2 "	51	Yarmouth harbour.
3½ "	48½	
5 "	50	
6½ "	48½	
8½ "	48½	
9 "	—	At Station H.

Temperatures from Yarmouth to Station H east of Lurcher shoal. On September 9, 1907.

0 miles	—	At bell buoy, Yarmouth
¾ "	51°	harbour.
2¾ "	48½	
5 "	47½	
7 "	49½	
8¾ "	49	At Station H.

Temperatures from Station H as above, to Yarmouth. On September 11, 1907.

0 miles	48°	At Station H.
1 "	47½	
3 "	48	
5 "	48	
7 "	49½	
9 "	52	At bell buoy, Yarmouth harbour.

Temperatures from Yarmouth to Station H as above. On September 16, 1907.

0 miles	51½°	At bell buoy, Yarmouth
2 "	50½	harbour.
4 "	49	
5½ "	—	At fairway buoy off Cape
6 "	48½	Forchu.
8 "	48½	
8¾ "	48½	At Station H.

Temperatures from Station H to Yarmouth. On September 17, 1907.

0 miles	49°	At Station H.
2 "	49	
3¾ "	—	At fairway buoy off Cape
4 "	49	Forchu.
7¼ "	51	
9 "	52	At bell buoy, Yarmouth harbour.

Temperatures from Yarmouth to Station H as above. On September 18, 1907.

0 miles	—	At bell buoy, Yarmouth
½ "	51½°	harbour.
2½ "	50	
4½ "	49½	
5 "	—	At fairway buoy, off Cape
6 "	49	Forchu.
8 "	49	
9 "	49	At Station H.

Temperatures from Station H as above, to Yarmouth. On September 21, 1907.

0 miles	48½°	At Station H.
2 "	48	
3½ "	48	
5 "	48	At fairway buoy off Cape Forchu.

NOTE.—This series shows that, as a rule, the temperatures nearer shore become higher when the weather remains quiet. Off this coast, however, the strong currents among the numerous islands and reefs, tend to mix the surface water with the under-water, and thus to maintain a more constant average temperature.

Temperatures from North Head, Grand Manan island, to Station C, south-eastward. On September 1, 1904.

0 miles	—	Off North Head. At buoy off Swallow-tail light.
½ "	54°	
2½ "	54	
5 "	55	
9 "	56	
11 "	55	
13 "	55	
15 "	53	
18 "	53	
20 "	53	
20½ "	—	At Station C.

Temperatures from Station C to Brier island. On September 3, 1904.

0 miles	—	At Station C.
¼ "	53°	
2 "	53	
4 "	52	
6 "	51	
8 "	53	
10 "	52	
12 "	51	
14 "	51	At north point of Brier island.

Temperatures from Brier island to Cape St. Mary. On September 3, 1904.

0 miles	—	In south entrance, Westport harbour.
1 "	53°	
3 "	53	
5 "	54	
7 "	53	
9 "	54	
11 "	54	
12 "	—	Off Cape St. Mary.

Temperatures from Yarmouth to Station L southwest of Lurcher shoal. On September 6, 1904.

0 miles	—	At bell buoy, Yarmouth harbour.
1 "	53°	
3 "	53	
5 "	51	
9 "	51	
12 "	52	
16 "	51	
18 "	51	
21 "	51	
23 "	51	At Station L.

Temperatures from Station L to Brier island. On September 13, 1904.

0 miles	—	At Station L.
¼ "	53°	
2 "	52	
5 "	51	
9 "	52	
13 "	52	
18 "	51	
23 "	51	
27 "	51	
31 "	52	
31½ "	—	At south end of Brier island.

Temperatures from Brier island to Station C, northward. On September 13, 1904.

0 miles	—	At north point of Brier island.
1 "	51°	
3 "	51	
6 "	51	
8 "	52	
12 "	52	
14 "	52	At Station C.

Temperatures from North Head, Grand Manan island, to Station C, south-eastward. On September 16, 1904.

0 miles	—	At Swallow-tail buoy.
1 "	52°	
3 "	52	
7 "	53	
11 "	53	
15 "	53	
19 "	52	
20¾ "	52	At Station C.

Temperatures from Station C as above, to Brier island. On September 17, 1904.

0 miles	—	At Station C.
1 "	53°	
3 "	52	
5 "	51	
9 "	51	
13 "	51	
13¾ "	—	At north end of Brier island.

Temperatures from Brier island to Station H east of Lurcher shoal. On September 19, 1904.

0 miles	52°	At 2 miles south of southern entrance to Westport harbour.
2 "	52	
4 "	52	
11 "	54	
13 "	53	
15 "	52	
17 "	52	
21 "	52	
22 "	—	At Station H.

Temperatures from Station H westward to Lurcher lightship. On September 20, 1904.

0 miles	52°	At Station H.
1 "	52	
3 "	51½	
5 "	51	
6 "	51	
7 "	51	
7½ "	—	At Lurcher light ship; 2 miles S.W. of 1½-fathom patch.

Temperatures from Station H as above, to Yarmouth. On September 20, 1904.

