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OYSTER INVESTIGATIONS AT MALAGASH, N. S.

Report for 1938.

Author

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by
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A. HYDROGRAPHIC DATA

The hydrography and general weather conditions of the Malagash Experimental area was followed from May 14 to September 1. The temperatures and salinities were taken at three places denoted in this report as Station #1, Station #2 and Station #3.

Station #1

The inner end of the dyke.

Station #2

The outer end of the dyke.

Station #3

A point directly in line with Stations #1 and #2 and at a distance from the shore appoFximately equal to the tip of the Fox Island Bar.

The observations at these stations are given in Table I.

TABLE I. Hydrographic data, Malagash Experimental Area.

Date	Time	Tide	Weather	Station #1 Temp.	Station #1 Sal.	Station #2 Temp.	Station #2 Sal.	Station #3 Temp.	Station #3 Sal.
May 14	8 a.m.	H.T.	Cold, dark	8.5					
	5 p.m.	L	Cold, dark	10.5		10.0			
" 16	8 a.m.	H.	Fine	11.5					
	5 p.m.	½T	"	10.5		10.0			
" 17	8 a.m.	¾T	Raining & cold	9.5					
	5 p.m.	¾T	Raining & cold	7.0		7.5			
" 18	8 a.m.	½T	Very cold	4.5		4.0			
	5 p.m.	?		9.0		6.5		6.5	
" 19	8 a.m.	?	Dark and cool	7.5		7.0		7.0	
	5 p.m.	?	Showers and cool	11.0		11.0		10.5	
" 20	8 a.m.	¼T	Fine and warmer	10.5		10.0		10.0	
	5 p.m.	½T	Dark, cool & rain	12.5		12.0		12.0	
" 21	8 a.m.	H	Cold and raining	12.0		12.0		12.5	
	5 p.m.	H	" " "	11.5		11.0		10.0	
" 23	8 a.m.	H	Fine and cool	10.0		10.0		10.5	
	5 p.m.	H	Fine, SW gale	17.0		12.0		12.5	
" 24	8 a.m.	¾T	Cool, dark & windy	13.5		11.5		11.0	
	5 p.m.	¾T	Clear & SW gale	18.5		14.5		13.0	
" 25	8 a.m.	½T	Dark & blowing hard	15.5		14.5		14.5	
	5 p.m.	¾T	Fine & warm, windy	20.0		17.5		15.0	
" 26	8 a.m.	½T	Fine East wind	13.5		12.5		12.5	
	5 p.m.	½T	Fine, strong SW	20.5		17.0		17.0	
" 27	8 a.m.	H	Dark, quite cool	15.5		14.5		12.5	
	5 p.m.	H	Fine quite cool	20.0		18.0		18.0	
" 28	8 a.m.	L	Fine, cool SW wind	13.5		12.0		12.0	
	5 p.m.	¼	Dark, cold, E wind	18.5		18.0		17.5	
" 30	8 a.m.	H	Clear & find calm	14.5		14.0		14.0	
	5 p.m.	L	" " " "	18.5		18.0		No water	
" 31	8 a.m.	¾	Clear strong SW	14.5		14.0		14.0	
	5 p.m.	L	Clear strong SW	20.0		19.0		No water	
June 1	8 a.m.	¾	Clear and warm	14.5		14.0			
	5 p.m.	L	Warm and fine	19.5		19.0			
" 2	8 a.m.	½	Fine, strong SW wind	15.0		15.0			
	5 p.m.	¼	Warm, SW gale	19.5		19.5			
" 3	8 a.m.	¼ R.	Fine SW gale	15.1		15.0			
	5 p.m.	2/3 L	Fine, strong SW gale	19.5		19.0			
" 4	8 a.m.	2/3 R	Fine, strong SW gale	17.5		16.0			
	5 p.m.	2/3 L	Fine, strong SW gale	18.0		17.5			
" 5	8 a.m.	¾L	Dark, high SW wind	17.5		17.0			
" 6	5 p.m.	H	Dark, rain SW	16.5	28.0	17.0	28.0	16.5	27.0
" 7	8 a.m.	H	Fine, SW wind	16.6	27.5	15.2	27.5	15.2	27.5
	5 p.m.	H	Clear SW wind	21.8	27.7	17.5	28.2	16.5	27.7
" 8	8 a.m.	L	Full, strong SW	16.2	26.6	17.5	26.6	16.5	27.1
	5 p.m.	[illegible]	Fine, SW wind	22.5	26.8	19.0	27.2	18.0	27.1

TABLE I - Continued.

