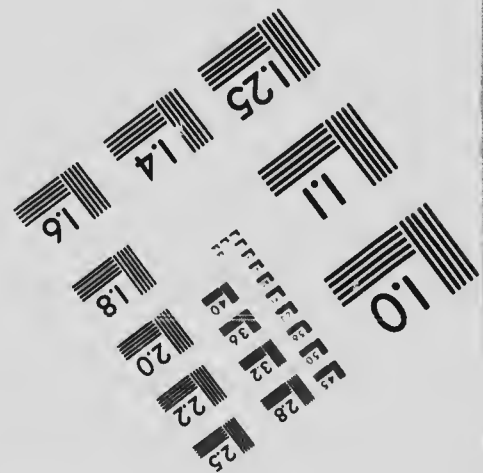
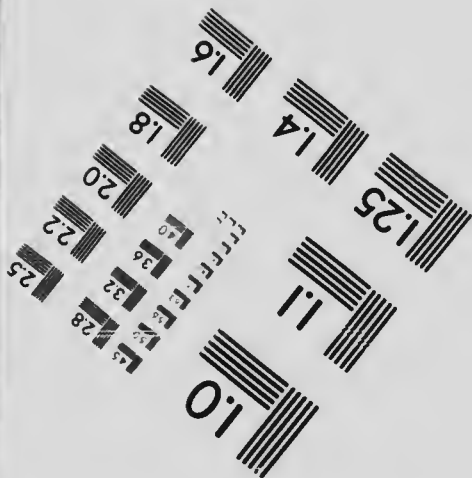
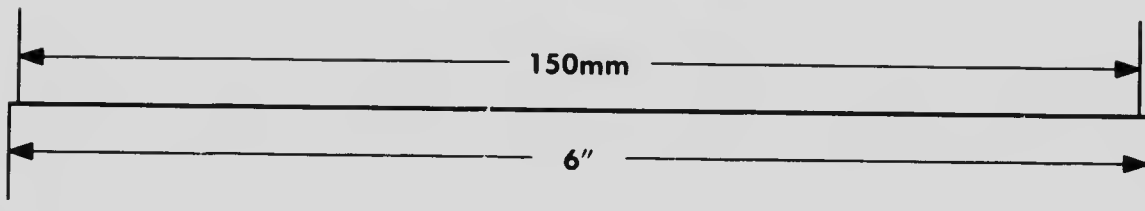
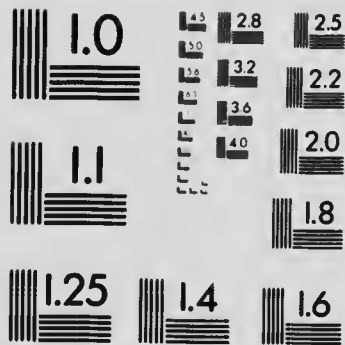
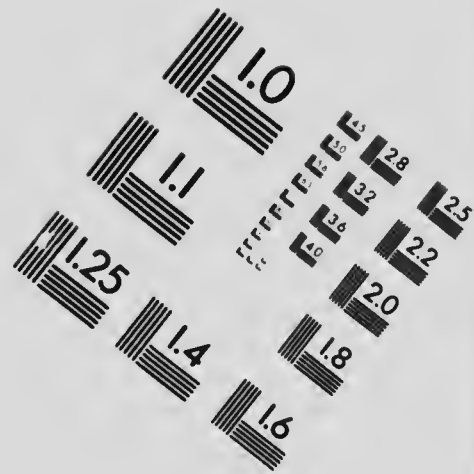
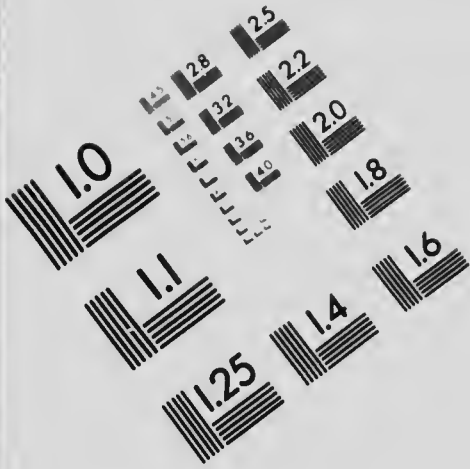


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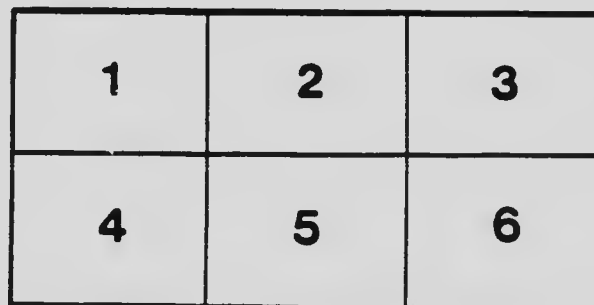
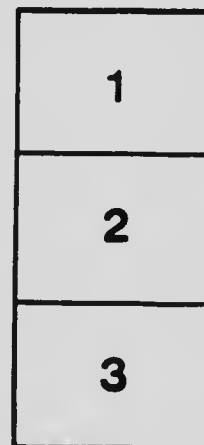
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TABLES
OF HOURLY DIRECTION AND VELOCITY OF
THE CURRENTS
AND TIME OF SLACK WATER IN THE
BAY OF FUNDY
AND ITS APPROACHES AS FAR AS CAPE SABLE

FROM INVESTIGATIONS OF THE TIDAL AND CURRENT SURVEY IN
THE SEASONS OF 1904 AND 1907.

