

**Some climatic and geomorphic
aspects of the Little Codroy
River, Newfoundland**

by A. R. Murray

FISHERIES RESEARCH BOARD OF CANADA

TECHNICAL REPORT NO. 98

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SOME CLIMATIC AND GEOMORPHIC ASPECTS OF THE
LITTLE CODROY RIVER, NEWFOUNDLAND

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A. R. Murray

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INTRODUCTION

Gross productivity in aquatic environments, or the total production of aquatic organisms per unit time, is controlled by climatic, edaphic, morphometric and biotic factors (Larkin, 1961). These important factors have rather complex interrelations (Fig. 1) as indicated by Rawson (1939). Although Fig. 1 represents the situation in a lake, the situation in an entire drainage basin is essentially similar.

Observations on certain aspects of these factors were obtained on the Little Codroy River, Newfoundland (Fig. 2), drainage basin during the

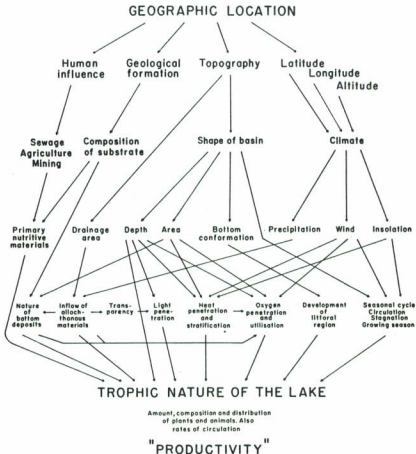


Fig. 1. A chart suggesting the interrelations of factors affecting the metabolism of a lake. Redrawn from Rawson (1939).

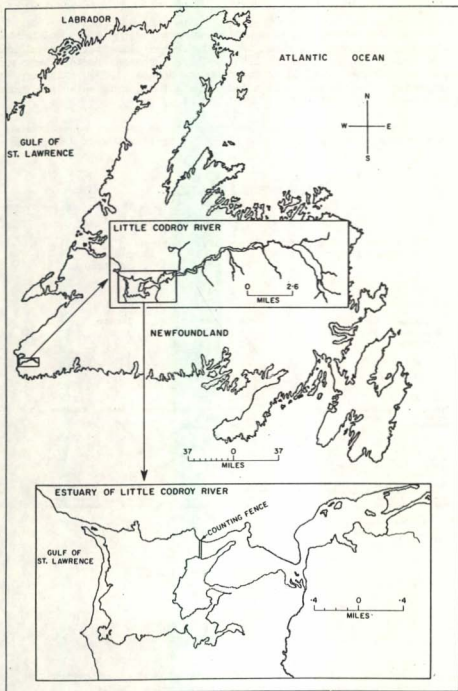


Fig. 2. Newfoundland, the Little Codroy River, and the estuary of the Little Codroy River.

course of investigations there on Atlantic salmon. These data, which include weather observations obtained from the Department of Transport, Meteorological Service of Canada, form the basis of this publication. It is recognized at the outset that some of the data herein are incomplete and contain deficiencies, nevertheless they are presented because they provide background essential to understanding the environment that existed in the Little Codroy and evaluating the productivity of the system.

GEOMORPHIC ASPECTS OF THE DRAINAGE BASIN

The Little Codroy is a small river near the southwest corner of the island of Newfoundland (Fig. 2). This river and the much larger Grand Codroy nearby drain the Codroy valley, a triangular lowland formed by the Anguille Mountains and the Long Range Mountains. The Little Codroy drainage basin is 86.4 square miles in area (Table I) and is somewhat elongate in shape (Fig. 3). The main stream of the Little Codroy flows along the base of the Long Range Mountains and into the Gulf of St. Lawrence.

Geology

The Long Range Mountains are the controlling feature of the Little Codroy landscape (Fig. 4). They form a steep westward-facing escarpment stretching from the Little Codroy north to Southwest and Bottom Brooks at the head of St. George's Bay. The escarpment is, on the average, about 1800 ft above sea level and 1500-1700 ft above the lowlands of the Codroy valley (Fig. 5); it marks the boundary between the Paleozoic Central Upland and the Carboniferous lowland (Hayes and Johnson, 1938). The main stream of the Little Codroy (and of the Grand Codroy) flows in a southwesterly direction along the strike of the strata and faults. Major tributaries of these streams arise in the Central Upland and flow at right angles to the main streams through gorges which they have cut in the escarpment (Fig. 6), some of which have been modified by glaciation so that they are cirque-like. Igneous and metamorphic rocks of the escarpment are exposed in the valleys of some tributaries (Hayes and Johnson, 1938).

The Long Range Mountains forming the Little Codroy basin consist of a complex of granite, gabbro, diorite, and peridotite plutonic rock of Devonian age which have been thrust upon a geologically younger lowland (Fig. 3). The top of the range is a glacially scoured peneplain (Hayes and Johnson, 1938) with numerous small rock basin lakes (Fig. 3).

The Little Codroy lowland is covered to a variable depth by glacial debris and glacial lacustrine deposits; beneath this are Carboniferous shales and sandstones (Fig. 3) whose beds strike parallel and lengthwise with the valley (Hayes and Johnson, 1938). The glacial till is a heterogeneous collection of granite, gneiss, schist, sandstone, and blue-gray limestone boulders, rubble, and gravel. Alluvial silt, sand, and gravel occur along the floodplains of the river.

Table I. Morphometric factors of the drainage basins of the Little Codroy River and its tributaries.

Drainage basin	Basin area	Mean width	Perimeter	Axial length	Relief	Perim. Circum.	Perim. Lemnisc.	Ax. len. Width	Relief Perim.	Relief Ax. len.
	miles ²	miles	miles	miles	ft					
Little Codroy R.	86.4	4.6	55.1	18.0	2050	1.67	1.37	3.91	0.0070	0.0216
main stream	30.8	2.5	52.8	16.6	1850	2.68	1.54	6.64	0.0066	0.0211
tributaries:										
Big Johns Ek.	6.6	1.1	12.4	4.7	2035	1.36	1.16	4.27	0.0311	0.0820
Campbells Ek.	3.8	1.2	9.2	3.8	2045	1.33	1.08	3.17	0.0421	0.1019
Coopers Ek.	7.1	1.4	13.2	4.9	1745	1.40	1.18	3.50	0.0250	0.0674
Doucets Ek.	1.8	0.5	7.3	3.0	2045	1.53	1.13	6.00	0.0530	0.1291
Eastern Ek.	13.8	1.7	20.8	6.6	1750	1.58	1.37	3.88	0.0159	0.0502
Frank Whites Ek.	1.8	0.9	6.4	2.3	445	1.34	1.19	2.56	0.0132	0.0366
Southern Ek.	11.0	2.1	18.8	7.2	1925	1.60	1.21	3.43	0.0194	0.0506
Southwest Ek.	9.7	2.4	16.1	4.9	1450	1.46	1.35	2.04	0.0170	0.0560

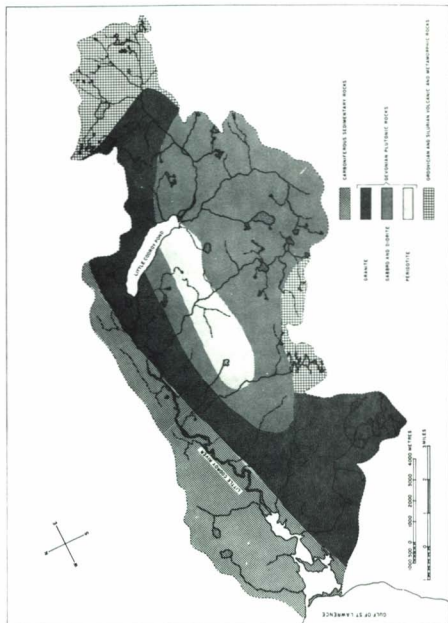


Fig. 3. Bedrock geology of the Little Codroy drainage basin.



Fig. 4. Long Range Mountains looking eastward up the valley of the Little Codroy River.

Hayes and Johnson (1938) report finding *Productus avonensis* Bell, a shallow water marine brachiopod, in an isolated outcrop of heavy bedded, massive limey shale in the Little Codroy River between sampling stations 2 and 3 (Fig. 7). They believe that the presence of this fossil indicates that the shale is similar in age to that of the Upper Windsor (Mississippian) in Nova Scotia and that the rocks are probably a part of the same basin of deposition.

Basin morphometry

A drainage basin is an area which contributes water to a particular channel or set of channels. It is separated from other such basins by a divide or ridge of land known as a watershed. The land surface within a basin is a system through which precipitation is imported and minerals and excess water are exported by erosional and transportational processes. Earth processes are closely related to climate; the effects of precipitation and temperature on weathering of rock or glacier formation, for example, are well known. Hence within a given climatic regime the forces of erosion acting on an area with certain physical properties will produce a basin whose morphology will transmit characteristic amounts of water and debris (Strahler, 1964).

The major morphometric factors of the Little Codroy drainage basin and of its tributary streams are summarized in Table I. The form of the Little Codroy basin is shown by the topographic map in Fig. 5 which was prepared from a series of Mines and Technical Surveys topographic maps, scale 1:50,000. The Little Codroy watershed was plotted on these maps by drawing a line through the heights of land around the river system; the watershed of each tributary was plotted in a similar manner and these are shown in Fig. 7. The main stream is not named as such in Fig. 7; it receives the discharge of all tributaries and it runs from the junction of Northern and Southern Brooks to the point

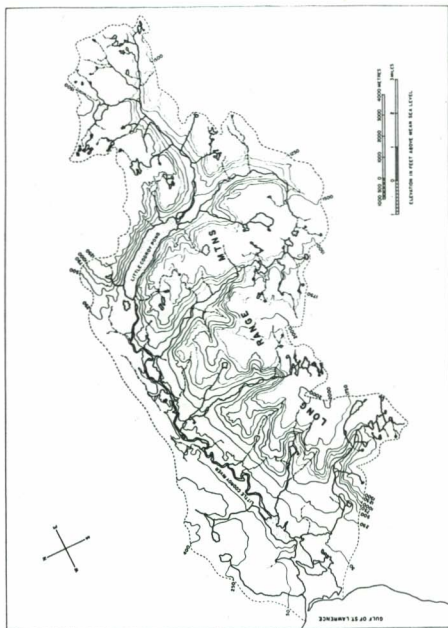


Fig. 5. Topographic map of the Little Codroy drainage basin.

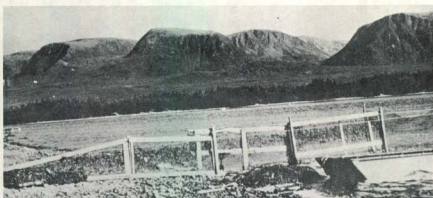


Fig. 6. Coopers Brook gorge, Long Range Mountains, near St. Andrews, Newfoundland.

where it discharges into the Gulf of St. Lawrence. Basin areas were determined with a polar planimeter, perimeters and axial lengths with a chartometer (map measurer), and basin widths with a ruler. The mean width is the average of a number of distances across the basin measured at right angles to the axial length. The axial length is the length of the long axis of the basin measured from the mouth to the most distant point on the perimeter. Relief in Table I means the maximum basin relief, that is, it is the difference in elevation between the mouth of the basin and the highest point on the basin perimeter.

Table I also contains five dimensionless ratios. The first of these is the ratio of the perimeter of the basin to the circumference of a circle whose area is equal to that of the basin. This ratio cannot be less than 1.0 and the closer to 1.0 the more nearly circular the basin. Values range from 1.33 for Campbells Brook to 2.68 for the main stream and 1.67 for the entire basin. A circle however is inappropriate as a figure of reference; the typical drainage basin is a pear-shaped ovoid (Strahler, 1964). Hence the second ratio in Table I compares the perimeter of the basin to the perimeter of a lemnisca. The method of calculating the perimeter of a lemnisca is outlined in Chorley et al. (1957). This ratio too cannot be less than 1.0 and the closer to 1.0 the more nearly pear-shaped the basin. Values range from 1.08 for Campbells Brook to 1.54 for the main stream and is 1.37 for the entire basin. In Fig. 7 it can be seen that the form of the basin of Campbells Brook is approximately tear-shaped whereas the form of the main stream is quite irregular.

The third ratio in Table I compares the axial length of each basin with its mean width. It is therefore an expression of the slimness of a basin. Values range from 2.04 for the relatively wide Southwest Brook to 6.00 for Doucets Brook and 6.64 for the main stream both of which are relatively slim. The entire basin has a ratio of 3.91.

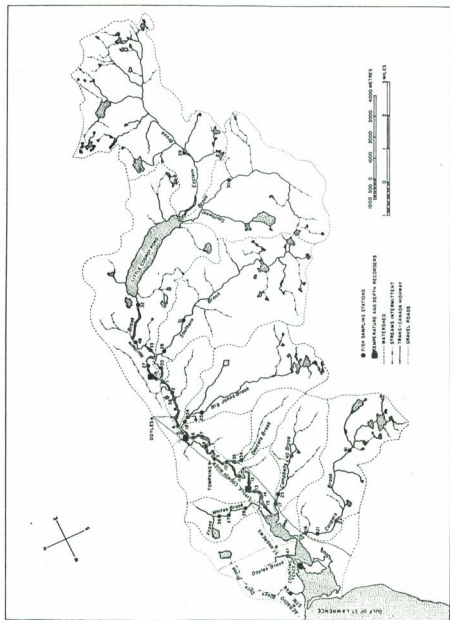


Fig. 7. Locations of temperature and depth recorders and fish sampling stations on the Little Codroy River, and watersheds comprising the Little Codroy drainage basin.

The last two ratios in Table I are relief ratios. The first of these compares relief and perimeter and the second relief and axial length. Values are quite small, generally less than 0.1. Strahler (1964) reports work which suggests that a correlation exists between relief ratio and hydrologic characteristics. He shows, for example, that annual sediment loss in basins of resistant rock was less than 0.2 acre-ft/square mile in basins with relief ratios less than 0.2. Areas of weak rock and higher relief ratios had higher annual sediment loss.

CLIMATE

During the period of the investigations on the Little Codroy, 1954-63, air temperatures, precipitation, and wind data were obtained from the Department of Transport Aeradio Station, St. Andrews, Newfoundland. This station, which is no longer being operated, was located near the mouth of the estuary (Fig. 2) at 47° 46'N latitude, 59° 20'W longitude.

Temperature

Daily and monthly means. Hourly values of air temperature (°F), read from a dry bulb thermometer mounted in a Meteorological Service of Canada (MSC) standard Stevenson screen at the Aeradio Station, were obtained for the months April-October or November each year. This period corresponded very approximately to the open water period in the river and included the months when active field work was being done. The mean air temperature for any given day was obtained by taking the average of the 24 hourly readings; these data are contained in Appendix A. The monthly means were obtained by summing the hourly values for a given month and dividing by the number of observations; these data are also contained in Appendix A.

Season of persistent thaw. The annual air temperature cycle at St. Andrews, like many places in Canada, rises from a winter minimum to a summer maximum and declines again. Each year therefore has a period when the mean daily temperatures are, on the average, above 32 F and another period when they are below 32 F. The period when the mean daily temperatures are greater than 32 F is called the season of persistent thaw (Hare, 1952); it is important ecologically because it is related to the period of ice and snow cover as well as to the period of rapid fish growth.

To determine the date when the mean daily temperature rose above 32 F, a period of 30 consecutive days was selected from early in the year, say, for example, March 1-30 inclusive, the mean daily temperatures were summed,

and the total compared with 960 (i.e., the product of 30 x 32)¹. If the total was less than 960, then the daily mean for March 1 was dropped and the daily mean for March 31 added, the temperatures summed, and the total again compared with 960. When the sum of the 30 days was equal to, or very close to 960, then the date when the mean daily temperature rose above 32 F was considered to be the sixteenth day in the group of 30. The date when the mean daily temperature fell below 32 F was determined in a similar manner.

The mean temperature of the season of persistent thaw (MPT) could not be determined from the hourly values in Appendix A because these data were not extensive enough. The daily maximum (MXT) and minimum (MNT) temperatures² were used for the period of persistent thaw (INT) each year:

$$MPT = \{[(\Sigma MXT - \Sigma MNT)/2] + \Sigma INT\} / INT \quad \dots(2).$$

On the average, during the period 1954-63, the mean daily air temperature rose above 32 F on April 5 and fell below it again December 12 (Table II). The average duration of the season of persistent thaw was 252 days; the average temperature during these periods was 47.5 F (Table II). This period begins a little earlier and ends a little later making the season about three weeks longer than that suggested by Hare (1952, Fig. 9-11). The mean monthly temperatures for the various months, or parts thereof, comprising the seasons of persistent thaw are given in Table III.

Vegetative season. The vegetative season is the period when growth in plants occurs. It is assumed that growth begins on the date when the mean air temperature rises above a certain threshold value and ceases when the temperature falls below the threshold again. The threshold value used here, 43 F, is the one used by Hare (1952) in his study of the climate of Newfoundland. Other values, such as 41 F (Landsberg, 1950), have also been used for the threshold.

Data about the vegetative season are included here primarily for comparative purposes. However, the onset and duration of this season may have some influence on the production of young salmon. Parr recently emerged from the gravel may consume river plankton before becoming insectivorous, and the production of the plankton may, in turn, be related to the growing season. Seasonal abundance of phytoplankton in lakes, for example, is related to temperature and illumination, as well as to other physical, chemical, and biological factors (Hutchinson, 1967).

¹The season of persistent thaw often extended beyond the period covered by the data in Appendix A. Mean daily temperatures (MDT) for such periods were calculated using the daily maximum (MXT) and minimum (MNT) temperature data in "Monthly record. Meteorological observations in Canada", published by the Department of Transport, and substituting in

$$MDT = [(MXT - MNT)/2] + MNT \quad \dots(1).$$

²Obtained from "Monthly record. Meteorological observations in Canada", 1954-63.

Table II. Onset, duration, and mean air temperatures in season of persistent thaw, St. Andrews, Newfoundland, 1954-63.

Year	Dates when mean daily air temperature rose above 32 F	Dates when mean daily air temperature fell below 32 F	Duration days	Mean air temperature °F
1954	April 16	January 8, 1955	268	46.8
1955	April 8	December 3	240	48.2
1956	April 5	December 6	246	47.2
1957	April 15	January 5, 1958	266	46.0
1958	March 15	November 25	256	47.0
1959	April 9	December 11	247	48.0
1960	April 11	December 5	239	48.7
1961	April 1	December 13	257	48.7
1962	March 23	December 9	262	46.3
1963	April 8	December 6	243	48.5
Means	April 5	December 12	252	47.5

The method of determining the dates when the mean daily temperature rose above, and fell below, 43 F is similar to that used to calculate the dates for the season of persistent thaw. The major difference is that the sum of 30 consecutive mean daily air temperatures was compared with 1290 (i.e., the product of 30 x 43) instead of 960.

The mean temperature of each vegetative season was determined from the data in Appendix A. Hourly values within each season were summed and divided by the number of observations.

On the average, the mean daily air temperature rose above 43 F on May 16 and fell below it again October 27 during the period 1954-63 (Table IV). The average length of the vegetative season was 165 days, 87 days shorter than the season of persistent thaw. The average air temperature during the vegetative season was 54.3 F. Again, as with the season of persistent thaw, the data indicate that the vegetative season begins at least five days earlier and is about two weeks longer than that suggested by Hare (1952, Fig. 16 and 17).

Frost-free season. The frost-free season is the period between the last spring and first autumn frosts. These data (Table V) are included so that they may be compared with the season of persistent thaw. As a concept it has limited value because the occurrence of frost is largely determined by topography. Moreover there is no simple relationship between plant growth and frost occurrence. Nevertheless, on the average, the first frost-free day in the spring at the St. Andrews Aeradio Station was June 3 and the last frost-free day of the summer was 115 days later on September 26 (Table V). The frost-free season was an average of 115 days, or about 16½ weeks, shorter than the season of persistent thaw.

Table III. The mean air temperatures (°F) of the various months, or parts thereof, comprising the seasons of persistent thaw, and the seasonal means, St. Andrews, Newfoundland, 1954-63.

Year	Season of persistent thaw										
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	January
1954	...	34.5	45.9	54.7	60.4	58.2	51.4	44.1	36.9	33.3	32.0 ⁽¹⁾
1955	...	34.9	43.8	52.5	58.2	58.6	52.5	45.4	38.2	33.2	...
1956	...	36.4	39.7	49.9	56.5	59.2	52.0	45.2	38.7	30.0	...
1957	...	33.6	39.4	49.0	58.9	59.0	52.8	45.0	38.0	33.8	27.2 ⁽²⁾
1958	36.6	39.3	45.6	50.4	57.7	60.1	51.5	43.3	30.6	...	...
1959	...	34.2	42.3	50.3	60.2	60.3	54.2	43.9	38.5	34.6	...
1960	...	33.9	46.4	54.2	59.6	59.8	52.9	43.9	37.2	31.6	...
1961	...	34.9	43.6	52.8	59.2	61.1	57.0	48.6	42.1	34.0	...
1962	28.9	34.9	40.8	49.9	55.9	59.1	52.9	45.5	40.2	36.9	...
1963	...	34.9	44.1	49.3	60.4	58.7	51.9	46.5	40.6	33.8	...
Means	33.5	35.0	43.2	51.3	58.4	59.2	53.0	44.9	38.8	33.6	30.2

(1) for the period January 1-8, 1955.

(2) for the period January 1-5, 1958.

Table IV. Onset, duration, and mean air temperatures in vegetative season, St. Andrews, Newfoundland, 1954-63.

Year	Dates when mean daily air temperature rose above 43 F	Dates when mean daily air temperature fell below 43 F	Duration	Mean air temperature
			days	°F
1954	May 9	October 26	171	53.4
1955	May 11	November 3	177	57.7
1956	May 21	October 23	156	52.5
1957	May 31	October 27	150	53.2
1958	May 11	October 17	160	52.8
1959	May 18	October 21	157	54.0
1960	May 7	October 21	168	54.2
1961	May 14	October 30	170	55.1
1962	May 26	November 3	162	57.3
1963	May 15	November 7	177	52.5
Means	May 16	October 27	165	54.3

Table V. Onset, duration, and mean air temperatures in frost-free season, St. Andrews, Newfoundland, 1954-63.

Year	First frost-free day in the spring	Last frost-free day in the autumn	Duration	Mean air temperature
			days	°F
1954	June 2	September 14	105	57.3
1955	May 22	September 23	125	55.2
1956	June 9	September 26	110	55.1
1957	June 7	September 29	115	55.9
1958	May 17	September 17	124	55.1
1959	June 12	October 2	113	57.3
1960	May 25	September 20	119	56.6
1961	June 16	October 11	118	58.2
1962	June 1	September 23	115	54.7
1963	June 8	September 24	109	56.0
Means	June 3	September 26	115	56.1

Precipitation

Daily and monthly totals. At the St. Andrews Aeradio Station, precipitation was collected in a standard MSC rain gauge and the amount expressed in inches. Daily and monthly totals for the months April-October or November each year are contained in Appendix B.

Season of persistent thaw and vegetative season. The average annual precipitation was 44.7 inches for the period 1954-63 (Table VI). On the average, 30.0 inches, or 67% of the annual total, fell during the season of persistent thaw, and 19.4 inches, or 43% of the annual total, fell during the vegetative season. The precipitation during the months comprising the season of persistent thaw is summarized in Table VII.

Wind

Basic observations. Wind data were obtained from the St. Andrews Aeradio Station for the months April-October or November each year from 1955 to 1963. Velocities were obtained with a MSC 3-cup anemometer, type 45B. Prior to 1959 the observations were recorded graphically, but in that year the graphical record was replaced with a flash indicator. Unlike the graphical record, which indicated the number of miles of wind that had blown by in a given period, the flash indicator only gave an instantaneous reading (in mph).

Table VI. Annual precipitation at St. Andrews, Newfoundland, 1954-63, compared with amounts recorded in seasons of persistent thaw and in vegetative seasons.

Year	Annual totals	Season of persistent thaw		Vegetative season	
		amount	proportion of total	amount	proportion of total
	. inches	inches	%	inches	%
1954	37.7	28.2	75	18.4	49
1955	40.7	29.9	73	23.0	56
1956	40.1	24.9	62	16.0	40
1957	38.0	29.7	78	14.8	50
1958	63.2	42.0	66	26.2	41
1959	44.2	27.9	63	16.3	37
1960	39.2	22.4	57	15.8	40
1961	47.6	30.0	63	19.0	40
1962	51.4	35.7	69	20.7	40
1963	44.7	29.9	67	23.3	52
Means	44.7	30.0	67	19.4	43

Table VII. The amount of precipitation, in inches, recorded during the seasons of persistent thaw,
St. Andrews, Newfoundland, 1954-63.

Year	Season of persistent thaw										
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	January
1954	...	0.11	2.94	1.99	4.69	2.99	2.12	5.86	2.83	3.78	0.84 ⁽¹⁾
1955	...	1.87	3.32	1.91	3.16	6.13	5.27	4.55	3.37	0.31	...
1956	...	2.44	4.23	3.11	2.78	2.99	2.73	2.39	3.87	0.36	...
1957	...	0.64	2.07	1.82	3.04	2.36	4.71	2.82	5.11	5.53	1.62 ⁽²⁾
1958	0.14	5.13	7.30	3.49	3.88	3.78	7.37	3.36	7.55	...	...
1959	...	0.53	2.47	3.14	1.26	3.67	3.90	4.28	6.95	1.72	...
1960	...	0.54	1.10	2.16	3.40	1.82	3.66	5.63	4.08	0.03	...
1961	...	1.30	6.17	3.45	1.21	1.90	2.09	5.58	5.36	2.93	...
1962	0.92	6.78	2.35	3.86	5.47	2.35	3.63	3.55	5.91	0.90	...
1963	...	0.88	3.75	3.16	1.51	6.85	4.50	1.99	6.41	0.84	...
Means	0.52	2.02	3.57	2.81	3.04	3.48	4.00	4.00	5.12	1.82	1.23

(1) for the period January 1-8, 1955.

(2) for the period January 1-5, 1958.

A wind vane was operated in conjunction with the anemometer. Only eight directions were registered on the graphical record; these were the four cardinal points of the compass (i.e., N, E, S, and W), and the four intermediate directions (i.e., NE, SE, SW, and NW). In contrast, 16 directions were registered on the flash indicator.

Wind velocity and occurrence. The basic data are too voluminous to be summarized on a daily basis, consequently the tables for wind velocity (Appendix C) and occurrences (Appendix D) are on a monthly and seasonal basis. The word season in this case merely refers to the months in which data were obtained in any given year. Strictly speaking, the mileages recorded between 1955 and 1958 are not velocities; they are treated so herein because the basic observations were taken hourly. It is well known that the movement of air over land is not a streamline flow but is a turbulent movement of successive gusts and lulls. The observations obtained with the flash indicator (1959-63) frequently included the velocities of the gusts. Each dual observation was reduced to a single one by adding the lull to half the difference between the gust and the lull.

The average monthly and seasonal velocities are summarized in Table VIII and the relative occurrences in Table IX. Only eight directions are used in these two tables to simplify the results and to make the 1959-63 and the 1955-58 summaries comparable. The data for 16 directions were reduced to eight by taking the velocity for a direction like, say, NNE, dividing it in half and assigning one portion to N and the other to NE.

The average wind velocity at the St. Andrews Aeradio Station was 9 mph for the months March-November, 1955-63 (Table VIII). On the average, wind velocities were lowest in the months of June and July (7 mph) and highest in the autumn (14 mph). Winds from the SE were strongest; the overall average velocity was 14 mph but gale force (33-63 mph) winds were frequently observed. Occasional stronger SE winds were recorded; peak velocities were winds of 80

Table VIII. The mean monthly and mean seasonal wind velocity (mph) from each direction at St. Andrews, Newfoundland, 1955-63.

Direction	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Directional means
N	11	9	8	7	6	8	7	9	11	8
NE	8	9	7	6	5	5	6	7	7	7
E	9	9	9	7	7	6	5	7	10	7
SE	23	19	17	11	11	11	12	15	14	14
S	8	12	14	11	10	10	12	13	14	11
SW	10	10	9	8	8	7	9	11	12	9
W	11	8	7	6	7	8	8	11	16	9
NW	13	10	9	7	7	9	11	11	16	10
Monthly means	11	10	9	7	7	8	9	10	14	9

Table IX. The mean monthly and mean seasonal relative occurrences (%) of wind from each direction at St. Andrews, Newfoundland, 1955-63.

Direction	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Directional means
N	27	12	9	8	6	7	8	9	4	9
NE	17	16	13	12	10	11	15	16	4	13
E	25	8	12	10	12	9	9	10	14	10
SE	8	8	9	9	9	10	8	8	10	9
S	3	9	13	14	18	20	18	14	8	15
SW	5	14	15	21	20	15	14	11	5	15
W	7	9	9	8	8	10	10	12	25	10
NW	8	18	14	11	10	12	14	17	30	14
Calm	0	6	6	7	7	6	4	3	0	5

with gusts to 115 mph (5 AM, April 9, 1963). The exceptional force of the SE winds was more or less confined to the lower end of the Little Codroy River valley; these winds increased in force when they dropped off the Long Range escarpment and when they funnelled through the hanging valleys of Campbells and Coopers Brooks. Strong winds blowing off the sea were also experienced; peak velocities were: NW 30-50 mph (midnight, October 20, 1959), and SW 34-60 mph (10 AM, September 13, 1960).

Despite their force winds from the SE only occurred 9% of the time (Table IX). Winds from S, SW, NW, and NE were about equally frequent and comprised 57% of the occurrences. Calm weather was only experienced in the months April-October, and occurred about 5% of the time.

VEGETATION

Most of the Codroy valley is heavily wooded. Fir and some birch occur in well-drained areas, spruce in poorly-drained areas, and alders along the river flood plains. The flood plains have been utilized for farms and these areas have been cleared of trees; land clearing appears to have proceeded more or less continuously since the area was settled 140 or so years ago, proceeding at a much faster rate recently. The farms produce hay and vegetable crops mainly, and varying quantities of livestock.

STREAMS OF THE LITTLE CODROY BASIN

Orders

Stream order is a measure of the position of a particular stream in a hierarchy of tributaries. A first-order stream has no tributaries; a second-order stream is formed where two first-order channels join; a third-order stream is formed where two second-order channels join; and so on (Strahler, 1964). The trunk or main stream, the channel through which all water and sediment passes, has the highest order.

The stream-order system is a useful concept because, on the average, order number is directly proportional to the size of the contributing basin, to channel dimensions, and to stream discharge (Strahler, 1964). It has no dimension consequently drainage systems of differing size or scale can be compared by means of their order numbers.

The Little Codroy basin contains 116 first-order streams, 26 second-order streams, 5 third-order streams, and 1 fourth-order stream (Table X). The Little Codroy is therefore a fourth-order stream (Fig. 8); the junction of Southwest and Eastern Brooks at the head of Little Codroy Pond marks its beginning and it includes the lake, Northern Brook, the so-called main river, and the estuary. Coopers, Big Johns, Southern, Southwest, and Eastern Brooks are third-order streams. Campbells and Frank Whites Brooks are second-order streams and Black Duck, Doyles, and Doucets Brooks are first-order streams which join the trunk stream (Fig. 8).

Bifurcation ratio. The bifurcation ratio is the ratio of the number of streams in one order to the number in the next lower order (Leopold et al., 1964). Bifurcation ratios typically range between 3.0 and 5.0 (Strahler, 1964). The theoretical minimum is 2.0 although it is rarely encountered under natural conditions (Strahler, 1964). The average for streams in the United States is 3.5 (Leopold et al., 1964).

The average bifurcation ratio for the Little Codroy is 4.9 (Table X). High bifurcation ratios are apparently characteristic of regions of steeply dipping rock strata with narrow strike valleys confined between hogback ridges. The plot of order number against logarithm of stream number is linear (Fig. 9A). In this it is similar to most drainage networks and is in agreement with Horton's law of stream numbers (Strahler, 1964).

Lengths, basin areas, and related factors

Stream length. The total length of all the channels in the Little Codroy River system is 150 miles (Table X). Of this, there are 83 miles of first-order streams, 27 miles of second-order streams, and 23 miles of third-order streams. The fourth-order stream is 16 miles long.

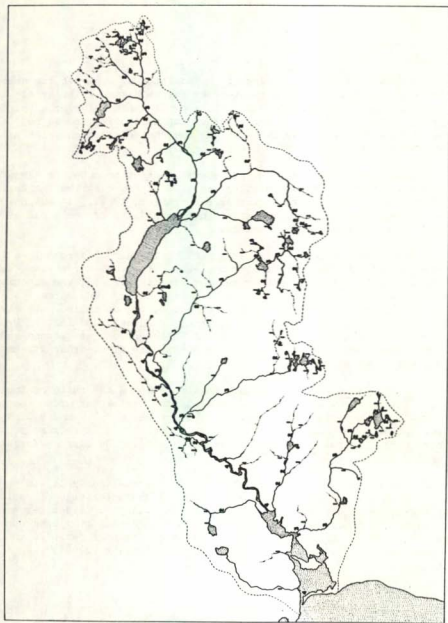


Fig. 8. Stream order numbers, Little Codroy River.

Table X. Numbers, lengths, and drainage areas of each stream order comprising the Little Codroy River.

Order	Number of streams	Bifurcation ratio	Number of streams entering next higher ratio	Stream length		Drainage area	
				total	mean	total	mean
				miles	miles	miles ²	miles ²
1	116		85	83.1	0.72	41.6	0.36
2	26	4.5	19	27.2	1.05	33.8	1.30
3	5	5.2	5	23.5	4.70	48.2	9.64
4	1	5.0		16.3	16.29	86.4	86.40
Totals	148			150.1		86.4	
Means		4.9			5.69		24.42

A plot of stream order against logarithm of mean channel length indicates a moderately good linear regression (Fig. 9B). This too is in agreement with Horton's law of stream lengths (Strahler, 1964).

Basin area. The total area of the Little Codroy drainage basin is 86.4 square miles (Tables I and X). Within this fourth-order basin there are 41.6 square miles of first-order basins, 33.8 square miles of second-order basins, and 48.2 square miles of third-order basins. Note that unlike stream lengths, the areas are not additive because a second-order basin includes all the first-order basins within it plus all additional surface elements, or interbasin areas, contributing to the second-order stream but not the first. Individually these areas do not support first-order channels but collectively they comprise about 20% of the total drainage area (Leopold *et al.*, 1964).

The total area of second-order basins, 33.8 square miles, is less than the total of first-order basins, 41.6 square miles (Table X). This is due to the fact that only 85 of the 116 first-order streams enter second-order streams, and that many of the remaining 31 first-order streams entering third- and fourth-order streams have quite large basins. For example, the area of the 85 first-order basins that enter second-order basins is 20.7 square miles, whereas the area of the 31 first-order basins that enter third- and fourth-order basins is 20.9 square miles. Similarly, the area of the 19 second-order basins that enter third-order basins is 22.0 square miles and the area of the 7 basins that enter the fourth-order stream is 11.8 square miles.

As with stream length, the regression of mean basin area on stream order is linear (Fig. 9C), and is in agreement with Schumm's law of stream areas (Strahler, 1964).

Drainage density. Drainage density, the quotient of the total length of all channels and the total drainage area (Leopold *et al.*, 1964), is an expression of the closeness of channel spacing. Values in the United States

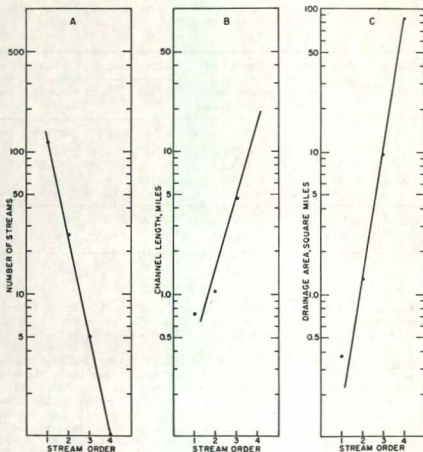


Fig. 9. Regression of number of streams, channel length, and drainage area on stream order, Little Codroy River.

range between 3.0 miles/square mile in resistant sandstone strata of the Appalachian Plateau Province to 1300 miles/square mile in badlands developed on weak clay at Perth Amboy, N.J. (Strahler, 1964). Low drainage density is characteristic of regions of resistant or permeable subsoil materials with dense vegetative cover and low relief; high drainage density, on the other hand, is characteristic of regions of weak or impermeable subsurface materials, sparse vegetation, and mountainous relief (Strahler, 1964).

The Little Codroy basin has a drainage density of 1.7 miles/square mile, a little lower than the lowest value reported by Strahler (1964).

Constant of channel maintenance. The constant of channel maintenance is the inverse of drainage density (Strahler, 1964). This value is 2643 for the Little Codroy, that is, 2643 square ft of drainage basin surface are required to maintain one linear foot of first-order channel. This value is much larger than the largest quoted by Strahler (1964) and Leopold *et al.* (1964), namely, 316 square ft/ft for Chileno Canyon in the San Gabriel Mountains of California. When all channels are considered the constant of channel maintenance becomes 3039 square ft/ft.

Stream frequency. Stream frequency, the number of stream segments per unit area (Strahler, 1964), is 1.71 for the Little Codroy.

Channels

Stream bed material. A stream bed consists essentially of discrete particles and aggregates of particles which form structures on it (Leopold *et al.*, 1964). The nature of the particles affect the quality and quantity of fauna living among them as well as stream flow. Flow is affected, not only by the size and shape of the individual particles, but also by the aggregates; the latter cause a drag on the flow which is in addition to the effect of the particles themselves (Leopold *et al.*, 1964).

Particles are named according to their size; the system adopted is that of Roelofs (1944). The size groupings are named and defined in Table XI.

The composition of the stream bed was assessed at many places in the Little Codroy system. The main stream and the downstream reaches of all tributaries were examined by wading. The method of describing the composition of the stream bed was one of visually estimating the proportion that each class of particle comprised in a narrow strip across the stream one grain diameter deep. Finer particles occupied the interstices between and beneath the larger particles; these fine sediments were not included unless, of course, they were considered to comprise the uppermost layer. Such a method lacks the precision of the more usual one of size analysis based on percentage by weight of

Table XI. Definition of particle size. Taken from Roelofs (1944).

Particle	Abbreviation	Definition
Bedrock	BR	rock strata in situ;
Boulders	BO	rocks over 12 inches diameter;
Coarse rubble	CR	rocks 6-12 inches;
Fine rubble	FR	rocks 3-6 inches;
Coarse gravel	CG	particles 1-3 inches;
Fine gravel	FG	particles 0.125-1.0 inch;
Sand	S	particles smaller than FG;
Muck	M	black, completely decomposed organic material.

different size components. In remote streams the latter method would require the carrying of considerable quantities of sediment in back packs to a place where they could be sorted, sieved, and weighed, and in view of the time and effort involved in such work, the visual estimation method was deemed sufficiently accurate.

In 1960, most of the remote channels on the escarpment were examined from a helicopter and a few sections were examined from the ground to verify the aerial observations.

First- and second-order streams originating on the escarpment had stream beds of bedrock, boulders, and rubble. The major constituents of the stream beds within the higher order streams of the Little Codroy system are given in Table XII. Stream beds at the fish sampling stations were examined in more detail and these data are summarized in Table XIII. The upper reaches of third-order streams consist of bedrock and boulders and the lower reaches rubble. The stream bed of Northern Brook and the main river, which form a fourth-order stream, grades from boulders in the upper reaches through rubble and gravel in the middle reaches to sand and mud in the section nearest the estuary. There is, therefore, a decrease in particle size downstream and this decrease is correlated with slope (Table XII). Coarser particles such as boulders and coarse rubble are found in sections where the slopes are steeper than about 0.03 and the finer particles where the slopes are less steep. Mud and sand occur in the lowest reaches of the main stream and although not measured the slope there is probably much less than the 0.001 estimated. Even though the data are crude, they are similar to those reported for the Yellowstone-Missouri-Mississippi River system (Leopold et al., 1964).

Stream profiles. Longitudinal profiles of most of the streams comprising the Little Codroy system are shown in Fig. 10, 11, and 12. Stream elevation was estimated from intersections of contour lines and streams on the Mines and Technical Surveys topographic maps, scale 1:50,000. Because all streams are shallow the distinction between stream bed and stream surface was ignored. The profile of the estuary is not shown; unlike the channels upstream its thalweg is deep and is below sea level.

The shape of the longitudinal profile is influenced by stream bed material (Leopold et al., 1964). Profile is concave when particle size decreases downstream and concavity is pronounced when the channel slope flattens rapidly. Profile is straight or convex when particle size increases downstream and becomes more convex with a rapid increase in particle size.

The profiles of the tributaries and the main stream are different (Fig. 10, 11, and 12). The upstream profiles of many tributaries are convex and the downstream portions concave. In contrast, the profile of the main stream is nearly straight.

Streams originating on the escarpment flow over resistant rock (Fig. 3), and, in addition, the coarsest debris occurs where the slopes are steepest. These two factors account for the convex profiles upstream. The channels flatten rapidly and particle size begins to decrease downstream when the streams reach the 500 ft elevation (Fig. 10, 11, and 12; and Table XII).

Table 4. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1957.

Day	April	May	June	July	August	September	October	November
1	25.3	40.0	47.1	65.3	63.6	48.6	55.9	54.0
2	35.4	40.7	57.9	57.6	63.6	51.3	51.8	48.3
3	23.9	36.3	46.8	52.4	58.4	56.1	47.8	46.9
4	23.0	32.1	46.0	54.9	62.0	59.2	46.1	48.8
5	27.2	33.3	45.8	60.6	64.5	58.8	46.2	45.3
6	29.3	33.5	43.3	63.6	61.2	59.4	44.6	39.7
7	34.5	38.2	40.1	61.4	61.0	58.9	46.1	36.4
8	31.6	40.8	40.1	60.2	60.8	58.2	53.8	37.0
9	32.4	48.6	42.4	65.9	61.4	51.0	52.4	48.7
10	33.0	42.4	44.9	64.0	66.9	52.7	52.1	45.4
11	31.4	38.3	45.7	62.9	65.0	49.1	50.2	33.1
12	32.1	41.5	49.1	60.8	62.6	50.7	43.8	30.2
13	34.7	42.9	51.2	67.0	59.3	52.9	42.1	30.4
14	30.9	37.1	47.5	62.7	61.4	55.7	37.5	35.6
15	30.3	35.2	51.8	62.3	60.4	53.0	40.0	36.5
16	29.9	36.5	48.5	61.0	57.5	55.7	46.3	37.3
17	33.9	31.6	48.5	56.0	57.6	55.9	51.1	38.8
18	31.5	34.0	45.0	50.2	58.2	49.2	48.9	34.0
19	33.7	34.8	53.2	53.9	58.3	49.9	41.2	34.2
20	36.9	38.7	48.6	55.6	60.3	56.4	49.7	47.5
21	37.7	42.6	44.6	53.7	55.6	55.3	38.6	41.5
22	31.5	40.2	47.2	55.0	53.7	53.2	39.3	40.8
23	33.9	39.3	47.3	53.2	49.8	62.1	43.6	34.9
24	27.5	44.0	51.1	55.4	58.8	56.4	37.3	37.8
25	27.5	42.0	48.4	54.9	59.4	49.6	51.3	33.2
26	32.3	39.9	49.2	55.0	59.2	47.1	40.0	22.8
27	40.8	44.6	50.0	59.4	63.3	45.6	37.5	28.1
28	38.2	47.2	55.6	60.9	52.5	43.5	35.4	32.2
29	36.2	41.2	63.8	60.2	50.3	44.6	36.0	31.6
30	36.0	40.2	68.8	60.3	49.6	45.6	38.3	32.2
31		43.2		60.3	52.0		50.3	
Means	32.1	39.4	49.0	58.9	59.0	52.8	45.0	38.0

Table 3. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1956.