Date	Time	Tide	Weather	Station #1 Temp.	Station #1 Sal.	Station #2 Temp.	Station #2 Sal.	Station #3 Temp.	Station #3 Sal.
June 9	8 a.m.	H	Clear N. Wind	20.0	27.4	18.5	26.6	17.8	26.8
"	5 p.m.	R	Clear Strong SW	21.5	27.0	21.5	27.0	19.8	27.1
" 10	8 a.m.	H	Clear, NW gale	16.2	27.9	15.8	27.9	15.5	27.9
	5 p.m.	R	Clear, calm	23.5	28.0	22.5	27.5	19.2	27.9
" 11	8 a.m.	R	Fine and SW breeze	17.2	28.5	17.2	27.9	17.0	27.7
	5 p.m.	L	Rain, E breeze	No water		Dyke open		20.0	27.5
" 13	8 a.m.	R	Rain	18.5	27.0	18.5	27.0	17.5	26.3
	5 p.m.	L	Cloudy	No water		18.5	27.1	18.2	27.1
" 14	8 a.m.	R	Fine, SW breeze	17.5	27.4	17.2	27.7	17.2	27.7
	5 p.m.	L	Fine and warm	No water		20.2	27.5	20.5	27.2
" 15	8 a.m.	R	Warm and calm	17.5	29.1	17.8	29.5	18.0	29.3
	5 p.m.	L	Warm with SW breeze	21.6	29.3	20.8	29.1	20.5	29.3
" 16	8 a.m.	R	Fine, warm and calm	19.0	29.1	18.5	28.0	18.5	28.8
	5 p.m.	L	" " " "	22.2	29.2	21.2	29.2	21.2	28.8
" 17	8 a.m.	R	Dark and raining	19.5	28.4	19.6	28.5	19.8	28.5
	5 p.m.	L	Fine with SW wind	22.5	29.1	21.6	28.5	21.5	28.5
" 18	8 a.m.	R	Dark and SW	19.0	28.2	19.0	28.8	19.8	27.5
	5 p.m.	L	Fine and warm	20.8	28.8	20.2	28.6	20.2	27.1
" 20	8 a.m.	R	Dark and raining	21.8	27.9	21.5	28.0	21.2	28.0
	5 p.m.	L	Clear and fine	19.0	28.3	19.0	28.5	18.8	28.3
" 21	8 a.m.	R	Clear and fine	18.8	28.5	18.5	28.5	18.2	28.4
	5 p.m.	L	Clear and fine	19.5	28.3	19.5	28.3	19.5	28.1
" 22	8 a.m. 5 p.m.	SW gale too strong to get boat off.							
" 23	8 a.m.	L	Strong west gale	22.0	28.3	21.5	28.3	21.0	28.5
	5 p.m.	R	Strong W gale, clear	25.4	28.4	22.8	28.4	22.4	28.4
" 24	8 a.m.	L	Cloudy and calm	22.0	28.0	23.0	28.0	23.0	28.3
	5 p.m.	R	Clear light W wind	26.0	28.4	24.0	27.9	20.3	28.4
" 25	8 a.m.	L	Dull, light rain	21.0	28.1	21.0	28.1	20.5	28.0
	5 p.m.	R	Warm and clear	24.8	28.4	23.5	28.4	22.8	28.2
" 27	8 a.m.	H	Dark and raining	18.5	27.4	19.0	27.4	18.0	28.2
	5 p.m.	L	Cloudy and calm	No water					
" 28	8 a.m.	H	Dark and raining	17.5	27.9	18.8	28.1	18.8	28.5
	5 p.m.	L	Cloudy and cool	No water					
" 29	8 a.m.	H	Raining and cool	17.5	27.5	17.8	27.5	18.2	27.5
	5 p.m.	L	Dark and cool	No water					
" 30	8 a.m.	H	Clear and cool	18.0	26.8	18.2	27.5	18.2	27.5
	5 p.m.	L	Clear and cool	No water					
July 1	8 a.m.	¾R	Fine and clear	18.0	26.5	18.8	26.6	18.6	27.0
	5 p.m.	¾L	Fine, clear & warm	No water					
" 2	8 a.m.	¾R	Cloudy, rain SE	16.8	27.0	17.8	26.5	18.4	26.5
	5 p.m.	¾F	Raining SE wind	17.5	27.0	18.0	27.2	18.0	27.1
" 4	8 a.m.	¾L	Cool and dark	17.5	26.7	18.2	26.7	17.2	27.1
	5 p.m.	H	SE wind and rain	18.2	26.6	18.0	26.6	18.0	26.6
" 5	8 a.m.	¾L	Dark and cool	17.2	26.2	17.2	27.0	17.2	27.1
	5 p.m.	¾	Dark and SW gale	17.8	26.7	17.8	28.3	17.5	28.3
" 6	8 a.m.	¾	Dark and cool	16.5	27.1	16.8	27.1	16.6	27.2
	5 p.m.	H	Clear SW wind	21.0	27.4	18.0	27.7	18.0	27.7
" 7	8 a.m.	½L	Clear, fresh W wind	17.8	27.4	17.0	27.9	17.0	28.2
	5 p.m.	¾	" " " "	22.8	28.2	20.5	28.2	19.5	28.0

