Oceanographic and Meteorological Observations in the Northeast and Central North Pacific, July -- December 1956

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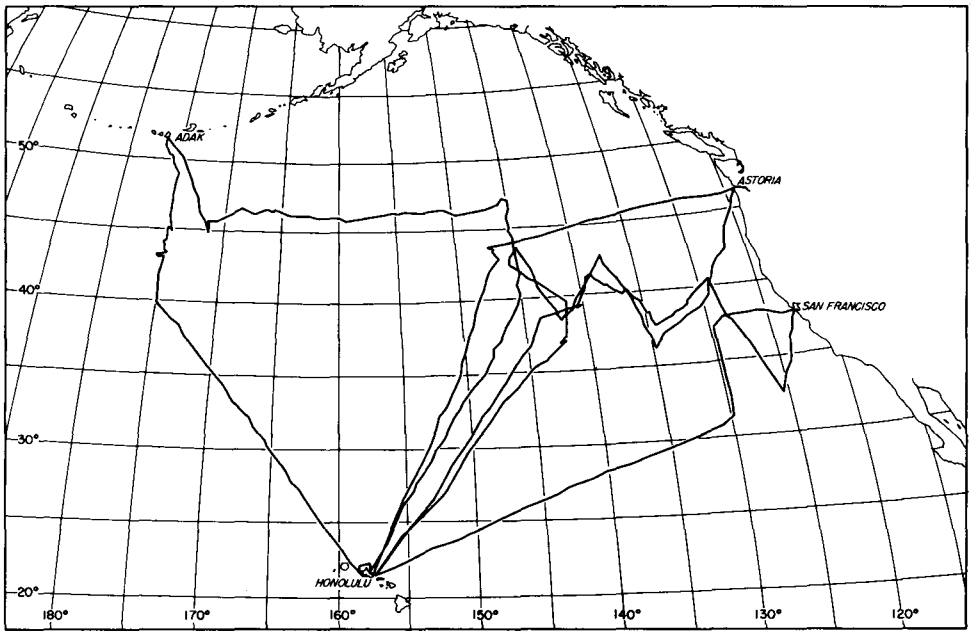
United States Department of the Interior, Fred A. Seaton, Secretary
Fish and Wildlife Service



OCEANOGRAPHIC AND METEOROLOGICAL OBSERVATIONS IN THE NORTHEAST AND CENTRAL NORTH PACIFIC, JULY - DECEMBER 1956

By

Richard J. Callaway
Oceanographer
Pacific Oceanic Fishery Investigations
Honolulu, T. H.

Special Scientific Report--Fisheries No. 230

WASHINGTON: August 1957

ABSTRACT

This report lists surface meteorological, physical, and chemical observations made during three albacore fishing cruises into the northeast and central North Pacific. Data were collected aboard the research vessels John R. Manning and Charles H. Gilbert in the summer and fall of 1956. Laboratory and field procedures are described.

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OCEANOGRAPHIC AND METEOROLOGICAL OBSERVATIONS IN THE NORTHEAST AND CENTRAL NORTH PACIFIC, JULY - DECEMBER 1956

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Through an allotment of funds provided by Public Law 466 of the 83rd Congress, better known as the Saltonstall-Kennedy Act of 1954, the Pacific Oceanic Fishery Investigations (POFI) of the U. S. Fish and Wildlife Service, Honolulu, T. H., has been studying albacore distribution and abundance in the North Pacific Ocean.

In the summer and fall of 1956, POFI vessels made three albacore fishing cruises into the waters north and northeast of Hawaii. It is the purpose of this report to make available to interested workers the physical and chemical data collected during these cruises. The data presented will supplement earlier reports on oceanographic observations in the area (McGary et al. 1956, Shomura and Otsu 1956, McGary and Stroup 1956, and Graham 1957) and will provide a more complete picture of the environmental features which influence the seasonal occurrence of albacore in the northeast Pacific.

Table 1 defines the approximate geographic limits and periods of the cruises. Track charts are given in figures 1, 5, and 9.

PHYSICAL AND CHEMICAL OBSERVATIONS

The following observations were made on each cruise unless otherwise indicated.

Temperature; Bathythermograph Slide Processing

Bathythermograph lowerings to 900 feet were made at approximately 30-mile intervals and while on gill-net stations. The bathythermograph log sheets (log sheet "B") are reproduced in tables 2, 5, and 8.

The vertical temperature sections for John R. Manning cruise 32 (figs. 2 - 4) are plots from BT slides processed at the U. S. Navy Hydrographic Office.

Sections for John R. Manning cruise 33 (figs. 6 - 8) and Charles H. Gilbert cruise 31 (figs. 10 - 12) are plots from BT slides processed at the POFI laboratory. The temperature corrections were made as follows. Each BT slide was placed against the stop in the appropriate grid and the indicated surface temperature was noted. The algebraic difference of the BT surface temperature and the bucket temperature was taken. Where the difference was consistent for a group of slides the average was applied as a correction when reading temperatures at depth. When an abrupt change appeared (e.g., from -0.2°F. to +0.3°F.) a new average was obtained and applied to BT slides which lay within that group.

Depth correction was obtained by comparing the position of the top horizontal BT trace with zero depth on the grid. The difference was applied to each slide when reading temperature against depth.

Throughout each cruise a continuous record of surface temperature was obtained by means of a recording thermograph.

Salinity

Surface samples for salinity determinations were usually taken at each BT position. The samples were analyzed in the POFI laboratory by a modification of Knudsen's method for the

Table 1.--Cruise limits and periods

Vessel	Cruise	Period, 1956	Limits
John R. Manning	32	July 16 - Sept. 12	175°W. - 145°W. between 40°N. and 49°N.
John R. Manning	33	Oct. 17 - Dec. 11	150°W. - west coast of the United States between 35°N. and 46°N.
Charles H. Gilbert	31	Oct. 22 - Dec. 11	145°W. - west coast of the United States between 31°N. and 46°N.

determination of salinity (Van Landingham 1957). Results are incorporated in the BT summaries. A plot of surface salinities collected on cruise 33 of the John R. Manning and cruise 31 of the Charles H. Gilbert is shown in figure 13.

Phosphate

Samples for inorganic phosphate determinations were usually taken at approximately 90-mile intervals.[1/] The samples were frozen at sea, returned to the POFI laboratory, and analyzed by the hydrazine sulfate modification of Deniges' method (King et al. 1957). Results (in μg at./L) are incorporated in the BT summaries.

Light Penetration and Water Color

Weather permitting, Secchi disk observations were made each day about local apparent noon. Water color was estimated using the Forel scale. Results are listed in tables 4, 7, and 10.

Photometer measurements, at 50-, 10-, 5-, and 1-percent levels of transmission, were made in addition to the above on John R. Manning cruise 32 and Charles H. Gilbert cruise 31.[2/] Results are listed in tables 4 and 10.

Photometer Description

The photometer[3/] used by POFI consists of a deck and sea unit, each housing a matched photoelectric cell. Opal glass shields over the photoelectric cells serve to diffuse the light normal to the windows of the cells. The amount of light incident upon a cell is registered by a microammeter.

Before lowering the sea unit into the water both cells are directly exposed to sunlight on deck and the ammeter readings are checked to note any failing in the photoelectric cells. The desired level of transmission is selected by placing a metal disk, with a hole in the center, over the opal glass shield of the deck cell. Disks with openings of various diameters are used in accordance with the percentage transmission to be measured. The sea unit is then lowered and ammeter readings of both cells checked until they are equal. The depth is determined from the wire angle and the amount of wire out.

When making observations care is taken to prevent the deck cell (mounted in gimbal-rings) from being shadowed by the ship's rigging and superstructure. In some instances, however, it was not possible to prevent the shadow cast by the ship's hull from influencing the reading of the sea cell.

METEOROLOGICAL OBSERVATIONS

Synoptic marine weather observations were recorded daily at 0000, 0600, 1200, and 1800 GCT. The reports were transmitted to the U.S. Weather Bureau at San Francisco, California, or Honolulu, T. H., as often as radio conditions would permit. Observations are listed in tables 3, 6, and 9.

RECORDS

The following records were kept and are on file at POFI, except as otherwise noted:

- Bait tank records [Charles H. Gilbert cruise 31 only]
- Barograph records (U. S. Weather Records Center, Asheville, N. C.)
- Bathythermograph log sheet "B" (duplicates at U. S. N. Hydrographic Office)
- BT slides (U. S. N. Hydrographic Office)
- Deck log
- Field plots of BT temperatures
- Flowmeter and plankton sampler calibration log
- Gill net record sheets
- Light station fishing log
- Occurrence of tuna schools, birds, and aquatic mammals log
- Photometer log [John R. Manning cruise 32 and Charles H. Gilbert cruise 31 only]
- Plankton log
- Scientists' log
- Short form tuna morphometric sheets
- Standardized surface trolling data sheet
- Tagging record sheets
- Thermograph records
- Track charts
- Tuna condition - vessel report
- U.S.W.B. Form 1210F (U. S. Weather Records Center, Asheville, N. C.)

1/ Samples were taken at approximately 30-mile intervals on John R. Manning 32.

2/ Except that on Charles H. Gilbert cruise 31 observations were made only on the initial northbound leg and measurements of the 50-percent level of transmission were not obtained.

3/ Manufactured by Fred Schueler, Albemarle, Massachusetts.

FIELD PARTIES

John R. Manning cruise 32
F. E. Barnett, Master
J. J. Graham, Fishery Research Biologist - Field Party Chief
R. S. Nishioka, Fishery Aid

John R. Manning cruise 33
F. E. Barnett, Master
G. R. Seckel, Oceanographer - Field Party Chief
W. M. Matsumoto, Fishery Research Biologist

Charles H. Gilbert cruise 31
W. T. Tanaka, Master
R. S. Shomura, Fishery Research Biologist - Field Party Chief
R. N. Uchida, Fishery Research Biologist

ACKNOWLEDGMENTS

The special weather forecasts provided by the U. S. Weather Bureau, Honolulu and San Francisco branches, played an important part in the successful completion of these cruises.

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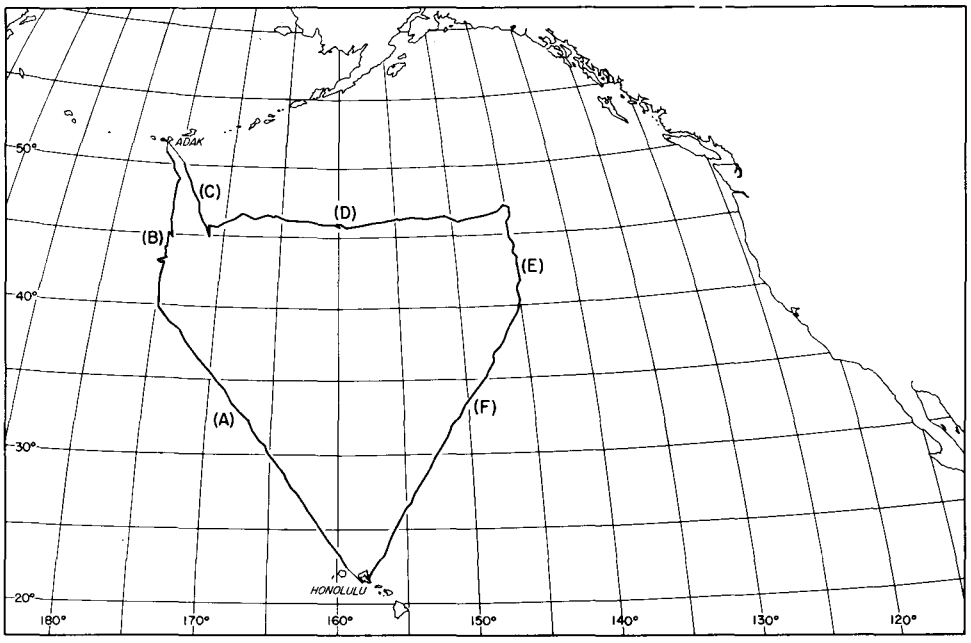

Figure 1.--Track chart, John R. Manning cruise 32, July 16 - September 12, 1956. Heavy lines and letters designate location of temperature sections shown in figures 2 to 4.

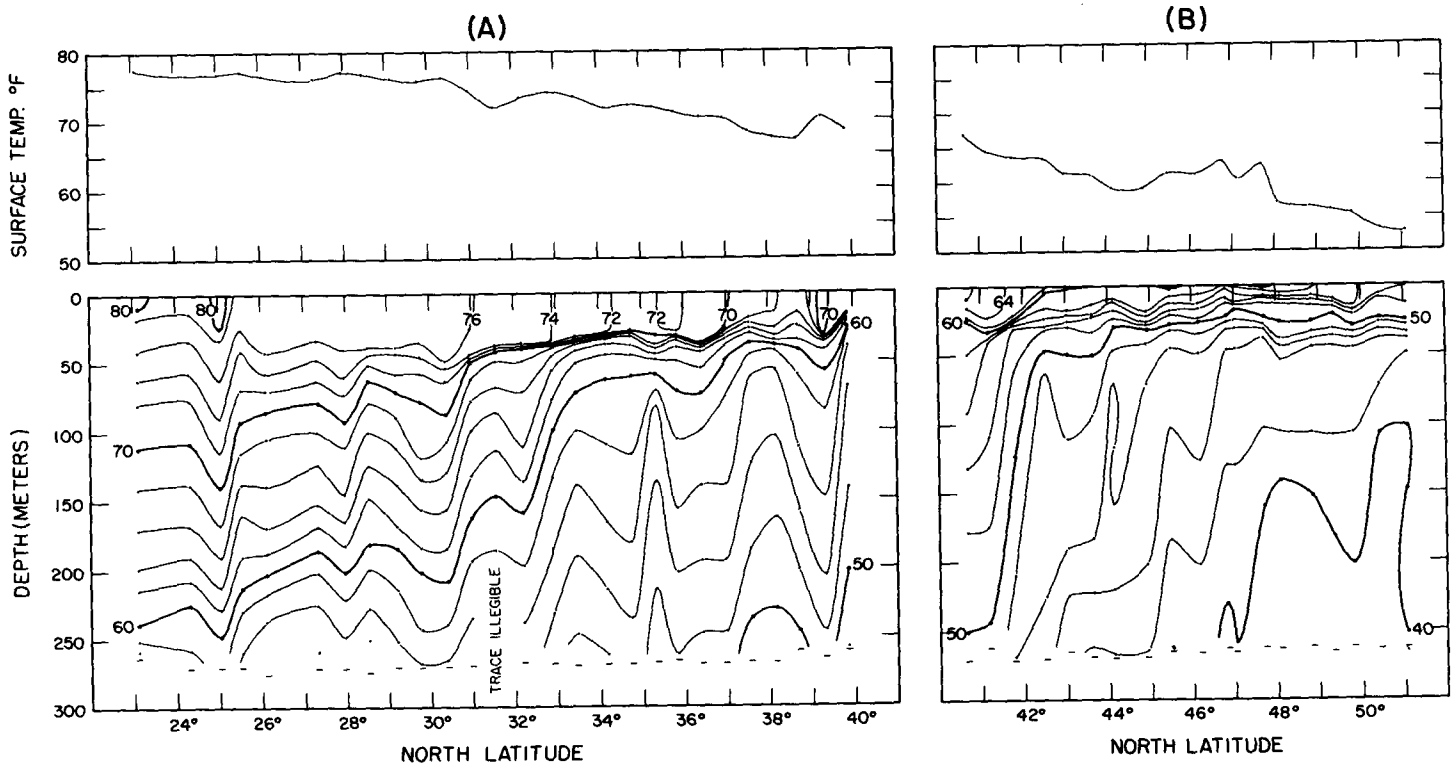

Figure 2.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section A and Section B (see fig. 1) of John R. Manning cruise 32, July - September 1956.

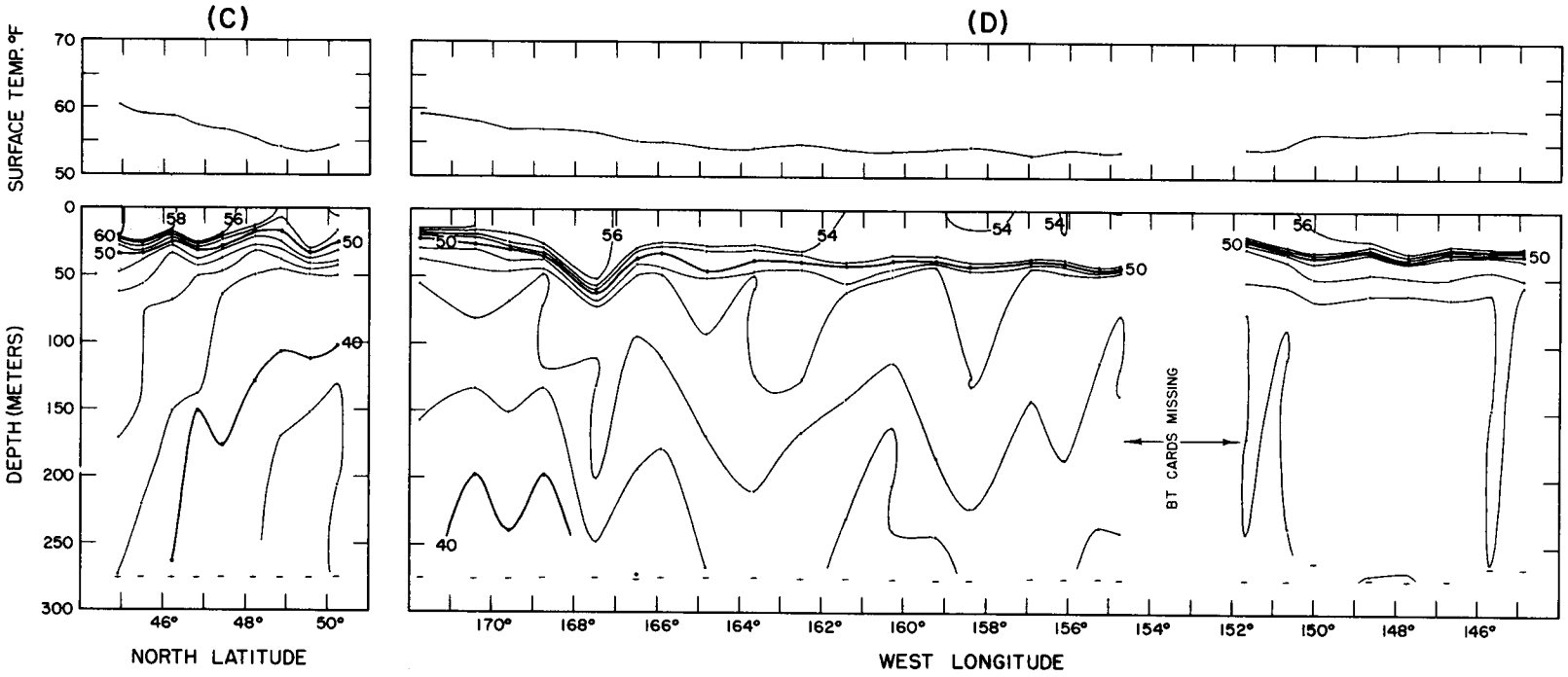

Figure 3.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section C and Section D (see fig. 1) of John R. Manning cruise 32, July - September 1956.

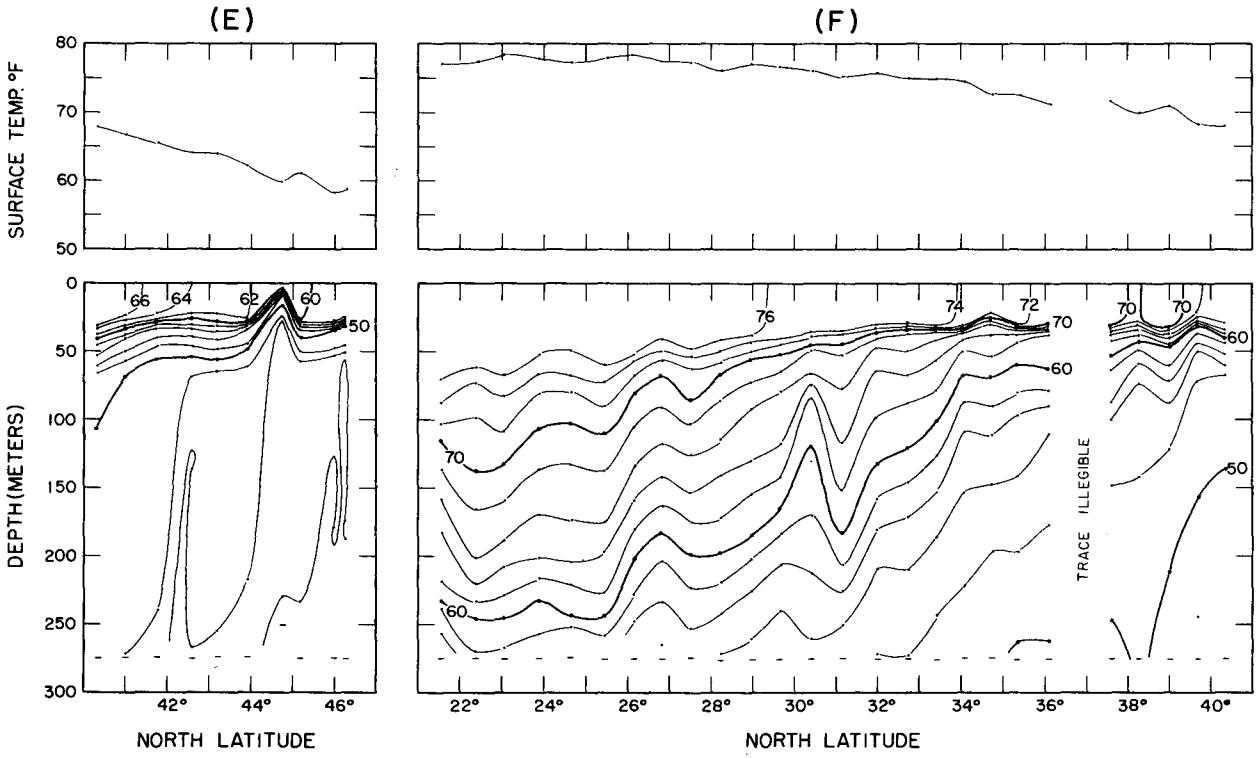

Figure 4.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section E and Section F (see fig. 1) of John R. Manning cruise 32, July - September 1956.

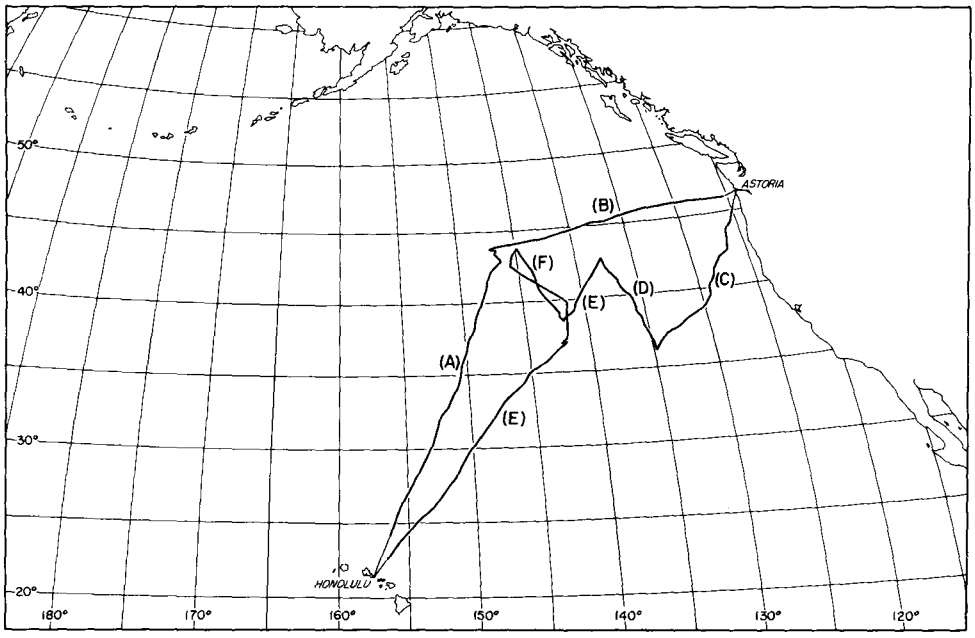

Figure 5.--Track chart, John R. Manning cruise 33, October 17 - December 22, 1956. Heavy lines and letters designate location of temperature sections shown in figures 6 - 8.

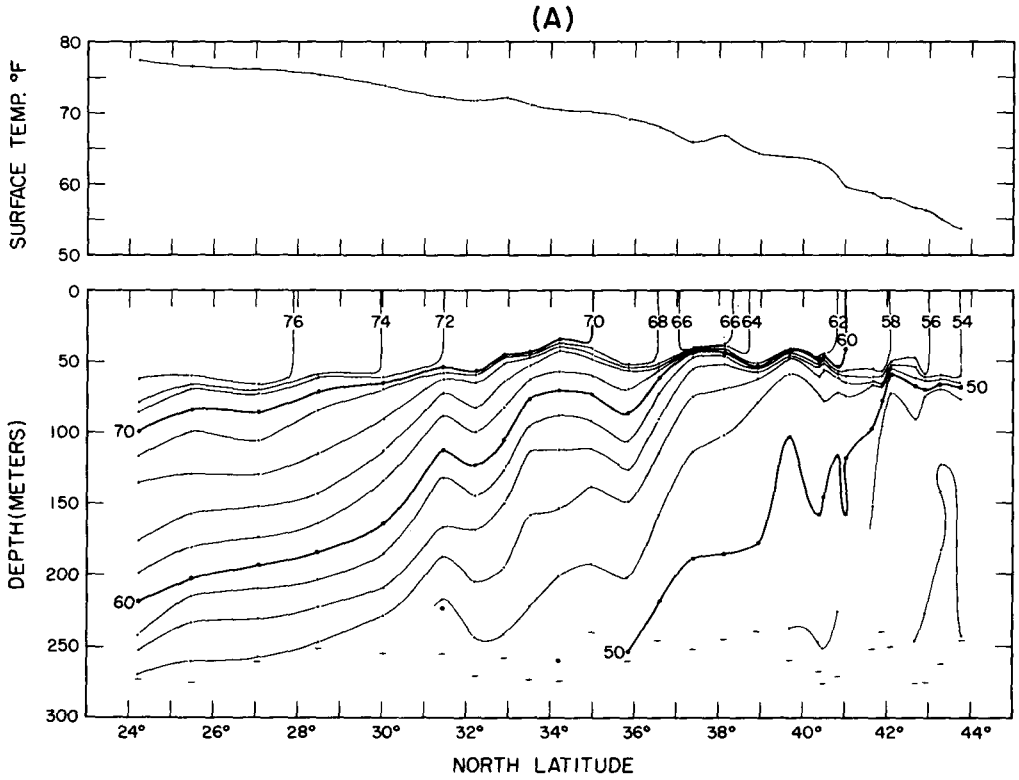

Figure 6.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section A (see fig. 5) of John R. Manning cruise 33, October - December 1956.

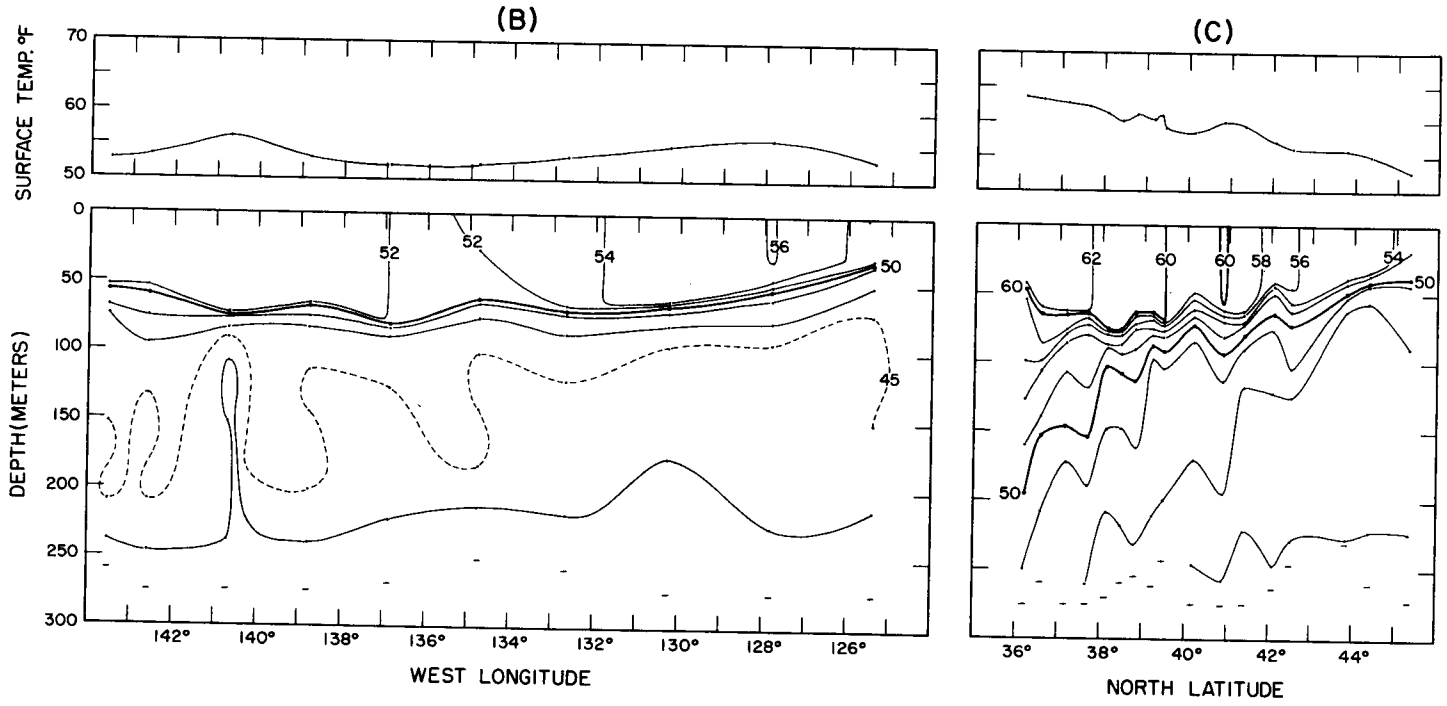

Figure 7.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section B and Section C (see fig. 5) of John R. Manning cruise 33, October - December 1956.

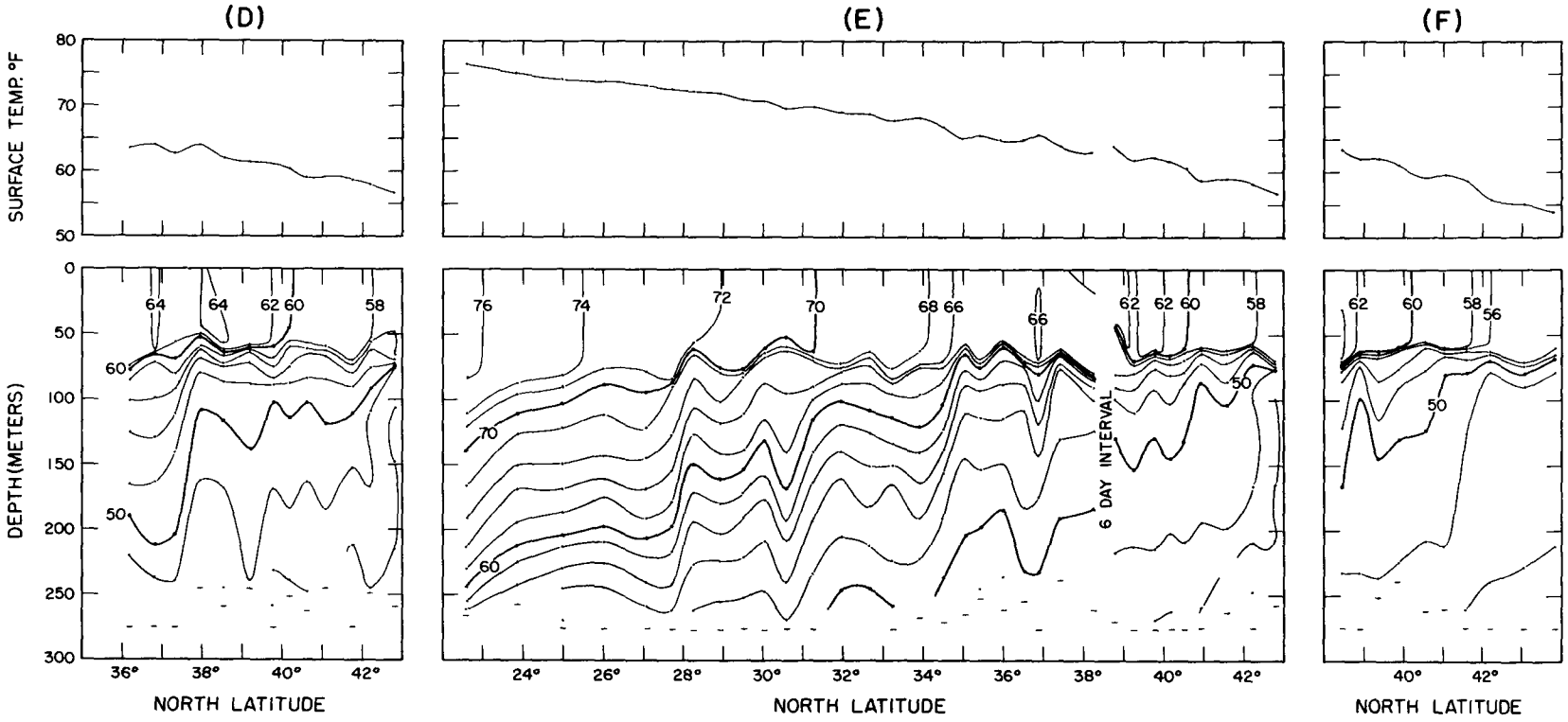

Figure 8.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section D, Section E and Section F (see fig. 5) of John R. Manning cruise 33, October - December 1956.

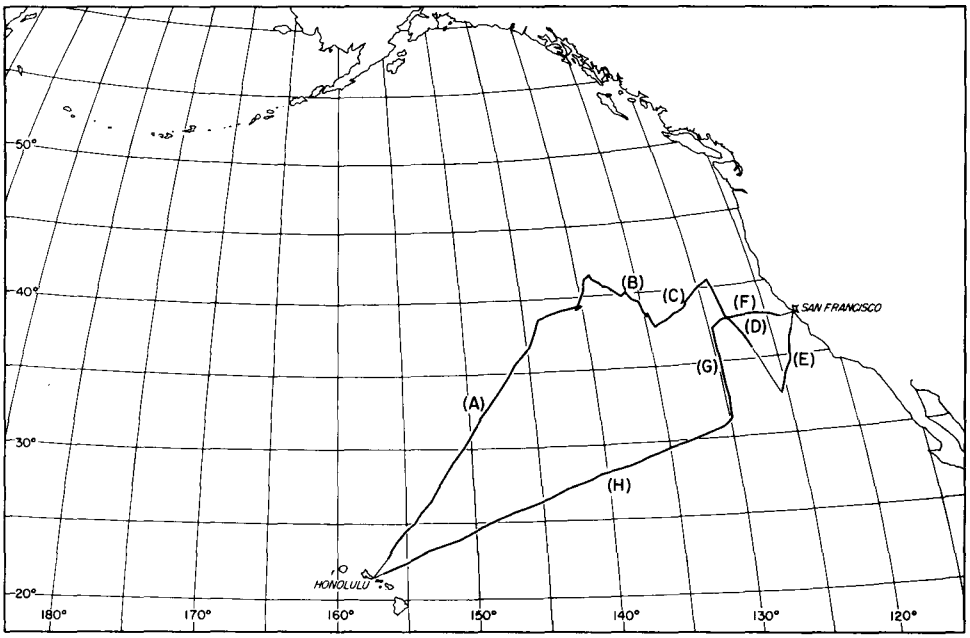

Figure 9.--Track chart, Charles H. Gilbert cruise 31, October 22 - December 11, 1956. Heavy lines and letters designate location of temperature sections shown in figures 10 to 12.

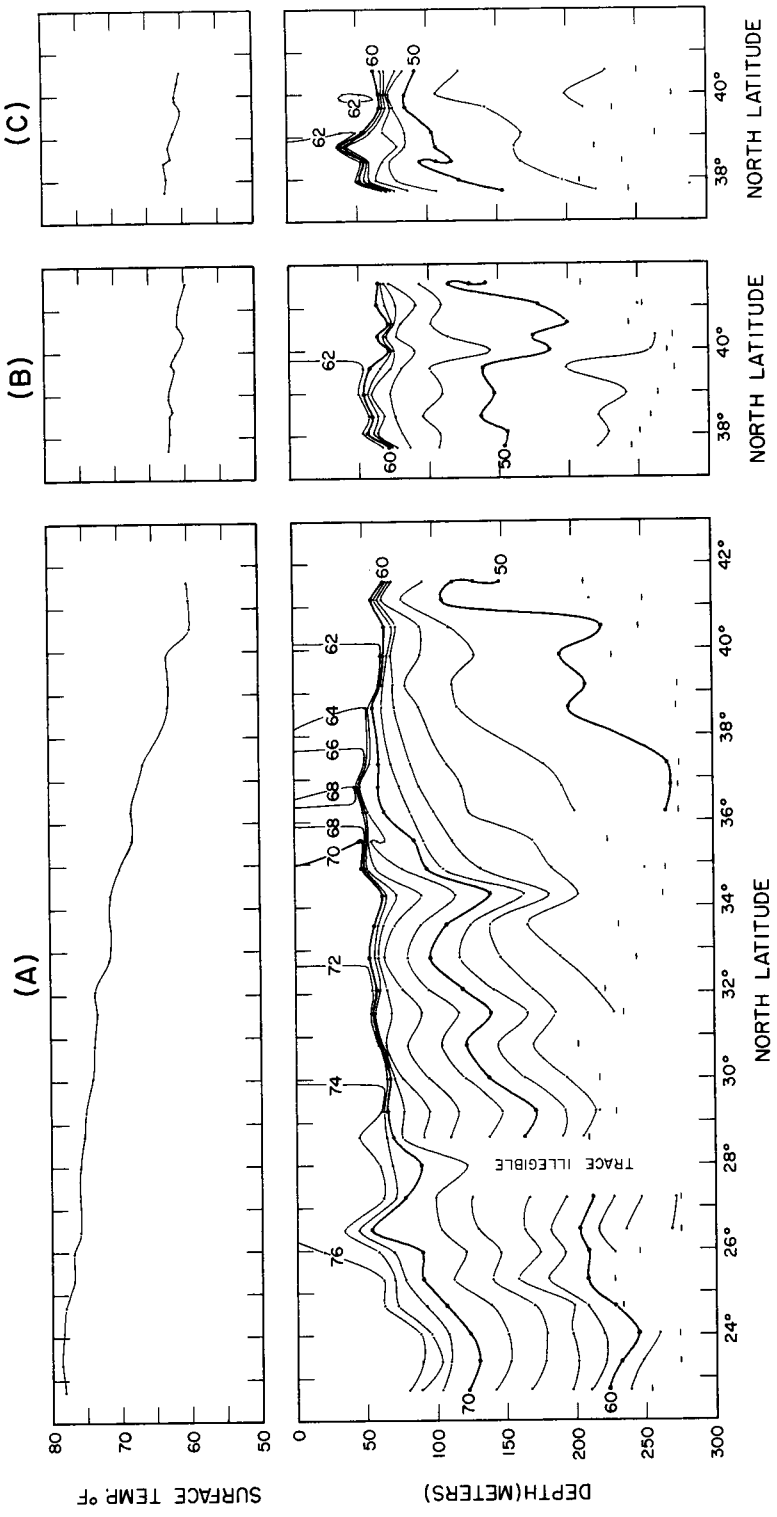

Figure 10.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section A, Section B and Section C (see fig. 9) of Charles H. Gilbert cruise 31, October - December 1956.

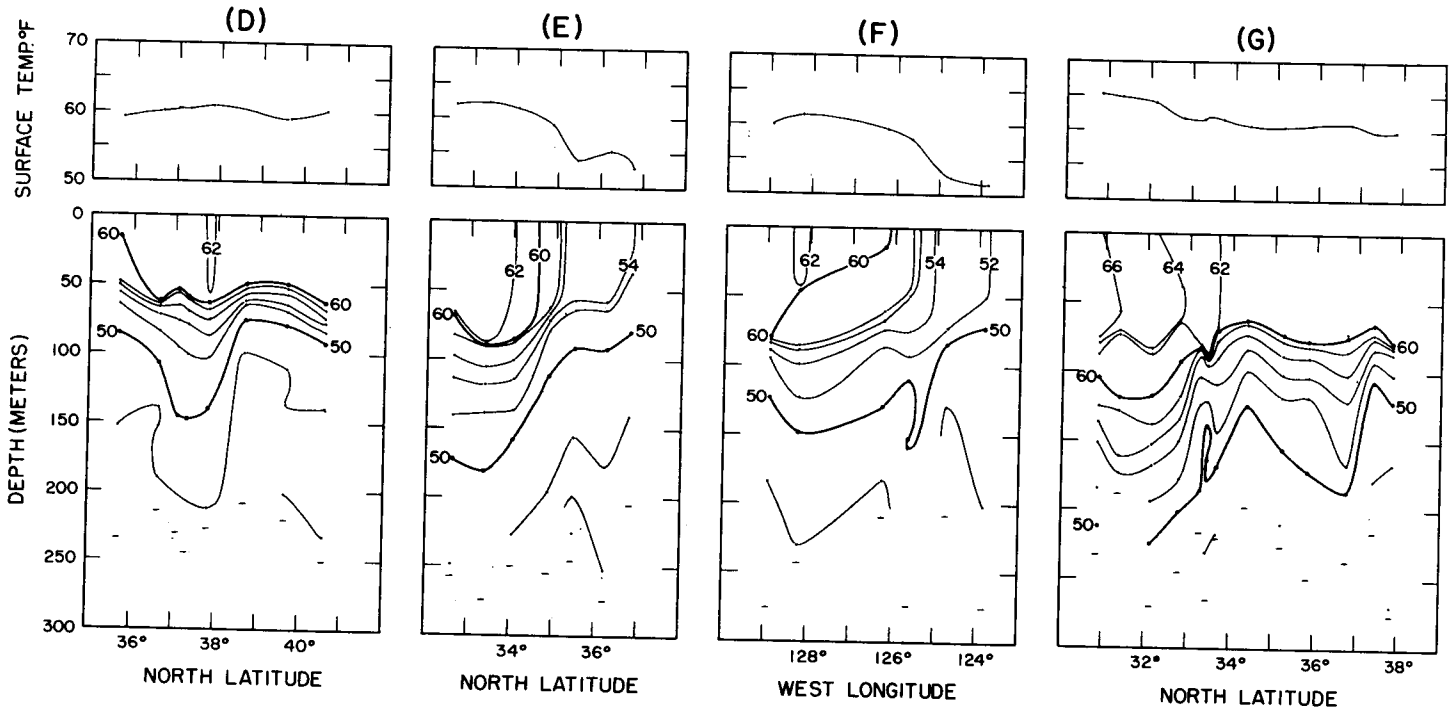

Figure 11.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section D, Section E, Section F, and Section G (see fig. 9) of Charles H. Gilbert cruise 31, October - December 1956.

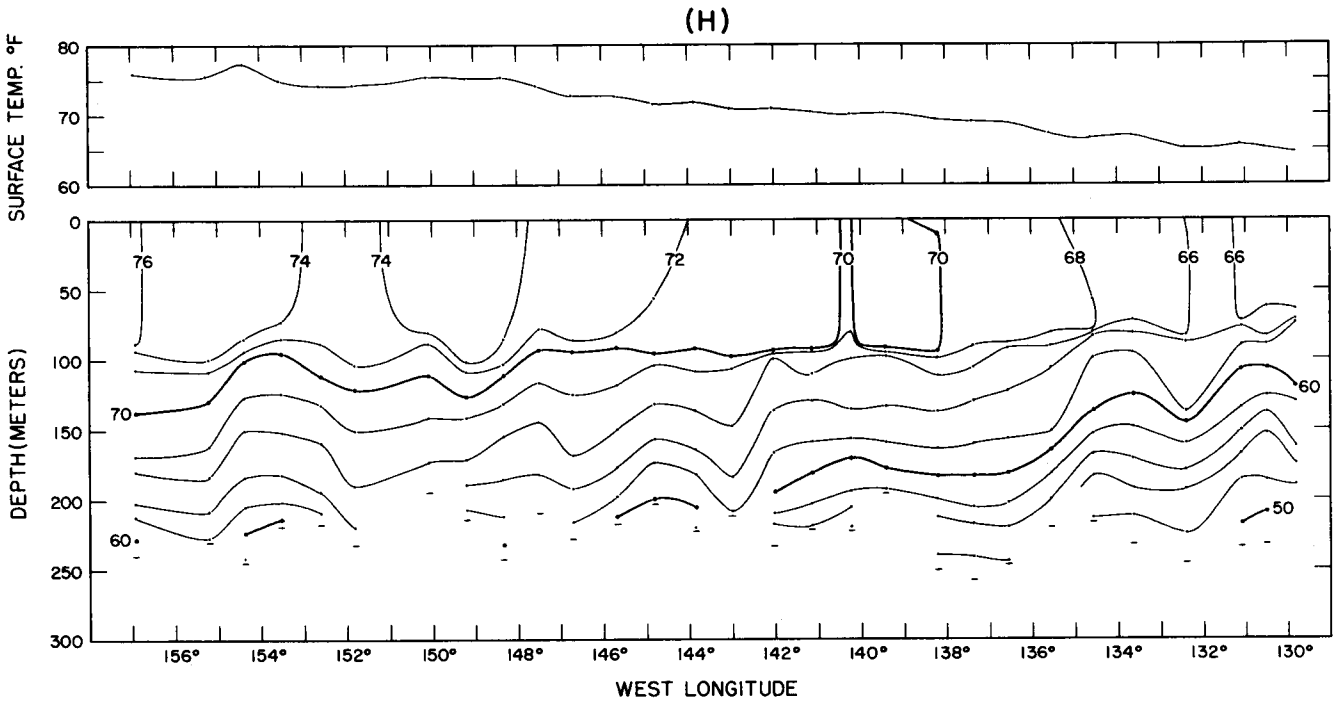

Figure 12.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section H (see fig. 9) of Charles H. Gilbert cruise 31, October - December 1956.