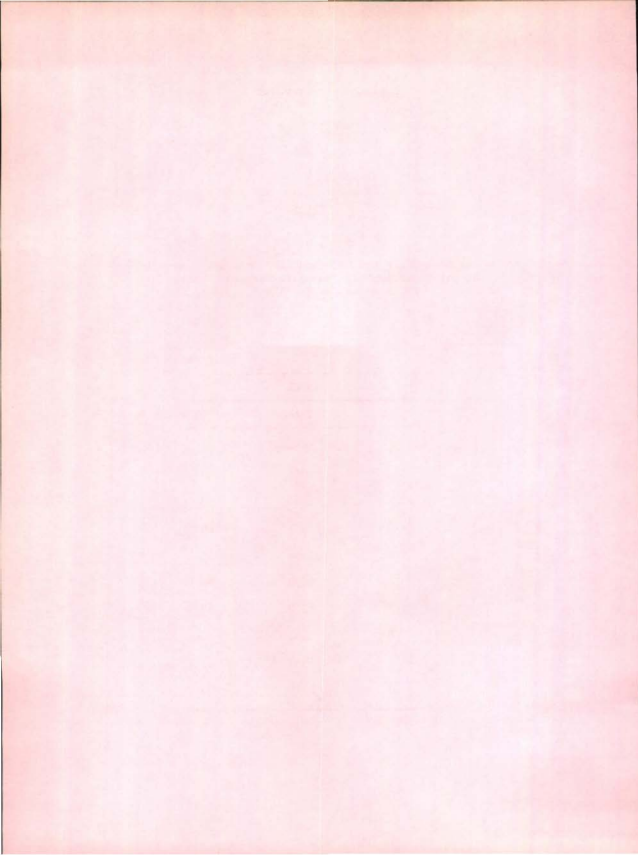
Day	April	May	June	July	August	September	October	November
1	31.7	32.4	51.6	53.7	60.9	51.8	52.8	45.3
2	29.7	33.8	57.7	55.2	59.7	55.3	59.6	41.8
3	30.7	36.3	51.8	49.3	58.3	61.3	52.9	36.2
4	30.8	36.7	55.4	49.8	55.8	56.5	51.3	38.6
5	33.5	33.5	56.5	49.8	57.6	59.7	48.9	38.2
6	32.0	40.0	46.8	49.6	59.2	60.5	43.9	38.7
7	29.5	32.3	41.2	51.0	61.8	62.8	45.4	41.8
8	37.3	32.5	39.0	50.7	64.1	55.1	52.8	46.3
9	39.9	35.0	39.5	54.8	62.7	51.4	52.7	47.3
10	37.2	37.9	45.0	59.0	60.8	49.4	45.3	38.3
11	34.6	34.4	47.7	61.9	61.1	48.7	39.9	30.6
12	35.5	40.3	48.8	62.2	63.9	58.1	39.8	39.3
13	37.4	45.0	50.0	56.0	60.0	61.5	44.8	49.2
14	34.0	42.3	50.0	59.2	57.4	63.6	42.9	33.3
15	32.4	40.8	59.9	60.9	60.3	55.6	42.5	34.0
16	36.3	41.4	50.6	63.6	59.1	45.2	46.8	31.3
17	46.3	44.5	45.8	54.5	60.1	46.1	47.8	44.6
18	41.3	39.1	46.1	53.7	65.0	51.4	47.7	32.4
19	43.0	44.4	43.9	54.9	63.2	50.7	39.8	32.8
20	34.1	42.4	48.6	55.4	59.1	47.7	43.2	32.6
21	37.6	37.5	53.6	56.1	58.2	54.5	45.2	38.0
22	36.6	45.5	52.7	59.1	54.4	50.2	47.8	49.6
23	36.9	50.4	49.4	59.9	52.8	47.7	49.9	39.1
24	38.5	40.2	45.9	59.5	55.5	45.7	50.8	37.3
25	36.3	37.0	48.6	57.8	60.0	43.0	31.8	31.6
26	34.8	37.9	52.2	59.4	59.8	43.3	35.3	29.9
27	34.4	38.2	50.4	58.1	57.1	43.0	41.9	43.6
28	38.2	36.6	58.3	59.7	58.2	46.3	37.5	40.8
29	40.0	50.7	56.6	59.6	57.0	48.0	38.1	36.1
30	32.0	44.7	53.8	57.6	57.0	46.0	38.1	41.9
31		47.6		58.7	55.6		43.9	
Means	35.7	39.7	49.9	56.5	59.2	52.0	45.2	38.7

Table 2. The mean daily and mean monthly air temperatures ($^{\circ}\text{F}$) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1955.

Day	April	May	June	July	August	September	October	November
1	24.4	35.6	46.5	65.7	61.4	67.0	53.5	38.8
2	27.9	35.2	44.3	60.2	62.6	60.9	49.1	37.6
3	31.8	38.0	46.6	54.0	57.8	58.2	43.8	41.5
4	28.6	40.7	54.7	54.1	54.3	59.1	42.4	46.5
5	26.5	39.2	48.4	55.2	57.5	64.7	43.8	47.7
6	25.9	36.8	51.1	54.6	61.4	58.8	40.3	50.5
7	33.5	38.6	51.4	59.5	58.2	60.4	41.2	51.8
8	32.6	40.1	52.5	62.2	59.2	56.3	53.6	44.9
9	32.5	42.5	49.1	66.3	55.4	51.6	51.2	45.6
10	32.2	46.3	47.5	68.6	59.3	49.4	50.3	39.7
11	34.8	53.4	47.7	63.0	60.9	60.2	48.0	40.0
12	32.1	46.2	49.0	57.7	61.8	62.9	44.6	39.5
13	30.7	46.0	53.2	60.0	62.0	54.6	40.0	38.8
14	38.0	43.9	52.5	57.7	63.9	50.0	39.5	33.9
15	41.4	47.7	47.8	60.7	64.4	55.7	41.5	34.9
16	30.4	46.0	46.9	62.4	59.6	52.2	47.3	33.7
17	27.9	42.9	48.7	61.9	50.5	47.0	47.8	38.9
18	29.8	44.7	55.0	61.0	54.2	53.2	47.9	33.9
19	34.6	49.6	51.2	53.0	59.1	42.0	48.4	33.9
20	33.0	46.1	52.4	52.3	61.7	47.4	45.2	32.4
21	34.1	43.5	48.3	57.5	58.8	49.7	44.5	39.0
22	37.2	42.1	55.0	53.8	62.7	44.2	39.2	32.6
23	37.4	47.2	61.0	56.9	61.1	44.5	36.6	32.5
24	36.9	51.4	61.4	59.5	60.5	43.2	41.0	34.8
25	37.6	46.0	54.1	56.2	53.6	50.7	48.8	34.9
26	37.1	45.0	55.6	57.0	55.5	43.8	41.7	29.9
27	36.4	42.3	55.4	58.0	55.8	44.3	44.9	32.2
28	37.4	42.7	58.6	49.2	57.1	46.9	43.4	33.5
29	38.3	47.4	63.1	51.9	57.3	49.5	48.1	42.7
30	39.4	45.1	65.4	53.8	53.1	45.5	49.0	31.0
31		43.9		58.5	54.9		49.5	
Means	33.4	43.8	52.5	58.2	58.6	52.5	45.4	38.2

Table 1. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1954.

Day	April	May	June	July	August	September	October
1	22.4	37.5	43.7	66.4	61.1	62.2	53.7
2	25.4	43.0	44.2	63.9	60.8	56.9	50.4
3	30.1	39.9	52.1	59.9	61.3	60.5	46.0
4	18.0	43.8	47.4	53.3	60.5	57.3	46.0
5	24.5	49.6	54.2	56.5	61.3	55.2	47.0
6	34.8	48.7	60.1	56.7	61.4	55.8	40.4
7	33.2	44.1	52.3	57.7	62.0	50.5	36.4
8	37.8	44.9	50.5	57.3	61.9	51.4	40.9
9	29.1	42.5	49.9	58.3	59.2	46.6	45.9
10	29.8	39.4	48.5	58.4	59.6	46.5	42.4
11	37.3	42.8	50.4	58.4	59.0	54.9	45.5
12	32.1	41.6	50.8	56.3	62.8	54.4	45.5
13	26.1	38.4	45.7	60.4	59.1	47.2	45.7
14	27.4	38.0	42.5	60.3	58.4	47.6	48.6
15	27.5	45.0	48.5	58.6	59.7	43.2	47.3
16	29.7	50.3	50.0	58.3	63.2	43.2	44.8
17	32.6	50.6	50.4	58.0	58.4	45.2	50.0
18	39.8	49.5	55.7	62.7	56.9	48.3	48.4
19	42.1	52.4	52.2	62.3	60.3	48.0	44.1
20	40.6	51.1	58.5	62.0	60.3	50.6	41.0
21	37.2	53.4	63.9	59.8	59.3	54.3	41.6
22	40.0	58.0	60.8	61.8	54.7	54.6	40.6
23	39.0	55.4	66.1	64.5	54.8	55.0	41.0
24	31.9	51.4	65.8	64.0	50.8	51.0	36.1
25	30.1	56.7	61.8	62.8	57.0	49.2	30.9
26	28.3	52.3	56.0	63.6	55.6	54.0	36.2
27	28.9	40.8	56.1	57.8	53.2	52.2	42.1
28	30.0	40.5	64.7	61.5	53.1	51.7	41.1
29	32.7	39.8	67.7	63.8	53.6	50.6	52.9
30	34.2	39.5	69.4	64.0	54.6	45.2	51.4
31		40.6		62.5	51.5		...
Means	31.8	45.9	54.7	60.4	58.2	51.4	44.1



APPENDIX A

The mean daily and mean monthly air temperatures (°F)
at the Department of Transport Aeradio Station,
St. Andrews, Newfoundland, 1954-63.

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counting fence was 2-3 C warmer, on the average, than water near stations 6 and 19 upstream (Tables XVI and XXIV). November temperatures, on the other hand, are cooler, by about 3.5 C, than upstream temperatures for the years 1956, 1957, and 1960.

The mean daily water temperatures at the fence and mean daily air temperatures from the Aeradio Station were subjected to linear regression analysis (Table XXV and Fig. 19). On the average, when the air temperature was 5.0 C the water temperature at the fence was 7.0 C, but when the air temperature was 20.0 C the water temperature was also 20.0 C.

Table XXV. Linear regression coefficients, fiducial limits of coefficients at the 5% point, and linear regression equations for water temperature on air temperature at the counting fence in the estuary of the Little Codroy River, 1954, 1956-63.

Year	Linear regression coefficient b'	Fiducial limits	Linear regression equation $\bar{Y} = (\bar{Y} - b'\bar{X}) + b'\bar{X}$
1954	0.2244	0.0577 - 0.3912	$\bar{Y} = 14.8737 + 0.2244\bar{X}$
1956	0.9160	0.8344 - 0.9977	$\bar{Y} = 1.4553 + 0.9160\bar{X}$
1957	0.5589	0.5116 - 0.6061	$\bar{Y} = 4.0048 + 0.5589\bar{X}$
1958	0.5433	0.4693 - 0.6173	$\bar{Y} = 5.8782 + 0.5433\bar{X}$
1959	0.9290	0.8498 - 1.0083	$\bar{Y} = 2.0839 + 0.9290\bar{X}$
1960	0.9551	0.8869 - 1.0232	$\bar{Y} = 2.7454 + 0.9551\bar{X}$
1961	0.9353	0.7966 - 1.0741	$\bar{Y} = 3.0473 + 0.9353\bar{X}$
1962	0.8473	0.7557 - 0.9390	$\bar{Y} = 3.9476 + 0.8473\bar{X}$
1963	0.8828	0.7783 - 0.9873	$\bar{Y} = 2.6739 + 0.8828\bar{X}$
all years	0.8677	0.8355 - 0.9000	$\bar{Y} = 2.7084 + 0.8677\bar{X}$

CONCLUSION

Gross productivity of the Little Codroy River is judged to be low because erosion has, in general, exceeded deposition, and because of the cool climate, the small amount of dissolved minerals and the small size of the basin coupled with the steep gradients of the tributary streams.

were recorded about 20% of the time and inflowing and outflowing currents were about equally frequent. Outflowing water was not observed beneath the surface during the flooding phase. Inflowing currents of 0.5 ft/sec were observed 58-43% of the time in mid-water but in deep water, they were 0.7 ft/sec and were observed 67-62% of the time (Table XXIII).

To summarize, on the average, an outflowing surface current was usually observed during the ebbing phase and at low tide. During the flooding phase and at high tide surface currents were not often recorded, but outflowing and inflowing currents did occur and the outflowing currents were more frequent and of greater velocity. Mid-water currents were observed infrequently at high tide and during the ebbing phase. Inflowing and outflowing mid-water currents occurred about equally often during these phases, but inflowing currents occurred more frequently at low tide and during flooding. Outflowing mid-water currents were not recorded during the flooding phase. Currents were not often observed along the bottom at high tide and during ebbing but were usually observed during low tide and flooding.

Temperature

A Taylor recording thermometer provided a continuous record of water temperature at the counting fence for a short period in 1954 and while the fence was operational from 1956 to 1963. It was mounted with the Barnsbury recorder in an instrument shelter attached to the side of the smolt trap (Fig. 25); the mercury-filled bulb was fastened about 4 ft from the base of the pole bearing the staff gauge so that it was about mid depth. The temperature recorder was not attached to the large smolt trap (Murray, 1968) but was mounted on one of the fence piers so that it remained in essentially the same position as formerly.

Daily and monthly average water temperatures at the fence are given in Appendix O and monthly and seasonal means in Table XXIV. Water at the

Table XXIV. The mean water temperature (°C) as measured by recorder at the estuarial counting fence, Little Codroy River, 1954, 1956-63.

Year	May	June	July	Aug.	Sept.	Oct.	Nov.	Seasonal means
1954	...	...	17.8	18.4	18.3	...	...	18.2
1956	5.8	8.9	14.9	17.0	13.2	7.4	3.2	10.6
1957	5.4	8.6	13.1	13.5	11.0	5.7	6.7	9.8
1958	9.8	11.4	14.2	15.1	...	...	...	12.4
1959	6.3	10.2	17.2	17.7	14.0	8.2	...	12.5
1960	8.8	14.0	17.7	19.4	14.7	9.1	4.3	13.6
1961	7.2	12.0	18.5	19.8	16.6	13.0	...	15.7
1962	5.6	12.1	15.7	17.8	13.9	9.4	...	13.6
1963	6.8	10.5	16.7	17.4	13.2	...	...	13.3
Monthly means	7.2	11.0	16.2	17.5	15.0	8.8	4.1	12.9

Table XXIII. Summary of water velocities and proportion of times that the currents were observed flowing outward, inward, or not at all, at the surface, mid-depth, and along the bottom of the Little Codroy estuary 300 yards upstream from the counting fence during various phases of the tide, June-August, 1957.

Direction of flow		Tide Phase											
		High		Ebbing				Low		Flooding			
		1		2		3		4		5		6	
		avg. vel. ft/sec	% occ.	avg. vel. ft/sec	% occ.	avg. vel. ft/sec	% occ.	avg. vel. ft/sec	% occ.	avg. vel. ft/sec	% occ.	avg. vel. ft/sec	% occ.
Surface	out	0.68	36	0.80	94	0.88	90	0.81	74	0.87	25	0.65	14
	nil	0.0	55	0.0	4	0.0	8	0.0	26	0.0	58	0.0	67
	in	0.45	9	0.45	2	0.98	2	...	..	0.45	17	0.48	19
Mid	out	0.55	10	0.45	13	0.52	6	0.65	3	...	..	...	..
	nil	0.0	77	0.0	80	0.0	88	0.0	65	0.0	42	0.0	57
	in	0.45	13	0.45	7	0.57	6	0.53	32	0.58	58	0.52	43
Bottom	out	0.65	5	0.45	4	...	..	...	..	...	..	...	..
	nil	0.0	68	0.0	85	0.0	88	0.0	56	0.0	33	0.0	38
	in	0.50	27	0.49	11	0.51	12	0.55	44	0.70	67	0.72	62

of Pritchard and Burt (1951), namely, a submerged drag, or drogue, attached to hydrographic wire, was let out from an anchored boat and the wire angle measured. The drag, made from $\frac{1}{2}$ -inch 5-ply fir plywood, was cruciform with each face 2 x 3 ft. A scow, used for work along the fence, had a davit set into it so that the hydrographic wire was kept about 3 ft out from the side. Currents were measured at the surface, mid-depth, and near the bottom in mid-channel about 300 yards upstream from the fence.

Velocities were calculated from

$$v = 1.689 \frac{k}{\tan \theta} \quad \dots(5)$$

where v is the velocity in ft/sec; 1.689 is the factor for converting knots into ft/sec; θ is the wire angle; and k , 0.91 knots, is a proportionality factor (Pritchard and Burt, 1951). Factor k was determined by

$$k = \sqrt{2} \frac{Mg}{C_D} \frac{A}{\rho} \quad \dots(6)$$

where M is the mass of the body; g is the force of gravity per unit mass of the body; C_D is the coefficient of drag; A is the cross-sectional area of the drag perpendicular to the direction of flow; and ρ is the density of the fluid (Pritchard and Burt, 1951).

It was not possible to measure the velocities throughout each tidal cycle in the estuary. Instead, measurements were taken three times daily during a 2½-month period. The data do not of course represent one tidal cycle but represent an average of several such cycles. Moreover, the data do not reveal the effects of runoff in the spring or following rain, the effects of spring and neap tides, or the effects of the wind. The latter, for example, probably affected estuarial circulation considerably because of the shallowness of the basin and the strong winds experienced there. Each tidal cycle was divided into six phases to simplify analysis: phase 1, high tide; phases 2 and 3, ebb tide; phase 4, low tide; and phases 5 and 6, flood tide. Phases 2 and 3, and, 4 and 5 were divided at the points of inflection on the depth (sine) curves registered by the depth recorder at the fence. Measurements were taken at the surface, mid-water (3-4 ft), and near the bottom (about 7 ft).

The basic data are contained in Appendix N and are summarized in Table XXIII. On the average, currents at the fence were as follows. Currents were not usually observed at high tide (Table XXIII). Some currents were recorded then however: an outward-flowing surface current of 0.7 ft/sec was observed 36% of the time; an inward-flowing mid-water current was observed 10%, and an outward-flowing one 13% of the time; and an inflowing bottom current of 0.5 ft/sec was observed 27% of the time. During the ebbing phase, surface currents of 0.8-0.9 ft/sec were observed at least 90% of the time whereas in the deeper water currents were not often recorded. Inflowing and outflowing mid-water currents were occasionally observed (about equally frequently) during the ebbing phase, and in deep water an inflowing current of 0.5 ft/sec was observed about 11% of the time. At low tide, an outflowing surface current of 0.8 ft/sec was observed 74% of the time whereas currents were not usually observed in the deeper water. Inflowing surface currents and outflowing bottom currents were not observed at low tide but inflowing currents of 0.5 ft/sec were observed in mid-water (32% of the time) and along the bottom (44% of the time). During the flooding phase, surface currents

Water samples were collected and salinity determined when the traps at the fence were being examined for fish. Results are contained in Appendix M and summarized in Fig. 27. Salinity of surface and bottom water at both high

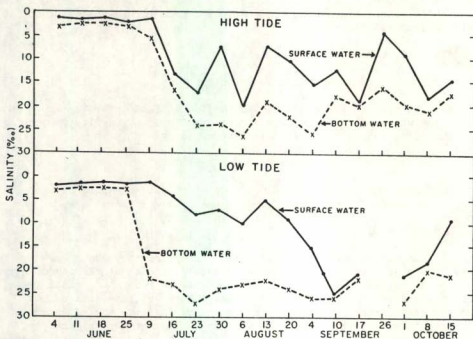


Fig. 27. Comparison of salinity (%) of surface and bottom water at high and low tide, at the counting fence, Little Codroy River, June-October, 1962.

and low tide was less than about 3.0‰ during June and increased markedly in July (Fig. 27). Upstream, water was deepest in May because of snowmelt and shallowest in July and August (Fig. 13). The relative freshness of the estuarial water in June is also associated with snowmelt and the increased salinity in July is associated with decrease in stage upstream. Surface water was relatively fresh July 30, August 13, and September 26 because of rain (Fig. 27 and 13).

Velocity

The velocity of water at one point in the estuary was measured three times daily during June, July, and August, 1957. The method was that

but the new position was 5.0 ft shallower than the old. Data for the years 1961-63 in Appendix L and Table XXII have been adjusted so that they are comparable to the 1955-60 data. The average depth of water at the position of the old smolt trap (Murray, 1968) was 7.9 ft. In general, water was deepest in May (average 8.2 ft) and shallowest in September and November (average 7.7 ft). The situation depicted in Fig. 26 is typical even though it is for a short period of time.

Tides

The Barnsbury recorders at the fence and near station 12 (1956 only) registered the rise and fall of the tides but these changes do not appear in the tables of Appendix L as a result of the averaging process. Depth records for a 6-day period at the counting fence and near station 12 are shown in Fig. 26. The average difference in height between low and high water at both

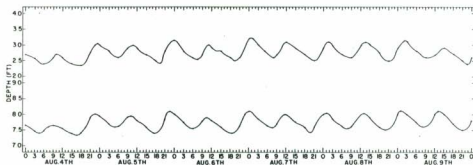


Fig. 26. Comparison of hourly depths of water at the counting fence and near station 12 for the period August 4-9, 1957.

locations was 0.5 ft for the period shown, and on the average, low water and high water occurred at station 12, which was 3.4 miles upstream from the fence, about an hour after it was recorded at the fence. At high tide the estuary contained about $21 \times 10^6 \text{ ft}^3$ more water than at low tide. The average interval from one high tide to the next was 12.5 hours. The flood phase took about 4.9 hours (39% of the interval) and the ebb phase took about 7.6 hours (61% of the interval).

Salinity

Salinity of surface and bottom (8-9 ft) water at the counting fence (Murray, 1968) was measured with hydrometers about once a week in 1962.

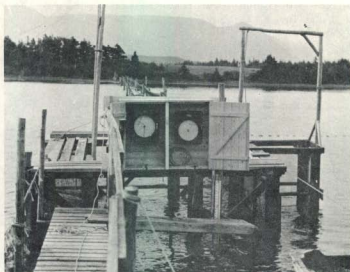


Fig. 25. Temperature and depth recorders attached to smolt trap in the estuary of the Little Codroy River.

Daily and monthly average depths are given in Appendix L and monthly and seasonal means are summarized in Table XXII. The smolt trap shown in Fig. 25 was located about half way across the channel. It was taken out of the river each autumn and set in the same place each spring. A larger smolt trap was used in 1961 for the first time and it was set in shallow water near one shore (Murray, 1968). The depth recorder was attached to this trap too

Table XXII. The mean depth (ft) of water as measured by the recorder at the counting fence, Little Codroy River, 1955-63.

Year	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Seasonal means
1955	...	7.7	7.6	7.9	8.4	8.4	8.5	8.0	8.1
1956	...	7.8	7.8	7.7	7.6	7.4	7.2	7.8	7.6
1957	...	7.9	7.7	7.7	7.7	7.7	7.6	7.8	7.7
1958	7.8	8.0	8.1	7.9	8.0	8.2	...	...	8.0
1959	...	8.4	8.1	7.9	8.0	8.0	8.2	...	8.1
1960	...	7.6	7.4	7.4	7.3	7.3	7.9	7.8	7.4
1961	...	10.6	9.6	8.4	7.3	7.3	7.7	7.6	8.1
1962	...	8.6	8.4	8.3	8.2	8.3	8.3	...	8.3
1963	...	8.1	7.9	7.8	7.8	7.6	...	...	7.8
Monthly means	7.8	8.2	8.1	7.9	7.8	7.7	7.8	7.7	7.9

Brook (Fig. 24). Flows in these streams are unidirectional upstream from the points where they join the estuary but water levels in the main river are influenced by tidal rise and fall as far upstream as fish sampling station 12.

Morphometry

A bathymetric map of the Little Codroy estuary is shown in Fig. 24; morphometric parameters are given in Table XXI. Contour lines have been kept to a minimum in Fig. 24 because of the irregular shape of the estuarial basin. Each contour line encloses an area of a certain average depth; depths are given in feet for mean high water.

Table XXI. Morphometry of Little Codroy estuary.

Length	5.1 km	(3.2 miles)
Mean breadth	0.8 km	(0.5 miles)
Area	3.9 km ²	(1.5 miles ²)
Maximum depth	6.1 m	(20 ft)
Mean depth	1.4 m	(4.6 ft)
Volume	5.5 x 10 ⁶ m ³	(1.94 x 10 ⁸ ft ³)
Length of shore line	26.9 km	(16.7 miles)
Development of shore line	3.83	

Depth

The Little Codroy estuary is shallow; its mean depth is 4.6 ft (Table XXI) and 87% of it is less than 6 ft deep. Two narrow deep channels join three wide shallow areas (Fig. 24). The first is a short distance downstream from the village of St. Andrews and joins the upper and middle areas. The second is near the site of the FRB field station and joins the middle and lower areas. Deepest water occurs along the shore in the upper and middle areas whereas the lower area is saucerlike with an extensive area of shallow water near the outlet.

A Negretti and Zambra Barnsbury recorder provided a continuous record of depth at the counting fence (Murray, 1968) while it was operational during the years 1955-63. This recorder was the same as those used near stations 6, 12, and 19 upstream. It was mounted in an instrument shelter attached to the side of the smolt trap (Fig. 25); the bulb was fastened to the base of the pole bearing the staff gauge.

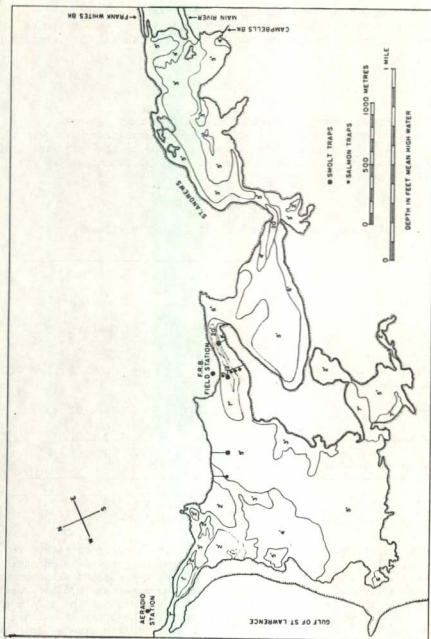


Fig. 24. Little Codroy estuary.

continuous exchange of water between the estuary and the sea at all stages of the tide. The estuary extends upstream 3.5 miles to the place where it receives the discharge of the main river, Frank Whites Brook, and Campbells

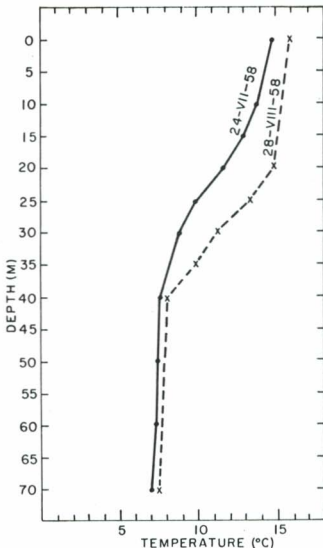


Fig. 23. Temperature curves, Little Codroy Pond, July 24 and August 28, 1958.

LITTLE CODROY ESTUARY

The estuary of the Little Codroy River is a drowned river valley almost completely separated from the sea by a long sand bar (Fig. 2). The inlet connecting the estuary with the sea is narrow (180 ft) in relation to the width of the estuary within the barrier (Fig. 24) but there is a



Fig. 22. Cirque lake, Campbells Brook, Little Codroy River.

Table XIX. Temperature, transparency, pH, and dissolved oxygen content of water at station I, Little Codroy Pond, July 24 and August 28, 1958.

	July 24		August 28	
	surface	bottom (70 m)	surface	bottom (70 m)
Temperature (°C)	14.8	7.1	15.9	7.2
pH	6.6	6.6	6.6	6.6
Dissolved oxygen (cc/liter)	6.9	7.1	6.0	4.7
Secchi disk transparency (m)	3.6		3.0	

Table XX. Analysis of water from station I, Little Codroy Pond, July 24, 1958.

	Surface	Bottom (70 m)
Total dissolved solids (ppm)	50.0	50.0
NaCl (ppm)	30.0	30.0
Na (meq/liter)	0.005	< 0.005
K (meq/liter)	0.015	0.01
Fe (ppm)	5.4	4.0
Ca	0.	0.
Mg	0.	0.
SO ₄	0.	0.

Table XVIII. Morphometry of Little Codroy Pond.

Length	4.7 km	(2.9 miles)
Mean breadth	0.7 km	(0.4 miles)
Area	3.4 km ²	(1.3 miles ²)
Maximum depth	73 m	(240 ft)
Mean depth	45.1 m	(148 ft)
Depth of cryptodepression	27 m	(90 ft)
Volume	0.153 km ³	(5.4 x 10 ⁹ ft ³)
Length of shore line	11.0 km	(6.8 miles)
Development of shore line	1.68	



Fig. 21. Ice-scour lakes on the upland of Long Range Mountains near valley of Coopers Brook, Little Codroy River.

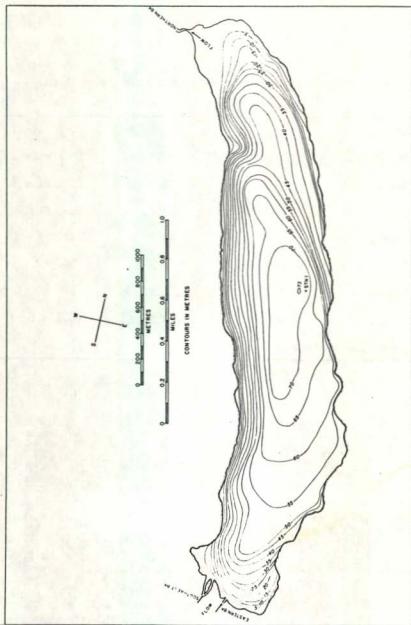


Fig. 20. Little Codroy Pond.

LITTLE CODROY POND

Little Codroy Pond, the largest lake in the Little Codroy River system, lies in a valley with the lake surface at an elevation of 46 m (150 ft) above mean sea level (Fig. 5). It has two major inlets, Eastern and Southwest Brooks, and a single outlet, Northern Brook (Fig. 7). The lake marks the beginning of the fourth-order stream in the Little Codroy (Fig. 8).

A bathymetric map of Little Codroy Pond is shown in Fig. 20; the morphometric parameters are given in Table XVIII. Depth and other parameters are given in the metric system in accordance with international limnological practice whereas, in other parts of this paper, data such as distance, discharge, area, etc., are given in the English system in accordance with North American practice.

Little Codroy Pond is a small, deep, elongate, glacially excavated rock basin lake. (In contrast, lakes on the Paleozoic upland have been formed by ice scouring (Fig. 21). There is in addition a cirque lake (Fig. 22) on the main stem of Campbells Brook.) The deepest point of Little Codroy Pond, 73 m, is 27 m below mean sea level. The mean depth, 45 m, is at sea level; 24% of the lake volume is below the mean depth. The lake is U-shaped with steep sides so that there is very little shallow water present (Fig. 20); the 0-5 m depth zone, in fact, only comprises 0.5% of the total lake area. The valley in which the lake is situated is also steep-sided; the peaks are 366-457 m (1200-1500 ft) above sea level within 0.6 km (0.4 miles) of the edges of the lake (Fig. 20).

The lake was visited July 24 and August 28, 1958, to collect water samples and obtain temperature data, etc. The results are summarized in Tables XIX and XX and Fig. 23. On July 24 the lake surface was 14.8 C and water deeper than 40 m was between 7 and 8 C; a thermocline appeared to be forming between 10 and 40 m (Fig. 23). A month later the epilimnion was 20 m deep and the temperatures between 15 and 16 C; temperatures in the hypolimnion were still between 7 and 8 C. The metalimnion was 20 m deep and the temperatures ranged from 8.0 C at 40 m to 14.9 C at 20 m. Surface water was almost saturated with dissolved oxygen July 24 and was 85% of saturation a month later. The dissolved oxygen content at 70 m was 85% of saturation July 24 and 55% of saturation August 28.

The total dissolved solids, or mineral content, of Little Codroy Pond was 50 ppm (Table XX). This value is similar to those reported from lakes within the Precambrian area (Rawson, 1951). The low mineral content is the result of Little Codroy Pond draining a complex of Paleozoic granite, gabbro, diorite, and peridotite plutonic rock.

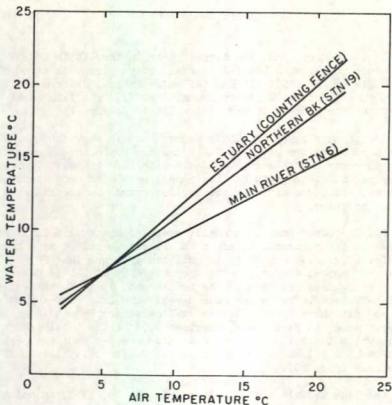


Fig. 19. Regression of water temperature at the counting fence and near stations 6 and 19 on air temperature at St. Andrews, Newfoundland.

were plotted using the following linear regression equation:

$$\underline{Y} = (\underline{\bar{Y}} - \underline{b'}\underline{\bar{X}}) + \underline{b'}\underline{X} \quad \dots(4)$$

where $\underline{Y}$ is the water temperature and $\underline{\bar{Y}}$ the average water temperature; $\underline{X}$ is the air temperature and $\underline{\bar{X}}$ the average air temperature; and $\underline{b'}$ is the linear regression coefficient. On the average, when the air temperature was 5.0 C, the water temperature near stations 12 and 19 was 7.0 C, and when the air temperature was 20.0 C, the water temperature was 18.2 C near station 19 and 14.7 C near station 6.

was limited to July, August, September, and October when temperatures at station 19 were 3.1 C, 3.4 C, 2.5 C, and 1.2 C warmer, respectively, than at station 6. Temperatures for April, May, June, and November were similar at the two stations. Cool water from Big Johns Brook, a stream which joins the main river a short distance upstream from the recorder near station 6 (Fig. 7), may have caused the difference. Snow remained in the ravines of Big Johns until August each year; the extended period of snowmelt and the well-shaded stream doubtless kept the water cool in Big Johns during the summer.

On the average, water temperatures were warmest in August (Table XVI), one of the months when water depth was lowest (Table XIV and Fig. 13). Temperatures in July and September were similar. In June and July the water warmed rapidly from less than 5.0 C to an average of 11.6 C near station 6 and 14.7 C near station 19. The stream cooled slowly in the autumn and was an average of 7.5 C in November.

The annual cycle of stream warming and cooling closely follows that of the air temperature. The mean daily water temperatures near stations 6, 12, and 19 and the mean daily air temperatures from the Aeradio Station were subjected to linear regression analysis. The method followed is outlined in Goulden (1952). Linear regression coefficients and their fiducial limits at the 5% level of probability are contained in Table XVII. The regression of water temperature on air temperature is illustrated in Fig. 19; the lines

Table XVII. Linear regression coefficients, fiducial limits of coefficients at the 5% point, and linear regression equations for stream temperature on air temperature, Little Codroy River, 1956-63.

Location of recorder	Year	Linear regression coefficient b'	Fiducial limits	Linear regression equation $\underline{Y} = (\bar{Y} - b'\bar{X}) + b'X$
near sta. 12	1956	0.5714	0.5299 - 0.6128	$\underline{Y} = 6.0369 + 0.5714X$
near sta. 6	1959	0.5491	0.4532 - 0.6451	$\underline{Y} = 5.2559 + 0.5491X$
	1960	0.5310	0.4922 - 0.5698	$\underline{Y} = 3.9811 + 0.5310X$
	1961	0.5469	0.4957 - 0.5982	$\underline{Y} = 3.5628 + 0.5469X$
	1962	0.5015	0.4613 - 0.5417	$\underline{Y} = 3.5160 + 0.5015X$
	1963	0.4434	0.3689 - 0.5179	$\underline{Y} = 4.3277 + 0.4434X$
	all years	0.5139	0.4855 - 0.5424	$\underline{Y} = 4.4023 + 0.5138X$
near sta. 19	1957	0.8022	0.7244 - 0.8800	$\underline{Y} = 2.5745 + 0.8022X$
	1958	0.7359	0.6213 - 0.8506	$\underline{Y} = 3.7836 + 0.7359X$
	1959	0.7135	0.6499 - 0.7771	$\underline{Y} = 2.8916 + 0.7135X$
	1960	0.7540	0.6852 - 0.8229	$\underline{Y} = 3.8440 + 0.7540X$
	1961	0.8095	0.7228 - 0.8962	$\underline{Y} = 3.0435 + 0.8095X$
	1962	0.5883	0.4972 - 0.6794	$\underline{Y} = 4.7575 + 0.5883X$
	1963	0.7780	0.6696 - 0.8864	$\underline{Y} = 2.5875 + 0.7780X$
	all years	0.7398	0.7088 - 0.7707	$\underline{Y} = 3.3971 + 0.7398X$

Temperature

Two Taylor recording thermometers provided a continuous record of water temperature throughout each season for several years. One was operated in conjunction with the depth recorder near station 6 (Fig. 7) from 1959 to 1963. The second was operated in conjunction with the depth recorder near station 19 (Fig. 7) from 1957 to 1963; this recorder was also operated in conjunction with the depth recorder a short distance downstream from station 12 in 1956 (Fig. 7). Each temperature recorder was mounted in a wooden instrument shelter set above the high-water mark on the stream bank. The connecting tubing, which was mercury-actuated, was passed through plastic pipe, placed on the stream bottom, and covered with stream bed material. The end of the pipe was perforated and left exposed on the stream bottom so the mercury-filled bulb was in contact with the stream. Temperatures were recorded on a circular chart of seven days duration. The temperature recorders, like the depth recorders, were removed from the river in the autumn and returned to the river in the spring.

The daily and monthly average water temperatures for the recorders near stations 12, 6, and 19 are given in Appendices I, J, and K, respectively. Monthly and seasonal means are summarized in Table XVI.

The water in northern Brook near station 19 was an average of 1.5 C warmer than the stream near station 6 downstream (Table XVI). This difference

Table XVI. The mean water temperature (°C) as measured by recorders at three locations in the Little Codroy River, 1956-63.

Location of recorder	Year	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Seasonal means
near sta. 12	1956	...	...	...	...	14.8	12.8	9.9	7.5	11.3
near sta. 6	1959	3.2	7.4	6.2	10.9	17.5	15.6	12.2	10.6	10.4
	1960	4.7	5.9	9.5	12.5	13.5	11.2	8.1	5.6	9.0
	1961	4.7	4.4	8.2	12.8	13.5	12.0	9.5	6.9	9.6
	1962	3.5	4.2	7.2	10.2	12.0	10.3	7.7	6.3	8.2
	1963	...	4.6	7.1	11.5	11.7	10.3	9.5	...	9.4
	Monthly means	3.8	4.9	8.5	11.6	13.4	11.8	9.4	7.4	9.5
near sta. 19	1957	2.6	3.2	7.3	14.5	16.7	13.9	10.4	8.8	10.8
	1958	...	6.8	9.8	14.3	17.1	14.0	10.2	8.3	12.9
	1959	2.7	3.2	7.1	14.1	16.5	13.9	9.7	6.2	9.5
	1960	2.3	5.4	11.1	15.8	18.0	15.1	10.7	6.8	11.0
	1961	3.0	3.6	8.8	16.5	18.2	15.9	12.8	8.9	11.9
	1962	3.3	4.3	8.1	12.9	15.3	13.5	10.3	7.7	10.1
	1963	...	4.6	8.0	14.7	16.1	13.7	10.0	...	11.6
	Monthly means	2.7	4.3	8.6	14.7	16.8	14.3	10.6	7.6	11.0

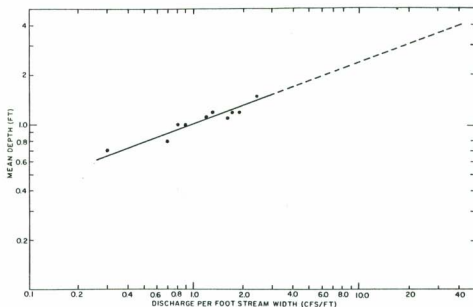


Fig. 18. Mean depth-discharge relation extrapolated for estimated maximum discharge, Northern Brook, Little Codroy River.

Table XV. Stage-discharge data, Northern Brook, Little Codroy River, 1962.

Date measured	Gauge height	Discharge	Stream width	Mean depth	Cross-sectional area	Discharge per foot width
	ft	cfs	ft	ft	ft ²	cfs/ft
Sept. 13	0.9	30.1	90.8	0.7	61.7	0.3
July 21	1.3	62.4	92.2	0.8	73.9	0.7
Oct. 22	1.4	86.6	92.4	1.0	93.6	0.9
July 27	1.5	76.5	92.3	1.0	92.1	0.8
Oct. 2	1.6	110.6	93.6	1.1	103.2	1.2
Oct. 9	1.7	125.3	94.2	1.2	109.4	1.3
Sept. 26	1.8	147.1	93.7	1.1	107.3	1.6
Oct. 15	1.8	162.6	94.0	1.2	114.0	1.7
Sept. 22	1.9	157.2	94.1	1.2	118.0	1.7
Aug. 22	2.0	177.4	94.2	1.2	115.2	1.9
Sept. 19	2.2	226.2	96.3	1.5	147.9	2.4

apply in this case. The two methods yield somewhat comparable results and the maximum discharge near station 19 is estimated to be approximately 3000 cfs.

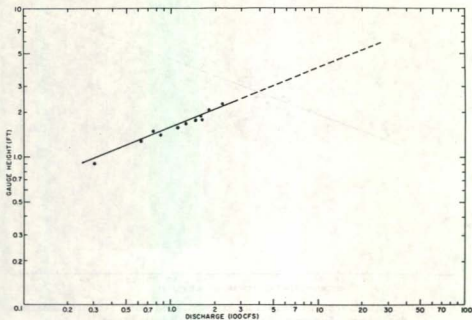


Fig. 16. Stage-discharge relation extrapolated for estimated maximum discharge, Northern Brook, Little Codroy River.