W. BELL DAWSON, M.A., D. SC., M. INST. C.E., ENGINEER IN CHARGE.

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THE CURRENTS

AND TIME OF SLACK WATER IN THE

BAY OF FUNDY

AND ITS APPROACHES AS FAR AS CAPE SABLE

OTTAWA, March 31, 1908.

The tables herewith, which show the set of the current at every hour, are based on observations during four months, June to September, in the two years 1904 and 1907. The region examined extends from St. John to the entrance of the Bay of Fundy and as far as the offing of Cape Sable. The examination was made with special reference to the important steamship routes in the region, which include the lines of ocean steamships, international lines between the Maritime Provinces and the United States, as well as the various coasting routes.

A knowledge of the currents in these outer waters is of more importance to navigation than in the more restricted part of the Bay of Fundy proper, where the tidal streams run parallel to the shores and have less tendency to set a vessel out of its course.

This is the first time that the currents in these regions have been systematically investigated with modern appliances; and they result in the only tables of the state of the current, hour by hour, similar to those prepared for the coasts of Europe, which have yet been published for any North American waters of extended area.

Throughout the region now under consideration, the currents are strong, steady and deep; instead of weak and superficial and liable to disturbance by the wind, as they usually are in the approaches to the Gulf of St. Lawrence. The investigation was made by anchoring a steamer at carefully selected points or stations, in the vicinity of the various steamship routes, to obtain information of the most practical value to navigators. All accessory questions were also examined,—such as the under-current in the deep water, the water temperature, and wind disturbance by comparison with continuous meteorological observations taken on board. On these a special report has been published, and the results are briefly stated below, so far as they affect the surface current.

Positions of the Stations.—For the purpose in view, the stations chosen for anchorage were far enough from shore to avoid the local influences found among the islands and shoals which are numerous on this coast within the 30-fathom line. The anchorages were made in all depths up to 100 fathoms.

The positions of the stations are shown on the accompanying Map; and at the head of each table the position is defined by a bearing and distance *from* some convenient landmark; so that a captain can readily plot these stations on his working chart, if desired for reference.

Methods and Appliances.—The surveying steamer *Gulnare* was employed in the investigations; and when anchored, it served as a fixed point from which to determine correctly the speed and direction of the set.

The strength of the current was determined from actual measurements of velocity by means of a current-meter registering electrically on board. A special method of suspension was devised to avoid error from the rolling of the steamer. When the rolling was considerable, an allowance was made by count, for the excess. The meter was placed at the standard depth of 18 feet (three fathoms) to be well below the keel of the surveying steamer. The measurement was thus free from any interference from the vessel itself, when lying more or less out of line with the direction of the set. With currents which are so deep, there is no appreciable change in strength from the surface to a moderate depth; and this measurement well represents the velocity as it affects a steamer of ordinary draught.

For the direction of the current, a float was used which was attached by a line from the stern. It was weighted till its surface was awash, to be unaffected by the wind. At night it was illuminated by a small electric light, operated from a battery.

The observations of velocity and direction were taken every half hour, day and night continuously. This is essential, as there are times when the two floods or ebbs in the course of the day are distinctly unequal in strength, owing to diurnal inequality in the rise and fall of the tide itself.

The methods and appliances used for the investigation of the under-current and for meteorological observations, need not here be noted.

Observations obtained as a Basis for the Tables.—The periods for which each station was occupied, and the total length of the observations obtained, are shown in the last Table appended. This serves to indicate the sound basis secured in the two seasons for the hourly tables and the time of slack water here published. The periods at each station were chosen, as far as practicable, at different stages of the lunar month, to ascertain the amount of variation with the changes in the moon's position. At two or three of the less important stations, notably Stations R and U, the observations are not as long as might be desired; yet the indications obtained are of sufficient value to be serviceable.

At the Lurcher shoal, observations were taken by the officers of the light-ship, day and night, throughout the season of 1904, from June 7 to September 30. These afforded a series of 232 comparisons for the time of slack water at that position.

For comparison with the observations of the current, continuous records of the tide at St. John, N.B. and at Halifax were secured simultaneously throughout the two seasons. The tide curves obtained from these registering gauges, afforded complete data for comparison. It was found that the currents and the time of slack water, as far as Cape Sable, were in close correspondence with the tide at St. John; while beyond that point, the weaker currents off the south-east coast of Nova Scotia accorded better with Halifax. This result also corresponds with the dividing line between the ports which can be referred to St. John and Halifax respectively, as found by the tidal observations taken along these shores in 1902.