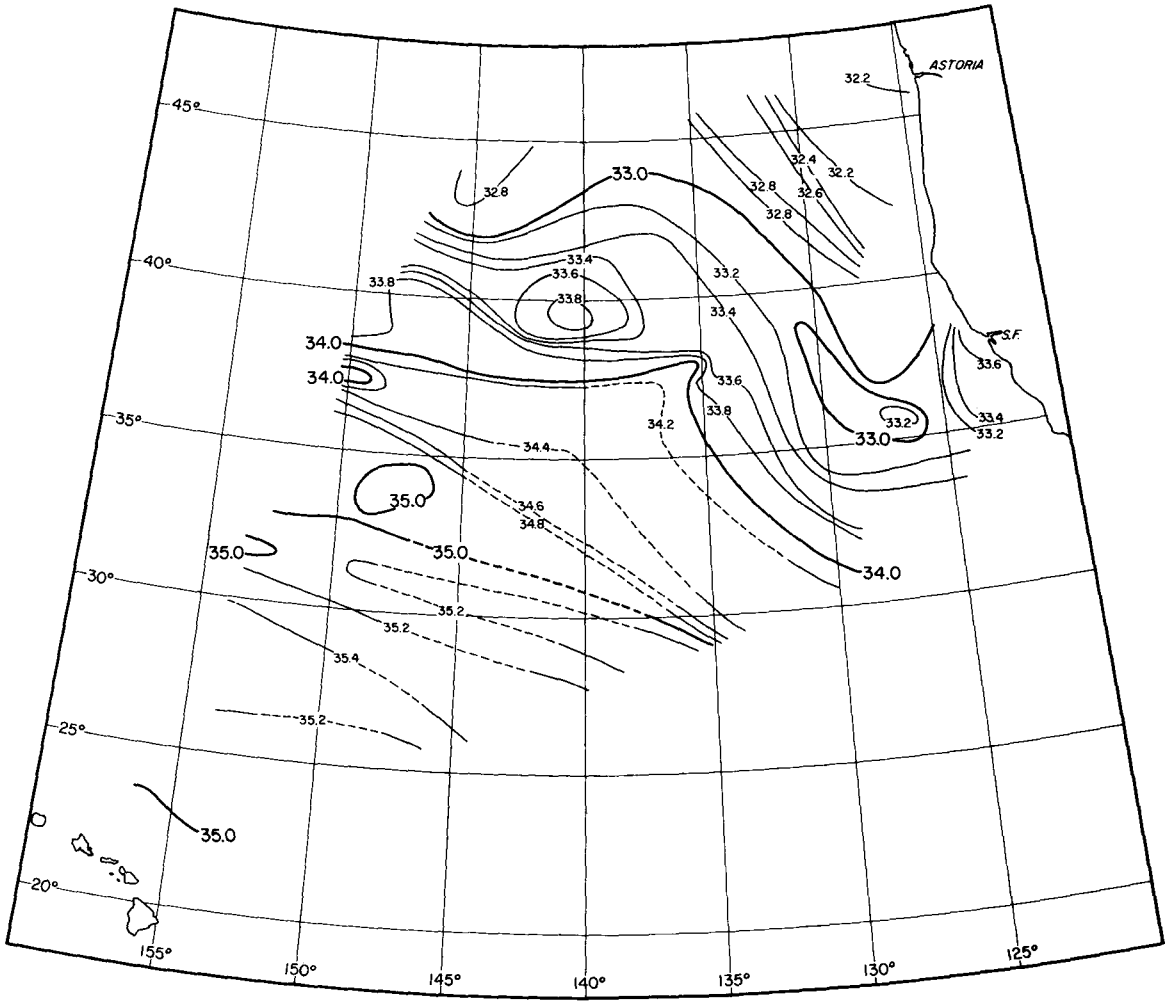

Figure 13.--Surface salinity, John R. Manning cruise 33 and Charles H. Gilbert cruise 31. Dashed lines indicate interpolated contours.

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
1	1730	7/17	22.5°	159.2°	76.3	07	4	76.0	70.2	16	02	8	5	9	2			35.16	
2	2330	7/17	23.1°	159.7°	77.5	07	3	77.1	71.5	15	01	8	7	9	2			34.94	
3	0530	7/18	23.7°	160.2°	78.0	03	3	76.6	71.0	17	01	8	3	9	3			34.88	
4	1130	7/18	24.3°	160.7°	76.8	07	3	75.5	71.5	18	01	8,4	2	9	3			35.37	
5	1830	7/18	25.0°	161.3°	76.9	10	2	77.5	71.0	19	02	8,1	3	9	3			35.12	
6	2330	7/18	25.6°	161.7°	77.2	07	5	75.0	70.3	19	15	8,1	6	9	3			35.07	
7	0500	7/19	26.1°	162.1°	76.8	07	4	76.1	70.0	19	15	1,4,8	6	9	3			35.17	
8	1130	7/19	26.7°	162.5°	76.5	08	4	75.4	70.0	20	02	8	6	9	3			35.19	
9	1730	7/19	27.3°	163.0°	76.2	06	4	74.8	69.5	20	02	4,8	7	9	3			35.19	
10	2330	7/19	28.0°	163.5°	77.3	08	4	78.2	70.2	22	02	1,4,8	7	9	3			35.16	
11	0530	7/20	28.5°	163.9°	76.8	06	5	74.0	69.2	22	01	1,8,9	6	9	3			35.37	
12	1130	7/20	29.2°	164.5°	76.3	07	5	75.0	69.0	23	01	8	3	9	4			35.41	
13	1730	7/20	29.8°	165.0°	75.8	08	5	75.0	68.9	23	02	1,8,9	6	9	3			35.34	
14	2330	7/20	30.4°	165.5°	76.3	06	5	76.5	71.2	25	03	8	5	9	4			35.44	
15	0530	7/21	31.0°	165.9°	74.6	06	5	74.0	69.8	24	03	6,8	9	9	3			35.50	0.13
16	1130	7/21	31.6°	166.4°	74.0	08	5	72.0	66.5	25	02	6,8	10	8	4			35.21	
17	1730	7/21	32.2°	166.9°	73.2	06	5	73.5	68.0	25	03	1,4,8,9	6	9	3			35.17	
18	2330	7/21	32.9°	167.5°	74.2	08	5	74.0	67.0	26	02	1,4,8	6	9	3			34.97	
19	0530	7/22	33.5°	168.1°	73.5	09	4	71.0	71.0	26	02	1,4,8	6	9	3			34.85	0.24
20	1130	7/22	34.2°	168.7°	71.8	12	3	69.9	65.9	26	03	4,8	9	9	2			34.65	
21	1730	7/22	34.8°	169.3°	72.3	29	3	70.0	63.0	26	02	4,8	7	9	1			34.74	0.17
22	2330	7/22	35.3°	169.9°	71.8	26	4	72.3	67.5	24	03	6,8	9	9	3			34.65	
23	0530	7/23	35.8°	170.4°	71.2	36	4	69.5	63.5	22	02	4,8	9	9	3			34.63	0.24
24	1130	7/23	36.4°	171.0°	70.5	34	4	66.1	61.2	24	02	4,8	8	7	3			34.61	
25	1730	7/23	37.0°	171.6°	70.3	05	5	65.3	60.2	24	02	6,8	-	-	-				0.05
26	2330	7/23	37.6°	172.2°	68.3	01	4	66.3	60.0	25	01	-	-	-	-			34.45	
27	0540	7/24	38.6°	172.8°	67.5	01	3	64.2	58.0	24	-	-	-	-	-				0.34
28	1130	7/24	38.7°	173.5°	67.2	08	3	63.5	58.9	-	-	-	-	-	-				
29	1730	7/24	39.3°	174.2°	70.3	11	3	67.2	59.0	-	-	-	-	-	-				0.11
30	2330	7/24	39.9°	174.9°	68.2	20	5	68.6	67.0	-	53	X	9	3	3			34.31	
31	0530	7/25	40.7°	174.9°	67.0	26	4	68.0	68.3	19	53	X	9	3	3			34.20	0.28
32	1130	7/25	41.2°	175.0°	64.8	35	3	67.0	65.0	20	12	9	X	0	3			33.98	
33	1730	7/25	41.8°	175.0°	63.8	26	2	64.3	63.9	19	45	X	9	3	2			33.93	0.43
34	2330	7/25	42.5°	175.0°	63.6	23	3	66.0	63.5	20	45	X	9	6	2			33.49	
35	0500	7/26	43.0°	175.0°	61.5	22	2	62.5	61.5	20	45	X	9	0	2				

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
36	0530	7/26	43.0°	175.0°	61.0	22	2	63.0	63.0	20	45	X	9	0	2			33.64	0.45
37	0600	7/26	43.0°	175.0°	60.0	22	2	64.0	62.2	20	45	X	9	0	2				
38	2330	7/26	43.1°	175.5°	62.2	20	2	65.0	63.1	23	01	6	8	8	2			33.53	
39	0500	7/27	43.1°	174.9°	62.6	18	3	67.0	64.8	24	47	X	9	0	2			33.73	0.26
40	2330	7/27	43.2°	174.7°	61.7	15	3	65.5	62.7	29	00	10	0	8	2			33.75	
41	0530	7/28	43.1°	174.9°	61.8	12	4	63.1	61.5	29	01	8	7	6	2			33.73	0.05
42	1940	7/28	43.2°	175.0°	61.3	12	4	63.0	61.5	32	47	X	9	7	2				
43	2010	7/28	43.3°	175.0°	61.8	-	-	-	-	-	-	-	-	-	-				
44	2040	7/28	43.3°	175.0°	62.0	-	-	-	-	-	-	-	-	-	-				
45	2330	7/28	43.6°	175.0°	61.1	09	12	64.0	62.8	32	45	X	9	1	2			33.69	
46	0405	7/29	44.0°	175.0°	60.0	11	10	62.1	61.3	31	45	X	9	0	2				
47	0425	7/29	44.0°	175.0°	60.2	12	10	62.0	61.2	31	45	X	9	0	2				
48	0435	7/29	44.0°	175.0°	60.2	13	4	62.0	61.0	30	45	X	9	0	3			33.28	0.79
49	1900	7/29	44.1°	175.0°	59.2	12	5	61.0	60.2	31	45	X	9	1	3				
50	1925	7/29	44.1°	175.0°	59.6	-	-	-	-	-	-	X	9	1	3				
51	2005	7/29	44.0°	175.0°	59.8	13	5	60.5	-	32	45	X	9	1	4			33.33	0.71
52	2330	7/29	43.8°	175.0°	60.7	10	5	63.5	62.0	30	45	X	9	5	5			33.75	
53	2330	7/30	44.1°	175.0°	59.6	19	4	63.2	62.0	27	10	X	9	3	4			33.21	
54	0500	7/31	44.0°	175.0°	60.1	16	4	63.0	62.0	26	45	X	9	0	3			33.42	0.41
55	1805	7/31	44.1°	174.9°	60.0	20	3	63.0	62.0	27	45	X	9	0	2			33.15	
56	2330	7/31	44.6°	174.9°	59.8	22	3	64.0	62.5	27	45	X	9	0	2				
57	0300	8/1	44.9°	175.0°	59.7	22	3	63.1	61.2	26	45	X	9	0	2				
58	0330	8/1	44.9	175.0°	59.5	-	-	62.0	61.0	-	-	-	-	-	-				
59	0400	8/1	45.0°	175.0°	59.1	23	3	62.0	61.2	26	45	X	9	0	2			33.13	0.70
60	1830	8/1	44.9°	174.5°	59.2	22	3	62.0	61.0	27	45	X	9	1	2				
61	2330	8/1	44.9°	173.8°	58.8	25	3	62.0	61.0	27	61	X	9	-	2				
62	0500	8/2	44.9°	174.1°	59.0	28	4	63.0	60.3	25	45	X	9	0	2				
63	1800	8/2	44.9°	174.2°	58.7	23	2	61.0	60.2	26	45	X	9	0	0			33.04	1.05
64	2330	8/2	45.0°	174.9°	63.8	21	2	67.5	64.8	25	40	4	2	8	1				
65	0500	8/3	44.9°	174.5°	64.9	03	1	71.2	66.8	25	10	X	9	8	1			33.04	1.18
66	1810	8/3	44.9°	174.5°	61.7	03	2	63.0	61.8	25	10	X	9	7	1				
67	1840	8/3	45.0°	174.5°	62.8	-	-	62.0	61.2	-	-	-	-	-	-				
68	1910	8/3	45.0°	174.5°	61.4	06	2	63.0	61.9	26	10	X	9	6	1				
69	2330	8/3	45.5°	174.7°	61.4	10	1	63.2	61.5	26	10	X	9	6	1			32.84	
70	0415	8/4	46.0°	174.9°	63.0	10	1	64.0	62.2	26	45	X	9	0	0				

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
71	0500	8/4	46.0°	175.0°	63.9	09	2	64.5	63.0	26	45	X	9	0	0			32.94	1.60
72	1730	8/4	46.0°	174.9°	62.2	09	1	60.5	59.9	26	45	X	9	0	0				
73	1800	8/4	46.1°	174.9°	61.8	-	-	61.0	59.7	-	-	-	-	-	-				
74	1830	8/4	46.2°	174.9°	61.2	14	2	61.0	60.0	26	45	X	9	0	0				
75	2330	8/4	46.8°	175.0°	63.0	09	1	64.5	62.2	27	01	X	9	0	0			32.75	
76	0345	8/5	47.0°	175.1°	68.7	09	1	65.2	62.2	27	10	X	9	8	0				
77	0410	8/5	47.0°	175.0°	68.2	-	-	63.8	62.4	-	-	-	-	-	-				
78	0430	8/5	47.0°	175.0°	57.7	19	2	64.0	62.0	-	10	X	9	8	0			32.90	1.48
79	1750	8/5	47.1°	175.1°	60.4	08	1	61.0	59.0	27	10	X	9	1	1				
80	1820	8/5	47.2°	175.0°	62.0	-	-	61.0	59.2	-	-	-	-	-	-				
81	1900	8/5	47.2°	175.0°	60.5	27	1	60.8	59.0	27	10	X	5	4	1				
82	2330	8/5	47.7°	175.0°	62.7	29	1	62.2	60.7	27	01	6	6	9	2			32.97	
83	0530	8/6	48.0°	175.0°	59.7	21	1	61.1	60.1	27	40	X	9	5	2				
84	1730	8/6	48.0°	174.9°	58.3	23	3	60.0	58.8	26	45	X	9	1	2			32.94	1.39
85	1815	8/6	48.1°	174.9°	57.2	-	-	60.0	58.8	-	-	-	-	-	-				
86	1845	8/6	48.2°	174.9°	57.0	23	3	60.1	58.8	27	45	X	9	1	2				
87	2330	8/6	48.7°	174.9°	56.6	21	2	60.5	59.8	25	45	X	9	1	2				
88	0335	8/7	49.0°	174.9°	56.0	24	2	59.0	58.5	23	45	X	9	0	3				
89	0400	8/7	49.0°	175.0°	55.2	-	-	59.0	58.2	-	-	-	-	-	-				
90	0500	8/7	49.0°	175.0°	55.8	24	2	59.0	58.5	-	45	X	9	0	3			32.88	1.39
91	1815	8/7	49.1°	174.9°	55.0	25	2	58.5	56.6	22	45	X	9	3	4				
92	1845	8/7	49.1°	175.0°	55.1	-	-	58.0	56.1	-	-	-	-	-	-				
93	1915	8/7	49.2°	175.0°	56.0	26	2	58.0	56.5	22	45	X	9	1	4				
94	2330	8/7	49.6°	175.4°	55.5	27	2	57.0	56.0	21	45	X	9	1	3			32.94	
95	0530	8/8	50.3°	175.8°	53.2	25	3	56.0	55.0	20	45	X	9	0	2			32.79	
96	1130	8/8	50.9°	176.5°	52.9	25	4	56.1	54.1	19	45	X	9	0	2				
97	1730	8/14	50.2°	174.7°	54.5	29	5	55.3	54.0	14	10	X	9	5	3			32.79	1.53
98	2330	8/14	49.6°	174.2°	53.6	31	4	55.5	53.4	16	10	X	9	5	4			32.88	
99	0530	8/15	48.8°	173.7°	54.2	33	3	54.8	52.5	16	10	X	9	5	3			32.84	1.18
100	1130	8/15	48.2°	173.3°	55.4	35	4	55.5	53.2	18	20	X	9	0	3			34.65	
101	1730	8/15	47.4°	172.9°	56.6	-	4	55.4	51.8	19	03	8	8	8	3			32.90	0.89
102	2330	8/15	46.9°	172.5°	57.3	36	3	57.5	54.0	21	02	6	8	9	3			32.88	
103	0530	8/16	46.2°	172.1°	58.6	34	4	57.5	53.0	21	02	6	8	9	3			32.99	1.55
104	1130	8/16	45.5°	171.6°	59.0	35	2	57.8	53.5	22	02	X	9	7	3			33.10	
105	1730	8/16	44.9°	171.2°	60.2	18	3	58.0	53.0	22	02	6	9	9	2			33.33	0.97

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
106	2330	8/16	45.3°	171.2°	61.3	25	2	59.8	53.7	22	02	6	8	8	3			33.03	
107	0530	8/17	45.8°	171.6°	59.8	19	2	60.3	56.8	20	03	6	8	8	3				
108	0730	8/17	46.0°	171.7°	59.2	17	4	60.0	59.0	19	63	X	9	0	3			33.03	1.29
109	1830	8/17	46.0°	170.4°	58.2	25	5	62.0	61.3	14	53	X	9	2	4			32.99	
110	2330	8/17	46.2°	169.6°	57.0	22	5	62.0	60.5	12	47	X	9	0	4			32.86	
111	0530	8/18	46.7°	168.8°	57.0	23	5	60.5	59.0	08	63	X	9	0	5			32.84	
112	1730	8/18	46.7°	168.6°	56.4	21	6	60.2	60.0	03	45	X	9	0	6			32.86	
113	1730	8/19	46.4°	167.4°	56.3	25	4	58.2	56.3	03	02	6	8	7	4			33.03	0.98
114	2330	8/19	46.6°	166.5°	55.2	21	3	60.1	57.1	03	02	9	6	8	4			32.84	
115	0500	8/20	46.5°	165.9°	55.0	30	5	55.5	54.0	03	02	6	8	9	5			32.84	0.78
116	1745	8/20	46.7°	165.6°	54.8	23	7	56.9	54.9	05	51	6, 8	9	9	6			32.84	
117	0530	8/21	46.3°	164.8°	54.3	26	4	56.6	53.8	04	03	6, 8	8	8	5			32.92	1.21
118	1130	8/21	46.2°	163.6°	54.1	28	4	55.8	54.0	06	02	6, 8, 4	8	5	5			32.97	
119	1730	8/21	46.1°	162.5°	54.7	29	4	54.8	51.0	10	03	6, 8	6	8	5			32.92	0.89
120	2330	8/21	46.0°	161.4°	54.0	26	3	58.0	53.0	11	03	4, 6, 8	3	9	5			32.92	
121	0530	8/22	46.0°	160.3°	53.2	26	4	55.2	52.3	11	02	4	7	9	5			32.81	
122	1805	8/22	46.0°	160.2°	53.1	26	3	55.0	52.0	12	02	6	8	9	4			32.77	
123	2330	8/22	45.9°	160.1°	53.8	29	4	57.0	53.1	13	02	6, 8	8	8	3			32.77	
124	0440	8/23	46.0°	160.3°	53.8	18	2	57.1	54.5	12	02	6, 8	8	9	3			32.77	1.27
125	2330	8/25	45.8°	159.2°	54.2	16	3	57.8	53.0	20	03	4, 1	5	9	3			32.79	
126	0530	8/26	46.0°	158.4°	54.6	15	4	56.6	54.5	18	02	4	6	7	4			32.83	1.18
127	1130	8/26	46.2°	156.9°	53.3	16	5	55.2	54.1	16	10	X	9	5	4			32.81	
128	1730	8/26	46.3°	156.1°	54.0	20	5	55.0	55.0	14	45	X	9	0	4			32.79	1.03
129	2330	8/26	46.4°	155.2°	53.8	21	4	57.4	57.1	13	45	X	9	0	4			32.72	
130	0530	8/27	46.5°	154.9°	53.9	19	6	57.0	54.5	12	45	X	9	1	5			32.65	0.87
131	1630	8/27	46.5°	154.7°	53.9	26	4	56.1	55.0	15	45	X	9	1	4			32.65	
132	2330	8/27	46.5°	153.6°	54.5	24	3	59.0	54.0	17	03	4, 6	2	9	3			32.70	
133	0530	8/28	46.4°	152.7°	54.2	25	3	57.0	54.2	19	03	6, 8	2	7	3			32.70	0.97
134	1130	8/28	46.4°	154.6°	54.4	26	4	55.2	52.0	21	03	8	5	7	3			32.65	
135	1730	8/28	46.8°	150.6°	55.0	25	4	56.5	51.3	22	02	4, 8	6	9	3			32.61	0.99
136	2330	8/28	46.0°	149.9°	56.5	24	4	58.0	54.8	23	02	8	5	8	5			32.59	
137	0530	8/29	46.0°	150.0°	56.5	17	4	57.5	55.5	23	03	0, 6,	8	7	6			32.65	0.84
138	1640	8/29	46.0°	149.8°	55.5	20	4	59.5	58.5	18	45	X	9	7	4				
139	2330	8/29	46.2°	148.6°	56.5	19	5	60.2	59.1	18	51	X	9	1	4			32.54	
140	0530	8/30	46.4°	147.7°	57.1	19	4	59.2	59.0	16	45	X	9	0	4			32.50	1.05

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
141	1130	8/30	46.6°	146.7°	57.3	21	3	59.0	59.0	92	45	X	9	0	4			32.50	
142	1730	8/30	46.9°	145.7°	57.2	23	4	59.3	54.1	15	45	X	9	0	4			32.43	0.88
143	2330	8/30	47.1°	145.2°	57.0	33	5	58.0	54.5	19	01	8	9	7	5			32.48	
144	0530	8/31	47.1°	145.0°	57.0	31	4	54.8	49.7	23	03	6	7	7	5			32.52	
145	1630	8/21	47.0°	144.9°	57.0	29	5	55.2	50.1	29	02	6	8	7	4			32.75	
146	2330	8/31	46.3°	144.9°	58.7	30	3	57.0	51.5	28	02	6, 8	8	9	3			32.56	
147	0530	9/1	46.0°	145.0°	58.3	36	2	57.0	52.1	28	02	X	9	5	2			32.63	0.69
148	1630	9/1	46.0°	145.0°	58.2	13	1	57.5	51.5	31	02	6	9	9	1				
149	2330	9/1	45.2°	145.0°	61.0	18	2	61.2	52.1	31	02	6	7	8	2			32.68	
150	0100	9/2	45.1°	145.0°	61.9	11	1	60.1	52.5	31	02	4, 6, 8	6	8	2				
151	0135	9/2	45.0°	145.0°	62.0	11	1	60.2	52.5	31	02	4, 6, 8	5	8	2				
152	0530	9/2	45.0°	145.0°	60.3	08	2	60.0	53.2	31	02	6, 8	4	8	3			32.72	0.69
153	1700	9/2	44.9°	145.0°	59.9	08	1	62.0	57.1	32	02	2, 6	2	9	1			32.74	
154	1730	9/2	44.8°	145.0°	59.7	01	3	62.8	54.9	32	02	1, 6	2	9	1				
155	1800	9/2	44.8°	145.0°	60.1	01	3	62.5	57.0	32	02	1, 6	2	9	1				
156	1830	9/2	44.7°	145.0°	59.9	01	3	63.0	57.7	32	02	1, 6	2	9	1				
157	2330	9/2	44.2°	145.0°	62.2	10	4	63.0	58.9	32	02	3, 6	3	9	2				
158	0530	9/3	44.0°	145.0°	62.2	09	3	62.8	60.0	32	02	3	1	7	2			32.86	0.38
159	1615	9/3	44.0°	145.0°	62.2	09	3	63.7	59.1	31	02	6	1	9	2			32.92	
160	1645	9/3	43.9°	145.0°	62.3	09	4	63.8	58.9	31	02	4, 8	1	9	2				
161	1730	9/3	43.8°	145.0°	62.3	09	4	64.0	59.2	31	02	6, 8	1	9	2			32.97	
162	2330	9/3	43.2°	144.9°	64.0	08	4	63.7	60.0	30	02	6, 8	6	9	2			33.04	
163	0530	9/4	42.6°	144.9°	64.1	09	4	65.2	60.1	29	02	6, 8	8	8	3			33.03	0.50
164	1130	9/4	41.8°	144.9°	65.5	08	4	65.5	61.0	28	00	X	X	5	3			33.13	
165	1730	9/4	41.0°	145.1°	66.8	09	4	67.1	62.0	27	02	6, 8	6	7	3			33.31	
166	2330	9/4	40.3°	145.0°	67.9	07	4	66.0	62.5	26	03	6, 8	7	9	4			33.44	
167	0530	9/5	39.7°	145.3°	68.2	07	3	68.1	61.9	24	02	X	9	0	3			33.68	0.19
168	1130	9/5	39.0°	145.9°	70.8	05	4	67.7	63.8	22	01	X	4	0	3			34.18	
169	1730	9/5	38.3°	146.4°	69.9	07	5	68.5	64.3	21	02	6, 8	7	9	4			34.00	0.69
170	2330	9/5	37.6°	146.9°	71.3	03	4	69.8	64.1	20	02	1, 6, 8	6	9	4			34.25	
171	0530	9/6	36.9°	147.5°	71.2	03	4	69.4	63.8	19	01	1, 6, 8, 9	4	9	4				0.18
172	1130	9/6	36.1°	147.9°	71.2	02	5	69.1	63.0	18	02	6, 8	2	4	4			34.27	
173	1730	9/6	35.4°	148.3°	72.4	35	4	70.1	63.0	18	02	1, 4, 8	5	9	4			34.52	0.09
174	2330	9/6	34.7°	149.0°	72.8	01	3	73.0	65.8	19	02	8	6	9	3			34.40	
175	0530	9/7	34.1°	149.6°	74.6	36	2	71.5	62.2	19	02	6, 8	3	4	3			34.76	0.21

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
176	1130	9/7	33.4°	150.3°	74.8	35	3	70.8	65.1	20	02	X	6	6	3			35.30	
177	1730	9/7	32.7°	150.9°	74.9	02	3	72.0	65.0	22	02	8	4	9	2			35.26	
178	2330	9/7	32.0°	151.4°	75.6	36	3	73.8	66.2	21	02	8	4	9	2			35.16	
179	0530	9/8	31.2°	151.8°	75.1	36	3	74.5	67.1	22	02	8, 9	3	9	2			35.48	0.09
180	1130	9/8	30.4°	152.3°	76.0	02	3	75.0	68.3	22	02	6, 8	2	4	2			35.61	
181	1730	9/8	29.7°	152.8°	76.5	36	0	74.8	67.2	22	15	8, 9	6	9	2			35.53	0.18
182	2330	9/8	29.0°	153.3°	77.0	06	4	76.8	69.5	22	02	8, 4	6	9	2			35.55	
183	0530	9/9	28.2°	153.8°	76.0	06	4	75.6	70.1	21	02	8	3	6	2			35.37	
184	1130	9/9	27.5°	154.2°	77.2	07	3	75.9	69.2	20	02	8	7	9	2			35.34	
185	1730	9/9	26.9°	154.7°	77.5	06	3	77.8	71.0	20	02	8	5	9	2			35.39	
186	2330	9/9	26.2°	155.2°	78.5	09	3	77.4	70.2	19	02	6, 8, 9	5	9	2			35.35	
187	0530	9/10	25.5°	155.7°	78.0	10	3	76.7	70.0	19	03	1, 6, 8, 9	6	9	2			35.17	
188	1130	9/10	24.7°	156.1°	77.3	08	4	76.8	70.1	18	02	X	4	5	3			35.30	
189	1730	9/10	23.9°	156.4°	77.8	12	4	77.0	71.9	18	02	6, 8, 9	5	9	3			35.01	
190	2330	9/10	23.1°	156.8°	78.4	10	4	79.0	71.5	16	02	4, 8	3	9	3			34.97	
191	0530	9/11	22.4°	157.2°	77.5	09	5	77.3	69.1	16	02	8	2	7	4			35.01	
192	1413	9/11	21.6°	157.7°	77.0	11	4	77.0	71.0	14	02	X	1	6	4			35.07	0.51
193	1540	9/11	21.8°	157.8°	76.8	08	5	76.5	69.8	14	02	8, 9	3	7	4			34.94	
194	1625	9/11	22.0°	157.8°	77.1	10	6	76.8	70.5	15	02	8	3	9	5			35.03	0.38
195	1820	9/11	22.1°	157.8°	77.2	11	5	78.5	72.1	15	02	6, 8	4	9	5			35.05	
196	1930	9/11	22.2°	157.8°	77.5	10	4	78.3	72.2	16	02	6, 8	5	9	4			34.99	
197	2055	9/11	22.2°	157.9°	77.5	07	4	79.2	72.0	16	02	6, 8	5	9	4			35.01	
198	2200	9/11	22.2°	157.9°	77.9	07	5	78.5	72.0	15	02	6, 8	5	9	4			35.01	0.21
199	2325	9/11	22.0°	157.9°	78.0	07	5	79.0	72.5	15	02	8	5	9	4			34.94	
200	0030	9/12	21.8°	157.9°	78.0	09	4	79.2	72.0	13	02	6, 8	5	9	4			34.92	0.40
201	0210	9/12	21.7°	158.1°	-	10	5	78.0	71.0	13	02	6, 8	5	9	4			34.99	
202	0300	9/12	21.7°	158.2°	78.4	06	5	77.5	72.7	13	02	4, 8	3	9	4			34.92	0.09
203	0415	9/12	21.6°	158.4°	78.5	06	4	78.2	73.0	13	02	8	2	9	4			34.88	
204	0530	9/12	21.6°	158.6°	79.0	06	5	78.2	72.0	14	02	8	3	9	4			34.94	0.33
205	0630	9/12	21.6°	158.8°	79.8	06	4	77.8	72.3	15	03	X	5	7	5			34.72	
206	0800	9/12	21.6°	159.0°	78.8	06	4	78.0	72.1	15	02	X	7	7	5				0.31
207	0930	9/12	21.4°	159.0°	79.0	06	5	77.0	72.5	14	01	X	2	7	5			34.78	
208	1120	9/12	21.4°	158.8°	78.8	07	4	77.5	71.0	14	01	X	2	7	5			34.83	0.41
209	1230	9/12	21.4°	158.6°	77.7	07	3	77.0	70.6	13	01	X	2	7	5			34.90	0.32
210	1400	9/12	21.4°	158.4°	77.3	06	3	76.9	69.7	13	02	X	2	7	5			34.90	
211	1500	9/12	21.4°	158.3°	77.3	10	3	76.8	69.0	14	02	4	1	9	1			34.94	0.20

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
7/17	22.5°	159.3°	1700	99	06	14	02	1	1017.3	X	XX	76.0	71.3	76.3	6	6	2	5	0	0	26	2	2
7/17	23.1°	159.7°	2300	99	06	06	01	2	1015.9	X	XX	77.1	71.5	77.5	7	7	2	5	0	0	34	2	2
7/18	23.7°	160.2°	0500	99	03	10	01	1	1016.9	X	XX	76.6	71.0	78.0	3	3	2	3	0	0	11	2	3
7/18	24.3°	160.7°	1100	99	03	09	01	0	1018.0	X	XX	75.5	71.5	76.8	2	1	2	3	6	0	06	2	3
7/18	25.1°	161.3°	1800	99	09	09	02	0	1018.6	X	XX	77.5	71.0	76.9	3	2	2	5	0	2	09	2	3
7/18	25.5°	161.6°	2200	99	06	18	15	1	1019.0	X	XX	75.0	70.3	77.2	6	5	4	6	2	6	01	2	3
7/19	26.1°	162.1°	0500	99	06	11	15	2	1019.0	X	XX	76.1	70.0	76.8	6	5	2	5	1	1	02	2	3
7/19	26.7°	162.5°	1100	99	08	16	02	2	1020.3	X	XX	75.4	70.0	76.5	6	6	2	5	0	0	06	2	3
7/19	27.3°	163.0°	1700	99	06	13	02	2	1019.6	X	XX	74.8	69.5	76.2	5	4	4	5	3	0	10	2	3
7/19	27.9°	163.5°	2300	99	08	16	02	2	1022.0	X	XX	78.2	70.2	77.3	5	4	2	5	6	1	04	2	3
7/20	28.5°	163.9°	0500	99	06	19	01	2	1022.0	X	XX	74.0	69.2	76.8	5	4	3	5	6	1	05	2	3
7/20	29.1°	164.4°	1100	99	07	21	01	1	1023.0	X	XX	75.0	69.0	76.3	3	3	2	6	0	0	05	2	4
7/20	29.8°	165.0°	1700	99	07	21	02	2	1022.7	X	XX	75.0	68.9	75.8	5	5	3	5	0	4	08	2	3
7/20	30.4°	165.5°	2300	99	06	17	03	1	1024.7	X	XX	76.5	71.2	76.3	5	3	2	5	5	0	02	2	3
7/21	30.9°	165.9°	0500	99	06	21	03	2	1024.0	X	XX	74.0	69.8	74.6	7	6	4	6	9	9	06	2	3
7/21	31.6°	166.4°	1100	98	08	20	02	2	1025.1	X	XX	72.0	66.5	74.0	8	7	4	7	9	9	05	2	3
7/21	32.2°	166.9°	1700	99	06	18	03	1	1025.1	X	XX	73.5	68.0	73.2	4	3	3	5	9	5	06	2	3
7/21	32.9°	167.5°	2300	99	07	19	02	1	1026.4	X	XX	74.0	67.0	74.2	6	5	2	6	6	1	05	2	3
7/22	33.5°	168.0°	0500	99	08	13	02	2	1025.7	X	XX	71.0	71.0	73.5	6	5	2	6	6	0	05	2	2
7/22	34.2°	168.7°	1100	99	12	09	03	2	1026.1	X	XX	69.9	65.9	71.8	8	7	1	6	6	0	22	2	2
7/22	34.8°	169.5°	1700	99	29	03	02	2	1025.4	X	XX	70.0	63.0	72.3	7	6	1	6	6	0	00	0	0
7/22	35.3°	169.9°	2300	99	26	16	03	2	1023.7	X	XX	72.3	67.5	71.8	7	7	4	5	0	0	28	2	2
7/23	35.9°	170.4°	0500	99	36	14	02	2	1022.0	X	XX	69.5	63.5	71.2	7	6	8	5	3	0	02	2	2
7/23	36.4°	171.0°	1100	98	34	12	02	2	1023.7	X	XX	66.1	61.2	70.5	8	7	8	5	3	0	31	2	3
7/23	37.0°	171.6°	1700	99	03	17	02	2	1024.0	X	XX	65.3	60.2	70.3	8	8	4	5	0	0	36	2	3
7/23	37.6°	172.3°	2300	99	36	13	01	2	1025.1	X	XX	66.3	60.0	68.3	6	6	2	5	0	0	36	2	3
7/24	38.3°	173.0°	0500	99	01	09	01	2	1024.4	X	XX	64.2	58.0	67.5	4	4	2	5	0	0	01	2	2
7/24	38.7°	173.5°	1100	99	08	08	01	1	1024.7	X	XX	63.5	58.9	67.2	2	1	1	5	3	1	10	2	2
7/24	39.3°	174.2°	1700	99	18	08	02	2	1022.7	X	XX	67.2	59.2	70.3	8	8	4	5	0	0	24	2	2
7/24	39.9°	174.9°	2300	94	20	22	53	5	1021.0	X	XX	68.6	67.0	68.2	9	9	X	X	X	X	25	2	3

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
7/25	40.4°	175.0°	0500	94	26	12	53	5	1019.0	X	XX	68.3	68.0	67.0	9	9	X	X	X	X	28	2	3
7/25	41.2°	175.0°	1100	90	35	09	12	4	1019.6	X	XX	67.0	65.0	64.8	9	9	X	X	X	X	XX	X	X
7/25	41.8°	175.0°	1700	93	26	05	45	4	1019.3	X	XX	64.3	63.9	63.8	9	9	X	X	X	X	32	2	2
7/25	42.5°	175.0°	2300	97	22	08	45	4	1020.3	X	XX	66.0	63.5	63.6	9	9	X	X	X	X	36	2	2
7/26	43.0°	175.0°	0500	91	22	06	45	4	1020.0	X	XX	63.0	62.0	61.0	9	9	X	X	X	X	27	2	2
7/26	43.1°	175.6°	2300	99	20	06	01	4	1023.4	X	XX	65.0	63.1	62.2	8	8	5	4	0	0	36	2	2
7/27	43.1°	174.9°	0500	90	18	09	45	4	1024.0	X	XX	67.0	64.8	62.6	9	9	X	X	X	X	49	2	2
7/27	43.1°	175.9°	1100	93	14	05	43	4	1023.4	X	XX	65.5	62.6	61.6	9	9	X	X	X	X	XX	X	X
7/27	43.1°	174.7°	2300	99	15	08	00	4	1028.8	X	XX	65.5	62.7	61.7	0	0	0	0	0	0	12	2	2
7/28	43.2°	174.9°	0500	97	12	12	03	1	1028.8	X	XX	63.1	61.5	61.8	8	8	1	6	0	0	12	2	2
7/28	43.2°	174.9°	1100	94	12	10	47	4	1031.5	X	XX	63.0	61.5	61.5	9	9	X	X	X	X	XX	2	2
7/28	43.6°	175.0°	2300	92	09	12	45	4	1031.5	X	XX	64.0	62.8	61.1	9	9	X	X	X	X	09	2	2
7/29	44.0°	175.0°	0700	98	17	15	45	4	1030.5	X	XX	62.0	61.0	59.9	9	9	X	X	X	X	13	2	3
7/29	44.0°	175.0°	1100	95	17	14	10	4	1031.2	X	XX	62.3	61.4	59.4	9	9	X	X	X	X	14	2	3
7/29	43.8°	175.0°	2300	96	10	19	10	4	1029.1	X	XX	63.5	62.0	60.7	9	9	X	X	X	X	12	2	6
7/30	43.6°	174.8°	0500	95	13	18	10	4	1028.4	X	XX	63.8	61.5	60.9	9	9	X	X	X	X	49	2	6
7/30	43.6°	174.8°	1100	92	13	17	10	4	1028.4	X	XX	63.0	61.2	60.3	9	9	X	X	X	X	49	2	6
7/30	44.1°	175.0°	2300	93	19	11	10	4	1027.1	X	XX	63.2	62.0	59.6	9	9	X	X	X	X	16	2	4
7/31	44.0°	175.0°	0500	91	16	12	45	4	1026.4	X	XX	63.0	62.0	60.1	9	9	X	X	X	X	12	2	3
7/31	44.0°	174.9°	1100	90	18	08	45	4	1027.4	X	XX	63.1	62.6	59.7	9	9	X	X	X	X	XX	2	3
7/31	44.0°	175.0°	1700	90	20	09	45	4	1027.1	X	XX	63.0	62.0	60.0	9	9	X	X	X	X	12	2	1
7/31	44.6°	174.9°	2300	90	22	07	45	4	1027.1	X	XX	64.0	62.5	59.8	9	9	X	X	X	X	16	2	2
8/1	45.0°	175.0°	0500	90	24	09	45	4	1026.4	X	XX	63.0	61.5	59.4	9	9	X	X	X	X	17	2	3
8/1	44.8°	174.7°	1100	90	22	08	45	4	1027.4	X	XX	61.5	60.5	59.0	9	9	X	X	X	X	22	2	1
8/1	44.9°	174.7°	1800	90	22	09	45	4	1026.8	X	XX	62.0	61.0	59.2	9	9	X	X	X	X	20	2	2
8/1	44.9°	173.8°	2300	91	25	07	61	5	1026.8	X	XX	62.0	61.0	58.8	9	9	X	X	X	X	16	2	2
8/2	44.9°	174.1°	0500	90	28	12	45	6	1025.7	X	XX	63.0	60.0	59.0	9	9	X	X	X	X	08	2	2
8/2	44.9°	174.1°	1100	90	27	08	45	4	1026.1	X	XX	62.0	60.0	58.8	9	9	X	X	X	X	22	2	1
8/2	44.9°	174.2°	1800	90	23	04	45	4	1025.7	X	XX	61.0	60.2	58.7	9	9	X	X	X	X	00	X	0
8/2	45.1°	175.0°	2300	99	21	05	40	4	1025.4	X	XX	67.5	64.8	63.8	2	1	3	6	3	0	00	X	0

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/3	44.9°	174.5°	0500	99	02	02	10	0	1024.4	X	XX	71.2	66.8	64.9	9	9	X	X	X	X	00	X	0
8/3	44.9°	174.5°	1100	90	12	03	44	4	1025.1	X	XX	63.2	62.0	61.3	9	9	X	X	X	X	00	X	0
8/3	44.9°	174.5°	1800	98	02	04	10	4	1025.1	X	XX	63.0	61.8	61.7	9	9	X	X	X	X	00	X	0
8/3	45.5°	174.7°	2300	97	09	03	10	4	1025.7	X	XX	63.2	61.5	61.4	9	9	X	X	X	X	49	2	1
8/4	46.0°	175.0°	0500	95	09	04	10	4	1025.7	X	XX	64.5	63.0	63.9	9	9	X	X	X	X	00	X	0
8/4	46.0°	174.9°	1100	95	12	04	10	4	1026.8	X	XX	62.7	61.2	62.0	9	9	X	X	X	X	00	X	0
8/4	46.0°	174.9°	1700	90	09	02	45	4	1026.4	X	XX	60.5	59.9	62.2	9	9	X	X	X	X	00	X	0
8/4	46.8°	175.0°	2300	98	09	02	01	4	1026.4	X	XX	64.5	62.2	65.4	7	9	X	X	X	X	00	X	0
8/5	47.0°	175.0°	0500	98	18	04	10	4	1026.4	X	XX	64.0	62.0	57.7	9	9	X	X	X	X	00	X	0
8/5	47.0°	175.1°	1100	90	22	04	10	4	1026.4	X	XX	62.2	60.5	58.7	9	9	X	X	X	X	00	X	0
8/5	47.1°	175.1°	1800	91	08	04	10	0	1026.8	X	XX	61.0	59.0	60.4	9	9	X	X	X	X	00	X	0
8/5	47.7°	175.0°	2300	99	29	03	01	4	1027.4	X	XX	62.2	60.7	62.7	6	6	5	3	X	X	49	2	1
8/6	48.0°	175.0°	0500	96	21	06	40	4	1026.8	X	XX	61.1	60.1	59.7	9	9	X	X	X	X	23	2	1
8/6	48.0°	175.0°	1100	91	22	12	44	4	1027.8	X	XX	60.0	59.1	59.5	9	9	X	X	X	X	23	2	2
8/6	48.0°	175.0°	1700	91	23	06	45	4	1026.4	X	XX	60.0	58.8	58.3	9	9	X	X	X	X	25	2	2
8/6	48.7°	174.9°	2300	92	21	15	45	4	1025.4	X	XX	60.5	59.8	56.6	9	9	X	X	X	X	24	2	3
8/7	49.0°	175.0°	0500	90	24	17	45	4	1022.4	X	XX	59.0	58.5	55.8	9	9	X	X	X	X	24	2	3
8/7	49.0°	175.0°	1100	90	24	15	45	4	1022.4	X	XX	59.0	58.5	54.5	9	9	X	X	X	X	24	2	3
8/7	49.1°	174.9°	1800	94	25	16	45	4	1022.0	X	XX	58.5	56.6	55.0	9	9	X	X	X	X	28	2	4
8/7	49.7°	175.4°	2300	90	26	14	45	4	1021.0	X	XX	57.0	56.0	55.5	9	9	X	X	X	X	28	2	4
8/8	50.3°	175.8°	0500	90	25	09	45	4	1020.0	X	XX	56.0	55.0	53.2	9	9	X	X	X	X	29	2	2
8/8	50.3°	176.5°	1100	90	25	19	45	4	1019.0	X	XX	56.1	54.9	52.9	9	9	X	X	X	X	28	2	2
8/14	50.2°	174.7°	1700	96	28	18	10	4	1013.9	X	XX	55.3	54.0	54.5	9	9	X	X	X	X	25	2	5
8/14	49.6°	174.2°	2300	96	31	16	10	4	1015.6	X	XX	55.5	53.4	53.6	9	9	X	X	X	X	32	2	4
8/15	48.8°	173.7°	0500	96	33	09	10	4	1015.6	X	XX	54.8	52.5	54.2	9	9	X	X	X	X	26	2	3
8/15	48.2°	173.3°	1100	90	34	11	20	4	1017.6	X	XX	55.5	53.2	55.4	9	9	X	X	X	X	34	X	3
8/15	47.5°	172.9°	1700	99	01	14	03	4	1019.3	X	XX	55.4	51.8	56.6	8	8	4	5	0	0	31	2	3
8/15	46.9°	172.5°	2300	99	35	08	02	1	1020.7	X	XX	57.5	54.0	57.3	8	8	5	5	0	0	30	2	3
8/16	46.4°	172.3°	0500	99	33	13	02	1	1020.7	X	XX	57.5	53.0	58.6	8	8	5	5	0	0	31	2	3
8/16	45.5°	171.6°	1100	98	35	10	02	2	1022.0	X	XX	57.8	53.5	59.0	9	9	X	X	X	X	30	2	3