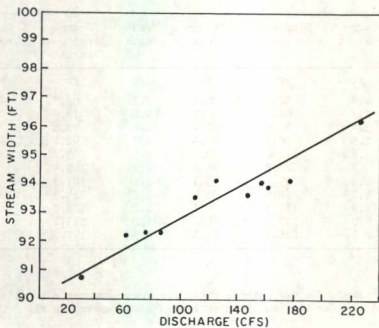


Fig. 17. Stream width-discharge relation, Northern Brook, Little Codroy River.

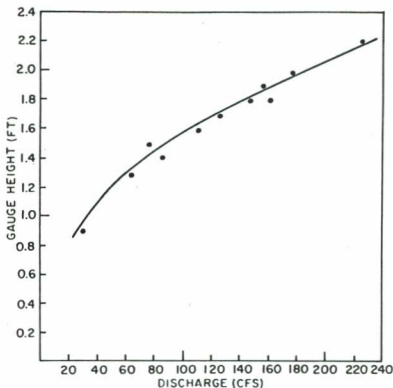


Fig. 15. Stage-discharge relation, Northern Brook, Little Codroy River.

226.2 cfs and the river was 2.2 ft deep at the recorder. However these figures do not represent the maximum depth and discharge there. The maximum depth observed in Northern Brook was 5.5 ft and the discharge at this level of flood flow was estimated by two methods. The first is merely the rating curve (plotted on logarithmic paper) extended to the maximum depth (Fig. 16). The discharge at 5.5 ft would be approximately 2500 cfs. Corbett and others (1962) suggest this method is satisfactory when the higher discharge values plot in a flat curve (Fig. 15), there is no overflow from the channel, and the width of the channel increases uniformly (Fig. 17). In the second method, the discharge per ft of stream width was plotted against mean depth on logarithmic paper (Fig. 18) and the rating curve extended to the mean depth (estimated to be 3.6 ft) corresponding to the maximum depth of 5.5 ft. Under these conditions, the river is estimated to be 110 ft wide and the estimated discharge 31 cfs/ft, or 3410 cfs total. Corbett and others (1962) suggest this method lacks verification for long extensions under varied conditions of channel and is not suitable for channels subject to overflow. Neither of these two objections

Discharge was estimated by

$$Q = AV \quad \dots(3)$$

where Q is the volume of flow in cubic ft per second (cfs); A is the cross-sectional area of the stream; and V is the average velocity in ft per second.

Discharges at the fish sampling stations were estimated at the upstream and downstream boundaries and midway along each station to provide information on the range of flow encountered by salmon parr living therein. The width at each position was divided into four equal segments and the depth and velocity were measured at the edges of the stream and at $1/4$, $1/2$, and $3/4$ of the width. The area, mean velocity, and discharge of each segment were calculated; the sum of the segment discharges represents the total discharge. The net discharge for a station was the sum of the discharges at the upper, middle, and lower positions divided by three.

Details of discharge estimates for each fish sampling station are contained in Appendix E and summarized in Table XIII. The average discharge of the first- and second-order streams was approximately similar, namely, 6.4 cfs and 5.7 cfs, respectively, whereas the average discharge of the third- and fourth-order streams was different, namely, 19.0 cfs and 77.8 cfs, respectively. The average discharge increased downstream in the fourth-order stream: it was 44.0 cfs in Northern Brook, 88.0 cfs in the upper part of the main river, and 100.0 cfs in the middle part of the main river. The average discharge of the lower portion of the main river, 75.3 cfs, is low because the two stations comprising this average are not representative of this section of the stream. Stations 11 and 12 were deliberately sampled when water levels were low because fields on either side of the stream were often flooded at higher water levels making approach to the stations and sampling of them difficult.

In the autumn of 1962 stage-discharge relations were determined over a range of stream depths in Northern Brook (a fourth-order stream), 200 ft upstream from the point where it is joined by Southern Brook (a third-order stream). Fish sampling station 19 is upstream from the point of measurement and the depth recorder is a short distance upstream from the station (Fig. 7). The disadvantage of this location is that the measurements are not representative of the entire river. The discharge should have been measured downstream to include the flows from most of the tributaries. It was not possible to do so because the stream banks are so low, especially between stations 11 and 15 (Fig. 7), that flood waters overflow the banks. However the site chosen has several important advantages. The channel there is rather straight and of uniform width upstream and downstream from the point of measurement. The stream bed is rubble and at low water forms a long riffle. There is no overflow during freshets because the banks are high enough to contain the flood waters.

For the stage-discharge relations, depths and velocities were measured at 5 ft intervals across the stream. Discharges were estimated by equation (3).

Stage-discharge relations for Northern Brook are summarized in Table XV and Fig. 15. The lowest discharge measured was 30.1 cfs and the river was 0.9 ft deep at the recorder; the highest discharge measured was

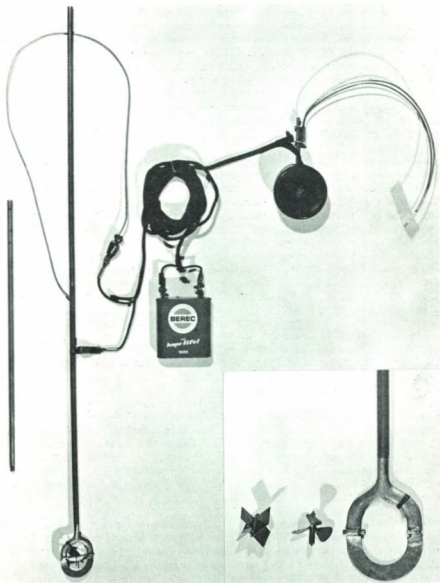


Fig. 14. Midget current meter.

by the boat. The meter was placed at 0.6 of the depth (measured from the surface) when the water was less than 1.5 ft deep and at 0.2 and 0.8 of the depth when the water was deeper than 1.5 ft.

of rain was required to cause an increase in stage. (Occasional lesser amounts caused increases in stage too; see, for example, June 25, 1960.) The second is that the effect of rainfall on stage was immediate. Peak stage was reached a day after the rain had ceased. If the rain occurred in a short period of time the increase in stage was sharp whereas if the rain occurred over a period of days the increase in stage was gradual and prolonged. Water levels subsided two to three days after the peak had been reached.

Velocity and discharge. Velocities were obtained to estimate discharge at each of the fish sampling stations and to determine the stage-discharge relation of the river.

Velocities were measured with two types of rotating current meter, a Leopold and Stevens Midget meter and a Price meter. The Midget meter was used to measure velocities at the fish sampling stations and the Price meter to obtain the data for the stage-discharge relation. The Midget meter has the revolving axle horizontal and parallel to the direction of flow (Fig. 14). Rotation about the axle is accomplished by means of propeller-shaped blades. Two such were supplied with the instrument, one with three blades, set at 60° , for measuring low velocities (from 0.1 to 0.6 ft/sec, approximately), and the other with four blades, set at 90° , for measuring higher velocities (from 0.2 to 5.1 ft/sec, approximately). In the Price meter the revolving axle is vertical to the direction of flow and rotation about the axle is accomplished by cups (bucket wheel). The Midget meter is suitable for measuring velocities in shallow water and among boulders and rubble because of its small size but it could not be successfully operated in swiftly-flowing water. A spur on the propeller shaft makes contact once every revolution with a fine stainless steel wire insulated from the meter rod (Fig. 14) and this contact is heard as a click in the earphone. It was not possible to accurately count the number of clicks when they were coming faster than about three per second. (Revolutions were counted for periods of 10 seconds.) In slowly-flowing water, one such observation at a position was sufficient but in swiftly-flowing water, several observations were taken and averaged. Care was always taken to point the meter directly into the flow. The Price meter is suitable for measuring higher velocities because it is more rugged, it can be supported in the stream by means of a graduated wading rod, and because the commutator box can be connected so that every fifth revolution is heard in the earphone. (Revolutions were counted for periods of at least 40 seconds.)

Velocities were measured by wading or from a boat. A line was first stretched across the stream at water level to mark the positions where observations were to be made. In wading operations an engineer's chain served as the line but when velocities were measured from a boat, a wire rope was stretched across the river and the engineer's chain passed through loops along it. In a wading operation two men worked in the river. One found the positions from the chain and measured the depths at these points while the other measured the velocities. To measure velocity, the meter operator stood facing one stream bank while holding the meter rod vertically with his upstream hand at the point of depth measurement. To minimize the effect of his body on the flow passing the meter the operator stood at least 18 inches diagonally downstream from the point where the depth was measured. Two men also worked from the boat. The first maneuvered the boat into position, tied it to the wire rope, and took the depth. The second measured the velocity by extending the meter as far ahead of the prow as possible so that it would be free from interference

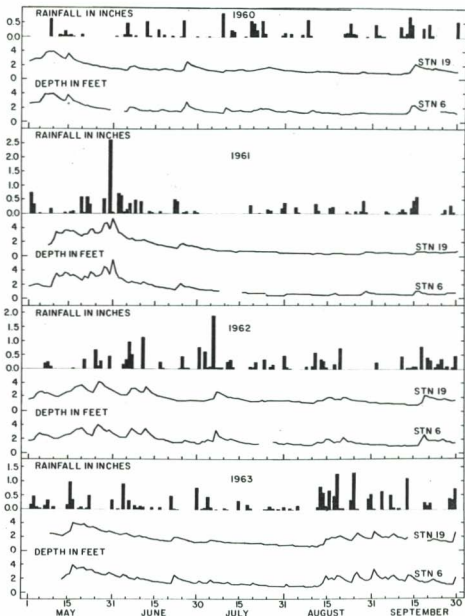


Fig. 13. Daily rainfall and mean daily water depth near stations 6 and 19, Little Codroy River, for the months May-September, 1960-63.

Even though the relation between rainfall and stage is affected by factors such as time of year, frequency and duration of rainfall, and initial soil moisture condition, two things are evident in Fig. 13. The first is that about an inch

Table XIV. The mean depth (ft) of water as measured by recorders at three locations in the Little Codroy River, 1956-63.

Location of recorder	Year	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Seasonal means
near sta. 12	1956	...	...	...	...	2.8	2.8	2.8	3.1	2.9
near sta. 6	1959				1.4	1.6	1.7	1.9	2.5	1.8
	1960	1.9	2.7	1.7	1.6	1.3	1.4	2.4	2.1	1.9
	1961	1.4	2.9	1.9	0.8	0.6	0.7	1.7	1.5	1.4
	1962	1.6	2.7	2.2	1.8	1.5	1.4	1.7	2.6	2.0
	1963	...	3.0	1.9	1.3	1.6	2.0	1.3	...	1.8
	Monthly means	1.8	2.8	1.9	1.4	1.3	1.4	1.8	2.2	1.8
near sta. 19	1957	...	...	...	...	2.9	3.6	3.2	3.0	3.3
	1958	...	2.7	2.2	1.9	2.0	2.4	2.1	2.2	2.2
	1959	1.8	3.2	2.3	1.4	1.5	1.7	1.8	2.4	2.0
	1960	1.7	2.6	1.6	1.4	1.0	1.2	2.3	2.0	1.7
	1961	...	3.3	1.9	0.6	0.4	0.5	1.7	1.5	1.4
	1962	1.6	2.8	2.2	1.7	1.5	1.3	1.6	2.8	2.0
	1963	...	3.1	1.9	1.2	1.5	1.9	1.4	...	1.8
	Monthly means	1.7	2.9	2.0	1.4	1.4	1.8	2.0	2.2	1.9

Depth. The Little Codroy, like most streams, is a succession of pools and shallows. Depths of the latter were assessed at the fish sampling stations located on many of the streams (Fig. 7). Populations of stream-dwelling fish were estimated by electrofishing (Murray, 1958); this method is most satisfactory in the shallow parts of streams and only one pool was sampled. The depth of the stream at each station was measured each time it was sampled. Many stations were assessed once a year, usually in the summer or autumn, and the remainder were visited less frequently (Appendix E). Fifteen depth measurements were taken at a station, which typically was 75 ft long; five measurements (at the edges of the stream and at 1/4, 1/2, and 3/4 of the width) were taken at each of the upper and lower ends and midway along the station. Depths were taken with a wading rod, a wooden staff graduated in tenths of a foot with the zero depth at the base of the staff.

In addition, two Negretti and Zambra Barnsbury recorders provided a continuous record of depth throughout each season for several years. One was set a short distance upstream from station 6 (Fig. 7) and was operated from 1959 to 1963. The second was set a short distance upstream from station 19 (Fig. 7) and was operated from 1957 to 1963; this recorder was also operated a short distance downstream from station 12 in 1956 (Fig. 7). Each recorder was connected to a partially-inflated rubber bulb; the recorder was mounted in a wooden instrument shelter set on the stream bank above the high-water mark and the bulb was placed in a barrel on the stream bottom in moderately deep water near the edge of a pool. Such a location ensured that the bulb would always be covered with water and would be deep enough to avoid being damaged by trees or other large debris drifting downstream. The pressure of the water over the bulb compressed air in the bulb and connecting tubing, actuated the recording mechanism, and provided a measure of depth. Depths were registered on a circular chart of seven days duration. Accuracy of the instrument was verified frequently by comparison with a staff gauge, a porcelain-coated metal rod graduated in feet and hundredths, attached to a post driven into the stream bottom beside the rubber bulb. The bulb, recorder, and staff gauge were removed from the river each autumn, and, except for the recorder near station 19 in 1957, they were put back in the same place in the following spring so that the records would be comparable from year to year. In 1958, the bulb of the recorder near station 19 was moved from the position selected in 1957; the old position was 1.4 ft deeper than the new one.

The daily and monthly average depths for the recorders near stations 12, 6, and 19 are given in Appendices F, G, and H, respectively. Monthly and seasonal means are summarized in Table XIV. The average depth of each station is given in Table XIII. The fish sampling stations were shallow, less than one ft deep on the average (Table XIII), and, in general, stations were shallowest in first-order streams and deepest in the fourth-order stream.

Stage hydrographs and hyetographs are shown in Fig. 13. Stage data are mean daily depths from the recorders near stations 6 and 19; precipitation is the total daily rainfall collected and measured at the St. Andrews Aeradio Station. The years shown in Fig. 13, 1960-63, were chosen because quite different amounts of rainfall were recorded during the months May-September. Stage was highest in May because of snowmelt and declined during June reaching the lowest values in July and August. Water levels increased slightly in September (Fig. 13) and more markedly in October and November (Table XIV).

Table XIII. Stream bed material and average widths, depths, and discharges at the fish sampling stations, Little Codroy River.

Stream order #	Station #	Location	Distance from headwaters	Mean width	Mean depth	Mean discharge	Stream bed material*									
							BR	BO	CR	FR	CG	FG	S	M		
			miles	ft	ft	cfs	%	%	%	%	%	%	%	%	%	%
1	47	Doyle's Bk.	0.8	4.8	0.2	2.0	50		50							
	34	Doucets Bk.	2.4	13.7	0.4	11.0		40	50	10						
	35	Doucets Bk.	2.7	12.6	0.4	6.1		10	60	30						
	46	Black Duck Bk.	2.8	5.0	...	...				50	50					
	Means			9.0	0.3	6.4										
2	36	F. Whites Bk.	0.9	7.9	0.2	1.1	50		50							
	37	F. Whites Bk.	1.1	7.7	0.3	2.4	100									
	40	Campbells Bk.	1.5	19.9	0.2	4.7	50	30	20							
	28	F. Whites Bk.	1.7	8.9	0.3	2.6			50	50						
	23	Campbells Bk.	2.8	15.4	0.4	11.5		53	32	10	5					
	17	Campbells Bk.	3.1	16.8	0.5	12.0		25	50	25						
	Means			12.8	0.3	5.7										
3	41	Coopers Bk.	2.4	20.0	...	...	60	30	10							
	30	Southwest Bk.	4.1	16.9	0.3	4.9		10	45	45						
	25	Big Johns Bk.	4.6	23.0	0.7	25.4		55	25	20						
	29	Eastern Bk.	4.6	21.8	0.4	8.5		10	45	45						
	22	Coopers Bk.	4.8	24.7	0.5	16.1	60	25	15							
	31	Southern Bk.	4.9	14.0	0.5	9.0		50	25	25						
	24	Big Johns Bk.	5.0	25.5	0.6	26.7		35	40	10	10	5				
	18	Big Johns Bk.	5.2	27.1	0.5	19.9		15	40	30	10	5				
	26	Southern Bk.	5.5	33.7	0.7	23.6		50	40	10						
	21	Coopers Bk.	5.6	21.3	0.6	17.0		33	40	25						
	16	Coopers Bk.	5.9	27.4	0.6	34.8			20	50	30					
	20	Southern Bk.	6.2	29.1	0.6	22.7				15	33	42	10			
	Means			23.7	0.5	19.0										
4	32	Northern Bk.	9.9	31.2	0.5	14.6		20	15	25	20	20				
	48	Northern Bk.	11.0	47.3	0.8	47.2		40	50	10						
	33	Northern Bk.	11.7	44.8	1.0	47.1				25	50	25				
	27	Northern Bk.	12.3	61.0	0.7	54.1		12	41	26	6			12		
	19	Northern Bk.	12.6	55.1	0.8	59.1		10	40	35	15					
	Means			47.9	0.8	44.0										
	1	main river	12.9	67.2	0.8	100.5				37	38	22	3			
	2	main river	13.4	41.9	0.6	65.4					50	25				
	38	main river	13.6	64.4	1.1	48.4					45	45	10			
	3	main river	14.2	60.7	0.9	85.4			4	50	30	12				
	4	main river	14.5	85.8	1.0	148.5		5	10	5	10	40		20		
	5	main river	14.7	44.3	0.8	79.7		2	20	25	22	30				
	Means			60.7	0.9	88.0										
	6	main river	15.1	69.7	0.8	91.5					50	50				
	7	main river	15.6	74.2	0.6	112.3						100				
	8	main river	15.8	67.8	0.9	116.8				5	55	40				
	9	main river	16.3	56.8	1.0	85.6			5	15	25	55				
	10	main river	16.7	71.7	0.7	93.9						35	55	10		
	Means			68.0	0.8	100.0										
	11	main river	17.4	85.4	1.0	82.0					50	45	5			
	12	main river	18.1	60.3	0.9	68.6					10	65	20	5		
	13	main river	18.5	200.0	...							50	50			
	14	main river	18.8	208.0	...								100			
	15	main river	19.1	253.0	...									25	75	
	Means			161.3	1.0	75.3										

*Abbreviations are defined in Table XI.

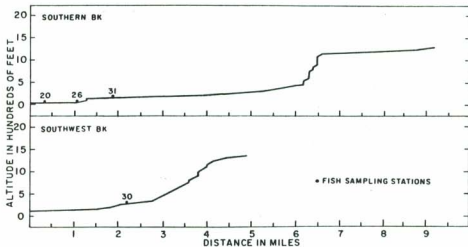


Fig. 12. Longitudinal profiles of Southern and Southwest Brooks, Little Codroy River.

Although the profile of the main river is shown as a straight line (Fig. 11) it is probably concave because the size of the stream particles decreases rapidly downstream (Table XII).

Width. Stream widths were measured at all fish sampling stations and at a number of other places. The width was considered to be the distance from the water's edge on one side of the stream to the water's edge on the other side.

The results are summarized in Table XIII. Each station was measured each time it was sampled so the data are the average of several years of measurements (Appendix E). On the average, first-order streams are 9 ft wide, second-order are 13 ft wide, third-order are 24 ft wide, and the fourth-order is 83 ft wide (Table XIII). Streams on the Long Range escarpment are a little wider than streams flowing from the watershed between the Little Codroy and Grand Codroy Rivers. Thus on the average, first-order streams on the escarpment are 12 ft wide and second-order are 17 ft wide (Table XIII). The fourth-order stream can be divided into four separate sections on the basis of stream bed material (Table XIII). The uppermost section, Northern Brook, has a stream bed of boulders and rubble and is an average of 48 ft wide. The main river may be divided into three sections: upper, middle, and lower. The so-called upper main section has a stream bed of rubble and is an average of 61 ft wide; the middle main has a stream bed of gravel and fine rubble and is an average of 68 ft wide; the lower main section has a stream bed of gravel, sand, and mud, and is an average of 161 ft wide.

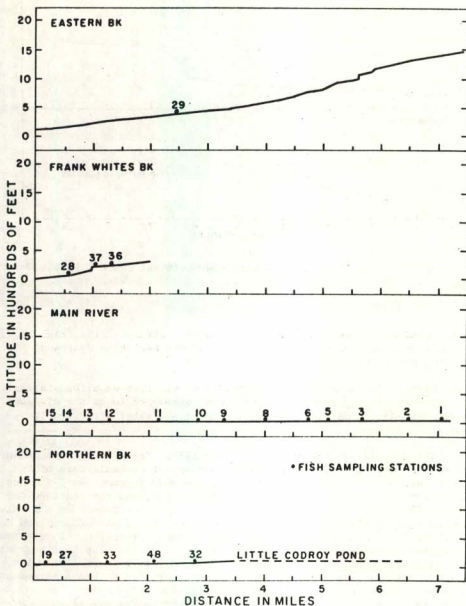


Fig. 11. Longitudinal profiles of Eastern, Frank Whites, the main stream, and Northern Brooks, Little Codroy River.

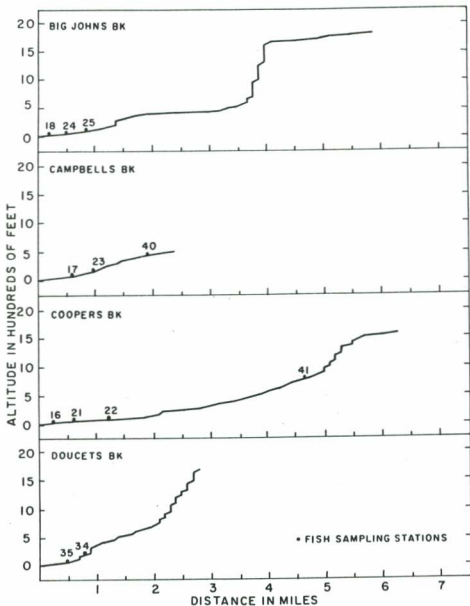


Fig. 10. Longitudinal profiles of Big Johns, Campbells, Coopers, and Doucets Brooks, Little Codroy River.

Table XII. Distribution of stream bed material in the Little Codroy River.

Stream	Order #	Section	Estimated slope	Major constituents of stream bed*
Big Johns Bk.	1	upper 1.8 miles lower 0.4 mile	0.095 ...	BO, BR CR, FR
Big Johns Bk.	3	upstream from Sta. 25 Sta. 24 to Sta. 25 downstream from Sta. 24	0.066 0.071 ...	BR, BO BO, CR CR, FR
Campbells Bk.	2	upstream from Sta. 23 downstream from Sta. 23	0.044 0.124	BO, CR CR, BO, FR
Coopers Bk.	3	upstream from Sta. 22 Sta. 21 to Sta. 22 downstream from Sta. 16	0.053 0.036 ...	BR, BO CR, BO FR
Doucets Bk.	1	upstream from Sta. 34 Sta. 34 to Sta. 35 downstream from Sta. 35	0.131 0.028 ...	BR, BO CR, BO CR, FR
Eastern Bk.	3	upstream from Sta. 29 1 mile downstream from Sta. 29 lower reaches	0.033 0.009 0.028	BO, BR CR, FR FR, CG
F. Whites Bk.	2	upper 1 mile lower 1 mile		BR, CR CR, FR
Northern Bk.	4	lake outlet to Sta. 48 Sta. 48 to Sta. 19	0.001	BO, CR CR, BO, FR
main stream	4	Sta. 19 to Sta. 5 Sta. 6 to Sta. 11 Sta. 11 to Sta. 15		CR, FR, BO CG, FR FG, S, M
Southern Bk.	3	upstream from Sta. 31 Sta. 26 to Sta. 31 downstream from Sta. 26		BR, BO BO, CR CG, FG
Southwest Bk.	2	lower 3 miles	0.060	BR, BO
Southwest Bk.	3	all but lower 1 mile of order 3 section lower mile	0.017 ...	CR FR, CG

*Particles are listed in order of importance; abbreviations are defined in Table XI.

Table 5. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1958.

Day	April	May	June	July	August	September	October	November
1	32.3	37.7	49.2	55.7	60.6	65.2	54.6	40.6
2	39.8	34.3	53.6	54.8	61.8	62.2	46.9	37.9
3	38.1	34.8	50.3	53.9	67.8	51.4	40.1	39.4
4	39.3	37.1	45.9	51.5	66.6	50.9	44.3	38.1
5	55.1	39.0	45.8	52.0	60.9	56.9	50.4	38.0
6	29.0	37.8	44.6	52.4	60.1	55.8	41.9	47.1
7	31.7	39.0	43.9	55.7	62.6	55.8	45.9	48.8
8	38.6	53.4	51.1	58.6	66.7	61.7	48.4	36.0
9	32.0	51.4	46.7	58.5	64.4	54.1	54.7	34.0
10	33.1	46.9	45.0	57.8	59.4	53.5	56.5	45.9
11	35.1	43.1	47.9	63.9	59.2	57.0	50.5	43.1
12	35.6	43.3	51.5	61.6	57.3	48.2	43.3	37.8
13	39.0	44.6	53.2	60.4	60.7	49.2	37.5	36.1
14	41.2	41.7	51.6	57.7	60.1	48.2	33.6	33.8
15	34.6	37.7	47.8	59.3	59.8	47.8	35.9	41.0
16	39.4	38.7	52.3	63.9	59.2	51.3	44.2	34.9
17	42.3	45.0	49.3	60.6	53.8	44.0	48.3	31.6
18	45.6	45.4	50.8	57.0	56.7	42.5	47.7	26.3
19	39.5	48.7	49.1	61.8	60.9	42.7	41.5	38.1
20	34.2	51.9	51.0	57.0	59.6	44.9	37.0	39.5
21	44.8	54.6	55.2	52.9	62.8	47.0	34.6	40.7
22	42.4	48.1	53.4	55.1	63.7	51.7	39.2	36.3
23	53.1	53.2	53.9	59.3	61.9	52.7	43.5	31.1
24	52.0	49.8	54.6	57.9	57.7	53.6	35.0	31.6
25	49.8	48.2	52.3	54.9	56.5	58.1	34.5	29.1
26	38.1	51.8	49.8	59.5	61.9	55.9	35.5	28.0
27	31.9	53.6	55.6	55.7	59.5	49.4	36.1	37.1
28	31.8	56.2	51.1	54.3	54.1	44.9	46.7	29.0
29	37.0	54.0	51.5	60.8	55.2	42.6	48.6	36.3
30	42.4	46.6	55.1	61.0	56.4	44.6	43.5	28.5
31		45.0		63.5	58.6		40.9	
Means	39.3	45.6	50.4	57.7	60.1	51.5	43.3	36.5

Table 6. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1959.

Day	April	May	June	July	August	September	October	November
1	28.2	42.8	44.4	50.8	68.7	62.8	48.2	43.2
2	34.6	40.2	44.7	49.8	63.0	60.1	44.5	42.8
3	40.7	35.6	43.3	49.5	56.0	54.0	43.5	39.3
4	42.2	36.3	45.3	51.0	57.5	59.2	48.8	36.9
5	43.0	42.6	48.5	57.5	60.6	63.5	47.0	43.8
6	40.6	40.7	47.6	63.9	63.9	58.7	44.4	53.1
7	37.6	37.0	44.3	61.9	64.9	60.7	43.0	46.4
8	31.1	36.5	41.4	58.4	66.6	64.2	49.8	38.8
9	32.6	35.1	41.2	54.2	63.9	59.0	46.4	40.0
10	29.7	36.2	41.3	62.2	63.4	58.0	51.5	38.7
11	28.3	38.7	45.6	63.7	61.8	62.9	48.0	36.2
12	28.8	46.4	46.7	60.4	60.0	58.5	50.3	35.9
13	28.0	47.9	58.0	61.1	62.7	51.8	45.3	39.2
14	28.1	45.1	63.1	60.8	59.7	43.4	42.6	38.5
15	33.4	47.0	59.4	57.7	58.7	45.8	41.4	45.2
16	32.3	40.2	54.0	58.0	59.2	48.2	38.8	33.7
17	33.5	42.3	51.0	60.8	60.1	42.0	40.2	39.5
18	34.2	43.1	55.3	64.7	64.2	45.8	45.4	36.9
19	35.5	42.2	55.5	67.6	58.6	45.6	37.5	25.9
20	35.2	43.4	52.5	60.8	57.1	48.6	37.6	25.2
21	33.4	43.1	47.4	55.4	55.3	52.4	32.6	24.5
22	32.4	43.4	53.6	60.4	50.0	53.3	36.0	26.2
23	36.3	41.8	56.4	65.0	52.4	46.8	39.2	28.8
24	39.2	38.1	49.6	67.0	57.8	56.2	50.3	39.3
25	34.6	40.6	52.3	65.0	52.8	51.6	56.4	53.2
26	41.8	48.3	55.1	60.5	61.2	48.3	54.1	40.0
27	37.0	52.5	54.7	66.1	63.5	54.3	50.0	34.4
28	37.8	48.8	54.4	61.1	61.8	55.8	43.5	46.1
29	39.9	43.8	51.3	61.7	61.9	60.9	34.2	47.7
30	39.7	49.3	50.9	64.6	62.5	56.2	32.7	34.5
31		42.1		64.6	60.6		36.5	
Means	35.0	42.3	51.0	60.2	60.3	54.2	43.9	38.5

Table 7. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1960.

Day	April	May	June	July	August	September	October	November
1	36.5	40.1	54.8	61.0	59.6	57.1	55.5	39.8
2	28.9	38.0	55.5	54.0	60.4	54.0	44.4	47.9
3	31.0	36.2	58.4	56.4	62.8	51.4	46.3	46.6
4	37.9	36.0	58.7	60.3	58.5	53.2	48.5	43.4
5	39.8	38.4	58.5	57.3	54.6	52.7	46.1	39.9
6	38.8	53.6	57.0	58.3	53.7	51.9	52.5	37.0
7	29.8	49.9	49.2	55.3	58.6	51.6	47.8	32.7
8	30.3	52.8	48.0	56.1	62.1	58.2	42.2	28.8
9	33.0	55.3	46.6	61.0	62.0	52.2	42.0	40.1
10	32.0	49.1	46.0	56.3	59.9	59.0	42.1	42.3
11	22.8	48.8	49.8	56.8	60.0	51.4	43.4	36.6
12	32.4	48.9	50.6	61.1	60.3	54.2	42.4	29.0
13	34.8	42.2	47.0	60.2	63.5	64.7	41.2	28.1
14	25.6	49.4	45.9	59.2	64.6	58.6	40.6	33.5
15	30.1	52.1	46.2	56.8	63.2	53.5	37.7	32.8
16	32.5	46.1	51.3	56.4	58.2	45.3	36.7	42.4
17	36.0	46.0	58.2	61.5	57.2	45.3	52.0	47.4
18	49.1	47.3	65.2	59.4	63.1	53.5	51.1	40.4
19	40.5	45.9	55.1	59.1	62.9	49.7	52.7	36.7
20	31.3	41.0	54.1	63.1	64.0	45.3	43.4	34.6
21	31.0	49.0	51.2	59.4	64.3	48.4	42.1	35.2
22	30.8	41.5	50.5	56.0	66.2	48.2	37.8	34.9
23	30.7	40.1	53.2	59.2	67.4	50.8	40.7	38.4
24	32.6	44.8	59.3	62.0	55.3	53.8	43.5	34.6
25	32.1	46.4	56.4	56.6	50.9	47.4	48.4	34.9
26	33.2	48.4	53.8	58.3	54.0	49.6	47.8	37.7
27	35.8	50.0	54.2	62.9	55.6	53.4	41.2	34.0
28	35.2	46.1	61.8	66.0	57.3	53.4	38.8	28.9
29	40.1	49.2	65.6	61.4	60.0	58.1	39.8	30.1
30	40.7	50.5	63.6	67.1	59.8	60.7	40.8	47.7
31		54.4		67.8	56.5		40.2	
Means	33.8	46.4	54.2	59.6	59.8	52.9	43.9	37.2

Table 8. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1961.

Day	April	May	June	July	August	September	October	November
1	33.2	39.6	42.1	51.1	58.1	59.0	50.3	41.4
2	36.9	36.5	51.7	50.0	59.0	52.9	57.7	38.4
3	34.8	36.5	51.0	55.2	60.9	51.4	60.9	42.6
4	30.8	34.0	48.4	60.0	62.8	54.0	62.8	50.4
5	32.0	36.3	50.4	60.2	61.6	61.5	56.1	50.7
6	34.6	30.4	52.0	56.6	61.4	59.9	53.3	47.8
7	34.5	32.4	45.1	58.0	57.1	50.9	52.4	43.7
8	31.7	39.3	48.7	59.1	63.1	51.5	47.3	44.3
9	32.2	45.1	49.6	58.6	65.0	57.9	53.8	39.2
10	33.8	48.1	53.4	60.7	62.5	58.6	51.6	37.2
11	35.2	40.3	46.4	57.3	69.5	58.2	40.7	32.9
12	36.0	41.7	49.1	62.6	67.3	58.6	46.4	33.5
13	39.5	47.2	56.8	57.8	66.4	51.6	51.2	37.1
14	36.2	47.1	48.3	57.5	61.7	48.9	53.1	45.7
15	35.5	43.4	43.4	54.2	61.5	63.5	60.5	43.7
16	37.1	46.6	44.3	57.2	63.7	54.9	49.8	39.1
17	34.3	47.2	51.1	61.5	61.2	50.4	39.8	41.7
18	35.6	40.8	57.8	59.6	61.2	51.6	43.3	46.0
19	34.8	45.0	60.1	60.7	64.7	56.8	51.3	35.5
20	30.6	38.9	58.4	59.9	63.2	57.1	47.7	32.5
21	35.7	41.7	60.6	62.1	60.0	53.2	43.8	32.8
22	36.2	47.9	61.3	60.3	59.1	57.1	36.2	37.2
23	34.0	40.8	60.5	61.0	59.3	64.6	33.7	45.7
24	36.8	42.3	53.5	68.1	61.2	63.1	40.0	51.6
25	33.9	46.6	63.6	68.9	62.3	65.0	49.9	52.2
26	35.2	56.2	58.6	63.6	61.4	67.9	54.8	42.0
27	33.9	58.0	53.0	55.8	52.4	64.0	51.4	49.2
28	34.5	51.2	49.9	54.3	59.1	60.0	44.1	49.1
29	39.5	53.6	56.4	61.0	58.9	55.6	41.2	40.7
30	39.0	54.6	57.8	62.3	53.4	50.2	41.2	39.9
31		43.3		59.8	54.1		42.0	
Means	34.7	43.6	52.8	59.2	61.1	57.0	48.6	42.1

Table 9. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1962.

Day	April	May	June	July	August	September	October	November
1	38.2	32.9	42.6	62.5	59.9	59.2	50.9	55.8
2	43.6	34.8	44.7	52.2	57.5	60.2	50.8	43.7
3	31.9	44.6	45.0	49.1	59.8	55.7	53.6	38.6
4	29.2	41.6	44.1	49.7	62.0	54.8	51.3	44.7
5	33.9	43.1	43.0	53.0	58.1	48.0	41.9	49.6
6	35.2	37.9	42.8	58.4	55.6	51.3	40.1	41.2
7	42.2	38.5	43.3	52.3	64.9	54.8	47.5	36.1
8	41.2	32.5	51.4	52.6	61.2	55.0	56.7	39.9
9	43.0	31.4	47.7	50.7	56.9	56.1	40.0	39.9
10	32.9	33.5	56.1	57.0	58.1	55.3	38.5	38.3
11	32.2	36.1	53.4	56.5	59.2	52.4	40.0	49.7
12	33.0	36.6	45.2	53.6	57.9	54.7	44.7	47.9
13	32.8	39.7	43.2	54.7	61.5	53.3	44.8	40.8
14	35.8	38.5	48.3	59.1	64.7	54.5	44.6	36.1
15	33.9	41.1	49.3	55.6	59.5	56.0	42.2	39.3
16	33.5	45.4	58.0	55.5	56.7	55.5	46.1	51.4
17	32.7	49.7	64.0	51.3	59.1	52.3	52.7	42.2
18	31.7	44.9	46.7	57.6	63.0	56.5	46.1	33.8
19	33.6	46.5	46.1	58.2	58.5	56.8	39.0	32.3
20	31.6	43.7	48.0	53.6	57.0	52.5	45.4	33.9
21	33.0	40.7	47.5	58.0	55.4	48.8	50.8	31.0
22	38.3	37.4	47.9	60.2	55.6	49.9	49.3	46.3
23	38.7	37.4	54.8	54.3	52.6	47.9	46.0	42.5
24	32.8	39.7	54.3	53.0	45.1	44.7	51.3	35.4
25	28.6	45.7	57.6	52.1	60.9	53.9	43.7	32.8
26	32.2	51.4	52.0	57.1	62.1	53.2	40.9	32.1
27	33.1	43.8	52.2	58.4	62.5	49.4	45.4	35.4
28	35.7	40.5	49.7	56.9	63.6	46.2	42.4	39.3
29	36.6	47.1	55.6	60.6	63.1	46.5	49.1	37.8
30	30.6	44.9	62.9	63.5	55.7	51.4	37.6	39.1
31		42.4		65.2	54.5		38.3	
Means	34.9	40.8	49.9	55.9	59.1	52.9	45.5	40.2

Table 10. The mean daily and mean monthly air temperatures (°F) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1963.

Day	April	May	June	July	August	September	October
1	23.8	44.7	47.8	52.0	60.3	58.5	44.9
2	29.8	50.6	49.7	50.3	56.4	57.9	50.4
3	20.2	49.2	53.9	60.3	56.6	62.8	51.8
4	22.3	40.2	47.6	60.5	60.3	58.1	53.7
5	31.1	38.1	44.2	57.5	61.2	49.3	47.1
6	27.7	34.6	44.0	62.9	60.0	48.7	45.1
7	30.1	34.7	43.6	57.8	63.7	59.1	47.6
8	34.1	36.8	45.2	60.5	65.4	54.5	48.3
9	34.7	37.2	44.6	63.7	64.7	56.6	38.7
10	37.7	32.3	43.3	59.5	63.6	56.2	39.2
11	40.4	36.9	42.8	55.4	60.8	52.4	43.4
12	40.4	40.9	44.7	61.7	60.3	57.7	43.7
13	33.5	36.3	50.8	64.5	60.4	52.1	39.0
14	30.8	43.6	49.7	65.6	64.0	44.0	41.2
15	33.9	41.6	46.9	64.1	60.0	46.7	47.1
16	34.9	46.0	49.3	64.9	59.5	53.2	48.0
17	37.7	39.6	45.6	63.6	58.0	53.9	41.3
18	33.1	47.6	48.6	56.5	61.3	55.2	46.0
19	33.9	51.9	50.1	55.0	59.7	59.7	49.4
20	33.7	53.6	57.0	56.5	58.5	51.6	50.4
21	35.0	49.1	60.1	57.2	58.8	42.0	46.3
22	39.8	48.5	54.8	58.6	57.2	43.0	36.5
23	39.5	46.4	51.7	57.7	53.9	44.5	46.4
24	35.4	41.8	50.6	60.6	50.6	42.4	48.2
25	33.8	44.4	55.8	58.7	53.4	45.8	43.2
26	34.5	47.8	52.4	64.6	55.2	54.1	51.6
27	34.7	49.2	53.6	64.8	51.2	52.6	49.8
28	37.7	47.1	49.4	66.2	49.7	43.9	45.0
29	34.9	52.4	46.8	60.2	58.1	45.4	49.9
30	43.8	55.6	54.4	67.9	58.3	54.2	59.6
31		47.0		63.0	59.2		47.8
Means	33.8	44.1	49.3	60.4	58.7	51.9	46.5

APPENDIX B

The daily and monthly precipitation (inches) at the
Department of Transport Aeradio Station, St. Andrews,
Newfoundland, 1954-63.

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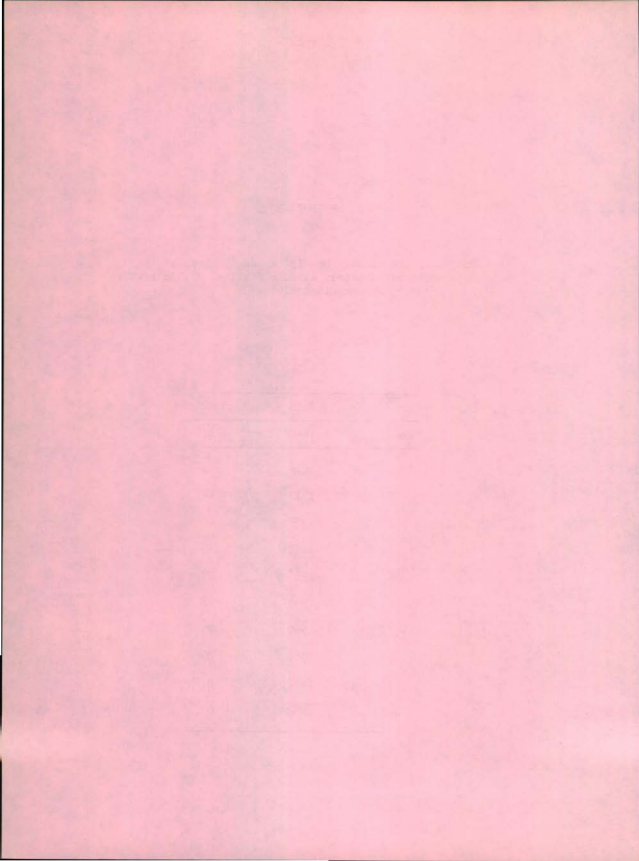


Table 1. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1954.

Day	April	May	June	July	August	September	October	November
1	...	...	...	0.39	...	...	0.10	0.09
2	...	...	...	0.34	0.10	...	0.02	...
3	0.23	...	...	0.48	...	0.05	0.14	0.66
4	0.10	...	...	...	0.40	...	...	...
5	0.01	...	0.38	...	...	0.06	0.25	0.57
6	0.53	...	...	0.02	0.13	...	0.02	0.08
7	...	0.24	...	...	...	0.33	0.02	...
8	0.31	0.11	0.02	0.01	0.04	...	0.03	...
9	...	...	...	...	0.03	...	0.11	0.02
10	...	...	...	...	0.18	...	...	...
11	0.97	...	...	...	0.06	0.13	0.05	0.02
12	0.01	0.13	...	...	0.45	...	0.25	...
13	...	0.04	...	0.94	...	...	0.01	...
14	...	...	...	0.06	0.07	...	0.22	0.14
15	...	...	...	1.44	0.06	...	...	...
16	...	...	...	...	0.34	...	...	0.22
17	...	0.12	...	...	0.66	...	...	0.06
18	...	...	...	...	...	...	0.13	...
19	...	...	...	...	...	...	...	...
20	0.01	0.11	...	...	...	0.24	...	0.14
21	...	0.18	...	0.14	...	...	0.34	0.05
22	...	0.53	...	0.22	0.10	...	0.97	0.03
23	...	0.87	0.03	...	...	...	0.52	...
24	...	...	0.46	0.08	0.03	0.06	0.74	...
25	0.10	...	1.09	...	0.21	...	0.10	0.20
26	...	...	...	...	0.06	0.33	...	...
27	...	0.11	...	...	...	0.03	...	...
28	...	...	0.01	...	0.07	0.79	0.98	...
29	...	0.21	...	...	...	...	0.06	0.50
30	...	...	...	0.53	...	0.10	0.28	0.05
31	...	0.29	...	0.04	...	...	0.52	...
Totals	2.27	2.94	1.99	4.69	2.99	2.12	5.86	2.83

Table 2. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1955.

