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SCHOOL OF SCIENCE

OREGON STATE UNIVERSITY

Corvallis, Oregon

TEMPERATURE, SALINITY, AND CURRENT MEASUREMENTS FOR
COOS BAY, OREGON, DURING 1960-1963

by

W. Bruce McAlister

and

Jackson O. Blanton

Data Report No. 10

U. S. Public Health Service
Grant No. WP217-(C1)

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Project No. 083-102

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October 1963

Wayne V. Burt
Chairman

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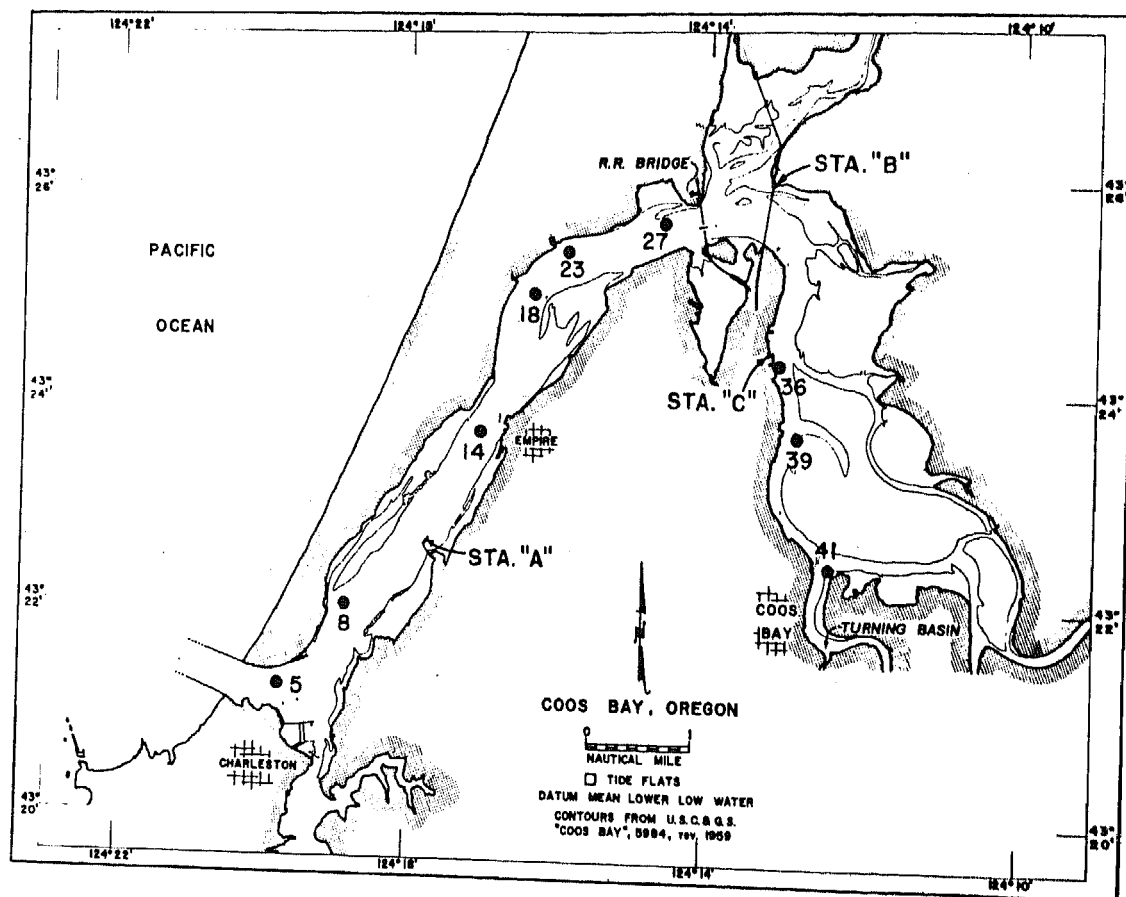


Figure 1. Map of Coos Bay.

TEMPERATURE, SALINITY AND CURRENT MEASUREMENTS FOR
COOS BAY, OREGON, DURING 1960-1963

INTRODUCTION

Temperature, salinity, and current measurements extending over one or more tidal cycles were made at various times during the three-year period 1960-1962 in Coos Bay, on the central Oregon coast ($43^{\circ}20'N$, $124^{\circ}13'W$). Dissolved oxygen was measured occasionally. The three regular sampling stations are shown in Figure 1. Station A is located at the Coos Bay Pulp and Paper dock south of Empire, Station B at the U. S. 101 Highway bridge, and Station C at the municipal docks at North Bend. On two occasions, midchannel stations along the entire fifteen-mile length of the estuary were sampled. A special current study was conducted in March 1963. Measurements in Coos Bay before 1960 have been reported by Queen and Burt (1955), Burt (1956), and Burt and McAlister (1958).

METHODS AND PROCEDURES

The present program began in June 1960 with observations of temperature, salinity, and currents at the three regular sampling stations. Measurements were made at hourly or half-hourly intervals. Observations were continued throughout at least one tidal cycle, although some of the records are incomplete for one or more stations because of equipment failure. Station B was sampled each time, and one or both of the other stations were usually sampled during the same period.

Water samples were obtained with a Frautschy bottle. Temperatures were read to $0.1^{\circ}C$ with a standardized bucket thermometer; salinities were determined to 0.1% by titration. Some measurements were made with a standardized conductivity-temperature indicator (CTI). These data are indicated in the tables by asterisks. The Winkler method was used to determine dissolved oxygen. Current velocities were measured with a current drag similar to that described by Pritchard and Burt (1951). Occasional measurements were made using Price and Ekman meters. Flood currents were recorded as positive numbers; ebb currents as negative numbers.

From June 1960 until summer 1961, measurements were taken only for surface and bottom. Temperature, salinity, and current velocities observed during this period at the three stations are listed in Table I.

Beginning in May 1961, measurements were taken at five-foot depth intervals, as well as at the surface and the bottom. Data for Station B for the period May through August 1961 are listed in Table II-i. Station C was sampled during July (Table II-ii), and Station A during August (Table II-iii).

Field measurements were normally made using a 16- or 25-foot boat. In August 1961 and March 1962, the small boat survey was supplemented by the research vessel ACONA. On these occasions, the ACONA occupied Station B and the small boats maintained a continuous survey at 5-foot depth intervals at various midchannel locations along the estuary. Current, temperature, and salinity were measured. These data are listed chronologically in Table III.

On several occasions during the sampling periods, dissolved oxygen measurements were taken. From July 1960 to May 1961, observations were made at the surface and the bottom at Station B. In March 1962, the measurements were taken at depths of 0, 10, 20, and 30 feet in midchannel. These observations are shown in Table IV.

In March 1963, short-period current measurements were also made at Station B in connection with a turbulence study. Mean current velocities from a depth of five feet were observed for one-minute intervals over a tidal cycle. A Price Meter was used. These observations are summarized in Table V.

RESULTS

Temperature and salinity data at the three principal stations indicate that Coos Bay ranges from a well-mixed estuary during periods of low runoff to a partially mixed estuary during periods of maximum runoff. This agrees with earlier studies.

The seasonal effects of runoff on the temperature and salinity structure of the estuary are graphically shown in Figure 2. Data at Station B are used for illustration. On 20 September 1960, a period of low runoff, the estuary was well mixed. By 20 December 1960, runoff had increased considerably, and the estuary had become partially mixed.

The one-minute current data were used in connection with a study to measure the natural turbulence. The intensity and scale of turbulence varied with the stage of the tide. Eddy diameters ranged from as small as could be observed to 500 meters (Blanton, 1963).