Table I - Continued

Date	Time	Tide	Weather	Station # 1 Temp.	Sal	Station # 2 Temp.	Sal.	Station # 3 Temp.	Sal.
July 8	8 a.m.	H	Clear, warm and calm	18.8	28.2	19.0	27.4	18.8	27.5
	5 p.m.	¾R	Clear, SW breeze	25.2	28.8	22.5	28.4	21.5	28.2
" 9	8 a.m.	¼L	Clear, SW gale	18.8	28.2	18.8	28.4	18.8	28.3
	5 p;m.	½R	Clear, SW gale	25.5	28.9	23.5	27.7	23.0	27.7
" 11	8.a.m.	H	Dark, cool, NE wind	20.0	28.4	19.8	28.2	19.2	28.5
	5 p.m.	¾R	Clear, NW breeze	22.8	28.7	23.0	28.3	23.5	28.3
" 12	8 a.m.	H	Dark, SE breeze	19.2	28.0	19.2	28.0	18.8	28.0
	5 p.m.	L	Dark, SE wind	21.0	28.4	21.0	28.2	21.0	28.4
" 13	8 a.m.	¾R	Dark and raining	18.2	28.0	18.2	27.1	18.2	27.0
	5 p.m.	¼L	Dark and raining	20.8	26.8	20.0	27.0	20.0	26.7
" 14	8 a.m.	¾R	Warm and fine	21.0	21.8	19.8	24.2	19.8	27.2
	7 p.m.	½R	Fine, SW breeze	22.8	23.9	23.0	26.5	22.8	26.0
" 15	8 a.m.	¾R	Raining and W wind	20.2	27.1	20.8	27.0	20.8	26.8
	5 p.m.	¼L	Clear SW gale	23.5	26.3	23.0	25.5	22.8	25.3
" 16	8 a.m.	½R	Clear, SW breeze	21.0	26.6	21.0	26.8	21.0	27.4
	5 p.m.	L	Clear SW breeze	22.5	26.7	23.5	26.7	23.5	28.1
" 18	8 a.m.	½R	Dark, SW breeze	20.8	28.5	20.0	28.7	19.5	28.4
	5 p.m.	¼L	Rain, calm	21.5	28.2	20.5	28.1	19.8	28.3
" 19	8 a.m.	½R	Rain calm	20.2	28.4	19.8	28.0	19.8	27.5
	5 p.m.	¾L	" "						
" 20	8 a.m.	¼L	Rain, calm	20.5	28.1	20.[illegible]	27.1	20.2	28.3
	5 p.m.	H	Dark, SW wind	24.5	27.2	21.6	28.8	21.4	28.9
" 21	8 a.m.	¾L	Cloudy, calm	21.8	27.5	21.5	28.1	20.8	27.5
	5 p.m.	¾R	Clear, calm	20.0	28.3	21.0	28.0	21.5	28.0
" 22	8 a.m.	¼L	Dark, SW wind	21.2	26.8	20.0	27.2	21.0	26.2
	5 p.m.	H	Dark and raining	24.0	24.2	21.5	28.8	21.0	27.5
" 23	8 a.m.	¾L	Cloudy high SW wind	21.8	25.5	21.2	23.5	21.0	23.6
	5 p.m.	¼R	Cloudy with rain	25.8	22.8	22.5	26.0	22.5	26.2
" 25	8 a.m.	H	Clear, SW gale	22.5	25.5	22.0	22.5	22.0	22.5
	5 p.m.	¾R	Clear, SW breeze	26.2	27.7	26.2	22.3	26.2	22.3
" 26	8 a.m.	H	Clear, SW gale	22.2	24.3	21.8	26.3	21.5	26.6
	5 p.m.	L	Clear, SW breeze	No water					
" 27	8 a.m.	H	Cloudy, SW breeze	22.5	26.0	21.5	26.2	21.8	26.5
	5 p.m.	L	" with rain	No water					
" 28	8 a.m.	¾R	Clear, NE breeze	21.5	26.5	21.5	26.3	21.2	26.7
	5 p.m.	L	" " "	No water					
" 29	8 a.m.	¾R	Clear, SW wind	21.5	25.0	21.8	25.3	21.8	25.0
	5 p.m.	L	Cloudy, SW wind	No water					
" 30	8 a.m.	¾R	Raining " "	20.8	25.3	20.8	25.3	20.8	25.3
	5 p.m.	¼L	Fine	No water					
Aug. 1	8 a.m.	½R	Fine, calm	22.0	26.5	21.0	27.2	21.0	27.1
	5 p.m.	¼L	Fine with SW breeze	25.0	27.5	22.2	28.2	21.2	28.8
2	8 a.m.	½R	Cloudy, SW wind	21.0	28.3	21.0	28.9	21.0	28.9
	5 p.m.	¾L	Clear, SW gale	22.8	28.4	21.2	28.5	21.0	28.3
3	8 a.m.	½R	Clear, calm	21.5	27.1	20.8	27.6	20.5	28.3
	5 p.m.	¾L	Clear SW breeze	23.5	30.1	24.0	28.2	24.0	29.3
4	8 a.m.	½L	Cloudy, calm	21.8	28.2	22.2	27.6	21.8	28.6
	5 p.m.	H	Clear SW breeze	23.0	28.4	23.0	28.1	22.8	27.5
5	8 a.m.	¾L	Dark, SW gale	23.2	28.2	23.2	28.0	23.0	28.5
	5 p.m.	H	Clear, W wind	26.8	28.0	23.5	28.5	23.5	29.2