Staff.—The investigations were carried out under the personal direction of Dr. W. Bell Dawson, with the assistance of Mr. S. C. Hayden in both seasons, and Mr. H. W. Jones in 1904 and Mr. C. L. Blois in 1907. The night observations were taken by the officers of the vessel or assistants engaged temporarily. Captain T. G. Taylor, the master of the vessel, gave valuable co-operation in the work, in addition to his ordinary duties. Mr. Hayden had also charge of the meteorological observations on board, and Mr. Jones afterwards assisted largely in the office reductions of the observations.

The simultaneous tidal observations at St. John, N.B., were taken by Mr. D. L. Hutchinson, and at Halifax by Mr. G. J. T. Russell. Tidal observations at Yarmouth were taken during 1904 by Captain J. E. Murphy, who is also in charge of the meteorological station there, at which continuous observations were taken in both seasons.

Reduction of the Observations, and the Results.—The half-hourly observations were first brought into relation with the time of high water, to determine for each station the average direction and velocity at every even hour before and after high water. This gave satisfactory results for direction; but it is evident that the velocities thus obtained require further to be brought into relation with some uniform standard of comparison. For it would obviously be untrustworthy to compare the springs at one place with the neaps at another; and in this region the tides not only vary in the ordinary way from springs to neaps, but they present the special feature of an equally pronounced variation with the change in the moon's distance from perigee to apogee. The standard or average velocities at springs and neaps, would therefore only be obtained when the moon is also at its mean distance.

It was found on investigation that the maximum strength of both flood and ebb is closely proportional to the rise or fall of the corresponding tide at St. John, N.B.; as both the variations in the range of the tide are also observable in the current, and this keeps the two in accord with each other. This proportional relation holds good as far as the offing of Cape Sable. Accordingly, the velocity of the current, at different times and places, can be correctly compared by bringing it into relation with the mean or average range at St. John, which is 21 feet. The velocities as given in the tables, are brought to this standard. When the range of the tide is greater or less than this amount, the currents will be proportionately stronger or weaker.

Hours of the Tide.—In the series of Hours before and after High Water, there is more than an hour of interval between "6 hours after" high water and "5 hours before" the following high water. As the period from high water to high water is the half lunar day, or 12h. 25m. 14s., the true mean interval in question is 1h. 25m. If any marked change occurs in this interval, it is noted in the Table; and this not infrequently happens, as at several stations it falls about the time of the turn of the current.

Time of Slack Water.—The Table of Slack Water which is appended, enables the time at which the current turns to be known from the tide tables published for St. John. Some care has been required in the preparation of such a table from observations taken on a vessel at anchor far from shore; as the current becomes weak before it turns, and the vessel may head round to the wind before the true time of the turn.

With observations which afford such complete information, there are two ways in which the time of slack water may be found; first, the time at which the current, in veering, sets at right angles to the flood and ebb directions, which are always very definite with currents of such strength; and second, the time of lowest velocity as shown by the current-meter. Both these methods were tried, as well as a further comparison between the time of maximum velocity and the moment of half tide as taken from the registering tide gauge.

Without discussing the relative advantages of these methods, it will suffice to say that it was found most satisfactory to take the time of lowest velocity as the true time of slack water. This was ascertained by determining the moment of minimum velocity, between the half-hourly observations, as shown by the record of the current-meter.

SUMMARY OF THE CHARACTERISTICS OF THE CURRENTS.

The following notes are given in the endeavour to summarize the leading characteristics of the current in this region. They refer to the currents at an offing of $3\frac{1}{2}$ to 18 miles from shore, on the routes usually taken by steamships, and they are not intended to include the currents among the islands and shoals nearer shore.

General Character.—The currents are predominantly tidal in their character, running strongly during flood and ebb in the two directions, which are usually opposite. Any veering, or set in a cross direction, occurs only when the current is weak. At the points farther from shore, the current veers more in turning and does not reverse its direction so promptly. The direction of the current and its strength in knots at half tide, flood and ebb, are shown on the accompanying Map, at each station as indicated.

Variation in Strength.—In this region the moon's distance, as it varies from perigee to apogee, alters the strength of the currents quite as markedly as the change from springs to neaps with the moon's phases. As the range of the tide

is affected in the same way, the maximum strength of both flood and ebb remains closely proportional to the rise or fall of the corresponding tide at St. John, N.B. The variation from the velocity as given in the hourly tables, for the mean range of 21 feet at St. John, may thus be allowed for.

Slack Water.—The time of slack water has a definite relation to the tide at St. John, throughout the region extending from the Bay of Fundy proper as far eastward as Cape Sable. The time of slack water can therefore be found correctly from the St. John Tide Tables by the use of the differences which are given in the Slack Water tables herewith.

Disturbance.—Almost everywhere, the current is as strong down to a depth of 30 fathoms as it is on the surface; and at most places it turns in direction on the surface and below at practically the same time. This has an important bearing on wind disturbance, as it shows that the current will soon regain its normal direction and strength after a storm moderates.