ACKNOWLEDGMENTS

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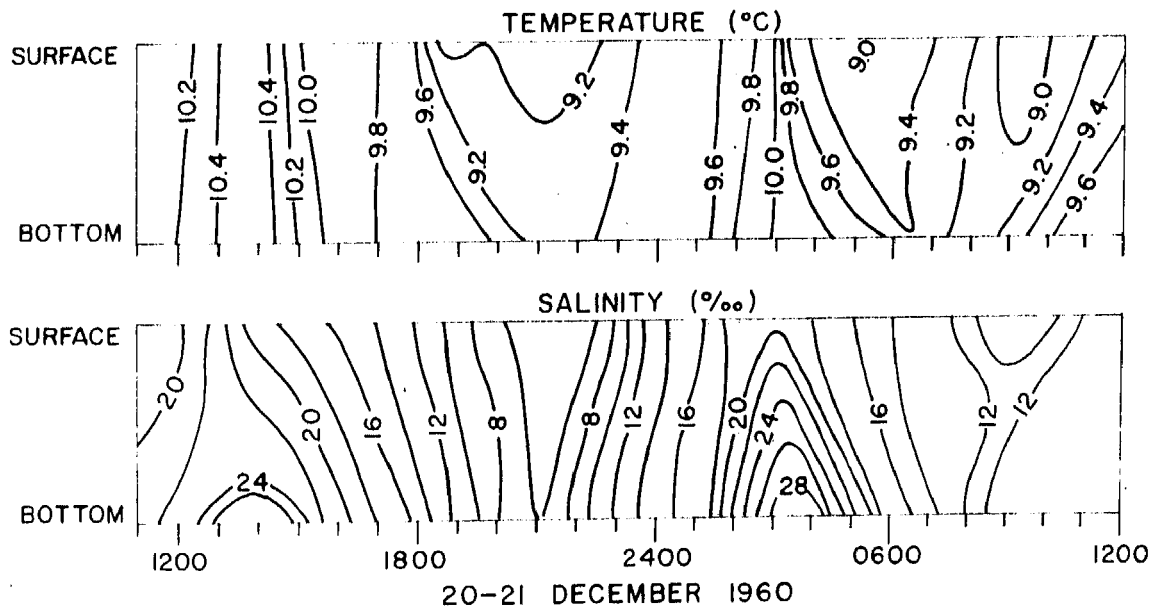
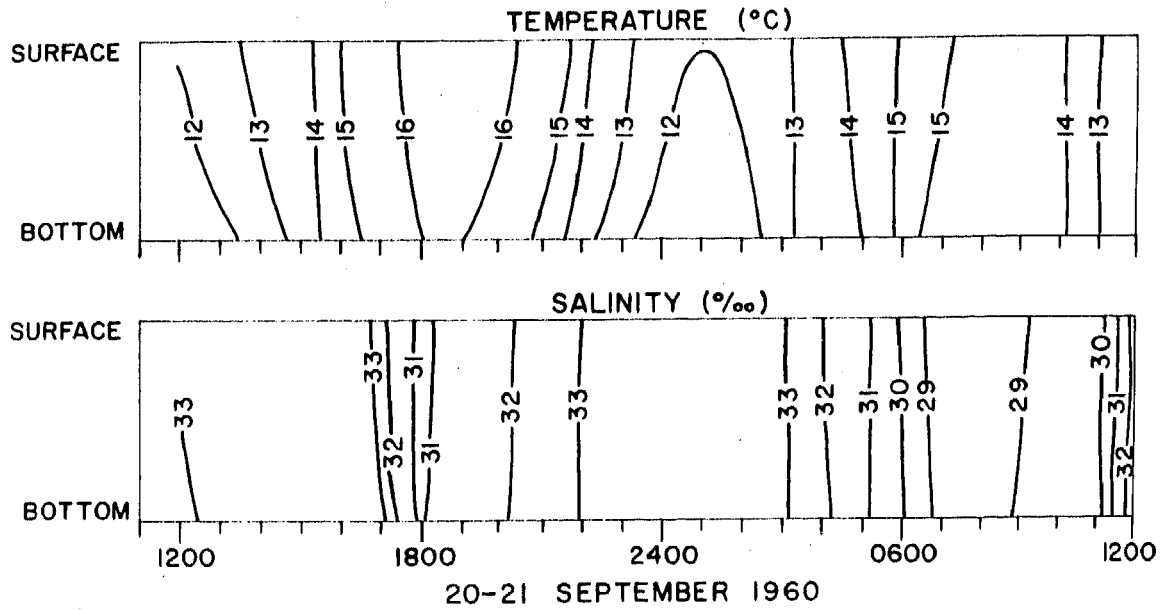


Figure 2. Temperature and Salinity Structure of Coos Bay during Periods of Low and High Runoff.

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2130	12.0	31.5	+ 37	12.0	31.8	+ 59	17.5	27.27*	- 40	15.3	27.52*	- 21	17.0	26.9	- 45	16.3	26.4	- 26	2130
2200							17.4	28.1	+ 32	14.0	28.5	+ 58							2200
2300							16.1	29.3	+ 93	14.0	29.0	+ 80							2300
2400							15.4	30.2	+ 94	13.6	30.3	+ 88							2400
0030							13.2	31.6	+ 116	12.3	31.2	+ 108							0030
0100							12.2	31.6	+ 112	11.4	31.98*	+ 82							0100
0130							12.2	31.62*	+ 104	10.8	33.8	+ 89							0130
0200							12.2	31.62*	+ 87	10.8	33.8	+ 89							0200
0300							12.2	31.62*	+ 87	10.8	33.8	+ 89							0300
0330							12.2	31.62*	+ 87	10.8	33.8	+ 89							0330
0400							12.2	31.62*	+ 87	10.8	33.8	+ 89							0400
0430							12.2	31.62*	+ 87	10.8	33.8	+ 89							0430
0500							12.6	30.8	- 26	11.5	32.9	- 26							0500
0600							14.4	39.9	- 51	12.3	29.1	- 51							0600
0630							15.1	29.0	- 80	12.2	28.4	- 59							0630
0700							16.3	29.45*	- 87	15.9	28.28*	- 70							0700
0730							17.1	29.3	- 77	16.8	29.3	- 66							0730
0800							17.4	26.5	- 52	17.4	26.3	- 51							0800
0830							17.1	25.9	- 37	16.9	26.4	- 26							0830
0900							17.3	26.9	+ 52	17.2	27.2	+ 65							0900
0930							16.8		+ 80	16.8	28.35*	+ 94							0930
1000							16.4	29.7	+ 122	15.9	29.3	+ 94							1000
1030							14.8		+ 135	14.8		+ 94							1030
1100							14.1		+ 115	14.2		+ 94							1100
1200							13.6		+ 101			+ 65							1200
1230									+ 80			+ 65							1230
1300									+ 58			+ 59							1300
1330																			1330
1400																			1400
1430																			1430
1500																			1500
1530																			1530
1600																			1600
1630																			1630
1700																			1700

16-17 August 1960

1400	13.2	33.2	- 26	13.0	33.5	+ 0	17.4	30.52*	+ 30	16.9	30.86*	- 73	18.5	27.5	+ 26	17.6	28.5	+ 0	1400
1500							17.4	31.5		16.2	30.8								1500
1600							17.3	31.6		16.4	31.0								1600
1700							16.6	31.8	+ 89	16.1	31.2	+ 58							1700
1730									+ 80			+ 89							1730
1800							15.4	32.5	+ 89	15.3	32.7	+ 80							1800
1830							14.6	32.8	+ 89	14.5	33.1	+ 65							1830
1900							13.8	32.83*	+ 50	13.8	32.88*	+ 30							1900
2000							14.2	33.2	+ 0	13.7	33.5	+ 46							2000
2030									+ 0										2030
2100									+ 41			- 32							2100
2130									- 80			- 59							2130
2200									- 50			- 41							2200
2230									- 58			- 50							2230
2300									- 65			- 58							2300
2330									- 73			- 58							2330
2400									- 65			- 65							2400
0030									- 59			- 41							0030
0100																			0100