TABLE I - Continued

Date	Time	Tide	Weather	Station #1 Temp.	Station #1 Sal.	Station # 2 Temp.	Station # 2 Sal.	Station # 3 Temp.	Station # 3 Sal.
Aug. 6	8 a.m.	H	Clear, calm	24.2	28.9	23.8	27.9	23.0	28.0
	5 p.m.	$\frac{3}{4}$R	Clear calm	25.2	28.1	25.0	28.0	24.5	28.1
" 8	8 a.m.	H	Clear SW breeze	21.8	28.1	21.5	28.1	21.5	28.1
	5 p.m.	$\frac{1}{2}$R	Clear SW breeze	25.2		25.2	29.1	24.5	
" 9	8 a.m.	H	Dark and E breeze	22.0	Sal. at #2 only away at Ellerslie.	22.0	29.1	21.8	
	5 p.m.	$\frac{3}{4}$L	Clear and E breeze	24.2		24.2	28.7	24.0	
" 10	8 a.m.	H	Rain	20.2		20.2	29.5	20.0	
	5 p.m.	$\frac{1}{2}$R	Dark E wind	23.0		23.0	29.5	22.8	
" 11	8 a.m.	$\frac{3}{4}$R	Dark	21.5		21.5	28.3	21.5	
	5 p.m.	L	Dark	21.8		21.8	28.1	21.8	
" 12	8 a.m.	$\frac{3}{4}$R	Dark E wind	20.5		20.5	28.1	20.0	
	5 p.m.	L	Dark and rain	20.8		20.8	27.9	20.5	
" 13	5 p.m.	L	Clear, NE breeze	21.5	27.1	21.8	27.4	21.0	28.0
" 15	8 a.m.	$\frac{1}{2}$R	Dark SW gale	21.0	27.1	20.8	27.1	20.8	21.1
	5 p.m.	$\frac{1}{2}$L	Cloudy, SW breeze	21.8	26.8	21.5	27.0	21.5	27.2
" 16	8 a.m.	$\frac{3}{4}$R	Cloudy, rain	21.0	25.9	20.5	26.6	20.8	26.8
	5 p.m.	$\frac{3}{4}$L	Clear, SW gale	23.2	28.3	23.2	27.9	22.5	28.1
" 17	8 a.m.	L	Clear, SW wind	24.2	27.5	23.5	27.9	23.5	27.9
	5 p.m.	$\frac{3}{4}$L	Clear, strong SW	25.5	28.2	24.5	28.1	23.5	28.3
" 18	8 a.m.	$\frac{1}{4}$L	Dark, light rain	22.8	28.1	22.8	28.0	22.8	27.7
	5 p.m.	$\frac{3}{4}$L	Dark, strong SW	25.2	28.0	23.8	27.2	23.8	28.0
" 19	8 a.m.	$\frac{3}{4}$L	Clear and calm	23.8	27.2	23.5	27.6	23.5	27.7
	5 p.m.	H	Clear and NW wind	25.2	27.7	23.8	27.9	22.8	28.0
" 20	8 a.m.	$\frac{3}{4}$L	Clear and NW wind	22.5	28.2	22.2	28.1	22.0	28.0
	5 p.m.	H	Clear and E wind	23.5	28.5	23.2	28.2	22.2	28.2
" 22	8 a.m.	$\frac{1}{4}$L	Clear and SW wind	21.0	27.9	21.0	27.4	20.8	27.9
	5 p.m.	$\frac{1}{2}$R	Clear, SW gale	26.0	28.2	23.4	28.0	23.4	28.0
" 23	8 a.m.	H	Clear, SW breeze	22.2	27.4	22.0	27.5	22.0	27.7
	5 p.m.	$\frac{1}{2}$R	Clear and calm	27.0	27.0	26.5	27.1	25.5	27.9
" 24	8 a.m.	H	Dark and calm	20.2	27.9	22.2	28.1	22.2	28.0
	5 p.m.	$\frac{1}{2}$R	Dark and raining	21.2	28.2	22.5	27.2	22.5	27.7
" 25	8 a.m.	H	NE gale with rain	19.5	23.3	19.5	23.6	too rough	
	5 p.m.	H	Strong NE gale - could not get out - rain						
" 26	8 a.m.	$\frac{3}{4}$R	Dark strong W wind	18.0	26.2	18.8	26.2	19.0	26.6
	5 p.m.	$\frac{1}{4}$L	Dark	20.5	25.5	20.5	25.5	20.5	25.5
" 27	8 a.m.	$\frac{3}{4}$R	Clear and calm	19.0	22.8	19.0	22.2	19.2	22.3
	5 p.m.	L	Clear W wind	21.5	23.6	22.0	23.6	22.0	24.2
" 29	8 a.m.	$\frac{1}{4}$R	Clear, SW breeze	18.2	24.2	16.8	24.9	17.2	25.5
	5 p.m.	$\frac{1}{2}$L	Clear, SW gale	20.5	26.0	19.2	26.2	19.2	26.8
" 30	8 a.m.	L	Clear, NW breeze	19.2	26.0	18.8	26.2	18.5	26.2
	5 p.m.	$\frac{1}{4}$L	Dark and calm	21.2	26.2	20.2	26.2	19.8	26.2
	8 a.m.	$\frac{3}{4}$L	Clear and SW breeze	18.0	25.5	18.5	25.9	18.8	26.2
" 31	5 p.m.	$\frac{3}{4}$L	Clear and calm	21.0		21.0		20.5	

The temperatures and salinities at two additional stations were also taken at intervals.