General Movement.—There is no general movement of the water in any one direction in this region which is at all well marked; nor did the temperature of the water give any definite indication of this.

Special Note.—The characteristic of the current which deserves special attention, is the change found at points only a few miles apart. The behaviour of the current is very regular and constant at any definitely fixed point, but a change in position of even a few miles may make a marked difference in its character. This difference is chiefly in the strength and in the time of slack water, and also so much in the direction. In passing islands, the strength may be very different indeed, according to the offing given; and in channels and passages there is a difference, between the centre and the sides, of an hour in the time of water.

CURRENTS.— THE LOWER BAY,

Lat. 41° 58' 28" N.
Long. 65° 57' 00" W.

STATION A

FROM CAPE SPENCER LIGHT,
S. 26° W. 13½ Miles.
Depth 55 Fath.

Lat. 41° 41' 00" N.
Long. 66° 15' 30" W.

STATION B

FROM PRIME POINT LIGHT,
W. 26° N. 20½ Miles.
Depth 68 Fath.

Lat. 41° 31' 10" N.
Long. 66° 22' 40" W.

STATION C

FROM PETIT PASSAGE LIGHT,
N. 28° W. 9¼ Miles.
Depth 98 Fath.

STATION A			STATION B			STATION C		
Tide at St. John, N.B.	Direction and Velocity of Current.		Tide at St. John, N.B.	Direction and Velocity of Current.		Tide at St. John, N.B.	Direction and Velocity of Current.	
At H.W.	NEbN.	0 76	At H.W.	NNE.	0 56	At H.W.	NEbE.	0 97
1 h. after	NbW	0 60	1 h. after	N'ward.	0 52	1 h. after	ESE.	0 64
2 h. "	WbN	0 97	2 h. "	WbN	0 79	2 h. "	SbW.	1 32
3 h. "	W	1 42	3 h. "	WbS.	1 23	3 h. "	SWbS.	1 82
4 h. "	W	1 60	4 h. "	WSW	1 37	4 h. "	SW	2 00
5 h. "	W	1 05	5 h. "	WSW	1 00	5 h. "	SW	1 55
6 h. "	W	1 10	6 h. "	S'ward.	Weak	6 h. "	SW	0 84
	Turning, W to N.			Slack or variable.				
5 h. before	NbE.	0 64	5 h. before	NEbE.	1 04	5 h. before	Veering.	Weak
4 h. "	NEbE.	1 38	4 h. "	NEbE.	1 46	4 h. "	NE.	1 25
3 h. "	ENE.	1 69	3 h. "	NEbE.	1 51	3 h. "	NE.	1 73
2 h. "	ENE.	1 61	2 h. "	NE.	1 17	2 h. "	NE.	1 89
1 h. "	NE.	1 29	1 h. "	NEbN.	0 74	1 h. "	NE.	1 62
At H.W.	NEbN.	0 76	At H.W.	NNE.	0 56	At H.W.	NEbE.	0 97
At the maximum:			At the maximum:			At the maximum:		
Half Ebb.	W½S.	1 65	Half Ebb.	WbS½S.	1 40	Half Ebb.	SW	2 05
Half Flood.	ENE.	1 70	Half Flood	NEbE.	1 55	Half Flood	NE½N.	1 90

TIME.—The state of the current is here referred to the time of High Water at St. John, N.B., to be found in the Tide Tables published by this Survey. It is there given in Atlantic Standard time, which is 4 hours slower than Greenwich Mean Time.

DIRECTION AND VELOCITY.—The directions indicate the point towards which the current sets. They are magnetic throughout, the average variation in these regions being 18° W. The velocities are in knots, tenths, and hundredths. They correspond with the average range of 21 feet at St. John; and will be stronger or weaker as the range varies from springs to neaps.

MAXIMUM STRENGTH.—The last lines give the direction of the set which corresponds with the maximum velocity on the flood and ebb, at each station. These are not therefore simultaneous at the different stations.

SLACK WATER.—The time of Slack Water at each station is given in a separate table at the end.

BAY OF FUNDY, AND ENTRANCES.

Lat. 44° 45' 05" N. Long. 66° 55' 55" W.	Lat. 44° 28' 40" N. Long. 66° 40' 35" W.	Lat. 44° 17' 18" N. Long. 66° 44' 10" W.
STATION D	STATION E	STATION F
FROM QUODDY HEAD LIGHT, S. 17° W. 4½ Miles. Depth 48 Fath.	FROM HANMER ROCK, S. 48° E. 5 Miles. Depth 45 Fath.	FROM BRUSH ISLAND LIGHT, W. 27° N. 15 Miles. Depth 105 Fath.

Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.
At H.W.	Ebb N. 0 66	At H.W.	SEbbE 0 88	At H.W.	N'ward. 0 65
1 h. after	SSE Weak	1 h. after	SWbS 1 49	1 h. after	NW 0 81
2 h. "	SSW 1 11	2 h. "	SWbW 2 97	2 h. "	WbN 1 03
3 h. "	SWbS 1 75	3 h. "	WSW 3 81	3 h. "	W 1 17
4 h. "	SWbW 2 09	4 h. "	WbS 3 03	4 h. "	WbN 1 02
5 h. "	WSW 1 70	5 h. "	WbS 2 09	5 h. "	NW'ward. Weak
6 h. "	NWbW 0 94	6 h. "	VbS 1 46	6 h. "	NEbbE 0 70
Turning, NW to NNE.		Turning, W to N			
5 h. before	NEbbN 1 26	5 h. before	NEbbN 0 77	5 h. before	E 1 28
4 h. "	NE 2 03	4 h. "	NEbbE 1 85	4 h. "	EbbN 1 36
3 h. "	NEbbE 2 54	3 h. "	NEbbE 2 55	3 h. "	ENE 1 32
2 h. "	NEbbE 2 32	2 h. "	ENE 2 11	2 h. "	ENE 1 27
1 h. "	NEbbE 1 37	1 h. "	EbbN 1 32	1 h. "	NE 0 94
At H.W.	Ebb N. 0 66	At H.W.	SEbbE 0 88	At H.W.	N'ward. 0 65
At the maximum:		At the maximum:		At the maximum:	
Half Ebb.	SWbW 2 15	Half Ebb.	WSW 3 90	Half Ebb.	W 1 20
Half Flood.	NEbbE 2 65	Half Flood	NEbbE 2 65	Half Flood	EbbN 1 40

TIME.—The state of the current is here referred to the time of High Water at St. John, N.B., to be found in the Tide Tables published by this Survey. It is there given in Atlantic Standard time, which is 4 hours slower than Greenwich Mean Time.

DIRECTION AND VELOCITY.—The directions indicate the point towards which the current sets. They are magnetic throughout, the average variation in these regions being 18° W. The velocities are in knots, tenths, and hundredths. They correspond with the average range of 21 feet at St. John; and will be stronger or weaker as the range varies from springs to neaps.

MAXIMUM STRENGTH.—The last lines give the direction of the set which corresponds with the maximum velocity on the flood and ebb, at each station. These are not therefore simultaneous at the different stations.

SLACK WATER.—The time of Slack Water at each station is given in a separate table at the end.

CURRENTS.—

LURCHER REGION.—

Lat. 44° 12' 56" N.
Long. 66° 30' 20" W.

Lat. 43° 51' 48" N.
Long. 66° 21' 00" W.

Lat. 43° 47' 00" N.
Long. 66° 14' 45" W.

STATION G

FROM BRIER ISLAND LIGHT,
W. 5° S. 5½ Miles.
Depth 50 Fath.

STATION H

FROM LURCHER 1½-FATHOM
PATCH, E. 3° S. 6¼ Miles.
Depth 31 Fath.

STATION J

FROM CAPE FORCHU LIGHT,
W. 9° N. 4½ Miles.
Depth 23 Fath.

Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.
At H.W.	N N E 0 95	At H.W.	N F b N 0 64	At H.W.	E N E Weak
1 h. after	S b E 0 83	1 h. after	S E'ward 0 63	1 h. after	SSW 0 85
2 h. "	S b W 1 39	2 h. "	S 1 18	2 h. "	S b W 1 29
3 h. "	SSW 2 13	3 h. "	S b W 1 63	3 h. "	S b W 1 65
4 h. "	SSW 2 44	4 h. "	S b W 1 65	4 h. "	S b W 1 45
5 h. "	SW b S 2 08	5 h. "	SSW 1 19	5 h. "	S b W 0 94
6 h. "	SW b S 1 31	6 h. "	SW b W 0 64	6 h. "	Turning, SSW to N
Turning, S W to N W		Turning, S W to N W			
5 h. before	N b W 1 12	5 h. before	N b W 1 12	5 h. before	N b E 1 38
4 h. "	N N E 2 24	4 h. "	N 1 68	4 h. "	N b E 1 85
3 h. "	N N E 2 66	3 h. "	N b E 1 93	3 h. "	N b E 2 00
2 h. "	N N E 2 36	2 h. "	N b E 1 67	2 h. "	N N E 1 80
1 h. "	N N E 1 69	1 h. "	N N E 1 14	1 h. "	N N E 1 12
At H.W.	N N E 0 95	At H.W.	N E b N 0 64	At H.W.	E N E Weak
At the maximum:		At the maximum:		At the maximum:	
Half Ebb.	SSW 2 50	Half Ebb.	S b W 1 75	Half Ebb.	S b W 1 70
Half Flood.	N N E 2 70	Half Flood	N b E 2 00	Half Flood	N b E ½ E 2 00

TIME.—The state of the current is here referred to the time of High Water at St. John, N.B., to be found in the Tide Tables published by this Survey. It is there given in Atlantic Standard time, which is 4 hours slower than Greenwich Mean Time.

DIRECTION AND VELOCITY.—The directions indicate the point towards which the current sets. They are magnetic throughout, the average variation in these regions being 18° W. The velocities are in knots, tenths, and hundredths. They correspond with the average range of 21 feet at St. John; and will be stronger or weaker as the range varies from springs to neaps.