Station A

22-23 October 1960

Time PST	Surface			Bottom		
	Temp. °C	Sal. ‰	Current cm/sec	Temp. °C	Sal. ‰	Current cm/sec
0030						
0100			+115			
0130	12.6	31.9	+113	12.8	32.0	+96
0145			+96			+113
0200						
0230	12.4	31.9	+58	12.4	32.1	+96
0235			+80			+50
0300	11.8	33.8	+15	11.4	33.5	+21
0330						
0400	11.5	33.5	-8			-22
0430						
0500						
0530						
0600						
0700						
0715	12.0	33.6	+0	11.9	33.5	-21
0730						
0750			-40			
0800						
0830			-34	13.6		+32
0850	12.4	32.9	+15			+0
0900				13.6		+0
0930			+53			+53
1000						
1030	12.1	33.6	+40	12.2	33.6	+44
1100						
1130	14.4	7.5	River			
1200						
1230				12.0	33.5	Ocean

Station B

20-21 December 1960

Time PST	Surface			Bottom		
	Temp. °C	Sal. ‰	Current cm/sec	Temp. °C	Sal. ‰	Current cm/sec
1100	10.1		+145	9.9		+130
1110			+150			+132
1140						
1200	10.1	19.7	+140	10.2	23.5	+116
1300	10.4	23.7	+105	10.4	26.5	+89
1330			+61			+65
1400	10.5	18.8	+0	10.6	27.3	+31
1430			-73			-58
1500	10.0	16.9	-80	10.2	26.1	-115
1530			-96			-120
1600	9.9	15.8	-96			-120
1630			-132	9.9	20.8	-117
1700	11.0	27.7	-38	9.8		-101
1800	9.6		-105	9.8		-120
1830			-113	10.2	15.8	-73
1900	10.0	21.4	-69	9.1	9.0	-89

Station C

20-21 December 1960

Time PST	Surface			Bottom		
	Temp. °C	Sal. ‰	Current cm/sec	Temp. °C	Sal. ‰	Current cm/sec
0030						
0100						
0130	13.5	31.9		13.2	32.0	
0145						
0200						
0230						
0235						
0300	13.0	32.4				
0330						
0400						
0430						
0500						
0530	13.5	31.1				
0600						
0700						
0715						
0730	14.0	30.6		14.0	30.8	
0750						
0800						
0830						
0850						
0900						
0930						
0940						
1000	13.9	32.0		13.9	30.6	
1030						
1100						
1130						
1145						
1200						
1230						

1930	12.5	-121	10.8	-155	15.7	31.9	-178	14.99	32.2	-123	1930
2000	11.9	-121		-153	15.7	31.4	-178	15.71	31.9	-117	2000
2030					16.3	31.6	-180	16.40	31.6	-101	2030
2100											2100
2130	13.3	29.7	13.3	29.7	17.3	31.0	-155				2130
2200	13.4	29.6	13.6	29.4	17.7	30.8	-146				2200
2230	14.3	28.5	14.2	28.3	18.0	30.4	-142				2230
2300	15.0	27.7	14.7	27.8							2300
2330	15.3	27.3	14.9	27.6							2330
2400	15.5	27.3	14.1	28.2	18.0	30.0	- 43				2400
0100	14.4	27.4	14.2	27.6	18.0	30.1	+ 43				0100
0200	13.7	27.4	13.5	28.1	17.3	30.9	+ 95				0200
0300	13.5	31.6	12.5		16.1	31.5	+120	16.47	31.5	+112	0300
0400	12.5		12.0		15.3	31.9	+150	15.51	32.0	+ 85	0400
0430	11.5	+105	11.1								0430
0500	11.1	+ 91	10.9		14.9	32.2	+ 78	13.84	32.3	+ 62	0500
0530	10.9	+ 71	10.8		14.6	32.3	+ 50	14.63	32.4	+ 65	0530
0600	11.0	+ 39	10.8								0600
0610	11.1	+ 19	10.4		14.5	31.8	- 36	14.61	32.4	- 15	0610
0630											0630
0700	11.5	- 35	10.2	- 10	16.15	31.4	- 79	14.29	32.3	- 53	0700
0730	11.9	- 65	10.9	- 50			-128				0730
0800	12.1	-103	10.9	- 71	16.5	31.2	-153				0800

Table II (i). Data at Various Depths at Station B

20-21 May 1961

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec
1300	0	14.4	12.3	+ 46	2000	15	13.7	21.0	
	5	14.4	16.2	+ 51		20	13.5	22.0	+ 32
	10	14.1	17.2	+ 55	2030	0	14.0	18.2	+ 51
1330	0	14.4	15.4	+ 58		5	13.9	19.8	+ 30
	5	14.2	16.8	+ 67		10	13.8	20.3	
	10	14.1	18.6	+ 30		15	13.6	21.0	+ 26.
1430	0	14.3	19.0	+ 61	0100	0	14.1	15.7	0
	5	14.0	19.1	+ 87		5	14.0	19.5	+ 44
	10	13.8	19.8	+ 86		10	13.8	20.9	
	15	13.7	20.0	+ 95		15	13.4	22.9	
	20	13.7	20.3	+ 79		20	13.4	23.3	+ 49
1500	0	13.6	20.0	+ 66	0200	0	13.7	18.4	+ 61
	5	13.7	20.4	+ 59		5	13.8	20.8	+ 71
	10	13.7	20.8	+ 69		10	13.3	23.4	+ 71
	15	13.7	20.9	+ 73		15	13.1	24.3	+ 71
	20	13.7	20.9	+ 68		20	12.8	25.5	+ 49
1530	0	13.8	20.6	+ 69	0300	0	13.7	19.3	+ 64
	5	13.6	21.4	+ 77		5	13.4	22.5	+ 73
	10	13.6	21.5	+ 85		10	13.1	24.3	+ 68
	15	13.6	21.5	+ 66		15	12.8	25.3	+ 56
	20	13.6	21.6	+ 65		20	12.8	25.6	+ 45
1600	0	13.5	21.1	+ 66	0415	0	13.3	21.6	+ 11
	5	13.6	21.3	+ 77		5	13.2	22.9	+ 21
	10	13.6	21.8	+ 60		10	12.8	25.0	+ 48
	15	13.5	22.0	+ 55		15	12.6	26.0	+ 21
	20	13.5	22.0	+ 45		20	12.6	26.2	+ 11
1630	0	13.4	21.5	+ 68		22	12.6	26.4	
	5	13.5	22.5	+ 61	0530	0	13.3	21.7	- 35
	10	13.4	22.9	+ 70		5	13.3	22.9	- 26
	15	13.4	22.9	+ 66		10	12.9	24.5	- 21
	20	13.4	23.0	+ 50		15	12.8	25.6	- 11
	22	13.4	23.0			20	12.6	26.3	+ 11
1700	0	13.8	21.1	+ 40		22	12.5	26.7	
	5	13.4	22.9	+ 51	0630	0	13.8	17.9	- 65
	10	13.3	23.0	+ 49		5	13.8	19.3	- 46
	15	13.3	23.3	+ 44		10	13.4	21.2	
	20	13.3	23.5	+ 35		15	12.8	25.1	
	23	13.2	23.5			20	12.6	26.2	
1730	0	13.6	20.7	+ 15		23	12.6	26.3	- 41
	5	13.3	23.0	+ 15	0730	0	13.9	19.3	
	10	13.2	23.7	+ 18		5	13.9	18.9	- 49
	15	13.2	23.9	+ 24		10	13.7	20.2	
	20	13.1	24.0	+ 28		15	13.3	22.7	
	23	13.1	24.0			20	12.9	24.0	- 41
1830	0	13.4	21.9	+ 40		22	12.8	25.0	
	5	13.5	22.7	+ 32	0800	0	13.6	18.1	- 50
	10	13.3	23.4	+ 32		5	13.9	18.9	- 44
	13	13.3	23.6			10	13.6	20.5	- 44
1900	0	13.6	20.2	+ 46		15	13.3	22.4	- 44
	5	13.5	22.1	+ 40		20	13.0	23.8	- 35
	10	13.4	22.8			21	13.0	24.1	
	15	13.2	23.7		0830	0	14.1	16.3	- 66
	20	13.2	23.8	+ 40		5	14.0	17.9	- 56
1930	0	13.7	18.3	+ 43		10	13.9	18.3	- 56
	5	13.7	21.2	+ 40		15	13.8	19.4	- 56
	10	13.5	22.4			20	13.6	20.6	- 40
	15	13.4	22.7			0	14.1	16.5	- 75
	20	13.4	22.9	+ 40	0900	0	14.1	16.5	- 75
2000	0	13.6	19.3	+ 53		5	14.0	17.3	- 69
	5	13.8	19.9	+ 56		10	14.0	17.6	- 69
	10	13.8	20.3			15	13.8	19.2	- 69
						19	13.4	21.2	- 32
					0930	0	14.2	16.3	- 77
						5	14.1	16.6	- 44
						10	14.1	16.9	