Station #4

The "neck" of the Malagash basin. Owing to the strong current through this narrow channel it was often impossible to get bottom temperatures and salinities.

Station #5.

A point in Tatamagouche bay where oysters were planted experimentally the previous autumn; this point being about one-quarter of a mile from the shore just below the old Embree house (now deserted).

Observations at these stations are given in Tables II And III.

TABLE II. Hydrographic data, Malagash Experimental Area.

Station IV

Date	Time	Tide	Temperature	Salinity	Sp. Gr. @ T°
June 7	4:00 p.m.	R	Surface - 16.8	27.7	1.0205 @ 20.4
June 14	4:00 p.m.	½L	Surface - 20.5	27.2	1.0190 @ 25.0
June 20	5:00 p.m.	L	Surface - 19.5	26.7	1.0188 @ 27.2
			Bottom - 19.8	28.4	1.0192 @ 27.4
June 29	4:00 p.m.	L	Surface - 18.9	27.7	1.0215 @ 15.6
			Bottom - 19.1	27.7	1.0215 @ 15.6
July 6	3:50 p.m.	½R	Surface - 18.0	28.1	1.0198 @ 24.4
			Bottom - 17.4	28.2	1.0198 @ 24.8
July 8	12:00 a.m.	¾L	Surface - 19.6	29.9	1.0210 @ 24.8
			Bottom - 19.4	28.2	1.0198 @ 24.8
July 14	10:00 a.m.	H	Surface - 20.5	27.0	1.0188 @ 25.0
			Bottom - 19.4	28.0	1.0195 @ 25.0
July 21	5:00 p.m.	½R	Surface - 21.0	28.4	1.0195 @ 27.4
Aug. 3	6:00 p.m.	H	Surface - 22.6	28.1	1.0202 @ 22.6
			Bottom - 19.0	28.8	1.0208 @ 22.6
Aug. 16	5:00 p.m.	¾L	Surface - 23.0	28.0	1.0200 @ 23.2
			Bottom - 21.8	28.2	1.0202 @ 23.2
Aug. 29	4:00 p.m.	½L	Surface - 20.0	26.8	1.0200 @ 20.0

TABLE III. Hydrographic data, Malagash Experimental Area.

Station V.

Date	Time	Tide	Temperature	Salinity	Sp. Gr. @ T°
June 13	11:00 a.m.	H	Surface - 17.2	28.0	1.0210 @ 18.8
			Bottom - 17.0	28.5	1.0215 @ 18.8
June 20	5:00 p.m.	L	Surface - 18.8	28.2	1.0190 @ 27.4
			Bottom - 18.7	28.7	1.0195 @ 27.2
June 29	3:30 p.m.	L	Surface - 18.6	27.2	1.0212 @ 15.6
			Bottom - 18.7	27.7	1.0215 @ 15.6
July 6	3:30 p.m.	½R.	Surface - 17.7	28.4	1.0200 @ 24.6
			Bottom - 17.7	28.4	1.0200 @ 24.8
July 8	11:30 a.m.	¼L.	Surface - 18.0	28.4	1.0200 @ 24.6
			Bottom - 16.6	28.4	1.0200 @ 24.6
July 14	9:30 a.m.	¾R	Surface - 20.5	27.2	1.0190 @ 25.0
			Bottom - 19.1	28.3	1.0198 @ 25.0
July 21	4:30 p.m.	¾R	Surface - 20.4	28.7	1.0195 @ 27.2
			Bottom - 19.5	28.7	1.0195 @ 27.2
Aug. 3	4:00 p.m.	¾R	Surface - 20.0	28.1	1.0202 @ 22.6
			Bottom - 18.0	28.4	1.0205 @ 22.5
Aug. 16	4:30 p.m.	¾L	Surface - 22.5	28.1	1.0202 @ 22.6
			Bottom - 21.8	28.6	1.0203 @ 22.6
Aug. 27	12:00 a.m.	H	Surface - 22.0	20.9	1.0160 @ 17.5
			Bottom - 20.8	22.2	1.0170 @ 17.5

Hydrographic observations at the "Spat bed" in the North-west arm of Wallace bay are given in Table IV.

TABLE IV. Hydrographic data, "Spat bed", Wallace bay.