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/16	44.9°	171.2°	1700	99	17	10	02	2	1021.7	X	XX	58.0	53.0	60.2	9	9	5	6	0	0	34	2	2
8/16	45.2°	171.2°	2300	98	25	10	02	2	1021.7	X	XX	59.8	53.7	61.3	9	8	5	6	6	0	36	2	3
8/17	45.8°	171.6°	0500	98	19	06	03	2	1019.6	X	XX	60.3	56.8	59.8	8	8	5	6	0	6	02	2	3
8/17	46.0°	171.8°	1100	90	19	18	53	2	1016.6	X	XX	61.0	60.0	59.0	9	9	X	X	X	X	49	X	4
8/17	46.0°	170.4°	1700	93	24	18	53	4	1013.5	X	XX	62.0	61.3	58.2	9	9	X	X	X	X	23	2	4
8/17	46.3°	169.6°	2300	90	22	19	47	5	1011.9	X	XX	62.0	60.5	57.0	9	9	X	X	X	X	22	2	4
8/18	46.7°	168.7°	0500	90	23	18	63	6	1008.5	X	XX	60.5	59.0	57.0	9	9	X	X	X	X	23	2	5
8/18	46.7°	168.6°	1100	91	26	22	53	5	1005.4	X	XX	60.0	59.2	56.8	9	9	X	X	X	X	49	X	5
8/18	46.7°	168.6°	1700	90	21	22	45	5	1003.1	X	XX	60.2	60.0	56.4	9	9	X	X	X	X	21	2	6
8/18	46.1°	168.9°	2300	91	23	26	45	4	1002.7	X	XX	63.5	61.9	57.0	9	9	X	X	X	X	21	2	6
8/19	45.9°	169.0°	0500	91	25	20	45	4	1001.7	X	XX	61.8	60.6	57.5	9	9	X	X	X	X	23	3	7
8/19	46.0°	168.4°	1100	92	26	07	20	4	1002.4	X	XX	59.8	58.0	57.5	9	9	X	X	X	X	24	2	2
8/19	46.3°	167.5°	1700	98	25	13	02	4	1003.1	X	XX	58.2	57.3	56.3	8	8	8	5	0	0	28	3	5
8/19	46.6°	166.5°	2300	98	21	10	02	2	1002.7	X	XX	60.1	57.1	55.2	8	8	5	5	0	0	21	2	5
8/20	46.5°	165.9°	0500	99	30	20	02	2	1002.7	X	XX	55.5	54.0	55.0	8	8	5	5	0	0	27	2	5
8/20	46.5°	165.9°	1100	99	25	16	03	2	1005.1	X	XX	55.2	52.1	54.8	5	5	8	5	0	0	23	3	5
8/20	46.6°	165.6°	1700	99	22	30	51	6	1004.7	X	XX	56.9	54.9	54.8	9	9	5	5	0	0	22	2	7
8/20	46.3°	165.7°	2300	98	27	21	16	2	1003.4	X	XX	57.6	54.5	54.6	8	8	6	4	0	0	27	3	5
8/21	46.3°	164.5°	0500	98	26	14	03	2	1004.1	X	XX	56.0	53.8	54.3	8	8	8	5	0	0	26	3	5
8/21	46.1°	163.5°	1100	95	28	11	02	2	1006.1	X	XX	55.8	54.0	54.1	7	6	3	5	6	0	28	2	5
8/21	46.1°	162.5°	1700	99	29	16	03	1	1009.5	X	XX	54.8	51.0	54.7	6	6	8	5	0	0	26	3	5
8/21	46.0°	161.5°	2300	99	25	09	03	0	1011.2	X	XX	58.0	53.0	54.0	3	2	2	4	6	0	25	2	5
8/22	46.0°	160.3°	0500	99	25	14	02	1	1011.2	X	XX	55.2	52.3	53.2	7	0	0	5	6	0	25	2	5
8/22	46.0°	160.3°	1100	97	25	13	10	2	1011.2	X	XX	55.3	53.0	52.9	9	9	X	X	X	X	25	2	4
8/22	46.0°	160.0°	1800	99	25	09	02	2	1011.9	X	XX	55.0	52.0	53.1	9	9	5	5	0	0	25	2	4
8/22	45.9°	160.1°	2300	98	21	12	02	2	1012.5	X	XX	57.0	53.1	53.8	8	8	8	4	0	0	22	2	3
8/23	46.1°	160.3°	0400	99	18	06	02	2	1011.5	X	XX	57.1	54.5	53.8	8	8	8	6	0	0	28	2	3
8/23	46.1°	160.3°	1200	96	14	16	50	6	1008.1	X	XX	55.0	53.0	53.2	9	9	X	X	X	X	19	2	4
8/23	46.1°	160.3°	1700	92	15	28	45	6	1000.7	X	XX	58.8	XXX	53.2	9	9	X	X	X	X	16	4	8
8/23	45.9°	160.3°	2300	93	18	28	45	4	995.9	X	XX	XXX	XXX	53.0	9	9	X	X	X	X	XX	X	3

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/24	45.8°	160.3°	0500	93	18	24	45	4	997.6	X	XX	59.0	59.0	53.4	9	9	X	X	X	X	XX	3	0
8/24	45.8°	160.3°	1100	93	21	24	45	4	998.0	X	XX	58.8	56.1	53.1	9	9	X	X	X	X	17	3	9
8/24	45.8°	160.2°	1700	96	21	28	45	4	999.0	X	XX	56.9	53.1	53.4	9	3	3	0	X	X	XX	2	5
8/24	45.7°	160.1°	2300	98	21	24	03	2	1005.1	X	XX	57.3	53.0	53.3	6	6	1	5	0	0	XX	4	5
8/25	45.7°	160.1°	0500	98	26	24	03	1	1011.2	X	XX	55.1	52.4	53.2	6	6	5	5	0	0	XX	4	4
8/25	45.7°	160.1°	1100	94	25	17	02	2	1016.6	X	XX	55.1	52.8	53.3	8	8	5	5	0	0	XX	4	2
8/25	45.7°	160.0°	1700	98	22	11	02	2	1019.6	X	XX	55.0	51.2	53.4	8	8	8	5	0	0	24	3	5
8/25	45.8°	159.2°	2300	99	15	08	03	1	1020.0	X	XX	57.8	53.0	54.2	5	0	0	X	6	9	25	4	4
8/26	46.0°	158.3°	0500	98	14	13	02	1	1017.6	X	XX	56.6	54.5	54.6	6	0	0	X	6	9	25	6	4
8/26	46.2°	157.2°	1100	96	16	18	10	1	1015.6	X	XX	55.2	54.1	53.3	9	9	X	X	X	X	17	3	4
8/26	46.3°	156.1°	1700	90	19	20	45	4	1013.9	X	XX	55.0	55.0	54.0	9	9	X	X	X	X	24	3	3
8/26	46.4°	155.2°	2300	91	21	15	45	4	1012.9	X	XX	57.4	57.1	53.8	9	9	X	X	X	X	20	3	4
8/27	46.5°	155.0°	0500	91	19	19	45	4	1012.2	X	XX	57.0	54.5	53.9	9	9	X	X	X	X	18	3	5
8/27	46.5°	155.0°	1100	90	23	20	45	4	1012.5	X	XX	57.5	55.5	54.0	9	9	X	X	X	X	23	4	6
8/27	46.5°	154.7°	1700	91	25	12	45	4	1015.2	X	XX	56.1	55.0	53.9	9	9	X	X	X	X	22	3	4
8/27	46.5°	153.6°	2300	99	24	10	03	1	1017.3	X	XX	59.0	54.0	54.5	4	0	0	0	5	2	24	3	3
8/28	46.5°	152.7°	0600	98	24	10	03	1	1019.3	X	XX	57.0	54.2	54.2	5	5	1	4	0	0	24	5	3
8/28	46.5°	151.7°	1100	98	26	16	03	1	1020.7	X	XX	55.2	52.0	54.4	4	4	1	4	0	0	25	3	3
8/28	46.5°	150.6°	1800	99	24	15	02	1	1022.4	X	XX	56.5	51.3	55.0	6	1	1	5	6	0	27	4	3
8/28	46.0°	154.9°	2300	98	24	13	02	1	1023.4	X	XX	58.0	54.8	56.5	6	6	1	4	0	0	28	6	6
8/29	46.0°	150.0°	0500	98	17	12	03	1	1023.0	X	XX	57.5	55.5	56.5	8	8	5	5	0	0	28	5	9
8/29	45.9°	149.9°	1100	92	18	18	53	4	1018.3	X	XX	59.0	58.5	55.9	9	9	X	X	X	X	25	5	4
8/29	46.0°	149.8°	1700	90	19	20	45	4	1018.3	X	XX	59.5	58.5	55.4	9	9	X	X	X	X	20	2	3
8/29	46.2°	148.7°	2300	92	19	18	51	4	1017.6	X	XX	60.2	59.1	56.5	9	9	X	X	X	X	22	3	4
8/30	46.4°	147.7°	0500	90	18	15	45	4	1016.6	X	XX	59.2	59.0	57.1	9	9	X	X	X	X	22	X	4
8/30	46.6°	148.8°	1100	90	20	10	45	4	1015.6	X	XX	59.0	59.0	57.3	9	9	X	X	X	X	22	X	4
8/30	46.8°	145.7°	1700	91	23	11	45	4	1015.2	X	XX	59.3	59.1	57.2	9	9	X	X	X	X	23	3	4
8/30	47.1°	145.1°	2300	98	32	20	01	4	1018.6	X	XX	58.0	54.5	57.0	9	9	6	4	0	0	32	X	5
8/31	47.1°	145.0°	0500	98	31	16	03	2	1023.0	X	XX	54.8	49.7	57.0	8	8	4	5	0	0	30	2	4
8/31	47.1°	145.0°	1100	95	28	12	02	2	1025.1	X	XX	55.8	50.3	57.0	9	9	X	X	X	X	28	2	4

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/31	47.1°	144.9°	1700	98	29	17	02	2	1025.7	X	XX	55.2	50.1	57.0	9	8	8	4	0	0	32	2	4
8/31	46.3°	144.9°	2300	99	29	10	02	2	1027.8	X	XX	57.0	51.5	58.7	8	8	8	4	0	0	49	X	3
9/1	45.9°	145.0°	0500	96	36	05	02	2	1028.8	X	XX	57.0	52.1	58.3	9	9	X	X	X	X	36	2	2
9/1	45.9°	145.0°	1100	97	31	04	02	2	1029.5	X	XX	57.5	52.8	58.5	9	9	X	X	X	X	34	2	2
9/1	45.9°	145.0°	1700	99	12	03	02	2	1030.5	X	XX	57.5	51.5	58.2	8	8	5	5	0	0	31	X	1
9/1	45.2°	145.0°	2300	99	18	05	02	2	1031.2	X	XX	61.2	52.1	61.0	7	7	8	5	0	0	29	2	2
9/2	45.0°	145.0°	0500	98	08	04	02	2	1030.8	X	XX	60.0	53.2	60.3	5	5	8	5	0	0	30	3	3
9/2	45.0°	145.0°	1100	97	14	06	03	0	1031.2	X	XX	60.5	54.0	59.7	3	3	X	0	X	X	30	X	2
9/2	44.8°	145.0°	1700	99	14	08	01	0	1031.5	X	XX	64.0	54.0	59.8	2	1	1	5	0	4	14	2	1
9/2	44.2°	145.0°	2300	99	09	13	02	0	1031.8	X	XX	63.0	58.9	62.2	3	1	5	5	0	9	49	2	2
9/3	44.0°	145.0°	0500	98	08	07	02	0	1031.8	X	XX	62.8	60.0	62.2	1	0	0	0	0	9	10	2	2
9/3	44.0°	145.0°	1100	98	14	07	02	0	1031.2	X	XX	62.3	59.0	62.1	1	1	X	0	X	X	15	2	2
9/3	43.8°	145.0°	1700	99	08	11	02	0	1031.2	X	XX	64.0	59.2	62.3	1	1	2	5	0	0	08	2	2
9/3	43.2°	144.9°	2300	99	08	11	02	1	1029.8	X	XX	63.7	60.0	64.0	5	5	8	5	0	0	11	2	2
9/4	42.6°	144.9°	0500	98	09	14	02	2	1028.8	X	XX	65.2	60.1	64.1	8	8	8	5	0	0	11	2	3
9/4	41.7°	143.7°	1100	96	08	13	00	2	1027.8	X	XX	65.5	61.0	65.5	9	9	X	X	X	X	10	2	3
9/4	41.0°	145.1°	1700	98	09	15	02	2	1027.4	X	XX	67.1	62.0	66.8	6	6	8	5	0	0	11	2	3
9/4	40.3°	145.0°	2300	99	06	12	03	2	1025.7	X	XX	66.0	62.5	67.9	7	7	8	5	0	0	07	3	3
9/5	39.7°	145.3°	0500	90	07	10	02	2	1024.4	X	XX	68.1	61.9	68.2	9	9	X	X	X	X	04	3	3
9/5	38.9°	145.8°	1100	90	05	15	01	1	1021.7	X	XX	67.7	63.8	70.8	5	5	X	0	X	X	35	2	3
9/5	38.3°	146.4°	1700	99	07	17	02	2	1021.0	X	XX	68.5	64.3	69.9	7	7	8	4	0	0	06	2	4
9/5	37.6°	146.9°	2300	99	03	16	02	2	1019.6	X	XX	69.8	64.1	71.3	6	5	3	4	9	2	03	2	4
9/6	36.9°	147.5°	0500	99	02	14	01	1	1019.0	X	XX	69.4	63.8	71.2	5	5	3	4	0	2	03	2	4
9/6	36.0°	148.1°	1100	95	01	18	02	2	1018.0	X	XX	69.1	63.0	71.2	2	2	8	4	0	0	03	2	4
9/6	35.3°	148.3°	1700	99	35	11	02	1	1018.3	X	XX	70.1	63.0	72.4	6	4	1	4	9	2	03	2	4
9/6	34.7°	149.0°	2300	99	01	10	02	1	1019.0	X	XX	73.8	65.8	72.8	6	6	2	4	0	0	03	2	3
9/7	34.1°	149.6°	0500	96	02	06	02	1	1019.3	X	XX	71.5	62.2	74.6	3	3	2	4	0	0	49	2	3
9/7	33.4°	150.3°	1100	98	35	09	02	1	1020.3	X	XX	70.8	65.1	74.8	6	9	X	X	X	X	05	2	3
9/7	32.7°	150.9°	1700	99	01	09	02	1	1021.7	X	XX	72.0	65.0	74.9	4	4	2	4	0	0	03	2	2
9/7	32.0°	141.4°	2300	99	36	09	02	0	1021.3	X	XX	73.8	66.2	75.6	4	4	2	4	0	0	03	2	2

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
9/8	31.2°	151.8°	0500	99	36	10	02	0	1021.7	X	XX	74.5	67.1	75.1	3	3	2	4	0	0	03	2	2
9/8	30.4°	152.2°	1100	95	01	10	02	0	1021.7	X	XX	75.0	68.3	76.0	2	2	2	4	0	0	03	2	2
9/8	29.7°	152.9°	1700	99	00	00	15	1	1022.4	X	XX	74.8	67.2	76.5	6	6	2	4	0	2	03	2	2
9/8	29.0°	153.3°	2300	99	04	12	02	2	1021.7	X	XX	76.8	69.5	77.0	5	4	2	4	6	0	03	2	2
9/9	28.2°	153.7°	0500	97	05	11	02	1	1021.0	X	XX	75.6	70.1	76.0	3	3	8	4	0	0	05	2	2
9/9	27.5°	154.2°	1100	98	07	10	02	2	1020.3	X	XX	73.9	69.2	77.2	7	9	X	X	X	X	03	2	2
9/9	26.9°	154.7°	1700	99	06	10	02	2	1020.0	X	XX	77.8	71.0	77.5	5	5	2	4	0	0	03	2	2
9/9	26.2°	155.2°	2300	99	09	10	02	2	1018.6	X	XX	77.4	70.2	78.5	6	6	8	4	0	0	04	2	2
9/10	25.5°	155.7°	0500	99	10	10	03	2	1018.3	X	XX	76.7	70.0	78.0	6	6	8	4	0	2	04	2	2
9/10	24.8°	156.1°	1100	96	08	14	02	1	1018.3	X	XX	76.8	70.1	77.3	6	6	X	0	X	X	10	2	3
9/10	23.9°	156.4°	1700	99	11	12	02	1	1017.6	X	XX	77.5	71.9	77.8	6	5	3	4	9	2	15	2	3
9/10	23.1°	156.8°	2300	99	10	12	02	1	1015.9	X	XX	79.0	71.5	78.4	3	2	2	4	6	0	08	2	3
9/11	22.5°	157.2°	0500	99	08	17	02	0	1015.6	X	XX	77.3	69.1	77.5	2	2	2	4	0	0	09	2	4
9/11	21.7°	157.7°	1200	98	08	17	02	0	1014.2	X	XX	77.0	70.8	77.5	3	3	2	4	0	0	09	2	4
9/11	22.1°	157.7°	1800	99	11	17	02	0	1015.2	X	XX	78.5	72.1	77.2	4	4	2	4	0	0	09	2	5
9/11	22.0°	157.9°	2400	99	08	20	02	1	1014.6	X	XX	79.0	72.5	78.0	4	4	2	4	0	0	08	2	5
9/12	21.6°	158.6°	0500	99	05	19	02	0	1013.5	X	XX	78.2	72.0	79.0	4	4	1	4	0	0	03	2	5
9/12	21.5°	158.8°	1200	97	07	14	02	0	1014.2	X	XX	77.5	71.0	78.8	2	2	X	0	X	X	09	2	5

Table 4.--Light penetration and water color, John R. Manning cruise 32, July - September 1956

Date, 1956	Time, LCT[1]	Latitude, N.	Longitude, W.	Sea[2]	Cloud cover[2]	Water color (Forel)	Secchi, meters	Photometer depth, meters[3] Percent transmission				Remarks
								50	10	5	1	
7/17	1240	23.1°	159.7°	2	7	1	18	8	37	78	112	
7/18	1248	25.5°	161.7°	3	6	1	27	22	54	75	115	
7/19	1240	28.0°	163.5°	3	7	1	29	3	7	54	126	
7/20	1240	30.4°	165.5°	4	5	1	29	7	50	79	130	
7/21	1240	32.9°	167.5°	3	6	1	27	7	41	60	97	
7/22	1240	35.3°	169.9°	3	9	1	27	24	46	64	97	
7/23	1250	37.6°	172.3°	3	6	1	26	1	31	40	60	
7/24	1240	39.9°	174.9°	3	9	2	14	4	32	52	90	Rain
7/25	1240	42.5°	175.0°	2	9	3-4	15	4	27	37	74	Fog
7/26	1240	43.1°	175.5°	2	8	4	9	6	15	26	64	
7/27	1250	43.2°	174.7°	2	0	5	7	6	16	22	36	Haze
7/28	1240	43.6°	175.0°	2	9	5	7	4	14	21	67	Fog
7/29	1250	43.8°	175.0°	5	9	5-6	6	6	13	21	39	Fog
7/30	1240	44.1°	175.0°	4	9	4	10	11	20	31	64	Haze
7/31	1240	44.6°	174.9°	2	9	3-4	14	6	22	31	67	Haze
8/1	1240	44.9°	173.8°	2	9	3	15	2	28	50	94	Rain/fog
8/2	1240	45.1°	174.9°	1	2	3-4	13	12	20	29	56	
8/3	1240	45.5°	174.7°	1	9	3	15	12	27	42	70	Haze
8/4	1240	46.8°	174.8°	0	9	3-4	13	6	21	33	60	Fog
8/5	1240	47.7°	175.0°	2	9	3	14	9	20	32	69	Haze
8/6	1240	48.7°	174.9°	2	9	3	14	3	19	32	60	Haze
8/7	1250	49.6°	175.4°	3	9	4	13	2	15	28	63	Haze
8/14	1340	49.6°	174.2°	4	9	3-4	11	1	22	39	58	Rain
8/15	1240	46.9°	172.5°	3	8	3	13	5	23	36	70	
8/16	1240	45.2°	171.2°	3	8	2-3	20	10	26	40	80	
8/17	1245	46.3°	169.6°	4	9	3-4	10	4	17	36	65	Haze
8/19	1245	46.6°	169.5°	4	9	4	11	5	15	27	62	
8/21	1250	46.0°	161.4°	5	5	4	11	2	17	24	60	
8/22	-	45.9°	160.1°	3	8	4	10	1	13	25	55	
8/25	1230	45.8°	159.2°	3	5	4	11	5	16	25	60	
8/26	1330	46.4°	155.3°	4	9	4	10	4	14	29	77	Fog
8/27	1330	46.5°	153.6°	3	3	3	15	6	19	32	76	
8/28	1345	46.0°	149.9°	5	5	4	12	3	17	27	63	
8/29	1345	46.2°	148.7°	4	9	3-4	13	1	24	37	69	Rain/fog
8/30	1340	47.1°	145.2°	5	9	3-4	12	0	16	31	70	

Table 4.--Light penetration and water color, John R. Manning cruise 32, July - September 1956 (cont'd)

Date, 1956	Time, LCT[1]	Latitude, N.	Longitude, W.	Sea[2]	Cloud cover[2]	Water color (Forel)	Secchi, meters	Photometer depth, meters[3] Percent transmission				Remarks
								50	10	5	1	
8/31	1345	46.3°	144.9°	3	8	2	17	0	18	36	68	
9/1	1340	45.2°	145.0°	2	7	2	22	5	27	45	80	
9/2	1350	44.2°	145.0°	2	3	2	25	10	24	38	68	
9/3	1340	43.2°	144.9°	2	5	2	19	7	26	40	78	
9/4	1340	40.3°	145.0°	4	7	1-2	26	5	29	53	-	
9/5	-	37.6°	146.9°	4	6	1	27	2	35	66	113	Readings doubtful
9/6	1340	34.7°	149.0°	-	-	1	28	0	41	65	111	
9/7	1340	32.0°	151.4°	2	4	1	35	1	74	108	109	
9/8	-	29.0°	153.3°	2	6	1	34	5	48	76	118	
9/9	1340	26.2°	155.2°	2	6	1	33	4	10	66	126	
9/10	1340	23.1°	156.8°	3	3	1	37	4	13	65	113	

1/ Time lowering began, Secchi disk and sea cell lowered at same time.

2/ For coded values see H. O. Pub. 606-C.

3/ Low values probably due to shadowing of deck cell.

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
1	0600	10/19	24.2°	156.3°	77.5	05	08	77.1	73.0	18	02	X	7	8	3				
2	1800	10/19	25.6°	155.7°	76.5	10	10	74.2	68.7	18	02	6	8	7	3				
3	0545	10/20	27.1°	154.9°	76.0	05	08	72.4	70.0	17	50	6	8	7	2			35.26	
4	1800	10/20	28.5°	154.2°	75.4	08	11	73.5	69.0	16	15	6	8	7	2			35.30	
5	0545	10/21	30.0°	153.3°	73.8	14	16	75.0	71.5	15	02	4, 8	7	9	3			35.44	
6	1800	10/21	31.5°	152.6°	72.1	14	13	69.6	68.9	19	63	0	8	5	3			34.99	0.07
7	0000	10/22	32.2°	152.2°	71.8	14	16	70.0	67.2	19	50	6	8	7	4			35.14	
8	0555	10/22	32.9°	151.8°	71.6	13	22	72.5	69.8	24	02	X	8	8	4			34.99	
9	1200	10/22	33.5°	151.4°	71.0	11	18	71.9	69.0	24	01	4, 8	6	9	4			34.81	
10	1800	10/22	34.2°	151.0°	70.3	13	16	71.1	68.0	26	01	4, 8	7	9	3			34.81	0.08
11	2345	10/22	35.0°	150.5°	70.1	09	14	70.1	67.0	26	02	1, 8	2	9	3			34.76	
12	0550	10/23	35.9°	150.4°	69.0	09	12	69.9	66.1	28	02	8	2	9	2			34.85	
13	1200	10/23	36.6°	150.1°	68.0	09	12	69.0	65.9	27	02	8	5	9	2			34.51	
14	1800	10/23	37.4°	149.7°	65.9	13	12	67.0	64.0	28	02	1, 4, 8	2	9	2			33.87	0.41
15	0000	10/24	38.1°	149.2°	66.6	15	12	66.9	63.9	27	03	8	3	9	3			34.18	
16	0545	10/24	38.9°	149.0°	64.2	18	11	66.3	64.0	27	02	8	2	9	2			33.75	0.21
17	1150	10/24	39.7°	148.6°	63.9	20	13	64.6	63.1	26	03	6	7	9	3			33.82	
18	1800	10/24	40.4°	148.3°	63.0	19	15	66.0	63.9	24	01	1, 8, 5	6	9	3			33.71	
19	0000	10/25	40.5°	148.2°	63.0	19	22	66.1	63.9	21	02	6	8	8	3			33.80	
20	0300	10/25	40.3°	148.1°	64.0	19	22	64.9	64.0	21	61	0	8	6	3			33.93	0.22
21	1745	10/25	40.3°	148.2°	63.9	04	24	59.9	58.4	25	61	0	8	7	3				
22	2355	10/25	40.8°	148.0°	60.8	06	15	57.2	52.1	26	02	5, 6	8	9	3			33.40	
23	0305	10/26	41.0°	147.9°	59.5	06	16	56.8	51.5	28	02	5, 6	8	6	3			33.37	0.39
24	1740	10/26	41.0°	148.0°	60.1	06	14	55.0	49.0	32	02	5, 6	8	8	3				
25	2355	10/26	41.6°	147.6°	58.8	06	15	54.4	49.2	33	02	5, 6	8	9	3			33.33	
26	0355	10/27	41.9°	147.5°	58.0	13	10	53.0	48.1	35	01	X	X	9	3			33.40	
27	0300	10/28	42.1°	147.2°	57.9	23	10	58.2	52.6	34	03	6	8	7	2			33.26	
28	1745	10/28	42.1°	147.0°	57.9	24	19	60.1	57.8	27	02	6	8	7	3				0.57
29	0005	10/29	42.7°	146.6°	56.7	28	23	59.0	58.1	20	63	0	8	5	4			32.94	
30	0305	10/29	42.9°	146.4°	56.3	02	09	54.5	53.5	18	50	0	9	6	3			32.83	
31	1800	10/30	43.3°	146.9°	54.9	30	29	51.5	45.6	25	02	8	6	9	5			33.06	
32	0600	10/31	43.8°	146.8°	53.7	29	25	53.6	48.0	22	61	X	8	8	5			32.97	
33	2355	10/31	43.7°	147.3°	54.8	26	28	60.2	57.6	11	02	0	8	6	6			32.88	
34	2350	11/1	44.3°	143.5°	52.6	22	23	58.9	56.4	11	02	0	8	5	6			32.74	
35	0550	11/2	44.4°	142.6°	53.2	20	23	57.8	56.6	11	02	0	8	5	6			32.88	

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
36	1800	11/2	44.7°	140.7°	53.4	19	26	56.3	58.0	13	10	0	8	5	6			32.88	
37	0550	11/3	45.0°	138.8°	53.0	20	24	58.6	56.1	15	02	0	8	4	6			32.90	
38	1750	11/3	45.4°	136.9°	52.0	19	24	56.8	55.1	17	28	0	8	3	5			32.90	
39	0600	11/4	45.7°	134.8°	52.2	19	28	56.0	54.8	16	02	X	8	7	5			32.79	
40	1745	11/4	46.0°	132.7°	53.3	19	14	55.5	54.5	16	61	6	8	3	4			32.86	
41	0550	11/5	46.1°	130.2°	54.8	20	21	56.5	54.9	16	61	0	8	X	4			32.70	
42	1750	11/5	46.1°	127.8°	56.0	32	22	52.9	51.9	21	50	0	8	4	4			32.14	
43	0600	11/6	46.1°	125.4°	52.8	33	17	51.5	46.0	28	02	X	8	X	4			32.23	
44	0600	11/12	45.4°	124.9°	52.8	22	06	51.5	50.2	28	28	X	X	0	2			32.05	
45	1625	11/12	44.4°	125.6°	55.2	21	08	55.9	53.8	28	02	6, 3	6	9	2			32.03	
46	2130	11/12	43.8°	126.1°	55.9	31	22	54.0	52.8	23	51	0	9	7	2			32.01	
47	1630	11/14	42.5°	126.8°	56.4	02	12	54.2	48.9	28	02	8	6	9	2			32.27	
48	2130	11/14	42.1°	127.4°	57.0	34	04	55.5	49.0	26	02	8, 1	4	9	2			32.21	
49	0130	11/15	41.8°	127.9°	56.1	26	03	53.6	48.0	25	02	8, 5	8	9	2			32.21	0.39
50	1600	11/15	42.0°	127.8°	56.1	25	19	57.0	55.9	21	02	6	9	7	5				
51	2130	11/15	41.4°	128.2°	59.4	24	18	60.8	58.7	22	02	6	9	7	5			32.84	
52	0355	11/16	40.9°	128.5°	60.0	23	12	61.2	59.4	24	02	6	8	8	3			32.79	
53	1800	11/16	40.2°	129.2°	58.6	27	17	60.4	58.5	26	14	6	8	8	3			32.56	
54	0000	11/17	39.5°	129.4°	59.0	22	14	62.0	59.8	26	01	5, 8	7	9	3			32.36	
55	0105	11/17	39.4°	129.4°	60.9	22	14	-	-	-	-	-	-	-	-			32.95	
56	0600	11/17	39.4°	129.4°	60.6	25	13	63.5	60.6	28	02	6	6	9	2				
57	1800	11/17	39.2°	129.7°	60.3	05	14	58.0	54.9	32	02	6	8	8	3			32.90	
58	0000	11/18	38.8°	130.5°	61.0	05	13	60.8	55.0	31	02	6	7	9	3			33.01	
59	0120	11/18	38.7°	130.6°	61.0	05	14	-	-	-	-	-	-	-	-				0.43
60	1605	11/18	38.7°	130.6°	60.9	02	21	56.1	50.5	31	02	4, 8	7	9	3				
61	2005	11/18	38.5°	131.0°	60.2	04	16	57.1	50.8	32	02	4, 8	6	9	3			32.83	
62	0125	11/19	38.1°	131.8°	61.4	03	18	57.2	50.8	31	02	6, 8	7	9	3			33.30	
63	1855	11/19	37.6°	132.2°	61.6	05	18	57.3	50.4	30	02	6	8	9	3			33.35	
64	2230	11/19	37.6°	132.7°	62.2	05	12	59.0	52.8	28	02	6	8	9	3			33.60	
65	0130	11/20	37.4°	133.2°	62.0	03	11	57.8	52.0	28	02	6	8	9	3			33.57	
66	0500	11/20	37.2°	133.6°	62.6	04	11	58.5	52.5	28	02	6	8	9	3			33.68	0.37
67	1130	11/20	36.6°	134.2°	63.1	05	14	58.5	53.2	27	02	6	8	9	3			33.80	
68	1530	11/20	36.2°	134.7°	63.6	06	12	59.7	54.0	26	01	5	6	9	3			33.86	
69	2115	11/20	36.8°	134.9°	64.0	08	16	61.5	55.0	26	02	8	1	9	3			33.95	
70	0200	11/21	37.3°	135.1°	62.7	07	16	60.1	54.8	27	02	8	1	9	3			33.77	0.33

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
71	1530	11/21	38.0°	135.3°	63.9	06	13	59.6	54.9	29	02	8	1	9	3			34.07	
72	2020	11/21	38.6°	135.4°	62.0	08	16	59.9	54.9	31	03	8	4	9	3			33.55	
73	0215	11/22	39.2°	135.7°	61.4	09	14	61.1	56.2	29	03	8	6	9	3			33.51	
74	1630	11/22	39.3°	135.7°	61.4	09	06	59.9	54.4	27	02	4	5	9	2				
75	2110	11/22	39.8°	135.9°	61.0	09	08	58.0	54.9	26	02	4	2	9	2			33.44	
76	0235	11/23	40.2°	136.1°	60.4	15	10	59.9	56.1	25	03	4	5	9	2			33.66	
77	1625	11/23	40.2°	136.1°	60.1	16	14	60.0	56.0	24	02	5, 6	7	9	2				
78	2105	11/23	40.6°	136.4°	59.1	15	14	61.3	57.8	23	02	4, 6	8	9	3			33.48	
79	0200	11/24	41.1°	136.8°	59.2	16	14	60.0	57.7	22	02	6	8	9	3			33.46	0.34
80	2000	11/24	41.7°	137.1°	58.7	16	20	60.3	56.9	20	02	1, 4	3	9	5			33.46	
81	0030	11/25	42.2°	137.4°	58.0	16	20	61.3	57.8	18	03	1, 4	7	9	5			33.39	
82	0540	11/25	42.8°	137.9°	56.8	17	21	58.7	57.0	15	02	X	X	9	6			33.22	0.58
83	2110	11/25	42.2°	138.3°	58.4	22	18	59.0	56.0	14	02	0, 6	8	9	6			33.28	
84	0540	11/26	41.6°	138.9°	59.0	25	08	57.0	52.1	22	02	X	1	9	4			33.49	
85	1705	11/26	40.9°	139.5°	58.8	17	12	60.0	56.9	25	02	1, 4, 8	4	9	3			33.31	
86	2110	11/26	40.5°	139.8°	60.5	17	19	62.5	58.0	25	02	1, 4, 8	6	9	4			33.60	
87	0225	11/27	40.2°	140.1°	61.6	15	22	62.1	57.5	24	02	6	7	9	4			33.82	
88	1810	11/27	39.8°	140.5°	62.3	18	15	63.9	61.3	23	02	1, 6, 4	7	9	4			33.80	
89	0005	11/28	39.3°	140.9°	61.9	16	13	63.8	61.0	23	02	1, 5	7	9	4			33.77	
90	0600	11/28	38.8°	141.2°	64.0	16	17	64.8	62.6	21	02	X	3	9	4			34.23	0.19
91	1630	11/28	38.5°	141.7°	63.3	16	17	65.0	61.8	20	02	5, 6	7	9	5			33.98	
92	2105	11/28	38.9°	142.0°	62.0	16	13	65.2	61.9	19	02	4	7	9	5			33.62	
93	0130	11/29	39.4°	142.3°	62.0	15	16	63.8	61.0	18	02	1, 6, 5	6	9	5			33.73	
94	0530	11/29	39.9°	142.6°	61.2	15	20	63.5	61.0	17	02	X	X	9	5			33.66	0.32
95	2005	11/29	40.6°	143.1°	59.1	15	26	63.8	61.2	15	60	0	8	5	5			33.22	
96	0100	11/30	41.0°	143.5°	59.6	15	27	63.0	60.8	12	60	0	8	5	5			33.42	
97	2330	11/30	41.6°	143.6°	58.7	17	10	59.8	56.7	16	02	5	8	9	3			33.33	
98	0555	12/1	42.2°	143.9°	55.9	15	03	57.2	54.9	20	60	X	8	X	3			32.99	0.55
99	1150	12/1	43.1°	144.5°	55.1	34	02	56.4	54.0	21	60	X	8	X	3			32.84	
100	1730	12/1	43.8°	144.9°	54.0	34	05	52.6	48.0	22	02	8	6	7	3			32.74	0.69
101	2345	12/1	43.2°	145.4°	54.5	06	21	52.0	51.2	19	61	0	8	4	3			32.77	
102	0530	12/2	42.6°	145.8°	55.7	19	17	60.0	58.5	17	01	X	X	X	3			32.95	
103	1750	12/2	41.6°	144.2°	57.1	17	16	59.8	58.2	17	02	5	7	8	3				
104	2350	12/2	41.2°	143.5°	59.7	21	18	61.4	59.9	16	02	6	8	8	3				
105	0540	12/3	40.7°	142.7°	60.1	24	15	62.1	60.5	17	02	X	8	X	3				

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
106	1615	12/3	39.9°	141.5°	60.9	02	23	55.8	53.7	19	61	0	8	8	3				
107	2105	12/3	39.3°	141.5°	62.5	06	23	57.0	56.1	20	60	0	8	3	4				
108	0200	12/4	38.6°	141.6°	61.9	06	23	58.0	57.0	21	61	0	8	3	5			33.66	
109	0540	12/4	38.2°	141.6°	62.9	06	23	57.5	57.0	22	50	0	8	3	5			33.89	
110	1150	12/4	37.4°	141.6°	64.0	07	25	58.6	57.8	21	50	X	8	3	5			34.11	
111	1750	12/4	36.9°	142.2°	65.8	00	00	59.9	59.6	21	65	0	8	4	3			34.38	0.12
112	2300	12/4	37.1°	141.9°	64.2	07	23	56.4	56.2	20	51	0	8	4	4				
113	0530	12/5	36.5°	142.6°	65.0	07	25	60.7	57.9	20	02	X	8	X	6			34.31	
114	1200	12/5	35.9°	143.5°	65.0	11	21	63.8	58.2	17	02	X	8	8	6			34.23	
115	1820	12/5	35.4°	144.2°	65.7	12	34	62.8	59.2	15	60	0	8	8	6			34.38	
116	2350	12/5	35.0°	145.0°	65.1	12	24	63.5	63.3	12	63	0	8	3	5			34.14	0.29
117	0550	12/6	34.5°	145.7°	66.9	27	03	65.0	61.5	14	01	8	1	9	2			34.69	
118	1130	12/6	33.9°	146.4°	68.2	32	16	67.5	64.0	16	02	8	1	9	2			35.01	
119	1810	12/6	33.2°	147.1°	68.0	33	17	66.9	63.5	18	02	8	3	9	3			34.90	
120	2350	12/6	32.7°	147.8°	68.9	33	12	67.3	62.8	16	02	8	2	9	2			34.96	
121	0545	12/7	32.0°	148.4°	69.0	04	03	67.1	62.2	18	02	8	1	9	2			35.17	
122	1155	12/7	31.2°	149.0°	70.0	13	14	67.5	62.8	17	02	8	3	9	2			35.23	
123	1800	12/7	30.6°	149.6°	69.8	19	16	70.0	64.8	15	02	8, 5	8	9	3			35.07	
124	0000	12/8	30.0°	150.1°	70.8	19	19	72.0	67.2	13	02	0	8	8	5			35.25	
125	0550	12/8	29.5°	150.5°	71.0	17	18	68.8	68.0	14	63	0	8	X	4			35.26	
126	1200	12/8	28.9°	150.9°	72.0	18	20	71.5	70.0	14	02	X	8	X	5			35.39	
127	1800	12/8	28.2°	151.4°	72.4	18	21	73.4	71.6	15	01	1, 8	6	9	4			35.23	
128	2350	12/8	27.7°	151.8°	72.7	18	17	74.1	71.9	15	02	1, 8	4	9	4			35.23	
129	0545	12/9	27.0°	152.3°	73.1	13	23	74.4	70.5	17	02	8	2	9	4			35.23	
130	1740	12/9	26.0°	153.3°	74.0	13	27	74.0	70.2	19	02	6, 8	4	9	5			35.17	
131	0550	12/10	25.0°	154.4°	74.1	12	23	74.9	69.5	20	01	6	6	9	5			35.14	
132	1800	12/10	23.8°	155.6°	75.0	11	20	74.9	74.0	20	02	6, 1	7	9	4			35.07	
133	0545	12/11	22.6°	156.6°	76.2	11	26	74.9	71.1	17	02	4, 6, 8	5	9	4			34.94	

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/19	24.2°	156.3°	0600	99	05	08	02	2	1018.3	3	17	77.1	73.0	77.5	7	X	X	X	X	X	09	3	2
10/19	25.6°	155.7°	1800	98	10	10	02	2	1018.0	2	09	74.2	68.7	76.5	8	8	5	6	X	X	12	4	2
10/20	26.3°	155.3°	0000	98	00	02	51	5	1017.3	7	24	74.4	71.6	76.4	8	8	4	5	X	X	12	3	2
10/20	27.0°	154.9°	0600	98	05	04	50	2	1017.3	4	00	72.4	70.0	76.0	8	8	8	5	X	X	10	3	2
10/20	28.5°	154.2°	1800	99	08	11	15	2	1015.6	4	00	73.5	69.0	75.4	7	4	5	5	2	1	13	3	2
10/21	29.3°	153.8°	0000	99	13	16	02	2	1014.2	6	17	76.5	70.6	74.7	7	4	8	5	1	X	14	3	2
10/21	30.0°	153.5°	0600	99	13	16	02	2	1015.2	2	24	75.0	71.5	73.8	7	X	X	X	X	X	14	3	3
10/21	31.5°	152.6°	1800	96	13	13	63	6	1018.3	2	17	69.6	68.9	72.1	8	8	6	4	X	X	14	3	3
10/22	32.3°	152.2°	0000	97	14	16	50	5	1019.3	4	00	70.0	67.2	71.8	8	8	8	X	X	X	14	3	4
10/22	33.0°	151.9°	0600	98	13	22	02	2	1023.7	2	27	72.5	69.8	71.6	8	X	X	X	X	X	18	3	4
10/22	33.5°	151.5°	1200	99	11	18	01	2	1024.4	4	00	71.9	69.0	71.0	6	4	8	5	4	0	18	3	4
10/22	34.2°	151.0°	1800	99	13	16	01	2	1026.1	2	09	71.1	68.0	70.3	7	2	1	5	7	9	18	3	3
10/23	35.0°	150.5°	0000	99	09	14	02	1	1025.7	8	14	70.1	67.0	70.1	2	1	1	5	0	8	13	3	3
10/23	35.9°	150.4°	0600	99	09	12	02	0	1027.8	1	20	69.9	66.1	69.9	2	X	X	X	X	X	13	3	2
10/23	36.6°	150.1°	1200	99	09	12	02	2	1027.4	4	00	69.0	65.9	68.0	6	6	1	0	0	0	10	3	2
10/23	37.5°	149.7°	1800	99	13	12	02	0	1028.4	2	10	67.0	64.0	65.9	2	2	1	5	3	1	15	3	2
10/24	38.1°	149.2°	0000	99	15	12	03	0	1027.1	7	17	66.9	63.9	66.6	3	3	1	5	0	0	35	4	4
10/24	38.9°	149.0°	0600	99	18	11	02	0	1026.8	4	00	66.3	64.0	64.2	3	3	1	5	X	X	13	3	3
10/24	39.5°	148.8°	1200	99	20	13	03	1	1025.7	7	07	64.6	63.1	63.9	7	7	4	5	X	X	35	3	4
10/24	40.4°	148.3°	1800	99	19	15	01	2	1023.7	7	07	66.0	63.9	63.0	6	1	1	5	7	1	20	3	3
10/25	40.5°	148.2°	0000	98	19	22	02	2	1020.7	7	20	66.1	63.9	63.0	8	8	5	6	X	X	19	3	4
10/25	40.3°	148.2°	0600	97	22	16	63	6	1021.3	2	09	64.9	64.0	63.8	8	8	6	X	X	X	20	3	3
10/25	40.4°	148.3°	1800	98	04	24	61	6	1025.4	2	24	59.9	58.4	63.9	8	8	6	X	X	X	06	3	3
10/26	40.8°	148.0°	0000	99	06	15	02	2	1026.4	4	00	57.2	52.1	60.8	8	4	5	5	2	X	03	3	4
10/26	41.0°	147.9°	0600	99	05	12	02	2	1029.5	2	17	55.0	50.9	59.5	7	X	X	X	X	X	03	3	3
10/26	40.9°	148.0°	1800	98	06	14	02	2	1031.8	2	09	55.0	49.0	60.1	8	5	5	5	2	X	05	2	3
10/27	41.6°	147.6°	0000	99	06	15	02	2	1032.5	4	00	54.4	49.2	58.8	8	5	5	5	2	X	00	3	3
10/27	41.9°	147.5°	0600	99	13	10	01	2	1034.5	1	10	53.0	48.1	58.0	4	X	X	X	X	X	13	3	3
10/27	41.9°	147.9°	1800	99	16	06	02	1	1036.2	2	10	55.2	49.0	58.2	5	5	5	5	0	0	00	4	3
10/28	42.1°	147.6°	0000	99	21	12	02	1	1033.9	8	24	56.5	51.5	58.0	6	0	0	9	0	8	40	4	3

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/28	42.1°	147.2°	0600	99	22	12	01	2	1033.5	4	00	58.6	53.2	57.8	3	X	X	X	X	X	22	3	3
10/28	42.2°	147.0°	1800	98	24	19	02	2	1026.8	6	10	60.1	57.8	57.9	8	8	5	7	X	X	20	2	3
10/29	42.7°	146.5°	0000	96	28	23	63	6	1020.3	7	44	59.0	58.1	56.7	8	8	6	3	X	X	27	3	4
10/29	42.9°	146.5°	0600	96	01	11	61	6	1016.9	6	14	54.0	52.9	56.3	8	8	6	3	X	X	27	3	2
10/29	43.0°	146.5°	1800	99	32	33	27	1	1017.6	2	20	51.9	45.9	56.3	6	6	8	5	0	0	82	3	0
10/30	43.0°	146.6°	0000	99	32	40	02	2	1018.6	4	00	52.9	46.5	56.0	7	7	8	6	0	0	82	3	6
10/30	43.0°	146.6°	0600	99	30	32	02	2	1022.4	2	17	50.6	44.0	55.5	8	8	X	X	X	X	82	3	6
10/30	43.3°	146.8°	1800	99	30	29	02	2	1025.7	2	05	51.5	45.6	54.9	7	5	8	5	7	0	30	3	8
10/31	43.5°	146.9°	0000	99	27	25	02	2	1023.4	7	17	53.0	47.0	54.4	7	7	8	6	X	X	30	3	8
10/31	43.7°	146.9°	0600	98	29	25	61	2	1022.0	5	17	53.6	48.0	53.7	8	X	X	X	X	X	30	3	8
10/31	43.8°	147.2°	1800	96	26	35	61	2	1011.2	4	00	58.2	56.5	54.0	8	8	6	X	X	X	76	2	1
11/1	43.9°	147.3°	0000	96	26	28	02	5	1010.8	6	10	60.2	57.6	54.8	8	8	6	3	X	X	30	3	8
11/1	43.8°	146.3°	0600	96	25	25	02	2	1009.8	4	00	60.2	57.8	54.2	8	8	6	3	X	X	25	3	8
11/1	44.2°	144.0°	1800	97	23	26	01	2	1011.5	5	07	57.5	55.1	51.0	7	3	6	3	4	9	23	3	8
11/2	44.3°	143.5°	0000	96	22	23	02	2	1010.5	4	00	58.9	56.4	52.6	8	8	6	3	X	X	22	3	8
11/2	44.4°	142.8°	0600	96	20	23	02	2	1011.2	2	09	57.8	56.6	53.2	8	8	6	3	X	X	20	3	8
11/2	44.7°	140.7°	1800	96	19	26	10	2	1013.2	2	17	58.0	56.3	53.4	8	8	6	3	X	X	70	3	0
11/3	44.8°	139.7°	0000	95	19	26	02	2	1013.2	4	00	57.9	56.1	52.8	8	8	6	3	X	X	70	3	0
11/3	45.0°	138.7°	0600	95	20	24	02	2	1015.2	2	14	58.6	56.1	53.0	8	8	6	3	X	X	22	3	9
11/3	45.4°	136.9°	1800	94	19	24	28	2	1017.3	3	10	56.8	55.1	52.0	8	8	6	3	X	X	26	4	7
11/4	45.5°	135.9°	0000	98	20	24	01	2	1015.9	6	17	57.8	55.1	52.5	6	4	8	6	0	9	26	4	7
11/4	45.7°	134.6°	0600	98	19	28	02	2	1015.9	4	00	56.0	54.8	52.2	8	X	X	X	X	X	19	3	6
11/4	45.9°	132.7°	1800	93	19	14	61	2	1015.9	2	09	55.5	54.5	53.3	8	8	6	3	X	X	19	4	4
11/5	46.0°	131.5°	0000	96	17	16	02	2	1015.2	4	00	57.5	55.8	53.0	8	8	5	3	X	X	17	3	3
11/5	46.1°	129.9°	0600	96	20	21	61	2	1015.9	2	07	56.5	54.9	54.5	8	8	X	X	X	X	19	3	3
11/5	46.1°	127.9°	1800	95	32	22	50	2	1021.3	2	24	52.9	51.9	56.0	8	8	6	X	X	X	30	3	4
11/6	46.2°	126.8°	0000	98	34	22	02	2	1025.4	2	17	52.0	47.5	55.0	7	7	5	4	0	0	30	3	4
11/6	46.2°	125.5°	0600	XX	33	17	02	2	1028.1	2	17	51.5	46.0	53.2	8	X	X	X	X	X	33	3	4
11/14	43.6°	127.2°	0600	99	33	11	02	0	1030.8	1	17	54.0	48.9	55.0	1	1	1	4	0	0	33	4	6
11/14	42.4°	127.0°	1800	99	01	09	02	1	1027.8	6	07	53.8	48.9	57.1	6	5	4	4	1	X	33	4	4