20-21 May 1961

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec
0930	15	14.1	17.2	- 32	1500	10	14.5	28.7	
	18	13.9	18.3			15	13.7	29.2	
1000	0	14.2	15.7	- 38	1530	20	13.7	29.2	
	5	14.1	16.2	- 28		23	13.7	29.2	- 58
	10	14.1	16.5	- 28		0	16.1	27.6	- 81
	15	13.9	17.9	- 13		5	15.5	28.0	- 73
	18	13.9	18.4	- 13		10	15.1	28.2	
1030	0	14.3		- 51	1600	15	15.0	28.4	
	5	14.3	15.2	- 30		20	14.9	28.5	
	10	14.2	15.5	- 30		22	14.9	28.5	- 63
	15	14.1	16.2	- 10		0	16.5	27.0	- 86
	17	14.0	17.1			5	16.2	27.1	- 73
1100	0	14.6		- 30	1630	10	15.7	27.6	
	5	14.3	14.7	0		15	15.6	27.6	
	10	14.3	15.3	0		20	15.5	27.7	- 60
	15	14.1	16.0	- 10		0	16.5	26.9	- 92
	18	14.0	17.4	- 10		5	16.2	27.3	- 78
1130	0	14.6		- 8	1700	10	16.3	27.3	
	5	14.3	14.6	0		15	16.3	27.3	
	10	14.3	15.0	0		20	16.2	27.4	- 66
	15	14.2	15.5	0		0	17.2	26.4	- 50
	17	14.1	17.2			5	17.1	26.4	- 58
1200	0	14.5	13.6	+ 13	1730	10	17.0	26.7	
	5	14.4	14.5	+ 13		15	16.9	26.8	
	10	14.2	15.7	+ 13		19	16.6	27.0	- 59
	15	13.9	18.4	+ 13		0	17.6	26.5	- 52
	19	13.6	20.5	+ 32		5	17.6	25.9	- 50
1230	0	14.6	14.0	+ 19	1800	10	17.6	25.9	
	5	14.4	14.9	+ 21		15	17.6	26.0	
	10	14.2	16.0	+ 21		18	17.6	26.0	- 45
	15	13.7	19.7	+ 21		0	17.9	25.4	- 50
	18	13.5	21.1	+ 35		5	17.9	25.5	- 45
					10	17.9	25.6		
					15	17.9	25.6		
					18	17.9	25.7	- 63	
					1830	0	18.1	25.0	- 30
1230	0	14.3	27.7	+ 52	1830	5	18.1	25.1	- 30
	5	13.9	28.1	+ 47		10	18.1	25.2	0
	bottom			+ 45		15	18.1	25.6	0
1300	0	14.9	27.4	+ 37		20	18.0	25.8	0
	5	13.3	28.2	+ 35		21.5	17.9	25.9	+ 0
	10	13.2	28.8		1900	0	18.2	25.1	0
	15	13.0	29.0			5	18.2	25.2	0
	20	12.7	29.3			10	18.1	25.5	0
	23	12.7	29.3	+ 35		15	17.7	25.8	
1330	0	14.2	28.7	+ 10		20	17.2	26.1	+ 15
	5	13.5	29.1	+ 23	25	16.8	26.4	+ 13	
	10	12.7	29.7		1930	0	17.9	25.3	+ 35
	15	11.9	30.2			5	18.2	25.6	+ 46
	20	11.4	30.6			10	17.5	26.0	+ 53
	24	11.4	30.5	+ 39		15	17.4	26.3	+ 53
1400	0	15.0	28.2	+ 0		20	17.1	26.5	+ 46
	5	14.9	28.3		22	17.1	26.5	+ 42	
	10	12.5	29.9		2000	0	17.7	25.7	+ 45
	15	11.9	30.3			5	17.6	26.2	+ 58
	20	11.1	31.0			10	17.1	26.5	+ 50
	23	11.1	31.0	- 32		15	17.0	26.6	+ 41
1430	0	15.6	28.0	- 56		20	17.0	26.6	+ 37
	5	14.6	28.6	- 53	24	17.0	26.7	+ 37	
	10	13.4	29.4		2030	0	17.1	26.7	+ 58
	15	13.4	29.6			5	16.8	27.0	+ 55
	20	12.3	30.2			10	16.7	27.0	+ 50
	22	12.0	30.3	- 46		15	16.7	27.1	
1500	0	15.9	27.9	- 81		20	16.6	27.2	
	5	15.7	27.9	- 73					