Day	April	May	June	July	August	September	October	November
1	...	...	...	...	0.12	0.34	0.40	...
2	...	...	0.37	...	0.60	...	...	...
3	...	0.15	0.02	...	0.44	...	...	...
4	...	0.17	...	...	...	...	0.19	...
5	...	...	0.05	0.26	0.50	0.03	0.21	...
6	0.06	...	0.03	...	...	...	...	0.42
7	0.26	0.07	...	...	0.79	0.01	0.07	0.22
8	0.01	...	...	...	...	...	0.09	0.19
9	...	0.69	...	...	...	...	...	0.03
10	0.04	0.28	...	...	...	...	0.21	0.08
11	0.04	...	...	...	0.16	...	0.16	0.14
12	...	...	0.03	...	0.25	0.17	0.05	0.04
13	...	...	0.04	...	...	...	...	0.01
14	0.55	0.13	0.09	...	0.05	...	...	0.06
15	0.44	...	0.02	...	0.31	0.44	...	0.19
16	0.10	0.12	...	1.29	...	...	...	...
17	...	...	...	0.05	0.04	0.45	...	0.28
18	...	...	0.05	0.42	0.42	...	0.61	0.15
19	...	...	...	...	0.01	0.08	1.07	...
20	0.11	0.01	...	0.04	...	0.26	0.02	0.82
21	...	...	...	0.51	...	1.94	0.03	0.08
22	...	0.05	...	0.09	0.05	0.01	...	0.06
23	...	...	0.20	0.02	0.15	...	...	0.01
24	...	0.30	0.07	...	1.96	0.06	...	0.16
25	...	0.32	0.94	...	0.01	0.36	0.50	0.03
26	...	...	...	...	...	0.04	0.04	...
27	0.56	...	...	0.03	0.07	...	0.73	...
28	0.06	0.03	...	...	0.14	1.09	0.14	0.31
29	...	0.33	...	...	0.06	...	...	0.01
30	...	0.24	...	...	...	...	0.03	0.08
31	...	0.43	...	0.44	...	...	...	...
Totals	2.23	3.32	1.91	3.15	6.13	5.28	4.55	3.37

Table 3. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1956.

Day	April	May	June	July	August	September	October	November
1	...	...	...	...	0.44	...	...	...
2	...	...	0.08	0.26	...	0.11	...	...
3	...	0.25	...	...	...	0.07	0.07	...
4	...	0.20	0.19	0.09	...	...	0.26	...
5	0.19	0.02	0.05	...	...	...	0.29	...
6	0.02	...	0.26	...	0.15	...	...	...
7	0.02	...	0.42	0.12	...	0.65	0.98	...
8	0.18	...	...	0.05	...	...	...	0.09
9	0.47	0.05	0.01	0.24	...	...	0.10	0.29
10	0.03	0.55	0.32	0.07	0.14	...	0.01	...
11	...	...	0.27	...	0.05	0.02	...	0.02
12	...	0.16	...	...	...	...	...	0.37
13	...	0.20	...	...	...	0.06	...	0.41
14	0.08	0.07	...	1.41	...	1.13	...	...
15	...	0.19	0.48	...	0.35	...	...	...
16	0.20	0.29	...	0.10	...	...	...	0.11
17	0.05	...	...	0.12	...	0.10	...	0.12
18	...	0.02	0.18	...	...	0.14	0.22	0.23
19	0.12	...	...	...	0.86	...	...	0.11
20	...	0.13	...	...	...	0.01	...	0.08
21	0.39	...	0.14	...	...	...	...	0.22
22	0.07	0.54	0.24	...	...	0.14	...	0.28
23	0.47	0.96	...	...	...	...	...	...
24	...	0.20	...	...	...	...	0.39	0.23
25	...	...	0.16	...	...	0.30	...	...
26	...	...	...	0.25	0.65	...	...	...
27	...	...	0.31	0.02	...	...	...	0.72
28	0.08	0.21	...	0.04	0.35	...	...	0.03
29	0.05	...	...	...	...	...	0.07	0.32
30	0.02	...	...	0.01	...	...	...	0.24
31	...	0.19	...	...	...	...	...	...
Totals	2.44	4.23	3.11	2.78	2.99	2.73	2.39	3.87

Table 4. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1957.

Day	April	May	June	July	August	September	October	November
1	...	0.84	...	...	0.28	...	0.46	0.37
2	0.28	...	0.14	0.06	0.34	0.30	0.72	0.10
3	...	0.08	...	...	0.05	0.85	0.02	0.51
4	...	0.26	0.12	0.13	0.06	0.23	...	0.08
5	...	...	...	0.19	0.90	0.07	...	0.03
6	0.12	...	...	...	...	...	...	...
7	...	0.10	0.45	...	0.01	...	...	0.03
8	...	...	0.02	0.14	...	0.55	...	...
9	0.04	0.08	...	...	...	0.62	...	1.32
10	0.10	0.07	...	0.01	...	...	0.04	...
11	0.05	...	...	...	...	...	0.17	...
12	...	...	...	0.08	...	...	...	...
13	0.80	0.03	...	0.20	...	0.10	...	...
14	...	...	...	0.01	0.01	...	...	...
15	...	0.12	...	1.52	0.05	...	...	0.03
16	...	...	0.09	...	0.03	0.07	...	...
17	...	...	...	...	...	...	...	...
18	...	...	...	0.02	...	...	...	...
19	...	...	0.41	...	...	...	0.01	0.15
20	0.36	...	0.08	0.07	...	0.01	0.90	1.03
21	0.15	...	...	...	...	0.02	0.03	...
22	0.01	...	...	...	...	0.62	...	...
23	...	...	0.03	0.29	...	0.45	0.07	...
24	...	0.24	0.31	0.05	...	0.25	0.04	0.43
25	...	0.02	...	...	...	...	0.21	0.18
26	...	...	...	...	0.49	0.05	...	0.14
27	...	0.09	...	...	0.14	0.45	0.15	0.07
28	...	0.14	0.01	...	...	0.05	...	0.14
29	0.12	...	...	...	...	0.02	...	...
30	...	...	0.16	0.26	...	...	...	0.50
31	...	...	...	0.01	...	...	...	...
Totals	2.03	2.07	1.82	3.04	2.36	4.71	2.82	5.11

Table 5. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1958.

Day	April	May	June	July	August	September	October	November
1	...	...	...	0.16	...	0.05	0.44	0.20
2	...	0.01	0.06	...	...	0.94	...	0.02
3	...	...	0.05	...	...	...	...	...
4	...	...	...	0.09	0.01	0.12	...	...
5	...	...	...	...	0.13	0.13	0.06	...
6	...	...	0.18	...	...	0.06	...	0.46
7	0.66	0.31	...	...	...	1.39	0.10	3.77
8	0.24	0.70	0.21	0.96	...	0.12	...	...
9	0.60	0.02	0.03	0.06	0.47	0.02	...	0.25
10	...	...	...	...	0.10	0.76	...	0.34
11	...	...	...	0.13	0.07	0.20	0.05	0.05
12	0.32	...	...	0.25	...	0.04	0.09	0.20
13	0.09	...	...	0.01	0.01	0.05	0.01	...
14	0.12	...	0.46	...	...	0.11	...	0.10
15	...	...	0.08	...	0.08	0.22	0.18	0.13
16	...	...	...	...	...	...	0.09	...
17	0.01	...	0.04	0.17	0.87	...	0.45	0.43
18	0.92	0.16	...	0.04	0.09	...	0.60	0.09
19	0.03	0.52	...	...	0.50	...	0.42	0.90
20	0.10	0.17	...	...	...	...	0.04	0.01
21	0.04	1.55	...	...	...	...	...	0.19
22	0.05	0.43	0.61	0.01	0.03	0.87	...	0.12
23	...	...	...	...	...	0.22	...	0.06
24	0.05	...	...	...	...	...	...	0.17
25	0.03	...	...	...	0.51	0.03	...	0.06
26	...	2.19	1.15	...	0.78	0.03	...	1.32
27	...	...	0.40	...	0.12	0.04	0.17	0.32
28	...	0.80	...	...	...	1.50	0.41	0.02
29	1.21	0.41	...	0.80	...	0.43	0.03	1.26
30	1.17	...	0.22	0.55	...	...	0.09	0.23
31	...	0.03	...	0.01	...	...	0.13	...
Totals	5.10	7.30	3.49	3.88	3.77	7.33	3.36	10.70

Table 6. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1959.

Day	April	May	June	July	August	September	October	November
1	0.08	...	0.35	...	0.43	0.84	0.36	0.90
2	...	0.05	...	0.21	...	...	...	0.01
3	0.39	0.02	1.12	...	...	...	0.28	0.11
4	0.88	...	...	...	...	0.22	...	0.07
5	...	...	...	...	0.34	...	...	0.08
6	0.27	...	...	...	0.01	...	0.01	0.15
7	0.07	...	0.41	0.41	0.10	...	...	0.21
8	0.05	0.62	0.10	...	...	...	...	0.19
9	...	1.55	...	...	...	...	0.01	0.02
10	...	...	0.28	...	0.01	...	0.05	0.03
11	0.10	...	...	0.11	0.30	0.21	...	...
12	0.04	...	...	0.07	0.16	...	0.26	0.06
13	...	...	...	...	0.01	0.15	0.14	...
14	...	...	...	...	...	0.68	0.07	...
15	...	...	...	...	...	0.20	...	0.34
16	...	0.23	...	...	...	...	0.02	0.63
17	...	...	...	...	0.42	0.20	0.90	...
18	...	...	0.36	...	0.01	0.12	0.63	0.25
19	0.01	0.11	0.21	0.29	...	...	0.09	0.07
20	0.09	0.01	0.01	...	...	...	0.25	0.13
21	...	0.35	...	...	...	0.58	0.03	0.01
22	...	...	...	...	0.01	0.58	...	...
23	...	...	...	...	...	0.06	...	...
24	0.18	...	...	...	...	0.03	...	1.60
25	...	...	...	0.15	0.50	0.01	...	0.03
26	0.11	...	...	...	...	...	0.12	0.11
27	...	...	...	...	0.53	0.01	0.14	0.30
28	...	0.05	...	0.02	0.68	...	0.88	0.86
29	...	0.05	0.27	...	0.13	...	...	0.72
30	...	0.69	0.03	...	0.01	...	...	0.07
31	...	...	...	...	0.03	...	0.04	...
Totals	2.27	2.38	3.14	1.26	3.68	3.89	4.28	6.95

Table 7. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1960.

Day	April	May	June	July	August	September	October	November
1	...	...	0.02	...	...	0.42	...	...
2	...	...	...	...	0.10	0.03	...	0.81
3	...	...	...	...	...	0.02	0.59	...
4	0.41	...	0.05	0.02	...	0.16	...	0.11
5	0.45	...	0.47	...	...	...	...	0.12
6	...	...	0.08	...	0.08	...	0.38	0.01
7	...	...	...	...	...	...	0.24	...
8	0.02	...	0.02	...	0.60	...	0.16	...
9	0.33	0.61	...	0.84	0.03	...	0.13	0.17
10	0.03	...	...	...	...	0.37	0.15	0.74
11	0.02	...	...	...	...	0.05	0.36	0.01
12	0.15	0.08	0.55	0.21	...	0.15	0.15	...
13	0.09	0.02	0.01	0.20	...	0.70	0.11	0.03
14	...	0.20	...	...	...	0.42	...	...
15	0.09	0.04	...	...	...	...	...	...
16	...	0.06	0.25	...	...	...	0.08	0.86
17	0.06	0.01	...	0.03	...	...	0.29	0.11
18	...	...	0.07	...	...	0.29	0.01	...
19	...	...	...	0.52	...	...	...	...
20	...	0.08	...	0.49	...	0.49	2.08	...
21	...	...	0.04	0.25	0.13	0.05	...	0.01
22	...	...	...	...	0.18	...	...	0.09
23	0.02	...	...	0.55	0.49	...	...	0.28
24	...	...	0.01	0.10	0.12	...	...	...
25	0.11	...	0.57	...	0.08	...	0.72	...
26	...	...	...	...	...	...	0.17	...
27	...	...	...	...	...	...	0.01	...
28	...	...	...	...	...	...	...	...
29	...	...	...	...	0.01	...	...	0.31
30	...	...	0.02	0.04	...	0.51	...	0.42
31	...	...	...	0.15	...	...	...	...
Totals	1.78	1.10	2.16	3.40	1.82	3.66	5.63	4.08

Table 8. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1961.

Day	April	May	June	July	August	September	October	November
1	0.04	...	...	...	...	...	...	0.49
2	0.12	0.75	0.73	...	...	...	...	0.17
3	...	0.32	...	...	...	...	0.54	...
4	...	...	0.02	...	0.23	...	0.73	...
5	0.07	0.01	0.11	...	0.02	0.09	0.20	0.29
6	...	...	0.36	...	...	0.02	0.01	0.02
7	...	...	...	...	...	...	...	0.43
8	...	...	0.48	...	...	...	...	0.01
9	...	0.18	...	...	...	0.01	0.04	0.91
10	...	...	0.41	...	...	0.06	0.02	0.13
11	0.16	...	...	...	0.35	0.15	...	0.11
12	0.13	...	...	...	0.10	0.03	...	0.09
13	...	...	0.06	...	...	...	...	...
14	0.13	0.05	0.05	...	...	0.18	0.16	0.87
15	0.05	...	...	...	...	0.47	2.13	0.04
16	...	0.06	...	...	0.20	0.60	0.07	...
17	...	0.07	0.06	...	0.24	...	0.19	0.11
18	...	...	...	...	...	...	...	0.30
19	...	...	...	0.26	...	...	...	0.01
20	...	0.60	...	...	...	...	0.05	...
21	...	0.01	...	...	...	...	...	...
22	...	0.58	0.50	0.01	0.09	...	...	0.36
23	0.57	0.34	0.46	...	0.01	...	...	...
24	0.02	...	...	...	...	...	...	...
25	0.01	...	0.04	0.15	0.08	0.02	0.03	0.03
26	...	...	0.08	0.11	0.01	0.14	0.04	...
27	...	...	...	...	0.06	...	0.25	...
28	...	0.52	...	...	0.48	0.27	0.82	0.56
29	...	...	0.08	...	0.03	0.05	0.17	0.01
30	...	2.63	0.01	0.18	...	...	...	0.42
31	...	0.05	...	0.38	...	...	0.10	...
Totals	1.30	6.17	3.45	1.09	1.90	2.09	5.55	5.36

Table 9. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1962.

Day	April	May	June	July	August	September	October	November
1	1.88	...	...	0.76	0.04	...	0.18	0.88
2	0.40	...	...	...	0.03	0.24	...	...
3	...	...	...	0.61	...	...	...	0.12
4	...	...	0.17	0.05	...	...	...	0.40
5	...	...	0.32	0.06	...	...	...	0.53
6	...	...	0.96	1.88	...	...	...	0.46
7	0.02	0.20	0.50	0.02	...	...	0.14	0.56
8	1.18	0.23	...	0.03	0.07	...	0.58	...
9	1.56	0.08	...	0.05	...	...	...	...
10	0.20	...	...	...	0.10	0.42	...	0.01
11	0.10	...	1.14	0.25	0.57	...	0.80	1.27
12	...	...	...	0.29	...	...	0.16	0.17
13	0.02	...	...	0.07	0.33	0.04	0.33	0.07
14	0.42	...	...	...	0.28	0.04	0.12	...
15	...	...	...	...	0.03	0.08	0.04	0.06
16	0.25	...	...	...	...	0.08	...	0.01
17	0.04	0.02	0.25	...	...	...	0.05	0.20
18	...	...	0.01	...	0.16	0.78	...	...
19	...	...	...	0.08	...	...	...	...
20	...	...	...	0.05	0.74	0.40	...	0.02
21	...	0.32	...	0.24	...	0.30	0.34	...
22	...	...	...	...	...	0.10	0.01	1.09
23	0.18	...	...	...	...	0.04	...	...
24	0.12	...	0.01	0.34	...	0.16	0.17	0.04
25	...	0.69	0.45	...	...	0.35	0.01	...
26	...	0.08	0.03	0.08	...	0.02	0.16	0.02
27	0.11	0.28	0.02	0.14	...	0.10	0.25	...
28	0.24	...	...	...	...	...	...	...
29	0.06	...	...	...	...	0.03	0.21	...
30	...	0.45	...	...	...	0.45	...	...
31	...	...	...	0.47	...	...	...	...
Totals	6.78	2.35	3.86	5.47	2.35	3.63	3.55	5.91

Table 10. The daily and monthly precipitation (inches) at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1963.

Day	April	May	June	July	August	September	October	November
1	...	0.01	...	...	...	0.01	0.06	0.05
2	...	0.19	0.03	0.04	0.04	...	...	0.30
3	...	0.46	...	0.05	0.02	...	...	2.15
4	0.07	0.07	0.88	0.44	...	0.63	0.01	0.12
5	0.08	0.03	...	0.06	0.15	...	0.04	...
6	0.05	...	0.32	...	...	...	...	0.06
7	...	0.13	...	0.01	...	0.53	0.32	0.11
8	0.10	0.33	0.18	...	...	0.07	0.20	...
9	0.35	...	0.06	...	...	...	...	...
10	0.12	0.07	0.14	0.04	...	0.03	...	...
11	0.05	...	0.10	0.01	...	...	...	...
12	0.04	...	...	...	0.07	...	...	0.21
13	0.07	...	...	...	0.82	1.13	0.03	0.52
14	0.02	...	0.08	...	0.60	...	...	0.56
15	...	0.16	...	0.34	0.12	...	...	0.18
16	...	0.98	0.02	...	0.67	...	0.04	0.29
17	...	0.34	0.06	...	...	...	0.11	0.17
18	...	...	...	0.16	0.48	...	...	0.40
19	0.01	0.03	...	0.05	1.27	0.24	...	...
20	0.08	0.06	...	...	0.04	0.15	...	0.09
21	0.04	0.02	0.47	...	0.04	0.23	...	...
22	...	0.04	0.02	...	...	...	...	0.29
23	...	0.49	0.02	...	...	...	...	...
24	...	...	...	0.02	0.29	...	...	0.28
25	...	...	...	0.02	1.31	...	0.17	0.09
26	...	...	...	0.12	0.01	...	...	0.04
27	...	...	...	0.04	...	...	...	0.31
28	...	...	...	...	...	0.39	...	...
29	...	...	...	0.01	...	0.35	0.30	0.16
30	...	...	0.78	...	0.38	0.74	0.62	0.03
31	...	0.34	...	0.10	0.54	...	0.09	...
Totals	1.08	3.75	3.16	1.51	6.85	4.50	1.99	6.41

APPENDIX C

The mean monthly and mean seasonal wind velocity (mph)
from each direction at the Department of Transport
Aeradio Station, St. Andrews, Newfoundland, 1955-63.

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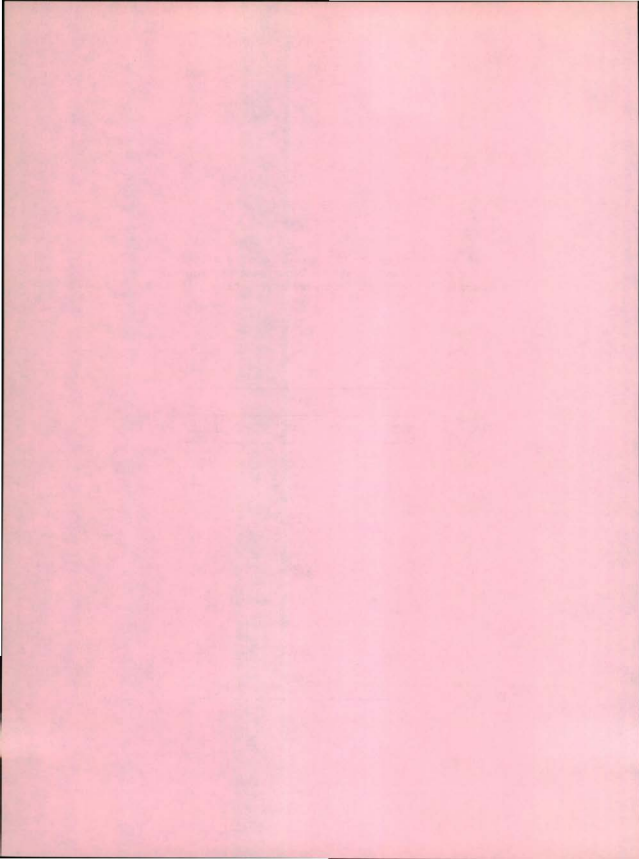


Table 1. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1955.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Means
N	6	5	5	5	6	8	7	12	6
NE	8	8	8	4	6	9	9	7	8
E	3	11	7	3	7	6	7	11	8
SE	15	18	11	12	12	20	9	14	15
S	6	10	7	11	9	16	14	14	11
SW	5	7	6	7	7	10	10	12	8
W	4	5	4	4	6	5	9	17	10
NW	10	8	6	9	10	15	10	17	11
Means	7	9	6	8	8	12	10	1	8

Table 2. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1956.

Direction	May	June	July	Aug.	Sept.	Oct.	Means
N	9	7	7	4	6	10	8
NE	11	6	4	6	5	6	6
E	7	6	5	9	5	6	6
SE	13	10	9	13	19	23	15
S	18	13	12	10	13	8	13
SW	10	8	7	8	11	9	9
W	7	6	4	8	11	9	8
NW	11	9	7	10	10	12	10
Means	11	8	7	9	10	10	9

Table 3. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1957.

Direction	March	April	May	June	July	Aug.	Sept.	Oct.	Means
N	11	11	7	6	6	11	9	10	9
NE	9	8	8	8	8	7	10	11	9
E	10	6	8	6	5	4	5	6	7
SE	23	22	15	5	5	5	4	4	8
S	8	8	7	12	10	6	9	6	9
SW	10	10	8	14	13	8	10	16	11
W	12	10	9	8	9	10	8	10	9
NW	14	14	10	6	6	9	12	8	11
Means	12	11	8	8	8	8	8	9	9

Table 4. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1958.

Direction	April	May	June	July	Means
N	8	4	4	3	5
NE	9	7	5	6	7
E	9	6	5	4	6
SE	21	17	11	11	15
S	11	15	9	4	12
SW	14	9	7	7	9
W	6	3	4	3	4
NW	10	8	9	8	9
Means	12	10	7	7	9

Table 5. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1959.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Means
N	9	9	5	5	8	8	8	8
NNE	8	8	10	6	8	8	7	8
NE	7	8	6	5	6	6	4	6
ENE	7	9	8	5	7	5	4	6
E	9	7	12	6	7	6	4	8
ESE	10	10	14	8	7	10	19	11
SE	19	8	16	7	9	9	19	13
SSE	32	15	17	18	14	11	24	20
S	13	12	12	10	11	9	15	11
SSW	10	9	10	10	8	10	10	9
SW	5	7	6	7	5	8	8	6
WSW	7	6	6	6	6	11	12	8
W	6	5	6	6	6	10	13	9
WNW	8	10	7	7	7	11	17	11
NW	9	10	7	7	9	10	13	9
NNW	10	9	7	11	10	9	10	10
Means	10	8	9	8	8	9	12	9

Table 6. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1960.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Means
N	11	9	9	4	6	6	7	8
NNE	10	10	9	4	5	8	7	9
NE	5	6	5	4	4	5	4	5
ENE	7	7	6	4	4	5	6	5
E	6	8	9	5	4	6	8	7
ESE	8	17	12	12	3	10	26	15
SE	14	6	13	12	5	9	19	13
SSE	16	11	21	17	15	19	20	17
S	0	9	10	10	10	13	15	11
SSW	12	11	10	8	9	13	11	10
SW	8	7	6	7	6	6	6	7
WSW	11	7	7	10	7	7	11	9
W	12	6	6	8	6	8	8	8
WNW	11	7	7	8	10	8	14	11
NW	10	8	7	6	8	8	12	9
NNW	12	9	10	8	10	8	12	10
Means	11	8	9	8	7	8	12	9

Table 7. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1961.

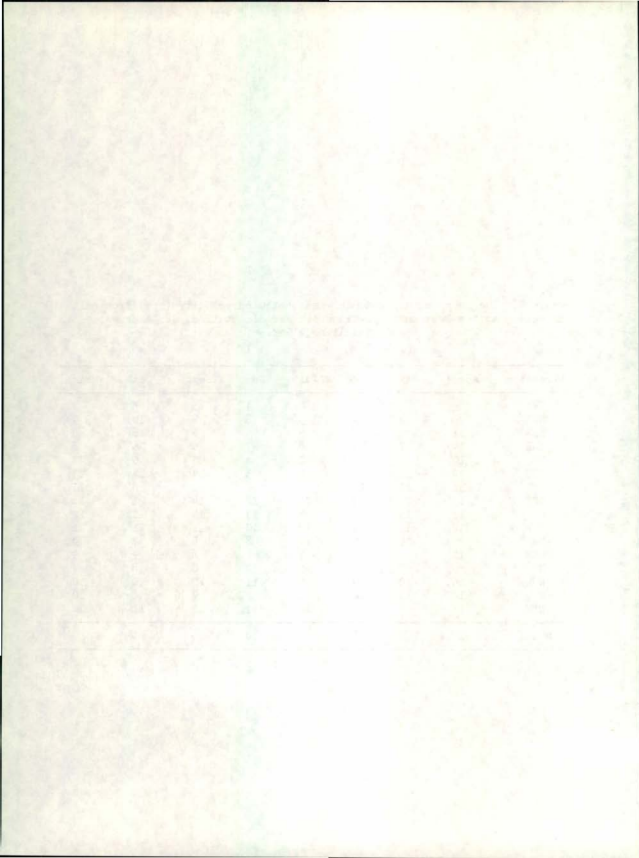
Direction	April	May	June	July	Aug.	Sept.	Oct.	Means
N	12	10	6	6	7	5	10	8
NNE	12	11	4	7	9	8	16	12
NE	8	7	4	5	4	5	7	6
ENE	12	7	7	6	6	9	10	10
E	9	8	5	6	6	5	5	6
ESE	16	34	12	10	18	4	11	21
SE	11	25	8	8	8	4	15	11
SSE	13	28	17	12	14	13	25	20
S	7	17	10	7	10	8	14	11
SSW	8	14	12	10	11	13	12	12
SW	5	8	6	7	6	6	10	7
WSW	5	10	7	8	9	10	13	9
W	4	8	7	6	10	6	8	7
WNW	7	8	9	10	10	13	14	11
NW	7	6	6	7	9	10	12	9
NNW	11	12	11	12	12	12	12	12
Means	9	2	7	7	8	8	11	8

Table 8. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1962.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Means
N	9	7	8	5	4	7	0	7
NNE	11	8	10	5	6	8	8	8
NE	5	5	4	4	5	8	7	6
ENE	9	6	6	8	5	5	6	7
E	8	7	8	9	5	8	7	7
ESE	26	11	11	17	12	7	8	14
SE	13	24	11	13	12	16	15	14
SSE	26	15	14	15	12	13	23	15
S	31	8	6	9	6	10	17	11
SSW	0	9	10	9	9	9	14	10
SW	12	9	9	7	6	10	9	10
WSW	10	11	7	6	8	10	18	11
W	7	8	6	3	6	7	12	8
WNW	9	8	9	7	11	10	12	10
NW	10	8	8	6	8	9	9	9
NNW	11	11	9	8	9	10	10	10
Means	11	8	8	9	8	9	11	9

Table 9. The mean monthly and mean seasonal wind velocity (mph) from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1963.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Means
N	9	7	8	4	4	5	8	7
NNE	0	0	12	9	8	8	10	9
NE	11	6	6	5	5	6	6	8
ENE	14	7	7	8	7	8	6	8
E	10	6	5	10	6	5	5	7
ESE	19	11	9	12	13	14	14	13
SE	31	13	14	14	9	8	8	17
SSE	17	22	13	19	18	14	21	18
S	13	15	11	8	13	14	11	12
SSW	12	12	11	10	10	11	11	11
SW	7	9	9	10	8	8	7	9
WSW	12	8	9	7	8	8	9	9
W	9	7	6	5	9	8	8	7
WNW	14	10	9	6	11	10	10	10
NW	12	11	10	8	9	9	8	10
NNW	11	8	10	10	11	11	11	10
Means	12	9	8	9	10	10	9	9



APPENDIX D

The monthly and seasonal relative occurrences (%) of
wind from each direction at the Department of Transport
Aeradio Station, St. Andrews, Newfoundland, 1955-63.

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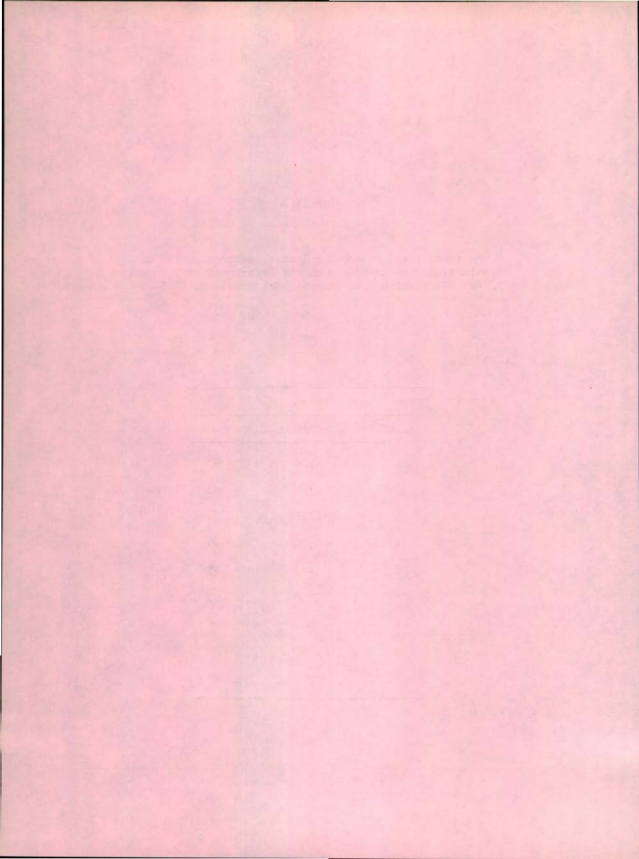


Table 1. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1955.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
N	10.8	6.0	6.0	10.3	8.3	4.9	7.1	3.9	7.2
NE	19.3	26.9	19.0	12.1	11.2	7.6	22.2	3.9	15.3
E	3.6	11.0	7.2	5.2	6.0	11.2	13.2	13.6	8.9
SE	6.1	12.8	6.2	4.3	7.5	4.7	2.3	10.4	6.8
S	10.6	12.2	16.0	32.3	23.7	24.9	10.9	7.7	17.3
SW	9.9	10.5	16.0	14.5	21.4	19.2	12.5	4.7	13.6
W	3.9	2.7	7.5	2.2	4.2	2.8	10.0	24.9	7.2
NW	29.7	15.5	16.1	17.5	16.0	24.7	21.8	30.8	21.5
Calm	6.1	2.4	6.0	1.6	1.7	0.0	0.0	0.1	2.2

Table 2. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1956.

Direction	May	June	July	August	September	October	Season
N	14.7	12.2	4.8	2.2	6.5	12.2	8.8
NE	6.3	7.1	11.3	18.4	29.4	17.2	14.9
E	11.2	16.9	16.3	3.9	4.0	4.6	9.4
SE	4.8	4.3	6.6	18.1	14.9	8.7	9.6
S	19.8	16.8	14.8	16.8	12.4	11.2	15.3
SW	17.7	22.4	27.8	19.9	12.8	13.6	19.0
W	6.6	6.8	5.2	5.2	6.1	7.1	6.2
NW	18.8	11.7	7.4	14.3	13.8	23.4	14.9
Calm	0.1	1.8	5.8	1.2	0.1	2.0	1.9

Table 3. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1957.

Direction	March	April	May	June	July	Aug.	Sept.	Oct.	Season
N	26.9	15.6	10.0	19.7	8.7	11.3	13.1	12.2	14.7
NE	16.4	9.7	12.8	13.9	8.9	7.7	13.9	17.3	12.6
E	25.3	9.3	15.7	6.3	9.0	5.2	6.7	15.9	11.7
SE	8.2	4.0	3.2	12.2	12.6	16.1	13.0	13.6	10.4
S	2.8	9.6	10.6	13.9	9.5	8.1	11.8	8.8	9.3
SW	5.2	12.5	9.6	8.9	11.7	7.5	5.1	7.0	8.4
W	6.6	16.8	21.5	19.4	35.5	35.2	28.3	20.3	23.0
NW	8.3	22.2	13.5	4.7	3.8	8.6	6.8	4.4	9.0
Calm	0.3	0.3	3.1	1.0	0.3	0.3	1.3	0.5	0.9

Table 4. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1958.

Direction	April	May	June	July	Season
N	5.1	3.1	4.4	3.4	4.0
NE	12.2	16.7	13.5	17.5	15.0
E	9.5	6.7	6.4	6.9	7.4
SE	16.0	20.2	20.3	14.0	17.6
S	7.2	16.5	5.8	5.4	8.8
SW	18.9	17.3	27.5	24.9	22.1
W	5.0	3.4	1.8	1.5	2.9
NW	24.4	15.4	18.1	24.6	20.6
Calm	1.7	0.7	2.2	1.8	1.6

Table 5. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1959.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Season
N	5.6	6.0	1.6	1.6	2.8	4.1	4.0	3.7
NNE	5.7	5.6	3.9	1.6	6.4	4.3	3.1	4.4
NE	6.4	7.6	6.3	3.6	7.8	4.4	7.4	6.2
ENE	4.2	7.1	8.2	7.6	6.0	5.1	4.2	6.1
E	3.9	5.9	9.1	6.3	4.8	4.3	1.9	5.2
ESE	2.9	5.0	4.6	2.4	3.6	2.2	1.9	3.2
SE	3.5	2.4	2.9	1.8	3.2	2.5	3.0	2.8
SSE	6.4	2.4	7.1	4.9	9.9	4.9	12.9	6.9
S	6.7	7.0	8.2	15.6	10.5	11.4	8.5	9.7
SSW	7.6	10.1	10.4	18.2	10.3	17.2	4.4	11.2
SW	5.8	6.6	7.8	8.5	2.7	5.6	2.4	5.6
WSW	3.8	3.1	3.1	1.9	1.5	2.8	2.3	2.6
W	4.4	2.7	2.4	2.3	2.0	5.6	7.3	3.8
WNW	6.5	5.5	4.9	3.6	4.2	10.3	14.4	7.1
NW	6.5	8.2	6.7	5.3	9.0	9.2	8.7	7.7
NNW	9.3	4.2	4.3	5.0	5.8	1.7	6.5	5.2
Calm	10.8	10.6	8.5	9.8	9.3	4.4	7.1	8.6

Table 6. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1960.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Season
N	6.5	4.6	4.2	1.8	3.2	3.8	2.0	3.7
NNE	9.5	7.7	2.6	1.5	2.7	3.3	2.3	4.2
NE	4.3	4.2	4.3	3.5	5.8	5.0	4.7	4.5
ENE	2.4	7.9	3.5	7.0	9.3	10.1	5.4	6.5
E	1.8	7.5	4.0	5.0	4.8	6.2	4.8	4.9
ESE	1.1	6.2	5.3	1.9	0.4	2.8	4.3	3.1
SE	1.5	1.3	2.8	2.0	0.9	1.0	3.6	1.9
SSE	15.2	1.6	8.5	9.1	4.8	3.5	7.5	7.1
S	...	1.8	12.1	16.0	11.1	10.4	7.7	8.4
SSW	9.1	9.4	18.2	16.4	12.8	16.5	4.6	12.4
SW	2.8	6.0	6.5	6.6	5.5	2.5	0.5	4.4
WSW	5.0	1.6	3.4	5.4	3.2	2.1	3.1	3.4
W	4.3	2.4	2.2	3.2	2.3	2.1	3.8	2.9
WNW	8.9	6.3	2.2	2.7	5.2	9.3	23.1	8.3
NW	10.2	10.8	3.3	4.0	11.4	8.1	9.7	8.3
NNW	10.6	5.9	4.0	1.3	5.2	5.8	9.3	6.0
Calm	6.8	14.8	12.9	12.6	11.3	7.5	3.6	10.0

Table 7. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1961.

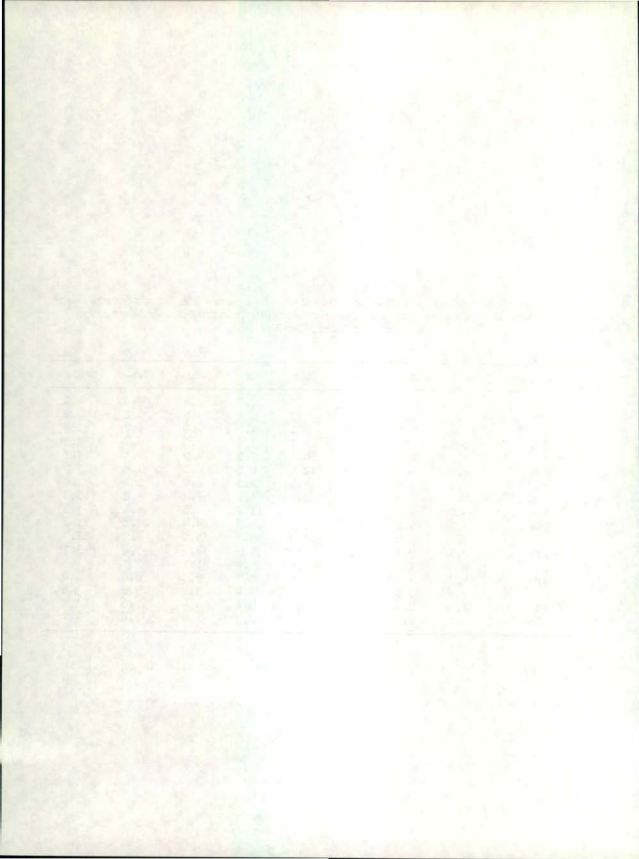
Direction	April	May	June	July	Aug.	Sept.	Oct.	Season
N	5.8	4.2	1.1	3.1	2.6	5.6	2.6	10.8
NNE	16.8	5.4	0.3	1.1	1.2	1.3	2.5	3.6
NE	11.2	5.8	3.3	3.4	3.2	6.8	11.3	4.1
ENE	15.3	3.9	1.4	0.3	1.3	0.7	5.1	6.4
E	5.7	2.0	7.9	9.0	9.8	10.8	7.3	4.0
ESE	5.8	10.4	0.6	2.2	3.2	0.6	5.9	7.5
SE	2.5	2.0	2.5	4.6	4.6	1.9	3.8	4.1
SSE	3.3	13.8	2.5	7.6	4.3	4.0	5.6	3.1
S	3.7	11.2	16.7	11.7	13.7	11.3	9.9	5.9
SSW	2.4	14.7	23.1	10.9	11.7	13.5	12.4	11.2
SW	2.5	3.8	6.9	9.7	8.3	10.1	3.6	12.6
WSW	2.4	1.0	0.8	0.6	2.3	0.3	2.3	6.4
W	2.4	1.9	4.7	3.2	6.5	2.1	3.4	1.4
WNW	3.2	3.6	2.5	4.9	5.6	6.5	9.4	3.4
NW	4.9	3.0	7.2	8.7	7.3	10.1	9.7	5.1
NNW	3.6	4.8	0.7	3.1	2.3	5.4	1.6	7.3
Calm	8.5	8.5	17.8	15.9	12.1	9.0	3.6	3.1

Table 8. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1962.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Season
N	3.0	2.4	1.5	1.7	0.8	0.4	...	1.4
NNE	4.9	5.9	6.0	3.8	3.9	3.8	7.9	6.2
NE	5.0	2.7	5.2	3.1	4.4	19.9	15.9	7.9
ENE	2.8	5.8	6.4	12.7	7.8	2.8	1.8	5.7
E	1.0	5.9	6.4	7.8	7.0	2.8	1.6	4.6
ESE	3.9	7.3	5.7	14.5	5.5	1.8	5.6	6.3
SE	1.7	2.3	4.6	3.2	5.7	8.2	10.1	5.0
SSE	1.2	0.4	0.1	6.5	5.1	6.8	2.8	3.2
S	2.4	0.3	0.1	5.0	8.6	4.9	3.9	3.6
SSW	...	0.8	1.0	12.0	25.9	8.6	9.0	8.2
SW	31.3	16.7	28.2	7.8	3.1	3.9	3.1	13.2
WSW	9.7	8.6	3.3	3.2	4.6	7.2	7.0	6.2
W	4.7	8.2	2.9	1.5	1.5	1.2	4.0	3.4
WNW	8.8	6.9	7.5	4.6	4.8	9.0	8.7	7.1
NW	7.6	7.8	8.1	4.0	1.9	6.2	9.6	6.4
NNW	4.4	6.2	4.0	2.8	3.2	5.4	4.6	4.3
Calm	7.6	11.8	9.0	5.8	6.2	7.1	4.4	1.3

Table 9. The monthly and seasonal relative occurrences (%) of wind from each direction at the Department of Transport Aeradio Station, St. Andrews, Newfoundland, 1963.

Direction	April	May	June	July	Aug.	Sept.	Oct.	Season
N	12.2	2.4	3.1	2.2	2.2	2.2	3.8	4.0
NNE	...	...	2.4	1.7	6.4	10.6	8.2	4.2
NE	29.6	5.1	13.3	5.1	4.0	6.4	5.8	9.8
ENE	8.5	7.9	8.1	4.7	5.8	9.3	6.7	7.3
E	4.2	7.7	6.7	10.6	7.5	4.9	9.4	7.3
ESE	4.0	4.2	3.4	12.8	6.8	2.1	1.6	5.0
SE	6.1	3.8	3.9	4.4	2.0	1.0	1.4	3.2
SSE	6.2	6.2	1.4	1.5	6.9	9.9	4.3	5.2
S	4.0	4.7	1.4	6.4	11.7	4.5	4.0	5.3
SSW	3.2	5.8	4.1	5.1	14.9	24.4	19.8	11.1
SW	3.1	20.6	21.9	23.8	6.7	5.0	4.9	12.3
WSW	3.5	2.2	4.1	2.0	4.3	3.9	5.8	3.7
W	2.8	7.2	4.9	5.4	5.4	1.7	3.5	4.4
WNW	4.9	7.5	5.6	1.6	4.7	5.3	6.6	5.2
NW	1.9	5.5	3.5	3.0	4.2	3.2	3.6	3.5
NNW	1.8	2.4	4.1	2.0	3.8	4.4	6.8	3.6
Calm	4.0	6.8	8.1	7.7	2.7	1.2	3.8	4.9



APPENDIX E

Morphometric data of fish sampling stations,
Little Codroy River, Newfoundland, 1956-63.