Date	Time	Tide	Temperature	Salinity	Sp. Gr. @ T°
June 21	3:00 p.m.	R	Surface - 21.5	23.9	1.0172 @ 22.6
			Bottom - 20.0	23.6	1.0168 @ 22.8
July 1	3:00 p.m.	¾L	Surface - 21.6	23.7	1.0185 @ 15.6
			Bottom - 21.0	24.3	1.0190 @ 15.6
July 7	4:45 p.m.	¾R	Surface - 22.2	22.1	1.0152 @ 25.0
			Bottom - 19.0	24.6	1.0170 @ 25.0
July 16	12:30 p.m.	H	Surface - 23.1	22.5	1.0152 @ 25.8
			Bottom - 22.8	22.2	1.0150 @ 26.0
July 23	3:30 p.m.	½R	Surface - 25.0	23.6	1.0168 @ 22.8
			Bottom - 24.0	24.5	1.0175 @ 22.8
Aug. 6	4:00 p.m.	½R	Surface - 24.8	23.9	1.0172 @ 22.8
			Bottom - 24.0	24.1	1.0172 @ 23.0
Aug. 21	10:30 a.m.	¾L	Surface - 24.5	23.8	L.0182 @ 17.4
			Bottom - 24.5	23.8	1.0182 @ 17.4
Aug. 26	3:30 p.m.	¾L	Surface - 21.0	19.6	1.0150 @ 17.4
			Bottom - 19.6	22.9	1.0175 @ 17.5

B PLANKTON and OYSTER LARVAE

Examination of the plankton with reference to oyster larvae showed five distinct "setting" maxima on July 8, 11, 14, 20 and 23. The largest set took place on July 20 when an average of 19 spat per shell was observed on the Fox Island Bar and 10 spat per shell in the dyke.

Sedimentation

The conditions obtaining in the Malagash Basin suggest an interesting and perhaps important factor in the settlement of oyster larvae.

The floor of the Basin is composed entirely of soft mud flats with a loose top layer. At a very low tide the flats are bare and at a high tide may have 8 to 10 ft. of water over them. Assuming that the amount of loose sedimentary material in the Basin is constant for the period of a tidal cycle, this means that during that period there is an increase in the concentration of sedimentary particles from high to low tide and a decrease from low to high tide. Assuming further that the number of oyster larvae is constant for the same period it will be seen that they are subject to parallel cycle from concentration to dispersion.

It was frequently observed, during the summer's work that few larvae were taken at high or low tide, while tows taken at half tides were comparatively rich in larvae. (It should be noted that tows were not taken in less than 3 ft. of water since the net dragged on the bottom).

If the water was perfectly clear of particles you would expect to find no larvae at infinity dispersion and all larvae at infinity concentration. The same would hold for sediment particles alone and for the number of contacts in the real system in which they are found together, that is, no contacts at infinity dispersion and close packing at infinity concentration.

The observations indicate that at low tides when the contacts between sediment particles and larvae are approaching their maximum, some interaction occurs which reduces the expected large number of larvae in a tow. It seems likely that as the concentration increases some such interaction would take place and that it would taking the form of "clumping" and precipitation.

At any rate, it is indicated that an understanding of the conditions prevailing on mud flats should include a study of sedimentation and its effects.

It may be that in addition to tidal differences, there are seasonal and almost certainly yearly differences in sedimentation. The word "sediment" does not include all my meaning. I have in mind not only "mud" particles but all truly planktonic particles, filamentous algae etc., which as far as this discussion is concerned behave in the same way as "mud" particles. Seasonal differences in any "sedimentation" index will, of course, be due to these living particles.

For instance, the growth of eel-grass in mud-flats would serve to decrease the amount of sedimental particles in the water and conceivably affect the oyster "set". In this connection, it is said by the old inhabitants of the Malagash basin district that oysters were much more plentiful when there was plenty of eel-grass in the basin. A body of quantitative data on free sediment correlated with the set of oyster larvae over a period of years might give a valuable clue to yearly fluctuations in the "set".

Such data could be collected by filtering pump samples, weighing the dried residue and calculating the weight of sedimentary particles (plus planktonic particles) per unit of water.

C. SPAT COLLECTION and the GROWTH OF SPAT

On July 11, 14 and 20 a total of 718 separate collectors were put out on the Fox Island bar and in the dyke.

The average total set per square was 9.7 in the dyke add 13.0 on the bar.

Why the set should be less in the dyke than on the bar provides an interesting problem. Tows taken over the dyke at high water showed the presence of larvae. The lower reaches of the beach is covered at high and most half-tides but exhibits practically no set of oysters although the stones should provide a good settling place. The smaller set in the dyke may be accounted for in part by the fact that throughout the summer the dyke was frequently open for flooring and that during these times freshly settled spat would be exposed.

No significant difference was found for the catch on two vertical surfaces and the catch on an upper and lower horizontal surface. Single collectors may, therefore, be placed "flat", that is, vertical surfaces only, without any significant loss in the catch.

Protection from the prevailing south-west wind is necessary for individual collectors in the dyke, and this is obtained by the log boom across the outside end of the dyke. A group of collectors placed on sandy bottom outside the protection of this boom were moved considerably while similar collectors on sandy bottom in the dyke were not disturbed. As a precautionary measure, however, the collectors should be heavily coated.

The attempt to use collectors individually, in wire-netted bundles or in wooden crates on the bar was unsuccessful. For the most part the collectors broke up and collapsed from movement over the sharp oysters. This was partly due to the light coat of cement, but a storm would, I think, damage the heaviest collectors on the bar where they are fully exposed to the action of wave and tide.

The use of heavily-coated individual collectors placed flat side by side in the dyke with the dyke holding water all the time, should produce the best results.