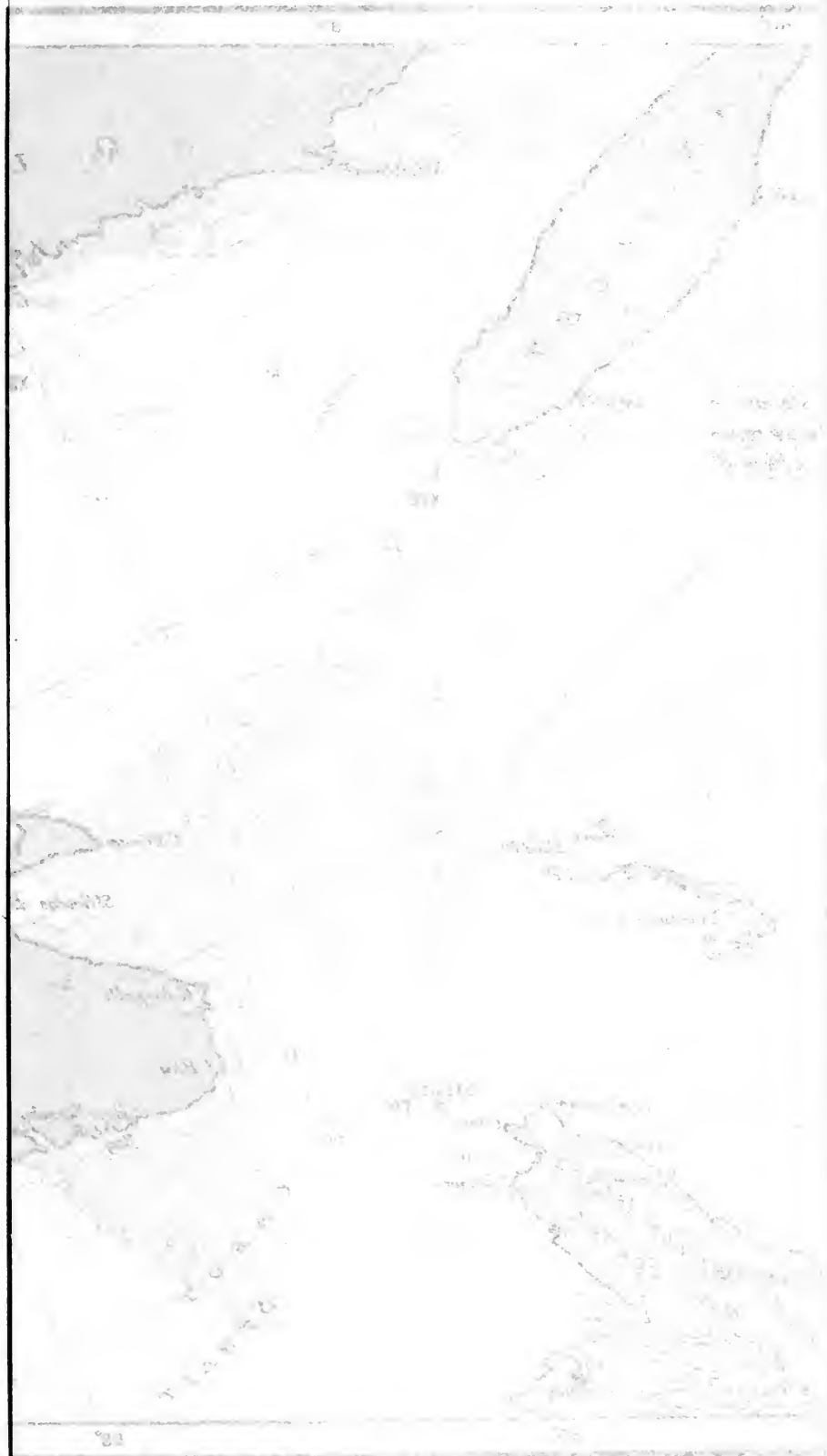
0 miles	52°	At Station H.
1 "	51½	
3 "	51½	
5 "	51	
7 "	51	
9 "	52	
9½ "	—	At bell buoy, Yarmouth harbour.

Temperatures from Yarmouth to Station H as above. On September 23, 1904.

0 miles	52°	At bell buoy, Yarmouth harbour.
1 "	52	
3 "	52	
4 "	51½	
4¼ "	—	At fairway buoy off Cape Forchu.
5 "	51¼	
6 "	51½	
8 "	51¼	
9 "	51¼	
9½ "	—	At Station H.

General note on the Bay of Fundy.—The extensive temperature observations in this Bay, although taken on the surface and to a depth of 30 fathoms, did not afford any definite information in regard to the direction of the current. They did not give sufficiently distinct indications to enable any general movement of the water to be traced, or to infer its continuous displacement from the relative temperatures of the flood and ebb. Some interesting results were obtained however, amongst which may be noted the effect of islands and shoals in modifying the temperature of the water. This appears to result from the stirring up of the water, and it causes a long trail or wake of colder water to extend from islands or shoals along the line of the current. When the water moves to and fro in an unbroken sheet, as it does outside the 50-fathom line, where clear of obstruction, the surface temperature is more uniform, and the rise in temperature with the progress of the season is more easily ascertained.

Where the islands and shoals are numerous, the general effect of these strong currents is to chill the water in the vicinity of the coast, by mixing the surface water with the colder water from below. It is possible that this lowering of the surface temperature may have a bearing on the formation of fog in these regions.



MER DE BEAUFORT
BAIE DE LIVERPOOL
YUKON
ALASKA