MAXIMUM STRENGTH.—The last lines give the direction of the set which corresponds with the maximum velocity on the flood and ebb, at each station. These are not therefore simultaneous at the different stations.

SLACK WATER.—The time of Slack Water at each station is given in a separate table at the end.

BAY OF FUNDY.

BRIER ISLAND TO SEAL ISLAND.

Lat. 43° 59' 03" N.
Long. 66° 37' 00" W.

STATION K

FROM CAPE ST. MARY LIGHT,
W. 4° S. 18½ Miles.
Depth 57 Fath.

Lat. 43° 45' 45" N.
Long. 66° 41' 55" W.

STATION L

FROM LURCHER 1½-FATHOM
PATCH, W. 9° S. 40 Miles.
Depth 54 Fath.

Lat. 43° 34' 25" N.
Long. 66° 24' 10" W.

STATION M

FROM CAPE FORCHU LIGHT,
W. 33° S. 17 Miles.
Depth 47 Fath.

Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.
At H.W.	N E. 0.74	At H.W.	E'ward. Weak	At H.W.	N N E. 0.64
1 h. after	E S E. Weak	1 h. after	S E b S. 0.89	1 h. after	E'ward. Weak
2 h. "	S b E. 0.89	2 h. "	S b E. 1.28	2 h. "	S E b S. 0.85
3 h. "	S b W. 1.14	3 h. "	S. 1.51	3 h. "	S S E. 1.14
4 h. "	S b W. 1.14	4 h. "	S. 1.53	4 h. "	S b E. 1.20
5 h. "	S S W. 0.85	5 h. "	S. 1.02	5 h. "	S S E. 0.98
6 h. "	Variable. Weak	6 h. "	S'ward. 0.69	6 h. "	S E b E. 0.68
	Beginning N'ward		Variable. Weak		Variable. Weak
5 h. before	N N E. 1.08	5 h. before	N E b N. 0.82	5 h. before	N E b N. 0.74
4 h. "	N N E. 1.54	4 h. "	N b E. 1.15	4 h. "	N b E. 1.07
3 h. "	N N E. 1.84	3 h. "	N N E. 1.36	3 h. "	N b E. 1.25
2 h. "	N N E. 1.71	2 h. "	N N E. 1.23	2 h. "	N b E. 1.17
1 h. "	N N E. 1.25	1 h. "	N E b N. 0.86	1 h. "	N. 0.92
At H.W.	N E. 0.74	At H.W.	E'ward. Weak	At H.W.	N N E. 0.64
At the maximum:		At the maximum:		At the maximum:	
Half Ebb.	S b W. 1.20	Half Ebb.	S. 1.55	Half Ebb.	S b E ½ E. 1.25
Half Flood.	N N E. 1.85	Half Flood	N b E ½ E. 1.40	Half Flood	N b E. 1.25

TIME.—The state of the current is here referred to the time of High Water at St. John, N.B., to be found in the Tide Tables published by this Survey. It is there given in Atlantic Standard time, which is 4 hours slower than Greenwich Mean Time.

DIRECTION AND VELOCITY.—The directions indicate the point towards which the current sets. They are magnetic throughout, the average variation in these regions being 18° W. The velocities are in knots, tenths, and hundredths. They correspond with the average range of 21 feet at St. John; and will be stronger or weaker as the range varies from springs to neaps.

MAXIMUM STRENGTH.—The last lines give the direction of the set which corresponds with the maximum velocity on the flood and ebb, at each station. These are not therefore simultaneous at the different stations.

SLACK WATER.—The time of Slack Water at each station is given in a separate table at the end.

CURRENTS.— CAPE SABLE

Lat. 43° 15' 55" N.
Long. 66° 15' 00" W.

STATION N

FROM SEAL ISLAND LIGHT,
W. 20° S. 13 Miles.
Depth 41 Fath.

Lat. 43° 15' 30" N.
Long. 65° 58' 50" W.

STATION P

FROM BLONDE ROCK,
S. 14° W. 5 Miles.
Depth 26 Fath.

Lat. 43° 14' 20" N.
Long. 65° 37' 15" W.

STATION Q

FROM CAPE SABLE LIGHT,
S. 18° W. 12 Miles.
Depth 34 Fath.

Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.
At H.W.	N N E. 0 78	At H.W.	E S E. 1 23	At H.W.	E S E. 0 99
1 h. after	Turning, NE to SE	1 h. after	S E. 1 83	1 h. after	E S E. 1 38
2 h. "	S E b S. 1 20	2 h. "	S E. 2 01	2 h. "	E S E. 1 59
3 h. "	S S E. 1 56	3 h. "	S E b S. 1 67	3 h. "	E S E. 1 41
4 h. "	S b E. 1 52	4 h. "	S E b S. 1 12	4 h. "	S E b E. 0 90
5 h. "	S b W. 1 13	5 h. "	Turning, S S E to W N W	5 h. "	Turning, S S E to W b S
6 h. "	S W b W. 0 95	6 h. "	N W b W. 1 23	6 h. "	W b N. 1 04
Turning, W S W to N W					
5 h. before.	N W. 1 51	5 h. before.	N W b N. 2 02	5 h. before.	N W b W. 1 65
4 h. "	N N W. 2 19	4 h. "	N W b N. 1 92	4 h. "	N W b W. 1 58
3 h. "	N b W. 2 54	3 h. "	N N W. 1 54	3 h. "	N W b W. 1 24
2 h. "	N b W. 2 26	2 h. "	N. 1 03	2 h. "	N W b W. 0 80
1 h. "	N. 1 49	1 h. "	N N E. 0 81	1 h. "	From N W to E S E
At H.W.	N N E. 0 78	At H.W.	E S E. 1 23	At H.W.	E S E. 0 99
At the maximum:		At the maximum:		At the maximum:	
Half Ebb.	S S E. 1 60	Half Ebb.	S E ½ S. 2 05	Half Ebb.	E b S ½ S. 1 60
Half Flood.	N b W ½ W. 2 60	Half Flood.	N W b N. 2 05	Half Flood.	N W b W. 1 70

TIME.—The state of the current is here referred to the time of High Water at St. John, N.B., to be found in the Tide Tables published by this Survey. It is there given in Atlantic Standard time, which is 4 hours slower than Greenwich Mean Time.

DIRECTION AND VELOCITY.—The directions indicate the point towards which the current sets. They are magnetic throughout, the average variation in these regions being 18° W. The velocities are in knots, tenths, and hundredths. They correspond with the average range of 21 feet at St. John; and will be stronger or weaker as the range varies from springs to neaps.

MAXIMUM STRENGTH.—The last lines give the direction of the set which corresponds with the maximum velocity on the flood and ebb, at each station. These are not therefore simultaneous at the different stations.

SLACK WATER.—The time of Slack Water at each station is given in a separate table at the end.

BAY OF FUNDY. REGION.

Lat. 43° 19' 54" N. Long. 65° 37' 40" W. STATION R FROM CAPE SABLE LIGHT, S. 22° W. 3½ Miles. Depth 20 Fath.	Lat. 43° 22' 05" N. Long. 65° 18' 25" W. STATION S FROM BRAZIL ROCK, E. 12° S. 6 Miles. Depth 51 Fath.	Lat. 43° 33' 13" N. Long. 65° 02' 00" W. STATION T FROM CAPE ROSEWAY LIGHT, E. 39° S. 11 Miles. Depth 36 Fath.
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Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at St. John, N.B.	Direction and Velocity of Current.	Tide at Halifax, N.S.	Direction and Velocity of Current.
At H.W.	ESE. 1.66	At H.W.	ENE 0.85	At H.W. ...	SbW. 0.60
1 h. after	ESE. 1.85	1 h. after	ENE 0.96	1 h. after	SbE. 0.60
2 h. "	SE. 1.26	2 h. "	ENE 0.87	2 h. "	SSE. 0.59
3 h. "	SSE. 0.69	3 h. "	ENE 0.76	3 h. "	SE. 0.59
4 h. "	From StoW 1.15	4 h. "	From NE to NW	4 h. "	ESE. 0.62
5 h. "	WbN 2.01	5 h. "	NWbN .. 0.64	5 h. "	E'ward 0.62
6 h. "	WNW. 2.20	6 h. "	NWbN .. 0.80	6 h. "	NE'ward ... 0.65
5 h. before ...	WNW. 2.17	5 h. before.	WNW. 0.94	5 h. before.	Variable 0.62
4 h. "	WNW. 1.98	4 h. "	WNW. 0.84	4 h. "	Variable 0.60
3 h. "	WNW. 1.31	3 h. "	WNW. 0.67	3 h. "	Variable 0.60
2 h. "	NW. 0.74	2 h. "	NE. 0.59	2 h. "	Variable 0.57
1 h. "	SE. 0.90	1 h. "	ENE 0.67	1 h. "	SW'ward. ... 0.60
At H.W.	ESE. 1.66	At H.W.	ENE 0.85	At H.W.	SbW. 0.60
At the maximum:		At the maximum:		At the maximum:	
Half Ebb.	ESE. 2.00	Half Ebb. ...	ENE 1.00	Half Ebb. ...	ESE to ENE 0.65
Half Flood. ...	WNW. 2.20	Half Flood	WNW. 1.00	Half Flood	Variable 0.60

TIME.—The state of the current is here referred to the time of High Water at St. John, N.B., except Station T, which is referred to Halifax. The time of High Water will be found in the Tide Tables published by this Survey. It is there given in Atlantic Standard time, which is 4 hours slower than Greenwich Mean Time.

DIRECTION AND VELOCITY.—The directions indicate the point towards which the current sets. They are magnetic throughout, the average variation in these regions being 18° W. The velocities are in knots, tenths, and hundredths. They correspond with the average range of 21 feet at St. John; and will be stronger or weaker as the range varies from springs to neaps.