The growth of spat is parallel to the growth of adult oysters in that the greatest growth takes place in the dyke as opposed to the bar. Measured on August 22, the average growth on the bar was 5 millimeters (largest 6 mm.) and in the dyke 6.5 millimeters (largest 7 mm.). This is a small growth compared with spat collected and grown at the head of Wallace bay which yielded the following data:

Maximum Size	Group	Minimum Size
23 mm.	1	19 mm.
15 mm.	2	12 mm.
8 mm.	3	6 mm.

The warmer, fresher water at the head of Wallace bay would induce a more rapid growth than the conditions in the Malagash basin.

D. GROWTH OF ADULT OYSTERS

The growth of adult oysters on the Fox Island bar and in the dyke was followed during June, July and August.

The oysters were placed in areas bounded by stones to prevent their displacement - (1) the outermost tip of the Fox Island bar (2) on sanded bottom near the middle of the dyke.

The material was divided into two classes on the basis of size as:

Group #1

100 oysters selected for uniformity of size and showing the following characteristics:

Average	Stand. Dev.	Coeff. of Variability
Length --8.4 cm.	± .32	3.8%
Width --5.7 cm.	± .45	7.9%

This constitutes a very uniform group.

Group #2

50 oysters selected for uniformity of size and showing the following characteristics:

Average	Stand. Dev.	Coeff. of Variability
Length 6.6 cm.	± .27	4.1%
Width 5.1 cm.	± .44	8.6%

This group also exhibits a good degree of uniformity. Each of these groups was divided in two, one half of the material placed on the bar and one half in the dyke.

Measurements of length, width (individual) and weight (total) were taken. Since scales were not available for June, there are no measurements of weight until July.

The data may be summarized under two headings:

(1) Growth as a homogeneous group.

(2) Growth as individuals.

Growth as a homogeneous group.

Group #1 - Dyke	June 10	August 1	August 31	% increase
Length	8.4 cm.	8.6 cm.	8.9 cm.	6.0%
Width	5.7 "	6.0 "	6.3 "	10.5%
Weight	July 8-9 lbs.	9 lbs. 12 oz.	11 lbs.	22.0%

Group #1 - Bar	June 14	August 2	August 30	% increase
Length	8.5 cm.	8.6 cm.	8.6 cm.	1.2%
Width	5.6 cm.	5.7 cm.	5.8 cm.	3.6 %
Weight	July 8.8 lbs. 7oz.	8 lbs.9oz.	9 lbs. 5oz.	

Group #2 - Dyke	June 20	July 20	August 16	% increase
Length	6.6 cm.	6.7 cm.	7.0 cm.	6.1%
Width	5.1 cm.	5.3 cm.	5.5 cm.	7.9%
Weight	10th of July 2lbs. 11oz.		3 lb 8oz.	30.2%

Group #2 - Bar	June 20	July 20	August 16	% increase
Length	6.6 cm.	6.6 cm.	6.7 cm.	1.5%
Width	5.1 "	5.1 "	5.2 "	2.0%
Weight	July 10 2lbs.12 oz.	2lb.14 oz.	3lb.4oz.	16.0%

It is apparent from this data that:

(1) Growth in general is definitely increased by the conditions which prevail in the dyke.

(2) Some physiological factor is operative, independent of physical conditions (i.e. bar or dyke), which suppresses growth in July and June - since the greatest increase takes place in August.

(3) Growth in width is uniformly greater than growth in length.

It is suggested that the smaller growth on the bar may be due:

(1) To the lower temperature prevailing here close to the main channel leading into the basin from Tatamagouche bay and shown in the temperature data of Station #3 as compared with Station #1.

(2) To the mechanical disturbance of the oysters caused by the heavy set of the tide across the tips of the bar. As a test the oysters on the tip of the bar were placed in parallel rows at a low tide. At the following low tide these oysters were found to be greatly disarranged while oysters in the dyke similarly arranged were undisturbed. After a storm the test oysters on the bar were often piled against the sides of the square of small stones which enclosed them and sometimes worked outside. That such mechanical disturbance has distinct inhibitory effect on the growth of molluscs has been shown by Stevenson ('35) and others.

Spawning is a physiological factor which I believe has been indicated as an agent inhibiting growth during the spawning season. This would explain the uniformly small growth during June and July.

The greater growth in width than in length lends itself to a rather interesting tentative explanation. Almost all the material for the growth experiments was selected from oysters taken from the bar and placed in the dyke the previous autumn. Much of this material from the bar was clumped and had to be broken apart before being placed in the dyke. Clumped oysters show a tendency to become elongated, lateral growth being suppressed by crowding. It may be, then, that a large number of the experimental oysters coming from such clumps and having restricted widths, would show a greater increase in width than in length. This could be tested by comparing the growth in width, under identical age and physical conditions of oysters separated from clumps and oysters grown from single spat.

Growth as Individuals.

The growth of individual oysters was follwed by painting numbers on the shells with fast-drying red enamel. For the most part these numbers remained legible over the period of observation.