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/15	41.9°	127.8°	0000	99	27	06	03	2	1025.1	7	10	55.2	49.0	55.5	8	3	4	4	1	0	34	4	4
11/15	41.9°	127.9°	0600	99	22	10	02	2	1023.7	8	05	54.3	49.1	56.1	7	6	4	4	1	0	34	4	4
11/16	41.1°	128.3°	0000	98	24	19	02	2	1023.0	3	10	60.6	59.0	59.4	8	8	5	3	X	X	25	3	5
11/16	40.6°	128.7°	0600	98	23	14	02	2	1024.4	2	07	61.2	59.7	60.0	8	8	5	3	X	X	25	3	4
11/16	40.2°	129.1°	1800	98	27	17	14	2	1025.7	2	10	60.4	58.5	58.6	8	8	5	3	X	X	27	3	5
11/17	39.6°	129.5°	0000	99	22	14	01	2	1026.4	3	00	62.0	59.8	59.0	7	3	8	4	5	X	24	3	3
11/17	39.5°	129.4°	0600	99	25	13	02	1	1028.1	2	10	63.5	60.6	61.0	6	6	5	5	X	X	24	4	3
11/17	39.1°	129.8°	1800	98	05	14	02	2	1031.8	2	17	58.0	54.9	60.3	8	8	5	5	X	X	30	3	4
11/18	38.8°	130.5°	0000	99	05	13	02	2	1031.2	6	05	60.8	55.0	61.0	7	7	4	5	0	1	32	4	4
11/18	38.7°	130.6°	0600	99	05	12	02	2	1031.2	1	03	58.4	52.7	61.0	7	7	1	4	5	X	32	4	3
11/18	38.5°	130.8°	1800	99	02	18	02	2	1031.8	1	07	56.2	50.1	61.0	7	7	8	5	0	0	34	4	6
11/19	38.2°	131.6°	0000	99	03	13	02	2	1030.1	7	02	58.0	51.9	61.5	7	7	8	5	0	0	34	4	5
11/19	38.1°	131.8°	0600	99	04	18	02	2	1030.1	4	00	57.6	51.9	61.5	8	8	8	4	X	X	34	4	5
11/19	37.9°	132.1°	1800	99	05	18	02	2	1029.8	1	10	57.3	50.4	61.5	7	7	8	4	X	X	35	4	4
11/20	37.5°	132.9°	0000	99	05	14	01	2	1028.1	7	10	57.8	51.1	62.6	7	7	8	4	X	X	02	3	4
11/20	37.1°	133.7°	0600	99	04	11	02	2	1028.1	4	00	58.6	53.7	62.6	7	7	8	4	0	0	04	3	4
11/20	36.6°	134.2°	1200	99	05	14	02	2	1026.8	4	00	58.5	53.2	63.1	7	7	8	4	0	0	04	3	4
11/20	36.5°	134.8°	1800	99	08	16	02	2	1027.8	3	07	60.9	54.7	63.6	4	4	4	4	0	0	06	3	3
11/21	37.1°	135.0°	0000	99	08	16	02	0	1026.4	5	00	61.1	55.7	64.1	1	1	1	4	0	0	07	3	4
11/21	37.5°	135.0°	0600	99	04	12	02	0	1028.1	2	17	59.8	55.1	62.7	0	0	0	9	0	0	07	3	4
11/21	38.3°	135.4°	1800	99	09	15	02	0	1030.1	3	17	60.3	55.3	62.0	1	1	1	4	0	0	04	3	4
11/22	39.0°	135.6°	0000	99	06	15	02	0	1028.8	6	10	59.8	55.1	61.5	2	2	1	4	0	1	06	3	4
11/22	39.2°	135.7°	0600	99	06	16	02	0	1028.1	4	00	60.2	56.0	62.0	2	2	8	5	0	0	06	3	4
11/22	39.4°	135.7°	1800	99	12	10	02	0	1027.4	0	00	59.9	54.5	61.2	1	1	1	5	4	0	28	4	4
11/23	40.0°	136.0°	0000	99	12	09	02	0	1024.7	7	09	60.0	55.2	60.2	3	3	0	0	3	0	28	4	2
11/23	40.2°	136.1°	0600	99	16	13	02	2	1025.4	4	00	60.1	56.5	60.4	9	X	X	X	X	X	28	4	2
11/23	40.4°	136.2°	1800	99	16	15	02	2	1024.4	2	03	60.1	56.9	59.7	7	7	8	4	X	X	18	3	3
11/24	40.9°	136.7°	0000	99	16	15	02	2	1021.7	7	14	59.8	57.4	59.2	8	8	8	6	X	X	16	3	3
11/24	41.1°	135.8°	0600	99	16	14	02	2	1021.7	4	00	59.9	56.9	59.2	8	X	X	X	X	X	16	3	3
11/24	41.4°	136.9°	1800	99	15	18	02	1	1020.0	4	00	60.0	56.2	59.1	6	6	0	X	3	0	21	4	5

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/25	42.2°	137.4°	0000	99	16	20	03	1	1017.6	6	07	61.3	57.8	59.2	7	0	0	X	7	9	24	4	7
11/25	42.7°	137.8°	0600	99	17	24	02	1	1015.2	7	17	58.7	57.0	56.8	X	X	X	X	X	X	19	3	8
11/25	42.4°	138.2°	1800	96	17	12	63	6	1011.9	2	14	58.2	57.2	57.6	8	8	6	3	X	X	19	3	9
11/26	41.9°	138.6°	0000	99	28	26	02	8	1016.6	2	34	57.0	53.5	58.9	7	7	8	4	0	0	22	3	7
11/26	41.7°	138.9°	0600	99	25	08	02	0	1021.7	2	27	57.0	52.1	59.0	1	X	X	X	X	X	22	3	6
11/26	40.8°	139.5°	1800	99	14	14	02	1	1025.1	2	14	61.9	57.9	58.8	5	1	2	4	0	2	22	3	5
11/27	40.3°	139.9°	0000	99	15	21	02	2	1023.4	7	14	62.1	57.5	61.6	6	3	8	4	0	2	17	3	6
11/27	40.0°	140.2°	0600	99	15	20	02	2	1024.0	2	07	63.2	57.5	61.9	4	X	X	X	X	X	15	3	6
11/27	39.8°	140.5°	1800	99	18	15	02	2	1023.0	0	00	63.9	61.3	62.2	7	4	8	4	7	1	22	3	7
11/28	39.4°	140.9°	0000	99	16	13	02	2	1021.3	7	03	63.8	61.0	61.7	7	1	8	4	1	1	22	3	8
11/28	38.7°	141.2°	0600	99	16	17	02	1	1021.3	4	00	64.8	62.6	64.1	3	X	X	X	X	X	22	3	8
11/28	38.6°	141.8°	1800	99	16	17	02	2	1020.3	2	07	65.0	61.8	62.7	7	7	8	6	X	1	22	3	8
11/29	39.2°	142.2°	0000	99	15	17	02	2	1017.6	7	20	65.0	61.7	62.0	8	8	8	6	X	X	73	3	1
11/29	39.8°	142.5°	0600	99	15	20	02	2	1016.9	5	00	63.5	61.0	61.2	8	X	X	X	X	X	73	3	1
11/29	40.3°	143.0°	1800	96	16	20	61	6	1015.6	3	00	63.8	62.0	61.1	8	8	6	2	X	X	23	4	7
11/30	41.0°	143.4°	0000	96	15	25	60	6	1012.5	6	17	62.8	60.8	58.8	8	8	6	4	X	X	15	3	6
11/30	41.2°	143.5°	0600	XX	16	32	60	6	1009.8	7	10	63.6	61.0	59.6	8	X	X	X	X	X	65	3	6
11/30	41.0°	143.2°	1800	97	18	19	60	6	1014.9	2	20	61.0	59.7	59.5	8	8	6	4	X	X	18	3	1
12/1	41.5°	143.6°	0000	99	17	10	02	2	1015.9	4	00	59.8	56.7	58.7	8	0	0	0	1	X	22	3	9
12/1	42.1°	144.0°	0600	XX	15	03	60	2	1020.0	2	15	57.2	54.9	55.9	8	X	X	X	X	X	22	4	9
12/1	42.9°	144.7°	1200	XX	34	02	60	2	1021.0	2	03	56.4	54.0	55.1	8	X	X	X	X	X	22	4	6
12/1	43.4°	145.1°	1800	98	34	05	02	2	1022.0	2	09	52.6	48.0	54.0	8	8	8	4	X	X	22	4	6
12/2	42.8°	145.6°	0000	95	06	21	61	6	1019.3	7	24	52.0	51.2	54.5	8	8	6	2	X	X	22	4	5
12/2	42.6°	145.8°	0600	XX	19	18	02	2	1016.9	4	00	60.0	58.5	55.7	X	X	X	X	X	X	19	3	4
12/2	41.6°	144.2°	1800	98	17	16	02	2	1016.9	2	10	59.8	58.2	57.1	7	0	0	0	1	X	18	3	5
12/3	41.1°	143.4°	0000	98	21	18	02	2	1016.3	7	10	61.4	59.9	59.7	8	8	8	6	X	X	21	3	5
12/3	40.9°	142.9°	0600	XX	24	15	02	2	1016.6	4	00	62.1	60.5	60.1	8	X	X	X	X	X	21	3	4
12/3	39.7°	141.5°	1800	94	06	22	61	6	1020.0	2	20	56.1	55.3	60.9	8	8	6	3	X	X	03	3	4
12/4	38.9°	141.5°	0000	95	06	23	60	6	1019.6	6	03	58.8	56.2	62.4	8	8	6	3	X	X	01	4	7
12/4	38.1°	141.5°	0600	95	06	23	50	5	1022.0	2	17	57.5	57.0	63.0	8	8	6	3	X	X	01	4	9

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
12/4	37.3°	141.6°	1200	XX	07	25	50	5	1021.3	7	09	58.6	57.8	64.0	8	X	X	X	X	X	05	4	9
12/4	36.9°	142.1°	1800	94	00	00	65	6	1020.7	0	00	59.9	59.6	55.8	8	8	6	3	X	X	05	3	6
12/4	37.1°	141.9°	2300	95	07	23	51	5	1021.0	6	07	56.4	56.2	64.2	8	8	6	3	X	X	07	3	5
12/5	36.4°	142.6°	0600	XX	07	25	02	2	1019.6	4	00	60.7	57.9	64.5	8	X	X	X	X	X	05	3	8
12/5	35.8°	143.3°	1200	98	11	21	02	2	1016.6	7	31	63.8	58.2	65.0	8	X	X	X	X	X	05	3	8
12/5	35.4°	144.2°	1800	98	12	34	60	6	1014.9	6	07	62.8	59.2	65.2	8	8	6	3	X	X	07	3	9
12/6	34.9°	144.9°	0000	94	12	24	63	6	1011.9	7	24	63.5	63.3	65.1	8	8	6	3	X	X	07	3	9
12/6	34.4°	145.7°	0600	99	27	03	01	1	1013.9	2	17	65.0	61.5	66.9	1	1	1	4	0	0	07	3	6
12/6	33.8°	146.3°	1200	99	32	16	02	0	1015.9	2	14	67.5	64.0	68.1	1	1	1	4	0	0	26	3	4
12/6	33.3°	147.1°	1800	99	33	17	02	0	1018.3	2	17	66.9	63.5	68.0	3	3	2	4	0	0	28	3	5
12/7	32.6°	147.8°	0000	99	33	12	02	0	1015.9	7	31	67.3	62.8	68.9	2	2	1	4	0	0	28	4	5
12/7	31.9°	148.4°	0600	99	04	03	02	0	1018.0	2	10	67.1	62.2	68.6	1	1	1	4	0	0	28	4	5
12/7	31.4°	148.9°	1200	99	13	14	02	0	1016.9	7	07	67.5	62.8	70.1	3	3	X	X	X	X	28	4	3
12/7	30.6°	149.6°	1800	99	19	16	02	2	1015.2	4	00	70.0	64.8	69.0	8	2	1	4	2	X	06	4	3
12/8	30.0°	150.0°	0000	98	19	19	02	2	1013.2	6	20	72.0	67.2	70.4	8	8	6	4	X	X	19	3	5
12/8	29.6°	150.5°	0600	XX	17	18	62	2	1014.2	2	07	68.6	68.0	70.9	8	8	6	X	X	X	19	3	5
12/8	28.9°	151.0°	1200	XX	18	20	02	2	1013.5	7	07	71.5	70.0	72.0	8	X	X	X	X	X	18	3	7
12/8	28.3°	151.4°	1800	99	18	21	01	2	1014.6	2	10	73.4	71.6	72.4	6	6	2	4	0	1	18	3	6
12/9	27.6°	151.8°	0000	99	18	17	02	1	1014.6	7	17	74.1	71.9	72.7	6	6	2	4	0	1	18	3	5
12/9	27.0°	152.4°	0600	99	13	23	02	1	1016.9	2	17	74.4	70.5	72.5	2	2	1	4	X	X	18	3	5
12/9	20.0°	153.4°	1800	99	13	27	02	1	1018.6	2	14	74.0	70.2	74.0	4	4	8	4	2	X	13	3	9
12/10	25.5°	153.9°	0000	99	12	23	14	2	1017.3	7	20	74.0	70.3	73.8	7	7	8	4	X	X	13	3	8
12/10	25.0°	154.4°	0600	99	12	23	01	8	1019.6	2	20	74.9	69.5	74.1	6	6	8	5	X	1	13	3	7
12/10	23.7°	155.6°	1800	99	11	20	02	2	1020.0	2	07	74.9	70.0	75.0	7	7	8	4	X	1	12	3	7
12/11	23.3°	156.1°	0000	99	11	14	02	2	1019.6	7	10	76.0	71.0	75.6	7	4	8	4	2	1	12	3	8
12/11	22.6°	156.6°	0600	99	11	26	02	2	1016.6	7	09	74.9	71.1	76.2	5	3	8	4	5	X	12	3	6

Table 7.--Light penetration and water color, John R. Manning cruise 33, October - December 1956

Date, 1956	Time, LCT[1]/	Latitude, N.	Longitude, W.	Sea[2]/	Cloud cover[2]/	Water color (Forel)	Secchi, meters
10/21		32.0°	152.3°	3	8	2	28
10/22		34.8°	150.6°	3	4	2	29
10/23		37.9°	149.4°	2	0	2	31
10/24		40.7°	148.2°	3	8	3	18
10/26		41.5°	147.7°	3	-	4	18
10/27		42.1°	147.9°	3	-	4	20
11/12		44.0°	126.0°	2	8	6	13
11/14		42.2°	127.3°	2	4	6	17
11/17		39.1°	129.9°	3	8	3	20
11/18		38.5°	131.1°	3	-	3	20
11/19		37.7°	132.5°	3	8	3	22
11/20		36.8°	134.9°	3	0	3	29
11/21		38.6°	135.4°	3	-	2	31
11/22		39.8°	135.9°	2	0	3	24
11/23		40.6°	136.4°	3	8	4	20
11/26		40.5°	139.8°	4	-	3	20
11/27		39.5°	140.8°	4	8	3	24
11/28		38.9°	142.0°	5	-	3	20
11/30		41.2°	143.4°	3	-	4	18
12/4		37.1°	142.0°	3	-	4	--

[1]/ Not recorded. Taken about noon.

[2]/ For coded values see H. O. Pub. 606-C.

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, μg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
1	1730	10/23	22.8°	156.5°	78.2	10	16	78.0	72.5	19	03	8	3	8	3	09	3	34.90	
2	0000	10/24	23.4°	156.0°	78.6	09	16	76.8	72.6	18	03	6	7	8	4	10	3	34.96	
3	0530	10/24	24.0°	155.4°	78.2	08	11	77.7	71.7	20	02	6	7	5	4	10	3	34.92	0.05
4	1130	10/24	24.7°	154.8°	78.0	09	16	77.2	69.9	19	00	4, 8	2	5	3	10	3	34.88	
5	1730	10/24	25.4°	154.3°	76.9	09	16	76.5	70.0	16	03	4, 6	5	7	3	10	3	35.17	0.08
6	0045	10/25	26.0°	153.7°	76.9	09	16	76.0	71.0	19	01	4, 8	4	7	3	10	3	35.16	0.06
7	0530	10/25	26.5°	153.3°	76.0	07	18	73.7	71.6	20	00	X	X	5	3	10	3	35.21	0.27
8	1110	10/25	27.2°	152.8°	75.9	07	18	75.0	71.5	20	01	8	4	5	3	10	3	35.34	0.23
9	1730	10/25	28.0°	152.2°	75.8	12	13	74.4	69.7	21	02	6	7	8	3	10	3	35.16	0.04
10	0030	10/26	28.7°	151.7°	75.2	12	15	75.5	67.0	20	01	8, 2	6	7	3	10	3	35.34	
11	0530	10/26	29.3°	151.2°	75.0	11	15	74.9	67.5	21	02	X	X	2	3	10	3	35.44	0.06
12	1130	10/26	30.0°	150.6°	74.0	12	15	74.0	66.8	21	02	X	X	2	3	10	3	35.43	
13	1730	10/26	30.3°	150.1°	73.8	10	14	72.9	68.9	23	01	2, 8	2	7	3	10	2	35.43	
14	2330	10/26	31.6°	149.5°	73.2	10	14	72.8	68.8	23	03	4, 8	6	7	3	10	3	35.30	
15	0530	10/27	32.1°	149.0°	73.5	10	14	73.0	69.2	24	00	X	X	5	3	10	3	35.25	
16	1115	10/27	32.8°	148.4°	71.5	10	14	71.5	66.8	26	00	X	X	5	3	10	3	34.99	
17	1730	10/27	33.6°	147.8°	71.4	11	18	68.0	66.8	29	50	6, 8	8	8	3	09	3	35.08	0.04
18	0015	10/28	34.3°	147.2°	71.3	09	18	68.2	63.5	30	02	6, 8	5	8	4	05	5	35.07	
19	0530	10/28	34.9°	146.6°	70.0	09	19	66.2	61.9	32	02	X	X	5	3	07	4	34.94	0.07
20	1130	10/28	35.6°	146.0°	68.2	08	10	64.7	57.0	33	02	X	6	5	2	07	3	34.42	
21	1730	10/28	36.2°	145.4°	68.3	35	02	62.8	56.7	33	02	1, 6, 8	5	9	1	03	1	34.65	0.16
22	0030	10/29	36.8°	144.8°	67.5	28	14	63.4	58.2	30	03	6	6	8	2	01	1	34.40	
23	0235	10/29	37.4°	144.4°	66.8	28	18	62.0	58.4	27	02	6, 4	8	6	3	01	3	34.29	0.11
24	1300	10/29	37.3°	144.4°	66.5	28	18	66.1	61.2	22	00	X	X	5	3	10	3	34.25	
25	1715	10/29	37.3°	144.4°	66.8	25	30	67.2	64.5	21	03	4	8	6	4	25	4	34.25	
26	1730	10/31	38.7°	143.8°	63.0	24	17	62.1	54.2	27	00	X	X	5	4	25	4	34.61	
27	0530	11/2	39.3°	140.0°	63.6	23	14	64.1	61.7	24	01	X	3	5	4	25	4	33.91	
28	1130	11/2	39.2°	140.5°	62.8	18	16	64.0	62.0	24	00	X	X	5	5	22	4	33.87	
29	1730	11/2	39.2°	140.7°	62.6	18	21	65.0	62.0	24	01	X	0	7	5	20	4	33.78	0.41
30	0015	11/3	39.9°	140.1°	63.0	18	21	67.0	63.5	22	03	6	3	7	4	20	4	33.93	
31	0530	11/3	40.5°	139.6°	59.9	18	18	63.6	61.1	22	03	X	6	2	4	21	4	33.35	0.51
32	1130	11/3	41.2°	139.3°	59.9	18	22	63.0	61.1	21	00	X	X	2	3	20	4	33.26	
33	1730	11/3	41.6°	139.0°	61.1	19	21	63.0	60.5	20	03	6	7	7	4	19	4	33.51	0.32
34	2330	11/3	41.1°	138.4°	60.8	18	20	64.0	60.8	19	02	6	7	7	4	20	4	33.58	
35	0530	11/4	40.6°	138.0°	61.1	19	21	63.7	61.1	19	00	X	X	5	4	20	4	33.57	0.28

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
36	1730	11/4	40.8°	137.7°	61.0	21	18	63.0	60.5	17	02	6, 8	7	7	4	18	3	33.58	0.33
37	2330	11/4	40.4°	137.3°	60.4	20	22	63.8	61.0	16	03	6, 8	8	7	4	18	4	33.51	
38	1745	11/5	40.0°	136.6°	61.4	06	18	59.0	57.9	24	02	6, 8	8	7	4	00	4	33.68	0.29
39	0245	11/6	40.2°	136.2°	61.8	20	15	62.8	61.0	25	02	X	X	2	2	35	1	33.68	
40	1715	11/6	40.2°	136.2°	61.0	19	15	61.3	59.7	25	02	6	8	8	3	18	4		
41	2345	11/6	39.7°	135.9°	62.0	19	15	62.8	61.0	23	02	6	8	8	3	18	4	33.39	
42	1720	11/7	39.6°	135.4°	61.7	19	17	63.7	61.2	22	02	6	7	8	3	19	1	33.26	0.34
43	2350	11/7	38.9°	135.1°	62.3	20	17	64.5	62.4	22	02	6	8	7	3	20	1	33.42	
44	0230	11/8	38.5°	134.9°	62.3	20	09	64.7	62.2	23	02	8	8	5	2	20	1	33.30	0.31
45	1645	11/8	38.6°	134.7°	61.8	22	18	64.0	62.3	23	02	8	8	7	3	20	1		
46	2330	11/8	38.1°	134.4°	62.4	24	13	63.9	61.7	21	02	6, 4	8	8	3	30	1	33.33	
47	0235	11/9	37.7°	134.2°	62.5	24	10	63.8	62.0	21	02	6, 8	8	6	2	16	1	33.30	0.33
48	1730	11/9	37.8°	134.1°	62.3	20	12	63.9	62.0	22	01	1, 6	7	8	2	20	1		
49	2330	11/9	38.0°	133.4°	62.3	17	12	63.7	61.0	20	02	1, 6	7	8	2	17	1	33.10	
50	0245	11/10	38.4°	132.9°	62.5	17	13	62.9	59.7	21	02	1, 4	4	5	2	17	1	33.08	0.46
51	1715	11/10	38.5°	132.8°	61.7	17	12	62.7	59.2	21	03	6	7	7	2	17	1	33.08	
52	2330	11/10	38.8°	132.0°	62.0	17	12	63.0	60.4	21	03	3, 4	5	8	2	17	1	33.06	
53	0200	11/11	39.0°	131.4°	61.5	14	09	62.6	59.8	23	02	3, 4	5	5	2	17	1	32.79	0.29
54	1700	11/11	39.1°	131.4°	61.2	30	15	60.7	58.1	24	02	6	8	6	2	28	1	32.77	
55	2330	11/11	39.7°	130.6°	60.3	31	06	58.8	58.0	23	03	4, 6	8	6	2	28	1	32.68	0.38
56	0205	11/12	39.9°	130.3°	61.0	05	05	59.2	57.8	23	20	6	8	2	2	28	1	33.03	0.35
57	1645	11/12	40.0°	130.1°	61.0	30	11	59.8	56.8	26	03	8	5	7	2	28	1	33.03	
58	2135	11/12	40.3°	129.6°	60.6	30	15	61.3	58.2	26	02	6, 8	7	7	2	31	1	32.77	0.45
59	1530	11/13	40.6°	129.1°	60.3	00	24	55.9	49.0	30	02	6, 8	8	7	5	02	4	32.77	0.36
60	2130	11/13	39.7°	129.0°	59.2	00	21	56.1	50.4	30	02	6, 8	8	7	5	00	6	32.57	
61	1530	11/14	38.7°	128.7°	52.5	02	19	56.0	49.5	27	01	6, 8	6	7	5	03	7	33.21	0.48
62	2130	11/14	38.0°	128.4°	62.2	02	19	57.0	50.5	26	02	6, 8	6	7	5	03	4	33.24	0.13
63	1530	11/15	37.8°	128.1°	61.0	34	13	58.0	52.2	16	03	6, 8	8	7	4	34	4	33.03	
64	2130	11/15	37.3°	127.8°	60.5	34	13	59.0	52.0	26	02	6, 8	7	8	2	34	4	33.01	0.41
65	0535	11/16	37.2°	127.7°	60.6	32	07	60.4	58.0	28	02	6, 8	7	5	2	35	4		
66	1620	11/16	37.1°	127.8°	60.6	32	08	59.5	58.9	28	20	6, 8	8	5	2	32	1	33.03	0.36
67	2050	11/16	36.7°	127.5°	60.6	33	11	60.0	58.1	28	01	6, 8	6	7	2	32	1	32.99	0.31
68	1805	11/17	36.6°	127.5°	60.2	32	08	62.8	60.7	30	03	1, 2	6	8	2	33	1	32.99	
69	0135	11/18	35.7°	127.0°	59.3	34	08	61.0	59.0	27	03	6	8	5	2	33	1	33.39	0.54
70	0530	11/20	32.6°	125.4°	62.2	02	17	59.0	54.0	20	02	4, 8	6	2	4	03	4	33.35	0.33

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
71	1730	11/20	33.4°	125.1°	62.4	05	17	59.6	56.0	23	02	2	6	8	4	03	4	33.39	0.07
72	2330	11/20	34.0°	124.8°	61.3	09	17	59.1	56.7	23	02	2	8	8	4	03	4	33.24	
73	1740	11/21	34.8°	124.3°	58.9	02	14	56.3	52.3	27	02	X	0	9	3	02	1	33.13	0.31
74	2330	11/21	35.5°	123.9°	53.8	33	13	55.0	53.0	24	02	X	0	8	3	35	3	33.44	
75	0530	11/22	36.2°	123.5°	55.1	33	16	55.7	52.0	23	02	X	0	5	3	33	3	33.53	0.31
76	1130	11/22	36.8°	123.2°	53.0	00	15	54.0	51.0	22	02	X	0	5	3	35	3	33.53	
77	0530	11/28	37.8°	123.8°	51.6	00	16	51.9	49.0	20	03	X	X	5	3	00	4	33.62	0.52
78	1145	11/28	38.0°	124.7°	52.5	00	18	53.7	52.5	20	02	X	X	5	3	34	4	33.08	
79	1730	11/28	38.0°	125.6°	58.0	01	12	55.5	52.5	23	02	8	8	6	3	35	4	32.95	
80	2330	11/28	38.0°	126.2°	59.3	00	10	57.6	53.9	23	02	6	7	7	2		9	33.10	
81	0530	11/29	37.9°	128.2°	61.3	03	07	56.8	55.6	25	02	X	X	5	2	00	9	33.30	0.30
82	1130	11/29	37.9°	128.9°	60.0	31	11	58.0	54.2	26	02	X	X	5	2	00	9	33.01	
83	1730	11/29	37.4°	129.5°	60.0	04	10	57.0	55.0	28	02	6	8	6	2	27	2	32.86	
84	2330	11/29	36.8°	129.5°	61.2	04	14	58.8	56.0	26	02	6	8	6	2	27	2	33.28	
85	1730	11/30	35.8°	129.7°	61.0	05	13	59.7	57.4	26	02	6	7	7	3	07	3	33.10	
86	2330	11/30	35.2°	129.7°	60.7	03	15	60.0	56.0	25	01	6	6	7	3	03	3	33.15	
87	1730	12/1	34.4°	129.7°	60.6	02	15	59.4	55.9	24	02	6	8	6	3	03	1	33.15	0.37
88	2330	12/1	33.7°	129.6°	61.6	00	13	60.0	57.8	22	02	6	8	6	2	01	1	33.24	
89	0130	12/2	33.4°	129.6°	62.0	00	08	60.2	56.0	22	02	6	8	6	2	20	1	33.42	
90	1615	12/2	33.3°	129.6°	61.7	23	06	59.6	54.0	20	02	8	8	7	0	-	9		
91	2055	12/2	32.8°	129.6°	61.8	22	06	61.2	54.8	20	02	8	8	7	0	0	0	33.33	
92	0130	12/3	32.3°	129.6°	63.8	22	08	60.8	54.7	19	02	8	8	7	0	0	0	33.93	0.34
93	1630	12/3	32.2°	129.6°	64.0	21	06	62.9	55.9	20	02	6, 8	8	6	0	03	2		
94	2330	12/3	31.4°	129.8°	64.7	17	08	63.1	58.9	18	02	3, 8	7	7	0	-	1	34.02	
95	0530	12/4	30.9°	130.5°	65.2	26	02	63.8	60.0	20	02	X	X	5	0	-	1	34.20	
96	1130	12/4	30.7°	131.1°	65.6	31	03	63.0	59.0	20	01	X	X	5	0	-	1	34.16	
97	1730	12/4	30.3°	132.4°	65.3	29	02	61.4	59.7	20	20	4, 8	6	6	0	-	1	34.16	
98	2330	12/4	29.9°	133.6°	67.0	00	06	64.6	59.0	19	02	2, 8	6	8	0	-	1	34.52	
99	0530	12/5	29.7°	134.6°	66.7	25	00	64.9	61.9	20	00	X	4	5	0	-	1	34.58	
100	1130	12/5	29.4°	135.6°	67.4	14	02	64.2	57.2	20	00	X	X	5	0	-	1	35.01	
101	1730	12/5	29.1°	136.6°	68.9	14	05	65.7	58.8	20	02	4, 8	5	8	0	34	1	35.26	0.12
102	2330	12/5	28.8°	137.4°	69.3	15	10	68.3	62.8	19	03	3, 6	6	8	2	18	1	35.25	
103	0530	12/6	28.6°	138.2°	69.3	15	12	68.0	65.3	19	01	X	3	5	2	18	1	35.19	
104	1730	12/6	28.4°	139.4°	70.2	32	16	71.5	67.6	17	01	8	4	8	4	18	4	35.34	
105	2330	12/6	28.2°	140.2°	70.0	33	15	70.8	67.6	16	02	8	4	8	4	34	3	35.19	

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, μg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
106	0530	12/7	27.8°	141.1°	70.5	01	12	69.8	66.1	18	00	X	5	5	3	01	3	35.37	0.07
107	1130	12/7	27.4°	142.0°	70.8	22	06	69.5	64.5	18	00	X	5	5	2	20	1	35.37	
108	1730	12/7	27.1°	143.0°	70.8	12	06	69.1	64.8	20	01	8	2	8	2	00	5	35.34	
109	2330	12/7	26.8°	143.8°	71.8	14	09	71.6	66.0	18	03	8	5	8	2	02	5	35.37	
110	0530	12/8	26.4°	144.8°	71.7	13	13	71.0	68.0	20	03	X	7	5	3	02	5	35.43	
111	1130	12/8	26.1°	145.7°	72.7	14	18	72.0	70.0	19	00	X	X	5	4	-	5	35.26	
112	1730	12/8	25.8°	146.7°	72.8	14	17	71.9	68.9	21	02	6, 8	8	6	4	18	3	35.19	
113	2330	12/8	25.5°	147.5°	74.1	15	18	74.0	70.2	20	01	6, 8	6	7	4	16	3	35.16	
114	0530	12/9	25.2°	148.4°	75.3	13	19	73.0	69.1	21	01	6, 8	5	5	4	14	3	34.97	
115	1130	12/9	24.9°	149.2°	75.3	11	18	73.5	72.0	21	00	X	6	2	4	14	3	35.01	
116	1730	12/9	24.6°	150.1°	75.5	13	21	74.0	68.0	21	01	6, 8	6	7	5	14	3	35.07	
117	0530	12/10	23.9°	151.8°	74.4	13	21	73.2	70.0	22	50	6, 8	8	5	4	13	3	35.03	
118	1130	12/10	23.6°	152.6°	74.3	13	20	74.5	68.7	20	00	X	3	5	4	13	3	35.01	
119	1730	12/10	23.2°	153.5°	75.0	12	18	75.8	69.2	21	03	6	6	7	4	13	3	35.14	
120	2330	12/10	22.8°	154.4°	77.3	12	17	75.0	72.0	20	02	2, 8	6	7	4	13	3	35.03	
121	0530	12/11	22.5°	155.2°	75.6	13	26	73.6	71.8	19	00	X	3	5	5	11	4	34.92	
122	1730	12/11	21.8°	156.9°	76.0	14	20	76.0	68.5	17	02	2, 6, 8	7	7	5	11	4	34.96	

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/23	22.8°	156.5°	1800	98	10	16	01	0	1018.6	3	14	78.0	72.5	78.2	4	4	2	4	0	0	09	3	4
10/24	23.4°	156.0°	0000	98	09	16	03	2	1018.3	7	10	76.8	72.6	78.6	7	5	4	4	X	X	10	3	4
10/24	24.0°	155.4°	0600	96	08	11	02	2	1019.6	2	20	77.7	71.7	78.2	7	4	4	4	X	X	10	3	4
10/24	24.7°	154.8°	1200	96	10	16	02	0	1019.3	6	10	77.2	69.9	78.0	2	2	2	4	0	0	10	3	4
10/24	25.3°	154.3°	1800	98	09	16	03	0	1019.6	2	10	76.5	70.0	76.9	5	3	4	4	6	0	10	3	4
10/25	25.9°	153.8°	0000	98	09	16	01	1	1018.6	7	14	76.0	71.0	76.9	3	2	8	4	6	0	10	3	5
10/25	26.6°	153.2°	0600	91	11	20	50	2	1020.3	2	17	73.7	71.6	76.0	9	X	X	X	X	X	10	3	5
10/25	27.5°	152.6°	1200	96	07	18	01	6	1020.0	7	10	75.0	71.5	75.9	4	4	6	4	0	0	10	3	5
10/25	28.0°	152.2°	1800	98	11	13	02	2	1021.0	2	14	74.4	69.7	75.8	7	7	4	4	0	0	10	3	4
10/26	28.7°	151.7°	0000	98	12	15	01	2	1019.6	7	17	75.5	67.0	75.2	6	3	8	4	0	1	10	3	4
10/26	29.4°	151.1°	0600	91	11	15	02	2	1021.0	2	15	74.9	67.5	75.0	9	X	X	X	X	X	10	3	4
10/26	30.0°	150.5°	1200	91	12	14	02	2	1021.3	4	00	74.0	66.8	74.0	7	7	4	3	0	0	10	3	3
10/26	30.8°	150.0°	1800	99	10	14	01	0	1023.0	2	17	72.9	68.9	73.8	3	2	2	4	6	6	10	3	3
10/27	31.6°	149.5°	0000	98	10	14	03	0	1022.7	7	14	72.8	68.8	73.2	5	5	4	4	0	0	12	3	3
10/27	32.2°	149.0°	0600	96	10	14	00	0	1024.4	2	20	73.0	69.2	73.5	9	X	X	X	X	X	12	3	3
10/27	32.9°	148.8°	1200	96	10	14	00	0	1026.4	2	07	71.5	66.8	71.5	9	X	X	X	X	X	12	3	3
10/27	33.7°	147.9°	1800	97	11	18	50	2	1029.1	2	27	68.0	66.8	71.4	8	8	8	4	X	X	08	3	4
10/28	34.3°	147.2°	0000	98	09	18	02	2	1029.8	5	07	68.2	63.5	71.3	6	6	2	4	0	0	05	3	5
10/28	35.0°	146.5°	0600	92	09	19	02	2	1032.5	2	24	66.2	61.9	70.0	9	X	X	X	X	X	07	3	4
10/28	35.8°	145.9°	1200	92	08	10	02	2	1033.2	1	02	64.7	57.0	68.2	6	X	X	X	X	X	07	3	3
10/28	36.3°	145.4°	1800	99	35	02	02	2	1032.9	2	05	62.8	56.7	68.3	6	5	4	4	6	0	04	3	2
10/29	37.0°	144.8°	0000	98	28	14	03	2	1029.8	7	25	63.4	58.2	67.5	7	7	5	4	0	0	01	3	3
10/29	37.3°	144.5°	0600	96	28	18	01	2	1027.1	6	07	65.0	59.0	66.2	9	X	X	X	X	X	01	3	3
10/29	37.3°	144.4°	1200	96	28	18	00	0	1022.4	7	27	66.1	61.2	66.5	9	X	X	X	X	X	10	3	3
10/29	37.3°	144.3°	1800	98	25	30	03	2	1021.0	6	10	67.2	64.5	66.8	8	8	4	4	X	X	25	3	7
10/30	37.2°	143.9°	0000	98	33	28	02	2	1020.0	4	00	64.0	59.3	66.5	7	7	8	4	0	0	32	3	6
10/30	37.2°	143.1°	0600	92	34	22	02	2	1023.4	2	20	61.8	53.9	67.6	9	X	X	X	X	X	33	3	6
10/30	37.1°	142.8°	1200	92	34	22	00	2	1025.7	2	07	61.9	54.0	67.2	7	X	X	X	X	X	33	3	5
10/30	36.8°	142.8°	1800	98	33	15	03	0	1027.8	7	20	59.0	51.9	66.1	8	0	0	0	6	X	33	3	6
10/31	37.5°	143.2°	0000	98	33	10	03	2	1028.1	6	07	59.2	51.8	67.1	7	7	2	4	0	0	33	4	5

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/31	37.8°	143.3°	0600	92	33	11	02	2	1028.8	1	0.3	62.0	54.1	67.5	7	X	X	X	X	X	33	5	5
10/31	38.2°	143.6°	1200	96	24	17	00	1	1027.4	7	1.0	62.0	54.2	63.0	9	X	X	X	X	X	25	5	5
10/31	38.7°	148.8°	1800	98	25	23	03	2	1026.1	6	0.7	62.0	56.9	62.2	7	6	2	4	6	0	28	3	5
11/1	38.8°	143.7°	0000	98	23	25	03	2	1023.7	7	1.7	65.0	60.0	63.2	6	6	4	4	0	0	23	3	5
11/1	39.0°	142.9°	0600	92	23	17	01	2	1024.0	2	0.7	64.9	61.0	62.3	9	X	X	X	X	X	25	3	5
11/1	39.0°	141.9°	1200	92	24	19	00	2	1024.0	6	0.5	64.2	61.5	62.2	9	X	X	X	X	X	25	3	5
11/1	39.1°	141.5°	1800	98	24	15	02	2	1024.0	3	0.5	66.0	59.0	62.1	8	8	8	4	X	X	25	3	4
11/2	39.3°	140.7°	0000	98	21	15	02	2	1023.7	7	1.0	65.8	61.8	63.2	8	8	4	4	X	X	25	3	4
11/2	39.4°	140.1°	0600	92	23	14	01	0	1024.4	2	1.0	64.1	61.7	63.6	3	X	X	X	X	X	25	4	4
11/2	39.2°	141.6°	1200	92	18	16	03	0	1024.0	7	0.7	64.0	62.0	62.8	9	X	X	X	X	X	22	4	4
11/2	39.2°	140.7°	1800	98	18	21	01	0	1024.4	2	0.7	65.0	62.0	62.6	0	0	0	9	0	0	20	4	4
11/3	40.0°	140.0°	0000	98	18	21	03	0	1022.4	7	1.4	67.0	63.5	63.0	3	3	4	4	0	0	20	4	4
11/3	40.6°	139.6°	0600	93	18	18	03	2	1022.4	4	0.0	63.6	61.1	59.9	7	X	X	X	X	X	21	4	4
11/3	41.2°	139.0°	1200	92	18	22	00	2	1020.7	7	0.9	63.0	61.1	59.9	9	X	X	X	X	X	21	4	4
11/3	41.6°	139.0°	1800	97	19	21	03	2	1020.0	3	0.2	63.0	60.5	60.1	7	7	8	4	0	0	20	4	5
11/4	41.0°	138.4°	0000	98	18	20	02	2	1018.6	7	1.4	64.0	60.8	60.8	7	7	4	4	0	0	20	4	5
11/4	40.5°	137.8°	0600	96	19	21	00	2	1018.6	6	0.3	63.7	61.1	61.1	9	X	X	X	X	X	20	4	5
11/4	40.6°	137.8°	1200	96	20	15	00	2	1017.6	7	0.7	66.5	62.5	60.6	9	X	X	X	X	X	20	4	4
11/4	40.6°	137.8°	1800	98	21	18	02	2	1016.6	3	0.3	63.0	60.5	61.0	7	7	4	4	0	0	18	3	5
11/5	40.5°	137.4°	0000	98	20	22	03	2	1015.9	4	0.2	63.8	61.0	60.4	8	8	4	4	X	X	18	3	5
11/5	40.3°	137.1°	0600	92	35	08	51	2	1019.6	2	1.7	59.4	58.0	62.1	9	X	X	X	X	X	49	X	3
11/5	40.3°	137.1°	1200	92	04	17	51	2	1021.3	2	0.7	54.0	51.4	60.0	9	X	X	X	X	X	05	3	3
11/5	40.0°	136.6°	1800	98	06	18	02	2	1023.7	2	1.7	59.0	57.9	61.4	8	8	8	4	X	X	00	3	4
11/6	40.0°	136.3°	0000	99	18	09	03	2	1024.0	5	0.0	67.7	63.1	62.0	6	3	8	4	4	9	35	3	3
11/6	40.3°	136.3°	0600	92	17	17	02	2	1025.1	1	0.7	62.9	61.0	61.0	9	X	X	X	X	X	49	X	3
11/6	40.3°	136.3°	1200	96	17	18	00	2	1023.7	7	0.7	61.8	59.5	61.2	9	X	X	X	X	X	04	X	3
11/6	40.2°	136.2°	1800	98	19	15	02	2	1024.7	2	0.7	61.3	59.7	61.0	8	8	4	4	X	X	18	4	4
11/7	39.6°	135.8°	0000	98	19	15	02	2	1022.7	7	1.7	62.8	61.0	62.0	8	8	4	4	X	X	18	4	4
11/7	39.5°	135.8°	0600	92	17	14	02	2	1023.4	2	1.2	63.2	61.1	61.9	9	X	X	X	X	X	18	3	3
11/7	39.6°	133.5°	1800	98	18	17	02	2	1022.4	3	0.7	63.7	61.2	61.7	7	7	8	4	0	0	18	3	3

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/8	38.9°	135.1°	0000	98	20	17	02	2	1021.7	7	1.2	64.5	62.4	62.3	8	8	8	4	X	X	20	3	3
11/8	38.5°	134.8°	0600	92	20	13	02	2	1023.0	4	0.0	64.0	62.1	61.8	9	X	X	X	X	X	20	3	3
11/8	38.5°	134.8°	1800	98	22	17	02	2	1022.7	3	0.7	63.7	62.1	61.8	8	8	8	4	X	X	20	3	3
11/9	38.1°	133.4°	0000	98	24	13	02	2	1021.0	7	1.0	63.9	61.7	62.4	8	0	0	0	4	X	30	3	3
11/9	37.8°	134.2°	0600	92	19	14	02	2	1021.3	3	0.2	63.5	61.2	62.2	9	X	X	X	X	X	16	3	3
11/9	37.8°	134.0°	1800	98	20	12	01	2	1021.7	3	0.7	63.9	62.0	62.3	7	6	4	4	0	1	20	3	3
11/10	38.1°	133.3°	0000	98	17	12	02	2	1020.3	7	0.7	63.7	61.0	62.3	7	6	8	4	6	1	17	3	3
11/10	38.4°	132.9°	0600	92	19	10	02	0	1021.3	1	0.5	62.4	58.7	62.0	9	X	X	X	X	X	17	3	3
11/10	38.6°	132.7°	1800	98	17	12	03	2	1021.0	2	0.9	62.7	59.2	61.7	7	7	4	4	0	0	17	3	3
11/11	38.8°	131.8°	0000	98	21	12	03	1	1020.7	6	0.7	63.0	60.4	62.0	6	3	8	4	3	9	20	3	3
11/11	39.0°	131.3°	0600	92	21	08	50	2	1021.0	2	0.9	60.5	59.7	61.4	9	X	X	X	X	X	27	4	3
11/11	39.1°	131.4°	1800	98	30	15	02	2	1023.7	2	2.0	60.7	58.1	61.2	8	8	8	4	0	0	28	3	3
11/12	39.8°	130.4°	0000	97	31	06	03	2	1022.7	7	0.7	58.8	58.0	60.3	8	8	8	4	0	0	28	3	3
11/12	40.0°	130.0°	0600	92	36	11	02	2	1024.7	2	1.5	59.3	58.0	61.2	8	8	8	3	0	0	49	X	2
11/12	40.0°	130.0°	1800	98	32	14	02	2	1027.4	2	2.0	60.2	56.9	60.2	7	8	8	4	0	0	35	2	2
11/13	40.4°	129.6°	0000	95	34	18	51	2	1025.7	7	1.0	58.1	58.0	60.6	8	8	8	3	0	0	35	X	3
11/13	40.7°	129.2°	0600	93	35	23	01	2	1027.1	2	0.7	57.0	52.8	60.9	6	4	8	4	6	0	34	3	3
11/13	40.6°	129.1°	1800	98	02	25	02	2	1031.2	2	1.5	55.0	48.2	60.0	7	7	8	4	0	0	03	3	7
11/14	39.4°	128.9°	0000	97	02	24	02	2	1029.8	7	0.9	56.9	51.2	59.0	8	8	8	4	X	X	03	3	6
11/14	39.5°	128.8°	0600	93	02	23	02	2	1029.5	2	0.7	56.7	51.2	59.2	8	8	8	4	X	X	02	3	6
11/14	38.7°	128.8°	1800	98	02	16	03	2	1027.4	6	0.2	57.7	52.3	61.5	7	7	8	4	0	0	03	3	6
11/15	37.7°	128.3°	0000	98	36	16	03	2	1024.7	7	1.7	57.8	51.8	62.0	7	7	2	4	0	0	04	3	5
11/15	37.4°	128.2°	0600	92	33	12	02	2	1025.4	1	0.7	58.1	55.0	61.4	8	8	8	4	X	X	03	3	4
11/15	37.8°	128.0°	1800	98	13	05	01	2	1027.1	2	0.3	59.5	53.0	61.0	7	7	4	4	0	0	34	3	2
11/16	37.3°	127.7°	0000	97	34	11	02	2	1026.8	6	0.7	59.2	53.9	60.6	7	7	8	4	0	0	34	3	2
11/16	37.0°	127.5°	0600	93	32	07	02	2	1027.8	3	0.7	60.4	58.0	60.6	8	8	8	4	X	X	35	4	2
11/16	37.0°	127.5°	1800	95	34	08	50	2	1029.1	2	1.0	61.8	58.9	60.6	8	8	8	4	X	X	33	3	2
11/17	36.3°	127.2°	0000	98	34	08	03	2	1027.8	7	0.7	59.5	57.2	59.4	7	7	4	4	X	X	34	3	2
11/17	36.4°	127.2°	0600	92	33	13	02	2	1029.1	2	0.7	60.1	58.6	59.1	8	8	8	3	X	X	33	3	2
11/17	36.5°	127.5°	1800	98	32	08	03	2	1030.1	2	0.7	62.8	60.7	60.2	6	4	5	4	0	6	33	3	2