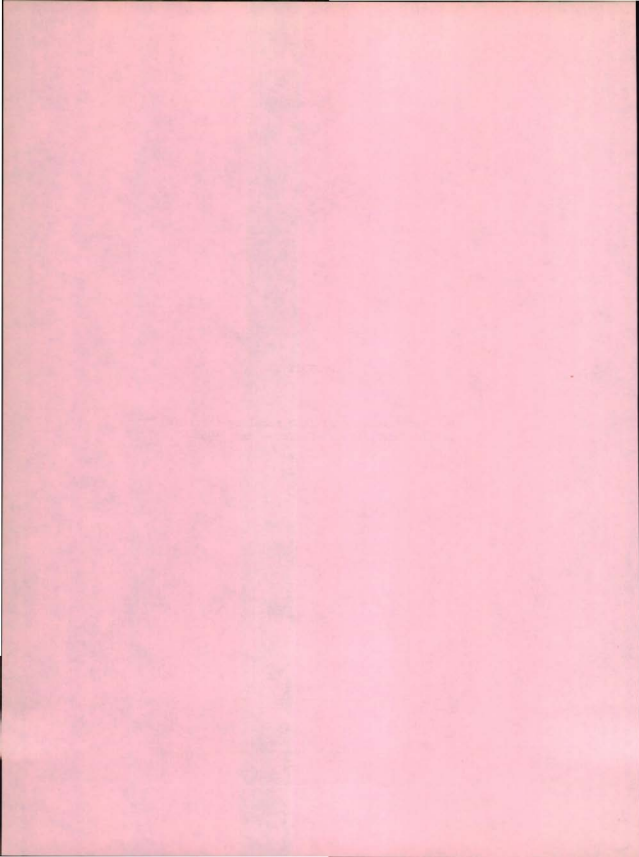


Table 1. Morphometric data of fish sampling stations, Little Codroy River, Newfoundland, 1956-63.

Station	Date	Length	Width		Area	Depth		Velocity		Discharge										
			upper	lower		mean	sq yards	ft	ft	ft/sec	ft/sec	upper	middle	lower	mean					
1	57 VI 21	75.0	97.2	104.0	106.0	102.4	896.7	0.9	0.6	0.7	0.7	1.9	2.1	2.0	146.6	110.4	129.6	128.9	cfs	
	57 VII 23	75.0	51.0	65.7	55.9	455.6	1.0	0.9	0.6	0.8	1.7	2.2	2.2	2.2	75.7	84.9	100.2	87.0	cfs	
	57 VIII 13	75.0	60.6	57.2	67.0	61.6	504.2	0.9	1.0	0.8	0.8	1.5	2.2	3.1	73.8	108.4	131.4	111.3	cfs	
	58 VI 11	75.0	73.3	62.7	65.9	67.3	551.2	1.1	1.2	0.7	0.9	1.8	2.8	3.0	2.5	116.2	171.0	111.3	132.9	cfs
	58 VII 7	75.0	62.0	59.4	72.6	64.7	527.9	1.0	1.1	0.8	0.9	2.0	2.3	3.0	2.4	115.8	127.8	155.7	133.1	cfs
	58 VIII 5	75.0	65.9	60.0	73.5	66.2	538.5	1.0	1.1	0.8	0.9	2.0	2.3	2.3	2.8	123.7	134.9	122.0	126.9	cfs
	59 VI 10	75.0	65.9	60.0	73.5	66.2	538.5	1.0	1.1	0.8	0.9	2.0	2.3	2.3	2.8	123.7	134.9	122.0	126.9	cfs
	60 VI 10	75.0	60.8	63.3	66.3	62.8	520.2	0.9	0.9	0.6	0.7	0.8	0.7	0.8	0.7	33.9	57.1	49.1	46.0	cfs
	61 VIII 1	75.0	60.8	63.3	66.3	62.8	520.2	0.9	0.9	0.6	0.7	0.8	0.7	0.8	0.7	33.9	57.1	49.1	46.0	cfs
	62 VIII 10	75.0	70.4	68.4	69.4	67.6	565.0	0.7	0.6	0.5	0.6	1.5	2.2	3.0	2.6	75.1	111.4	85.7	95.7	cfs
Means																				
2	56 VIII 7	100.0	39.8	39.0	47.0	41.9	457.8	0.4	0.3	0.7	0.5	1.0	...	...	14.7	...	...	14.7	cfs	
	57 VIII 24	75.0	32.7	33.2	35.5	33.8	280.4	0.5	0.5	0.6	0.5	2.5	2.0	2.3	2.2	36.1	30.8	37.5	34.8	cfs
	58 VIII 13	75.0	49.5	46.6	46.0	47.4	393.1	0.9	1.0	0.9	0.9	3.7	3.3	3.1	3.4	139.5	128.4	119.8	129.3	cfs
	59 IX 10	75.0	47.0	46.2	44.3	45.8	382.7	1.0	0.8	0.8	0.8	2.9	3.0	3.1	3.1	118.5	97.3	101.6	105.9	cfs
	60 VII 1	75.0	49.8	46.0	50.0	48.6	399.6	0.8	0.9	0.8	0.8	2.6	2.6	2.6	2.6	88.8	85.0	84.4	86.1	cfs
	61 VIII 16	75.0	37.3	33.3	33.0	34.5	285.2	0.6	0.8	0.8	0.8	1.2	1.5	1.9	1.5	23.7	16.5	22.6	21.0	cfs
	62 VIII 28	75.0	34.5	32.1	42.0	43.2	357.7	0.6	0.7	0.6	0.6	3.0	3.2	3.5	3.2	49.1	41.0	105.4	93.9	cfs
	63 VII 25	75.0	42.0	42.2	42.2	42.2	357.2	0.7	0.7	0.6	0.6	2.3	2.1	2.1	2.3	54.8	52.1	47.5	51.9	cfs
	63 VIII 26	75.0	42.0	42.2	42.2	42.2	357.2	0.7	0.7	0.6	0.6	2.3	2.1	2.1	2.3	54.8	52.1	47.5	51.9	cfs
	Means																			
3	56 VIII 14	75.0	70.5	...	78.0	74.3	618.7	1.1	...	1.0	1.0	1.3	...	1.2	1.2	32.2	...	31.1	31.7	cfs
	57 IX 16	75.0	63.5	67.4	74.0	68.3	567.3	1.0	0.9	1.0	0.9	2.6	2.5	2.2	2.4	142.7	128.5	131.7	137.7	cfs
	58 VIII 25	75.0	61.6	63.5	70.0	65.0	538.7	1.1	0.9	1.0	0.9	2.8	3.5	3.3	3.2	157.3	173.1	189.9	173.5	cfs
	60 VIII 15	75.0	54.6	58.0	63.6	58.7	487.9	1.1	1.0	0.8	0.9	1.5	1.6	1.4	1.5	75.3	73.2	58.5	69.0	cfs
	61 VIII 7	75.0	47.2	49.6	53.0	49.9	421.4	1.1	0.9	0.7	0.8	0.8	1.0	1.3	1.0	37.7	37.7	39.6	37.1	cfs
	62 X 7	75.0	52.6	54.2	56.1	54.3	452.3	1.5	1.2	1.0	1.2	1.6	1.9	2.1	1.9	107.0	102.8	103.0	104.3	cfs
Means																				
4	57 IX 18	50.0	80.5	68.3	60.0	69.6	384.9	0.9	1.0	1.1	0.9	1.3	1.6	1.8	1.5	89.8	94.2	104.1	96.1	cfs
	58 X 8	50.0	115.2	96.6	94.0	101.9	458.9	1.2	1.2	1.1	1.1	1.2	2.2	2.2	2.1	204.4	194.6	203.5	200.9	cfs
Means																				

Cont'd.

Cont'd.

Table 1 Cont'd.

Station	Date	Length		Width		Area		Depth		Velocity		Discharge							
		ft	ft	ft	ft	sq yards	ft	ft	ft/sec	ft/sec	cfs	cfs							
18	56 XI 9	75.0	38.6	27.7	34.8	33.7	268.3	0.4	0.6	0.5	1.6	1.0	1.2	23.3	12.8	16.4	17.6		
	57 IX 3	75.0	35.5	28.4	39.4	34.4	274.8	0.4	0.7	0.4	1.4	1.3	1.5	16.1	21.7	27.5	30.5		
	58 VIII 14	75.0	34.2	30.0	42.0	35.4	283.8	0.5	0.9	0.6	2.2	1.9	1.8	31.2	32.9	47.6	47.2		
	59 IX 7	75.0	14.0	20.5	20.1	18.2	156.5	0.6	0.6	0.5	2.3	2.5	2.1	2.3	15.9	26.8	18.4	20.4	
	60 VIII 31	75.0	27.2	24.1	34.2	28.5	228.3	0.4	0.6	0.3	1.6	0.9	0.9	11.7	3.8	7.9	7.8		
	61 VIII 31	75.0	45.2	26.2	30.5	34.0	266.9	0.5	0.6	0.5	1.4	0.9	1.7	1.3	24.6	11.5	20.2	18.9	
	62 IX 25	75.0	19.3	18.0	21.4	19.6	159.8	0.5	0.9	0.7	2.4	1.0	1.6	1.7	21.9	15.6	20.8	19.5	
	63 IX 17	75.0	39.8	16.7	17.0	21.5	169.2	0.3	0.5	0.6	1.3	2.6	1.3	1.7	10.5	19.7	18.3	16.3	
	63 IX 17	75.0	39.8	16.7	17.0	21.5	169.2	0.9	0.5	0.6	1.3	2.4	2.3	2.1	18.3	20.4	25.2	21.3	
	Mean						277.1		0.6	0.6	0.5	1.7	1.5	1.6	19.3	18.4	22.0	19.9	
19	56 VIII 15	75.0	44.3	51.0	47.7	397.1	1.1	0.7	0.9	1.0	1.6	1.3	1.6	1.3	46.2	55.8	47.3	46.8	
	57 IX 21	75.0	48.0	52.0	56.4	434.2	1.1	0.7	0.8	0.8	1.2	2.4	1.5	1.7	55.0	53.8	63.4	57.4	
	58 IX 20	75.0	58.0	64.2	70.3	64.2	521.7	1.1	1.1	1.1	2.5	2.2	1.4	2.0	140.7	139.6	112.4	130.9	
	60 VIII 2	75.0	54.0	62.2	72.0	62.7	521.7	0.8	0.7	1.0	0.8	0.2	0.2	0.2	6.9	8.0	9.7	8.3	
	61 VII 28	75.0	44.1	35.0	60.1	46.4	362.9	0.7	0.6	0.7	0.6	1.0	0.9	1.0	27.9	30.0	25.3	27.8	
	62 VIII 9	75.0	50.6	52.0	66.8	56.5	461.2	0.7	0.7	1.0	0.8	1.9	2.1	1.1	1.7	61.9	75.4	60.9	66.1
	63 VII 19	75.0	48.3	56.1	63.6	55.1	466.9	1.1	0.7	1.1	0.9	1.6	2.1	1.4	1.7	74.8	73.4	80.5	76.3
	Mean						434.1	0.9	0.6	0.9	1.3	1.5	1.1	1.4	59.0	63.4	57.1	59.1	
	56 VIII 16	246.0	11.8	16.0	17.0	14.9	415.5	0.7	0.6	0.8	0.7	1.8	0.8	0.7	1.1	4.8	2.4	2.9	3.4
	58 VIII 15	75.0	32.3	36.2	36.1	34.9	293.3	1.5	0.6	0.6	0.9	0.7	1.3	2.3	28.6	37.4	31.9	31.9	
20	59 IX 3	75.0	35.0	35.0	30.0	33.3	281.2	1.2	0.8	0.7	1.4	2.6	2.9	2.3	48.7	58.0	52.3	51.1	
	60 VII 30	75.0	28.2	33.2	29.1	30.2	257.7	0.9	0.6	0.4	0.6	...	...	...	...	...	...	...	...
	61 VIII 22	75.0	25.3	36.4	37.0	32.9	281.5	1.1	0.4	0.3	0.3	0.7	1.1	0.7	6.2	17.9	10.8	8.4	
	62 VII 30	75.0	26.0	31.3	31.8	30.9	295.0	0.9	0.5	0.6	0.8	1.1	1.4	1.2	18.8	18.9	17.8	18.5	
	63 VII 18	75.0	35.7	26.1	20.4	27.4	225.6	0.5	0.3	0.5	1.4	2.3	2.3	2.1	20.8	18.7	22.5	20.7	
	Mean						299.1	1.0	0.6	0.5	0.9	1.3	1.5	1.2	21.5	22.4	24.0	22.7	
	59 VII 27	75.0	25.0	27.0	30.6	27.5	228.3	0.5	0.6	0.5	2.0	1.5	1.4	1.6	19.3	20.0	17.5	19.0	
	60 VIII 23	100.0	17.0	27.0	23.8	22.6	263.3	0.6	0.5	0.5	2.1	1.7	3.7	2.5	17.6	26.0	29.4	22.6	
	61 VIII 23	75.0	14.2	21.8	19.6	18.5	161.2	0.5	0.7	0.7	0.6	1.2	0.8	0.6	0.9	7.8	12.1	6.8	9.0
	62 VIII 30	75.0	13.4	18.0	18.2	16.5	140.8	0.6	0.8	0.9	0.7	1.5	0.9	0.7	1.0	10.3	10.2	9.4	10.0
21	63 IX 12	75.0	21.5	20.0	23.3	21.6	176.7	1.2	0.9	0.9	1.1	1.2	1.6	1.3	26.5	17.9	29.1	24.6	
	Mean						194.1	0.7	0.7	0.7	1.6	1.2	1.6	1.5	16.3	16.2	18.4	17.0	
	59 VII 24	80.0	20.0	26.5	20.0	22.2	206.7	0.5	0.6	0.6	2.3	0.9	1.3	1.5	19.5	14.0	12.2	15.3	
	60 VIII 24	75.0	25.0	28.0	25.0	24.7	204.2	0.6	0.7	0.6	1.3	2.2	1.9	1.8	12.8	28.1	20.7	20.7	
	61 VIII 9	75.0	23.4	24.6	18.0	22.0	188.8	0.6	0.6	0.6	0.5	1.1	1.0	0.9	1.0	15.1	13.4	8.0	12.2
	62 VIII 30	75.0	28.6	27.8	28.6	20.2	234.2	0.5	0.6	0.7	0.5	1.5	1.7	1.3	1.5	17.6	24.9	21.3	21.3
	63 VIII 8	75.0	23.8	24.0	32.1	26.9	216.5	0.5	0.6	0.6	0.7	0.9	0.9	0.8	7.1	9.4	15.0	16.1	
	Mean						210.0	0.5	0.6	0.6	1.4	1.3	1.3	1.4	14.4	16.6	17.0	16.1	
	59 VII 24	80.0	20.0	26.5	20.0	22.2	206.7	0.5	0.6	0.6	2.3	0.9	1.3	1.5	19.5	14.0	12.2	15.3	
	60 VIII 24	75.0	25.0	28.0	25.0	24.7	204.2	0.6	0.7	0.6	1.3	2.2	1.9	1.8	12.8	28.1	20.7	20.7	
22	61 VIII 9	75.0	23.4	24.6	18.0	22.0	188.8	0.6	0.6	0.6	0.5	1.1	1.0	0.9	1.0	15.1	13.4	8.0	12.2
	62 VIII 30	75.0	28.6	27.8	28.6	20.2	234.2	0.5	0.6	0.7	0.5	1.5	1.7	1.3	1.5	17.6	24.9	21.3	21.3
	63 VIII 8	75.0	23.8	24.0	32.1	26.9	216.5	0.5	0.6	0.6	0.7	0.9	0.9	0.8	7.1	9.4	15.0	16.1	
	Mean						210.0	0.5	0.6	0.6	1.4	1.3	1.3	1.4	14.4	16.6	17.0	16.1	

23	59 VII 16	75.0 11.2	15.6 18.9	15.2	127.7	0.4	0.5	0.5	0.4	2.2	2.0	1.3	1.8	7.4	13.3	10.4	10.4
	60 IX 12	60.0 17.0	12.4	171.3	0.3	0.5	0.5	0.3	0.3	2.6	2.5	2.7	2.0	11.0	21.7	10.0	10.3
	61 VIII 1	75.0 14.4	15.7 16.6	134.0	0.4	0.4	0.3	0.3	1.3	1.3	1.2	2.7	1.3	7.4	11.0	12.2	8.6
	62 VIII 29	75.0 19.2	14.3 15.0	120.4	0.6	0.6	0.5	0.5	1.0	1.1	1.1	1.9	1.1	6.4	7.3	12.2	8.6
	63 VIII 27	75.0 17.2	22.8 15.6	163.3	0.5	0.6	0.5	0.5	3.2	1.7	1.7	1.5	2.8	27.9	24.6	15.1	22.6
	Means			15.4	124.6	0.5	0.5	0.4	2.1	1.7	1.6	1.6	1.6	12.0	12.3	10.2	11.5
24	59 VIII 21	75.0 25.8	23.0 24.5	200.6	0.6	0.9	0.6	0.6	2.4	1.4	1.4	1.2	1.6	31.0	25.1	15.5	23.9
	60 IX 27	75.0 18.1	27.0 18.2	211	168.1	0.7	0.8	0.5	0.6	1.6	1.0	2.1	1.5	16.5	19.5	13.8	16.6
	61 IX 14	75.0 17.4	18.0 13.2	168.2	138.8	0.6	0.5	0.7	0.5	1.0	1.5	1.3	1.3	8.7	9.7	10.2	9.6
	62 IX 26	75.0 11.0	30.2 30.6	33.9	275.0	0.8	0.8	1.0	0.8	2.0	2.7	1.7	2.1	98.0	54.2	42.7	51.6
	63 VIII 22	75.0 40.1	31.6 24.4	32.0	266.0	0.7	0.8	0.7	0.7	1.4	1.8	1.9	1.7	32.8	35.4	27.0	31.8
	Means			25.5	213.7	0.7	0.8	0.7	0.6	1.7	1.7	1.6	1.6	29.4	28.8	21.8	26.7
25	59 VII 17	75.0 34.0	22.6 17.0	24.5	200.4	0.3	0.4	0.6	0.4	1.6	2.5	2.8	2.3	13.6	16.9	26.5	18.7
	60 IX 26	75.0 28.1	22.0 19.1	23.1	190.2	0.4	0.3	0.6	0.4	1.5	2.4	2.8	2.3	11.9	15.4	20.7	18.4
	61 IX 13	75.0 22.3	14.6 18.0	18.3	115.8	0.5	0.7	0.7	0.6	1.1	1.1	1.3	1.2	11.1	8.5	12.1	10.6
	62 X 4	75.0 24.5	24.8 24.2	24.5	204.8	1.0	1.0	1.1	1.0	2.9	1.7	2.3	2.3	58.0	33.0	52.1	44.0
	63 VIII 23	66.0 26.6	24.4 23.2	24.7	180.8	0.8	1.2	1.0	0.9	1.1	1.9	1.5	1.5	19.9	42.8	27.9	30.2
	Means			23.0	178.4	0.6	0.7	0.8	0.7	1.6	1.9	2.1	1.9	23.4	23.4	29.3	25.4
26	59 VII 23	75.0 29.0	39.6 25.0	31.2	277.5	0.8	0.5	0.6	0.6	1.3	1.1	1.8	1.4	26.1	20.2	24.5	23.6
	60 VIII 5	75.0 39.0	24.0 36.6	33.2	257.5	0.5	0.7	0.9	0.6	0.7	1.3	0.7	0.9	10.5	18.0	19.3	16.0
	61 VIII 18	75.0 37.6	36.0 36.4	36.7	304.2	0.6	0.5	0.8	0.6	1.0	0.9	0.9	0.9	18.3	17.3	19.9	18.6
	62 VIII 3	75.0 37.1	25.6 36.0	32.9	259.0	0.7	0.9	1.0	0.8	1.3	1.6	1.1	1.3	28.4	31.7	30.1	30.1
	63 VII 22	75.0 39.8	30.6 33.0	34.5	279.2	0.7	0.8	0.8	0.7	1.3	1.3	1.4	1.3	31.0	27.4	30.8	29.8
	Means			33.7	275.5	0.7	0.7	0.8	0.7	1.1	1.2	1.2	1.2	22.9	22.9	24.9	23.6
27	59 VII 30	75.0 62.6	63.5 57.0	61.0	513.7	0.9	0.7	0.6	0.6	1.6	1.4	1.8	1.6	70.8	48.8	50.2	56.6
	60 VIII 12	75.0 65.8	68.0 66.6	66.6	533.7	0.8	0.8	0.8	0.8	1.6	2.2	2.2	2.0	76.3	96.3	100.9	91.3
	61 VII 24	75.0 55.0	60.0 49.0	54.7	466.7	0.6	0.5	1.0	0.6	1.3	0.7	1.1	1.0	32.7	21.3	44.2	32.8
	62 VIII 1	75.0 66.1	65.7 66.0	65.9	549.0	0.8	0.8	0.7	0.7	1.6	1.4	1.8	1.8	68.7	56.7	67.9	64.5
	63 VIII 7	75.0 58.8	54.4 57.2	61.0	468.3	0.6	0.5	0.8	0.6	0.7	1.1	0.9	0.9	21.6	23.2	31.3	25.4
	Means			61.0	510.3	0.7	0.7	0.8	0.7	1.4	1.4	1.6	1.6	54.0	49.3	56.9	54.1
28	60 IX 15	100.0 6.0	10.6 9.0	8.5	100.6	0.5	0.4	0.5	0.4	2.0	1.2	2.1	1.7	5.1	3.7	7.0	5.3
	61 IX 25	75.0 10.5	8.4 11.1	10.0	80.0	0.3	0.3	0.2	0.2	0.2	0.6	0.2	0.4	0.4	1.1	0.3	0.7
	62 IX 11	75.0 6.0	4.6 4.2	6.3	57.1	0.1	0.3	0.2	0.1	0.2	0.3	0.5	0.3	0.1	0.6	0.2	0.4
	63 IX 16	75.0 13.3	12.2 7.2	8.9	93.5	0.3	0.3	0.7	0.4	1.4	0.5	1.2	1.0	4.9	1.4	5.0	3.8
	Means			8.9	82.8	0.3	0.3	0.4	0.3	0.9	0.6	1.0	0.8	2.6	1.7	3.1	2.6
29	60 VIII 29	75.0 17.0	22.0 26.5	21.8	182.3	0.3	0.5	0.5	0.4	3.1	1.3	1.2	1.8	5.7	9.0	10.7	8.5
30	60 VIII 29	75.0 14.0	15.6 21.0	16.9	137.9	0.3	0.4	0.4	0.3	1.2	0.8	1.0	1.0	3.8	3.4	7.2	4.9
31	60 VIII 29	75.0 12.3	14.0 15.8	14.0	116.9	0.7	0.5	0.4	0.5	1.0	1.5	1.7	1.4	7.9	10.0	8.9	9.0
32	60 VIII 29	75.0 15.6	17.0 25.6	19.4	156.7	0.5	0.4	0.4	0.4	1.1	0.8	1.4	1.1	7.7	5.0	13.5	8.8
	61 VIII 8	75.0 50.0	44.6 34.2	36.1	361.2	0.6	0.6	0.9	0.6	0.7	0.9	0.7	0.7	20.2	22.1	18.6	20.4
	Means			31.2	258.9	0.6	0.5	0.6	0.5	0.9	0.8	1.1	0.9	14.0	13.6	16.2	14.6

Cont'd.

Table 1 Cont'd.

Station	Date	Length		Width		Area		Depth		Velocity		Discharge						
		ft	ft	ft	ft	sq yards	ft	ft	ft/sec	ft/sec	cfs	cfs						
33	60 VIII 30	75.0	54.0	44.0	39.5	45.8	378.1	1.3	1.2	1.8	1.4	0.7	1.5	1.1	46.6	68.1	66.3	60.4
	62 VIII 7	75.0	46.7	47.0	49.8	47.8	396.9	1.1	0.8	0.7	0.8	1.5	1.6	1.8	1.6	63.4	49.4	55.4
	63 VIII 6	75.0	41.0	43.6	40.9	44.8	342.3	1.0	0.7	0.6	0.7	0.6	1.0	1.2	0.9	23.5	25.8	24.8
	Means						372.4	1.1	0.9	1.0	1.0	0.9	1.4	1.4	1.2	44.5	47.8	47.1
	60 IX 16	100.0	10.0	12.2	14.0	12.1	134.4	0.5	0.4	0.3	0.3	1.5	2.4	2.1	2.0	6.1	8.4	8.5
34	61 IX 12	75.0	8.2	9.0	12.6	9.9	80.8	0.4	0.3	0.4	0.3	1.2	1.3	1.0	1.2	3.2	2.4	3.3
	62 VIII 26	75.0	13.4	14.0	11.6	13.0	110.4	0.5	0.6	0.4	0.4	1.7	1.8	1.7	1.7	8.6	11.3	8.8
	63 VIII 26	75.0	17.1	11.8	24.4	13.7	160.6	0.6	0.7	0.7	0.6	2.5	2.3	1.2	2.1	23.6	24.7	24.0
	Means						121.6	0.5	0.5	0.4	0.4	1.7	1.9	1.6	1.8	30.4	11.7	11.0
	60 IX 19	100.0	9.0	12.6	10.0	10.5	122.8	0.4	0.6	0.4	0.4	2.4	1.4	2.4	2.0	7.5	8.3	8.1
35	61 IX 11	75.0	21.6	12.0	10.6	14.7	117.1	0.3	0.4	0.3	0.3	1.6	0.7	1.4	1.2	7.6	3.4	3.6
	62 VII 31	75.0	13.6	11.1	10.0	11.6	95.4	0.4	0.4	0.6	0.4	1.6	1.9	1.7	1.7	7.3	5.7	7.0
	63 VII 23	75.0	8.6	13.0	15.9	12.5	105.2	0.5	0.5	0.4	0.4	1.1	0.7	0.9	0.9	3.5	4.4	4.1
	63 VII 24	75.0	15.1	13.3	12.6	13.7	113.1	0.7	0.5	0.5	0.5	0.8	1.1	1.3	1.1	6.7	6.4	6.8
	Means						110.7	0.5	0.5	0.4	0.4	1.5	1.2	1.5	1.4	6.5	5.6	6.1
36	60 VIII 26	75.0	8.8	8.0	9.0	8.6	70.4	0.2	0.2	0.3	0.2	0.7	0.9	0.7	0.7	0.8	0.5	0.7
	61 IX 25	75.0	5.0	8.2	5.3	6.2	55.6	0.4	0.2	0.4	0.3	0.4	0.7	0.2	0.4	0.6	0.9	0.7
	62 IX 11	75.0	8.2	9.5	7.6	8.4	72.5	0.3	0.2	0.2	0.2	0.5	0.5	0.5	1.1	0.8	0.6	
	63 IX 18	75.0	7.2	10.0	8.8	9.7	75.0	0.3	0.3	0.3	0.2	0.6	1.1	1.1	1.0	1.3	2.6	2.3
	Means						71.9	0.3	0.2	0.3	0.2	0.6	0.8	0.6	1.0	1.3	1.3	1.1
37	60 VIII 26	75.0	6.0	6.8	7.6	6.8	56.7	0.4	0.2	0.3	0.2	0.6	1.2	1.1	0.9	0.8	0.6	1.6
	61 IX 25	75.0	8.2	5.5	3.4	5.7	47.1	0.3	0.2	0.3	0.2	0.3	1.6	0.5	0.8	0.6	1.6	0.4
	62 IX 11	75.0	9.1	5.3	5.0	6.5	51.5	0.2	0.4	0.3	0.3	0.7	0.5	0.8	0.7	1.3	0.8	1.0
	63 IX 16	75.0	13.0	8.3	14.1	11.8	91.0	0.4	0.3	0.7	0.4	0.1	1.2	1.9	1.1	0.5	2.7	16.6
	Means						61.6	0.3	0.3	0.4	0.3	0.4	1.1	1.1	0.9	0.8	1.4	4.9
38	60 VIII 25	288.0	71.2	58.0	67.0	65.4	2033.6	0.9	1.6	1.4	1.2	2.8	0.6	0.9	1.4	97.2	52.1	63.4
	61 IX 15	292.0	67.2	58.4	64.8	63.5	2018.0	0.5	1.4	1.3	1.0	2.2	0.3	0.3	0.9	56.7	20.4	22.9
	Means						64.4	0.7	1.5	1.4	1.1	2.5	0.4	0.6	1.2	77.0	36.2	31.8
	60 VIII 30	75.0	24.0	17.1	18.7	19.9	160.2	0.2	0.3	0.4	0.2	1.7	1.2	0.6	1.1	6.0	4.0	4.1
	47	63 X 10	500.0	4.0	4.2	6.3	4.8	259.7	0.2	0.3	0.4	0.2	1.1	1.4	1.7	1.4	0.8	1.6
48	61 IX 22	75.0	41.6	48.0	47.4	45.7	385.4	1.1	0.8	1.0	0.9	1.4	2.1	1.3	1.6	96.1	60.6	45.5
	63 VIII 5	75.0	49.4	47.0	50.2	48.9	403.3	0.8	0.5	0.9	0.7	1.5	1.2	1.1	1.3	50.9	26.2	43.9
	Means						394.4	0.9	0.6	0.9	0.8	1.4	1.6	1.2	1.4	53.5	43.4	44.7
	47	63 X 10	500.0	4.0	4.2	6.3	4.8	259.7	0.2	0.3	0.4	0.2	1.1	1.4	1.7	1.4	0.8	1.6
	48	61 IX 22	75.0	41.6	48.0	47.4	45.7	385.4	1.1	0.8	1.0	0.9	1.4	2.1	1.3	1.6	96.1	60.6

APPENDIX F

The mean daily and mean monthly water depths (ft)
near station 12, Little Codroy River, Newfoundland,
1956.

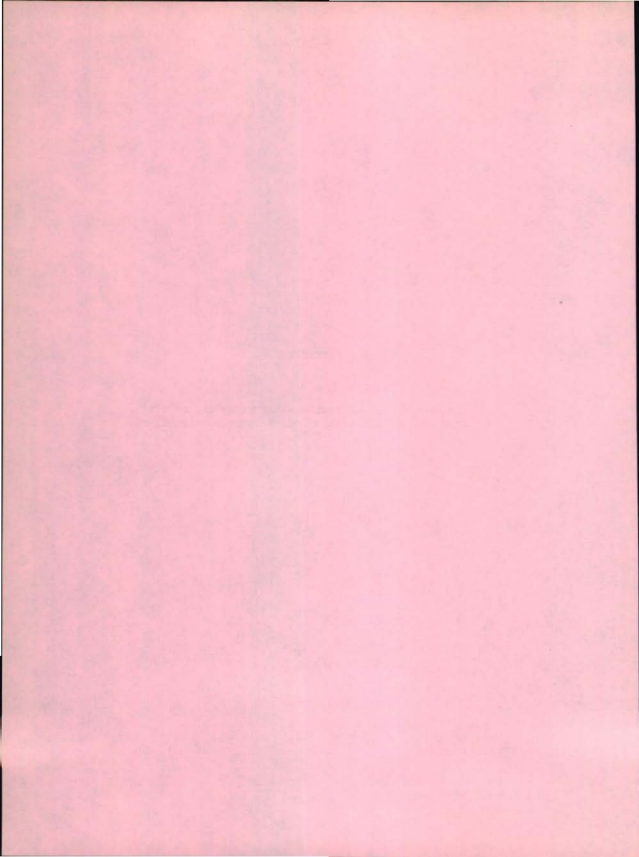
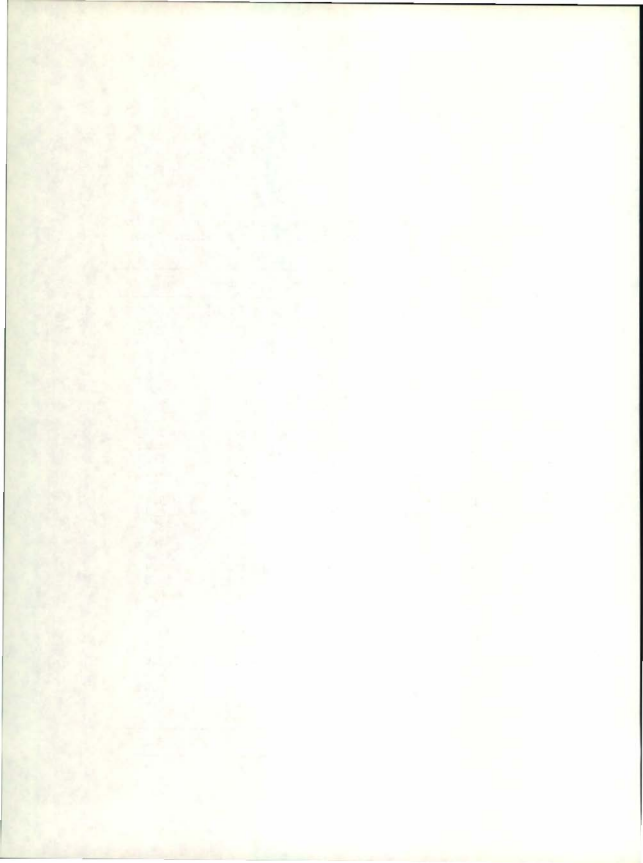


Table 1. The mean daily and mean monthly water depths (ft)
near station 12, Little Codroy River, Newfoundland, 1956.

Day	August	September	October	November
1	...	2.4	2.5	2.7
2	...	2.5	2.8	2.6
3	2.6	2.7	3.0	2.5
4	2.6	2.7	3.3	2.6
5	2.8	2.7	3.5	2.6
6	2.8	2.7	3.4	2.6
7	2.8	2.8	3.0	2.5
8	2.8	2.8	4.8	2.5
9	2.8	2.5	4.0	2.7
10	2.8	2.4	3.2	3.0
11	2.8	2.6	2.8	2.9
12	2.9	2.5	2.5	2.7
13	2.7	2.4	2.4	4.5
14	2.5	2.6	2.3	4.5
15	2.6	3.7	2.3	3.4
16	2.6	3.2	2.4	2.8
17	2.5	2.8	2.5	3.1
18	2.6	2.7	2.7	3.0
19	2.8	3.8	2.8	2.9
20	3.2	3.1	2.6	2.9
21	2.9	3.0	2.8	2.8
22	2.7	3.1	2.6	4.2
23	2.5	3.3	2.5	4.1
24	2.4	2.9	3.2	3.7
25	2.7	2.7	3.0	3.1
26	2.9	2.6	2.5	3.6
27	3.1	2.4	2.4	3.0
28	3.1	2.3	2.4	4.5
29	3.2	2.3	2.4	3.6
30	2.9	2.4	2.4	3.8
31	2.6		2.6	
Means	2.8	2.8	2.8	3.1



APPENDIX G

The mean daily and mean monthly water depths (ft)
near station 6, Little Codroy River, Newfoundland,
1959-63.

INDEX		
TABLE	YEAR	PAGE
1	1959	113
2	1960	114
3	1961	115
4	1962	116
5	1963	117

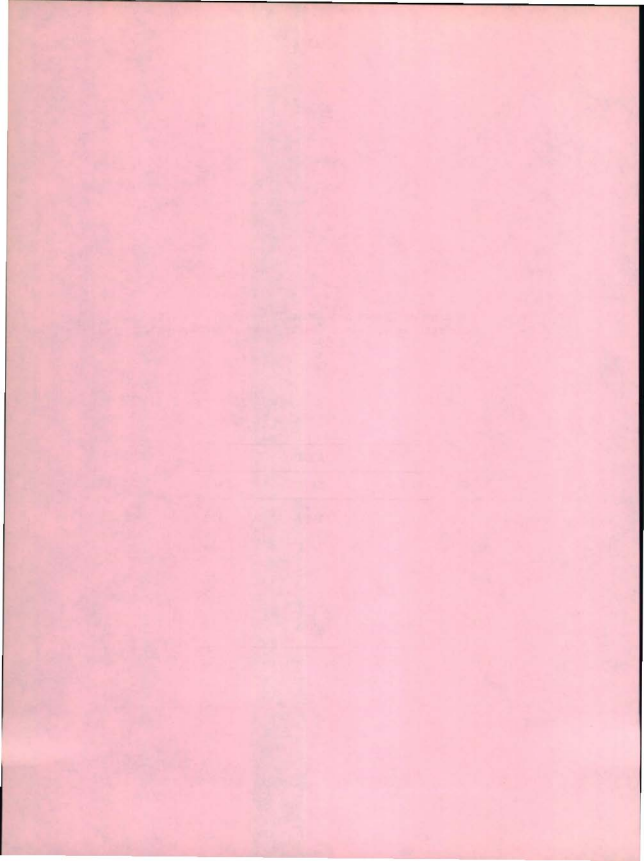


Table 1. The mean daily and mean monthly water depths (ft)
near station 6, Little Codroy River, Newfoundland, 1959.

Day	July	August	September	October	November
1	1.5	1.2	2.0	1.4	2.6
2	1.4	1.9	2.9	1.4	3.4
3	1.6	1.6	2.3	1.4	2.6
4	1.5	1.5	2.0	1.4	2.3
5	1.5	1.4	2.1	1.4	2.2
6	1.4	1.5	2.0	1.4	2.6
7	1.5	1.7	1.8	1.4	2.5
8	2.3	1.6	1.5	1.4	2.4
9	1.9	1.6	1.4	1.3	2.3
10	1.8	1.6	1.4	1.3	2.2
11	1.6	1.5	1.4	1.4	2.0
12	1.7	1.6	1.4	1.6	1.9
13	1.6	1.6	1.4	2.3	1.8
14	1.6	1.5	1.4	2.0	1.8
15	1.5	1.4	1.6	1.8	1.8
16	1.4	1.4	1.6	1.7	2.0
17	1.4	1.3	1.5	1.6	2.0
18	1.3	1.7	1.5	3.1	2.2
19	1.3	1.8	1.5	3.2	2.2
20	1.4	1.6	1.5	2.6	2.0
21	1.4	1.5	1.4	2.3	1.8
22	1.3	1.4	2.0	2.0	1.8
23	1.2	1.5	2.1	1.8	1.7
24	1.2	1.3	2.0	1.8	1.6
25	1.2	1.3	2.0	2.0	4.8
26	1.3	1.6	1.9	1.8	4.3
27	1.2	1.7	1.8	2.3	3.2
28	1.2	1.8	1.6	2.5	3.0
29	1.2	2.1	1.6	2.7	5.0
30	1.2	2.0	1.5	2.2	3.9
31	1.2	1.8		2.0	
Means	1.4	1.6	1.7	1.9	2.5

Table 2. The mean daily and mean monthly water depths (ft)
near station 6, Little Codroy River, Newfoundland, 1960.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	...	2.5	...	1.6	1.6	1.2	1.3	1.8	3.4
2	...	2.6	...	1.5	1.5	1.2	1.4	1.8	2.6
3	...	2.7	...	1.5	1.4	1.2	1.4	4.0	2.2
4	...	2.7	1.5	1.4	1.4	1.2	2.4	2.8	2.0
5	...	2.8	1.5	1.4	1.3	1.2	1.9	2.5	1.8
6	...	3.2	2.1	1.4	1.3	1.2	1.7	2.3	1.7
7	...	3.9	2.1	1.4	1.3	1.2	2.6	2.1	1.7
8	...	3.8	1.9	1.3	1.3	1.2	2.5	1.9	1.7
9	...	3.9	1.7	1.3	1.5	1.2	2.4	1.8	1.6
10	...	3.9	1.6	2.0	1.6	1.2	2.5	1.8	2.7
11	1.8	3.6	1.5	1.7	1.4	1.2	2.3	3.2	...
12	1.8	3.2	1.5	1.5	1.4	1.2	2.6	2.5	...
13	1.7	3.0	1.6	1.5	1.3	1.5	2.5	2.2	...
14	1.7	2.9	1.5	1.5	1.3	2.3	2.3	2.0	...
15	1.6	3.7	1.5	1.6	1.3	2.4	2.1	1.9	...
16	1.5	3.4	1.5	1.5	1.3	2.0	2.0	2.1	...
17	1.5	2.9	1.7	1.5	1.2	1.8	1.9	2.9	...
18	1.7	2.7	1.7	1.4	1.2	1.7	2.5	2.6	...
19	3.0	2.6	1.6	1.4	1.2	1.8	2.5	2.2	...
20	2.6	2.4	1.5	1.6	1.1	...	2.3	2.0	...
21	2.2	2.2	1.5	1.7	1.1	...	5.3	1.9	...
22	2.0	2.2	1.5	1.9	1.1	...	3.6	1.8	...
23	1.9	2.1	1.5	1.8	1.1	...	2.8	1.7	...
24	1.8	2.0	1.4	1.9	1.2	1.5	2.4	1.7	...
25	1.7	1.9	2.0	1.9	1.2	1.5	2.4	1.6	...
26	1.7	1.9	2.8	1.8	1.3	1.5	3.3	1.5	...
27	1.6	1.8	2.2	1.6	1.3	1.4	3.0	1.5	...
28	1.6	1.8	2.0	1.5	1.3	1.4	2.6	1.4	...
29	1.8	1.7	1.8	1.5	1.2	1.4	2.3	1.4	...
30	2.2	1.7	1.7	1.4	1.2	1.3	2.1	1.9	...
31	...	...	...	1.4	1.2	...	1.9	...	...
Means	1.9	2.7	1.7	1.6	1.3	1.4	2.4	2.1	2.1

Table 3. The mean daily and mean monthly water depths (ft)
near station 6, Little Codroy River, Newfoundland, 1961.