28-29 June 1961

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec
2030	22	16.6	27.3		0200	10	11.8	31.1	- 46
2100	0	16.1	27.6	+ 96		15	11.6	31.1	- 60
	5	16.1	27.7	+ 80		20	11.4	31.2	- 59
	10	16.1	27.7	+ 89		25	11.4	31.2	- 60
	15	16.1	27.8	+ 89	0230	0	13.7	28.6	- 37
	20	16.1	27.8	+ 96		5	13.5	29.0	- 43
	25	16.1	27.8	+ 73		10	12.8	29.6	- 62
2130	0	14.9	28.7	+ 96		15	12.5	29.9	- 68
	5	14.9	28.8	+ 96		20	12.6	29.9	- 77
	10	14.8	28.9	+ 91		25	12.5	30.2	- 77
	15	14.8	29.1	+ 84	0300	0	13.6	29.7	- 41
	20	14.8	29.1	+ 84		5	13.3	30.0	- 30
	25	14.8	29.1	+ 80		10	13.3	30.2	- 39
2200	0	14.3	29.2	+ 73		15	13.4	30.2	- 50
	5	14.0	29.5	+ 89		20	12.9	30.4	- 41
	10	13.8	29.6	+ 96		25	12.8	30.6	
	15	13.8	29.6	+105	0330	0	14.6	29.0	- 19
	20	13.8	29.6	+113		5	14.4	29.0	- 30
	25	13.8	29.6	+ 80		10	14.1	29.2	- 46
2230	0	13.0	30.0	+ 96		15	13.9	29.5	- 50
	5	12.9	30.2	+ 89		20	13.8	29.7	- 41
	10	12.8	30.4	+ 96		24	13.8	29.7	
	15	12.8	30.4	+ 96	0400	0	15.1	28.3	- 30
	20	12.8	30.5	+ 89		5	15.0	28.5	- 66
	25	12.8	30.5	+ 89		10	14.9	28.5	- 53
2300	0	12.4	30.7	+ 73		15	15.1	28.3	- 46
	5	12.3	30.9	+ 89		20	15.1	28.6	- 50
	10	12.2	31.0	+ 73	0430	0	15.8	27.3	- 50
	15	12.3	31.0	+ 65		5	15.8	27.6	- 37
	20	12.2	31.0	+ 65		10	15.7	27.9	- 41
	25	12.2	31.0	+ 58		15	15.8	27.9	- 43
2330	0	11.9	31.0	+ 65		20	15.6	28.0	- 41
	5	11.5	31.3	+ 65	0500	0	16.1	27.4	- 78
	10	11.5	31.4	+ 58		5	16.1	27.4	- 46
	15	11.4	31.6	+ 65		10	16.2	27.4	- 58
	20	11.4	31.6	+ 65		15	16.2	27.5	- 58
	25	11.4	31.6	+ 50		20	16.2	27.5	- 54
2400	0	11.3	31.4	+ 58	0530	0	16.6	26.7	- 77
	5	11.1	31.6	+ 58		5	16.6	26.7	- 63
	10	11.0	31.9	+ 45		10	16.6	26.8	- 67
	15	11.0	31.9	+ 45		15	16.5	26.8	- 75
	20	11.0	31.9	+ 41		18	16.5	26.9	- 79
0030	25	11.0	31.9	+ 41	0600	0	17.0	25.9	- 56
	0	10.8	32.1			5	17.0	26.1	- 47
	5	10.8	32.2			10	17.0	26.1	- 40
	10	10.8	32.2			15	16.9	26.3	- 40
	15	10.8	32.2			16	16.8	26.5	
	20	10.8	32.2		0630	0	17.2	26.0	- 35
0100	24	10.8	32.2			5	17.2	26.0	- 25
	0	10.9	31.4	0		10	17.2	26.0	
	5	10.8	31.5	0		15	17.1	26.0	
	10	10.7		0		17	17.1	26.0	- 35
	15	10.6		0	0700	0	17.5	25.6	- 38
	20	10.5		0		5	17.5	25.6	- 35
0130	24	10.5		0		10	17.5	25.5	
	0	11.4		- 28		15	17.5	25.5	- 28
	5	11.2		- 28	0730	0	17.4	25.5	- 30
	10	10.8		- 22		5	17.4	25.5	- 32
	15	10.7				10	17.4	25.5	
	20	10.6				15	17.4	25.5	- 40
	25	10.4		- 26	0800	0	17.7	25.2	0
0200	26	10.4				5	17.6	25.3	0
	0	13.6	29.5	- 41		10	17.4	25.4	0
	5	12.4	30.4	- 33		15	17.1	25.7	0

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Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec
0830	0	17.7	25.3	+ 26	0030	0	19.26*	28.3	- 11
	5	17.3	25.8	+ 34		5	19.26*	28.5	- 12
	10	17.2	25.8	+ 33		10	19.27*	28.6	- 6
	15	17.4	25.9	+ 22		15	19.27*	28.7	- 5
0900	0	17.6	25.2	+ 34	0100	18B	19.30*	28.8	- 12
	5	17.4	25.7	+ 43		0	19.36*	28.4	- 10
	10	17.2	25.8	+ 46		5	19.33*	28.5	- 12
	15	17.1	26.2	+ 35		10	19.29*	28.6	- 12
0930	0	17.4	26.0	+ 51	0130	15	19.31*	28.7	- 12
	5	17.1	26.1	+ 60		17B	19.36*	28.7	- 12
	10	17.0	26.3	+ 62		0	19.26*	28.3	+ 11
	15	17.0	26.3			5	19.28*	28.6	+ 20
1000	17	17.9	26.3	+ 56	0200	10	19.12*	28.7	+ 22
	0	17.0	26.5	+ 49		15	18.90*	28.8	+ 21
	5	16.8	26.7	+ 51		18B	18.89*	28.9	+ 18
	10	16.7	26.8	+ 51		0	19.14*	28.7	+ 25
1030	15	16.6	26.9		0230	5	19.15*	28.8	+ 24
	20	16.7	26.9	+ 54		10	19.16*	28.9	+ 30
	0	16.7	27.1	+ 50		15	19.02*	28.9	+ 30
	5	16.6	27.1	+ 59		18B	19.02*	29.0	+ 25
1100	10	16.5	27.2		0300	0	18.92*	28.7	+ 34
	15	16.5	27.2			5	18.84*	29.0	+ 38
	20	16.5	27.2	+ 69		10	18.94*	28.9	+ 35
	0	16.3	27.6			15	18.94*	29.1	+ 30
1130	5	16.1	27.9	+ 89	0330	19B	18.96*	29.2	+ 24
	10	16.0	28.0	+ 80		0	18.60*	28.7	+ 43
	15	16.0	28.0	+ 65		5	18.52*	29.2	+ 45
	20	16.0	28.0			10	18.49*	29.3	+ 44
1200	22	16.0	28.0		0400	15	18.48*	29.3	+ 37
	0	15.9	28.1			19B	18.46*	29.4	+ 33
	5	15.6	28.3	+ 89		0	18.39*	29.2	+ 45
	10	15.5	28.5	+ 73		5	18.32*	29.3	+ 41
1230	15	15.5	28.5	+ 65	0430	10	18.30*	29.4	+ 43
	20	15.5	28.5			15	18.29*	29.1	+ 36
	24	15.5	28.5			19B	18.28*	29.1	+ 32
	0	15.6	28.1	+ 76		0	18.07*	28.8	+ 50
1300	5	15.4	28.5	+ 80	0500	5	18.00*	29.3	+ 45
	10	15.1	28.6			10	18.00*	29.3	+ 41
	15	15.1	28.8			15	18.00*	29.4	+ 37
	20	15.1	28.8	+ 80		20B	18.00*	29.4	+ 28
20-21 July 1961	25	15.1	28.8		0530	0	17.96*	29.4	+ 38
	0	14.7	29.1			5	17.80*	29.7	+ 41
	5	14.4	29.5			10	17.80*	29.7	+ 38
	10	14.3	29.8			15	17.80*	29.7	+ 35
2300	15	14.3	29.7		0600	20	17.80*	29.8	+ 25
	20	14.3	29.7			0	17.48*	30.0	+ 39
	23	14.3	29.7			5	17.48*	30.0	+ 35
						10	17.48*	30.0	+ 36
2330	15	17.46*	30.0	+ 33	0600	15	17.46*	30.0	+ 33
	Bottom	18.88*	28.8	- 4		20B	17.46*	30.0	+ 25
	0	19.02*	28.5	- 34		0	17.28*	30.3	+ 36
	5	19.00*	28.6	- 34		5	17.23*	30.3	+ 28
2400	10	19.00*	28.7	- 10	0600	10	17.00*	30.6	+ 27
	15	19.02*	28.7	- 6		15	16.89*	30.6	+ 28
	B	19.02*	28.7	- 6		20B	16.89*	30.7	+ 21
	0	19.24*	28.4	- 15		0	17.22*	30.3	+ 21
2400	5	19.26*	28.3	- 14	0600	5	16.88*	30.6	+ 23
	10	19.26*	28.3	- 10		10	16.80*	30.6	+ 27
	15-B	19.27*	28.3	- 10		15	16.70*	30.8	+ 22
						21B	16.67*	30.8	+ 24