The average individual increase over the total period and the indices for judging the validity of the average as an expression for the growth of the individual follows:

Group	Increase(length)	Stand. Dev.	Coeff. of Variability
Group # 1 (Dyke)	.50 cm.	± .281	56.2%
" #1 (Bar)	.15 cm.	± .126	84.0%
" #2 (Dyke)	.38 cm.	± .020	52.5%
" #2 (Bar)	.18 cm.	± .152	84.4%

The variability of the material is high. In the case of the oysters grown on the bar the variability is so high as to place the average, as an index of the individual's increase, outside the range of statistical significance. This does not, of course, invalidate the averages as indicators of the relative efficacy of the bar and the dyke for growth.

This table shows:

(1) That the average individual increase is greater in the dyke than on the bar.

(2) That the larger oysters of Group #1 show a greater absolute increase than the smaller oysters of Group #2.

(3) That there is a high degree of individual variation in growth.

(4) That this variation in the growth increase may be due (a) to a real variation in growth caused inherently or by some inequality in temperature, feeding or disturbance. (b) To an apparent variation caused by an error resident in the method of measurement.

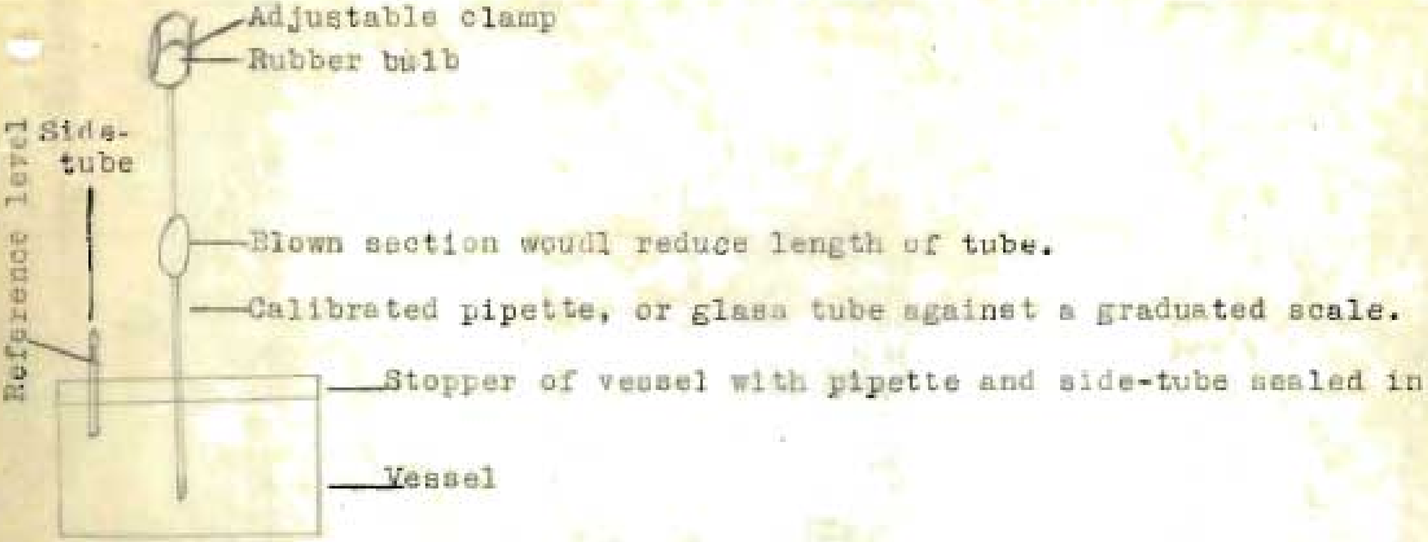
It will be noticed that the greatest variation is found among the experimental oysters on the bar. As already indicated the bar oysters were subject to much more displacement than those in the dyke. Oysters placed close to the stones which enclosed them would be sheltered from current to some extent and might have a greater opportunity to feed in the resultant eddies than those in the exposed centre of the enclosure. Such a factor (shelter) might lead to a real variation in growth among the bar oysters and to a less extent among the oysters in the dyke.

It is significant that the bar oysters which show a small absolute increase in growth, exhibit the greatest individual variation. The average increase is less than 2 millimetres and the measurements were made to the nearest millimetre. The measurement of such a rough object as an oyster with a scale whose units are scarcely less than the differences to be detected is bound to give a large error. It is almost certain then, that a large part of the variability found for the bar oysters is due to this error which would of course be decreased in the measurement of the dyke oysters where the absolute increase was larger and, therefore, more accurately measured on the same scale. It is quite possible also that the wave and tide action at the tip of the bar may have broken off the thin growing tips and that this action would not be equal from individual to individual.

It is suggested, therefore, that a more accurate method of measurement be used. By placing the oysters on paper, carefully working their limits with a pencil and measuring with a scale, worked in $\frac{1}{10}$ millimetres, I believe the material will be found to be much more uniform than my data shows.

Volume Measurements.

With reference to future work, volume measurements might prove a useful index of growth in general and also of the



The vessel is filled with water, the stopper inserted, and the water-level brought to coincide with the reference-level by the clamp on the rubber bulb. A reading is taken on the pipette. Water is then drawn up into the pipette, the stopper removed and the specimen inserted. The stopper is replaced and the water-level again brought to coincide with the reference-level. The pipette level is read and the volume calculated from the former level.