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/18	36.1°	127.2°	0000	97	35	12	02	2	1027.8	7	1.2	62.1	60.3	59.0	8	8	8	4	X	X	32	3	3
11/18	35.7°	127.0°	0600	93	35	20	02	2	1027.8	1	0.7	59.3	55.6	59.3	6	4	8	4	4	0	34	3	4
11/19	34.6°	126.4°	0000	98	36	22	02	2	1023.4	6	1.5	58.4	55.0	61.6	6	6	2	4	0	0	30	4	9
11/19	34.0°	126.0°	0600	93	36	23	01	0	1022.4	8	0.5	58.8	56.0	62.3	1	0	0	0	1	0	03	4	8
11/19	33.1°	125.8°	1800	98	35	19	02	2	1021.3	2	0.7	59.5	54.5	62.0	7	7	4	4	0	0	03	4	8
11/20	32.5°	125.7°	0000	98	35	17	01	2	1019.3	7	1.4	59.0	54.5	62.8	3	3	1	4	0	0	34	4	8
11/20	32.6°	125.4°	0600	93	02	17	03	2	1020.0	2	0.7	59.0	54.0	62.2	6	5	2	4	4	0	02	3	7
11/20	33.4°	125.0°	1800	98	05	17	02	2	1022.7	2	1.9	59.6	56.0	62.4	6	0	0	9	0	8	03	3	5
11/21	34.1°	124.7°	0000	97	09	17	02	2	1023.0	3	0.2	59.1	56.7	61.3	8	0	0	9	0	7	06	3	4
11/21	34.8°	124.4°	0600	93	10	11	02	2	1026.8	2	1.9	58.8	53.1	60.5	0	0	0	9	0	0	06	3	3
11/21	34.7°	124.5°	1800	98	02	14	02	0	1027.1	1	0.7	56.3	52.3	58.9	0	0	0	9	0	0	02	3	3
11/22	35.7°	123.8°	0000	98	33	13	02	0	1024.4	7	1.0	55.0	53.0	53.8	0	0	0	9	0	0	33	3	2
11/22	36.5°	123.2°	0600	96	33	16	02	0	1023.4	4	0.2	55.7	52.0	55.1	0	0	0	9	0	0	33	3	3
11/22	36.8°	123.2°	1200	92	36	15	02	0	1022.0	7	0.7	54.0	51.0	53.0	0	0	0	9	0	0	35	3	3
11/28	37.8°	123.8°	0600	92	36	16	03	2	1019.6	2	0.7	51.9	49.0	51.6	8	X	X	X	X	X	36	4	4
11/28	37.8°	125.3°	1200	92	36	18	02	2	1021.3	2	0.7	53.7	52.5	52.5	9	X	X	X	X	X	34	4	4
11/28	38.0°	125.8°	1800	98	01	12	02	2	1023.0	2	1.4	55.5	52.5	58.0	8	8	4	4	X	X	35	4	4
11/29	38.0°	127.0°	0000	98	36	10	02	2	1023.0	4	0.0	57.6	53.9	59.3	7	7	4	4	0	0	49	X	2
11/29	38.0°	127.7°	0600	96	03	07	02	2	1024.7	2	1.0	56.8	55.6	61.3	7	X	X	X	X	X	49	X	2
11/29	38.0°	128.2°	1200	96	31	11	02	2	1026.1	2	0.7	58.0	54.2	60.0	7	X	X	X	X	X	49	X	2
11/29	37.5°	129.4°	1800	97	04	10	02	2	1027.8	2	0.9	57.0	55.0	60.0	8	8	5	4	X	X	27	6	3
11/30	36.9°	129.6°	0000	98	04	14	02	2	1026.4	6	0.7	58.8	56.0	61.2	7	7	8	4	0	0	27	3	3
11/30	36.5°	129.5°	0600	92	06	13	02	2	1026.8	1	0.2	58.1	56.0	61.3	9	X	X	X	X	X	07	3	3
11/30	36.0°	129.4°	1800	98	05	13	02	2	1026.4	2	0.7	59.7	57.4	61.0	7	7	8	4	0	0	07	2	3
12/1	35.0°	129.7°	0000	98	03	15	01	2	1024.7	6	1.0	60.0	56.0	60.7	7	7	4	4	0	0	03	2	3
12/1	34.5°	129.7°	0600	92	03	17	02	2	1024.7	4	0.0	59.7	57.2	60.0	9	X	X	X	X	X	03	2	3
12/1	34.4°	129.7°	1800	97	02	15	02	2	1024.4	2	0.7	59.4	55.9	60.6	8	8	5	4	X	X	03	2	3
12/2	33.6°	129.7°	0000	97	36	13	02	2	1022.0	7	1.7	60.0	57.8	61.6	8	8	5	4	X	X	02	2	2
12/2	33.5°	129.7°	0600	92	01	10	02	2	1022.0	4	0.0	59.5	54.2	61.9	8	8	5	4	X	X	02	2	3
12/3	32.5°	129.5°	0000	98	22	06	02	2	1019.0	6	0.7	61.0	53.7	64.0	8	8	4	4	X	X	49	X	0

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
12/3	32.3°	129.5°	0600	92	14	02	02	2	1019.3	4	0.0	61.5	55.9	64.0	8	8	4	4	X	X	49	X	1
12/3	32.0°	129.7°	1800	98	21	06	01	2	1019.6	2	0.7	63.1	56.7	64.8	7	2	2	4	6	0	04	5	1
12/4	31.0°	130.0°	0000	98	17	08	02	2	1018.0	7	1.0	63.1	58.9	64.7	7	5	2	4	0	8	49	X	1
12/4	30.6°	130.6°	0600	92	26	02	02	2	1020.0	2	1.2	63.8	60.0	65.2	9	X	X	X	X	X	49	X	1
12/4	30.3°	131.5°	1200	92	31	03	01	1	1019.6	8	0.3	63.0	59.0	65.6	9	X	X	X	X	X	49	X	1
12/4	30.3°	132.4°	1800	97	29	02	20	2	1020.3	2	0.9	61.4	59.7	65.3	7	5	7	4	4	0	49	X	1
12/5	29.9°	133.6°	0000	99	36	06	02	2	1019.0	6	1.0	64.6	59.0	67.0	7	4	2	4	4	2	49	X	1
12/5	29.7°	134.7°	0600	96	25	00	00	0	1019.6	1	1.0	64.9	61.9	66.7	3	X	X	X	X	X	49	X	1
12/5	29.5°	135.6°	1200	96	14	02	00	0	1019.6	7	0.3	64.2	57.2	67.4	9	X	X	X	X	X	49	X	1
12/5	29.1°	136.6°	1800	98	14	05	02	2	1020.3	2	1.0	65.7	58.8	68.9	6	1	2	4	6	0	34	5	1
12/6	28.8°	137.5°	0000	98	15	10	03	2	1018.6	7	1.7	68.3	62.8	69.3	6	5	4	4	0	8	18	2	2
12/6	28.6°	138.4°	0600	92	15	12	01	1	1018.6	4	0.0	68.0	65.3	69.3	3	X	X	X	X	X	18	2	3
12/6	28.4°	139.5°	1800	98	32	16	01	5	1017.3	2	1.7	71.5	67.6	70.2	4	4	8	4	0	0	18	2	4
12/7	28.1°	140.5°	0000	98	33	15	02	0	1015.9	6	1.5	70.8	67.6	70.0	4	4	2	4	0	0	34	2	4
12/7	27.8°	141.1°	0600	92	01	12	00	0	1017.6	2	1.4	69.8	66.1	70.5	4	X	X	X	X	X	01	3	3
12/7	27.5°	141.7°	1200	92	22	06	00	0	1018.0	6	0.3	69.5	64.5	70.8	4	X	X	X	X	X	20	2	2
12/7	27.1°	143.0°	1800	98	12	06	01	0	1019.6	2	1.5	69.1	64.8	70.8	2	2	1	4	0	0	36	4	4
12/8	26.8°	144.0°	0000	98	14	09	03	1	1018.0	7	2.0	71.6	66.0	71.8	5	4	2	4	0	1	02	3	4
12/8	26.4°	144.8°	0600	92	13	13	03	1	1019.6	1	1.2	71.0	68.0	71.7	7	X	X	X	X	X	01	3	4
12/8	26.2°	145.6°	1200	92	14	18	00	2	1019.0	7	1.5	72.0	70.0	72.7	9	X	X	X	X	X	49	X	4
12/8	25.7°	146.7°	1800	96	14	17	02	2	1020.7	2	1.7	71.9	68.9	72.8	8	8	8	4	X	X	18	2	4
12/9	25.4°	147.5°	0000	97	15	18	01	2	1020.0	7	1.4	74.0	70.2	74.1	7	7	2	4	0	0	16	2	5
12/9	25.1°	148.5°	0600	92	13	19	01	2	1021.3	2	1.7	73.0	69.1	75.3	5	5	2	4	0	0	14	2	4
12/9	24.8°	149.2°	1200	92	11	18	00	2	1021.0	7	1.4	73.5	72.0	75.3	7	X	X	X	X	X	14	2	4
12/9	24.7°	150.0°	1800	97	13	21	01	2	1021.3	2	1.0	74.0	68.0	75.5	6	6	2	4	0	0	14	2	5
12/10	24.2°	151.0°	0000	97	10	20	01	2	1019.6	7	1.7	74.9	71.0	75.2	3	3	4	4	0	0	14	2	5
12/10	24.0°	151.8°	0600	93	13	21	50	2	1021.7	2	1.5	73.2	70.0	74.4	8	8	2	4	X	X	13	2	4
12/10	23.5°	152.7°	1200	93	13	20	00	0	1020.3	7	1.7	74.5	68.7	74.3	3	X	X	X	X	X	13	2	4
12/10	23.1°	153.6°	1800	98	12	18	03	2	1021.0	2	1.4	75.8	69.2	75.0	6	6	4	4	0	7	13	2	4
12/11	22.8°	154.4°	0000	98	12	17	02	2	1019.6	7	2.0	75.0	72.0	77.3	6	4	2	4	0	2	13	2	5

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
12/11	22.5°	155.2°	0600	92	13	26	00	2	1019.0	8	0.7	73.6	71.8	75.6	2	X	X	X	X	X	11	2	5
12/11	21.7°	156.9°	1800	97	14	20	02	2	1017.3	3	1.4	76.0	68.5	76.0	7	3	2	4	0	2	11	3	6

Table 10.--Light penetration and water color, Charles H. Gilbert cruise 31, October - December 1956

Date, 1956	Time, LCT[1/]	Latitude, N.	Longitude, W.	Sea[2/]	Cloud cover[2/]	Water color (Forel)	Secchi, meters	Photometer depth, meters			
								Percent transmission			
								50	10	5	1
10/24	1415	26.0°	153.7°	3	6	1	24	-	58	82	-
10/25	1410	28.7°	151.6°	3	6	3	34	-	36	69	125
10/26	1440	31.6°	149.5°	2	4	3	38	-	39	71	114
10/28	1330	36.8°	144.8°	2	8	2	28	-	40	63	112
11/8	1230	38.3°	134.5°	2	9	4	25	-	34	67	100

[1/] Time lowering began, Secchi disk and photometer lowered at same time.

[2/] For coded values see H. O. Pub. 606-C.

Explanatory Note

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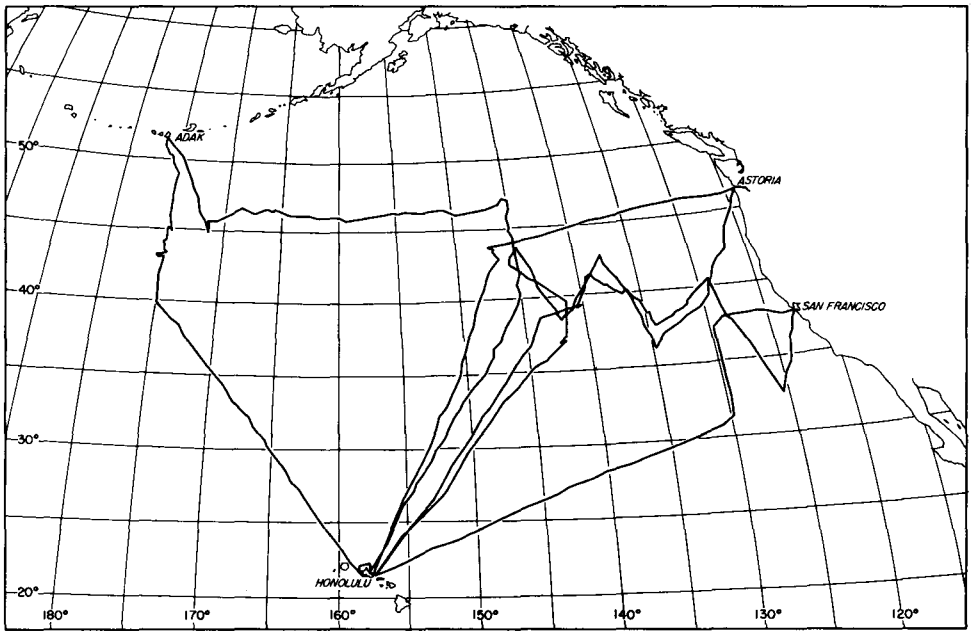
United States Department of the Interior, Fred A. Seaton, Secretary
Fish and Wildlife Service



OCEANOGRAPHIC AND METEOROLOGICAL OBSERVATIONS IN THE NORTHEAST AND CENTRAL NORTH PACIFIC, JULY - DECEMBER 1956

By

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Honolulu, T. H.

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ABSTRACT

This report lists surface meteorological, physical, and chemical observations made during three albacore fishing cruises into the northeast and central North Pacific. Data were collected aboard the research vessels John R. Manning and Charles H. Gilbert in the summer and fall of 1956. Laboratory and field procedures are described.

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OCEANOGRAPHIC AND METEOROLOGICAL OBSERVATIONS IN THE NORTHEAST AND CENTRAL NORTH PACIFIC, JULY - DECEMBER 1956

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Through an allotment of funds provided by Public Law 466 of the 83rd Congress, better known as the Saltonstall-Kennedy Act of 1954, the Pacific Oceanic Fishery Investigations (POFI) of the U. S. Fish and Wildlife Service, Honolulu, T. H., has been studying albacore distribution and abundance in the North Pacific Ocean.

In the summer and fall of 1956, POFI vessels made three albacore fishing cruises into the waters north and northeast of Hawaii. It is the purpose of this report to make available to interested workers the physical and chemical data collected during these cruises. The data presented will supplement earlier reports on oceanographic observations in the area (McGary et al. 1956, Shomura and Otsu 1956, McGary and Stroup 1956, and Graham 1957) and will provide a more complete picture of the environmental features which influence the seasonal occurrence of albacore in the northeast Pacific.

Table 1 defines the approximate geographic limits and periods of the cruises. Track charts are given in figures 1, 5, and 9.

PHYSICAL AND CHEMICAL OBSERVATIONS

The following observations were made on each cruise unless otherwise indicated.

Temperature; Bathythermograph Slide Processing

Bathythermograph lowerings to 900 feet were made at approximately 30-mile intervals and while on gill-net stations. The bathythermograph log sheets (log sheet "B") are reproduced in tables 2, 5, and 8.

The vertical temperature sections for John R. Manning cruise 32 (figs. 2 - 4) are plots from BT slides processed at the U. S. Navy Hydrographic Office.

Sections for John R. Manning cruise 33 (figs. 6 - 8) and Charles H. Gilbert cruise 31 (figs. 10 - 12) are plots from BT slides processed at the POFI laboratory. The temperature corrections were made as follows. Each BT slide was placed against the stop in the appropriate grid and the indicated surface temperature was noted. The algebraic difference of the BT surface temperature and the bucket temperature was taken. Where the difference was consistent for a group of slides the average was applied as a correction when reading temperatures at depth. When an abrupt change appeared (e.g., from -0.2°F. to +0.3°F.) a new average was obtained and applied to BT slides which lay within that group.

Depth correction was obtained by comparing the position of the top horizontal BT trace with zero depth on the grid. The difference was applied to each slide when reading temperature against depth.

Throughout each cruise a continuous record of surface temperature was obtained by means of a recording thermograph.

Salinity

Surface samples for salinity determinations were usually taken at each BT position. The samples were analyzed in the POFI laboratory by a modification of Knudsen's method for the

Table 1.--Cruise limits and periods

Vessel	Cruise	Period, 1956	Limits
John R. Manning	32	July 16 - Sept. 12	175°W. - 145°W. between 40°N. and 49°N.
John R. Manning	33	Oct. 17 - Dec. 11	150°W. - west coast of the United States between 35°N. and 46°N.
Charles H. Gilbert	31	Oct. 22 - Dec. 11	145°W. - west coast of the United States between 31°N. and 46°N.

determination of salinity (Van Landingham 1957). Results are incorporated in the BT summaries. A plot of surface salinities collected on cruise 33 of the John R. Manning and cruise 31 of the Charles H. Gilbert is shown in figure 13.

Phosphate

Samples for inorganic phosphate determinations were usually taken at approximately 90-mile intervals.[1/] The samples were frozen at sea, returned to the POFI laboratory, and analyzed by the hydrazine sulfate modification of Deniges' method (King et al. 1957). Results (in μg at./L) are incorporated in the BT summaries.

Light Penetration and Water Color

Weather permitting, Secchi disk observations were made each day about local apparent noon. Water color was estimated using the Forel scale. Results are listed in tables 4, 7, and 10.

Photometer measurements, at 50-, 10-, 5-, and 1-percent levels of transmission, were made in addition to the above on John R. Manning cruise 32 and Charles H. Gilbert cruise 31.[2/] Results are listed in tables 4 and 10.

Photometer Description

The photometer[3/] used by POFI consists of a deck and sea unit, each housing a matched photoelectric cell. Opal glass shields over the photoelectric cells serve to diffuse the light normal to the windows of the cells. The amount of light incident upon a cell is registered by a microammeter.

Before lowering the sea unit into the water both cells are directly exposed to sunlight on deck and the ammeter readings are checked to note any failing in the photoelectric cells. The desired level of transmission is selected by placing a metal disk, with a hole in the center, over the opal glass shield of the deck cell. Disks with openings of various diameters are used in accordance with the percentage transmission to be measured. The sea unit is then lowered and ammeter readings of both cells checked until they are equal. The depth is determined from the wire angle and the amount of wire out.

When making observations care is taken to prevent the deck cell (mounted in gimbal-rings) from being shadowed by the ship's rigging and superstructure. In some instances, however, it was not possible to prevent the shadow cast by the ship's hull from influencing the reading of the sea cell.

METEOROLOGICAL OBSERVATIONS

Synoptic marine weather observations were recorded daily at 0000, 0600, 1200, and 1800 GCT. The reports were transmitted to the U.S. Weather Bureau at San Francisco, California, or Honolulu, T. H., as often as radio conditions would permit. Observations are listed in tables 3, 6, and 9.

RECORDS

The following records were kept and are on file at POFI, except as otherwise noted:

- Bait tank records [Charles H. Gilbert cruise 31 only]
- Barograph records (U. S. Weather Records Center, Asheville, N. C.)
- Bathythermograph log sheet "B" (duplicates at U. S. N. Hydrographic Office)
- BT slides (U. S. N. Hydrographic Office)
- Deck log
- Field plots of BT temperatures
- Flowmeter and plankton sampler calibration log
- Gill net record sheets
- Light station fishing log
- Occurrence of tuna schools, birds, and aquatic mammals log
- Photometer log [John R. Manning cruise 32 and Charles H. Gilbert cruise 31 only]
- Plankton log
- Scientists' log
- Short form tuna morphometric sheets
- Standardized surface trolling data sheet
- Tagging record sheets
- Thermograph records
- Track charts
- Tuna condition - vessel report
- U.S.W.B. Form 1210F (U. S. Weather Records Center, Asheville, N. C.)

1/ Samples were taken at approximately 30-mile intervals on John R. Manning 32.

2/ Except that on Charles H. Gilbert cruise 31 observations were made only on the initial northbound leg and measurements of the 50-percent level of transmission were not obtained.

3/ Manufactured by Fred Schueler, Albemarle, Massachusetts.

FIELD PARTIES

John R. Manning cruise 32
F. E. Barnett, Master
J. J. Graham, Fishery Research Biologist - Field Party Chief
R. S. Nishioka, Fishery Aid

John R. Manning cruise 33
F. E. Barnett, Master
G. R. Seckel, Oceanographer - Field Party Chief
W. M. Matsumoto, Fishery Research Biologist

Charles H. Gilbert cruise 31
W. T. Tanaka, Master
R. S. Shomura, Fishery Research Biologist - Field Party Chief
R. N. Uchida, Fishery Research Biologist

ACKNOWLEDGMENTS

The special weather forecasts provided by the U. S. Weather Bureau, Honolulu and San Francisco branches, played an important part in the successful completion of these cruises.

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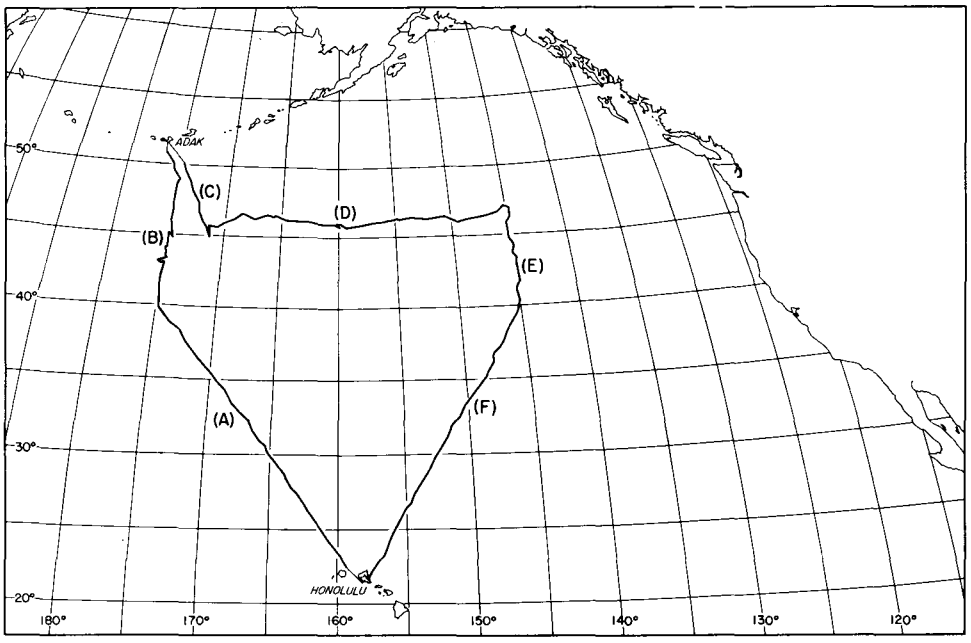

Figure 1.--Track chart, John R. Manning cruise 32, July 16 - September 12, 1956. Heavy lines and letters designate location of temperature sections shown in figures 2 to 4.

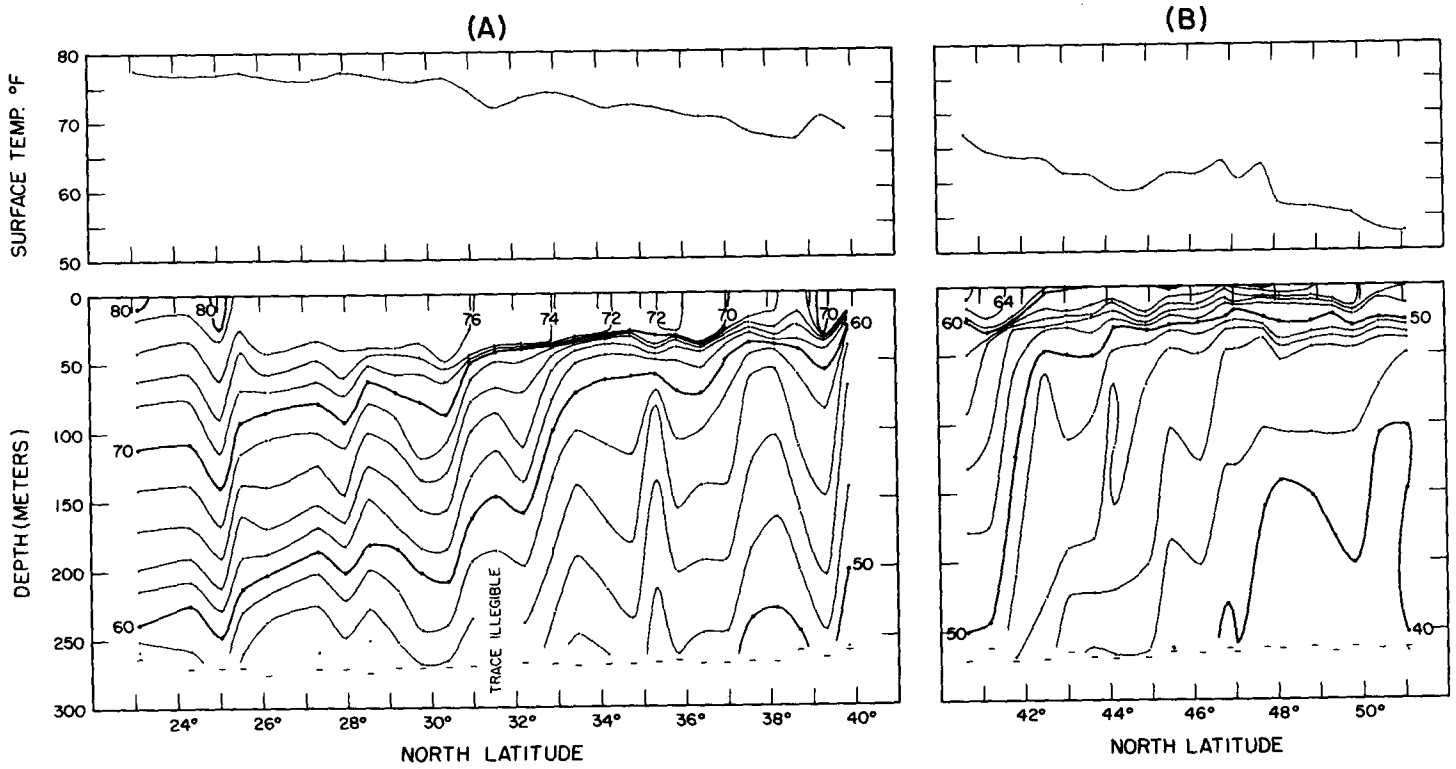

Figure 2.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section A and Section B (see fig. 1) of John R. Manning cruise 32, July - September 1956.

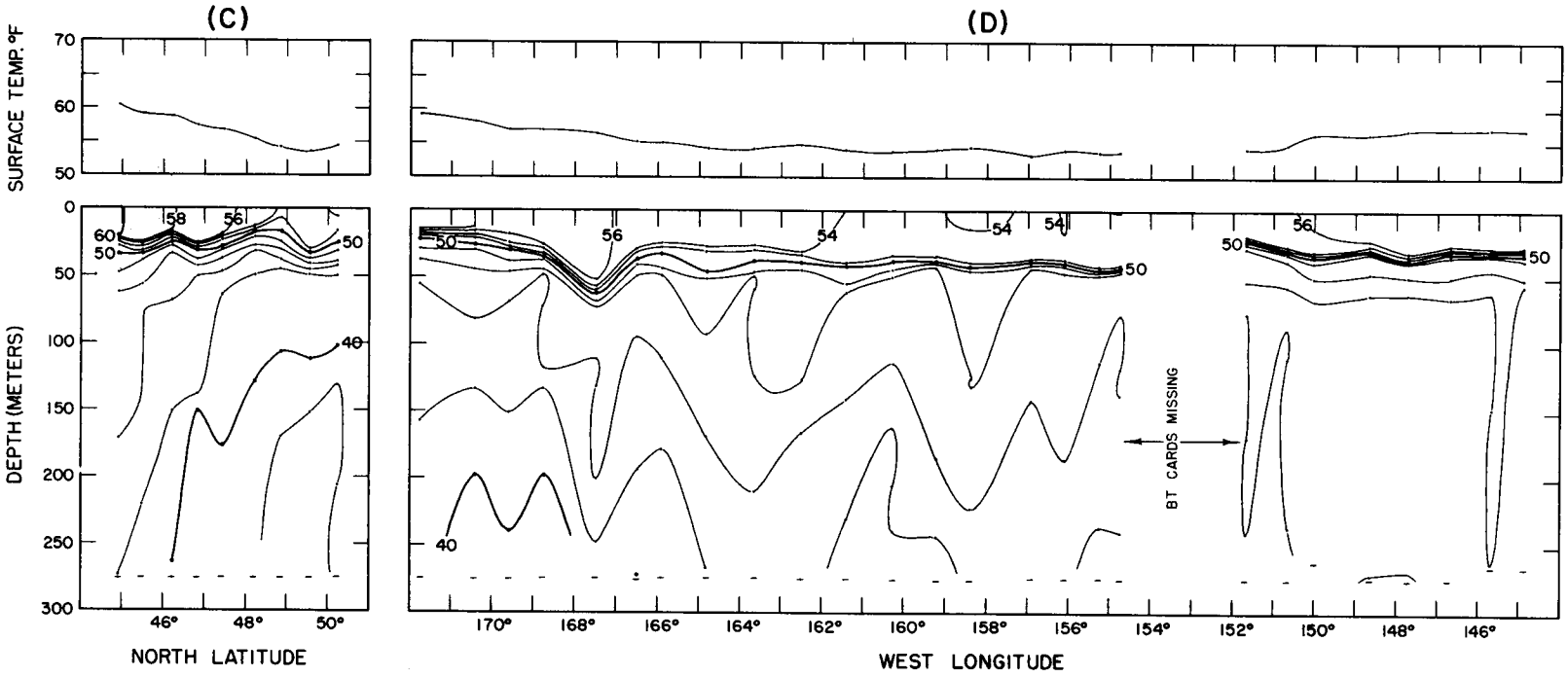

Figure 3.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section C and Section D (see fig. 1) of John R. Manning cruise 32, July - September 1956.

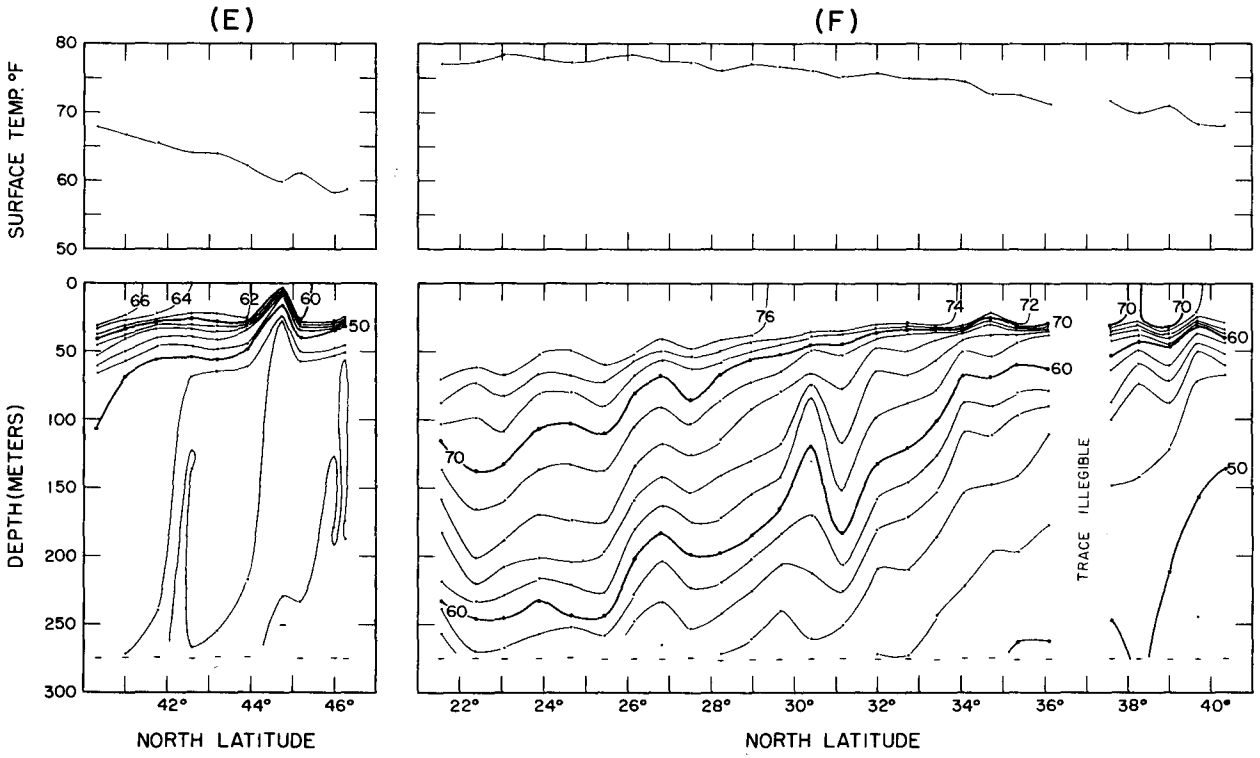

Figure 4.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section E and Section F (see fig. 1) of John R. Manning cruise 32, July - September 1956.

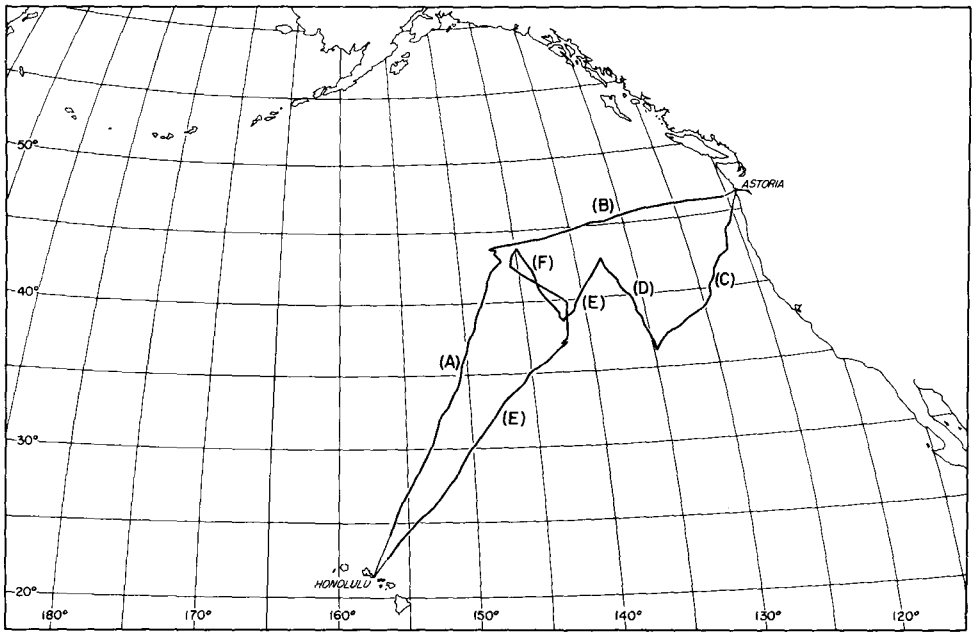

Figure 5.--Track chart, John R. Manning cruise 33, October 17 - December 22, 1956. Heavy lines and letters designate location of temperature sections shown in figures 6 - 8.

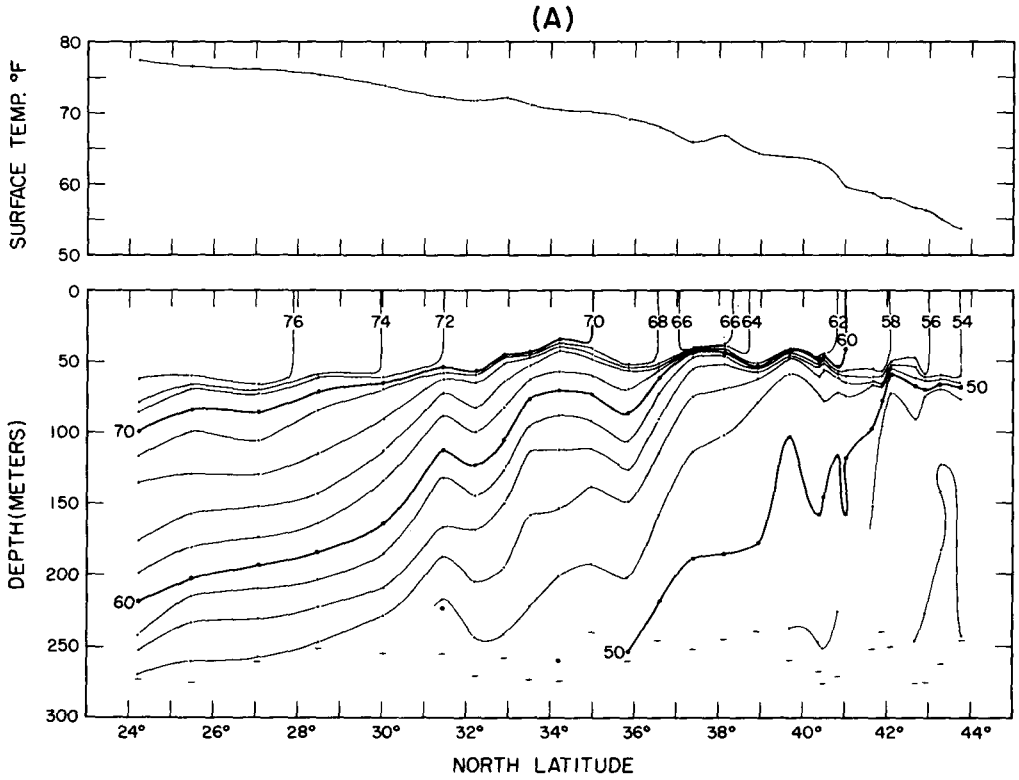

Figure 6.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section A (see fig. 5) of John R. Manning cruise 33, October - December 1956.

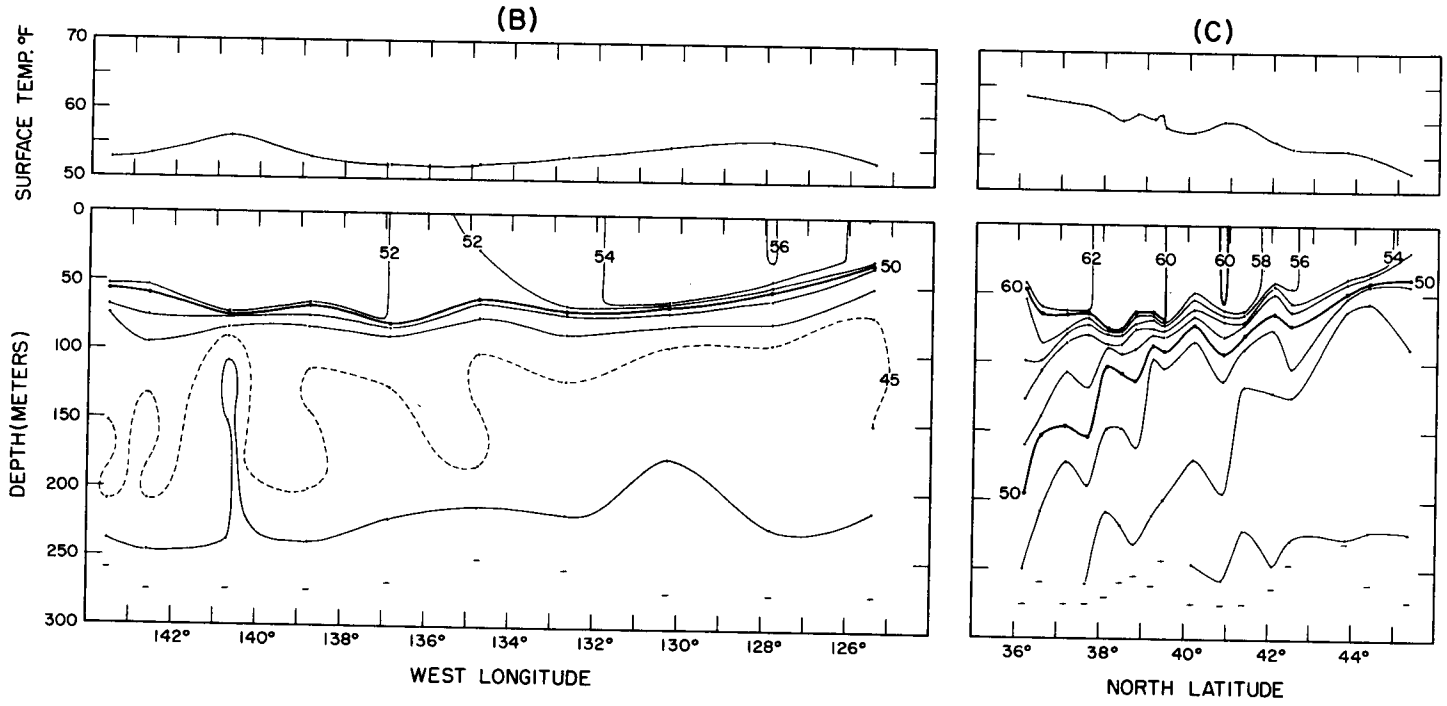

Figure 7.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section B and Section C (see fig. 5) of John R. Manning cruise 33, October - December 1956.

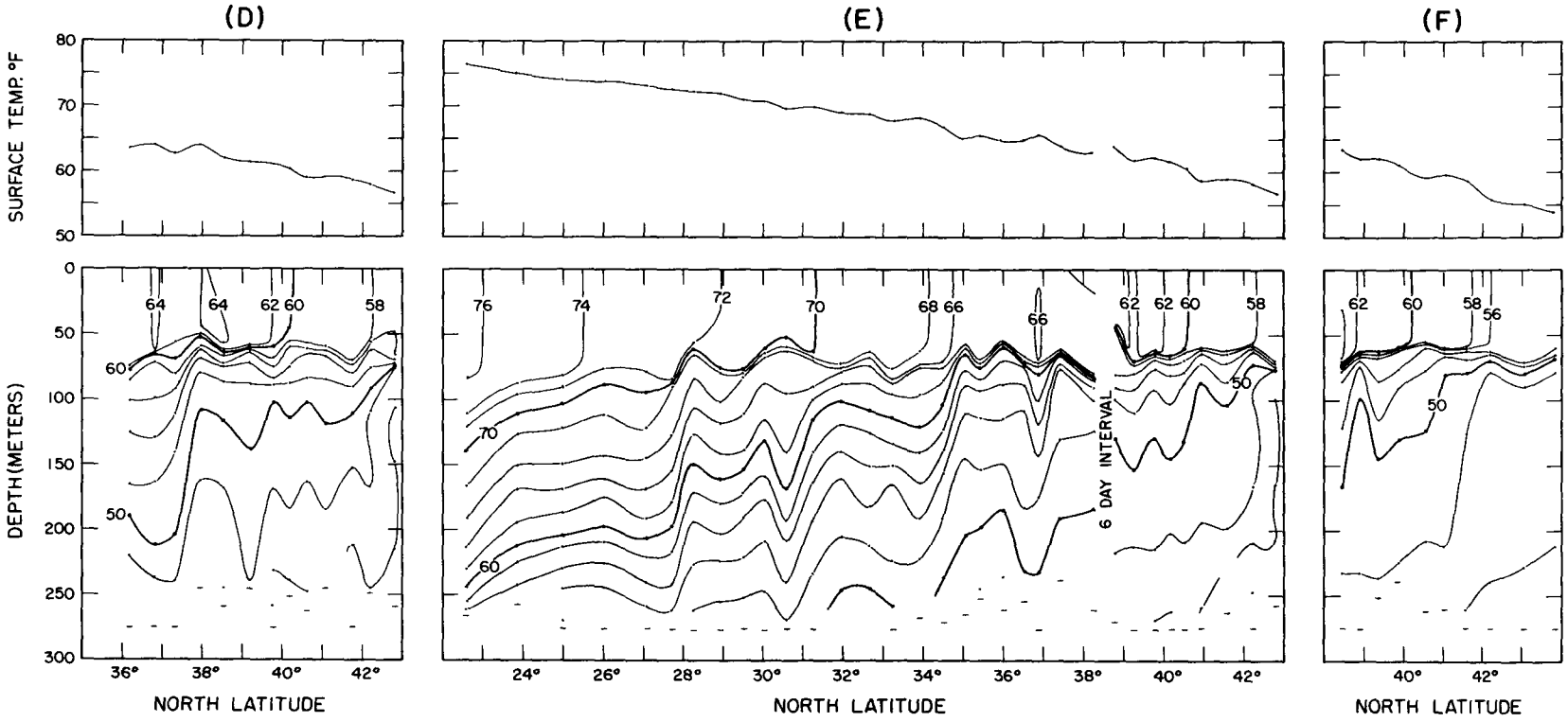

Figure 8.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section D, Section E and Section F (see fig. 5) of John R. Manning cruise 33, October - December 1956.

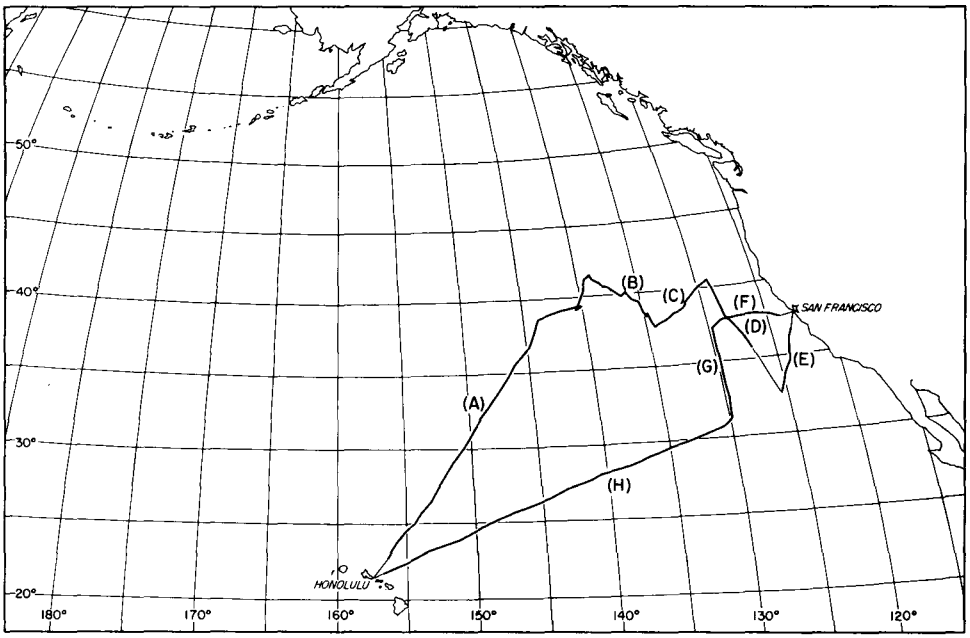

Figure 9.--Track chart, Charles H. Gilbert cruise 31, October 22 - December 11, 1956. Heavy lines and letters designate location of temperature sections shown in figures 10 to 12.