20-21 July 1961

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec
0630	0	17.80*	29.8	- 21	1200	0	17.2	30.4	+ 92
	5	17.02*	30.5	- 14		5	17.51*	30.5	+117
	10	16.68*	30.8	- 20		10	17.48*	30.5	+121
	15	16.58*	31.0	- 13		15	16.6	30.9	+103
	22B	16.52*	31.0	- 13		20	16.95*	31.0	+ 78
0700	0	17.40*	30.3	- 16	1300	0	16.6	30.9	+131
	5	17.02*	30.4	- 7		5	16.94*	31.6	+139
	10	16.48*	31.0	- 6		10	15.7	31.7	+148
	15	16.40*	31.0	- 8		15	15.48*	31.9	+128
	22B	16.38*	31.0	- 7		20	15.42*	31.9	+117
0730	0	17.51*	30.2	- 20	1400	0	15.7	31.7	+143
	5	17.20*	30.4	- 25		5	15.48*	31.9	+162
	10	16.81*	30.8	- 22		10	14.4	32.5	+142
	15	16.55*	31.0	- 13		15	14.11*	32.5	+131
	22B	16.40*	31.0	- 11		20	14.04*	32.6	+136
0800	0	17.56*	29.9	- 30	1500	0	14.4	32.5	+152
	5	17.46*	30.1	- 30		5	14.3	32.6	+178
	10	17.30*	30.2	- 16		10	13.67*	32.7	+148
	15	17.04*	30.8	- 18		15	13.60*	32.8	+162
	21B	16.80*	30.9	- 17		20	13.5	32.8	+178
0830	0	17.65*	30.1	- 34	1600	0	14.3	32.6	+139
	5	17.60*	30.1	- 32		5	13.67*	32.7	+159
	10	17.54*	30.2	- 21		10	13.60*	32.8	+136
	15	17.50*	30.2	- 21		15	13.5	32.8	+119
	20	17.18*		- 23		20	13.21*	32.8	+122
0900	0	18.06*	29.7	- 29	1700	0	13.5	32.8	+106
	5	18.02*	29.7	- 24		5	13.21*	32.8	+ 97
	10	18.00*	29.7	- 24		10	12.47*	33.1	+ 84
	15	17.94*	29.8	- 17		15	12.47*	33.1	+ 77
	20	17.90*	29.8	- 13		20	14.4	32.5	+ 76
0930	0	18.52*	29.4	- 24	1800	0	14.4	32.5	- 34
	5	18.38*	29.4	- 26		5	13.57*	32.8	- 21
	10	18.38*	29.4	- 25		10	13.57*	32.8	- 15
	15	18.34*	29.4	- 20		15	12.53*	33.0	- 38
	19B	18.28*	29.5	- 18		18	15.2	32.1	- 68
1000	0	18.61*	29.2	- 16	1830	0	15.2	32.1	- 95
	5	18.61*	29.2	- 22		5	13.49*	32.8	- 82
	10	18.68*	29.2	- 18		10	13.49*	32.8	- 83
	15	18.58*	29.2	- 16		15	13.02*	32.9	- 84
	19B	18.48*	29.3	- 16		18	15.8		- 57
1030	0	18.80*	29.1	- 16	1900	0	15.8		-199
	5	18.81*	29.1	- 28		5	14.36*	32.4	- 79
	10	18.80*	29.1	- 15		10	14.36*	32.4	-145
	15	18.78*	29.1	- 17		15	15.4	32.6	-124
	18B	18.74*	29.1	- 26		18	15.46*	32.1	-104
2-3-August 1961					2000	5			-170
1000	0	17.5	30.0	- 13		10	15.46*	32.1	-194
	5			- 79		15	14.99*	32.2	-111
	10	17.87*	30.0	-111		18	15.7	31.4	-123
	15			- 82		0	16.10*	31.7	-178
	18	17.85*	30.0	- 97	5			-182	
1030	0	17.8	29.8	- 57	2100	10	16.10*	31.7	-153
	5			- 41		15	15.71*	31.9	-126
	10	18.11*	29.8	- 48		18	16.3	31.6	-117
	15			- 23		0	16.51*	31.6	-180
	18	18.07*	29.8	- 26		5			-161
1100	0	17.6	27.6	+ 28	2200	10	16.40*	31.6	-156
	5			+ 31		15	17.3	31.0	-121
	10	18.05*	29.8	+ 26		18			-101
	15			+ 18		0	17.3	31.0	-155
	18	17.92*	29.9	+ 22		5			-167
					10			-131	
					15	17.56*	31.1	-110	

2-3 August 1961

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	
2230	0	17.7	30.8	-146	0500	0	14.9	32.2	+ 78	
	5			-209		5			+ 69	
	10			-133		10			+ 85	
	15	- 88	15	+ 62						
	2300	0	18.00*	30.9		- 88			0530	0
2300	5	18.0	30.4	-142	0530	5	14.6	32.3	+ 50	
	10			-117		10			+ 55	
	15			-107		15			+ 64	
2400	0	18.34*	30.6	- 82	0610	0	14.63*	32.4	+ 65	
	5			- 43		5			- 36	
	10			- 14		10			- 27	
0100	0	18.46*	30.1	- 39	0610	15	15.31*	32.0	- 11	
	5			- 78		15			- 5	
	10			- 43		20			- 15	
0200	0	18.0	30.1	+ 43	0700	0	16.15*	31.4	- 79	
	5			+123		5			- 62	
	10			+ 62		10			- 64	
0300	0	18.37*	30.4	+ 65	0700	15	15.41*	31.9	- 64	
	5			+ 95		18			- 53	
	10			+113		0730			0	-128
0400	0	17.3	30.9	+108	0730	5	14.29*	32.3	-146	
	5			+ 36		10			-113	
	10			+120		15			- 95	
0300	0	17.67*	31.0	+103	0800	0	16.5	31.2	-153	
	5			+106		5			-133	
	10			+112		10			-188	
0400	0	16.47*	31.5	+150	0800	15	16.16*	31.5	-111	
	5			+150		15			-111	
	10			+111						
0400	0	15.3	31.9	+ 35						
	5			+ 35						
	15			+ 85						
	15	15.51*	32.0	+ 85						