MAXIMUM STRENGTH.—The last lines give the direction of the set which corresponds with the maximum velocity on the flood and ebb, at each station. These are not therefore simultaneous at the different stations.

SLACK WATER.—The time of Slack Water at each station is given in a separate table at the end.

BAY OF FUNDY.

TABLE OF SLACK WATER.

TIME OF SLACK WATER BEFORE OR AFTER HIGH AND LOW WATER
AT ST. JOHN, N.B.

Station and Position.	Depth.	Slack Water at High Tide.	Slack Water at Low Tide.
Station A. Within the bay.....	55 F.	h. m. 0: 48 after High Water.	h. m. 0: 48 after Low Water.
“ B. “	68 F.	45 “ “	35 “ “
“ C. Entrance to Bay	98 F.	50 “ “	45 “ “
“ G. “	50 F.	45 “ “	40 “ “
“ D. Grand Manan Channel.....	48 F.	30 “ “	10 “ “
“ E. Off Grand Manan.	45 F.	00 (At High Water)..	35 “ “
“ F. At mouth of Bay.....	105 F.	05 after High Water	45 before Low Water
“ K. North of Lurcher shoal....	57 F.	40 “ “	05 “ “
Lurcher shoal Light-ship.		22 “ “	34 “ “
Station H. East of Lurcher shoal.....	31 F.	30 “ “	05 after Low Water.
“ J. Off Yarmouth	23 F.	00 (At High Water)..	15 before Low Water
“ L. West of Lurcher shoal.....	54 F.	25 after High Water.	20 after Low Water.
“ M. South of Lurcher shoal.....	47 F.	35 “ “	35 “ “
“ N. Off Seal island.....	44 F.	30 “ “	20 before Low Water
“ P. “	26 F.	45 before High Water	1: 05 “ “
“ Q. Off Cape Sable.....	34 F.	55 “ “	1: 15 “ “
“ R. “	20 F.	1: 30 “ “	3: 05 “ “
“ S. Off Brazil rock	51 F.	2: 05 “ “	2: 05 “ “

The differences of time at the various stations as above indicated, are to be applied to the time of High Water and Low Water at St. John, N.B., to be found in the Tide Tables published by this Survey.

The time of Slack Water that results, will be in Atlantic Standard time, which is 4 hours slower than Greenwich Mean Time. This is the same standard time as used for the Tide Tables themselves.

BAY OF FUNDY.

OBSERVATIONS OBTAINED.

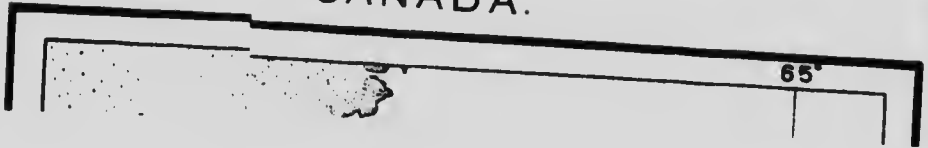
SEASONS OF 1904 AND 1907.

Taken every half hour, continuously ; and forming the basis for the tables herewith.

Station.	Period of Observations.	Number of hours.	Station.	Period of Observations.	Number of hours.
Station A.	1907, July 22 to 26 . . .	94 hours.	Station K.	1907, July 16 to 20.	
Station B.	1907, August 9 to 10.			1907, August 19 to 24 . . .	208 hours.
	1907, August 12 to 17 . . .	128 hours.	Station L.	1904, June 16 to 18.	
Station C.	1904, September 1 to 3			1904, July 6 to 9.	
	1904, September 13 to 17	102 hours.		1904, Sept. 6 to 13.	
Station D.	1904, Aug. 29 to Sept. 1	67 hours.		1907, June 11 to 15 . . .	347 hours.
Station E.	1904, August 22 to 25 . . .	72 hours.	Station M.	1907, June 17 to 22.	
Station F.	1904, June 3 to 6.			1907, July 29 to Aug. 1.	
	1904, June 22 to 30.			1907, August 26 to 31 . . .	299 hours.
	1904, August 15 to 20 . . .	320 hours.	Station N.	1904, June 7 to 16	163 hours.
Station G.	1904, August 5 to 6.		Station P.	1904, July 25 to 30.	
	1904, August 8 to 13 . . .	155 hours.		1907, July 8 to 13	233 hours.
Station H.	1904, Sept. 19 to 20.		Station Q.	1904, July 18 to 21.	
	1904, Sept. 23 and 24.			1907, July 1 to 6	185 hours.
	1907, Sept. 2 to 3.		Station R.	1904, July 21 to 23	44 hours.
	1907, Sept. 9 to 11.		Station S.	1907, June 25 to 29	90 hours.
	1907, Sept. 16 to 21 . . .	215 hours.	Station T.	1904, July 13 to 16	79 hours.
Station J.	1907, Sept. 13 to 14.		Station U.	1904, August 26 and 27 . . .	25 hours.
	1907, Sept. 23 and 27 . . .	43 hours.			



- CANADA.



SURVEY OF TIDES AND CURRENTS - CANADA.