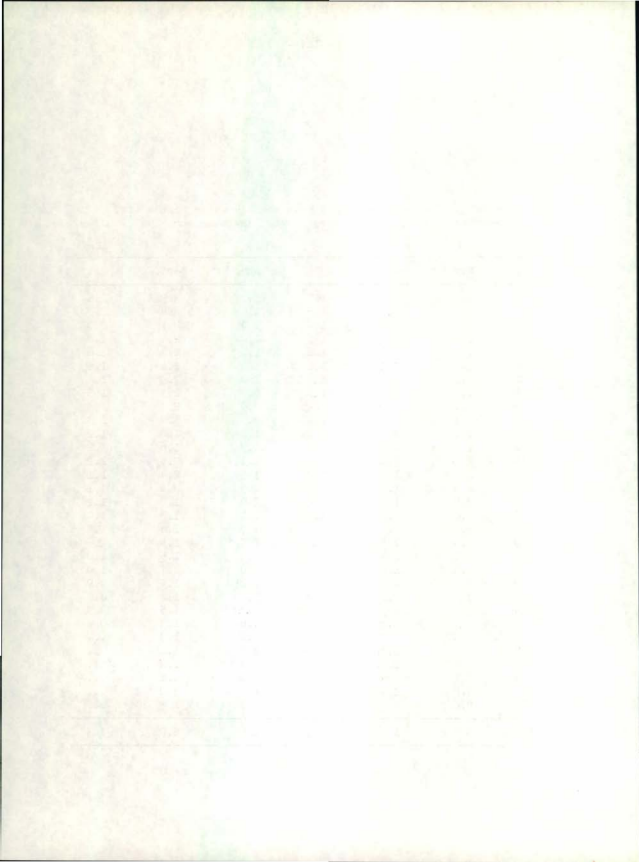
Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	...	1.7	3.6	1.2	0.6	0.7	0.8	1.6	1.4
2	...	1.8	2.9	1.2	0.6	0.6	0.8	1.7	1.3
3	...	2.0	2.9	1.1	0.6	0.6	0.7	1.5	1.3
4	...	2.0	2.6	1.1	0.6	0.6	1.7	1.3	1.2
5	...	1.9	2.3	1.1	0.6	0.6	3.4	1.2	1.1
6	...	1.7	2.2	1.0	0.6	0.6	2.4	1.6	1.3
7	...	1.7	2.4	1.0	0.6	0.6	1.9	1.5	1.3
8	...	1.6	2.2	1.0	0.6	0.6	1.6	1.5	1.2
9	...	1.7	2.1	...	0.6	0.5	1.4	1.6	1.1
10	...	2.7	2.0	...	0.5	0.5	1.2	2.1	...
11	...	3.4	2.3	...	0.5	0.5	1.1	1.8	...
12	...	3.0	2.1	...	0.5	0.5	1.0	1.6	...
13	...	3.2	1.9	...	0.5	0.5	1.0	1.4	...
14	...	3.6	1.9	...	0.5	0.5	0.9	1.3	...
15	...	3.5	1.7	0.8	0.5	0.5	3.6	2.5	...
16	...	3.2	1.6	0.8	0.5	1.0	4.3	1.8	...
17	...	3.3	1.5	0.8	0.6	1.0	3.0	1.5	...
18	...	3.1	1.5	0.7	0.7	0.8	2.3	1.7	...
19	...	2.8	1.4	0.7	0.5	0.8	1.9	1.7	...
20	...	2.6	1.4	0.7	0.5	0.7	1.6	1.5	...
21	...	3.1	1.3	0.7	0.5	0.7	1.4	1.4	...
22	...	2.9	1.2	0.7	0.5	0.7	1.2	1.3	...
23	...	3.7	1.5	0.7	0.5	0.6	1.1	1.4	...
24	...	3.4	2.0	0.7	0.5	0.6	1.0	1.4	...
25	...	3.0	1.8	0.6	0.5	0.6	1.0	1.3	...
26	...	3.1	1.6	0.6	0.5	0.6	1.0	1.3	...
27	1.3	3.4	1.6	0.6	0.5	0.8	1.0	1.2	...
28	1.3	4.5	1.5	0.6	0.7	0.8	1.8	1.2	...
29	1.4	4.2	1.4	0.6	1.0	0.8	1.9	1.3	...
30	1.6	3.3	1.3	0.6	0.8	0.8	1.7	1.2	...
31		5.4		0.6	0.7		1.6		...
Means	1.4	2.9	1.9	0.8	0.6	0.7	1.7	1.5	1.3

Table 4. The mean daily and mean monthly water depths (ft)
near station 6, Little Codroy River, Newfoundland, 1962.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	...	1.7	2.6	1.4	1.5	1.2	1.6	3.0	1.6
2	...	1.7	2.4	1.7	1.4	1.2	1.8	4.8	1.5
3	...	1.9	2.2	1.6	1.3	1.2	1.7	3.3	1.5
4	...	2.5	2.2	1.9	1.3	1.2	1.6	2.8	1.4
5	...	2.8	2.2	1.8	1.3	1.2	1.5	2.9	1.4
6	...	2.6	2.9	1.7	1.3	1.1	1.4	2.7	...
7	...	2.5	3.4	3.3	1.2	1.1	1.4	2.6	...
8	...	2.5	3.1	2.4	1.2	1.1	1.6	2.4	...
9	...	2.3	2.7	2.2	1.2	1.1	2.0	2.2	...
10	...	2.1	2.6	2.0	1.2	1.1	1.8	2.0	...
11	...	2.0	3.0	1.9	1.4	1.0	1.7	3.1	...
12	...	2.1	3.5	2.1	1.6	1.1	2.0	4.3	...
13	...	2.3	2.8	1.9	1.5	1.0	2.2	3.2	...
14	...	2.5	2.5	1.8	1.6	1.0	2.1	2.7	...
15	...	2.6	2.2	1.7	2.0	1.0	1.9	2.3	...
16	...	2.7	2.1	1.6	2.0	1.1	1.7	2.1	...
17	...	3.0	2.0	1.5	1.7	1.1	1.6	2.1	...
18	...	3.3	2.0	1.5	1.5	1.8	1.6	2.0	...
19	...	3.4	1.8	1.4	1.6	2.6	1.4	1.8	...
20	...	3.5	1.7	1.3	1.6	2.0	1.4	1.7	...
21	...	3.1	1.6	1.3	2.3	1.8	1.4	1.7	...
22	...	2.7	1.5	1.4	1.9	1.8	1.5	2.5	...
23	...	2.6	1.5	...	1.7	1.8	1.5	4.5	...
24	1.9	2.4	1.5	...	1.6	1.7	1.4	3.2	...
25	1.8	3.4	1.5	...	1.5	1.9	1.4	2.6	...
26	1.6	4.0	1.8	...	1.4	1.9	1.4	2.3	...
27	1.6	3.7	1.7	1.7	1.4	1.7	1.5	2.1	...
28	1.5	3.3	1.5	1.6	1.3	1.6	1.7	1.9	...
29	1.6	3.0	1.5	1.4	1.3	1.5	1.9	1.8	...
30	1.7	3.2	1.4	1.4	1.3	1.5	2.6	1.6	...
31		2.8		1.3	1.2		2.2		...
Means	1.6	2.7	2.2	1.8	1.5	1.4	1.7	2.6	1.5

Table 5. The mean daily and mean monthly water depths (ft)
near station 6, Little Codroy River, Newfoundland, 1963.

Day	May	June	July	Aug.	Sept.	Oct.
1	...	2.4	1.7	1.1	3.3	2.6
2	...	2.3	1.5	1.0	2.4	2.3
3	...	2.2	1.4	1.0	2.1	2.0
4	...	2.5	1.5	1.0	2.0	1.8
5	...	2.4	1.8	1.0	2.3	1.6
6	...	2.1	1.6	1.0	1.9	1.5
7	...	2.0	1.6	1.0	2.3	1.4
8	...	1.9	1.5	0.9	2.5	1.5
9	...	2.2	1.4	0.9	2.1	1.4
10	...	2.0	1.4	0.9	1.9	1.3
11	...	2.0	1.6	1.0	1.8	1.2
12	...	1.9	1.4	0.9	1.6	1.2
13	1.9	1.8	1.3	1.1	2.5	1.2
14	2.2	1.7	1.3	1.5	2.4	1.1
15	2.5	1.6	1.3	2.5	2.0	1.1
16	2.6	1.6	1.4	2.0	1.8	1.1
17	4.0	1.5	1.3	2.2	1.6	1.0
18	3.6	1.5	1.3	1.9	1.6	1.0
19	3.4	1.4	1.2	2.5	1.4	1.0
20	3.5	1.4	1.4	2.3	1.5	1.0
21	3.5	1.4	1.3	2.0	1.7	1.0
22	3.2	2.5	1.2	1.8	1.9	0.9
23	3.2	2.1	1.2	1.6	1.6	0.9
24	3.2	1.9	1.2	1.5	1.5	0.9
25	2.9	1.8	1.1	2.6	1.4	0.8
26	2.8	1.7	1.0	3.0	1.3	...
27	2.7	1.6	1.0	2.3	1.2	...
28	2.6	1.5	1.0	2.0	1.2	...
29	2.6	1.4	1.0	1.8	1.2	...
30	2.8	1.4	1.0	1.8	3.2	...
31	2.6		1.0	2.0		...
Means	3.0	1.9	1.3	1.6	2.0	1.3



APPENDIX H

The mean daily and mean monthly water depths (ft)
near station 19, Little Codroy River, Newfoundland,
1957-63.

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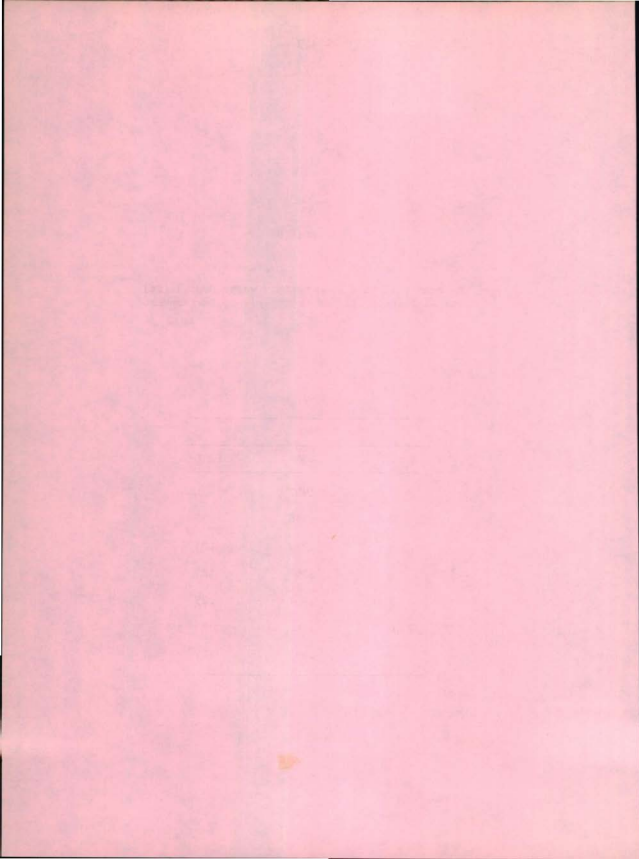


Table 1. The mean daily and mean monthly water depths
(ft) near station 19, Little Codroy River, Newfoundland,
1957.

Day	August	September	October	November
1	...	3.0	3.8	2.9
2	...	3.1	4.1	3.0
3	...	3.3	4.3	2.8
4	...	3.7	3.9	3.1
5	...	3.4	3.8	3.3
6	...	3.6	3.6	3.1
7	...	3.7	3.5	2.8
8	...	3.7	3.7	2.6
9	...	3.5	3.8	...
10	...	3.6	3.6	...
11	...	3.6	3.4	...
12	...	3.5	3.1	...
13	...	3.5	2.9	...
14	3.0	3.7	2.6	...
15	2.8	3.6	2.7	...
16	2.7	3.5	2.9	...
17	2.6	3.6	2.9	...
18	...	3.3	2.9	...
19	...	3.2	2.8	...
20	...	3.4	3.2	...
21	...	3.4	3.1	...
22	...	3.5	2.9	...
23	...	4.0	3.2	...
24	3.0	4.0	2.9	...
25	2.8	3.9	3.5	...
26	2.8	3.7	3.0	...
27	3.2	3.7	2.8	...
28	3.0	3.7	2.8	...
29	2.8	3.7	2.8	...
30	2.8	3.6	2.4	...
31	3.0		2.7	
Means	2.9	3.6	3.2	3.0

Table 2. The mean daily and mean monthly water depths (ft) near station 19, Little Codroy River, Newfoundland, 1958.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	3.3	2.6	2.1	2.0	2.9	2.2
2	...	2.9	2.5	2.0	1.9	3.0	2.2
3	...	2.5	2.4	1.9	2.4	2.8	2.2
4	...	2.4	2.2	1.7	2.3	2.6	2.1
5	...	2.2	2.0	1.7	2.1	2.4	2.1
6	...	2.2	1.8	1.6	1.9	2.1	2.0
7	...	2.1	1.7	1.6	2.0	2.0	2.7
8	1.3	2.1	1.6	1.5	3.8	1.9	...
9	1.2	2.0	1.8	1.5	3.6	1.8	...
10	1.1	2.0	1.9	1.7	3.1	1.8	...
11	...	2.0	1.9	2.1	3.8	1.8	...
12	...	1.9	1.8	2.1	3.7	1.8	...
13	...	1.8	1.8	2.0	3.2	1.8	...
14	...	1.8	1.8	1.9	2.8	1.8	...
15	...	2.2	1.8	1.8	2.6	1.8	...
16	...	2.2	1.7	1.8	2.6	1.7	...
17	1.9	2.0	1.7	1.8	2.4	1.7	...
18	1.9	2.0	1.8	2.2	2.2	2.1	...
19	1.9	1.9	1.8	2.2	2.0	2.7	...
20	1.9	1.8	1.8	2.2	1.9	2.6	...
21	1.9	1.8	2.1	2.1	1.8	2.5	...
22	1.8	1.8	2.1	2.0	1.7	2.3	...
23	2.0	2.1	2.0	1.8	1.7	2.1	...
24	2.1	2.1	1.8	1.8	1.8	2.0	...
25	3.0	2.0	1.7	1.7	1.8	1.9	...
26	3.2	2.0	1.6	2.1	1.7	1.8	...
27	4.5	3.2	1.6	2.4	1.7	1.7	...
28	3.7	3.5	1.5	2.6	1.6	1.7	...
29	4.8	3.1	1.5	2.4	2.6	2.1	...
30	4.6	2.8	1.8	2.2	3.2	2.3	...
31	3.8		2.3	2.0		2.2	
Means	2.7	2.2	1.9	2.0	2.4	2.1	2.2

Table 3. The mean daily and mean monthly water depths (ft) near station 19,
Little Codroy River, Newfoundland, 1959.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	2.7	3.5	1.4	1.1	2.0	1.4	2.2
2	...	2.6	3.2	1.3	1.6	2.7	1.3	2.9
3	...	2.7	3.4	1.3	1.7	2.4	1.3	2.7
4	...	2.5	3.8	1.4	1.6	2.2	1.3	2.4
5	...	2.6	3.4	1.5	1.5	2.1	1.3	2.2
6	...	2.9	3.0	1.3	1.5	2.1	1.3	2.3
7	...	3.1	2.8	1.3	1.5	1.9	1.3	2.4
8	...	3.2	2.5	1.8	1.6	1.7	1.2	2.4
9	...	3.6	2.5	1.9	1.6	1.6	1.1	2.3
10	2.2	3.4	2.4	1.9	1.5	1.5	1.2	2.2
11	2.0	3.0	2.3	1.8	1.5	1.4	1.2	2.0
12	2.0	3.0	2.3	1.7	1.5	1.4	1.3	1.8
13	1.7	3.3	2.3	1.6	1.5	1.3	1.8	1.7
14	1.7	3.4	2.3	1.6	1.5	1.3	1.8	1.7
15	1.5	3.7	2.4	1.5	1.5	1.3	1.7	1.7
16	1.5	3.6	2.3	1.4	1.5	1.4	1.7	1.8
17	1.5	3.5	2.2	1.3	1.3	1.4	1.6	1.9
18	1.5	3.4	2.1	1.3	1.4	1.4	2.5	2.0
19	1.5	3.3	2.0	1.3	1.6	1.4	3.2	2.0
20	1.5	3.3	2.0	1.3	1.6	1.4	2.8	1.9
21	1.5	3.3	2.0	1.3	1.6	1.3	2.4	1.8
22	1.5	3.2	1.9	1.3	1.5	1.6	2.1	1.7
23	1.5	3.4	1.9	1.2	1.4	1.8	1.9	1.6
24	1.7	3.3	1.8	1.2	1.3	1.8	1.9	1.5
25	1.9	3.0	1.7	1.1	1.3	1.9	1.9	4.1
26	2.0	2.9	1.6	1.2	1.3	1.9	1.8	4.6
27	2.4	3.2	1.5	1.2	1.4	1.8	1.8	3.6
28	2.6	3.5	1.5	1.2	1.6	1.7	2.1	3.1
29	2.6	3.4	1.5	1.1	2.0	1.6	2.4	4.5
30	2.6	3.3	1.4	1.1	2.1	1.5	2.2	4.3
31		4.1		1.1	1.9		2.0	
Means	1.8	3.2	2.3	1.4	1.5	1.7	1.8	2.4

Table 4. The mean daily and mean monthly water depths (ft) near station 19,
Little Codroy River, Newfoundland, 1960.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	2.4	1.5	1.6	1.3	0.9	1.1	1.7
2	...	2.5	1.5	1.5	1.3	0.9	1.1	1.8
3	...	2.7	1.4	1.4	1.3	0.9	1.2	3.3
4	...	2.7	1.3	1.3	1.2	0.9	1.7	2.8
5	...	2.8	1.3	1.3	1.1	0.9	1.7	2.5
6	...	3.1	1.7	1.3	1.1	0.8	1.7	2.3
7	...	3.7	1.9	1.2	1.1	0.8	2.3	2.1
8	...	3.8	1.9	1.1	1.1	0.8	2.4	1.9
9	...	3.8	1.7	1.1	1.1	0.8	2.4	1.8
10	...	3.9	1.6	1.3	1.2	0.8	2.4	1.7
11	1.8	3.7	1.5	1.3	1.2	0.9	2.2	2.6
12	1.8	3.3	1.4	1.3	1.1	0.9	2.3	2.4
13	1.7	3.0	1.4	1.3	1.1	1.0	2.3	2.2
14	1.7	2.9	1.4	1.4	1.1	1.7	2.3	2.0
15	1.7	3.6	1.4	1.4	1.1	2.2	2.1	1.8
16	1.5	3.2	1.3	1.4	1.0	2.0	1.9	1.8
17	1.3	2.8	1.4	1.3	1.0	1.8	1.8	2.5
18	1.3	2.6	1.5	1.3	1.0	1.7	2.1	2.5
19	1.9	2.5	1.5	1.3	0.9	1.6	2.3	2.3
20	2.2	2.3	1.4	1.3	0.9	1.6	2.1	2.2
21	2.1	2.2	1.4	1.4	0.9	1.5	4.7	1.9
22	1.9	2.1	1.3	1.5	0.9	1.6	4.0	1.7
23	1.8	2.0	1.3	1.6	0.9	1.5	3.0	1.7
24	1.7	1.9	1.2	1.7	0.9	1.5	2.4	1.6
25	1.6	1.9	1.5	1.8	0.9	1.4	2.3	1.5
26	1.5	1.7	2.5	1.7	0.9	1.3	2.9	1.5
27	1.5	1.7	2.3	1.6	1.0	1.3	3.0	1.5
28	1.5	1.7	2.0	1.5	1.0	1.2	2.6	1.3
29	1.6	1.6	1.9	1.4	0.9	1.1	2.3	1.3
30	2.0	1.5	1.7	1.3	0.9	1.1	2.0	1.4
31		1.5		1.3	0.9		1.9	
Means	1.7	2.6	1.6	1.4	1.0	1.2	2.3	2.0

Table 5. The mean daily and mean monthly water depths (ft) near station 19, Little Codroy River, Newfoundland, 1961.

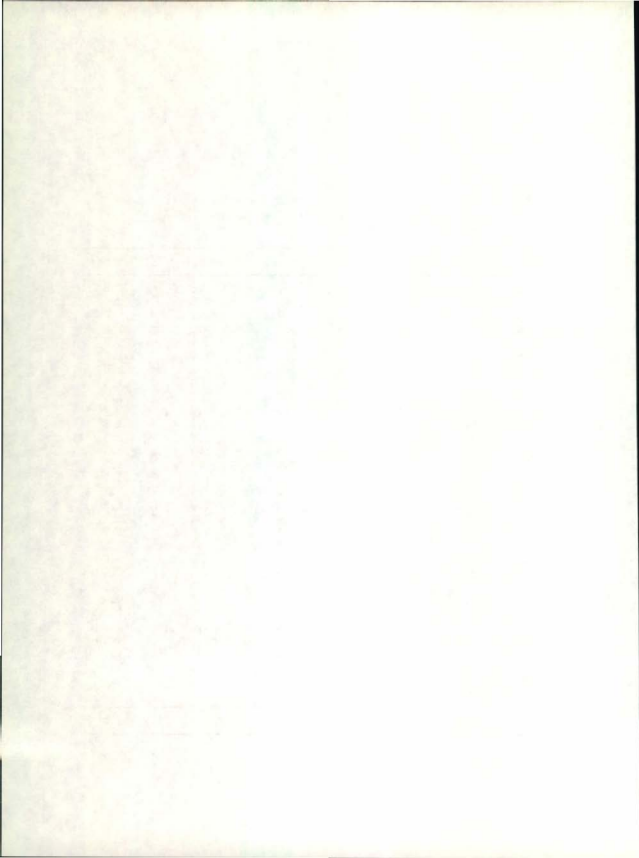
Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	4.2	1.1	0.4	0.5	0.7	1.6
2	...	3.3	1.0	0.4	0.5	0.7	1.6
3	...	3.1	0.9	0.4	0.5	0.6	1.5
4	...	2.8	0.9	0.4	0.5	1.4	1.5
5	...	2.5	0.9	0.4	0.5	3.1	1.3
6	...	2.3	0.8	0.4	0.5	2.7	1.4
7	...	2.4	0.7	0.4	0.4	2.2	1.4
8	1.5	2.2	0.7	0.4	0.4	1.9	1.5
9	1.7	2.1	0.7	0.4	0.4	1.6	1.6
10	2.3	2.1	0.7	0.3	0.4	1.4	2.0
11	3.4	2.2	0.7	0.4	0.4	1.2	1.9
12	3.2	2.1	0.7	0.4	0.4	1.1	1.7
13	3.2	1.9	0.6	0.4	0.3	1.0	1.5
14	3.6	1.8	0.5	0.3	0.3	0.9	1.4
15	3.6	1.7	0.6	0.3	0.3	3.1	2.0
16	3.5	1.5	0.6	0.3	0.6	4.6	1.8
17	3.5	1.5	0.6	0.4	0.7	3.5	1.6
18	3.2	1.4	0.6	0.4	0.7	2.7	1.7
19	3.0	1.3	0.6	0.4	0.7	2.2	1.7
20	2.8	1.3	0.6	0.4	0.6	1.8	1.6
21	3.0	1.2	0.5	0.3	0.6	1.6	1.5
22	3.1	1.1	0.5	0.3	0.6	1.4	1.4
23	3.7	1.1	0.5	0.3	0.6	1.2	1.4
24	3.8	1.6	0.5	0.3	0.5	1.1	1.4
25	3.2	1.7	0.5	0.3	0.5	1.1	1.4
26	3.2	1.5	0.5	0.3	0.5	1.0	1.3
27	3.5	1.4	0.5	0.3	0.6	1.0	1.3
28	4.5	1.4	0.5	0.4	0.6	1.4	1.2
29	4.7	1.3	0.4	0.6	0.6	1.9	1.2
30	3.8	1.2	0.4	0.6	0.7	1.8	1.2
31	5.3		0.4	0.6		1.7	
Means	3.3	1.9	0.6	0.4	0.5	1.7	1.5

Table 6. The mean daily and mean monthly water depths (ft) near station 19,
Little Codroy River, Newfoundland, 1962.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	1.6	2.7	1.4	1.5	1.2	1.5	2.9
2	...	1.7	2.5	1.5	1.5	1.2	1.6	5.0
3	...	1.8	2.3	1.5	1.4	1.1	1.6	3.8
4	...	2.3	2.2	1.6	1.4	1.1	1.6	3.1
5	...	2.7	2.2	1.7	1.4	1.1	1.5	3.0
6	...	2.7	2.6	1.7	1.3	1.1	1.4	2.8
7	...	2.5	3.2	2.7	1.3	1.0	1.4	2.7
8	...	2.5	3.2	2.6	1.3	1.0	1.4	2.5
9	...	2.4	2.9	2.4	1.2	1.0	1.7	2.3
10	...	2.2	2.7	2.2	1.2	1.0	1.7	2.1
11	...	2.0	2.7	2.0	1.3	1.0	1.6	2.8
12	...	2.0	3.4	2.0	1.5	1.0	1.7	4.5
13	...	2.2	3.0	1.9	1.5	0.9	1.8	3.7
14	...	2.4	2.6	1.9	1.6	0.9	1.9	3.0
15	...	2.6	2.4	1.8	1.8	0.9	1.8	2.6
16	...	2.7	2.2	1.7	2.0	0.9	1.7	2.3
17	...	3.0	2.1	1.6	1.9	0.9	1.7	2.2
18	1.8	3.3	2.0	1.5	1.7	1.2	1.6	2.1
19	1.7	3.5	1.9	1.4	1.7	2.2	1.5	1.9
20	1.6	3.6	1.8	1.4	1.6	2.1	1.5	1.8
21	1.6	3.4	1.7	1.4	2.0	1.9	1.4	1.7
22	1.5	2.9	1.6	1.4	2.0	1.9	1.4	2.1
23	1.5	2.7	1.5	1.5	1.8	1.8	1.4	4.6
24	1.6	2.5	1.5	1.4	1.7	1.7	1.5	3.8
25	1.6	3.2	1.5	1.5	1.6	1.7	1.4	3.0
26	1.6	4.1	1.5	1.5	1.5	1.8	1.4	2.5
27	1.5	3.9	1.6	1.5	1.5	1.7	1.5	2.2
28	1.5	3.5	1.5	1.5	1.4	1.6	1.5	2.1
29	1.5	3.2	1.5	1.5	1.4	1.5	1.7	1.9
30	1.6	3.1	1.5	1.5	1.3	1.5	2.5	1.7
31		2.9		1.5	1.2		2.4	
Means	1.6	2.8	2.2	1.7	1.5	1.3	1.6	2.8

Table 7. The mean daily and mean monthly water depths (ft) near station 19, Little Codroy River, Newfoundland, 1963.

Day	May	June	July	August	September	October
1	...	2.5	1.3	0.9	2.8	2.8
2	...	2.4	1.3	0.9	2.5	2.6
3	...	2.3	1.3	0.9	2.2	2.2
4	...	2.4	1.4	0.8	2.0	1.9
5	...	2.5	1.6	0.8	2.1	1.8
6	...	2.3	1.6	0.8	1.9	1.7
7	...	2.2	1.5	0.8	2.2	1.6
8	...	2.1	1.5	0.8	2.5	1.5
9	2.5	2.1	1.4	0.7	2.2	1.5
10	2.5	2.1	1.3	0.8	2.0	1.4
11	2.3	2.0	1.3	0.7	1.9	1.3
12	2.2	2.0	1.2	0.7	1.7	1.3
13	2.1	1.9	1.2	0.9	1.9	1.3
14	2.3	1.8	1.2	1.0	...	1.2
15	2.6	1.7	1.2	1.8	...	1.1
16	2.8	1.7	1.2	1.8	...	1.1
17	4.0	1.6	1.2	2.0	...	1.1
18	3.9	1.6	1.1	1.9	...	1.0
19	3.8	1.5	1.1	2.1	...	1.1
20	3.7	1.4	1.1	2.2	1.4	1.1
21	3.8	1.5	1.1	2.0	1.5	1.0
22	3.5	1.9	1.1	1.9	1.7	0.9
23	3.4	2.0	1.1	1.7	1.6	0.9
24	3.5	1.9	1.0	1.6	1.5	0.9
25	3.3	1.8	1.0	2.1	1.4	0.9
26	3.1	1.7	1.0	2.6	1.4	...
27	2.9	1.5	1.0	2.3	1.3	...
28	2.8	1.4	1.0	2.1	1.2	...
29	2.7	1.3	0.9	1.9	1.2	...
30	2.8	1.3	0.9	1.8	2.8	...
31	2.7		0.9	1.8		...
Means	3.1	1.9	1.2	1.5	1.9	1.4



APPENDIX I

The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$)
near station 12, Little Codroy River, Newfoundland, 1956.

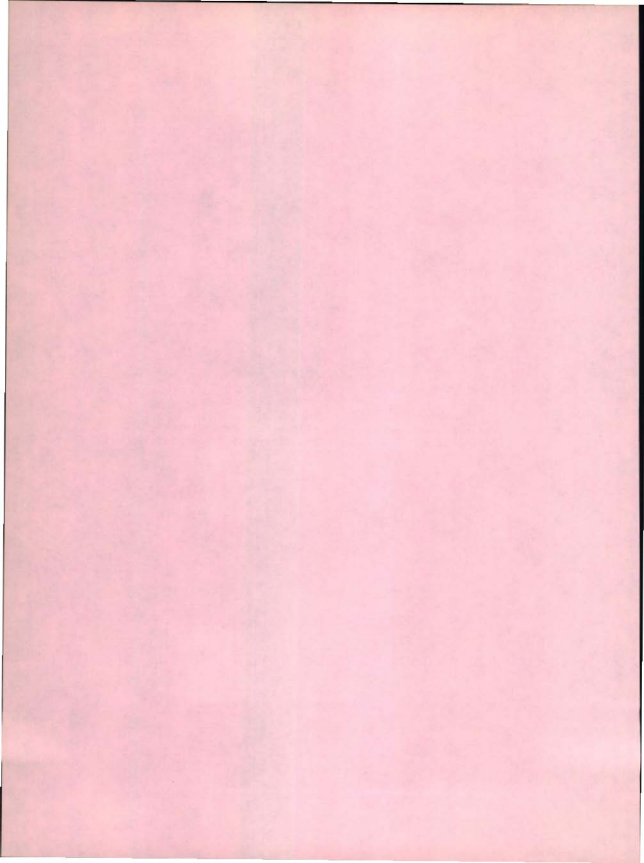
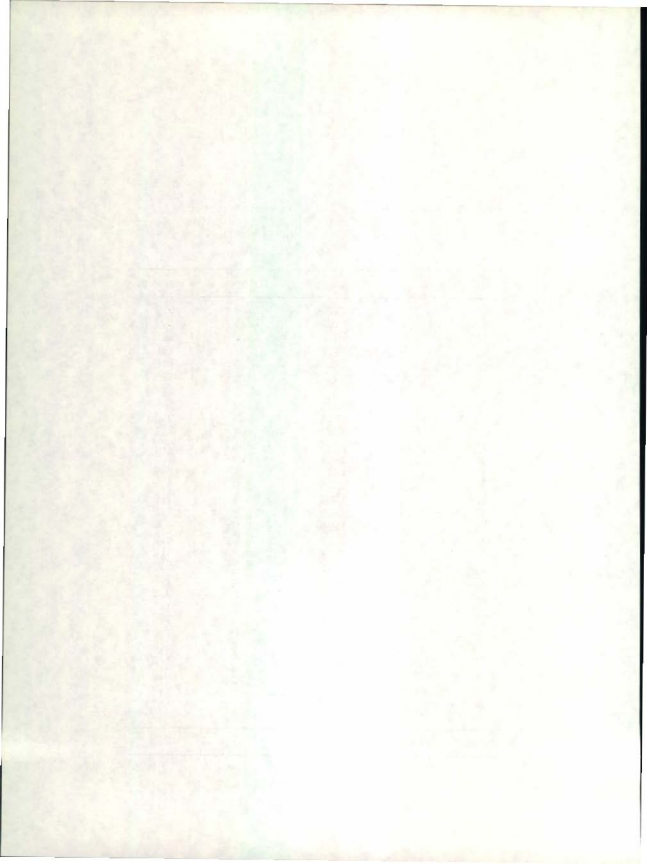


Table 1. The mean daily and mean monthly water temperatures (°C) near station 12, Little Codroy River, Newfoundland, 1956.

Day	August	September	October	November
1	...	13.9	10.6	9.0
2	...	13.7	12.3	8.2
3	16.8	14.6	13.0	7.0
4	15.4	14.7	12.1	7.2
5	15.6	14.8	11.0	6.9
6	15.4	15.6	10.1	7.3
7	16.3	15.8	10.1	8.2
8	17.3	15.0	11.0	8.4
9	16.1	13.4	11.2	9.2
10	16.1	12.8	11.4	8.7
11	16.0	12.5	10.1	5.7
12	15.7	14.0	9.3	5.5
13	16.2	15.0	9.9	8.3
14	15.9	15.8	9.8	8.4
15	15.1	14.2	10.0	7.9
16	15.0	12.3	10.3	7.2
17	15.1	12.3	11.0	8.4
18	16.9	11.5	10.0	6.9
19	16.8	11.7	8.8	6.2
20	14.9	11.1	8.9	6.6
21	14.1	11.8	9.2	7.2
22	14.3	11.6	9.1	8.2
23	13.8	11.4	9.8	7.5
24	13.3	10.6	11.7	7.6
25	14.2	10.4	7.9	7.0
26	14.2	11.2	7.8	6.4
27	14.1	10.5	8.6	7.2
28	13.5	10.8	8.0	8.0
29	14.0	11.3	7.8	7.0
30	13.4	11.2	8.4	7.4
31	13.8		8.8	
Means	14.8	12.8	9.9	7.5



APPENDIX J

The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$)
near station 6, Little Codroy River, Newfoundland,
1959-63.

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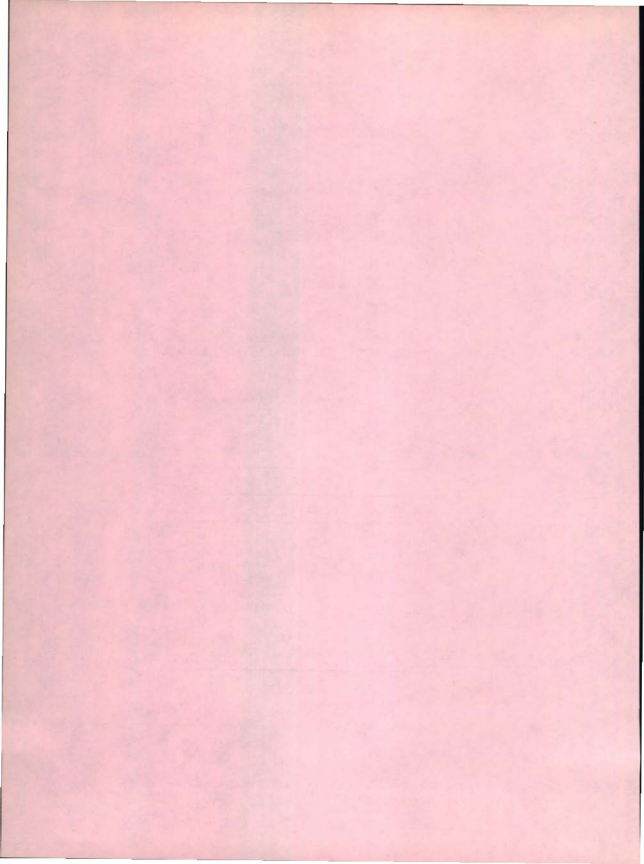


Table 1. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 6, Little Codroy River, Newfoundland, 1959.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	2.5	3.9	8.6	19.5	17.8	14.4	10.6
2	...	2.1	4.2	7.1	18.6	17.0	13.9	11.3
3	...	1.8	3.7	7.3	17.8	16.8	13.1	11.3
4	...	2.4	4.4	8.8	17.4	16.5	13.9	10.9
5	...	2.4	4.5	8.6	17.4	16.6	13.8	11.2
6	...	2.2	4.7	10.6	18.1	16.9	13.3	12.8
7	...	2.4	4.1	10.1	18.4	16.4	13.1	12.5
8	...	2.3	4.2	8.9	18.6	18.1	13.3	11.1
9	...	2.0	5.2	9.2	18.8	16.1	13.7	11.4
10	...	2.8	3.9	8.8	18.2	16.8	13.6	11.4
11	...	3.4	5.1	10.8	18.0	16.7	13.5	10.8
12	...	3.5	5.6	9.7	17.4	17.1	13.4	10.2
13	...	3.2	5.7	9.5	17.9	16.4	12.7	10.9
14	...	3.1	6.7	9.7	18.3	14.0	12.1	10.0
15	3.7	3.1	6.8	10.3	16.8	13.4	12.4	11.1
16	3.3	2.5	6.6	10.5	17.5	13.9	12.4	10.1
17	3.5	2.9	6.4	11.4	17.8	13.5	12.4	10.1
18	4.1	3.4	7.3	11.0	17.6	13.9	12.0	9.8
19	3.1	3.5	7.4	12.8	17.3	14.1	12.0	9.1
20	3.8	2.9	6.8	13.6	17.0	14.6	11.8	9.3
21	3.1	3.5	6.3	10.9	17.0	14.6	11.3	8.6
22	2.9	3.1	7.3	11.9	15.9	14.7	11.4	8.8
23	4.1	3.2	7.0	13.3	16.3	14.6	11.7	9.2
24	3.8	3.0	8.0	13.4	16.8	14.4	12.1	9.4
25	3.1	3.9	7.9	11.8	16.0	14.8	12.6	10.2
26	2.8	3.8	8.6	...	16.8	14.1	13.1	10.6
27	2.6	4.0	8.9	...	17.3	15.0	12.6	10.0
28	2.6	3.8	9.2	...	17.0	15.4	11.8	10.5
29	2.6	3.8	8.9	...	17.1	16.1	11.0	11.0
30	2.7	3.6	7.8	18.4	17.5	16.5	11.0	10.8
31		3.4		18.1	17.8		10.9	
Means	3.2	7.4	6.2	10.9	17.5	15.6	12.2	10.6

Table 2. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 6, Little Codroy River, Newfoundland, 1960.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	4.0	9.7	12.1	14.4	13.0	11.6	6.6
2	...	4.6	8.4	11.9	12.6	12.2	9.4	6.8
3	...	4.0	9.8	12.0	12.9	10.9	8.1	7.1
4	...	4.2	9.1	12.3	13.8	11.2	9.0	7.3
5	...	4.3	9.8	12.6	13.3	11.6	9.1	6.6
6	...	4.8	10.1	11.8	11.9	11.4	9.5	6.1
7	...	4.4	9.2	12.6	13.5	10.5	9.5	5.9
8	...	4.6	8.4	12.7	13.4	12.1	8.5	5.1
9	...	4.6	8.8	12.2	13.1	11.1	8.3	5.6
10	...	4.8	8.0	11.4	12.3	12.2	8.5	6.3
11	2.8	5.0	11.1	12.1	12.6	11.7	8.6	5.9
12	2.1	4.7	8.5	11.5	13.8	10.9	7.9	5.4
13	2.7	4.7	8.6	12.0	14.4	13.1	8.2	5.2
14	3.5	4.9	8.9	12.6	14.5	11.7	8.1	5.8
15	2.2	5.4	9.5	12.6	14.4	11.6	7.8	5.4
16	3.1	5.6	8.3	12.8	14.0	11.3	7.7	5.3
17	4.4	5.4	10.4	11.9	13.1	10.7	8.3	6.2
18	4.8	5.6	11.5	13.8	13.9	10.3	8.4	6.0
19	3.5	6.3	10.7	13.0	15.2	11.3	7.6	5.8
20	2.4	5.6	10.8	12.6	14.8	10.5	7.5	5.8
21	3.3	6.0	10.2	12.7	14.3	9.8	7.8	5.4
22	3.6	6.5	10.3	11.7	14.8	10.3	7.5	5.0
23	3.3	6.2	10.1	11.0	14.9	10.6	7.4	5.4
24	3.1	7.2	12.4	12.4	13.0	10.0	7.4	5.0
25	3.1	7.0	10.5	12.3	11.8	10.2	7.3	4.6
26	3.6	7.5	9.5	12.7	12.1	10.0	7.1	5.3
27	4.9	8.6	9.6	13.1	12.5	10.8	7.0	4.7
28	8.1	8.5	10.8	13.6	13.6	11.6	6.9	3.3
29	5.0	8.4	11.2	13.0	13.2	11.6	6.6	3.4
30	4.5	9.5	12.0	14.7	14.3	12.0	6.8	4.7
31		10.0		14.8	13.4		7.0	
Means	4.7	5.9	9.5	12.5	13.5	11.2	8.1	5.6

Table 3. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 6, Little Codroy River, Newfoundland, 1961.