Table II (ii). Data at Various Depths at Station C*

20-21 July 1961

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec
1100	0	19.14	27.4	+ 14	1800	0	15.24	30.5	+ 25
	10	19.06	27.4	+ 13		5	15.20	30.9	+ 32
	19	18.94	27.7	+ 12		10	14.98	31.0	+ 32
1130	0	19.19	27.4	+ 18	1830	15	14.88	31.1	- 29
	5	19.12	27.4	+ 12		20	14.84	31.2	- 35
	10	19.07	27.5	+ 11		0	16.14	30.4	+ 29
	15	19.06	27.6	+ 10		5	15.34	31.0	+ 27
1200	18	19.01	27.7	+ 14	1900	10	15.02	31.1	- 21
	0	19.17	27.5	+ 21		15	14.60	31.3	- 36
	5	19.09	27.6	+ 24		20	14.58	31.3	- 22
	10	18.97	27.6	+ 23		0	15.74	30.7	+ 27
1230	15	18.92	27.6	+ 20	1930	5	15.15	31.1	+ 23
	18	18.86	27.7	+ 24		10	15.12	31.1	+ 23
	0	19.14	27.8	+ 29		15	14.68	31.3	- 18
	5	19.08	27.8	+ 32		20	14.56	31.3	- 18
1300	10	18.83	27.9	+ 35	2000	0	16.64	30.1	+ 36
	15	18.77	28.0	+ 38		5	15.84	30.8	+ 33
	19	18.75	28.1	+ 29		10	15.54	31.0	+ 20
	0	19.13	27.9	+ 33		15	15.36	31.1	+ 31
1330	5	18.92	28.0	+ 36	2105	20	15.10	31.3	+ 27
	10	18.70	28.2	+ 35		0	17.50	29.5	+ 49
	15	18.68	28.2	+ 29		5	16.28	30.5	+ 36
	18	18.68	28.2	+ 27		10	15.66	31.0	+ 34
1400	0	18.84	28.3	+ 46	2135	15	15.35	31.1	+ 34
	5	18.63	28.4	+ 47		20	15.32	31.2	+ 33
	10	18.59	28.4	+ 41		0	17.36	29.5	+ 31
	15	18.53	28.5	+ 38		5	17.50	29.6	- 26
1430	18	18.52	28.5	+ 32	2200	10	17.42	29.7	- 26
	0	18.54	28.5	+ 50		15	17.28	29.8	- 18
	5	18.51	28.5	+ 52		20	17.26	29.8	- 16
	10	18.45	28.5	+ 50		21	17.26	29.8	- 26
1500	15	18.41	28.7	+ 41	2235	0	17.88	29.3	- 26
	19	18.40	28.7	+ 38		5	17.88	29.6	- 32
	0	18.17	29.0	+ 57		10	17.84	29.7	- 31
	5	18.16	29.0	+ 59		15	17.84	29.8	- 28
1530	10	18.10	29.0	+ 56	2300	21	17.88	29.7	- 18
	15	18.09	29.0	+ 55		0	18.26	29.1	- 21
	20	18.08	29.0	+ 55		5	18.30	29.1	- 38
	0	17.75	29.2	+ 47		10	18.30	29.1	- 21
1635	5	17.66	29.3	+ 57	2330	15	18.28	29.2	- 15
	10	17.58	29.3	+ 58		20	18.22	29.2	- 10
	15	17.54	29.5	+ 50		0	18.70	28.8	- 18
	20	17.54	29.5	+ 45		5	18.77	28.4	- 21
1700	0	17.26	29.5	+ 45	2400	10	18.74	28.8	- 17
	5	17.15	29.7	+ 56		15	18.72	28.8	- 14
	10	17.08	29.8	+ 52		20	18.52	29.0	- 12
	15	17.07	29.8	+ 48		0	18.90	28.8	- 18
1735	20	17.06	29.9	+ 35	0030	5	18.90	28.7	- 21
	0	16.24	30.1	+ 48		10	18.88	28.7	- 17
	5	16.38	29.9	+ 52		15	18.88	28.7	- 11
	10	16.10	30.2	+ 55		19	18.88	28.7	- 3
1800	15	16.16	30.2	+ 48	2430	0	19.02	28.6	- 22
	20	16.16	30.1	+ 45		5	19.00	28.6	- 22
	0	16.16	30.1	+ 64		10	19.00	28.7	- 10
	5	15.82	30.4	+ 54		15	19.02	28.7	- 6
1830	10	15.70	30.7	+ 43	0000	18	19.00	28.7	- 6
	15	15.66	30.6	+ 41		0	19.24	28.4	- 15
	20	15.66	30.7	+ 41		5	19.26	28.4	- 14
	0	15.44	30.7	+ 37		10	19.26	28.4	- 10
1900	5	15.38	30.7	+ 38	0030	15	19.22	28.4	- 10
	10	15.17	30.9	+ 34		0	19.26	28.4	- 11
	15	15.10	31.0	- 34		5	19.26	28.4	- 12
	20	15.11	31.0	- 32		10	19.27	28.5	- 6

*All observations made with C.T.I.

20-21 July

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	
0030	15	19.27	28.7	- 5	0700	15	16.40	31.1	- 8	
	18	19.30	28.8	- 12		22	16.38	31.1	- 7	
0100	0	19.36	28.4	- 10	0730	0	17.51	30.2	- 19	
	5	19.33	28.5	- 12		5	17.20	30.3	- 25	
	10	19.29	28.6	- 12		10	16.81	30.7	- 22	
	15	19.31	28.7	- 12		15	16.55	30.9	- 13	
	17	19.36	28.7	- 12		22	16.40	31.1	- 11	
0130	0	19.26	28.3	+ 11	0800	0	17.56	29.9	- 31	
	5	19.28	28.6	+ 20		5	17.46	30.0	- 31	
	10	19.12	28.7	+ 22		10	17.30	30.3	- 16	
	15	18.90	28.8	+ 21		15	17.04	30.7	- 18	
	18	18.89	28.9	+ 18		21	16.80	30.9	- 17	
0200	0	19.14	28.6	+ 25	0830	0	17.65	30.0	- 34	
	5	19.15	28.8	+ 24		5	17.60	30.2	- 32	
	10	19.16	28.8	+ 31		10	17.54	30.2	- 21	
	15	19.02	28.9	+ 31		0830	15	17.50	30.2	- 21
	18	19.02	29.0	+ 25			20	17.18	30.5	- 23
0230	0	18.92	28.7	+ 34	0900	0	18.06	29.6	- 29	
	5	18.84	29.0	+ 38		5	18.02	29.7	- 24	
	10	18.94	29.0	+ 35		10	18.00	29.7	- 24	
	15	18.94	29.2	+ 31		15	17.94	29.8	- 17	
	19	18.96	29.1	+ 24		20	17.90	29.8	- 13	
0300	0	18.60	28.8	+ 43	0930	0	18.52	29.2	- 24	
	5	18.52	29.3	+ 45		5	18.38	29.3	- 26	
	10	18.49	29.3	+ 44		10	18.38	29.3	- 25	
	15	18.48	29.4	+ 37		15	18.34	29.4	- 20	
	19	18.46	29.4	+ 33		19	18.28	29.4	- 18	
0330	0	18.39	29.2	+ 45	1000	0	18.61	29.2	- 16	
	5	18.32	29.4	+ 42		5	18.61	29.2	- 22	
	10	18.30	29.4	+ 43		10	18.60	29.2	- 18	
	15	18.29	29.0	+ 36		15	18.58	29.2	- 16	
	19	18.28	29.1	+ 32		19	18.48	29.3	- 16	
0400	0	18.07	29.6	+ 50	1030	0	18.80	29.1	- 16	
	5	18.00	29.3	+ 45		5	18.81	29.1	- 28	
	10	18.00	29.3	+ 41		10	18.80	29.0	- 15	
	15	18.00	29.3	+ 37		15	18.78	29.0	- 17	
	20	18.00	29.3	+ 28		19	18.74	29.1	- 26	
0430	0	17.96	29.4	+ 38						
	5	17.80	29.7	+ 42						
	10	17.80	29.7	+ 38						
	15	17.80	29.7	+ 35						
	20	17.80	29.7	+ 25						
0500	0	17.48	29.9	+ 39						
	5	17.47	30.0	+ 35						
	10	17.47	30.0	+ 42						
	15	17.46	30.0	+ 33						
	20	17.46	30.0	+ 25						
0530	0	17.28	30.2	+ 36						
	5	17.23	30.4	+ 28						
	10	17.00	30.6	+ 32						
	15	16.89	30.6	+ 28						
	20	16.88	30.6	+ 21						
0600	0	17.22	30.2	+ 21						
	5	16.88	30.7	+ 23						
	10	16.80	30.8	+ 27						
	15	16.70	30.9	+ 22						
	21	16.67	30.9	+ 24						
0630	0	17.80	29.8	- 21						
	5	17.02	30.6	- 14						
	10	16.68	30.8	- 19						
	15	16.58	30.9	- 13						
	22	16.52	31.0	- 13						
0700	0	17.40	30.2	- 16						
	5	17.02	30.6	- 7						
	10	16.48	31.0	- 12						