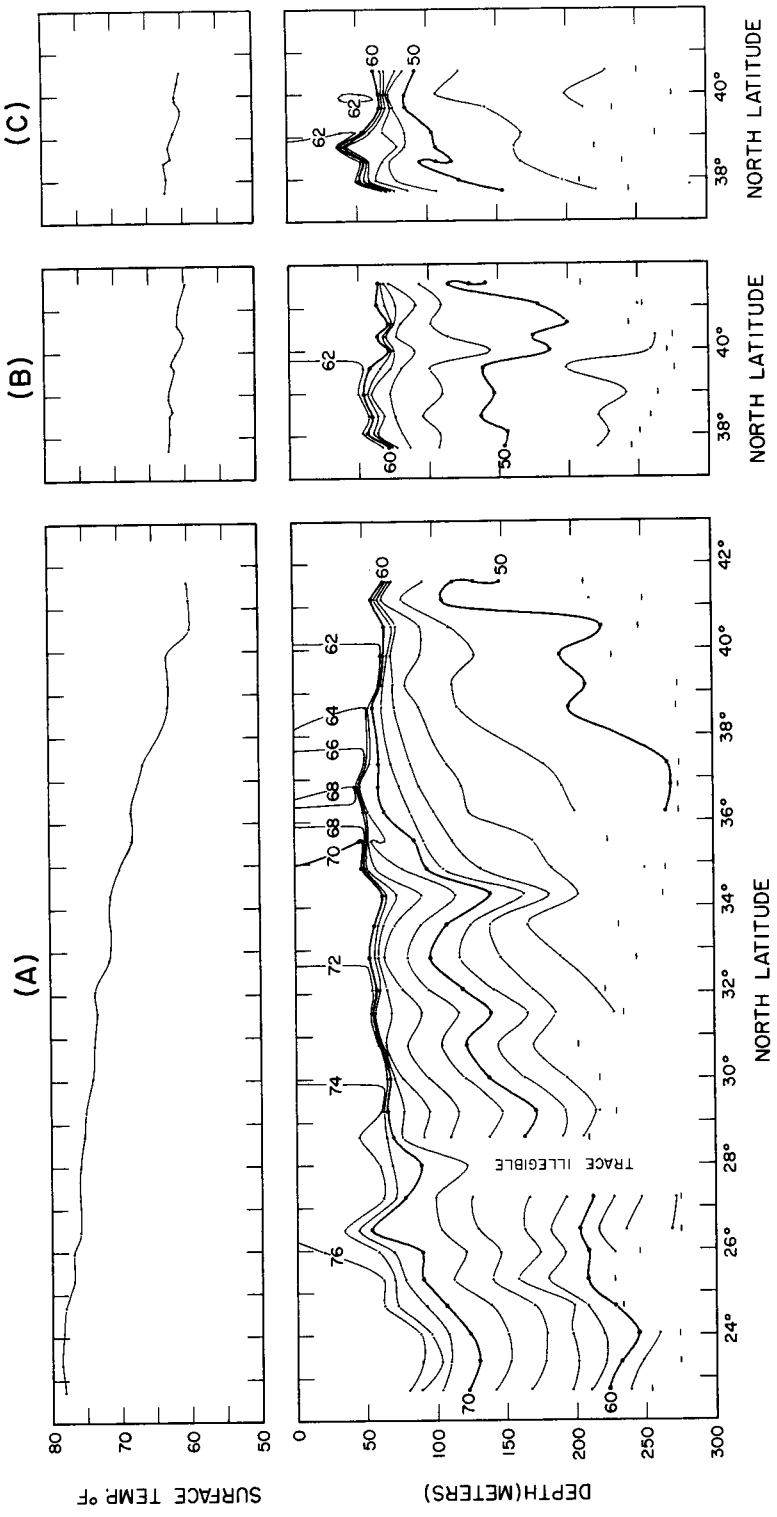

Figure 10.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section A, Section B and Section C (see fig. 9) of Charles H. Gilbert cruise 31, October - December 1956.

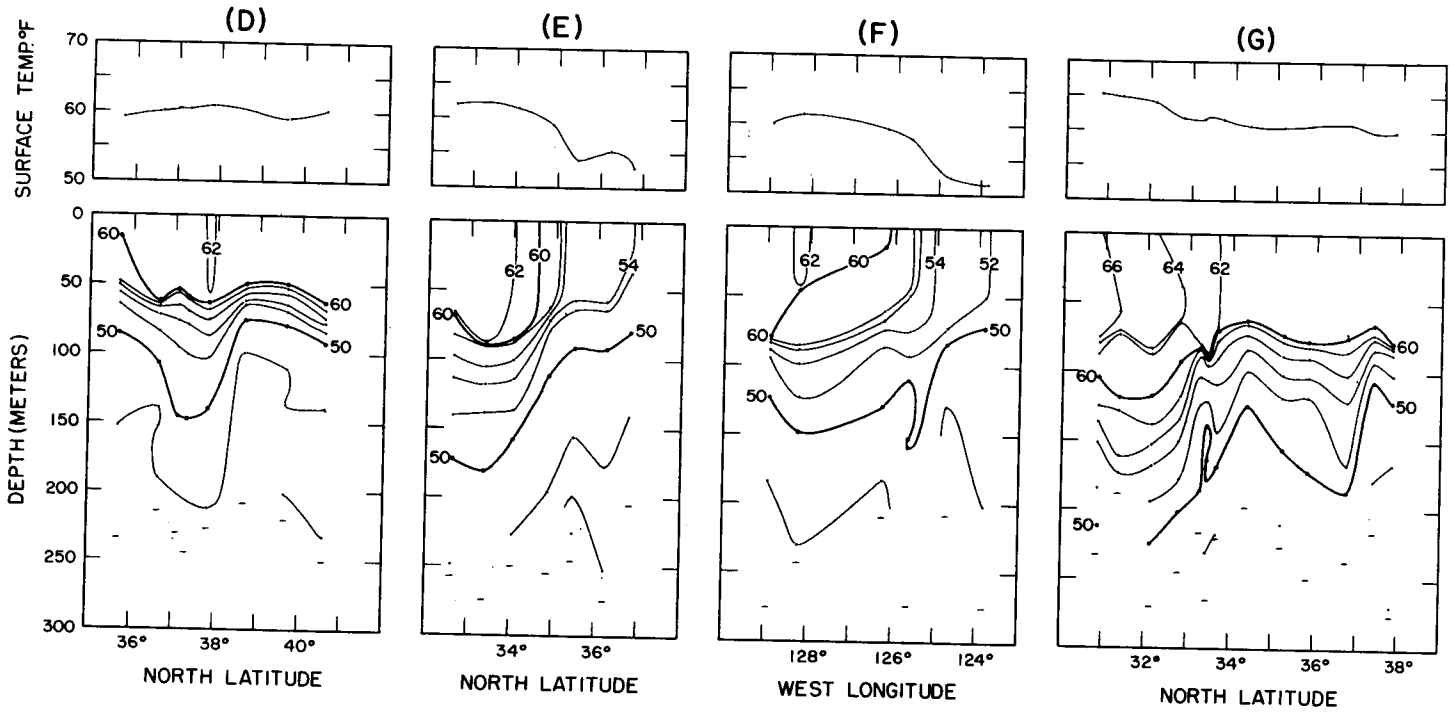

Figure 11.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section D, Section E, Section F, and Section G (see fig. 9) of Charles H. Gilbert cruise 31, October - December 1956.

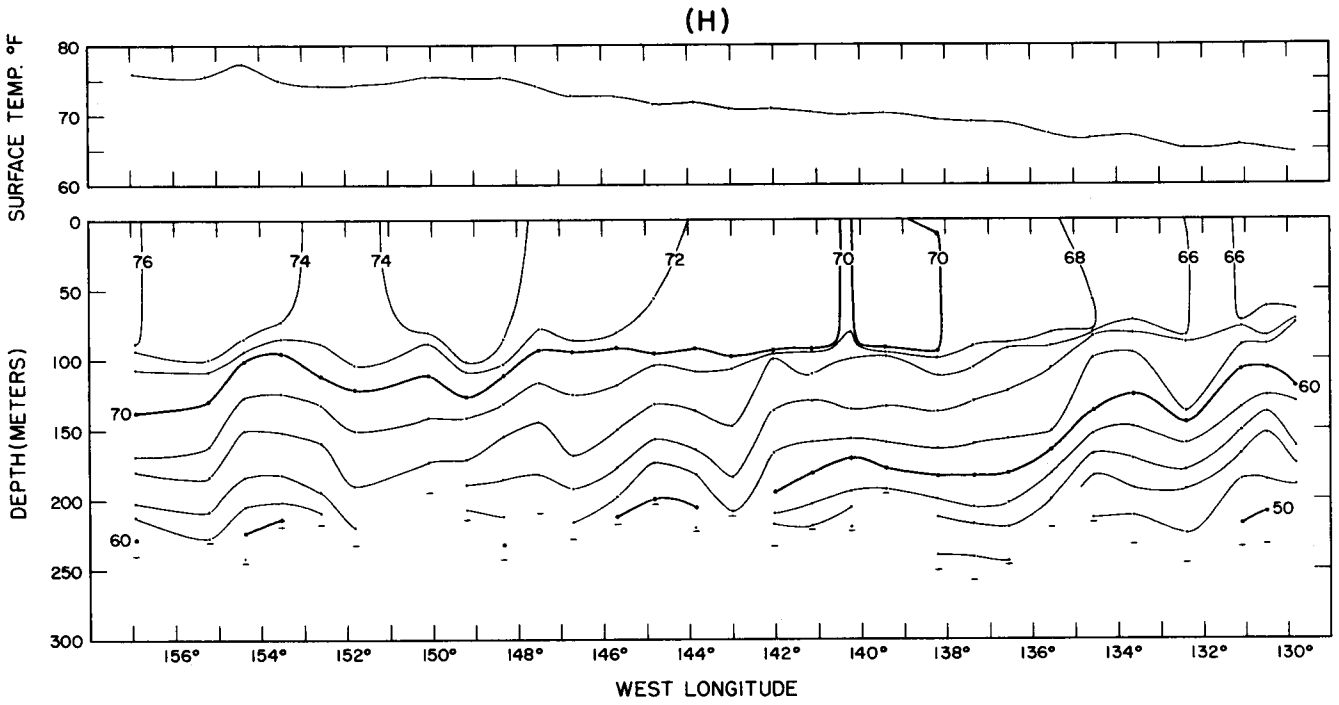

Figure 12.--Surface bucket-temperature (upper panel) and temperature-depth sections from BT observations (lower panel). Section H (see fig. 9) of Charles H. Gilbert cruise 31, October - December 1956.

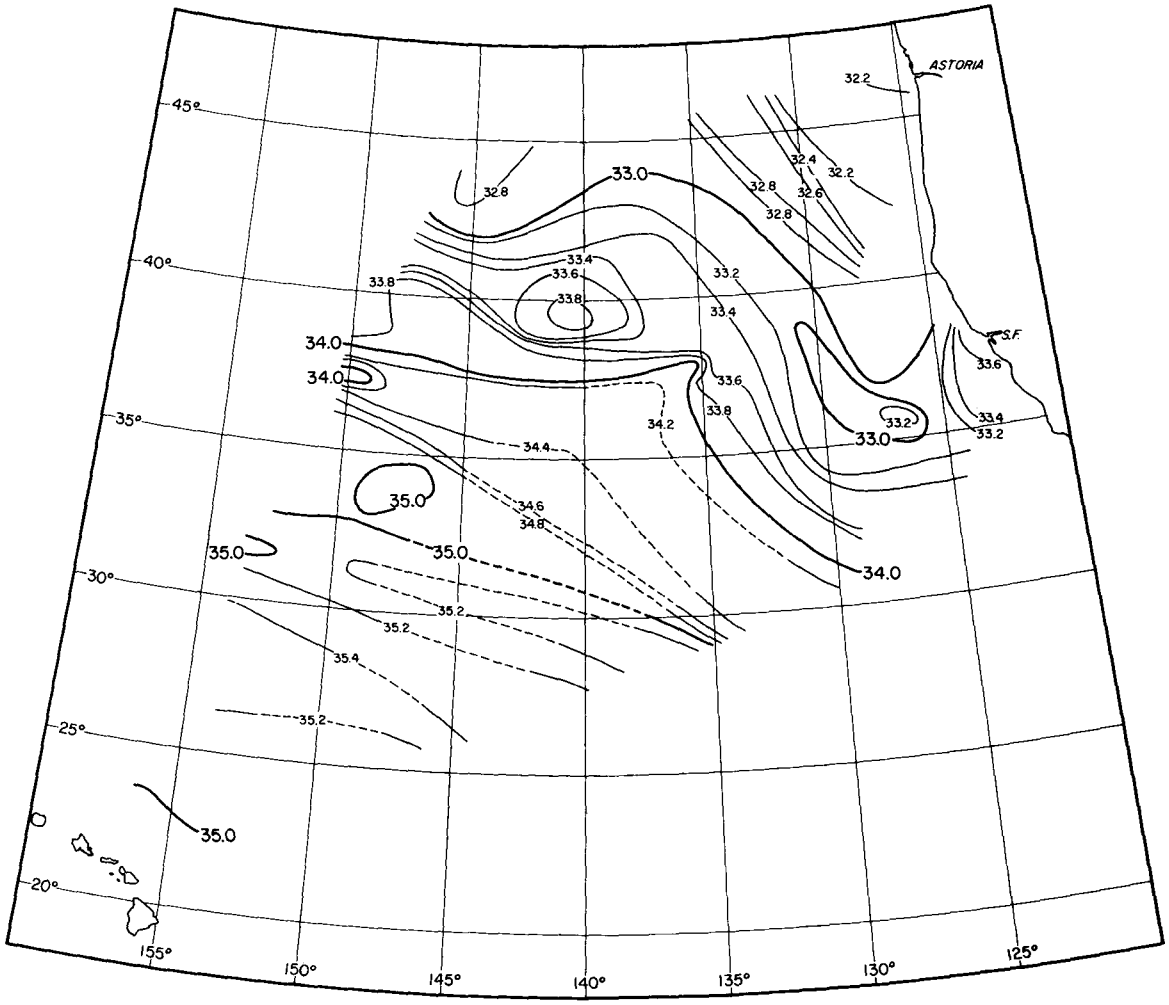

Figure 13.--Surface salinity, John R. Manning cruise 33 and Charles H. Gilbert cruise 31. Dashed lines indicate interpolated contours.

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
1	1730	7/17	22.5°	159.2°	76.3	07	4	76.0	70.2	16	02	8	5	9	2			35.16	
2	2330	7/17	23.1°	159.7°	77.5	07	3	77.1	71.5	15	01	8	7	9	2			34.94	
3	0530	7/18	23.7°	160.2°	78.0	03	3	76.6	71.0	17	01	8	3	9	3			34.88	
4	1130	7/18	24.3°	160.7°	76.8	07	3	75.5	71.5	18	01	8,4	2	9	3			35.37	
5	1830	7/18	25.0°	161.3°	76.9	10	2	77.5	71.0	19	02	8,1	3	9	3			35.12	
6	2330	7/18	25.6°	161.7°	77.2	07	5	75.0	70.3	19	15	8,1	6	9	3			35.07	
7	0500	7/19	26.1°	162.1°	76.8	07	4	76.1	70.0	19	15	1,4,8	6	9	3			35.17	
8	1130	7/19	26.7°	162.5°	76.5	08	4	75.4	70.0	20	02	8	6	9	3			35.19	
9	1730	7/19	27.3°	163.0°	76.2	06	4	74.8	69.5	20	02	4,8	7	9	3			35.19	
10	2330	7/19	28.0°	163.5°	77.3	08	4	78.2	70.2	22	02	1,4,8	7	9	3			35.16	
11	0530	7/20	28.5°	163.9°	76.8	06	5	74.0	69.2	22	01	1,8,9	6	9	3			35.37	
12	1130	7/20	29.2°	164.5°	76.3	07	5	75.0	69.0	23	01	8	3	9	4			35.41	
13	1730	7/20	29.8°	165.0°	75.8	08	5	75.0	68.9	23	02	1,8,9	6	9	3			35.34	
14	2330	7/20	30.4°	165.5°	76.3	06	5	76.5	71.2	25	03	8	5	9	4			35.44	
15	0530	7/21	31.0°	165.9°	74.6	06	5	74.0	69.8	24	03	6,8	9	9	3			35.50	0.13
16	1130	7/21	31.6°	166.4°	74.0	08	5	72.0	66.5	25	02	6,8	10	8	4			35.21	
17	1730	7/21	32.2°	166.9°	73.2	06	5	73.5	68.0	25	03	1,4,8,9	6	9	3			35.17	
18	2330	7/21	32.9°	167.5°	74.2	08	5	74.0	67.0	26	02	1,4,8	6	9	3			34.97	
19	0530	7/22	33.5°	168.1°	73.5	09	4	71.0	71.0	26	02	1,4,8	6	9	3			34.85	0.24
20	1130	7/22	34.2°	168.7°	71.8	12	3	69.9	65.9	26	03	4,8	9	9	2			34.65	
21	1730	7/22	34.8°	169.3°	72.3	29	3	70.0	63.0	26	02	4,8	7	9	1			34.74	0.17
22	2330	7/22	35.3°	169.9°	71.8	26	4	72.3	67.5	24	03	6,8	9	9	3			34.65	
23	0530	7/23	35.8°	170.4°	71.2	36	4	69.5	63.5	22	02	4,8	9	9	3			34.63	0.24
24	1130	7/23	36.4°	171.0°	70.5	34	4	66.1	61.2	24	02	4,8	8	7	3			34.61	
25	1730	7/23	37.0°	171.6°	70.3	05	5	65.3	60.2	24	02	6,8	-	-	-				0.05
26	2330	7/23	37.6°	172.2°	68.3	01	4	66.3	60.0	25	01	-	-	-	-			34.45	
27	0540	7/24	38.6°	172.8°	67.5	01	3	64.2	58.0	24	-	-	-	-	-				0.34
28	1130	7/24	38.7°	173.5°	67.2	08	3	63.5	58.9	-	-	-	-	-	-				
29	1730	7/24	39.3°	174.2°	70.3	11	3	67.2	59.0	-	-	-	-	-	-				0.11
30	2330	7/24	39.9°	174.9°	68.2	20	5	68.6	67.0	-	53	X	9	3	3			34.31	
31	0530	7/25	40.7°	174.9°	67.0	26	4	68.0	68.3	19	53	X	9	3	3			34.20	0.28
32	1130	7/25	41.2°	175.0°	64.8	35	3	67.0	65.0	20	12	9	X	0	3			33.98	
33	1730	7/25	41.8°	175.0°	63.8	26	2	64.3	63.9	19	45	X	9	3	2			33.93	0.43
34	2330	7/25	42.5°	175.0°	63.6	23	3	66.0	63.5	20	45	X	9	6	2			33.49	
35	0500	7/26	43.0°	175.0°	61.5	22	2	62.5	61.5	20	45	X	9	0	2				

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
36	0530	7/26	43.0°	175.0°	61.0	22	2	63.0	63.0	20	45	X	9	0	2			33.64	0.45
37	0600	7/26	43.0°	175.0°	60.0	22	2	64.0	62.2	20	45	X	9	0	2				
38	2330	7/26	43.1°	175.5°	62.2	20	2	65.0	63.1	23	01	6	8	8	2			33.53	
39	0500	7/27	43.1°	174.9°	62.6	18	3	67.0	64.8	24	47	X	9	0	2			33.73	0.26
40	2330	7/27	43.2°	174.7°	61.7	15	3	65.5	62.7	29	00	10	0	8	2			33.75	
41	0530	7/28	43.1°	174.9°	61.8	12	4	63.1	61.5	29	01	8	7	6	2			33.73	0.05
42	1940	7/28	43.2°	175.0°	61.3	12	4	63.0	61.5	32	47	X	9	7	2				
43	2010	7/28	43.3°	175.0°	61.8	-	-	-	-	-	-	-	-	-	-				
44	2040	7/28	43.3°	175.0°	62.0	-	-	-	-	-	-	-	-	-	-				
45	2330	7/28	43.6°	175.0°	61.1	09	12	64.0	62.8	32	45	X	9	1	2			33.69	
46	0405	7/29	44.0°	175.0°	60.0	11	10	62.1	61.3	31	45	X	9	0	2				
47	0425	7/29	44.0°	175.0°	60.2	12	10	62.0	61.2	31	45	X	9	0	2				
48	0435	7/29	44.0°	175.0°	60.2	13	4	62.0	61.0	30	45	X	9	0	3			33.28	0.79
49	1900	7/29	44.1°	175.0°	59.2	12	5	61.0	60.2	31	45	X	9	1	3				
50	1925	7/29	44.1°	175.0°	59.6	-	-	-	-	-	-	X	9	1	3				
51	2005	7/29	44.0°	175.0°	59.8	13	5	60.5	-	32	45	X	9	1	4			33.33	0.71
52	2330	7/29	43.8°	175.0°	60.7	10	5	63.5	62.0	30	45	X	9	5	5			33.75	
53	2330	7/30	44.1°	175.0°	59.6	19	4	63.2	62.0	27	10	X	9	3	4			33.21	
54	0500	7/31	44.0°	175.0°	60.1	16	4	63.0	62.0	26	45	X	9	0	3			33.42	0.41
55	1805	7/31	44.1°	174.9°	60.0	20	3	63.0	62.0	27	45	X	9	0	2			33.15	
56	2330	7/31	44.6°	174.9°	59.8	22	3	64.0	62.5	27	45	X	9	0	2				
57	0300	8/1	44.9°	175.0°	59.7	22	3	63.1	61.2	26	45	X	9	0	2				
58	0330	8/1	44.9	175.0°	59.5	-	-	62.0	61.0	-	-	-	-	-	-				
59	0400	8/1	45.0°	175.0°	59.1	23	3	62.0	61.2	26	45	X	9	0	2			33.13	0.70
60	1830	8/1	44.9°	174.5°	59.2	22	3	62.0	61.0	27	45	X	9	1	2				
61	2330	8/1	44.9°	173.8°	58.8	25	3	62.0	61.0	27	61	X	9	-	2				
62	0500	8/2	44.9°	174.1°	59.0	28	4	63.0	60.3	25	45	X	9	0	2				
63	1800	8/2	44.9°	174.2°	58.7	23	2	61.0	60.2	26	45	X	9	0	0			33.04	1.05
64	2330	8/2	45.0°	174.9°	63.8	21	2	67.5	64.8	25	40	4	2	8	1				
65	0500	8/3	44.9°	174.5°	64.9	03	1	71.2	66.8	25	10	X	9	8	1			33.04	1.18
66	1810	8/3	44.9°	174.5°	61.7	03	2	63.0	61.8	25	10	X	9	7	1				
67	1840	8/3	45.0°	174.5°	62.8	-	-	62.0	61.2	-	-	-	-	-	-				
68	1910	8/3	45.0°	174.5°	61.4	06	2	63.0	61.9	26	10	X	9	6	1				
69	2330	8/3	45.5°	174.7°	61.4	10	1	63.2	61.5	26	10	X	9	6	1			32.84	
70	0415	8/4	46.0°	174.9°	63.0	10	1	64.0	62.2	26	45	X	9	0	0				

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
71	0500	8/4	46.0°	175.0°	63.9	09	2	64.5	63.0	26	45	X	9	0	0			32.94	1.60
72	1730	8/4	46.0°	174.9°	62.2	09	1	60.5	59.9	26	45	X	9	0	0				
73	1800	8/4	46.1°	174.9°	61.8	-	-	61.0	59.7	-	-	-	-	-	-				
74	1830	8/4	46.2°	174.9°	61.2	14	2	61.0	60.0	26	45	X	9	0	0				
75	2330	8/4	46.8°	175.0°	63.0	09	1	64.5	62.2	27	01	X	9	0	0			32.75	
76	0345	8/5	47.0°	175.1°	68.7	09	1	65.2	62.2	27	10	X	9	8	0				
77	0410	8/5	47.0°	175.0°	68.2	-	-	63.8	62.4	-	-	-	-	-	-				
78	0430	8/5	47.0°	175.0°	57.7	19	2	64.0	62.0	-	10	X	9	8	0			32.90	1.48
79	1750	8/5	47.1°	175.1°	60.4	08	1	61.0	59.0	27	10	X	9	1	1				
80	1820	8/5	47.2°	175.0°	62.0	-	-	61.0	59.2	-	-	-	-	-	-				
81	1900	8/5	47.2°	175.0°	60.5	27	1	60.8	59.0	27	10	X	5	4	1				
82	2330	8/5	47.7°	175.0°	62.7	29	1	62.2	60.7	27	01	6	6	9	2			32.97	
83	0530	8/6	48.0°	175.0°	59.7	21	1	61.1	60.1	27	40	X	9	5	2				
84	1730	8/6	48.0°	174.9°	58.3	23	3	60.0	58.8	26	45	X	9	1	2			32.94	1.39
85	1815	8/6	48.1°	174.9°	57.2	-	-	60.0	58.8	-	-	-	-	-	-				
86	1845	8/6	48.2°	174.9°	57.0	23	3	60.1	58.8	27	45	X	9	1	2				
87	2330	8/6	48.7°	174.9°	56.6	21	2	60.5	59.8	25	45	X	9	1	2				
88	0335	8/7	49.0°	174.9°	56.0	24	2	59.0	58.5	23	45	X	9	0	3				
89	0400	8/7	49.0°	175.0°	55.2	-	-	59.0	58.2	-	-	-	-	-	-				
90	0500	8/7	49.0°	175.0°	55.8	24	2	59.0	58.5	-	45	X	9	0	3			32.88	1.39
91	1815	8/7	49.1°	174.9°	55.0	25	2	58.5	56.6	22	45	X	9	3	4				
92	1845	8/7	49.1°	175.0°	55.1	-	-	58.0	56.1	-	-	-	-	-	-				
93	1915	8/7	49.2°	175.0°	56.0	26	2	58.0	56.5	22	45	X	9	1	4				
94	2330	8/7	49.6°	175.4°	55.5	27	2	57.0	56.0	21	45	X	9	1	3			32.94	
95	0530	8/8	50.3°	175.8°	53.2	25	3	56.0	55.0	20	45	X	9	0	2			32.79	
96	1130	8/8	50.9°	176.5°	52.9	25	4	56.1	54.1	19	45	X	9	0	2				
97	1730	8/14	50.2°	174.7°	54.5	29	5	55.3	54.0	14	10	X	9	5	3			32.79	1.53
98	2330	8/14	49.6°	174.2°	53.6	31	4	55.5	53.4	16	10	X	9	5	4			32.88	
99	0530	8/15	48.8°	173.7°	54.2	33	3	54.8	52.5	16	10	X	9	5	3			32.84	1.18
100	1130	8/15	48.2°	173.3°	55.4	35	4	55.5	53.2	18	20	X	9	0	3			34.65	
101	1730	8/15	47.4°	172.9°	56.6	-	4	55.4	51.8	19	03	8	8	8	3			32.90	0.89
102	2330	8/15	46.9°	172.5°	57.3	36	3	57.5	54.0	21	02	6	8	9	3			32.88	
103	0530	8/16	46.2°	172.1°	58.6	34	4	57.5	53.0	21	02	6	8	9	3			32.99	1.55
104	1130	8/16	45.5°	171.6°	59.0	35	2	57.8	53.5	22	02	X	9	7	3			33.10	
105	1730	8/16	44.9°	171.2°	60.2	18	3	58.0	53.0	22	02	6	9	9	2			33.33	0.97

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
106	2330	8/16	45.3°	171.2°	61.3	25	2	59.8	53.7	22	02	6	8	8	3			33.03	
107	0530	8/17	45.8°	171.6°	59.8	19	2	60.3	56.8	20	03	6	8	8	3				
108	0730	8/17	46.0°	171.7°	59.2	17	4	60.0	59.0	19	63	X	9	0	3			33.03	1.29
109	1830	8/17	46.0°	170.4°	58.2	25	5	62.0	61.3	14	53	X	9	2	4			32.99	
110	2330	8/17	46.2°	169.6°	57.0	22	5	62.0	60.5	12	47	X	9	0	4			32.86	
111	0530	8/18	46.7°	168.8°	57.0	23	5	60.5	59.0	08	63	X	9	0	5			32.84	
112	1730	8/18	46.7°	168.6°	56.4	21	6	60.2	60.0	03	45	X	9	0	6			32.86	
113	1730	8/19	46.4°	167.4°	56.3	25	4	58.2	56.3	03	02	6	8	7	4			33.03	0.98
114	2330	8/19	46.6°	166.5°	55.2	21	3	60.1	57.1	03	02	9	6	8	4			32.84	
115	0500	8/20	46.5°	165.9°	55.0	30	5	55.5	54.0	03	02	6	8	9	5			32.84	0.78
116	1745	8/20	46.7°	165.6°	54.8	23	7	56.9	54.9	05	51	6, 8	9	9	6			32.84	
117	0530	8/21	46.3°	164.8°	54.3	26	4	56.6	53.8	04	03	6, 8	8	8	5			32.92	1.21
118	1130	8/21	46.2°	163.6°	54.1	28	4	55.8	54.0	06	02	6, 8, 4	8	5	5			32.97	
119	1730	8/21	46.1°	162.5°	54.7	29	4	54.8	51.0	10	03	6, 8	6	8	5			32.92	0.89
120	2330	8/21	46.0°	161.4°	54.0	26	3	58.0	53.0	11	03	4, 6, 8	3	9	5			32.92	
121	0530	8/22	46.0°	160.3°	53.2	26	4	55.2	52.3	11	02	4	7	9	5			32.81	
122	1805	8/22	46.0°	160.2°	53.1	26	3	55.0	52.0	12	02	6	8	9	4			32.77	
123	2330	8/22	45.9°	160.1°	53.8	29	4	57.0	53.1	13	02	6, 8	8	8	3			32.77	
124	0440	8/23	46.0°	160.3°	53.8	18	2	57.1	54.5	12	02	6, 8	8	9	3			32.77	1.27
125	2330	8/25	45.8°	159.2°	54.2	16	3	57.8	53.0	20	03	4, 1	5	9	3			32.79	
126	0530	8/26	46.0°	158.4°	54.6	15	4	56.6	54.5	18	02	4	6	7	4			32.83	1.18
127	1130	8/26	46.2°	156.9°	53.3	16	5	55.2	54.1	16	10	X	9	5	4			32.81	
128	1730	8/26	46.3°	156.1°	54.0	20	5	55.0	55.0	14	45	X	9	0	4			32.79	1.03
129	2330	8/26	46.4°	155.2°	53.8	21	4	57.4	57.1	13	45	X	9	0	4			32.72	
130	0530	8/27	46.5°	154.9°	53.9	19	6	57.0	54.5	12	45	X	9	1	5			32.65	0.87
131	1630	8/27	46.5°	154.7°	53.9	26	4	56.1	55.0	15	45	X	9	1	4			32.65	
132	2330	8/27	46.5°	153.6°	54.5	24	3	59.0	54.0	17	03	4, 6	2	9	3			32.70	
133	0530	8/28	46.4°	152.7°	54.2	25	3	57.0	54.2	19	03	6, 8	2	7	3			32.70	0.97
134	1130	8/28	46.4°	154.6°	54.4	26	4	55.2	52.0	21	03	8	5	7	3			32.65	
135	1730	8/28	46.8°	150.6°	55.0	25	4	56.5	51.3	22	02	4, 8	6	9	3			32.61	0.99
136	2330	8/28	46.0°	149.9°	56.5	24	4	58.0	54.8	23	02	8	5	8	5			32.59	
137	0530	8/29	46.0°	150.0°	56.5	17	4	57.5	55.5	23	03	0, 6,	8	7	6			32.65	0.84
138	1640	8/29	46.0°	149.8°	55.5	20	4	59.5	58.5	18	45	X	9	7	4				
139	2330	8/29	46.2°	148.6°	56.5	19	5	60.2	59.1	18	51	X	9	1	4			32.54	
140	0530	8/30	46.4°	147.7°	57.1	19	4	59.2	59.0	16	45	X	9	0	4			32.50	1.05

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
141	1130	8/30	46.6°	146.7°	57.3	21	3	59.0	59.0	92	45	X	9	0	4			32.50	
142	1730	8/30	46.9°	145.7°	57.2	23	4	59.3	54.1	15	45	X	9	0	4			32.43	0.88
143	2330	8/30	47.1°	145.2°	57.0	33	5	58.0	54.5	19	01	8	9	7	5			32.48	
144	0530	8/31	47.1°	145.0°	57.0	31	4	54.8	49.7	23	03	6	7	7	5			32.52	
145	1630	8/21	47.0°	144.9°	57.0	29	5	55.2	50.1	29	02	6	8	7	4			32.75	
146	2330	8/31	46.3°	144.9°	58.7	30	3	57.0	51.5	28	02	6, 8	8	9	3			32.56	
147	0530	9/1	46.0°	145.0°	58.3	36	2	57.0	52.1	28	02	X	9	5	2			32.63	0.69
148	1630	9/1	46.0°	145.0°	58.2	13	1	57.5	51.5	31	02	6	9	9	1				
149	2330	9/1	45.2°	145.0°	61.0	18	2	61.2	52.1	31	02	6	7	8	2			32.68	
150	0100	9/2	45.1°	145.0°	61.9	11	1	60.1	52.5	31	02	4, 6, 8	6	8	2				
151	0135	9/2	45.0°	145.0°	62.0	11	1	60.2	52.5	31	02	4, 6, 8	5	8	2				
152	0530	9/2	45.0°	145.0°	60.3	08	2	60.0	53.2	31	02	6, 8	4	8	3			32.72	0.69
153	1700	9/2	44.9°	145.0°	59.9	08	1	62.0	57.1	32	02	2, 6	2	9	1			32.74	
154	1730	9/2	44.8°	145.0°	59.7	01	3	62.8	54.9	32	02	1, 6	2	9	1				
155	1800	9/2	44.8°	145.0°	60.1	01	3	62.5	57.0	32	02	1, 6	2	9	1				
156	1830	9/2	44.7°	145.0°	59.9	01	3	63.0	57.7	32	02	1, 6	2	9	1				
157	2330	9/2	44.2°	145.0°	62.2	10	4	63.0	58.9	32	02	3, 6	3	9	2				
158	0530	9/3	44.0°	145.0°	62.2	09	3	62.8	60.0	32	02	3	1	7	2			32.86	0.38
159	1615	9/3	44.0°	145.0°	62.2	09	3	63.7	59.1	31	02	6	1	9	2			32.92	
160	1645	9/3	43.9°	145.0°	62.3	09	4	63.8	58.9	31	02	4, 8	1	9	2				
161	1730	9/3	43.8°	145.0°	62.3	09	4	64.0	59.2	31	02	6, 8	1	9	2			32.97	
162	2330	9/3	43.2°	144.9°	64.0	08	4	63.7	60.0	30	02	6, 8	6	9	2			33.04	
163	0530	9/4	42.6°	144.9°	64.1	09	4	65.2	60.1	29	02	6, 8	8	8	3			33.03	0.50
164	1130	9/4	41.8°	144.9°	65.5	08	4	65.5	61.0	28	00	X	X	5	3			33.13	
165	1730	9/4	41.0°	145.1°	66.8	09	4	67.1	62.0	27	02	6, 8	6	7	3			33.31	
166	2330	9/4	40.3°	145.0°	67.9	07	4	66.0	62.5	26	03	6, 8	7	9	4			33.44	
167	0530	9/5	39.7°	145.3°	68.2	07	3	68.1	61.9	24	02	X	9	0	3			33.68	0.19
168	1130	9/5	39.0°	145.9°	70.8	05	4	67.7	63.8	22	01	X	4	0	3			34.18	
169	1730	9/5	38.3°	146.4°	69.9	07	5	68.5	64.3	21	02	6, 8	7	9	4			34.00	0.69
170	2330	9/5	37.6°	146.9°	71.3	03	4	69.8	64.1	20	02	1, 6, 8	6	9	4			34.25	
171	0530	9/6	36.9°	147.5°	71.2	03	4	69.4	63.8	19	01	1, 6, 8, 9	4	9	4				0.18
172	1130	9/6	36.1°	147.9°	71.2	02	5	69.1	63.0	18	02	6, 8	2	4	4			34.27	
173	1730	9/6	35.4°	148.3°	72.4	35	4	70.1	63.0	18	02	1, 4, 8	5	9	4			34.52	0.09
174	2330	9/6	34.7°	149.0°	72.8	01	3	73.0	65.8	19	02	8	6	9	3			34.40	
175	0530	9/7	34.1°	149.6°	74.6	36	2	71.5	62.2	19	02	6, 8	3	4	3			34.76	0.21

Table 2.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 32
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, (Beaufort)	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
176	1130	9/7	33.4°	150.3°	74.8	35	3	70.8	65.1	20	02	X	6	6	3			35.30	
177	1730	9/7	32.7°	150.9°	74.9	02	3	72.0	65.0	22	02	8	4	9	2			35.26	
178	2330	9/7	32.0°	151.4°	75.6	36	3	73.8	66.2	21	02	8	4	9	2			35.16	
179	0530	9/8	31.2°	151.8°	75.1	36	3	74.5	67.1	22	02	8, 9	3	9	2			35.48	0.09
180	1130	9/8	30.4°	152.3°	76.0	02	3	75.0	68.3	22	02	6, 8	2	4	2			35.61	
181	1730	9/8	29.7°	152.8°	76.5	36	0	74.8	67.2	22	15	8, 9	6	9	2			35.53	0.18
182	2330	9/8	29.0°	153.3°	77.0	06	4	76.8	69.5	22	02	8, 4	6	9	2			35.55	
183	0530	9/9	28.2°	153.8°	76.0	06	4	75.6	70.1	21	02	8	3	6	2			35.37	
184	1130	9/9	27.5°	154.2°	77.2	07	3	75.9	69.2	20	02	8	7	9	2			35.34	
185	1730	9/9	26.9°	154.7°	77.5	06	3	77.8	71.0	20	02	8	5	9	2			35.39	
186	2330	9/9	26.2°	155.2°	78.5	09	3	77.4	70.2	19	02	6, 8, 9	5	9	2			35.35	
187	0530	9/10	25.5°	155.7°	78.0	10	3	76.7	70.0	19	03	1, 6, 8, 9	6	9	2			35.17	
188	1130	9/10	24.7°	156.1°	77.3	08	4	76.8	70.1	18	02	X	4	5	3			35.30	
189	1730	9/10	23.9°	156.4°	77.8	12	4	77.0	71.9	18	02	6, 8, 9	5	9	3			35.01	
190	2330	9/10	23.1°	156.8°	78.4	10	4	79.0	71.5	16	02	4, 8	3	9	3			34.97	
191	0530	9/11	22.4°	157.2°	77.5	09	5	77.3	69.1	16	02	8	2	7	4			35.01	
192	1413	9/11	21.6°	157.7°	77.0	11	4	77.0	71.0	14	02	X	1	6	4			35.07	0.51
193	1540	9/11	21.8°	157.8°	76.8	08	5	76.5	69.8	14	02	8, 9	3	7	4			34.94	
194	1625	9/11	22.0°	157.8°	77.1	10	6	76.8	70.5	15	02	8	3	9	5			35.03	0.38
195	1820	9/11	22.1°	157.8°	77.2	11	5	78.5	72.1	15	02	6, 8	4	9	5			35.05	
196	1930	9/11	22.2°	157.8°	77.5	10	4	78.3	72.2	16	02	6, 8	5	9	4			34.99	
197	2055	9/11	22.2°	157.9°	77.5	07	4	79.2	72.0	16	02	6, 8	5	9	4			35.01	
198	2200	9/11	22.2°	157.9°	77.9	07	5	78.5	72.0	15	02	6, 8	5	9	4			35.01	0.21
199	2325	9/11	22.0°	157.9°	78.0	07	5	79.0	72.5	15	02	8	5	9	4			34.94	
200	0030	9/12	21.8°	157.9°	78.0	09	4	79.2	72.0	13	02	6, 8	5	9	4			34.92	0.40
201	0210	9/12	21.7°	158.1°	-	10	5	78.0	71.0	13	02	6, 8	5	9	4			34.99	
202	0300	9/12	21.7°	158.2°	78.4	06	5	77.5	72.7	13	02	4, 8	3	9	4			34.92	0.09
203	0415	9/12	21.6°	158.4°	78.5	06	4	78.2	73.0	13	02	8	2	9	4			34.88	
204	0530	9/12	21.6°	158.6°	79.0	06	5	78.2	72.0	14	02	8	3	9	4			34.94	0.33
205	0630	9/12	21.6°	158.8°	79.8	06	4	77.8	72.3	15	03	X	5	7	5			34.72	
206	0800	9/12	21.6°	159.0°	78.8	06	4	78.0	72.1	15	02	X	7	7	5				0.31
207	0930	9/12	21.4°	159.0°	79.0	06	5	77.0	72.5	14	01	X	2	7	5			34.78	
208	1120	9/12	21.4°	158.8°	78.8	07	4	77.5	71.0	14	01	X	2	7	5			34.83	0.41
209	1230	9/12	21.4°	158.6°	77.7	07	3	77.0	70.6	13	01	X	2	7	5			34.90	0.32
210	1400	9/12	21.4°	158.4°	77.3	06	3	76.9	69.7	13	02	X	2	7	5			34.90	
211	1500	9/12	21.4°	158.3°	77.3	10	3	76.8	69.0	14	02	4	1	9	1			34.94	0.20

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
7/17	22.5°	159.3°	1700	99	06	14	02	1	1017.3	X	XX	76.0	71.3	76.3	6	6	2	5	0	0	26	2	2
7/17	23.1°	159.7°	2300	99	06	06	01	2	1015.9	X	XX	77.1	71.5	77.5	7	7	2	5	0	0	34	2	2
7/18	23.7°	160.2°	0500	99	03	10	01	1	1016.9	X	XX	76.6	71.0	78.0	3	3	2	3	0	0	11	2	3
7/18	24.3°	160.7°	1100	99	03	09	01	0	1018.0	X	XX	75.5	71.5	76.8	2	1	2	3	6	0	06	2	3
7/18	25.1°	161.3°	1800	99	09	09	02	0	1018.6	X	XX	77.5	71.0	76.9	3	2	2	5	0	2	09	2	3
7/18	25.5°	161.6°	2200	99	06	18	15	1	1019.0	X	XX	75.0	70.3	77.2	6	5	4	6	2	6	01	2	3
7/19	26.1°	162.1°	0500	99	06	11	15	2	1019.0	X	XX	76.1	70.0	76.8	6	5	2	5	1	1	02	2	3
7/19	26.7°	162.5°	1100	99	08	16	02	2	1020.3	X	XX	75.4	70.0	76.5	6	6	2	5	0	0	06	2	3
7/19	27.3°	163.0°	1700	99	06	13	02	2	1019.6	X	XX	74.8	69.5	76.2	5	4	4	5	3	0	10	2	3
7/19	27.9°	163.5°	2300	99	08	16	02	2	1022.0	X	XX	78.2	70.2	77.3	5	4	2	5	6	1	04	2	3
7/20	28.5°	163.9°	0500	99	06	19	01	2	1022.0	X	XX	74.0	69.2	76.8	5	4	3	5	6	1	05	2	3
7/20	29.1°	164.4°	1100	99	07	21	01	1	1023.0	X	XX	75.0	69.0	76.3	3	3	2	6	0	0	05	2	4
7/20	29.8°	165.0°	1700	99	07	21	02	2	1022.7	X	XX	75.0	68.9	75.8	5	5	3	5	0	4	08	2	3
7/20	30.4°	165.5°	2300	99	06	17	03	1	1024.7	X	XX	76.5	71.2	76.3	5	3	2	5	5	0	02	2	3
7/21	30.9°	165.9°	0500	99	06	21	03	2	1024.0	X	XX	74.0	69.8	74.6	7	6	4	6	9	9	06	2	3
7/21	31.6°	166.4°	1100	98	08	20	02	2	1025.1	X	XX	72.0	66.5	74.0	8	7	4	7	9	9	05	2	3
7/21	32.2°	166.9°	1700	99	06	18	03	1	1025.1	X	XX	73.5	68.0	73.2	4	3	3	5	9	5	06	2	3
7/21	32.9°	167.5°	2300	99	07	19	02	1	1026.4	X	XX	74.0	67.0	74.2	6	5	2	6	6	1	05	2	3
7/22	33.5°	168.0°	0500	99	08	13	02	2	1025.7	X	XX	71.0	71.0	73.5	6	5	2	6	6	0	05	2	2
7/22	34.2°	168.7°	1100	99	12	09	03	2	1026.1	X	XX	69.9	65.9	71.8	8	7	1	6	6	0	22	2	2
7/22	34.8°	169.5°	1700	99	29	03	02	2	1025.4	X	XX	70.0	63.0	72.3	7	6	1	6	6	0	00	0	0
7/22	35.3°	169.9°	2300	99	26	16	03	2	1023.7	X	XX	72.3	67.5	71.8	7	7	4	5	0	0	28	2	2
7/23	35.9°	170.4°	0500	99	36	14	02	2	1022.0	X	XX	69.5	63.5	71.2	7	6	8	5	3	0	02	2	2
7/23	36.4°	171.0°	1100	98	34	12	02	2	1023.7	X	XX	66.1	61.2	70.5	8	7	8	5	3	0	31	2	3
7/23	37.0°	171.6°	1700	99	03	17	02	2	1024.0	X	XX	65.3	60.2	70.3	8	8	4	5	0	0	36	2	3
7/23	37.6°	172.3°	2300	99	36	13	01	2	1025.1	X	XX	66.3	60.0	68.3	6	6	2	5	0	0	36	2	3
7/24	38.3°	173.0°	0500	99	01	09	01	2	1024.4	X	XX	64.2	58.0	67.5	4	4	2	5	0	0	01	2	2
7/24	38.7°	173.5°	1100	99	08	08	01	1	1024.7	X	XX	63.5	58.9	67.2	2	1	1	5	3	1	10	2	2
7/24	39.3°	174.2°	1700	99	18	08	02	2	1022.7	X	XX	67.2	59.2	70.3	8	8	4	5	0	0	24	2	2
7/24	39.9°	174.9°	2300	94	20	22	53	5	1021.0	X	XX	68.6	67.0	68.2	9	9	X	X	X	X	25	2	3