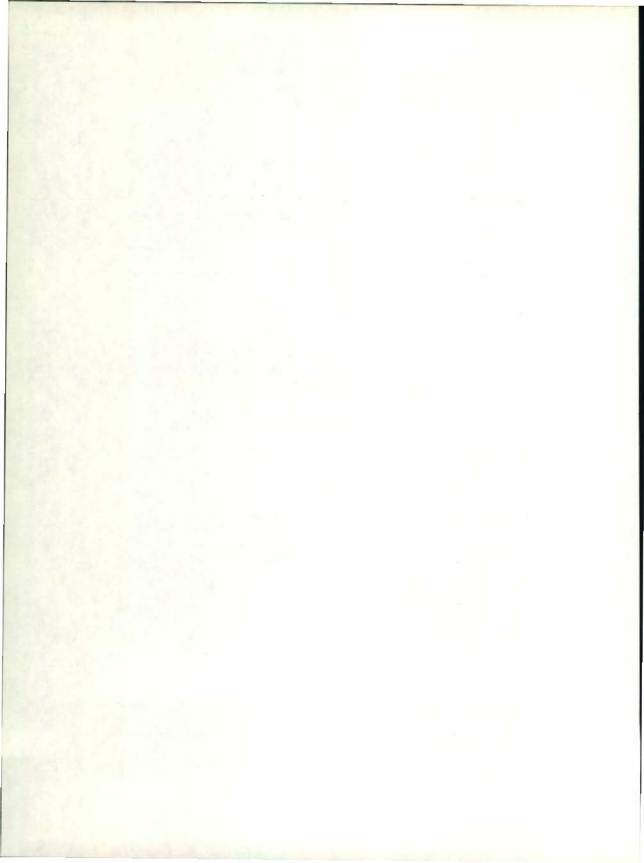
Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	4.5	5.3	13.1	11.8	13.1	9.6	6.9
2	...	4.5	5.9	9.6	12.5	12.0	10.8	6.9
3	...	3.4	5.8	10.2	13.4	11.7	11.3	7.4
4	...	3.7	5.6	11.2	13.4	12.0	11.7	8.1
5	...	4.3	6.5	12.5	13.5	12.8	11.7	8.6
6	...	3.9	6.2	12.6	14.8	13.4	10.9	8.8
7	...	4.5	6.5	12.9	14.6	11.4	11.0	8.2
8	...	5.2	6.2	12.6	15.1	11.0	10.5	7.7
9	...	5.0	6.7	13.3	15.8	12.4	11.0	7.4
10	...	4.2	7.2	12.5	15.5	12.6	10.6	7.0
11	...	4.2	7.0	11.6	13.6	11.9	9.0	6.6
12	...	4.6	6.6	12.5	15.6	11.9	9.1	6.4
13	...	4.3	7.7	12.4	15.4	11.2	10.0	6.7
14	...	3.6	7.2	12.2	15.2	10.1	10.3	7.0
15	...	4.1	7.4	12.8	13.8	13.2	10.4	6.6
16	...	3.7	7.8	12.9	13.5	11.8	10.4	6.9
17	...	3.9	7.6	12.8	13.2	10.1	9.8	6.8
18	...	4.2	8.5	13.4	13.0	10.4	9.3	7.1
19	...	4.5	9.9	12.4	13.9	11.5	9.9	6.0
20	...	3.6	10.1	13.6	13.9	11.7	9.8	6.0
21	...	4.2	10.4	14.8	14.1	11.6	9.0	5.6
22	...	4.9	10.8	13.9	12.4	11.5	8.0	5.7
23	...	4.1	9.9	14.2	12.6	12.7	7.8	6.5
24	...	4.0	10.2	14.8	13.4	13.7	7.4	7.2
25	...	5.0	10.7	14.8	13.3	13.2	7.5	7.3
26	...	5.4	10.8	14.1	13.4	15.0	9.3	6.5
27	4.4	5.4	9.9	13.7	11.1	14.1	9.4	6.6
28	5.2	4.8	10.1	12.8	10.7	12.4	7.9	7.4
29	4.9	5.3	10.2	13.0	11.7	11.6	7.4	6.4
30	7.5	5.3	11.2	13.1	18.8	9.6	7.9	6.0
31		4.9		12.7	12.0		7.4	
Means	4.7	4.4	8.2	12.8	13.5	12.0	9.5	6.9

Table 4. The mean daily and mean monthly water temperatures (°C) near station 6, Little Codroy River, Newfoundland, 1962.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	4.2	5.3	10.9	12.2	12.9	9.2	7.5
2	...	4.1	4.8	11.1	12.0	12.3	9.1	7.8
3	...	4.8	5.3	8.8	13.3	11.1	9.1	7.0
4	...	4.4	5.3	8.6	12.8	10.7	9.6	6.8
5	...	3.9	6.1	8.9	12.6	10.3	8.6	7.5
6	...	3.6	5.4	9.0	11.5	10.7	6.9	7.0
7	...	3.5	5.2	8.2	12.2	10.8		6.1
8	...	2.8	5.5	8.6	13.0	11.0	9.8	6.6
9	...	2.7	5.7	9.3	12.4	11.6	8.2	6.6
10	...	3.5	6.4	9.4	11.9	11.9	7.6	5.8
11	...	4.4	6.6	9.1	11.0	10.4	7.4	6.5
12	...	4.1	6.2	8.7	11.6	9.7	7.7	7.3
13	...	4.3	6.3	8.9	11.6	10.0	7.2	6.9
14	...	4.6	6.9	9.1	12.5	10.3	7.3	6.3
15	...	4.4	7.5	9.5	11.8	10.5	7.8	6.3
16	...	4.5	8.2	10.6	11.5	10.4	7.9	7.3
17	...	4.4	9.0	10.4	11.7	10.6	8.5	6.6
18	...	4.5	7.4	11.6	11.8	9.8	8.3	5.3
19	...	4.3	7.3	11.4	11.7	10.3	7.7	5.6
20	...	4.2	6.6	11.0	11.1	10.1	7.1	5.5
21	...	3.7	7.0	11.8	11.5	10.3	8.2	4.7
22	...	4.7	8.6	11.6	11.3	9.6	8.6	5.5
23	...	4.3	9.0	11.8	11.1	9.2	7.6	6.4
24	2.8	4.7	9.0	9.6	11.5	9.2	7.7	5.8
25	2.4	4.0	8.5	11.4	11.7	9.7	7.4	5.8
26	3.4	4.6	9.2	11.5	12.0	9.2	6.4	5.9
27	3.2	4.4	8.3	10.9	12.4	9.4	6.4	5.5
28	3.6	4.8	9.2	10.8	13.1	9.1	5.4	5.2
29	4.3	5.2	10.4	12.1	13.4	8.8	7.1	5.5
30	4.3	4.5	11.3	12.4	12.6	9.0	6.1	5.2
31		4.9		12.0	12.5		6.4	
Means	3.5	4.2	7.2	10.2	12.0	10.3	7.7	6.3

Table 5. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 6, Little Codroy River, Newfoundland, 1963.

Day	May	June	July	August	September	October
1	...	6.0	10.0	...	10.2	10.6
2	...	5.0	8.0	...	11.0	10.8
3	...	6.3	9.3	12.5	11.0	11.0
4	...	5.8	10.0	12.7	10.6	11.2
5	...	5.6	10.2	12.7	10.2	10.7
6	...	5.2	9.6	12.6	9.8	10.4
7	...	5.6	9.2	13.6	10.1	9.9
8	...	5.9	10.7	14.5	10.3	10.4
9	...	5.6	10.4	14.4	10.9	9.6
10	...	5.5	9.7	13.1	10.8	9.1
11	...	5.5	10.6	13.0	9.7	9.3
12	...	6.4	11.7	12.4	10.1	8.8
13	5.2	7.0	11.9	12.3	10.0	9.0
14	4.0	6.0	12.6	11.2	9.2	8.3
15	3.2	6.8	12.2	11.3	9.4	9.1
16	3.9	7.7	13.4	11.4	9.7	9.6
17	3.6	7.0	13.1	11.4	10.2	9.0
18	4.0	7.8	11.6	11.8	10.0	8.1
19	4.0	7.9	10.7	11.5	10.9	9.7
20	4.6	9.2	10.1	11.9	10.4	9.9
21	4.3	9.8	11.5	11.5	9.0	9.7
22	4.4	8.1	13.1	11.3	10.7	7.6
23	4.4	7.5	12.8	11.4	10.8	7.6
24	4.7	8.7	12.9	9.9	10.8	9.7
25	4.6	9.1	12.7	9.0	10.2	8.1
26	4.9	8.9	13.8	10.2	10.9	...
27	5.4	9.0	13.9	10.3	11.3	...
28	5.4	8.0	13.9	10.1	9.8	...
29	5.5	8.7	13.7	10.5	9.9	...
30	5.8	8.3	12.9	10.7	10.9	...
31	5.4	...	...	10.4	...	...
Means	4.6	7.1	11.5	11.7	10.3	9.5



APPENDIX K

The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$)
near station 19, Little Codroy River, Newfoundland,
1957-63.

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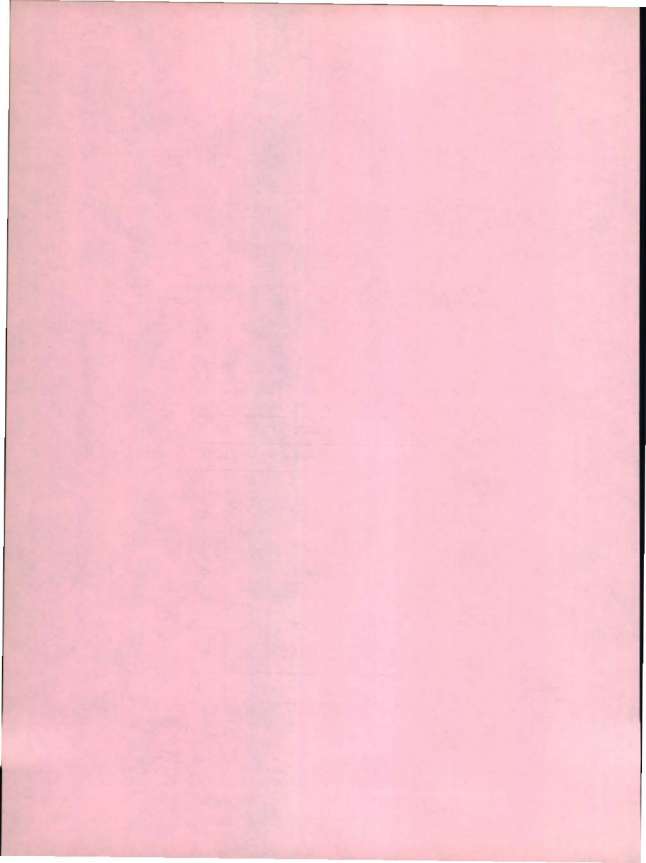


Table 1. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 19, Little Codroy River, Newfoundland, 1957.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	2.3	5.1	12.6	16.1	14.0	12.8	9.9
2	...	1.6	6.0	12.4	16.1	14.3	12.9	9.9
3	...	1.8	5.4	11.7	15.7	14.4	12.0	9.1
4	...	1.8	5.3	10.9	15.2	16.1	11.1	8.0
5	...	2.5	5.4	11.9	16.0	15.0	11.4	9.0
6	...	2.4	5.4	13.5	15.8	15.1	11.2	8.7
7	...	2.8	4.8	13.1	16.0	15.3	10.8	7.9
8	...	3.2	4.9	13.4	16.2	15.1	11.6	7.6
9	...	1.8	6.1	15.0	16.3	14.1	12.3	...
10	...	2.2	5.2	15.1	18.0	13.7	12.1	...
11	...	2.7	5.4	15.4	17.8	14.0	11.7	...
12	...	3.1	5.9	15.7	17.6	14.1	10.9	...
13	...	2.8	7.3	15.6	17.1	13.7	10.2	...
14	...	3.5	6.6	16.3	17.0	14.6	8.8	...
15	...	2.9	6.9	15.6	16.2	14.3	9.2	...
16	5.4	2.8	7.7	16.0	15.8	13.2	11.0	...
17	2.3	2.3	8.1	15.7	17.2	14.6	11.2	...
18	3.8	2.8	7.3	13.1	15.7	13.7	10.9	...
19	3.7	3.6	8.2	14.4	15.9	13.2	10.0	...
20	2.9	4.1	7.4	13.3	16.3	13.9	9.9	...
21	1.7	4.5	6.9	13.5	17.3	14.7	9.9	...
22	1.2	4.5	8.0	14.4	16.0	12.5	9.1	...
23	2.3	4.1	7.0	13.4	15.7	14.3	9.8	...
24	2.5	3.4	7.8	15.4	16.5	14.2	8.3	...
25	2.4	4.0	8.6	15.7	16.6	13.8	10.5	...
26	2.7	4.1	9.1	15.2	16.7	13.2	9.4	...
27	3.3	4.0	9.0	15.8	17.2	12.4	8.5	...
28	2.9	4.1	9.9	16.2	14.3	11.5	8.0	...
29	1.7	4.2	12.9	16.5	14.1	12.1	7.7	...
30	2.1	4.4	14.2	17.0	14.2	11.8	7.7	...
31		4.6		16.4	14.6		8.8	
Means	2.6	3.2	7.3	14.5	16.7	13.9	10.4	8.8

Table 2. The mean daily and mean monthly water temperatures (°C) near station 19, Little Codroy River, Newfoundland, 1958.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	7.5	12.2	16.0	17.3	11.9	8.5
2	...	8.5	11.4	16.2	17.3	12.2	8.1
3	...	8.2	12.5	17.1	15.5	11.4	8.4
4	...	8.2	12.3	17.6	15.3	11.5	8.3
5	...	8.9	12.2	17.1	15.2	11.8	8.0
6	...	7.8	12.4	17.3	15.4	10.8	8.5
7	...	8.8	13.2	17.5	14.4	10.5	9.2
8	...	8.2	12.5	18.0	15.5	10.9	...
9	...	8.5	13.6	18.5	15.0	11.6	...
10	...	8.5	14.5	16.3	14.4	12.7	...
11	...	9.3	14.9	16.5	14.6	11.7	...
12	...	8.6	15.7	16.3	14.6	10.3	...
13	...	10.0	14.9	16.6	14.2	10.1	...
14	...	9.4	15.6	17.1	13.9	9.6	...
15	7.2	9.2	15.5	17.1	13.5	8.9	...
16	6.0	10.0	15.9	17.3	14.0	9.6	...
17	7.0	9.5	16.4	15.0	13.0	10.9	...
18	6.6	9.8	13.8	16.0	12.9	10.4	...
19	6.0	10.3	14.8	16.6	13.0	9.7	...
20	6.5	11.4	14.2	15.7	12.7	9.5	...
21	7.4	13.1	13.6	16.1	12.6	9.2	...
22	6.4	11.4	14.2	16.9	14.1	9.0	...
23	6.1	11.6	14.2	17.0	13.3	9.3	...
24	6.3	11.2	14.6	16.0	13.6	8.6	...
25	7.2	11.6	13.8	15.1	13.8	8.2	...
26	7.6	10.9	15.6	16.8	14.4	8.1	...
27	7.1	11.1	16.7	16.0	12.1	8.0	...
28	7.0	10.6	17.0	15.8	11.7	9.0	...
29	8.1	10.8	16.4	16.0	10.9	8.7	...
30	7.7	12.0	15.3	16.0	11.7	...	...
31	7.0		16.1	14.9		9.1	
Means	6.8	9.8	14.3	17.1	14.0	10.2	8.3

Table 3. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 19, Little Codroy River, Newfoundland, 1959.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	2.3	4.2	10.5	19.2	16.5	12.0	6.7
2	...	2.1	4.7	8.3	17.3	15.5	11.8	7.7
3	...	2.0	4.5	9.2	16.4	15.5	11.0	7.3
4	...	2.8	5.0	10.4	16.2	15.1	11.6	6.9
5	...	2.5	5.2	10.4	16.7	15.1	11.6	7.0
6	...	2.2	5.1	12.4	17.3	15.1	10.9	8.2
7	...	2.6	4.7	11.9	17.9	15.5	10.7	8.1
8	...	2.6	5.1	11.0	17.9	16.4	11.0	7.0
9	...	2.0	6.0	11.2	18.1	15.3	11.3	7.2
10	2.7	2.5	4.6	11.8	17.1	15.1	11.1	7.1
11	2.5	3.2	6.0	12.6	17.2	15.9	11.2	6.7
12	2.3	3.2	5.9	12.4	16.7	15.8	10.6	6.2
13	2.7	2.7	5.9	12.2	17.2	14.9	10.2	6.8
14	3.1	2.9	7.2	12.2	17.3	12.4	9.8	5.8
15	2.4	3.0	7.4	13.0	15.6	12.2	10.1	7.0
16	3.1	2.7	7.0	13.6	16.6	12.6	10.0	6.2
17	4.0	3.4	7.1	14.7	17.0	12.1	9.5	5.8
18	3.5	3.6	8.1	15.8	16.4	12.2	9.6	5.5
19	2.4	3.6	8.8	16.7	15.7	12.5	9.4	5.1
20	3.2	3.3	8.1	17.9	15.7	13.0	8.6	5.2
21	2.3	4.0	7.4	14.8	15.7	12.9	8.0	4.3
22	2.4	3.6	7.8	16.4	14.9	12.8	8.0	4.4
23	3.3	3.6	7.8	18.4	15.3	12.8	8.2	4.7
24	3.0	3.4	9.1	18.3	15.5	12.8	8.5	4.8
25	2.5	4.2	8.6	17.5	14.4	13.2	9.1	6.1
26	2.6	4.4	9.5	16.9	15.8	12.0	9.2	6.1
27	2.5	4.7	9.8	17.5	16.3	12.7	9.0	5.5
28	2.3	4.4	10.6	16.1	16.0	12.9	8.3	5.7
29	2.3	4.5	10.7	17.3	15.4	13.7	7.5	6.0
30	2.4	4.0	9.9	17.6	16.0	13.8	7.1	6.0
31		4.2		18.8	16.4		7.0	
Means	2.7	3.2	7.1	14.1	16.5	13.9	9.7	6.2

Table 4. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 19, Little Codroy River, Newfoundland, 1960.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	3.3	9.9	14.7	18.5	16.8	14.8	8.1
2	...	3.7	8.6	14.1	16.6	16.0	12.8	8.2
3	...	3.2	10.5	14.5	16.9	14.3	11.4	8.5
4	...	3.3	9.4	14.8	18.2	15.3	13.1	8.4
5	...	3.5	10.3	15.7	17.5	15.6	12.7	8.0
6	...	3.7	9.9	14.2	15.8	15.2	12.8	7.7
7	...	3.4	9.5	15.3	18.3	14.4	12.8	7.4
8	...	3.9	8.9	15.5	17.8	16.1	11.8	6.9
9	...	3.9	9.4	14.7	17.8	14.5	11.6	6.9
10	...	4.1	9.8	14.5	16.7	16.1	12.0	7.6
11	1.4	4.4	10.2	15.1	16.7	15.8	11.7	7.8
12	0.6	4.2	9.7	14.7	18.2	14.6	11.1	6.9
13	1.1	4.0	9.5	15.4	19.0	18.0	11.1	6.7
14	1.9	4.2	10.1	15.8	19.2	16.4	10.9	7.2
15	0.1	5.1	11.0	16.0	19.2	15.7	10.3	6.8
16	1.4	5.2	9.4	16.2	18.4	15.3	10.3	6.5
17	2.8	4.9	12.0	15.2	17.4	14.5	10.6	7.8
18	3.5	5.0	13.2	17.9	18.2	14.4	11.3	7.1
19	2.4	5.6	12.5	16.5	19.8	15.2	10.1	6.6
20	1.1	5.1	13.0	16.4	20.3	14.3	10.0	6.6
21	1.8	5.4	12.1	15.8	18.8	13.6	9.8	6.8
22	1.8	6.2	12.5	15.1	19.8	14.1	9.3	6.8
23	1.7	6.0	12.0	14.4	20.1	14.1	9.5	6.1
24	2.2	6.8	14.8	16.0	18.0	14.3	9.6	5.5
25	2.3	7.0	12.6	16.0	16.3	13.8	9.3	5.6
26	3.0	7.2	11.1	16.2	16.4	13.8	9.1	6.0
27	4.1	8.4	10.9	16.6	16.6	14.6	8.7	5.3
28	3.8	7.8	12.4	17.6	17.7	15.4	8.2	4.3
29	4.1	8.7	12.7	17.0	17.2	15.2	8.1	4.6
30	3.6	9.8	13.9	18.9	18.8	15.8	8.3	6.0
31		9.5		18.9	17.4		8.7	
Means	2.3	5.4	11.1	15.8	18.0	15.1	10.7	6.8

Table 5. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 19, Little Codroy River, Newfoundland, 1961.

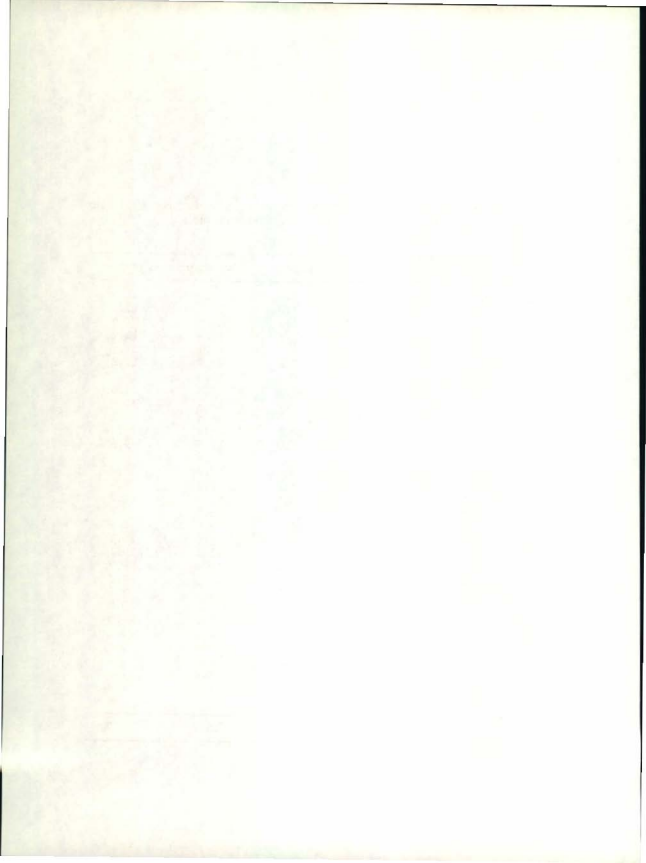
Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	2.9	5.1	12.8	15.4	17.4	13.4	9.9
2	...	3.0	5.6	11.2	16.3	16.2	14.5	9.8
3	...	1.8	5.6	12.7	17.5	15.8	14.9	10.0
4	...	2.1	5.5	13.9	18.0	16.1	15.7	10.0
5	...	2.6	6.4	15.5	18.2	16.9	15.3	10.3
6	...	2.6	6.1	15.3	19.4	17.3	14.6	10.8
7	...	3.1	6.5	16.0	19.4	14.6	14.1	10.1
8	...	3.8	6.2	16.2	20.4	14.6	13.8	9.8
9	...	3.5	6.1	18.0	21.2	16.3	14.5	9.5
10	...	2.4	7.2	15.4	20.2	16.8	14.1	9.4
11	...	3.2	7.1	15.1	20.7	16.1	12.5	8.5
12	...	3.6	6.6	16.3	20.5	16.6	12.4	8.6
13	...	3.1	7.8	15.7	20.9	15.0	13.2	8.9
14	...	3.2	7.3	15.8	20.2	13.2	13.3	9.0
15	...	3.7	7.5	17.1	18.5	17.1	13.7	9.0
16	...	3.3	7.9	16.7	18.1	16.2	13.9	8.8
17	...	3.5	8.0	15.6	17.7	13.7	13.0	8.8
18	...	3.9	9.5	17.9	17.6	14.1	12.6	8.9
19	...	4.2	11.1	15.3	18.6	15.1	12.8	8.1
20	...	3.3	11.3	18.3	18.7	15.3	12.7	8.1
21	...	4.0	11.4	19.2	19.1	15.0	11.9	7.6
22	...	4.5	11.9	18.3	16.5	14.9	11.1	7.3
23	...	3.9	11.1	19.0	17.1	16.5	10.8	8.3
24	...	3.8	11.0	19.5	18.1	16.9	10.4	8.7
25	3.7	4.6	12.3	19.4	17.5	17.1	10.3	8.6
26	2.1	4.9	12.4	18.6	18.1	19.3	12.0	7.9
27	2.4	5.0	11.6	18.3	14.6	18.4	12.1	8.3
28	3.7	4.7	11.7	17.1	14.6	16.0	10.7	8.8
29	3.5	5.1	12.4	17.5	16.4	15.6	10.2	7.9
30	2.8	5.0	13.6	17.6	16.6	13.3	10.7	7.7
31		4.8		15.7	16.4		10.1	
Means	3.0	3.6	8.8	16.5	18.2	15.9	12.8	8.9

Table 6. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) near station 19, Little Codroy River, Newfoundland, 1962.

Day	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	4.7	5.5	13.3	15.2	16.6	12.2	9.3
2	...	3.9	4.7	13.6	15.0	16.0	12.1	9.3
3	...	4.7	5.2	10.8	16.4	14.2	12.0	8.6
4	...	4.4	5.8	11.4	15.7	14.1	11.9	8.3
5	...	2.6	6.8	11.6	15.7	14.1	11.0	9.0
6	...	2.8	5.8	11.8	15.0	14.1	10.4	8.8
7	...	3.5	6.1	11.2	15.6	14.4	10.2	7.9
8	...	4.3	6.0	11.4	16.5	14.9	12.2	8.1
9	...	3.7	5.8	11.5	15.5	15.7	10.9	8.0
10	...	3.1	6.3	11.8	15.4	15.3	10.4	7.4
11	...	3.7	6.7	11.9	13.7	13.6	10.1	8.2
12	...	3.8	7.0	11.6	14.4	12.5	10.8	8.8
13	...	4.4	6.9	11.9	15.2	13.0	10.1	8.4
14	...	4.5	7.7	11.8	15.9	14.1	...	7.8
15	...	4.1	8.4	12.1	14.4	13.8	...	7.6
16	...	4.4	9.2	13.4	14.1	13.4	...	8.5
17	...	4.5	9.0	13.1	14.8	13.7	...	7.9
18	3.3	4.6	7.7	13.0	15.0	12.5	...	7.2
19	2.7	4.2	7.7	13.4	14.8	13.0	...	7.6
20	4.0	4.2	7.4	13.1	14.1	12.8	...	7.0
21	3.9	4.1	9.0	13.8	14.6	13.2	...	5.9
22	2.7	4.7	9.9	13.8	14.3	12.6	...	7.0
23	3.5	4.5	10.2	13.8	14.6	12.2	...	7.9
24	2.7	4.8	10.8	11.8	14.9	12.4	...	7.0
25	2.3	4.7	10.0	14.1	14.9	12.8	...	7.0
26	3.2	4.6	10.9	14.2	15.0	12.1	8.9	7.2
27	3.2	4.7	9.6	14.2	15.7	12.2	8.3	6.9
28	3.0	4.8	10.8	13.0	16.8	12.2	7.4	6.5
29	3.3	5.3	12.2	14.6	17.0	11.8	9.2	6.7
30	4.9	4.9	12.7	14.9	16.4	11.7	8.3	6.5
31		5.4		14.7	16.7		8.2	
Means	3.3	4.3	8.1	12.9	15.3	13.5	10.3	7.7

Table 7. The mean daily and mean monthly water temperatures (°C) near station 19, Little Codroy River, Newfoundland, 1963.

Day	May	June	July	August	September	October
1	...	6.1	12.0	17.8	14.0	11.4
2	...	5.4	9.5	17.0	14.2	11.5
3	...	6.5	11.2	15.6	14.4	11.9
4	...	6.3	12.1	17.2	14.4	11.9
5	...	6.3	12.0	16.9	13.9	11.6
6	...	6.2	11.5	17.2	13.7	11.2
7	...	6.6	11.3	18.7	13.8	10.7
8	...	6.3	13.0	19.5	13.7	11.0
9	...	5.7	12.8	19.5	14.4	10.2
10	...	6.1	12.2	17.6	14.3	9.9
11	...	6.2	13.5	18.3	13.0	10.1
12	...	6.8	13.7	17.0	13.5	9.6
13	4.8	7.5	14.2	16.9	13.6	9.6
14	3.8	6.7	14.8	15.6	12.9	8.8
15	3.0	7.8	14.4	15.8	12.7	9.4
16	3.8	9.0	17.1	15.7	12.9	10.0
17	3.7	8.4	17.0	15.8	13.3	9.2
18	3.8	8.5	14.5	15.9	13.4	8.7
19	3.7	8.9	14.2	15.8	14.6	10.1
20	4.5	10.6	14.0	16.3	13.8	10.1
21	4.1	11.2	15.4	16.0	12.0	9.7
22	4.3	9.7	16.8	15.5	11.5	7.8
23	4.4	8.8	16.8	15.4	...	7.5
24	4.8	9.5	17.4	14.1	...	10.0
25	4.6	10.0	16.7	13.1	...	7.8
26	4.8	9.8	17.9	14.3	...	...
27	5.5	10.5	17.8	13.8	...	...
28	5.5	9.6	17.9	13.7	11.0	...
29	5.6	10.1	17.8	14.4	11.2	...
30	6.1	9.8	18.7	14.4	11.9	...
31	5.9		18.4	14.2		...
Means	4.6	8.0	14.7	16.1	13.7	10.0



APPENDIX L

The mean daily and mean monthly water depths (ft) at
the counting fence, Little Codroy River, Newfoundland,
1955-63.

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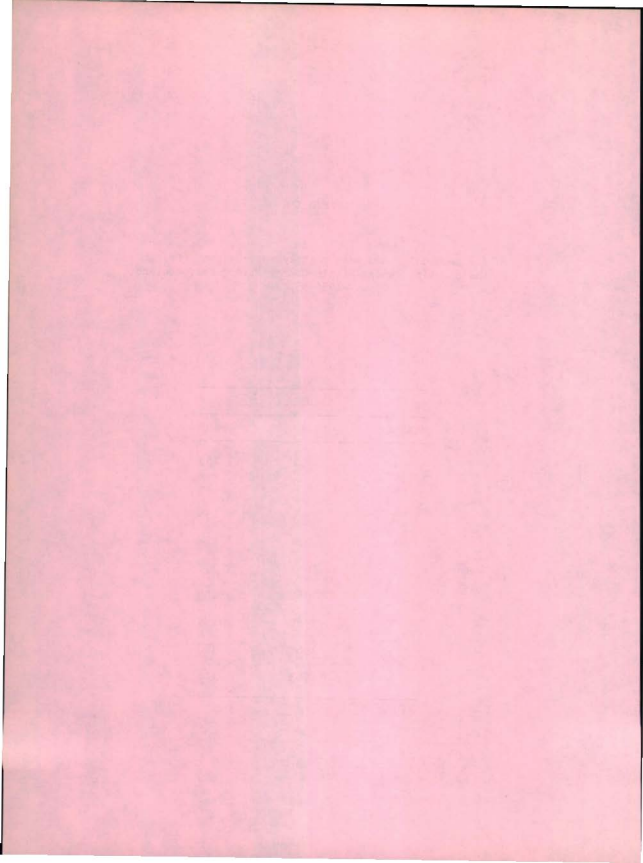


Table 1. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1955.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	7.7	...	8.1	8.2	8.6	8.6
2	...	7.6	7.6	8.3	8.4	8.9	8.4
3	...	7.6	7.3	8.6	8.4	8.5	8.2
4	...	7.5	7.4	8.8	8.5	8.3	8.1
5	...	7.7	7.7	8.6	8.4	8.2	8.1
6	...	7.7	7.6	8.7	8.4	8.2	...
7	...	7.6	7.6	8.3	8.3	8.0	8.3
8	...	7.6	7.7	9.0	8.4	7.8	8.4
9	...	7.7	7.6	8.7	8.2	8.0	8.5
10	...	7.6	7.5	8.2	7.8	8.3	9.0
11	...	7.6	7.5	8.0	7.7	8.7	8.8
12	...	7.4	7.4	8.2	8.0	8.8	9.0
13	...	7.4	7.2	8.1	8.5	8.4	9.0
14	...	7.8	7.3	7.9	8.3	8.2	8.6
15	...	7.8	7.3	8.1	8.2	8.2	8.8
16	7.8	7.6	7.4	8.6	8.4	8.8	8.6
17	8.0	7.3	8.4	8.4	8.4	8.6	8.5
18	7.9	7.3	8.6	8.4	8.7	8.6	...
19	7.9	7.5	8.8	8.5	8.3	8.8	...
20	...	7.5	8.6	8.6	8.3	9.0	...
21	...	7.6	8.9	8.6	8.6	8.8	...
22	...	7.6	8.8	8.5	10.0	8.4	...
23	...	7.6	8.6	8.4	8.8	8.1	...
24	...	7.6	8.7	8.1	8.2	8.0	...
25	...	7.6	8.4	8.6	8.0	8.2	...
26	...	7.7	8.1	8.4	9.0	8.7	...
27	...	7.5	8.1	8.2	8.5	8.6	...
28	7.2	7.3	8.0	8.3	8.2	9.0	...
29	7.6	7.2	8.0	8.4	9.0	9.3	...
30	7.5	7.4	7.8	8.4	9.0	8.9	...
31	7.7	7.6	7.8	8.2		8.8	
Means	7.7	7.6	7.9	8.4	8.4	8.5	8.0

Table 2. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1956.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	7.8	7.5	7.3	7.2	7.2	7.1
2	...	8.0	7.5	7.4	7.3	7.4	7.0
3	...	8.0	7.5	7.5	7.5	7.7	6.8
4	...	7.7	7.4	7.6	7.5	7.8	6.9
5	...	8.1	7.4	7.7	7.6	7.9	6.9
6	...	8.2	7.3	7.7	7.5	7.8	6.8
7	...	8.1	7.4	7.8	7.6	7.3	6.7
8	...	8.2	7.7	7.8	7.6	8.4	6.8
9	...	8.0	7.7	7.8	7.4	8.1	7.1
10	...	7.8	7.9	7.7	7.2	7.4	7.9
11	...	8.0	8.1	7.7	7.3	7.1	7.7
12	...	8.2	8.0	7.8	7.2	6.8	7.6
13	...	8.2	7.8	7.6	7.2	6.8	8.6
14	...	7.8	7.6	7.4	7.3	6.7	8.8
15	...	7.6	8.4	7.5	8.0	6.6	8.3
16	...	7.7	8.1	7.5	7.7	6.7	7.8
17	...	7.5	7.9	7.4	7.4	6.9	8.0
18	...	7.5	7.8	7.5	7.5	7.2	8.0
19	...	7.5	7.5	7.7	8.1	7.3	7.9
20	...	7.5	7.4	7.9	7.6	7.0	7.9
21	...	7.6	7.4	7.7	7.5	7.2	8.1
22	...	8.0	7.4	7.6	7.6	7.0	9.0
23	...	8.0	7.4	7.4	7.8	7.0	8.9
24	...	7.7	7.5	7.4	7.4	7.4	8.5
25	8.1	7.6	7.7	7.6	7.2	7.2	7.8
26	7.9	7.9	7.7	7.7	7.2	6.7	7.3
27	7.6	7.8	7.7	7.8	6.9	6.7	7.8
28	7.6	7.6	7.7	7.8	6.7	6.6	9.0
29	7.9	7.6	7.8	7.9	6.9	6.6	8.5
30	8.0	7.6	7.9	7.6	7.0	6.7	8.6
31	8.0		7.5	7.3		7.0	
Means	7.8	7.8	7.7	7.6	7.4	7.2	7.8

Table 3. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1957.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	8.2	7.8	8.2	7.8	7.4	7.5	7.3
2	8.6	7.9	8.2	7.9	7.3	7.9	7.3
3	8.8	8.1	8.0	8.0	7.4	8.2	7.5
4	8.3	7.7	7.8	7.8	8.0	7.7	7.9
5	7.8	7.8	7.8	7.8	7.6	7.4	8.5
6	7.6	7.7	7.9	8.0	7.7	7.1	8.2
7	7.6	7.6	7.7	7.8	7.8	7.2	7.8
8	7.9	8.1	7.5	7.6	7.9	7.6	...
9	8.1	7.8	7.6	7.6	7.8	7.8	...
10	8.2	7.8	7.6	7.8	7.7	7.8	...
11	8.2	7.9	7.9	7.8	7.6	7.8	...
12	7.9	7.8	7.8	7.8	7.6	7.5	...
13	8.0	7.9	7.9	7.7	7.6	7.7	...
14	8.0	7.8	7.8	7.7	7.7	7.5	...
15	8.0	7.6	7.8	7.7	7.5	7.2	...
16	8.1	7.7	7.9	7.6	7.4	7.1	...
17	7.7	7.7	7.8	7.6	7.4	7.2	...
18	7.8	7.3	7.5	7.5	7.3	7.4	...
19	7.7	7.5	7.3	7.3	7.1	7.4	...
20	7.3	7.6	7.4	7.4	7.4	7.7	...
21	7.5	7.5	7.5	7.4	7.7	7.9	...
22	7.5	7.3	7.4	7.2	7.8	7.7	...
23	7.5	7.2	7.5	7.2	8.0	7.8	...
24	7.7	7.4	7.5	7.5	8.1	7.8	...
25	7.9	7.5	7.4	7.6	8.1	8.2	...
26	8.0	7.5	7.5	7.6	8.2	7.7	...
27	7.8	7.6	7.6	8.0	8.3	7.5	...
28	8.0	7.7	7.6	8.2	8.5	7.7	...
29	8.3	8.0	7.5	7.8	7.9	8.0	...
30	8.0	8.1	7.3	7.4	7.4	7.6	...
31	7.8		7.7	7.5		7.4	
Means	7.9	7.7	7.7	7.7	7.7	7.6	7.8

Table 4. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1958.

Day	April	May	June	July	August	September
1	...	...	8.2	8.2	8.2	8.4
2	...	...	8.2	8.3	8.2	8.4
3	...	...	8.1	8.3	8.2	8.1
4	...	...	8.0	8.2	8.0	7.9
5	...	...	7.8	8.2	7.8	8.0
6	...	...	8.1	8.0	7.8	7.9
7	...	...	8.0	7.8	7.7	8.0
8	...	7.8	8.1	7.7	7.7	8.8
9	...	8.2	8.0	7.8	7.9	8.6
10	...	8.2	7.9	7.6	8.2	8.4
11	...	7.7	7.8	7.4	8.1	8.8
12	...	7.5	7.7	7.6	7.9	8.7
13	...	7.5	7.7	7.7	7.8	8.6
14	...	7.5	7.9	7.5	7.8	8.6
15	...	7.4	8.5	7.6	7.8	8.4
16	...	7.4	8.7	7.9	8.0	8.7
17	...	7.5	8.6	8.2	8.0	8.3
18	...	7.5	8.5	8.2	8.2	8.0
19	...	7.7	8.3	8.2	8.3	7.9
20	...	8.0	8.1	8.3	8.3	7.9
21	...	8.1	8.0	8.1	8.1	7.8
22	...	8.8	7.8	7.9	7.9	7.7
23	...	8.6	8.1	8.0	7.8	7.9
24	8.5	8.2	8.0	7.9	7.6	8.1
25	8.7	7.9	7.7	7.8	7.5	8.2
26	8.2	8.0	7.5	7.7	8.0	8.3
27	7.4	8.7	8.0	7.6	8.2	8.3
28	7.0	8.2	8.6	7.5	8.2	8.2
29	7.4	8.7	8.4	7.7	8.2	8.4
30	8.3	8.9	8.2	8.1	8.2	...
31		8.5		8.4	8.2	
Means	7.8	8.0	8.1	7.9	8.0	8.2

Table 5. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1959.

Day	May	June	July	August	September	October
1	...	8.0	7.8	8.0	8.0	7.8
2	...	8.1	7.6	8.2	8.5	7.9
3	...	8.2	7.8	8.0	8.2	7.9
4	...	8.6	7.8	8.0	8.1	8.2
5	...	8.2	7.8	8.1	8.3	8.2
6	7.9	8.4	7.9	8.3	8.2	8.2
7	8.2	8.2	7.9	8.3	8.0	8.1
8	8.4	8.1	8.1	8.4	8.0	8.0
9	8.5	8.1	8.1	8.3	8.0	8.0
10	8.4	8.1	7.9	8.0	7.8	8.2
11	8.3	8.2	8.0	8.0	7.8	8.1
12	8.5	8.0	8.0	8.0	8.0	8.2
13	8.6	8.2	7.8	8.0	8.0	8.8
14	8.6	8.2	7.7	8.0	8.2	8.6
15	8.8	8.2	7.7	7.9	8.4	8.2
16	8.8	8.1	7.6	8.0	8.4	8.1
17	8.6	8.1	7.8	8.1	8.2	8.1
18	8.5	8.1	8.1	8.3	8.1	8.9
19	8.1	8.3	8.2	8.4	8.0	9.1
20	8.3	8.6	8.3	8.2	7.9	8.5
21	8.2	8.6	8.0	8.2	7.8	8.0
22	8.4	8.4	8.0	8.1	8.3	7.6
23	8.8	8.4	8.0	8.0	8.1	7.4
24	8.6	8.3	7.9	7.7	7.9	7.4
25	8.2	8.0	8.1	7.7	8.0	...
26	8.3	7.8	8.0	7.9	7.8	...
27	8.4	7.8	7.9	7.8	7.7	...
28	8.3	7.7	7.8	7.8	7.6	...
29	8.2	7.6	7.6	8.0	7.6	...
30	8.1	7.8	7.5	8.0	7.8	...
31	8.5		7.6	7.9		...
Means	8.4	8.1	7.9	8.0	8.0	8.2

Table 6. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1960.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	7.1	7.4	7.2	7.0	7.4	7.5
2	...	7.0	7.2	7.2	7.6	7.5	7.7
3	...	7.0	7.3	7.4	7.5	7.3	8.6
4	...	7.0	7.2	7.4	7.4	8.0	8.4
5	...	7.2	7.4	7.6	7.6	7.8	8.3
6	...	7.6	7.5	7.6	7.6	7.8	8.2
7	7.7	7.6	7.4	7.7	7.5	8.4	8.0
8	7.8	7.5	7.4	7.5	7.5	8.5	7.6
9	7.9	7.4	7.6	7.7	7.4	8.4	7.5
10	8.2	7.4	8.0	7.7	7.1	8.0	7.3
11	8.3	7.6	7.7	7.5	6.9	7.9	7.8
12	8.3	7.9	7.6	7.5	7.1	7.9	7.6
13	8.0	7.7	7.5	7.1	...	8.0	7.4
14	8.1	7.5	7.5	7.2	7.7	7.5	7.3
15	8.3	7.2	7.2	7.2	7.8	7.4	7.2
16	8.4	7.2	7.1	7.1	7.4	7.4	7.4
17	8.2	7.3	7.1	6.8	7.1	7.4	8.3
18	7.9	7.4	7.1	7.0	7.5	7.8	8.5
19	7.3	7.1	7.0	7.0	7.4	7.9	8.1
20	6.6	7.2	7.1	6.9	7.2	7.8	8.0
21	6.8	7.2	7.6	7.1	7.3	9.3	7.8
22	6.8	7.2	7.6	7.4	7.3	9.0	7.8
23	7.1	7.2	7.7	7.7	7.2	8.2	7.6
24	7.2	7.3	7.9	7.7	7.2	7.9	7.6
25	7.1	7.4	7.6	7.5	6.9	7.9	7.6
26	7.5	8.0	7.4	7.4	7.0	8.2	7.4
27	7.3	7.7	7.2	7.4	7.1	8.3	7.6
28	7.2	7.5	7.2	7.1	7.2	7.7	7.5
29	7.2	7.3	7.2	7.1	7.1	7.5	7.2
30	7.2	7.3	7.2	7.2	7.1	7.4	7.8
31	7.2		7.3	7.1		7.4	
Means	7.6	7.4	7.4	7.3	7.3	7.9	7.8

Table 7. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1961.

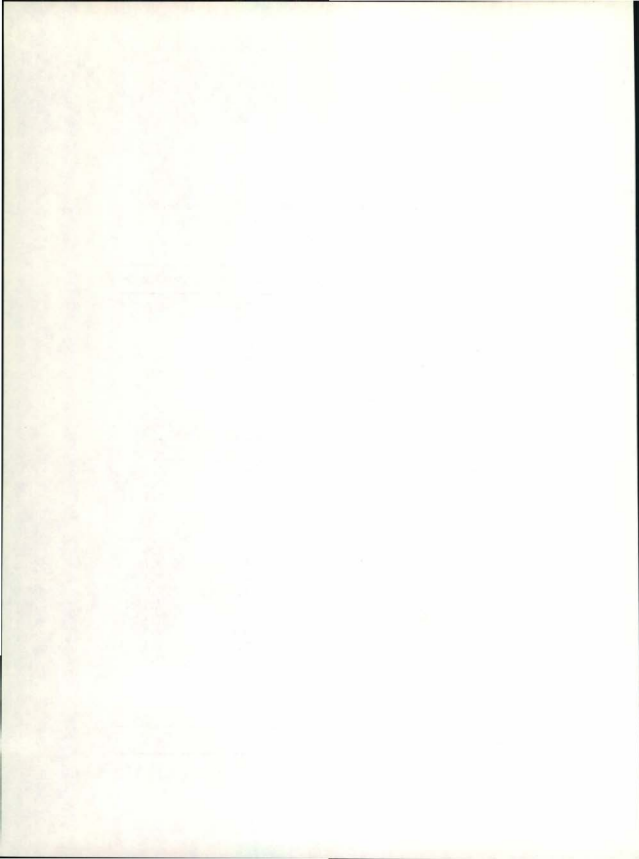
Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	10.8	10.0	7.6	7.4	7.1	7.9
2	...	10.3	9.9	7.6	7.1	6.9	7.6
3	...	10.4	9.7	7.3	6.9	7.1	7.2
4	...	10.2	9.6	7.0	6.9	7.5	7.1
5	...	9.7	9.5	7.1	7.9	8.2	7.2
6	...	9.8	9.3	7.1	7.3	7.8	7.3
7	...	9.7	9.1	7.1	7.1	7.6	7.4
8	...	9.6	9.1	7.3	6.9	7.4	7.7
9	...	9.7	9.1	7.4	7.1	7.4	8.0
10	...	9.9	9.1	7.3	7.3	7.6	8.4
11	...	9.9	9.3	7.4	7.4	7.3	8.0
12	...	9.7	9.4	7.7	7.5	7.2	7.6
13	...	9.6	9.5	7.6	7.2	7.4	7.3
14	...	9.8	9.3	7.6	7.1	7.5	7.2
15	...	9.7	9.1	7.4	7.4	8.5	7.6
16	...	9.4	9.1	7.5	7.5	9.1	7.4
17	...	9.3	7.9	7.6	...	8.3	7.4
18	...	9.4	7.3	7.2	...	7.8	7.6
19	...	9.4	7.2	6.9	...	7.6	...
20	...	9.3	7.3	7.0	7.0	7.5	...
21	...	9.2	7.3	7.0	7.0	7.8	...
22	...	9.0	7.2	6.9	7.0	7.7	...
23	...	9.2	7.1	7.0	7.5	7.6	...
24	...	9.4	7.2	7.1	7.6	7.6	...
25	10.0	9.4	7.5	7.1	7.6	7.8	...
26	10.0	9.4	7.8	7.3	7.7	7.9	...
27	10.3	9.5	7.6	7.4	7.9	7.8	...
28	10.8	9.4	7.4	7.7	7.6	7.8	...
29	10.9	9.4	7.5	7.8	7.6	7.8	...
30	10.5	9.7	7.5	7.6	7.5	7.7	...
31	11.7		7.8	7.5		7.9	
Means	10.6	9.6	8.4	7.3	7.3	7.7	7.6

Table 8. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1962.