Table II (iii). Data at Various Depths at Station A

2-3 August 1961

Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec
0930	0	15.0	32.4	-141	1730	0	10.9		- 30
	10	14.3	32.3	-136		10	10.9		- 35
	20			-118		20	10.8		- 35
1000	30			-103	30				- 30
	0	14.9	32.1	-103	35				- 19
	10	14.4		- 82	1800	0	13.8		- 30
20			- 70	10		11.5		0	
30			- 50	20		10.9		0	
1030	0	15.1	31.6	- 46	30	10.8		0	
	10	15.2	31.9	- 47	1830	0	13.2		- 61
	20	14.7	32.3	- 39		10	11.1		- 46
27	14.9	32.1	- 26	20		10.5		- 43	
1100	0	15.3		- 19	30	10.5		- 41	
	10	15.1		- 10	1900	0	13.6		-134
	20	14.3		0		10	11.5		-136
24	14.3		- 19	20		11.1		-101	
1130	0	15.3		+ 27	30	10.8		- 70	
	10	14.5		+ 41	1930	0	12.5		-121
	20	14.3		+ 37		10	11.5		-139
25	14.1		+ 50	20		11.5		-151	
1200	0	14.5		+ 73	30	11.2		-153	
	10	14.4		+ 65	34			-155	
	20	14.3		+ 41	2000	0	11.9		-121
28	14.3		+ 57	10		10.9		-139	
0	14.3		+115	20		11.2		-155	
1230	10	14.2		+ 94	30	10.8		-153	
	20	14.2		+ 88	2130	0	13.3	29.7	-160
	30	14.0		+ 69		10	13.1	30.0	
0	13.3		+127	20		13.1	30.0		
1300	10	13.5		+121	30	13.3	29.7		
	20	13.3		+111	2200	0	13.4	29.6	-162
	30	13.3		+108		10	13.6	29.4	
38	13.3		+ 96	20		13.6	29.4		
1330	0	12.9		+ 73	30	13.6	29.4		
	10	12.5		+130	2230	0	14.3	28.5	-162
	20			+137		10	14.3	28.5	
30			+131	20		14.2	28.3		
1430	39			+104	30	14.2	28.3		
	0	12.5		+137	2300	0	15.0	27.7	-105
	10	11.8		+152		10	14.7	27.8	-101
20	11.5		+ 85	20		14.7	27.8	- 73	
1500	30	11.2		+ 80	28	14.7	27.8	- 73	
	0	11.8		+133	2330	0	15.3	27.3	- 55
	10	11.5		+155		10	15.0	27.5	- 61
20	11.5		+162	20		14.8	27.7	- 61	
1530	30	11.2		+101	24	14.9	27.6	- 43	
	0	11.5		+118	2400	0	15.5	27.3	- 30
	10	11.0		+145		10	15.3	27.4	- 19
20	11.1		+139	20		14.7	27.8	- 10	
1600	30	11.1		+101	22	14.1	28.2	- 10	
	0	11.3		+109	0100	0	14.4	27.4	+ 65
	10	11.0		+119		10	14.4	27.4	+ 80
20	11.0		+ 90	20		14.2	27.6	+ 73	
1630	30	10.8		+ 70	25	14.2	27.6	+ 71	
	0	11.5		+ 85	0200	0	13.7	27.9	+101
	10	11.2		+ 84		10	13.6	28.0	+ 96
20	11.0		+ 76	20		13.6	28.0	+ 89	
1700	30	11.0		+ 73	30	13.5	28.1	+ 74	
	0	11.0		+ 65	0300	0	13.5	31.6	+101
	10	11.0		+ 66		10	12.0		+ 99
20	10.9		+ 62	20		11.9		+ 93	
	30	10.8		+ 53	30	12.5		+ 95	
	38			+ 43					

2-3 August 1961

Time PST	Depth ft	Temp. °C	Sal.	Current cm/sec	Time PST	Depth ft	Temp. °C	Sal.	Current cm/sec
0330	0	12.5		+ 89	0600	0	11.1		+ 19
	10	12.0		+ 86		10	10.8		+ 30
	20	12.0		+ 89		20	10.9		+ 33
	30	12.0				30	10.4		+ 35
0400	0	11.5		+105	0630	0	11.5		- 35
	10	11.3		+ 99		10	11.1		0
	20	11.1		+ 96		20	10.2		- 10
	30	11.1		+ 89		30			- 10
0430	0	11.1		+ 91	0700	0	11.9	31.0	- 65
	10	11.0		+ 86		10	11.7	31.2	- 45
	20	11.0		+ 84		20	10.5		- 41
	30	10.9		+ 73		30	10.2		- 50
0500	0	10.9		+ 71	0730	0	12.1	30.6	-103
	10	10.8		+ 71		10	11.8	31.1	- 88
	20	10.8		+ 68		20	10.9		- 81
	30	10.8		+ 58		30	10.9		- 71
0530	0	11.0		+ 39					
	10	10.8		+ 43					
	20	10.8		+ 41					
	30	10.8		+ 39					

Location	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec	Location	Time PST	Depth ft	Temp. °C	Sal. ‰	Current cm/sec		
Empire	0604	0	15.03		-24	Station A	1300	0	9.3	32.09			
		5	14.84		-21			10	9.2	32.16			
		10	14.52		-21			20	9.2	32.10			
		15	14.47		-17			30	9.2	32.14			
		20	14.46		-21	Railroad Bridge	1300	0	8.9	24.78			
		25	14.44		-21			10	8.9	25.46			
		30	14.42		-17			20	8.9	25.93			
		35	14.42		-21			30	8.8	26.22			
		37.5	14.42		-11			1500	0	8.9	17.12		
		0	14.82		-14				10	8.8	16.78		
	5	14.66		-21	20	8.7	16.89						
	10	14.48		-7	30	8.6	16.53						
	0635	0635	15	14.42		-11	Station A	1530	0	9.3	28.60		
			20	14.37		-14			10	9.3	29.05		
			25	14.35		-24			20	9.3	29.56		
			30	14.32		-17			30	9.3	29.69		
			35	14.30		-11	Railroad Bridge	1700	0	8.4	12.34		
			37.5	14.30		-4			10	8.4	11.91		
			0	15.38		-21			20	8.5	11.76		
			5	14.98		-17			30	8.6	11.60		
			10	14.57		-21			Station A	1900	0	8.5	15.30
			15	14.53		-21					10	8.6	16.00
	20	14.50		-21	20	8.7	16.53						
	25	14.48		-17	30	8.8	18.03						
	0703	0703	30	14.46		-14	2200	0	9.1	28.37			
			35	14.44		-14		10	9.3	30.70			
			37.5	14.43		-11		20	9.3	30.86			
			0	15.50		-47		30	9.3	31.08			
			5	15.24		-47	0100	0	9.3	31.69			
			10	15.12		-40		10	9.3	31.69			
			15	14.81		-40		20	9.3	31.69			
			20	14.82		-37		30	9.3	31.71			
			25	14.61		-30		0	9.2	29.69			
			30	14.64		-27		0400	10	9.2	29.74		
	35	14.60		-24	20	9.2	29.78						
	37.5	14.60		-21	30	9.2	29.81						
	0	16.10		-67	0700	10	8.5		16.37				
5	15.25		-64	20		8.6	18.71						
10	15.17		-57	30		8.7	19.92						
15	15.18		-54	0930		0	8.9	22.09					
20	15.19		-50		10	8.9	22.74						
25	15.19		-54		20	8.9	22.99						
30	15.21		-47										
0730	0730	35	15.21		-41								
		38	15.21		-27								
		0	15.50		-47								
		5	15.24		-47								
		10	15.12		-40								
		15	14.81		-40								
		20	14.82		-37								
		25	14.61		-30								
		30	14.64		-27								
		35	14.60		-24								
0800	0800	37.5	14.60		-21								
		0	16.10		-67								
		5	15.25		-64								
		10	15.17		-57								
		15	15.18		-54								
		20	15.19		-50								
		25	15.19		-54								
		30	15.21		-47								
		35	15.21		-41								
		38	15.21		-27								
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Railroad Bridge	0900	0	7.6	13.21									
		10	7.9	16.13									
		20	8.0	18.33									
		30	8.1	19.40									
Station A	0930	0	9.1	30.73									
		10	9.1	31.47									
		20	9.1	31.58									
		30	9.1	31.69									
Station A	1130	0	9.2	32.07									
		10	9.2	31.94									
		20	9.2	31.92									
		30	9.2	31.98									