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
7/25	40.4°	175.0°	0500	94	26	12	53	5	1019.0	X	XX	68.3	68.0	67.0	9	9	X	X	X	X	28	2	3
7/25	41.2°	175.0°	1100	90	35	09	12	4	1019.6	X	XX	67.0	65.0	64.8	9	9	X	X	X	X	XX	X	X
7/25	41.8°	175.0°	1700	93	26	05	45	4	1019.3	X	XX	64.3	63.9	63.8	9	9	X	X	X	X	32	2	2
7/25	42.5°	175.0°	2300	97	22	08	45	4	1020.3	X	XX	66.0	63.5	63.6	9	9	X	X	X	X	36	2	2
7/26	43.0°	175.0°	0500	91	22	06	45	4	1020.0	X	XX	63.0	62.0	61.0	9	9	X	X	X	X	27	2	2
7/26	43.1°	175.6°	2300	99	20	06	01	4	1023.4	X	XX	65.0	63.1	62.2	8	8	5	4	0	0	36	2	2
7/27	43.1°	174.9°	0500	90	18	09	45	4	1024.0	X	XX	67.0	64.8	62.6	9	9	X	X	X	X	49	2	2
7/27	43.1°	175.9°	1100	93	14	05	43	4	1023.4	X	XX	65.5	62.6	61.6	9	9	X	X	X	X	XX	X	X
7/27	43.1°	174.7°	2300	99	15	08	00	4	1028.8	X	XX	65.5	62.7	61.7	0	0	0	0	0	0	12	2	2
7/28	43.2°	174.9°	0500	97	12	12	03	1	1028.8	X	XX	63.1	61.5	61.8	8	8	1	6	0	0	12	2	2
7/28	43.2°	174.9°	1100	94	12	10	47	4	1031.5	X	XX	63.0	61.5	61.5	9	9	X	X	X	X	XX	2	2
7/28	43.6°	175.0°	2300	92	09	12	45	4	1031.5	X	XX	64.0	62.8	61.1	9	9	X	X	X	X	09	2	2
7/29	44.0°	175.0°	0700	98	17	15	45	4	1030.5	X	XX	62.0	61.0	59.9	9	9	X	X	X	X	13	2	3
7/29	44.0°	175.0°	1100	95	17	14	10	4	1031.2	X	XX	62.3	61.4	59.4	9	9	X	X	X	X	14	2	3
7/29	43.8°	175.0°	2300	96	10	19	10	4	1029.1	X	XX	63.5	62.0	60.7	9	9	X	X	X	X	12	2	6
7/30	43.6°	174.8°	0500	95	13	18	10	4	1028.4	X	XX	63.8	61.5	60.9	9	9	X	X	X	X	49	2	6
7/30	43.6°	174.8°	1100	92	13	17	10	4	1028.4	X	XX	63.0	61.2	60.3	9	9	X	X	X	X	49	2	6
7/30	44.1°	175.0°	2300	93	19	11	10	4	1027.1	X	XX	63.2	62.0	59.6	9	9	X	X	X	X	16	2	4
7/31	44.0°	175.0°	0500	91	16	12	45	4	1026.4	X	XX	63.0	62.0	60.1	9	9	X	X	X	X	12	2	3
7/31	44.0°	174.9°	1100	90	18	08	45	4	1027.4	X	XX	63.1	62.6	59.7	9	9	X	X	X	X	XX	2	3
7/31	44.0°	175.0°	1700	90	20	09	45	4	1027.1	X	XX	63.0	62.0	60.0	9	9	X	X	X	X	12	2	1
7/31	44.6°	174.9°	2300	90	22	07	45	4	1027.1	X	XX	64.0	62.5	59.8	9	9	X	X	X	X	16	2	2
8/1	45.0°	175.0°	0500	90	24	09	45	4	1026.4	X	XX	63.0	61.5	59.4	9	9	X	X	X	X	17	2	3
8/1	44.8°	174.7°	1100	90	22	08	45	4	1027.4	X	XX	61.5	60.5	59.0	9	9	X	X	X	X	22	2	1
8/1	44.9°	174.7°	1800	90	22	09	45	4	1026.8	X	XX	62.0	61.0	59.2	9	9	X	X	X	X	20	2	2
8/1	44.9°	173.8°	2300	91	25	07	61	5	1026.8	X	XX	62.0	61.0	58.8	9	9	X	X	X	X	16	2	2
8/2	44.9°	174.1°	0500	90	28	12	45	6	1025.7	X	XX	63.0	60.0	59.0	9	9	X	X	X	X	08	2	2
8/2	44.9°	174.1°	1100	90	27	08	45	4	1026.1	X	XX	62.0	60.0	58.8	9	9	X	X	X	X	22	2	1
8/2	44.9°	174.2°	1800	90	23	04	45	4	1025.7	X	XX	61.0	60.2	58.7	9	9	X	X	X	X	00	X	0
8/2	45.1°	175.0°	2300	99	21	05	40	4	1025.4	X	XX	67.5	64.8	63.8	2	1	3	6	3	0	00	X	0

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/3	44.9°	174.5°	0500	99	02	02	10	0	1024.4	X	XX	71.2	66.8	64.9	9	9	X	X	X	X	00	X	0
8/3	44.9°	174.5°	1100	90	12	03	44	4	1025.1	X	XX	63.2	62.0	61.3	9	9	X	X	X	X	00	X	0
8/3	44.9°	174.5°	1800	98	02	04	10	4	1025.1	X	XX	63.0	61.8	61.7	9	9	X	X	X	X	00	X	0
8/3	45.5°	174.7°	2300	97	09	03	10	4	1025.7	X	XX	63.2	61.5	61.4	9	9	X	X	X	X	49	2	1
8/4	46.0°	175.0°	0500	95	09	04	10	4	1025.7	X	XX	64.5	63.0	63.9	9	9	X	X	X	X	00	X	0
8/4	46.0°	174.9°	1100	95	12	04	10	4	1026.8	X	XX	62.7	61.2	62.0	9	9	X	X	X	X	00	X	0
8/4	46.0°	174.9°	1700	90	09	02	45	4	1026.4	X	XX	60.5	59.9	62.2	9	9	X	X	X	X	00	X	0
8/4	46.8°	175.0°	2300	98	09	02	01	4	1026.4	X	XX	64.5	62.2	65.4	7	9	X	X	X	X	00	X	0
8/5	47.0°	175.0°	0500	98	18	04	10	4	1026.4	X	XX	64.0	62.0	57.7	9	9	X	X	X	X	00	X	0
8/5	47.0°	175.1°	1100	90	22	04	10	4	1026.4	X	XX	62.2	60.5	58.7	9	9	X	X	X	X	00	X	0
8/5	47.1°	175.1°	1800	91	08	04	10	0	1026.8	X	XX	61.0	59.0	60.4	9	9	X	X	X	X	00	X	0
8/5	47.7°	175.0°	2300	99	29	03	01	4	1027.4	X	XX	62.2	60.7	62.7	6	6	5	3	X	X	49	2	1
8/6	48.0°	175.0°	0500	96	21	06	40	4	1026.8	X	XX	61.1	60.1	59.7	9	9	X	X	X	X	23	2	1
8/6	48.0°	175.0°	1100	91	22	12	44	4	1027.8	X	XX	60.0	59.1	59.5	9	9	X	X	X	X	23	2	2
8/6	48.0°	175.0°	1700	91	23	06	45	4	1026.4	X	XX	60.0	58.8	58.3	9	9	X	X	X	X	25	2	2
8/6	48.7°	174.9°	2300	92	21	15	45	4	1025.4	X	XX	60.5	59.8	56.6	9	9	X	X	X	X	24	2	3
8/7	49.0°	175.0°	0500	90	24	17	45	4	1022.4	X	XX	59.0	58.5	55.8	9	9	X	X	X	X	24	2	3
8/7	49.0°	175.0°	1100	90	24	15	45	4	1022.4	X	XX	59.0	58.5	54.5	9	9	X	X	X	X	24	2	3
8/7	49.1°	174.9°	1800	94	25	16	45	4	1022.0	X	XX	58.5	56.6	55.0	9	9	X	X	X	X	28	2	4
8/7	49.7°	175.4°	2300	90	26	14	45	4	1021.0	X	XX	57.0	56.0	55.5	9	9	X	X	X	X	28	2	4
8/8	50.3°	175.8°	0500	90	25	09	45	4	1020.0	X	XX	56.0	55.0	53.2	9	9	X	X	X	X	29	2	2
8/8	50.3°	176.5°	1100	90	25	19	45	4	1019.0	X	XX	56.1	54.9	52.9	9	9	X	X	X	X	28	2	2
8/14	50.2°	174.7°	1700	96	28	18	10	4	1013.9	X	XX	55.3	54.0	54.5	9	9	X	X	X	X	25	2	5
8/14	49.6°	174.2°	2300	96	31	16	10	4	1015.6	X	XX	55.5	53.4	53.6	9	9	X	X	X	X	32	2	4
8/15	48.8°	173.7°	0500	96	33	09	10	4	1015.6	X	XX	54.8	52.5	54.2	9	9	X	X	X	X	26	2	3
8/15	48.2°	173.3°	1100	90	34	11	20	4	1017.6	X	XX	55.5	53.2	55.4	9	9	X	X	X	X	34	X	3
8/15	47.5°	172.9°	1700	99	01	14	03	4	1019.3	X	XX	55.4	51.8	56.6	8	8	4	5	0	0	31	2	3
8/15	46.9°	172.5°	2300	99	35	08	02	1	1020.7	X	XX	57.5	54.0	57.3	8	8	5	5	0	0	30	2	3
8/16	46.4°	172.3°	0500	99	33	13	02	1	1020.7	X	XX	57.5	53.0	58.6	8	8	5	5	0	0	31	2	3
8/16	45.5°	171.6°	1100	98	35	10	02	2	1022.0	X	XX	57.8	53.5	59.0	9	9	X	X	X	X	30	2	3

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/16	44.9°	171.2°	1700	99	17	10	02	2	1021.7	X	XX	58.0	53.0	60.2	9	9	5	6	0	0	34	2	2
8/16	45.2°	171.2°	2300	98	25	10	02	2	1021.7	X	XX	59.8	53.7	61.3	9	8	5	6	6	0	36	2	3
8/17	45.8°	171.6°	0500	98	19	06	03	2	1019.6	X	XX	60.3	56.8	59.8	8	8	5	6	0	6	02	2	3
8/17	46.0°	171.8°	1100	90	19	18	53	2	1016.6	X	XX	61.0	60.0	59.0	9	9	X	X	X	X	49	X	4
8/17	46.0°	170.4°	1700	93	24	18	53	4	1013.5	X	XX	62.0	61.3	58.2	9	9	X	X	X	X	23	2	4
8/17	46.3°	169.6°	2300	90	22	19	47	5	1011.9	X	XX	62.0	60.5	57.0	9	9	X	X	X	X	22	2	4
8/18	46.7°	168.7°	0500	90	23	18	63	6	1008.5	X	XX	60.5	59.0	57.0	9	9	X	X	X	X	23	2	5
8/18	46.7°	168.6°	1100	91	26	22	53	5	1005.4	X	XX	60.0	59.2	56.8	9	9	X	X	X	X	49	X	5
8/18	46.7°	168.6°	1700	90	21	22	45	5	1003.1	X	XX	60.2	60.0	56.4	9	9	X	X	X	X	21	2	6
8/18	46.1°	168.9°	2300	91	23	26	45	4	1002.7	X	XX	63.5	61.9	57.0	9	9	X	X	X	X	21	2	6
8/19	45.9°	169.0°	0500	91	25	20	45	4	1001.7	X	XX	61.8	60.6	57.5	9	9	X	X	X	X	23	3	7
8/19	46.0°	168.4°	1100	92	26	07	20	4	1002.4	X	XX	59.8	58.0	57.5	9	9	X	X	X	X	24	2	2
8/19	46.3°	167.5°	1700	98	25	13	02	4	1003.1	X	XX	58.2	57.3	56.3	8	8	8	5	0	0	28	3	5
8/19	46.6°	166.5°	2300	98	21	10	02	2	1002.7	X	XX	60.1	57.1	55.2	8	8	5	5	0	0	21	2	5
8/20	46.5°	165.9°	0500	99	30	20	02	2	1002.7	X	XX	55.5	54.0	55.0	8	8	5	5	0	0	27	2	5
8/20	46.5°	165.9°	1100	99	25	16	03	2	1005.1	X	XX	55.2	52.1	54.8	5	5	8	5	0	0	23	3	5
8/20	46.6°	165.6°	1700	99	22	30	51	6	1004.7	X	XX	56.9	54.9	54.8	9	9	5	5	0	0	22	2	7
8/20	46.3°	165.7°	2300	98	27	21	16	2	1003.4	X	XX	57.6	54.5	54.6	8	8	6	4	0	0	27	3	5
8/21	46.3°	164.5°	0500	98	26	14	03	2	1004.1	X	XX	56.0	53.8	54.3	8	8	8	5	0	0	26	3	5
8/21	46.1°	163.5°	1100	95	28	11	02	2	1006.1	X	XX	55.8	54.0	54.1	7	6	3	5	6	0	28	2	5
8/21	46.1°	162.5°	1700	99	29	16	03	1	1009.5	X	XX	54.8	51.0	54.7	6	6	8	5	0	0	26	3	5
8/21	46.0°	161.5°	2300	99	25	09	03	0	1011.2	X	XX	58.0	53.0	54.0	3	2	2	4	6	0	25	2	5
8/22	46.0°	160.3°	0500	99	25	14	02	1	1011.2	X	XX	55.2	52.3	53.2	7	0	0	5	6	0	25	2	5
8/22	46.0°	160.3°	1100	97	25	13	10	2	1011.2	X	XX	55.3	53.0	52.9	9	9	X	X	X	X	25	2	4
8/22	46.0°	160.0°	1800	99	25	09	02	2	1011.9	X	XX	55.0	52.0	53.1	9	9	5	5	0	0	25	2	4
8/22	45.9°	160.1°	2300	98	21	12	02	2	1012.5	X	XX	57.0	53.1	53.8	8	8	8	4	0	0	22	2	3
8/23	46.1°	160.3°	0400	99	18	06	02	2	1011.5	X	XX	57.1	54.5	53.8	8	8	8	6	0	0	28	2	3
8/23	46.1°	160.3°	1200	96	14	16	50	6	1008.1	X	XX	55.0	53.0	53.2	9	9	X	X	X	X	19	2	4
8/23	46.1°	160.3°	1700	92	15	28	45	6	1000.7	X	XX	58.8	XXX	53.2	9	9	X	X	X	X	16	4	8
8/23	45.9°	160.3°	2300	93	18	28	45	4	995.9	X	XX	XXX	XXX	53.0	9	9	X	X	X	X	XX	X	3

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/24	45.8°	160.3°	0500	93	18	24	45	4	997.6	X	XX	59.0	59.0	53.4	9	9	X	X	X	X	XX	3	0
8/24	45.8°	160.3°	1100	93	21	24	45	4	998.0	X	XX	58.8	56.1	53.1	9	9	X	X	X	X	17	3	9
8/24	45.8°	160.2°	1700	96	21	28	45	4	999.0	X	XX	56.9	53.1	53.4	9	3	3	0	X	X	XX	2	5
8/24	45.7°	160.1°	2300	98	21	24	03	2	1005.1	X	XX	57.3	53.0	53.3	6	6	1	5	0	0	XX	4	5
8/25	45.7°	160.1°	0500	98	26	24	03	1	1011.2	X	XX	55.1	52.4	53.2	6	6	5	5	0	0	XX	4	4
8/25	45.7°	160.1°	1100	94	25	17	02	2	1016.6	X	XX	55.1	52.8	53.3	8	8	5	5	0	0	XX	4	2
8/25	45.7°	160.0°	1700	98	22	11	02	2	1019.6	X	XX	55.0	51.2	53.4	8	8	8	5	0	0	24	3	5
8/25	45.8°	159.2°	2300	99	15	08	03	1	1020.0	X	XX	57.8	53.0	54.2	5	0	0	X	6	9	25	4	4
8/26	46.0°	158.3°	0500	98	14	13	02	1	1017.6	X	XX	56.6	54.5	54.6	6	0	0	X	6	9	25	6	4
8/26	46.2°	157.2°	1100	96	16	18	10	1	1015.6	X	XX	55.2	54.1	53.3	9	9	X	X	X	X	17	3	4
8/26	46.3°	156.1°	1700	90	19	20	45	4	1013.9	X	XX	55.0	55.0	54.0	9	9	X	X	X	X	24	3	3
8/26	46.4°	155.2°	2300	91	21	15	45	4	1012.9	X	XX	57.4	57.1	53.8	9	9	X	X	X	X	20	3	4
8/27	46.5°	155.0°	0500	91	19	19	45	4	1012.2	X	XX	57.0	54.5	53.9	9	9	X	X	X	X	18	3	5
8/27	46.5°	155.0°	1100	90	23	20	45	4	1012.5	X	XX	57.5	55.5	54.0	9	9	X	X	X	X	23	4	6
8/27	46.5°	154.7°	1700	91	25	12	45	4	1015.2	X	XX	56.1	55.0	53.9	9	9	X	X	X	X	22	3	4
8/27	46.5°	153.6°	2300	99	24	10	03	1	1017.3	X	XX	59.0	54.0	54.5	4	0	0	0	5	2	24	3	3
8/28	46.5°	152.7°	0600	98	24	10	03	1	1019.3	X	XX	57.0	54.2	54.2	5	5	1	4	0	0	24	5	3
8/28	46.5°	151.7°	1100	98	26	16	03	1	1020.7	X	XX	55.2	52.0	54.4	4	4	1	4	0	0	25	3	3
8/28	46.5°	150.6°	1800	99	24	15	02	1	1022.4	X	XX	56.5	51.3	55.0	6	1	1	5	6	0	27	4	3
8/28	46.0°	154.9°	2300	98	24	13	02	1	1023.4	X	XX	58.0	54.8	56.5	6	6	1	4	0	0	28	6	6
8/29	46.0°	150.0°	0500	98	17	12	03	1	1023.0	X	XX	57.5	55.5	56.5	8	8	5	5	0	0	28	5	9
8/29	45.9°	149.9°	1100	92	18	18	53	4	1018.3	X	XX	59.0	58.5	55.9	9	9	X	X	X	X	25	5	4
8/29	46.0°	149.8°	1700	90	19	20	45	4	1018.3	X	XX	59.5	58.5	55.4	9	9	X	X	X	X	20	2	3
8/29	46.2°	148.7°	2300	92	19	18	51	4	1017.6	X	XX	60.2	59.1	56.5	9	9	X	X	X	X	22	3	4
8/30	46.4°	147.7°	0500	90	18	15	45	4	1016.6	X	XX	59.2	59.0	57.1	9	9	X	X	X	X	22	X	4
8/30	46.6°	148.8°	1100	90	20	10	45	4	1015.6	X	XX	59.0	59.0	57.3	9	9	X	X	X	X	22	X	4
8/30	46.8°	145.7°	1700	91	23	11	45	4	1015.2	X	XX	59.3	59.1	57.2	9	9	X	X	X	X	23	3	4
8/30	47.1°	145.1°	2300	98	32	20	01	4	1018.6	X	XX	58.0	54.5	57.0	9	9	6	4	0	0	32	X	5
8/31	47.1°	145.0°	0500	98	31	16	03	2	1023.0	X	XX	54.8	49.7	57.0	8	8	4	5	0	0	30	2	4
8/31	47.1°	145.0°	1100	95	28	12	02	2	1025.1	X	XX	55.8	50.3	57.0	9	9	X	X	X	X	28	2	4

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/31	47.1°	144.9°	1700	98	29	17	02	2	1025.7	X	XX	55.2	50.1	57.0	9	8	8	4	0	0	32	2	4
8/31	46.3°	144.9°	2300	99	29	10	02	2	1027.8	X	XX	57.0	51.5	58.7	8	8	8	4	0	0	49	X	3
9/1	45.9°	145.0°	0500	96	36	05	02	2	1028.8	X	XX	57.0	52.1	58.3	9	9	X	X	X	X	36	2	2
9/1	45.9°	145.0°	1100	97	31	04	02	2	1029.5	X	XX	57.5	52.8	58.5	9	9	X	X	X	X	34	2	2
9/1	45.9°	145.0°	1700	99	12	03	02	2	1030.5	X	XX	57.5	51.5	58.2	8	8	5	5	0	0	31	X	1
9/1	45.2°	145.0°	2300	99	18	05	02	2	1031.2	X	XX	61.2	52.1	61.0	7	7	8	5	0	0	29	2	2
9/2	45.0°	145.0°	0500	98	08	04	02	2	1030.8	X	XX	60.0	53.2	60.3	5	5	8	5	0	0	30	3	3
9/2	45.0°	145.0°	1100	97	14	06	03	0	1031.2	X	XX	60.5	54.0	59.7	3	3	X	0	X	X	30	X	2
9/2	44.8°	145.0°	1700	99	14	08	01	0	1031.5	X	XX	64.0	54.0	59.8	2	1	1	5	0	4	14	2	1
9/2	44.2°	145.0°	2300	99	09	13	02	0	1031.8	X	XX	63.0	58.9	62.2	3	1	5	5	0	9	49	2	2
9/3	44.0°	145.0°	0500	98	08	07	02	0	1031.8	X	XX	62.8	60.0	62.2	1	0	0	0	0	9	10	2	2
9/3	44.0°	145.0°	1100	98	14	07	02	0	1031.2	X	XX	62.3	59.0	62.1	1	1	X	0	X	X	15	2	2
9/3	43.8°	145.0°	1700	99	08	11	02	0	1031.2	X	XX	64.0	59.2	62.3	1	1	2	5	0	0	08	2	2
9/3	43.2°	144.9°	2300	99	08	11	02	1	1029.8	X	XX	63.7	60.0	64.0	5	5	8	5	0	0	11	2	2
9/4	42.6°	144.9°	0500	98	09	14	02	2	1028.8	X	XX	65.2	60.1	64.1	8	8	8	5	0	0	11	2	3
9/4	41.7°	143.7°	1100	96	08	13	00	2	1027.8	X	XX	65.5	61.0	65.5	9	9	X	X	X	X	10	2	3
9/4	41.0°	145.1°	1700	98	09	15	02	2	1027.4	X	XX	67.1	62.0	66.8	6	6	8	5	0	0	11	2	3
9/4	40.3°	145.0°	2300	99	06	12	03	2	1025.7	X	XX	66.0	62.5	67.9	7	7	8	5	0	0	07	3	3
9/5	39.7°	145.3°	0500	90	07	10	02	2	1024.4	X	XX	68.1	61.9	68.2	9	9	X	X	X	X	04	3	3
9/5	38.9°	145.8°	1100	90	05	15	01	1	1021.7	X	XX	67.7	63.8	70.8	5	5	X	0	X	X	35	2	3
9/5	38.3°	146.4°	1700	99	07	17	02	2	1021.0	X	XX	68.5	64.3	69.9	7	7	8	4	0	0	06	2	4
9/5	37.6°	146.9°	2300	99	03	16	02	2	1019.6	X	XX	69.8	64.1	71.3	6	5	3	4	9	2	03	2	4
9/6	36.9°	147.5°	0500	99	02	14	01	1	1019.0	X	XX	69.4	63.8	71.2	5	5	3	4	0	2	03	2	4
9/6	36.0°	148.1°	1100	95	01	18	02	2	1018.0	X	XX	69.1	63.0	71.2	2	2	8	4	0	0	03	2	4
9/6	35.3°	148.3°	1700	99	35	11	02	1	1018.3	X	XX	70.1	63.0	72.4	6	4	1	4	9	2	03	2	4
9/6	34.7°	149.0°	2300	99	01	10	02	1	1019.0	X	XX	73.8	65.8	72.8	6	6	2	4	0	0	03	2	3
9/7	34.1°	149.6°	0500	96	02	06	02	1	1019.3	X	XX	71.5	62.2	74.6	3	3	2	4	0	0	49	2	3
9/7	33.4°	150.3°	1100	98	35	09	02	1	1020.3	X	XX	70.8	65.1	74.8	6	9	X	X	X	X	05	2	3
9/7	32.7°	150.9°	1700	99	01	09	02	1	1021.7	X	XX	72.0	65.0	74.9	4	4	2	4	0	0	03	2	2
9/7	32.0°	141.4°	2300	99	36	09	02	0	1021.3	X	XX	73.8	66.2	75.6	4	4	2	4	0	0	03	2	2

Table 3.--Log of ship's weather observations, John R. Manning cruise 32, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
9/8	31.2°	151.8°	0500	99	36	10	02	0	1021.7	X	XX	74.5	67.1	75.1	3	3	2	4	0	0	03	2	2
9/8	30.4°	152.2°	1100	95	01	10	02	0	1021.7	X	XX	75.0	68.3	76.0	2	2	2	4	0	0	03	2	2
9/8	29.7°	152.9°	1700	99	00	00	15	1	1022.4	X	XX	74.8	67.2	76.5	6	6	2	4	0	2	03	2	2
9/8	29.0°	153.3°	2300	99	04	12	02	2	1021.7	X	XX	76.8	69.5	77.0	5	4	2	4	6	0	03	2	2
9/9	28.2°	153.7°	0500	97	05	11	02	1	1021.0	X	XX	75.6	70.1	76.0	3	3	8	4	0	0	05	2	2
9/9	27.5°	154.2°	1100	98	07	10	02	2	1020.3	X	XX	73.9	69.2	77.2	7	9	X	X	X	X	03	2	2
9/9	26.9°	154.7°	1700	99	06	10	02	2	1020.0	X	XX	77.8	71.0	77.5	5	5	2	4	0	0	03	2	2
9/9	26.2°	155.2°	2300	99	09	10	02	2	1018.6	X	XX	77.4	70.2	78.5	6	6	8	4	0	0	04	2	2
9/10	25.5°	155.7°	0500	99	10	10	03	2	1018.3	X	XX	76.7	70.0	78.0	6	6	8	4	0	2	04	2	2
9/10	24.8°	156.1°	1100	96	08	14	02	1	1018.3	X	XX	76.8	70.1	77.3	6	6	X	0	X	X	10	2	3
9/10	23.9°	156.4°	1700	99	11	12	02	1	1017.6	X	XX	77.5	71.9	77.8	6	5	3	4	9	2	15	2	3
9/10	23.1°	156.8°	2300	99	10	12	02	1	1015.9	X	XX	79.0	71.5	78.4	3	2	2	4	6	0	08	2	3
9/11	22.5°	157.2°	0500	99	08	17	02	0	1015.6	X	XX	77.3	69.1	77.5	2	2	2	4	0	0	09	2	4
9/11	21.7°	157.7°	1200	98	08	17	02	0	1014.2	X	XX	77.0	70.8	77.5	3	3	2	4	0	0	09	2	4
9/11	22.1°	157.7°	1800	99	11	17	02	0	1015.2	X	XX	78.5	72.1	77.2	4	4	2	4	0	0	09	2	5
9/11	22.0°	157.9°	2400	99	08	20	02	1	1014.6	X	XX	79.0	72.5	78.0	4	4	2	4	0	0	08	2	5
9/12	21.6°	158.6°	0500	99	05	19	02	0	1013.5	X	XX	78.2	72.0	79.0	4	4	1	4	0	0	03	2	5
9/12	21.5°	158.8°	1200	97	07	14	02	0	1014.2	X	XX	77.5	71.0	78.8	2	2	X	0	X	X	09	2	5

Table 4.--Light penetration and water color, John R. Manning cruise 32, July - September 1956

Date, 1956	Time, LCT[1]	Latitude, N.	Longitude, W.	Sea[2]	Cloud cover[2]	Water color (Forel)	Secchi, meters	Photometer depth, meters[3] Percent transmission				Remarks
								50	10	5	1	
7/17	1240	23.1°	159.7°	2	7	1	18	8	37	78	112	
7/18	1248	25.5°	161.7°	3	6	1	27	22	54	75	115	
7/19	1240	28.0°	163.5°	3	7	1	29	3	7	54	126	
7/20	1240	30.4°	165.5°	4	5	1	29	7	50	79	130	
7/21	1240	32.9°	167.5°	3	6	1	27	7	41	60	97	
7/22	1240	35.3°	169.9°	3	9	1	27	24	46	64	97	
7/23	1250	37.6°	172.3°	3	6	1	26	1	31	40	60	
7/24	1240	39.9°	174.9°	3	9	2	14	4	32	52	90	Rain
7/25	1240	42.5°	175.0°	2	9	3-4	15	4	27	37	74	Fog
7/26	1240	43.1°	175.5°	2	8	4	9	6	15	26	64	
7/27	1250	43.2°	174.7°	2	0	5	7	6	16	22	36	Haze
7/28	1240	43.6°	175.0°	2	9	5	7	4	14	21	67	Fog
7/29	1250	43.8°	175.0°	5	9	5-6	6	6	13	21	39	Fog
7/30	1240	44.1°	175.0°	4	9	4	10	11	20	31	64	Haze
7/31	1240	44.6°	174.9°	2	9	3-4	14	6	22	31	67	Haze
8/1	1240	44.9°	173.8°	2	9	3	15	2	28	50	94	Rain/fog
8/2	1240	45.1°	174.9°	1	2	3-4	13	12	20	29	56	
8/3	1240	45.5°	174.7°	1	9	3	15	12	27	42	70	Haze
8/4	1240	46.8°	174.8°	0	9	3-4	13	6	21	33	60	Fog
8/5	1240	47.7°	175.0°	2	9	3	14	9	20	32	69	Haze
8/6	1240	48.7°	174.9°	2	9	3	14	3	19	32	60	Haze
8/7	1250	49.6°	175.4°	3	9	4	13	2	15	28	63	Haze
8/14	1340	49.6°	174.2°	4	9	3-4	11	1	22	39	58	Rain
8/15	1240	46.9°	172.5°	3	8	3	13	5	23	36	70	
8/16	1240	45.2°	171.2°	3	8	2-3	20	10	26	40	80	
8/17	1245	46.3°	169.6°	4	9	3-4	10	4	17	36	65	Haze
8/19	1245	46.6°	169.5°	4	9	4	11	5	15	27	62	
8/21	1250	46.0°	161.4°	5	5	4	11	2	17	24	60	
8/22	-	45.9°	160.1°	3	8	4	10	1	13	25	55	
8/25	1230	45.8°	159.2°	3	5	4	11	5	16	25	60	
8/26	1330	46.4°	155.3°	4	9	4	10	4	14	29	77	Fog
8/27	1330	46.5°	153.6°	3	3	3	15	6	19	32	76	
8/28	1345	46.0°	149.9°	5	5	4	12	3	17	27	63	
8/29	1345	46.2°	148.7°	4	9	3-4	13	1	24	37	69	Rain/fog
8/30	1340	47.1°	145.2°	5	9	3-4	12	0	16	31	70	

Table 4.--Light penetration and water color, John R. Manning cruise 32, July - September 1956 (cont'd)

Date, 1956	Time, LCT[1]	Latitude, N.	Longitude, W.	Sea[2]	Cloud cover[2]	Water color (Forel)	Secchi, meters	Photometer depth, meters[3] Percent transmission				Remarks
								50	10	5	1	
8/31	1345	46.3°	144.9°	3	8	2	17	0	18	36	68	
9/1	1340	45.2°	145.0°	2	7	2	22	5	27	45	80	
9/2	1350	44.2°	145.0°	2	3	2	25	10	24	38	68	
9/3	1340	43.2°	144.9°	2	5	2	19	7	26	40	78	
9/4	1340	40.3°	145.0°	4	7	1-2	26	5	29	53	-	
9/5	-	37.6°	146.9°	4	6	1	27	2	35	66	113	Readings doubtful
9/6	1340	34.7°	149.0°	-	-	1	28	0	41	65	111	
9/7	1340	32.0°	151.4°	2	4	1	35	1	74	108	109	
9/8	-	29.0°	153.3°	2	6	1	34	5	48	76	118	
9/9	1340	26.2°	155.2°	2	6	1	33	4	10	66	126	
9/10	1340	23.1°	156.8°	3	3	1	37	4	13	65	113	

1/ Time lowering began, Secchi disk and sea cell lowered at same time.

2/ For coded values see H. O. Pub. 606-C.

3/ Low values probably due to shadowing of deck cell.

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
1	0600	10/19	24.2°	156.3°	77.5	05	08	77.1	73.0	18	02	X	7	8	3				
2	1800	10/19	25.6°	155.7°	76.5	10	10	74.2	68.7	18	02	6	8	7	3				
3	0545	10/20	27.1°	154.9°	76.0	05	08	72.4	70.0	17	50	6	8	7	2			35.26	
4	1800	10/20	28.5°	154.2°	75.4	08	11	73.5	69.0	16	15	6	8	7	2			35.30	
5	0545	10/21	30.0°	153.3°	73.8	14	16	75.0	71.5	15	02	4, 8	7	9	3			35.44	
6	1800	10/21	31.5°	152.6°	72.1	14	13	69.6	68.9	19	63	0	8	5	3			34.99	0.07
7	0000	10/22	32.2°	152.2°	71.8	14	16	70.0	67.2	19	50	6	8	7	4			35.14	
8	0555	10/22	32.9°	151.8°	71.6	13	22	72.5	69.8	24	02	X	8	8	4			34.99	
9	1200	10/22	33.5°	151.4°	71.0	11	18	71.9	69.0	24	01	4, 8	6	9	4			34.81	
10	1800	10/22	34.2°	151.0°	70.3	13	16	71.1	68.0	26	01	4, 8	7	9	3			34.81	0.08
11	2345	10/22	35.0°	150.5°	70.1	09	14	70.1	67.0	26	02	1, 8	2	9	3			34.76	
12	0550	10/23	35.9°	150.4°	69.0	09	12	69.9	66.1	28	02	8	2	9	2			34.85	
13	1200	10/23	36.6°	150.1°	68.0	09	12	69.0	65.9	27	02	8	5	9	2			34.51	
14	1800	10/23	37.4°	149.7°	65.9	13	12	67.0	64.0	28	02	1, 4, 8	2	9	2			33.87	0.41
15	0000	10/24	38.1°	149.2°	66.6	15	12	66.9	63.9	27	03	8	3	9	3			34.18	
16	0545	10/24	38.9°	149.0°	64.2	18	11	66.3	64.0	27	02	8	2	9	2			33.75	0.21
17	1150	10/24	39.7°	148.6°	63.9	20	13	64.6	63.1	26	03	6	7	9	3			33.82	
18	1800	10/24	40.4°	148.3°	63.0	19	15	66.0	63.9	24	01	1, 8, 5	6	9	3			33.71	
19	0000	10/25	40.5°	148.2°	63.0	19	22	66.1	63.9	21	02	6	8	8	3			33.80	
20	0300	10/25	40.3°	148.1°	64.0	19	22	64.9	64.0	21	61	0	8	6	3			33.93	0.22
21	1745	10/25	40.3°	148.2°	63.9	04	24	59.9	58.4	25	61	0	8	7	3				
22	2355	10/25	40.8°	148.0°	60.8	06	15	57.2	52.1	26	02	5, 6	8	9	3			33.40	
23	0305	10/26	41.0°	147.9°	59.5	06	16	56.8	51.5	28	02	5, 6	8	6	3			33.37	0.39
24	1740	10/26	41.0°	148.0°	60.1	06	14	55.0	49.0	32	02	5, 6	8	8	3				
25	2355	10/26	41.6°	147.6°	58.8	06	15	54.4	49.2	33	02	5, 6	8	9	3			33.33	
26	0355	10/27	41.9°	147.5°	58.0	13	10	53.0	48.1	35	01	X	X	9	3			33.40	
27	0300	10/28	42.1°	147.2°	57.9	23	10	58.2	52.6	34	03	6	8	7	2			33.26	
28	1745	10/28	42.1°	147.0°	57.9	24	19	60.1	57.8	27	02	6	8	7	3				0.57
29	0005	10/29	42.7°	146.6°	56.7	28	23	59.0	58.1	20	63	0	8	5	4			32.94	
30	0305	10/29	42.9°	146.4°	56.3	02	09	54.5	53.5	18	50	0	9	6	3			32.83	
31	1800	10/30	43.3°	146.9°	54.9	30	29	51.5	45.6	25	02	8	6	9	5			33.06	
32	0600	10/31	43.8°	146.8°	53.7	29	25	53.6	48.0	22	61	X	8	8	5			32.97	
33	2355	10/31	43.7°	147.3°	54.8	26	28	60.2	57.6	11	02	0	8	6	6			32.88	
34	2350	11/1	44.3°	143.5°	52.6	22	23	58.9	56.4	11	02	0	8	5	6			32.74	
35	0550	11/2	44.4°	142.6°	53.2	20	23	57.8	56.6	11	02	0	8	5	6			32.88	

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
36	1800	11/2	44.7°	140.7°	53.4	19	26	56.3	58.0	13	10	0	8	5	6			32.88	
37	0550	11/3	45.0°	138.8°	53.0	20	24	58.6	56.1	15	02	0	8	4	6			32.90	
38	1750	11/3	45.4°	136.9°	52.0	19	24	56.8	55.1	17	28	0	8	3	5			32.90	
39	0600	11/4	45.7°	134.8°	52.2	19	28	56.0	54.8	16	02	X	8	7	5			32.79	
40	1745	11/4	46.0°	132.7°	53.3	19	14	55.5	54.5	16	61	6	8	3	4			32.86	
41	0550	11/5	46.1°	130.2°	54.8	20	21	56.5	54.9	16	61	0	8	X	4			32.70	
42	1750	11/5	46.1°	127.8°	56.0	32	22	52.9	51.9	21	50	0	8	4	4			32.14	
43	0600	11/6	46.1°	125.4°	52.8	33	17	51.5	46.0	28	02	X	8	X	4			32.23	
44	0600	11/12	45.4°	124.9°	52.8	22	06	51.5	50.2	28	28	X	X	0	2			32.05	
45	1625	11/12	44.4°	125.6°	55.2	21	08	55.9	53.8	28	02	6, 3	6	9	2			32.03	
46	2130	11/12	43.8°	126.1°	55.9	31	22	54.0	52.8	23	51	0	9	7	2			32.01	
47	1630	11/14	42.5°	126.8°	56.4	02	12	54.2	48.9	28	02	8	6	9	2			32.27	
48	2130	11/14	42.1°	127.4°	57.0	34	04	55.5	49.0	26	02	8, 1	4	9	2			32.21	
49	0130	11/15	41.8°	127.9°	56.1	26	03	53.6	48.0	25	02	8, 5	8	9	2			32.21	0.39
50	1600	11/15	42.0°	127.8°	56.1	25	19	57.0	55.9	21	02	6	9	7	5				
51	2130	11/15	41.4°	128.2°	59.4	24	18	60.8	58.7	22	02	6	9	7	5			32.84	
52	0355	11/16	40.9°	128.5°	60.0	23	12	61.2	59.4	24	02	6	8	8	3			32.79	
53	1800	11/16	40.2°	129.2°	58.6	27	17	60.4	58.5	26	14	6	8	8	3			32.56	
54	0000	11/17	39.5°	129.4°	59.0	22	14	62.0	59.8	26	01	5, 8	7	9	3			32.36	
55	0105	11/17	39.4°	129.4°	60.9	22	14	-	-	-	-	-	-	-	-			32.95	
56	0600	11/17	39.4°	129.4°	60.6	25	13	63.5	60.6	28	02	6	6	9	2				
57	1800	11/17	39.2°	129.7°	60.3	05	14	58.0	54.9	32	02	6	8	8	3			32.90	
58	0000	11/18	38.8°	130.5°	61.0	05	13	60.8	55.0	31	02	6	7	9	3			33.01	
59	0120	11/18	38.7°	130.6°	61.0	05	14	-	-	-	-	-	-	-	-				0.43
60	1605	11/18	38.7°	130.6°	60.9	02	21	56.1	50.5	31	02	4, 8	7	9	3				
61	2005	11/18	38.5°	131.0°	60.2	04	16	57.1	50.8	32	02	4, 8	6	9	3			32.83	
62	0125	11/19	38.1°	131.8°	61.4	03	18	57.2	50.8	31	02	6, 8	7	9	3			33.30	
63	1855	11/19	37.6°	132.2°	61.6	05	18	57.3	50.4	30	02	6	8	9	3			33.35	
64	2230	11/19	37.6°	132.7°	62.2	05	12	59.0	52.8	28	02	6	8	9	3			33.60	
65	0130	11/20	37.4°	133.2°	62.0	03	11	57.8	52.0	28	02	6	8	9	3			33.57	
66	0500	11/20	37.2°	133.6°	62.6	04	11	58.5	52.5	28	02	6	8	9	3			33.68	0.37
67	1130	11/20	36.6°	134.2°	63.1	05	14	58.5	53.2	27	02	6	8	9	3			33.80	
68	1530	11/20	36.2°	134.7°	63.6	06	12	59.7	54.0	26	01	5	6	9	3			33.86	
69	2115	11/20	36.8°	134.9°	64.0	08	16	61.5	55.0	26	02	8	1	9	3			33.95	
70	0200	11/21	37.3°	135.1°	62.7	07	16	60.1	54.8	27	02	8	1	9	3			33.77	0.33

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
71	1530	11/21	38.0°	135.3°	63.9	06	13	59.6	54.9	29	02	8	1	9	3			34.07	
72	2020	11/21	38.6°	135.4°	62.0	08	16	59.9	54.9	31	03	8	4	9	3			33.55	
73	0215	11/22	39.2°	135.7°	61.4	09	14	61.1	56.2	29	03	8	6	9	3			33.51	
74	1630	11/22	39.3°	135.7°	61.4	09	06	59.9	54.4	27	02	4	5	9	2				
75	2110	11/22	39.8°	135.9°	61.0	09	08	58.0	54.9	26	02	4	2	9	2			33.44	
76	0235	11/23	40.2°	136.1°	60.4	15	10	59.9	56.1	25	03	4	5	9	2			33.66	
77	1625	11/23	40.2°	136.1°	60.1	16	14	60.0	56.0	24	02	5, 6	7	9	2				
78	2105	11/23	40.6°	136.4°	59.1	15	14	61.3	57.8	23	02	4, 6	8	9	3			33.48	
79	0200	11/24	41.1°	136.8°	59.2	16	14	60.0	57.7	22	02	6	8	9	3			33.46	0.34
80	2000	11/24	41.7°	137.1°	58.7	16	20	60.3	56.9	20	02	1, 4	3	9	5			33.46	
81	0030	11/25	42.2°	137.4°	58.0	16	20	61.3	57.8	18	03	1, 4	7	9	5			33.39	
82	0540	11/25	42.8°	137.9°	56.8	17	21	58.7	57.0	15	02	X	X	9	6			33.22	0.58
83	2110	11/25	42.2°	138.3°	58.4	22	18	59.0	56.0	14	02	0, 6	8	9	6			33.28	
84	0540	11/26	41.6°	138.9°	59.0	25	08	57.0	52.1	22	02	X	1	9	4			33.49	
85	1705	11/26	40.9°	139.5°	58.8	17	12	60.0	56.9	25	02	1, 4, 8	4	9	3			33.31	
86	2110	11/26	40.5°	139.8°	60.5	17	19	62.5	58.0	25	02	1, 4, 8	6	9	4			33.60	
87	0225	11/27	40.2°	140.1°	61.6	15	22	62.1	57.5	24	02	6	7	9	4			33.82	
88	1810	11/27	39.8°	140.5°	62.3	18	15	63.9	61.3	23	02	1, 6, 4	7	9	4			33.80	
89	0005	11/28	39.3°	140.9°	61.9	16	13	63.8	61.0	23	02	1, 5	7	9	4			33.77	
90	0600	11/28	38.8°	141.2°	64.0	16	17	64.8	62.6	21	02	X	3	9	4			34.23	0.19
91	1630	11/28	38.5°	141.7°	63.3	16	17	65.0	61.8	20	02	5, 6	7	9	5			33.98	
92	2105	11/28	38.9°	142.0°	62.0	16	13	65.2	61.9	19	02	4	7	9	5			33.62	
93	0130	11/29	39.4°	142.3°	62.0	15	16	63.8	61.0	18	02	1, 6, 5	6	9	5			33.73	
94	0530	11/29	39.9°	142.6°	61.2	15	20	63.5	61.0	17	02	X	X	9	5			33.66	0.32
95	2005	11/29	40.6°	143.1°	59.1	15	26	63.8	61.2	15	60	0	8	5	5			33.22	
96	0100	11/30	41.0°	143.5°	59.6	15	27	63.0	60.8	12	60	0	8	5	5			33.42	
97	2330	11/30	41.6°	143.6°	58.7	17	10	59.8	56.7	16	02	5	8	9	3			33.33	
98	0555	12/1	42.2°	143.9°	55.9	15	03	57.2	54.9	20	60	X	8	X	3			32.99	0.55
99	1150	12/1	43.1°	144.5°	55.1	34	02	56.4	54.0	21	60	X	8	X	3			32.84	
100	1730	12/1	43.8°	144.9°	54.0	34	05	52.6	48.0	22	02	8	6	7	3			32.74	0.69
101	2345	12/1	43.2°	145.4°	54.5	06	21	52.0	51.2	19	61	0	8	4	3			32.77	
102	0530	12/2	42.6°	145.8°	55.7	19	17	60.0	58.5	17	01	X	X	X	3			32.95	
103	1750	12/2	41.6°	144.2°	57.1	17	16	59.8	58.2	17	02	5	7	8	3				
104	2350	12/2	41.2°	143.5°	59.7	21	18	61.4	59.9	16	02	6	8	8	3				
105	0540	12/3	40.7°	142.7°	60.1	24	15	62.1	60.5	17	02	X	8	X	3				

Table 5.--Summary of observations at bathythermograph lowerings, John R. Manning, cruise 33
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
106	1615	12/3	39.9°	141.5°	60.9	02	23	55.8	53.7	19	61	0	8	8	3				
107	2105	12/3	39.3°	141.5°	62.5	06	23	57.0	56.1	20	60	0	8	3	4				
108	0200	12/4	38.6°	141.6°	61.9	06	23	58.0	57.0	21	61	0	8	3	5			33.66	
109	0540	12/4	38.2°	141.6°	62.9	06	23	57.5	57.0	22	50	0	8	3	5			33.89	
110	1150	12/4	37.4°	141.6°	64.0	07	25	58.6	57.8	21	50	X	8	3	5			34.11	
111	1750	12/4	36.9°	142.2°	65.8	00	00	59.9	59.6	21	65	0	8	4	3			34.38	0.12
112	2300	12/4	37.1°	141.9°	64.2	07	23	56.4	56.2	20	51	0	8	4	4				
113	0530	12/5	36.5°	142.6°	65.0	07	25	60.7	57.9	20	02	X	8	X	6			34.31	
114	1200	12/5	35.9°	143.5°	65.0	11	21	63.8	58.2	17	02	X	8	8	6			34.23	
115	1820	12/5	35.4°	144.2°	65.7	12	34	62.8	59.2	15	60	0	8	8	6			34.38	
116	2350	12/5	35.0°	145.0°	65.1	12	24	63.5	63.3	12	63	0	8	3	5			34.14	0.29
117	0550	12/6	34.5°	145.7°	66.9	27	03	65.0	61.5	14	01	8	1	9	2			34.69	
118	1130	12/6	33.9°	146.4°	68.2	32	16	67.5	64.0	16	02	8	1	9	2			35.01	
119	1810	12/6	33.2°	147.1°	68.0	33	17	66.9	63.5	18	02	8	3	9	3			34.90	
120	2350	12/6	32.7°	147.8°	68.9	33	12	67.3	62.8	16	02	8	2	9	2			34.96	
121	0545	12/7	32.0°	148.4°	69.0	04	03	67.1	62.2	18	02	8	1	9	2			35.17	
122	1155	12/7	31.2°	149.0°	70.0	13	14	67.5	62.8	17	02	8	3	9	2			35.23	
123	1800	12/7	30.6°	149.6°	69.8	19	16	70.0	64.8	15	02	8, 5	8	9	3			35.07	
124	0000	12/8	30.0°	150.1°	70.8	19	19	72.0	67.2	13	02	0	8	8	5			35.25	
125	0550	12/8	29.5°	150.5°	71.0	17	18	68.8	68.0	14	63	0	8	X	4			35.26	
126	1200	12/8	28.9°	150.9°	72.0	18	20	71.5	70.0	14	02	X	8	X	5			35.39	
127	1800	12/8	28.2°	151.4°	72.4	18	21	73.4	71.6	15	01	1, 8	6	9	4			35.23	
128	2350	12/8	27.7°	151.8°	72.7	18	17	74.1	71.9	15	02	1, 8	4	9	4			35.23	
129	0545	12/9	27.0°	152.3°	73.1	13	23	74.4	70.5	17	02	8	2	9	4			35.23	
130	1740	12/9	26.0°	153.3°	74.0	13	27	74.0	70.2	19	02	6, 8	4	9	5			35.17	
131	0550	12/10	25.0°	154.4°	74.1	12	23	74.9	69.5	20	01	6	6	9	5			35.14	
132	1800	12/10	23.8°	155.6°	75.0	11	20	74.9	74.0	20	02	6, 1	7	9	4			35.07	
133	0545	12/11	22.6°	156.6°	76.2	11	26	74.9	71.1	17	02	4, 6, 8	5	9	4			34.94	