Day	May	June	July	August	September	October
1	...	8.4	8.4	8.3	8.2	8.4
2	...	8.5	8.5	8.3	8.3	8.4
3	8.5	8.5	8.4	8.1	8.2	8.2
4	8.6	8.4	8.4	8.1	7.9	8.2
5	8.7	8.4	8.1	8.1	7.8	7.9
6	8.7	8.6	8.1	8.0	7.7	7.7
7	8.9	9.0	8.8	8.1	7.8	7.9
8	9.2	8.6	8.5	8.4	7.8	8.7
9	9.0	8.3	8.3	8.0	7.9	8.6
10	8.6	8.3	8.0	7.8	7.9	8.4
11	8.2	8.4	8.1	7.9	8.1	8.8
12	8.0	8.7	8.1	8.1	8.6	8.9
13	7.8	8.3	8.1	8.2	8.7	9.3
14	7.8	8.2	8.2	8.4	8.5	9.0
15	7.9	8.3	8.3	8.8	8.8	8.8
16	8.0	8.4	8.3	8.6	8.7	8.5
17	8.1	8.6	8.3	8.4	8.5	8.7
18	8.4	8.8	8.4	8.5	8.4	8.6
19	8.5	8.5	8.4	8.7	9.1	8.2
20	8.7	8.4	8.5	8.6	8.6	8.2
21	8.6	8.3	8.4	8.3	8.2	8.3
22	8.6	8.2	8.7	8.0	7.9	8.6
23	8.5	8.1	8.3	7.8	7.8	8.3
24	8.2	8.1	8.2	7.9	7.8	8.2
25	8.6	8.2	8.2	7.9	8.4	...
26	8.9	8.2	8.0	8.0	8.3	...
27	8.9	8.1	8.4	8.1	8.1	...
28	8.6	8.1	8.5	8.3	8.0	...
29	8.3	8.2	8.3	8.1	8.0	...
30	8.6	8.2	8.2	8.1	8.3	...
31	8.6		8.2			...
Means	8.6	8.4	8.3	8.2	8.3	8.3

Table 9. The mean daily and mean monthly water depths (ft) at the counting fence, Little Codroy River, Newfoundland, 1963.

Day	May	June	July	August	September
1	...	7.6	7.7	7.6	8.2
2	...	7.5	7.5	7.5	8.0
3	...	7.6	7.9	7.6	7.8
4	...	7.8	8.1	7.7	7.9
5	...	7.8	8.1	7.8	8.0
6	...	7.9	8.0	7.9	7.6
7	...	8.0	7.8	7.8	7.8
8	...	8.0	7.8	7.8	7.9
9	7.9	8.5	7.8	7.8	7.7
10	8.2	8.6	7.9	7.8	7.8
11	7.8	8.4	8.0	7.8	7.6
12	7.6	8.1	7.7	7.7	7.5
13	7.6	8.0	7.6	7.7	7.8
14	7.8	7.8	7.6	7.9	7.6
15	8.0	7.7	7.7	8.5	7.3
16	7.8	7.7	7.8	8.0	7.2
17	8.4	7.8	7.8	7.8	7.4
18	8.3	7.8	7.7	7.7	7.4
19	8.1	7.8	7.8	8.0	7.6
20	8.2	7.9	8.1	8.0	7.7
21	8.5	8.0	8.2	8.0	7.5
22	8.3	8.5	8.1	7.9	7.6
23	8.4	8.1	7.9	7.7	7.5
24	8.4	7.8	7.9	7.9	7.4
25	8.1	7.9	7.7	8.4	7.3
26	8.0	7.9	7.6	7.8	7.3
27	7.9	7.9	7.6	7.6	7.5
28	7.9	7.8	7.6	7.4	...
29	7.8	7.5	7.4	7.5	...
30	7.8	7.5	7.3	7.5	...
31	7.8		7.7	7.7	
Means	8.1	7.9	7.8	7.8	7.6



APPENDIX M

The salinity (‰) of water at the counting fence,
Little Codroy River, Newfoundland, 1962.

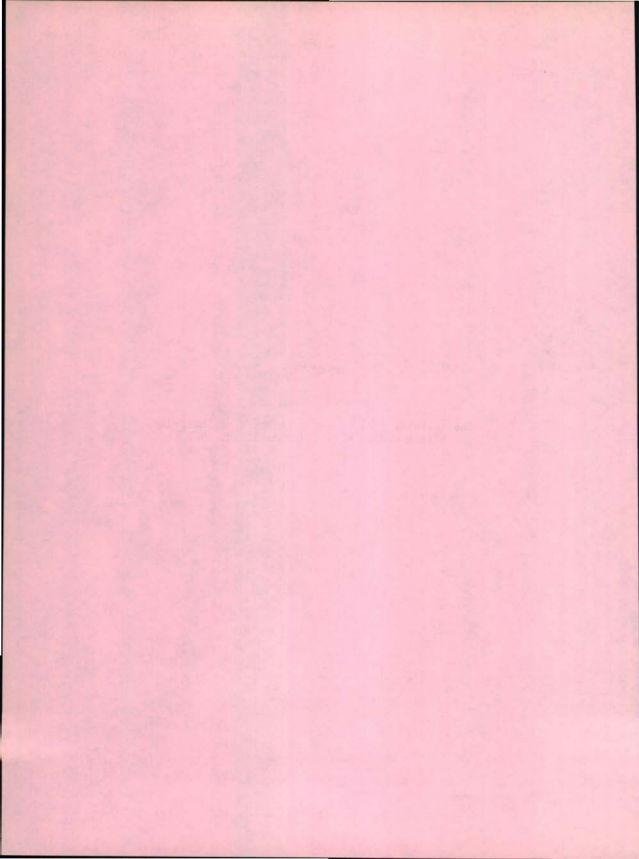


Table 1. The salinity (‰) of water at the counting fence, Little Codroy River, Newfoundland, 1962.

Date	Time (NST)	Depth (ft)	Salinity (‰)		
			surface	mid	bottom
June 4	7	8.3	1.7	3.0	2.7
	12	8.5	1.1	2.4	3.0
	16	8.2	2.6	2.6	3.0
11	6	8.4	1.4	1.4	1.4
	12	8.2	1.4	1.4	1.4
	18	8.4	1.0	1.0	1.2
18	6	8.6	1.2	1.4	2.6
	12	9.0	0.8	1.7	2.6
	18	8.4	0.7	2.2	2.2
25	6	8.3	2.0	2.3	2.5
	12	8.0	1.6	1.6	1.6
	18	8.4	2.2	2.2	2.1
July 9	7	8.5	1.0	1.0	12.2
	12	8.1	1.0	2.0	22.0
	16	8.3	1.0	6.0	6.0
16	7	8.2	13.0	19.0	17.0
	12	8.3	4.0	5.0	23.0
	23	8.4	1.0	14.0	27.0
	12	8.2	8.0	26.0	27.0
	16	8.5	17.0	17.0	24.0
	30	8.1	7.0	18.0	24.0
	16	8.0	7.0	11.0	24.0
	Aug. 6	7	8.0	12.0	22.0
	12	8.0	10.0	17.0	23.0
	16	8.2	20.0	21.0	26.0
	13	7	8.2	7.0	12.0
	16	7.9	5.0	19.0	22.0
20	7	8.4	9.0	8.0	24.0
	12	8.6	8.0	8.0	9.0
	16	8.7	10.0	10.0	22.0
Sept. 4	7	7.9	15.0	21.0	26.0
	12	7.9	11.0	12.0	24.0
	16	8.0	15.0	15.0	26.0
10	7	8.0	12.0	14.0	18.0
	12	7.8	11.0	14.0	24.0
	16	7.7	26.0	20.0	26.0
17	7	8.3	21.0	21.0	21.0
	12	8.6	25.0	25.0	26.0
	16	8.6	19.0	19.0	19.0
26	7	8.3	4.0	9.0	16.0

Cont'd.

Table 1 Cont'd.

Date	Time (NST)	Depth (ft)	Salinity (‰)		
			surface	mid	bottom
Oct. 1	7	8.1	21.0	26.0	27.0
	12	8.5	15.0	16.0	19.0
	16	8.5	9.0	14.0	20.0
8	7	8.6	17.0	17.0	19.0
	12	8.2	18.0	20.0	20.0
	16	8.8	18.0	21.0	21.0
15	7	8.5	9.0	19.0	21.0
	12	9.1	14.0	18.0	17.0
	16	9.0	28.0	28.0	28.0

APPENDIX N

Surface, mid, and bottom water velocities (ft/sec)
measured 300 yards upstream from the counting
fence, Little Codroy estuary, during various phases
of the tide, June-August, 1957.

INDEX		
TABLE	MONTH	PAGE
1	June	169
2	July	171
3	August	173

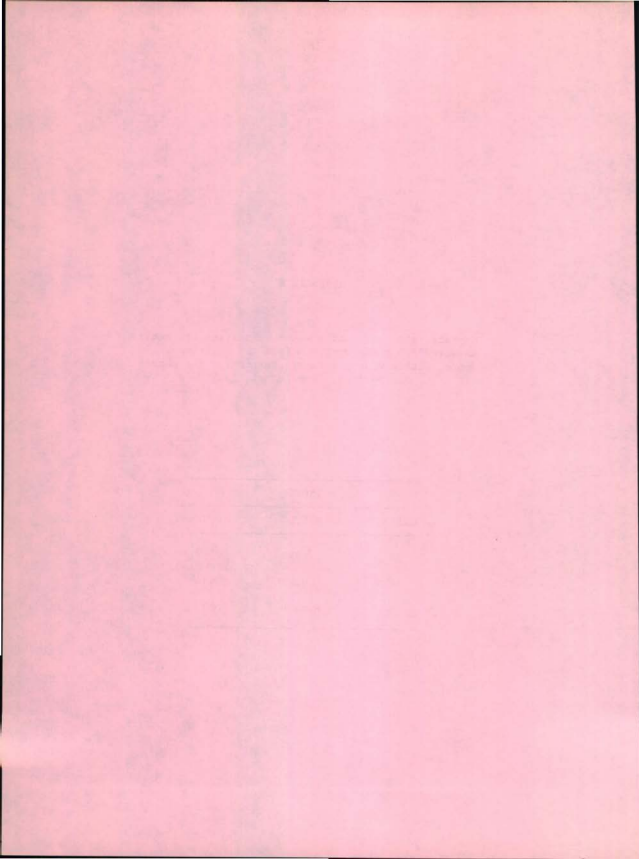


Table 1. Surface, mid, and bottom water velocities (ft/sec) measured 300 yards upstream from the counting fence, Little Codroy estuary, during various phases of the tide, June, 1957.

Date	Time NST	Tide phase	Surface current ft/sec	Mid current ft/sec	Bottom current ft/sec
6	12	3	0.80	0.00	0.00
6	18	1	0.00	-0.45*	-0.45
7	6	1	0.93	0.00	-0.45
7	12	3	0.93	0.65	0.00
7	18	6	0.00	0.00	0.00
8	6	6	0.54	0.00	-0.93
8	12	3	1.17	0.00	-0.45
8	18	5	1.17	0.00	-0.45
9	6	5	0.00	-0.45	0.00
9	12	2	0.93	0.00	0.00
10	6	4	0.82	0.00	-0.45
10	12	2	0.80	0.00	0.00
10	18	4	0.82	0.65	-0.82
11	6	4	1.22	-0.65	-0.65
11	12	2	1.05	0.00	0.00
11	18	4	0.93	0.00	-0.45
12	6	3	1.17	-0.80	-0.80
12	12	2	0.45	0.45	-0.45
13	6	3	0.98	0.00	-0.45
13	18	3	0.80	0.00	0.00
14	6	3	1.17	0.00	-0.45
14	12	1	0.00	0.00	-0.58
14	18	3	0.98	0.00	0.00
15	6	3	1.29	0.00	0.00
15	12	6	0.00	-0.45	-0.65
15	18	3	1.05	0.00	0.00
16	6	3	1.05	0.00	0.00
16	12	6	0.00	0.00	-0.45
17	6	2	1.17	0.00	0.00
17	12	5	0.80	0.00	0.00
18	6	2	0.80	0.00	0.00
18	12	4	0.65	0.00	0.00
18	18	2	0.65	0.00	0.00
19	6	2	0.93	0.00	0.00
19	12	4	0.45	0.00	0.00
19	18	2	0.65	0.00	0.00
20	6	2	0.71	0.00	0.00
21	18	1	0.00	-0.45	-0.45
22	6	1	0.71	0.00	0.00
22	12	3	0.54	0.00	0.00
22	18	6	0.00	0.00	0.00
23	6	1	0.00	0.00	0.00
23	12	2	0.80	0.00	0.00
24	6	6	0.00	0.00	-0.98
24	12	2	0.45	0.45	0.00
24	18	5	0.00	-0.45	-0.80

Cont'd.

Table 1 Cont'd.

Date	Time NST	Tide phase	Surface current ft/sec	Mid current ft/sec	Bottom current ft/sec
25	6	6	0.00	0.00	-0.71
25	12	2	0.71	0.45	0.00
25	18	4	0.80	0.00	-0.45
26	6	4	0.93	-0.45	-0.45
26	12	2	0.93	0.00	0.00
26	18	4	0.80	0.00	0.00
27	6	4	1.17	0.00	0.00
27	12	2	0.80	0.00	0.00
27	18	4	0.82	0.00	0.00
28	6	3	0.71	0.00	0.00
28	12	2	0.88	0.00	0.00
28	18	3	1.05	0.00	0.00
29	6	3	0.82	0.00	0.00
29	12	1	0.00	0.00	0.00
29	18	3	0.65	0.00	0.00
30	6	3	1.05	0.00	0.00
30	12	6	-0.45	-0.65	-0.65
30	18	3	0.82	0.00	0.00

* - denotes water flowing inward (i.e., upstream).

Table 2. Surface, mid, and bottom water velocities (ft/sec) measured 300 yards upstream from the counting fence, Little Codroy estuary, during various phases of the tide, July, 1957.

Date	Time NST	Tide phase	Surface current ft/sec	Mid current ft/sec	Bottom current ft/sec
1	6	3	0.82	-0.45	-0.45
1	12	6	-0.45*	-0.54	-0.80
1	18	3	0.95	0.00	0.00
2	6	2	1.29	0.45	0.45
2	12	5	-0.45	-0.45	-0.80
2	18	2	0.82	0.00	0.00
3	6	2	1.05	0.00	0.00
3	12	4	0.65	-0.45	-0.45
3	18	2	1.05	0.00	0.00
4	6	2	1.05	0.00	0.00
4	12	4	0.80	-0.45	-0.45
4	18	2	0.93	0.00	0.00
5	6	1	0.80	0.00	0.00
5	12	3	0.65	0.00	0.00
5	18	1	0.00	0.65	0.65
6	6	1	0.00	0.00	0.00
6	12	3	1.12	0.00	0.00
6	18	6	0.00	0.00	0.00
7	6	6	0.00	0.00	0.00
7	12	3	0.80	0.00	0.00
7	18	5	-0.45	-0.45	-0.45
8	6	5	0.00	-0.80	-0.93
8	12	2	0.02	0.00	0.00
8	18	5	0.00	0.00	0.00
9	6	4	0.82	-0.65	-0.80
9	12	2	0.88	0.00	0.00
9	18	4	0.65	-0.65	-0.65
10	6	4	0.80	-0.45	-0.45
10	12	2	0.65	0.00	0.00
10	18	4	0.80	0.00	0.00
11	6	4	0.00	-0.65	-0.80
11	12	2	0.80	0.00	0.00
11	18	3	0.65	0.00	0.00
12	6	3	0.93	0.00	0.00
12	12	1	0.00	0.00	0.00
12	18	3	0.65	0.00	0.00
13	6	3	0.80	0.00	0.00
13	12	1	0.00	0.00	0.00
13	18	3	0.88	0.00	0.00
14	6	3	0.98	-0.45	-0.45
14	12	1	-0.45	-0.45	-0.45
14	18	3	0.93	0.00	0.00
15	6	3	0.80	0.00	0.00
15	12	6	0.00	-0.45	-0.65
15	18	3	1.05	0.45	0.00
16	6	3	0.93	0.00	0.00

Cont'd.

Table 2 Cont'd.

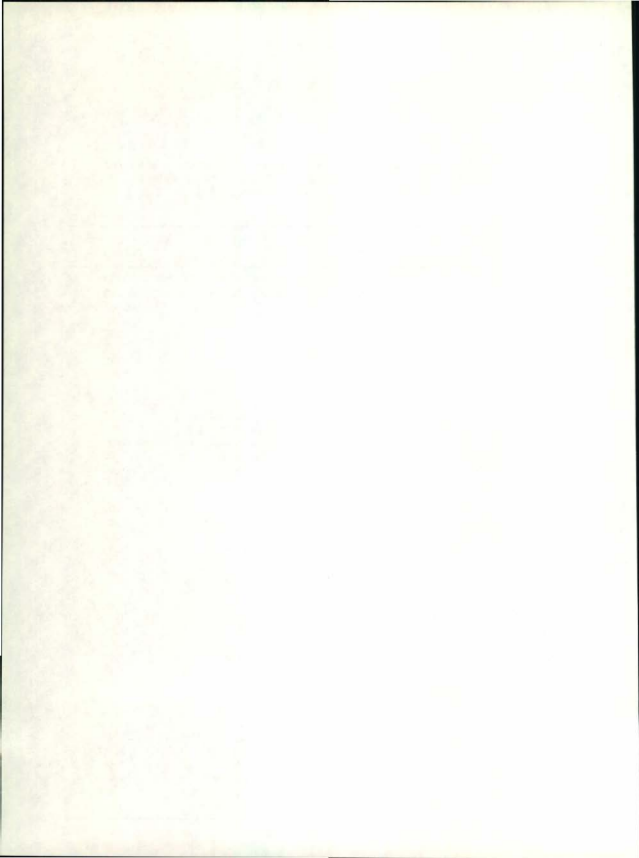
Date	Time NST	Tide phase	Surface current ft/sec	Mid current ft/sec	Bottom current ft/sec
16	12	6	0.00	-0.45	-0.80
16	18	3	-0.98	0.45	0.00
17	6	2	0.80	0.45	0.00
17	12	6	0.00	-0.45	-0.65
17	18	2	1.12	0.00	0.00
18	6	2	0.71	0.00	0.00
18	12	4	0.00	-0.35	-0.45
18	18	2	0.65	0.00	0.00
19	6	2	0.65	0.00	0.00
19	12	4	0.00	0.00	0.00
19	18	2	0.50	0.00	0.00
20	6	1	0.71	0.00	0.00
20	12	4	0.45	0.00	0.00
20	18	1	0.00	0.00	0.00
22	6	1	0.65	0.00	0.00
22	12	3	0.00	0.00	0.00
22	18	6	0.00	0.00	0.00
23	6	6	0.00	-0.45	-0.65
23	12	3	0.00	0.00	0.00
24	6	5	0.00	0.00	-0.45
24	18	5	0.65	0.00	0.00
25	6	4	0.00	0.00	-0.45
25	12	2	0.58	0.00	0.00
25	18	4	0.65	0.00	0.00
26	6	4	0.00	0.00	0.00
26	12	2	0.65	0.00	0.00
26	18	3	0.80	0.00	0.00
27	6	3	0.58	0.00	0.00
27	12	1	0.71	0.45	0.00
27	18	3	0.00	0.00	0.00
29	6	3	0.80	0.00	0.00
29	12	6	-0.58	-0.58	-0.58
30	6	3	0.58	0.00	0.00
30	12	6	-0.45	-0.65	-0.80
30	18	2	0.80	0.00	0.00
31	6	2	0.80	0.00	0.00

* - denotes water flowing inward (i.e., upstream).

Table 3. Surface, mid, and bottom water velocities (ft/sec) measured 300 yards upstream from the counting fence, Little Codroy estuary, during various phases of the tide, August, 1957.

Date	Time NST	Tide phase	Surface current ft/sec	Mid current ft/sec	Bottom current ft/sec
1	6	2	0.88	0.00	0.00
1	12	5	0.00	-0.65*	-0.93
1	18	2	0.00	-0.45	-0.65
2	6	2	0.88	0.00	0.00
2	12	4	0.93	0.00	0.00
2	18	2	0.00	0.00	0.00
3	6	2	1.05	0.45	0.45
3	12	3	0.93	0.00	0.00
3	18	1	0.00	0.00	-0.65
4	6	2	1.17	0.00	0.00
5	6	1	0.45	0.00	0.00
5	12	3	0.88	0.00	0.00
5	18	6	0.65	0.00	0.00
6	6	6	0.77	0.00	0.00
6	12	3	1.54	0.00	0.00
6	18	4	1.36	0.00	0.00
7	6	4	0.80	0.00	0.00
7	12	2	1.05	0.00	0.00
7	18	4	0.80	0.00	0.00
8	6	4	0.00	0.00	0.00
9	6	4	0.80	-0.45	-0.45
9	12	2	0.80	0.00	0.00
9	18	4	0.65	0.00	0.00
12	6	3	0.80	0.00	0.00
12	12	1	-0.45	0.00	0.00
12	18	3	0.80	0.00	0.00
13	6	3	0.65	0.00	0.00
13	18	3	0.65	0.00	0.00
14	6	3	0.00	0.00	0.00
16	12	5	0.00	-0.80	-0.80
16	18	2	0.45	-0.45	-0.45
17	6	3	0.65	0.00	0.00
17	12	4	0.00	-0.65	0.00
17	18	2	-0.45	-0.45	-0.45
19	6	2	0.45	-0.45	-0.45
19	12	4	0.00	0.00	0.00
19	18	1	0.00	0.00	0.00
20	6	1	0.45	0.00	0.00
20	12	4	0.00	0.00	0.00
20	18	6	0.00	0.00	0.00

* - denotes water flowing inward (i.e., upstream).



APPENDIX O

The mean daily and mean monthly water temperatures (°C)
at the counting fence, Little Codroy River, Newfoundland,
1954, 1956-63.

INDEX		
TABLE	YEAR	PAGE
1	1954	177
2	1956	178
3	1957	179
4	1958	180
5	1959	181
6	1960	182
7	1961	183
8	1962	184
9	1963	185

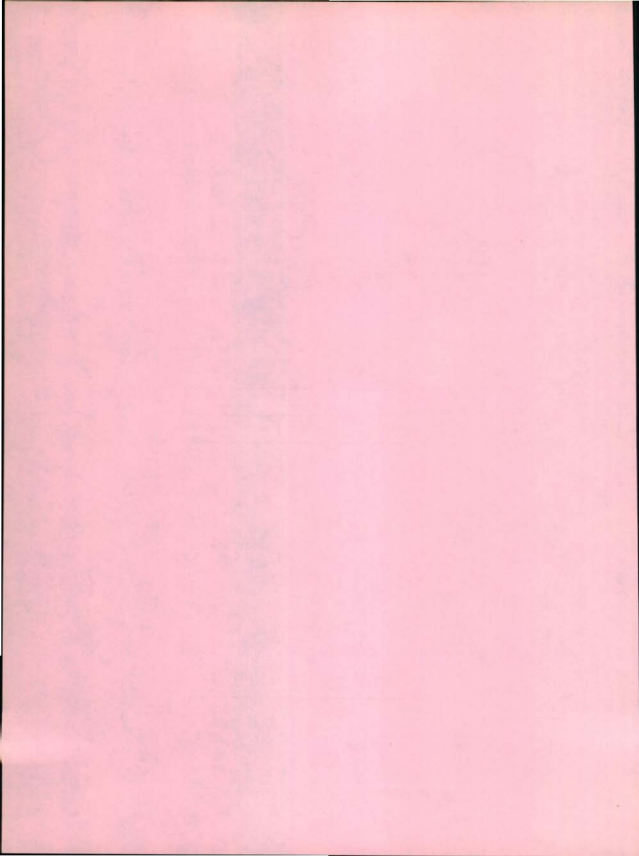


Table 1. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) at the counting fence, Little Codroy River, Newfoundland, 1954.

Day	July	August	September
1	...	19.7	19.4
2	...	19.9	20.0
3	18.5	20.8	20.7
4	16.2	19.4	19.2
5	15.4	17.6	18.9
6	16.3	18.5	19.1
7	16.5	19.1	18.0
8	16.5	20.5	16.4
9	17.4	20.3	16.5
10	18.8	19.8	16.9
11	20.0	17.3	16.0
12	20.3	17.4	...
13	19.6	17.6	...
14	17.8	17.9	...
15	16.7	18.4	...
16	15.4	19.1	...
17	15.5	19.0	...
18	15.7	17.3	...
19	17.4	17.4	...
20	16.6	18.1	...
21	15.0	19.1	...
22	15.1	19.6	...
23	16.4	19.1	...
24	17.7	17.1	...
25	19.0	16.4	...
26	19.8	16.9	...
27	20.4	17.0	...
28	20.2	16.4	...
29	20.2	17.3	...
30	21.6	19.2	...
31	20.5	18.7	...
Means	17.8	18.4	18.3

Table 2. The mean daily and mean monthly water temperatures ($^{\circ}\text{C}$) at the counting fence, Little Codroy River, Newfoundland, 1956.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	6.3	14.0	18.0	16.1	9.2	4.2
2	...	7.6	13.9	17.8	15.8	9.8	3.9
3	...	7.2	13.4	18.2	15.7	10.6	2.8
4	...	7.3	13.0	17.8	15.7	10.6	2.3
5	...	8.2	13.2	18.5	16.4	10.0	1.8
6	...	8.4	13.9	16.5	16.6	9.0	2.0
7	...	6.3	13.9	17.5	16.4	8.2	3.3
8	...	5.4	11.4	17.6	16.4	9.4	4.1
9	...	7.2	11.8	16.0	16.0	9.3	4.8
10	...	6.6	13.3	15.8	15.6	10.0	4.8
11	...	5.6	12.9	16.5	15.1	9.4	2.8
12	...	5.9	13.1	16.9	15.7	8.0	0.9
13	...	6.7	14.2	17.3	16.6	7.2	4.6
14	...	7.7	15.7	18.5	16.7	6.9	4.5
15	...	9.4	15.4	18.0	16.8	6.8	3.0
16	...	10.3	15.5	18.2	15.2	7.7	2.1
17	...	11.0	16.9	18.2	13.9	8.7	3.2
18	...	10.0	16.6	18.8	10.9	7.9	3.1
19	...	9.6	16.6	19.0	9.9	6.2	2.3
20	...	11.1	16.6	19.1	9.3	6.9	2.0
21	...	11.4	17.5	18.0	9.2	6.1	2.2
22	...	11.1	18.1	17.1	9.7	5.4	4.8
23	...	10.3	17.5	17.0	9.1	5.9	5.3
24	...	11.1	16.4	15.0	8.8	9.0	4.4
25	5.3	10.8	15.8	13.9	9.1	6.0	1.8
26	4.8	9.5	14.5	14.8	9.3	3.9	1.6
27	6.0	10.8	14.5	14.9	9.4	4.4	2.0
28	5.8	11.5	15.1	15.0	10.0	4.8	4.6
29	5.3	11.9	15.0	15.4	10.0	4.2	2.8
30	6.8	13.4	15.9	15.6	9.6	4.6	3.4
31	6.5		16.6	15.6		4.1	
Means	5.8	8.9	14.9	17.0	13.2	7.4	3.2

Table 3. The mean daily and mean monthly water temperatures (°C) at the counting fence, Little Codroy River, Newfoundland, 1957.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	3.6	7.5	12.8	12.8	11.2	9.0	6.1
2	3.2	8.4	12.7	13.2	11.7	9.4	6.7
3	3.3	9.1	12.9	12.8	12.1	8.7	7.0
4	3.3	8.2	11.6	12.5	12.4	8.0	6.6
5	3.3	8.9	11.5	12.9	12.0	8.2	7.0
6	3.9	8.4	13.0	13.0	11.8	8.4	7.0
7	4.7	8.7	14.0	13.1	12.6	8.4	6.5
8	5.5	7.2	13.8	13.0	12.8	8.4	...
9	5.4	7.4	14.1	13.6	11.7	8.0	...
10	4.5	8.0	14.4	14.5	10.8	7.2	...
11	4.5	6.6	13.8	14.6	11.2	7.5	...
12	4.9	7.0	14.2	14.1	11.2	7.6	...
13	5.1	7.4	14.1	14.1	10.7	7.9	...
14	5.1	7.0	13.4	15.0	10.8	7.8	...
15	6.1	7.1	12.9	14.4	10.7	7.8	...
16	4.9	6.8	12.9	13.1	11.1	8.3	...
17	4.2	7.2	12.4	13.8	11.6	8.2	...
18	4.7	9.4	12.1	14.5	11.6	8.4	...
19	5.3	10.5	12.2	14.1	11.7	9.0	...
20	5.8	10.4	13.4	13.8	11.8	8.7	...
21	6.9	9.0	12.9	14.1	11.3	7.8	...
22	7.8	9.6	13.0	14.7	10.6	6.9	...
23	7.8	10.1	12.9	14.5	10.6	7.1	...
24	7.2	9.4	12.4	14.4	10.9	6.0	...
25	7.0	9.3	12.1	14.5	10.9	7.1	...
26	7.2	9.2	12.6	13.0	9.8	7.1	...
27	7.2	9.2	13.4	13.0	9.4	6.8	...
28	6.0	8.9	14.0	12.4	8.2	6.4	...
29	6.3	9.6	13.7	11.6	8.1	6.2	...
30	6.2	12.3	13.3	11.4	8.0	5.4	...
31	6.7		13.7	10.8		5.5	
Means	5.4	8.6	13.1	13.5	11.0	5.7	6.7

Table 4. The mean daily and mean monthly water temperatures (°C) at the counting fence, Little Codroy River, Newfoundland, 1958.

Day	May	June	July	August
1	...	10.1	11.7	14.0
2	...	11.3	12.2	14.6
3	...	9.7	12.3	15.4
4	...	8.5	12.8	16.1
5	...	10.3	13.0	15.7
6	...	10.5	13.8	...
7	...	10.2	14.9	...
8	8.2	11.2	15.1	17.1
9	9.5	11.1	14.3	16.5
10	8.3	11.0	14.9	16.1
11	8.1	10.9	16.3	15.5
12	9.3	11.9	16.0	14.8
13	10.6	11.4	15.2	14.5
14	10.0	11.2	15.4	15.0
15	9.4	10.8	16.0	14.3
16	10.1	10.8	16.0	...
17	10.4	10.8	15.9	...
18	10.3	10.8	15.0	...
19	9.6	11.4	14.9	...
20	9.4	12.3	13.7	...
21	10.2	13.3	12.9	...
22	9.9	12.8	13.4	...
23	8.9	12.8	13.8	...
24	8.9	12.6	12.9	...
25	10.4	13.4	12.9	...
26	11.2	13.9	13.1	...
27	10.0	12.3	13.6	...
28	9.8	11.8	14.6	...
29	11.2	12.1	14.9	...
30	11.0	12.3	14.2	...
31	10.0		13.6	...
Means	9.8	11.4	14.2	15.1

Table 5. The mean daily and mean monthly water temperatures (°C) at the counting fence, Little Codroy River, Newfoundland, 1959.

Day	May	June	July	Aug.	Sept.	Oct.
1	...	6.0	13.7	22.3	18.0	13.0
2	...	7.3	14.3	23.0	17.1	10.3
3	...	6.8	12.4	21.4	17.0	8.9
4	...	7.1	12.0	20.4	15.8	9.1
5	...	8.3	13.2	17.6	15.2	8.6
6	6.2	8.7	14.7	14.6	15.8	9.2
7	6.2	7.5	16.2	16.1	16.7	9.3
8	6.1	7.1	15.7	17.1	17.7	9.2
9	4.4	6.2	15.6	17.5	18.5	9.4
10	4.2	7.0	15.4	18.0	19.4	9.8
11	6.3	6.5	15.3	18.0	...	10.2
12	6.6	8.8	16.8	17.6	18.2	10.8
13	6.4	10.3	16.1	17.9	17.5	10.2
14	6.2	12.3	16.2	18.6	15.5	8.5
15	5.9	13.3	16.4	18.8	13.8	7.7
16	4.4	12.9	17.6	18.6	11.9	7.7
17	4.5	12.8	18.2	17.6	9.7	6.6
18	6.0	11.2	...	18.1	9.7	7.4
19	6.9	10.7	...	17.8	9.8	6.3
20	7.6	10.8	19.8	18.3	10.3	4.9
21	7.5	8.7	18.7	18.7	11.4	3.9
22	7.5	8.5	17.9	16.5	11.5	3.4
23	6.1	9.4	19.1	11.6	11.3	4.1
24	7.6	9.8	20.2	13.7	11.8	4.8
25	6.0	11.9	20.4	15.7	11.9	...
26	6.2	13.4	20.5	15.6	11.6	...
27	6.8	14.8	20.5	17.9	12.2	...
28	8.3	16.2	21.0	17.8	13.6	...
29	7.7	17.2	20.9	17.0	13.8	...
30	7.0	15.5	21.8	17.3	14.5	...
31	6.4		21.6	17.7		...
Means	6.3	10.2	17.2	17.7	14.0	8.2

Table 6. The mean daily and mean monthly water temperatures (°C) at the counting fence, Little Codroy River, Newfoundland, 1960.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	...	14.9	17.9	20.9	17.9	15.8	7.0
2	...	15.3	17.8	21.1	17.0	13.5	7.4
3	...	14.6	18.4	19.8	14.6	11.4	8.3
4	...	15.1	18.4	18.4	15.4	12.3	8.0
5	...	15.1	17.3	18.3	16.0	11.3	7.3
6	...	15.4	17.7	17.0	13.6	11.1	5.8
7	6.3	13.5	17.4	16.9	14.3	11.8	4.0
8	6.1	13.4	17.8	17.9	15.0	9.4	2.5
9	6.6	12.7	18.4	18.2	12.0	8.0	2.6
10	5.9	13.7	15.9	18.4	13.4	8.2	4.0
11	7.5	12.9	15.8	19.0	15.3	8.8	5.6
12	8.4	10.2	16.4	18.4	14.7	8.3	3.5
13	6.6	9.6	15.8	19.4	18.9	8.6	2.7
14	5.9	8.5	15.6	20.5	18.7	8.2	3.3
15	8.0	10.2	16.7	21.4	17.0	7.5	3.6
16	9.1	12.4	17.2	22.1	15.8	7.4	4.2
17	8.9	12.5	18.0	22.7	14.4	8.8	6.5
18	7.2	15.4	18.7	23.4	13.7	10.2	6.1
19	8.0	16.3	19.5	22.7	15.2	9.2	4.8
20	8.1	16.2	19.0	22.6	14.4	8.0	4.6
21	7.2	16.6	19.0	22.2	14.2	9.0	4.3
22	7.0	14.5	18.7	19.3	13.9	7.1	3.5
23	8.6	14.5	17.6	19.8	14.2	7.5	3.7
24	8.3	15.5	17.2	19.5	13.7	7.8	3.9
25	9.9	16.0	16.4	18.2	13.0	7.6	2.6
26	10.5	14.9	17.0	16.2	13.3	8.7	2.5
27	10.8	14.0	17.7	16.7	14.1	8.2	2.5
28	12.0	14.9	18.9	17.4	15.6	7.2	0.7
29	12.8	15.8	18.6	16.4	15.7	6.5	0.4
30	14.1	17.1	18.8	18.7	16.1	6.6	3.2
31	14.3		20.3	18.4		7.5	
Means	8.8	14.0	17.7	19.4	14.7	9.1	4.3

Table 7. The mean daily and mean monthly water temperatures (°C) at the counting fence, Little Codroy River, Newfoundland, 1961.

Day	May	June	July	Aug.	Sept.	Oct.
1	...	6.3	13.9	18.5	17.4	13.6
2	...	8.1	15.0	19.5	17.3	14.7
3	...	8.2	13.0	19.5	17.4	15.1
4	...	7.0	13.8	19.9	18.0	15.4
5	...	7.7	14.9	19.2	17.8	17.0
6	...	8.3	17.0	20.6	18.6	15.6
7	...	8.2	18.6	21.6	17.6	14.7
8	...	9.5	19.2	21.5	16.9	14.8
9	...	9.5	20.4	22.1	16.7	13.4
10	...	9.7	19.5	22.1	16.6	11.2
11	...	10.5	18.9	22.3	15.9	9.4
12	...	10.7	19.6	21.9	16.1	10.5
13	...	10.9	19.8	21.5	15.2	9.4
14	...	10.4	17.7	22.3	14.8	8.5
15	...	9.7	17.9	23.0	15.4	12.7
16	...	10.7	19.4	20.7	17.0	13.2
17	...	10.6	20.7	20.0	16.0	11.7
18	...	11.0	19.3	20.3	16.1	12.0
19	...	12.1	18.5	20.7	17.0	...
20	...	13.9	18.5	20.6	16.5	...
21	...	15.3	19.6	21.6	15.8	...
22	6.6	16.7	20.6	20.5	14.4	...
23	5.7	16.9	20.5	19.1	13.8	...
24	4.2	17.2	22.3	19.2	14.7	...
25	6.2	17.7	22.7	18.6	14.9	...
26	8.0	18.3	21.1	18.5	17.0	...
27	10.3	16.8	19.6	16.1	19.5	...
28	8.6	15.7	19.3	15.0	18.5	...
29	7.1	15.8	17.4	15.4	18.3	...
30	8.9	15.6	17.7	16.1	17.4	...
31	6.4	...	18.5	16.7	...	...
Means	7.2	12.0	18.5	19.8	16.6	13.0

Table 8. The mean daily and mean monthly water temperatures (°C) at the counting fence, Little Codroy River, Newfoundland, 1962.

Day	May	June	July	Aug.	Sept.	Oct.
1	...	...	19.0	18.2	17.9	12.0
2	...	7.5	18.2	17.5	17.8	11.9
3	6.9	6.5	17.1	18.3	16.9	11.9
4	5.4	6.8	14.8	19.6	15.8	12.7
5	5.6	8.2	13.8	18.8	14.6	11.9
6	5.6	8.1	12.2	18.3	14.1	10.1
7	4.7	7.3	12.5	18.5	13.8	9.5
8	...	7.5	12.7	18.7	14.6	11.0
9	...	9.4	14.1	18.1	15.6	10.2
10	...	11.5	15.0	17.0	16.6	9.3
11	...	12.2	14.2	16.2	15.2	10.0
12	...	9.2	13.4	17.0	13.6	9.8
13	...	9.3	13.3	17.9	13.0	9.2
14	...	12.1	13.5	18.9	12.9	8.8
15	...	13.1	13.5	18.2	13.0	9.2
16	...	15.3	14.9	17.3	13.6	8.8
17	...	16.9	16.0	17.4	14.5	9.6
18	...	15.4	16.8	16.8	14.1	10.6
19	...	13.9	16.4	17.4	14.3	10.6
20	...	13.0	15.3	16.9	13.6	8.9
21	...	12.1	16.2	16.6	13.5	9.5
22	...	12.5	16.6	17.1	13.0	10.3
23	...	14.8	18.3	17.1	12.6	10.3
24	...	13.8	17.1	16.8	11.6	9.6
25	...	14.0	16.8	17.7	12.5	9.2
26	...	15.2	18.0	18.7	12.7	7.4
27	...	14.6	17.2	19.0	12.3	7.0
28	...	14.8	16.3	19.0	10.9	5.9
29	...	16.5	17.3	18.9	10.5	6.7
30	...	18.1	18.8	17.4	11.1	6.4
31	...	...	18.3	16.5	...	4.6
Means	5.6	12.1	15.7	17.8	13.9	9.4

Table 9. The mean daily and mean monthly water temperatures (°C) at the counting fence, Little Codroy River, Newfoundland, 1963.

Day	May	June	July	August	September
1	...	11.9	14.5	21.5	14.4
2	...	11.9	14.6	20.1	14.8
3	...	12.1	12.9	19.5	15.1
4	...	12.1	13.1	18.6	15.1
5	...	11.0	14.0	17.0	14.7
6	...	9.8	12.9	17.3	14.0
7	...	8.6	13.8	18.5	12.7
8	...	9.0	13.6	19.7	14.1
9	4.9	8.3	15.9	20.4	14.3
10	4.6	8.3	15.2	19.4	14.4
11	3.5	7.9	15.3	19.8	13.9
12	4.3	8.1	15.6	20.2	14.0
13	5.1	7.8	16.3	20.8	13.8
14	5.5	7.3	17.4	19.8	13.1
15	5.4	7.1	18.6	18.5	13.6
16	5.8	7.8	19.3	17.4	13.9
17	5.5	7.3	19.9	16.5	12.8
18	5.0	7.8	19.9	17.1	11.6
19	6.4	8.5	17.2	17.3	12.0
20	6.8	10.2	13.9	17.2	12.0
21	7.1	12.6	14.7	16.6	10.9
22	6.3	13.4	15.5	16.0	10.9
23	7.2	13.0	17.2	16.6	11.4
24	6.6	13.3	18.3	15.8	11.8
25	6.7	13.1	18.6	12.7	11.9
26	7.7	13.0	19.6	12.8	12.2
27	8.8	13.7	19.1	13.3	12.5
28	10.1	12.6	19.2	13.4	...
29	10.7	12.8	20.7	14.6	...
30	11.1	13.8	20.3	14.9	...
31	11.5		21.3	14.8	
Means	6.8	10.5	16.7	17.4	13.2