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/19	24.2°	156.3°	0600	99	05	08	02	2	1018.3	3	17	77.1	73.0	77.5	7	X	X	X	X	X	09	3	2
10/19	25.6°	155.7°	1800	98	10	10	02	2	1018.0	2	09	74.2	68.7	76.5	8	8	5	6	X	X	12	4	2
10/20	26.3°	155.3°	0000	98	00	02	51	5	1017.3	7	24	74.4	71.6	76.4	8	8	4	5	X	X	12	3	2
10/20	27.0°	154.9°	0600	98	05	04	50	2	1017.3	4	00	72.4	70.0	76.0	8	8	8	5	X	X	10	3	2
10/20	28.5°	154.2°	1800	99	08	11	15	2	1015.6	4	00	73.5	69.0	75.4	7	4	5	5	2	1	13	3	2
10/21	29.3°	153.8°	0000	99	13	16	02	2	1014.2	6	17	76.5	70.6	74.7	7	4	8	5	1	X	14	3	2
10/21	30.0°	153.5°	0600	99	13	16	02	2	1015.2	2	24	75.0	71.5	73.8	7	X	X	X	X	X	14	3	3
10/21	31.5°	152.6°	1800	96	13	13	63	6	1018.3	2	17	69.6	68.9	72.1	8	8	6	4	X	X	14	3	3
10/22	32.3°	152.2°	0000	97	14	16	50	5	1019.3	4	00	70.0	67.2	71.8	8	8	8	X	X	X	14	3	4
10/22	33.0°	151.9°	0600	98	13	22	02	2	1023.7	2	27	72.5	69.8	71.6	8	X	X	X	X	X	18	3	4
10/22	33.5°	151.5°	1200	99	11	18	01	2	1024.4	4	00	71.9	69.0	71.0	6	4	8	5	4	0	18	3	4
10/22	34.2°	151.0°	1800	99	13	16	01	2	1026.1	2	09	71.1	68.0	70.3	7	2	1	5	7	9	18	3	3
10/23	35.0°	150.5°	0000	99	09	14	02	1	1025.7	8	14	70.1	67.0	70.1	2	1	1	5	0	8	13	3	3
10/23	35.9°	150.4°	0600	99	09	12	02	0	1027.8	1	20	69.9	66.1	69.9	2	X	X	X	X	X	13	3	2
10/23	36.6°	150.1°	1200	99	09	12	02	2	1027.4	4	00	69.0	65.9	68.0	6	6	1	0	0	0	10	3	2
10/23	37.5°	149.7°	1800	99	13	12	02	0	1028.4	2	10	67.0	64.0	65.9	2	2	1	5	3	1	15	3	2
10/24	38.1°	149.2°	0000	99	15	12	03	0	1027.1	7	17	66.9	63.9	66.6	3	3	1	5	0	0	35	4	4
10/24	38.9°	149.0°	0600	99	18	11	02	0	1026.8	4	00	66.3	64.0	64.2	3	3	1	5	X	X	13	3	3
10/24	39.5°	148.8°	1200	99	20	13	03	1	1025.7	7	07	64.6	63.1	63.9	7	7	4	5	X	X	35	3	4
10/24	40.4°	148.3°	1800	99	19	15	01	2	1023.7	7	07	66.0	63.9	63.0	6	1	1	5	7	1	20	3	3
10/25	40.5°	148.2°	0000	98	19	22	02	2	1020.7	7	20	66.1	63.9	63.0	8	8	5	6	X	X	19	3	4
10/25	40.3°	148.2°	0600	97	22	16	63	6	1021.3	2	09	64.9	64.0	63.8	8	8	6	X	X	X	20	3	3
10/25	40.4°	148.3°	1800	98	04	24	61	6	1025.4	2	24	59.9	58.4	63.9	8	8	6	X	X	X	06	3	3
10/26	40.8°	148.0°	0000	99	06	15	02	2	1026.4	4	00	57.2	52.1	60.8	8	4	5	5	2	X	03	3	4
10/26	41.0°	147.9°	0600	99	05	12	02	2	1029.5	2	17	55.0	50.9	59.5	7	X	X	X	X	X	03	3	3
10/26	40.9°	148.0°	1800	98	06	14	02	2	1031.8	2	09	55.0	49.0	60.1	8	5	5	5	2	X	05	2	3
10/27	41.6°	147.6°	0000	99	06	15	02	2	1032.5	4	00	54.4	49.2	58.8	8	5	5	5	2	X	00	3	3
10/27	41.9°	147.5°	0600	99	13	10	01	2	1034.5	1	10	53.0	48.1	58.0	4	X	X	X	X	X	13	3	3
10/27	41.9°	147.9°	1800	99	16	06	02	1	1036.2	2	10	55.2	49.0	58.2	5	5	5	5	0	0	00	4	3
10/28	42.1°	147.6°	0000	99	21	12	02	1	1033.9	8	24	56.5	51.5	58.0	6	0	0	9	0	8	40	4	3

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/28	42.1°	147.2°	0600	99	22	12	01	2	1033.5	4	00	58.6	53.2	57.8	3	X	X	X	X	X	22	3	3
10/28	42.2°	147.0°	1800	98	24	19	02	2	1026.8	6	10	60.1	57.8	57.9	8	8	5	7	X	X	20	2	3
10/29	42.7°	146.5°	0000	96	28	23	63	6	1020.3	7	44	59.0	58.1	56.7	8	8	6	3	X	X	27	3	4
10/29	42.9°	146.5°	0600	96	01	11	61	6	1016.9	6	14	54.0	52.9	56.3	8	8	6	3	X	X	27	3	2
10/29	43.0°	146.5°	1800	99	32	33	27	1	1017.6	2	20	51.9	45.9	56.3	6	6	8	5	0	0	82	3	0
10/30	43.0°	146.6°	0000	99	32	40	02	2	1018.6	4	00	52.9	46.5	56.0	7	7	8	6	0	0	82	3	6
10/30	43.0°	146.6°	0600	99	30	32	02	2	1022.4	2	17	50.6	44.0	55.5	8	8	X	X	X	X	82	3	6
10/30	43.3°	146.8°	1800	99	30	29	02	2	1025.7	2	05	51.5	45.6	54.9	7	5	8	5	7	0	30	3	8
10/31	43.5°	146.9°	0000	99	27	25	02	2	1023.4	7	17	53.0	47.0	54.4	7	7	8	6	X	X	30	3	8
10/31	43.7°	146.9°	0600	98	29	25	61	2	1022.0	5	17	53.6	48.0	53.7	8	X	X	X	X	X	30	3	8
10/31	43.8°	147.2°	1800	96	26	35	61	2	1011.2	4	00	58.2	56.5	54.0	8	8	6	X	X	X	76	2	1
11/1	43.9°	147.3°	0000	96	26	28	02	5	1010.8	6	10	60.2	57.6	54.8	8	8	6	3	X	X	30	3	8
11/1	43.8°	146.3°	0600	96	25	25	02	2	1009.8	4	00	60.2	57.8	54.2	8	8	6	3	X	X	25	3	8
11/1	44.2°	144.0°	1800	97	23	26	01	2	1011.5	5	07	57.5	55.1	51.0	7	3	6	3	4	9	23	3	8
11/2	44.3°	143.5°	0000	96	22	23	02	2	1010.5	4	00	58.9	56.4	52.6	8	8	6	3	X	X	22	3	8
11/2	44.4°	142.8°	0600	96	20	23	02	2	1011.2	2	09	57.8	56.6	53.2	8	8	6	3	X	X	20	3	8
11/2	44.7°	140.7°	1800	96	19	26	10	2	1013.2	2	17	58.0	56.3	53.4	8	8	6	3	X	X	70	3	0
11/3	44.8°	139.7°	0000	95	19	26	02	2	1013.2	4	00	57.9	56.1	52.8	8	8	6	3	X	X	70	3	0
11/3	45.0°	138.7°	0600	95	20	24	02	2	1015.2	2	14	58.6	56.1	53.0	8	8	6	3	X	X	22	3	9
11/3	45.4°	136.9°	1800	94	19	24	28	2	1017.3	3	10	56.8	55.1	52.0	8	8	6	3	X	X	26	4	7
11/4	45.5°	135.9°	0000	98	20	24	01	2	1015.9	6	17	57.8	55.1	52.5	6	4	8	6	0	9	26	4	7
11/4	45.7°	134.6°	0600	98	19	28	02	2	1015.9	4	00	56.0	54.8	52.2	8	X	X	X	X	X	19	3	6
11/4	45.9°	132.7°	1800	93	19	14	61	2	1015.9	2	09	55.5	54.5	53.3	8	8	6	3	X	X	19	4	4
11/5	46.0°	131.5°	0000	96	17	16	02	2	1015.2	4	00	57.5	55.8	53.0	8	8	5	3	X	X	17	3	3
11/5	46.1°	129.9°	0600	96	20	21	61	2	1015.9	2	07	56.5	54.9	54.5	8	8	X	X	X	X	19	3	3
11/5	46.1°	127.9°	1800	95	32	22	50	2	1021.3	2	24	52.9	51.9	56.0	8	8	6	X	X	X	30	3	4
11/6	46.2°	126.8°	0000	98	34	22	02	2	1025.4	2	17	52.0	47.5	55.0	7	7	5	4	0	0	30	3	4
11/6	46.2°	125.5°	0600	XX	33	17	02	2	1028.1	2	17	51.5	46.0	53.2	8	X	X	X	X	X	33	3	4
11/14	43.6°	127.2°	0600	99	33	11	02	0	1030.8	1	17	54.0	48.9	55.0	1	1	1	4	0	0	33	4	6
11/14	42.4°	127.0°	1800	99	01	09	02	1	1027.8	6	07	53.8	48.9	57.1	6	5	4	4	1	X	33	4	4

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/15	41.9°	127.8°	0000	99	27	06	03	2	1025.1	7	10	55.2	49.0	55.5	8	3	4	4	1	0	34	4	4
11/15	41.9°	127.9°	0600	99	22	10	02	2	1023.7	8	05	54.3	49.1	56.1	7	6	4	4	1	0	34	4	4
11/16	41.1°	128.3°	0000	98	24	19	02	2	1023.0	3	10	60.6	59.0	59.4	8	8	5	3	X	X	25	3	5
11/16	40.6°	128.7°	0600	98	23	14	02	2	1024.4	2	07	61.2	59.7	60.0	8	8	5	3	X	X	25	3	4
11/16	40.2°	129.1°	1800	98	27	17	14	2	1025.7	2	10	60.4	58.5	58.6	8	8	5	3	X	X	27	3	5
11/17	39.6°	129.5°	0000	99	22	14	01	2	1026.4	3	00	62.0	59.8	59.0	7	3	8	4	5	X	24	3	3
11/17	39.5°	129.4°	0600	99	25	13	02	1	1028.1	2	10	63.5	60.6	61.0	6	6	5	5	X	X	24	4	3
11/17	39.1°	129.8°	1800	98	05	14	02	2	1031.8	2	17	58.0	54.9	60.3	8	8	5	5	X	X	30	3	4
11/18	38.8°	130.5°	0000	99	05	13	02	2	1031.2	6	05	60.8	55.0	61.0	7	7	4	5	0	1	32	4	4
11/18	38.7°	130.6°	0600	99	05	12	02	2	1031.2	1	03	58.4	52.7	61.0	7	7	1	4	5	X	32	4	3
11/18	38.5°	130.8°	1800	99	02	18	02	2	1031.8	1	07	56.2	50.1	61.0	7	7	8	5	0	0	34	4	6
11/19	38.2°	131.6°	0000	99	03	13	02	2	1030.1	7	02	58.0	51.9	61.5	7	7	8	5	0	0	34	4	5
11/19	38.1°	131.8°	0600	99	04	18	02	2	1030.1	4	00	57.6	51.9	61.5	8	8	8	4	X	X	34	4	5
11/19	37.9°	132.1°	1800	99	05	18	02	2	1029.8	1	10	57.3	50.4	61.5	7	7	8	4	X	X	35	4	4
11/20	37.5°	132.9°	0000	99	05	14	01	2	1028.1	7	10	57.8	51.1	62.6	7	7	8	4	X	X	02	3	4
11/20	37.1°	133.7°	0600	99	04	11	02	2	1028.1	4	00	58.6	53.7	62.6	7	7	8	4	0	0	04	3	4
11/20	36.6°	134.2°	1200	99	05	14	02	2	1026.8	4	00	58.5	53.2	63.1	7	7	8	4	0	0	04	3	4
11/20	36.5°	134.8°	1800	99	08	16	02	2	1027.8	3	07	60.9	54.7	63.6	4	4	4	4	0	0	06	3	3
11/21	37.1°	135.0°	0000	99	08	16	02	0	1026.4	5	00	61.1	55.7	64.1	1	1	1	4	0	0	07	3	4
11/21	37.5°	135.0°	0600	99	04	12	02	0	1028.1	2	17	59.8	55.1	62.7	0	0	0	9	0	0	07	3	4
11/21	38.3°	135.4°	1800	99	09	15	02	0	1030.1	3	17	60.3	55.3	62.0	1	1	1	4	0	0	04	3	4
11/22	39.0°	135.6°	0000	99	06	15	02	0	1028.8	6	10	59.8	55.1	61.5	2	2	1	4	0	1	06	3	4
11/22	39.2°	135.7°	0600	99	06	16	02	0	1028.1	4	00	60.2	56.0	62.0	2	2	8	5	0	0	06	3	4
11/22	39.4°	135.7°	1800	99	12	10	02	0	1027.4	0	00	59.9	54.5	61.2	1	1	1	5	4	0	28	4	4
11/23	40.0°	136.0°	0000	99	12	09	02	0	1024.7	7	09	60.0	55.2	60.2	3	3	0	0	3	0	28	4	2
11/23	40.2°	136.1°	0600	99	16	13	02	2	1025.4	4	00	60.1	56.5	60.4	9	X	X	X	X	X	28	4	2
11/23	40.4°	136.2°	1800	99	16	15	02	2	1024.4	2	03	60.1	56.9	59.7	7	7	8	4	X	X	18	3	3
11/24	40.9°	136.7°	0000	99	16	15	02	2	1021.7	7	14	59.8	57.4	59.2	8	8	8	6	X	X	16	3	3
11/24	41.1°	135.8°	0600	99	16	14	02	2	1021.7	4	00	59.9	56.9	59.2	8	X	X	X	X	X	16	3	3
11/24	41.4°	136.9°	1800	99	15	18	02	1	1020.0	4	00	60.0	56.2	59.1	6	6	0	X	3	0	21	4	5

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/25	42.2°	137.4°	0000	99	16	20	03	1	1017.6	6	07	61.3	57.8	59.2	7	0	0	X	7	9	24	4	7
11/25	42.7°	137.8°	0600	99	17	24	02	1	1015.2	7	17	58.7	57.0	56.8	X	X	X	X	X	X	19	3	8
11/25	42.4°	138.2°	1800	96	17	12	63	6	1011.9	2	14	58.2	57.2	57.6	8	8	6	3	X	X	19	3	9
11/26	41.9°	138.6°	0000	99	28	26	02	8	1016.6	2	34	57.0	53.5	58.9	7	7	8	4	0	0	22	3	7
11/26	41.7°	138.9°	0600	99	25	08	02	0	1021.7	2	27	57.0	52.1	59.0	1	X	X	X	X	X	22	3	6
11/26	40.8°	139.5°	1800	99	14	14	02	1	1025.1	2	14	61.9	57.9	58.8	5	1	2	4	0	2	22	3	5
11/27	40.3°	139.9°	0000	99	15	21	02	2	1023.4	7	14	62.1	57.5	61.6	6	3	8	4	0	2	17	3	6
11/27	40.0°	140.2°	0600	99	15	20	02	2	1024.0	2	07	63.2	57.5	61.9	4	X	X	X	X	X	15	3	6
11/27	39.8°	140.5°	1800	99	18	15	02	2	1023.0	0	00	63.9	61.3	62.2	7	4	8	4	7	1	22	3	7
11/28	39.4°	140.9°	0000	99	16	13	02	2	1021.3	7	03	63.8	61.0	61.7	7	1	8	4	1	1	22	3	8
11/28	38.7°	141.2°	0600	99	16	17	02	1	1021.3	4	00	64.8	62.6	64.1	3	X	X	X	X	X	22	3	8
11/28	38.6°	141.8°	1800	99	16	17	02	2	1020.3	2	07	65.0	61.8	62.7	7	7	8	6	X	1	22	3	8
11/29	39.2°	142.2°	0000	99	15	17	02	2	1017.6	7	20	65.0	61.7	62.0	8	8	8	6	X	X	73	3	1
11/29	39.8°	142.5°	0600	99	15	20	02	2	1016.9	5	00	63.5	61.0	61.2	8	X	X	X	X	X	73	3	1
11/29	40.3°	143.0°	1800	96	16	20	61	6	1015.6	3	00	63.8	62.0	61.1	8	8	6	2	X	X	23	4	7
11/30	41.0°	143.4°	0000	96	15	25	60	6	1012.5	6	17	62.8	60.8	58.8	8	8	6	4	X	X	15	3	6
11/30	41.2°	143.5°	0600	XX	16	32	60	6	1009.8	7	10	63.6	61.0	59.6	8	X	X	X	X	X	65	3	6
11/30	41.0°	143.2°	1800	97	18	19	60	6	1014.9	2	20	61.0	59.7	59.5	8	8	6	4	X	X	18	3	1
12/1	41.5°	143.6°	0000	99	17	10	02	2	1015.9	4	00	59.8	56.7	58.7	8	0	0	0	1	X	22	3	9
12/1	42.1°	144.0°	0600	XX	15	03	60	2	1020.0	2	15	57.2	54.9	55.9	8	X	X	X	X	X	22	4	9
12/1	42.9°	144.7°	1200	XX	34	02	60	2	1021.0	2	03	56.4	54.0	55.1	8	X	X	X	X	X	22	4	6
12/1	43.4°	145.1°	1800	98	34	05	02	2	1022.0	2	09	52.6	48.0	54.0	8	8	8	4	X	X	22	4	6
12/2	42.8°	145.6°	0000	95	06	21	61	6	1019.3	7	24	52.0	51.2	54.5	8	8	6	2	X	X	22	4	5
12/2	42.6°	145.8°	0600	XX	19	18	02	2	1016.9	4	00	60.0	58.5	55.7	X	X	X	X	X	X	19	3	4
12/2	41.6°	144.2°	1800	98	17	16	02	2	1016.9	2	10	59.8	58.2	57.1	7	0	0	0	1	X	18	3	5
12/3	41.1°	143.4°	0000	98	21	18	02	2	1016.3	7	10	61.4	59.9	59.7	8	8	8	6	X	X	21	3	5
12/3	40.9°	142.9°	0600	XX	24	15	02	2	1016.6	4	00	62.1	60.5	60.1	8	X	X	X	X	X	21	3	4
12/3	39.7°	141.5°	1800	94	06	22	61	6	1020.0	2	20	56.1	55.3	60.9	8	8	6	3	X	X	03	3	4
12/4	38.9°	141.5°	0000	95	06	23	60	6	1019.6	6	03	58.8	56.2	62.4	8	8	6	3	X	X	01	4	7
12/4	38.1°	141.5°	0600	95	06	23	50	5	1022.0	2	17	57.5	57.0	63.0	8	8	6	3	X	X	01	4	9

Table 6.--Log of ship's weather observations, John R. Manning cruise 33, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
12/4	37.3°	141.6°	1200	XX	07	25	50	5	1021.3	7	09	58.6	57.8	64.0	8	X	X	X	X	X	05	4	9
12/4	36.9°	142.1°	1800	94	00	00	65	6	1020.7	0	00	59.9	59.6	55.8	8	8	6	3	X	X	05	3	6
12/4	37.1°	141.9°	2300	95	07	23	51	5	1021.0	6	07	56.4	56.2	64.2	8	8	6	3	X	X	07	3	5
12/5	36.4°	142.6°	0600	XX	07	25	02	2	1019.6	4	00	60.7	57.9	64.5	8	X	X	X	X	X	05	3	8
12/5	35.8°	143.3°	1200	98	11	21	02	2	1016.6	7	31	63.8	58.2	65.0	8	X	X	X	X	X	05	3	8
12/5	35.4°	144.2°	1800	98	12	34	60	6	1014.9	6	07	62.8	59.2	65.2	8	8	6	3	X	X	07	3	9
12/6	34.9°	144.9°	0000	94	12	24	63	6	1011.9	7	24	63.5	63.3	65.1	8	8	6	3	X	X	07	3	9
12/6	34.4°	145.7°	0600	99	27	03	01	1	1013.9	2	17	65.0	61.5	66.9	1	1	1	4	0	0	07	3	6
12/6	33.8°	146.3°	1200	99	32	16	02	0	1015.9	2	14	67.5	64.0	68.1	1	1	1	4	0	0	26	3	4
12/6	33.3°	147.1°	1800	99	33	17	02	0	1018.3	2	17	66.9	63.5	68.0	3	3	2	4	0	0	28	3	5
12/7	32.6°	147.8°	0000	99	33	12	02	0	1015.9	7	31	67.3	62.8	68.9	2	2	1	4	0	0	28	4	5
12/7	31.9°	148.4°	0600	99	04	03	02	0	1018.0	2	10	67.1	62.2	68.6	1	1	1	4	0	0	28	4	5
12/7	31.4°	148.9°	1200	99	13	14	02	0	1016.9	7	07	67.5	62.8	70.1	3	3	X	X	X	X	28	4	3
12/7	30.6°	149.6°	1800	99	19	16	02	2	1015.2	4	00	70.0	64.8	69.0	8	2	1	4	2	X	06	4	3
12/8	30.0°	150.0°	0000	98	19	19	02	2	1013.2	6	20	72.0	67.2	70.4	8	8	6	4	X	X	19	3	5
12/8	29.6°	150.5°	0600	XX	17	18	62	2	1014.2	2	07	68.6	68.0	70.9	8	8	6	X	X	X	19	3	5
12/8	28.9°	151.0°	1200	XX	18	20	02	2	1013.5	7	07	71.5	70.0	72.0	8	X	X	X	X	X	18	3	7
12/8	28.3°	151.4°	1800	99	18	21	01	2	1014.6	2	10	73.4	71.6	72.4	6	6	2	4	0	1	18	3	6
12/9	27.6°	151.8°	0000	99	18	17	02	1	1014.6	7	17	74.1	71.9	72.7	6	6	2	4	0	1	18	3	5
12/9	27.0°	152.4°	0600	99	13	23	02	1	1016.9	2	17	74.4	70.5	72.5	2	2	1	4	X	X	18	3	5
12/9	20.0°	153.4°	1800	99	13	27	02	1	1018.6	2	14	74.0	70.2	74.0	4	4	8	4	2	X	13	3	9
12/10	25.5°	153.9°	0000	99	12	23	14	2	1017.3	7	20	74.0	70.3	73.8	7	7	8	4	X	X	13	3	8
12/10	25.0°	154.4°	0600	99	12	23	01	8	1019.6	2	20	74.9	69.5	74.1	6	6	8	5	X	1	13	3	7
12/10	23.7°	155.6°	1800	99	11	20	02	2	1020.0	2	07	74.9	70.0	75.0	7	7	8	4	X	1	12	3	7
12/11	23.3°	156.1°	0000	99	11	14	02	2	1019.6	7	10	76.0	71.0	75.6	7	4	8	4	2	1	12	3	8
12/11	22.6°	156.6°	0600	99	11	26	02	2	1016.6	7	09	74.9	71.1	76.2	5	3	8	4	5	X	12	3	6

Table 7.--Light penetration and water color, John R. Manning cruise 33, October - December 1956

Date, 1956	Time, LCT[1]/	Latitude, N.	Longitude, W.	Sea[2]/	Cloud cover[2]/	Water color (Forel)	Secchi, meters
10/21		32.0°	152.3°	3	8	2	28
10/22		34.8°	150.6°	3	4	2	29
10/23		37.9°	149.4°	2	0	2	31
10/24		40.7°	148.2°	3	8	3	18
10/26		41.5°	147.7°	3	-	4	18
10/27		42.1°	147.9°	3	-	4	20
11/12		44.0°	126.0°	2	8	6	13
11/14		42.2°	127.3°	2	4	6	17
11/17		39.1°	129.9°	3	8	3	20
11/18		38.5°	131.1°	3	-	3	20
11/19		37.7°	132.5°	3	8	3	22
11/20		36.8°	134.9°	3	0	3	29
11/21		38.6°	135.4°	3	-	2	31
11/22		39.8°	135.9°	2	0	3	24
11/23		40.6°	136.4°	3	8	4	20
11/26		40.5°	139.8°	4	-	3	20
11/27		39.5°	140.8°	4	8	3	24
11/28		38.9°	142.0°	5	-	3	20
11/30		41.2°	143.4°	3	-	4	18
12/4		37.1°	142.0°	3	-	4	--

[1]/ Not recorded. Taken about noon.

[2]/ For coded values see H. O. Pub. 606-C.

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, μg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
1	1730	10/23	22.8°	156.5°	78.2	10	16	78.0	72.5	19	03	8	3	8	3	09	3	34.90	
2	0000	10/24	23.4°	156.0°	78.6	09	16	76.8	72.6	18	03	6	7	8	4	10	3	34.96	
3	0530	10/24	24.0°	155.4°	78.2	08	11	77.7	71.7	20	02	6	7	5	4	10	3	34.92	0.05
4	1130	10/24	24.7°	154.8°	78.0	09	16	77.2	69.9	19	00	4, 8	2	5	3	10	3	34.88	
5	1730	10/24	25.4°	154.3°	76.9	09	16	76.5	70.0	16	03	4, 6	5	7	3	10	3	35.17	0.08
6	0045	10/25	26.0°	153.7°	76.9	09	16	76.0	71.0	19	01	4, 8	4	7	3	10	3	35.16	0.06
7	0530	10/25	26.5°	153.3°	76.0	07	18	73.7	71.6	20	00	X	X	5	3	10	3	35.21	0.27
8	1110	10/25	27.2°	152.8°	75.9	07	18	75.0	71.5	20	01	8	4	5	3	10	3	35.34	0.23
9	1730	10/25	28.0°	152.2°	75.8	12	13	74.4	69.7	21	02	6	7	8	3	10	3	35.16	0.04
10	0030	10/26	28.7°	151.7°	75.2	12	15	75.5	67.0	20	01	8, 2	6	7	3	10	3	35.34	
11	0530	10/26	29.3°	151.2°	75.0	11	15	74.9	67.5	21	02	X	X	2	3	10	3	35.44	0.06
12	1130	10/26	30.0°	150.6°	74.0	12	15	74.0	66.8	21	02	X	X	2	3	10	3	35.43	
13	1730	10/26	30.3°	150.1°	73.8	10	14	72.9	68.9	23	01	2, 8	2	7	3	10	2	35.43	
14	2330	10/26	31.6°	149.5°	73.2	10	14	72.8	68.8	23	03	4, 8	6	7	3	10	3	35.30	
15	0530	10/27	32.1°	149.0°	73.5	10	14	73.0	69.2	24	00	X	X	5	3	10	3	35.25	
16	1115	10/27	32.8°	148.4°	71.5	10	14	71.5	66.8	26	00	X	X	5	3	10	3	34.99	
17	1730	10/27	33.6°	147.8°	71.4	11	18	68.0	66.8	29	50	6, 8	8	8	3	09	3	35.08	0.04
18	0015	10/28	34.3°	147.2°	71.3	09	18	68.2	63.5	30	02	6, 8	5	8	4	05	5	35.07	
19	0530	10/28	34.9°	146.6°	70.0	09	19	66.2	61.9	32	02	X	X	5	3	07	4	34.94	0.07
20	1130	10/28	35.6°	146.0°	68.2	08	10	64.7	57.0	33	02	X	6	5	2	07	3	34.42	
21	1730	10/28	36.2°	145.4°	68.3	35	02	62.8	56.7	33	02	1, 6, 8	5	9	1	03	1	34.65	0.16
22	0030	10/29	36.8°	144.8°	67.5	28	14	63.4	58.2	30	03	6	6	8	2	01	1	34.40	
23	0235	10/29	37.4°	144.4°	66.8	28	18	62.0	58.4	27	02	6, 4	8	6	3	01	3	34.29	0.11
24	1300	10/29	37.3°	144.4°	66.5	28	18	66.1	61.2	22	00	X	X	5	3	10	3	34.25	
25	1715	10/29	37.3°	144.4°	66.8	25	30	67.2	64.5	21	03	4	8	6	4	25	4	34.25	
26	1730	10/31	38.7°	143.8°	63.0	24	17	62.1	54.2	27	00	X	X	5	4	25	4	34.61	
27	0530	11/2	39.3°	140.0°	63.6	23	14	64.1	61.7	24	01	X	3	5	4	25	4	33.91	
28	1130	11/2	39.2°	140.5°	62.8	18	16	64.0	62.0	24	00	X	X	5	5	22	4	33.87	
29	1730	11/2	39.2°	140.7°	62.6	18	21	65.0	62.0	24	01	X	0	7	5	20	4	33.78	0.41
30	0015	11/3	39.9°	140.1°	63.0	18	21	67.0	63.5	22	03	6	3	7	4	20	4	33.93	
31	0530	11/3	40.5°	139.6°	59.9	18	18	63.6	61.1	22	03	X	6	2	4	21	4	33.35	0.51
32	1130	11/3	41.2°	139.3°	59.9	18	22	63.0	61.1	21	00	X	X	2	3	20	4	33.26	
33	1730	11/3	41.6°	139.0°	61.1	19	21	63.0	60.5	20	03	6	7	7	4	19	4	33.51	0.32
34	2330	11/3	41.1°	138.4°	60.8	18	20	64.0	60.8	19	02	6	7	7	4	20	4	33.58	
35	0530	11/4	40.6°	138.0°	61.1	19	21	63.7	61.1	19	00	X	X	5	4	20	4	33.57	0.28

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
36	1730	11/4	40.8°	137.7°	61.0	21	18	63.0	60.5	17	02	6, 8	7	7	4	18	3	33.58	0.33
37	2330	11/4	40.4°	137.3°	60.4	20	22	63.8	61.0	16	03	6, 8	8	7	4	18	4	33.51	
38	1745	11/5	40.0°	136.6°	61.4	06	18	59.0	57.9	24	02	6, 8	8	7	4	00	4	33.68	0.29
39	0245	11/6	40.2°	136.2°	61.8	20	15	62.8	61.0	25	02	X	X	2	2	35	1	33.68	
40	1715	11/6	40.2°	136.2°	61.0	19	15	61.3	59.7	25	02	6	8	8	3	18	4		
41	2345	11/6	39.7°	135.9°	62.0	19	15	62.8	61.0	23	02	6	8	8	3	18	4	33.39	
42	1720	11/7	39.6°	135.4°	61.7	19	17	63.7	61.2	22	02	6	7	8	3	19	1	33.26	0.34
43	2350	11/7	38.9°	135.1°	62.3	20	17	64.5	62.4	22	02	6	8	7	3	20	1	33.42	
44	0230	11/8	38.5°	134.9°	62.3	20	09	64.7	62.2	23	02	8	8	5	2	20	1	33.30	0.31
45	1645	11/8	38.6°	134.7°	61.8	22	18	64.0	62.3	23	02	8	8	7	3	20	1		
46	2330	11/8	38.1°	134.4°	62.4	24	13	63.9	61.7	21	02	6, 4	8	8	3	30	1	33.33	
47	0235	11/9	37.7°	134.2°	62.5	24	10	63.8	62.0	21	02	6, 8	8	6	2	16	1	33.30	0.33
48	1730	11/9	37.8°	134.1°	62.3	20	12	63.9	62.0	22	01	1, 6	7	8	2	20	1		
49	2330	11/9	38.0°	133.4°	62.3	17	12	63.7	61.0	20	02	1, 6	7	8	2	17	1	33.10	
50	0245	11/10	38.4°	132.9°	62.5	17	13	62.9	59.7	21	02	1, 4	4	5	2	17	1	33.08	0.46
51	1715	11/10	38.5°	132.8°	61.7	17	12	62.7	59.2	21	03	6	7	7	2	17	1	33.08	
52	2330	11/10	38.8°	132.0°	62.0	17	12	63.0	60.4	21	03	3, 4	5	8	2	17	1	33.06	
53	0200	11/11	39.0°	131.4°	61.5	14	09	62.6	59.8	23	02	3, 4	5	5	2	17	1	32.79	0.29
54	1700	11/11	39.1°	131.4°	61.2	30	15	60.7	58.1	24	02	6	8	6	2	28	1	32.77	
55	2330	11/11	39.7°	130.6°	60.3	31	06	58.8	58.0	23	03	4, 6	8	6	2	28	1	32.68	0.38
56	0205	11/12	39.9°	130.3°	61.0	05	05	59.2	57.8	23	20	6	8	2	2	28	1	33.03	0.35
57	1645	11/12	40.0°	130.1°	61.0	30	11	59.8	56.8	26	03	8	5	7	2	28	1	33.03	
58	2135	11/12	40.3°	129.6°	60.6	30	15	61.3	58.2	26	02	6, 8	7	7	2	31	1	32.77	0.45
59	1530	11/13	40.6°	129.1°	60.3	00	24	55.9	49.0	30	02	6, 8	8	7	5	02	4	32.77	0.36
60	2130	11/13	39.7°	129.0°	59.2	00	21	56.1	50.4	30	02	6, 8	8	7	5	00	6	32.57	
61	1530	11/14	38.7°	128.7°	52.5	02	19	56.0	49.5	27	01	6, 8	6	7	5	03	7	33.21	0.48
62	2130	11/14	38.0°	128.4°	62.2	02	19	57.0	50.5	26	02	6, 8	6	7	5	03	4	33.24	0.13
63	1530	11/15	37.8°	128.1°	61.0	34	13	58.0	52.2	16	03	6, 8	8	7	4	34	4	33.03	
64	2130	11/15	37.3°	127.8°	60.5	34	13	59.0	52.0	26	02	6, 8	7	8	2	34	4	33.01	0.41
65	0535	11/16	37.2°	127.7°	60.6	32	07	60.4	58.0	28	02	6, 8	7	5	2	35	4		
66	1620	11/16	37.1°	127.8°	60.6	32	08	59.5	58.9	28	20	6, 8	8	5	2	32	1	33.03	0.36
67	2050	11/16	36.7°	127.5°	60.6	33	11	60.0	58.1	28	01	6, 8	6	7	2	32	1	32.99	0.31
68	1805	11/17	36.6°	127.5°	60.2	32	08	62.8	60.7	30	03	1, 2	6	8	2	33	1	32.99	
69	0135	11/18	35.7°	127.0°	59.3	34	08	61.0	59.0	27	03	6	8	5	2	33	1	33.39	0.54
70	0530	11/20	32.6°	125.4°	62.2	02	17	59.0	54.0	20	02	4, 8	6	2	4	03	4	33.35	0.33

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, µg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
71	1730	11/20	33.4°	125.1°	62.4	05	17	59.6	56.0	23	02	2	6	8	4	03	4	33.39	0.07
72	2330	11/20	34.0°	124.8°	61.3	09	17	59.1	56.7	23	02	2	8	8	4	03	4	33.24	
73	1740	11/21	34.8°	124.3°	58.9	02	14	56.3	52.3	27	02	X	0	9	3	02	1	33.13	0.31
74	2330	11/21	35.5°	123.9°	53.8	33	13	55.0	53.0	24	02	X	0	8	3	35	3	33.44	
75	0530	11/22	36.2°	123.5°	55.1	33	16	55.7	52.0	23	02	X	0	5	3	33	3	33.53	0.31
76	1130	11/22	36.8°	123.2°	53.0	00	15	54.0	51.0	22	02	X	0	5	3	35	3	33.53	
77	0530	11/28	37.8°	123.8°	51.6	00	16	51.9	49.0	20	03	X	X	5	3	00	4	33.62	0.52
78	1145	11/28	38.0°	124.7°	52.5	00	18	53.7	52.5	20	02	X	X	5	3	34	4	33.08	
79	1730	11/28	38.0°	125.6°	58.0	01	12	55.5	52.5	23	02	8	8	6	3	35	4	32.95	
80	2330	11/28	38.0°	126.2°	59.3	00	10	57.6	53.9	23	02	6	7	7	2		9	33.10	
81	0530	11/29	37.9°	128.2°	61.3	03	07	56.8	55.6	25	02	X	X	5	2	00	9	33.30	0.30
82	1130	11/29	37.9°	128.9°	60.0	31	11	58.0	54.2	26	02	X	X	5	2	00	9	33.01	
83	1730	11/29	37.4°	129.5°	60.0	04	10	57.0	55.0	28	02	6	8	6	2	27	2	32.86	
84	2330	11/29	36.8°	129.5°	61.2	04	14	58.8	56.0	26	02	6	8	6	2	27	2	33.28	
85	1730	11/30	35.8°	129.7°	61.0	05	13	59.7	57.4	26	02	6	7	7	3	07	3	33.10	
86	2330	11/30	35.2°	129.7°	60.7	03	15	60.0	56.0	25	01	6	6	7	3	03	3	33.15	
87	1730	12/1	34.4°	129.7°	60.6	02	15	59.4	55.9	24	02	6	8	6	3	03	1	33.15	0.37
88	2330	12/1	33.7°	129.6°	61.6	00	13	60.0	57.8	22	02	6	8	6	2	01	1	33.24	
89	0130	12/2	33.4°	129.6°	62.0	00	08	60.2	56.0	22	02	6	8	6	2	20	1	33.42	
90	1615	12/2	33.3°	129.6°	61.7	23	06	59.6	54.0	20	02	8	8	7	0	-	9		
91	2055	12/2	32.8°	129.6°	61.8	22	06	61.2	54.8	20	02	8	8	7	0	0	0	33.33	
92	0130	12/3	32.3°	129.6°	63.8	22	08	60.8	54.7	19	02	8	8	7	0	0	0	33.93	0.34
93	1630	12/3	32.2°	129.6°	64.0	21	06	62.9	55.9	20	02	6, 8	8	6	0	03	2		
94	2330	12/3	31.4°	129.8°	64.7	17	08	63.1	58.9	18	02	3, 8	7	7	0	-	1	34.02	
95	0530	12/4	30.9°	130.5°	65.2	26	02	63.8	60.0	20	02	X	X	5	0	-	1	34.20	
96	1130	12/4	30.7°	131.1°	65.6	31	03	63.0	59.0	20	01	X	X	5	0	-	1	34.16	
97	1730	12/4	30.3°	132.4°	65.3	29	02	61.4	59.7	20	20	4, 8	6	6	0	-	1	34.16	
98	2330	12/4	29.9°	133.6°	67.0	00	06	64.6	59.0	19	02	2, 8	6	8	0	-	1	34.52	
99	0530	12/5	29.7°	134.6°	66.7	25	00	64.9	61.9	20	00	X	4	5	0	-	1	34.58	
100	1130	12/5	29.4°	135.6°	67.4	14	02	64.2	57.2	20	00	X	X	5	0	-	1	35.01	
101	1730	12/5	29.1°	136.6°	68.9	14	05	65.7	58.8	20	02	4, 8	5	8	0	34	1	35.26	0.12
102	2330	12/5	28.8°	137.4°	69.3	15	10	68.3	62.8	19	03	3, 6	6	8	2	18	1	35.25	
103	0530	12/6	28.6°	138.2°	69.3	15	12	68.0	65.3	19	01	X	3	5	2	18	1	35.19	
104	1730	12/6	28.4°	139.4°	70.2	32	16	71.5	67.6	17	01	8	4	8	4	18	4	35.34	
105	2330	12/6	28.2°	140.2°	70.0	33	15	70.8	67.6	16	02	8	4	8	4	34	3	35.19	

Table 8.--Summary of observations at bathythermograph lowerings, Charles H. Gilbert, cruise 31
(for coded values see H. O. Pub. 606-C) (cont'd)

Ser. No.	Time, GCT	Date, 1956	Latitude N.	Longitude W.	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰	Surf. PO_4-P, μg at./L.
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.		
106	0530	12/7	27.8°	141.1°	70.5	01	12	69.8	66.1	18	00	X	5	5	3	01	3	35.37	0.07
107	1130	12/7	27.4°	142.0°	70.8	22	06	69.5	64.5	18	00	X	5	5	2	20	1	35.37	
108	1730	12/7	27.1°	143.0°	70.8	12	06	69.1	64.8	20	01	8	2	8	2	00	5	35.34	
109	2330	12/7	26.8°	143.8°	71.8	14	09	71.6	66.0	18	03	8	5	8	2	02	5	35.37	
110	0530	12/8	26.4°	144.8°	71.7	13	13	71.0	68.0	20	03	X	7	5	3	02	5	35.43	
111	1130	12/8	26.1°	145.7°	72.7	14	18	72.0	70.0	19	00	X	X	5	4	-	5	35.26	
112	1730	12/8	25.8°	146.7°	72.8	14	17	71.9	68.9	21	02	6, 8	8	6	4	18	3	35.19	
113	2330	12/8	25.5°	147.5°	74.1	15	18	74.0	70.2	20	01	6, 8	6	7	4	16	3	35.16	
114	0530	12/9	25.2°	148.4°	75.3	13	19	73.0	69.1	21	01	6, 8	5	5	4	14	3	34.97	
115	1130	12/9	24.9°	149.2°	75.3	11	18	73.5	72.0	21	00	X	6	2	4	14	3	35.01	
116	1730	12/9	24.6°	150.1°	75.5	13	21	74.0	68.0	21	01	6, 8	6	7	5	14	3	35.07	
117	0530	12/10	23.9°	151.8°	74.4	13	21	73.2	70.0	22	50	6, 8	8	5	4	13	3	35.03	
118	1130	12/10	23.6°	152.6°	74.3	13	20	74.5	68.7	20	00	X	3	5	4	13	3	35.01	
119	1730	12/10	23.2°	153.5°	75.0	12	18	75.8	69.2	21	03	6	6	7	4	13	3	35.14	
120	2330	12/10	22.8°	154.4°	77.3	12	17	75.0	72.0	20	02	2, 8	6	7	4	13	3	35.03	
121	0530	12/11	22.5°	155.2°	75.6	13	26	73.6	71.8	19	00	X	3	5	5	11	4	34.92	
122	1730	12/11	21.8°	156.9°	76.0	14	20	76.0	68.5	17	02	2, 6, 8	7	7	5	11	4	34.96	

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/23	22.8°	156.5°	1800	98	10	16	01	0	1018.6	3	14	78.0	72.5	78.2	4	4	2	4	0	0	09	3	4
10/24	23.4°	156.0°	0000	98	09	16	03	2	1018.3	7	10	76.8	72.6	78.6	7	5	4	4	X	X	10	3	4
10/24	24.0°	155.4°	0600	96	08	11	02	2	1019.6	2	20	77.7	71.7	78.2	7	4	4	4	X	X	10	3	4
10/24	24.7°	154.8°	1200	96	10	16	02	0	1019.3	6	10	77.2	69.9	78.0	2	2	2	4	0	0	10	3	4
10/24	25.3°	154.3°	1800	98	09	16	03	0	1019.6	2	10	76.5	70.0	76.9	5	3	4	4	6	0	10	3	4
10/25	25.9°	153.8°	0000	98	09	16	01	1	1018.6	7	14	76.0	71.0	76.9	3	2	8	4	6	0	10	3	5
10/25	26.6°	153.2°	0600	91	11	20	50	2	1020.3	2	17	73.7	71.6	76.0	9	X	X	X	X	X	10	3	5
10/25	27.5°	152.6°	1200	96	07	18	01	6	1020.0	7	10	75.0	71.5	75.9	4	4	6	4	0	0	10	3	5
10/25	28.0°	152.2°	1800	98	11	13	02	2	1021.0	2	14	74.4	69.7	75.8	7	7	4	4	0	0	10	3	4
10/26	28.7°	151.7°	0000	98	12	15	01	2	1019.6	7	17	75.5	67.0	75.2	6	3	8	4	0	1	10	3	4
10/26	29.4°	151.1°	0600	91	11	15	02	2	1021.0	2	15	74.9	67.5	75.0	9	X	X	X	X	X	10	3	4
10/26	30.0°	150.5°	1200	91	12	14	02	2	1021.3	4	00	74.0	66.8	74.0	7	7	4	3	0	0	10	3	3
10/26	30.8°	150.0°	1800	99	10	14	01	0	1023.0	2	17	72.9	68.9	73.8	3	2	2	4	6	6	10	3	3
10/27	31.6°	149.5°	0000	98	10	14	03	0	1022.7	7	14	72.8	68.8	73.2	5	5	4	4	0	0	12	3	3
10/27	32.2°	149.0°	0600	96	10	14	00	0	1024.4	2	20	73.0	69.2	73.5	9	X	X	X	X	X	12	3	3
10/27	32.9°	148.8°	1200	96	10	14	00	0	1026.4	2	07	71.5	66.8	71.5	9	X	X	X	X	X	12	3	3
10/27	33.7°	147.9°	1800	97	11	18	50	2	1029.1	2	27	68.0	66.8	71.4	8	8	8	4	X	X	08	3	4
10/28	34.3°	147.2°	0000	98	09	18	02	2	1029.8	5	07	68.2	63.5	71.3	6	6	2	4	0	0	05	3	5
10/28	35.0°	146.5°	0600	92	09	19	02	2	1032.5	2	24	66.2	61.9	70.0	9	X	X	X	X	X	07	3	4
10/28	35.8°	145.9°	1200	92	08	10	02	2	1033.2	1	02	64.7	57.0	68.2	6	X	X	X	X	X	07	3	3
10/28	36.3°	145.4°	1800	99	35	02	02	2	1032.9	2	05	62.8	56.7	68.3	6	5	4	4	6	0	04	3	2
10/29	37.0°	144.8°	0000	98	28	14	03	2	1029.8	7	25	63.4	58.2	67.5	7	7	5	4	0	0	01	3	3
10/29	37.3°	144.5°	0600	96	28	18	01	2	1027.1	6	07	65.0	59.0	66.2	9	X	X	X	X	X	01	3	3
10/29	37.3°	144.4°	1200	96	28	18	00	0	1022.4	7	27	66.1	61.2	66.5	9	X	X	X	X	X	10	3	3
10/29	37.3°	144.3°	1800	98	25	30	03	2	1021.0	6	10	67.2	64.5	66.8	8	8	4	4	X	X	25	3	7
10/30	37.2°	143.9°	0000	98	33	28	02	2	1020.0	4	00	64.0	59.3	66.5	7	7	8	4	0	0	32	3	6
10/30	37.2°	143.1°	0600	92	34	22	02	2	1023.4	2	20	61.8	53.9	67.6	9	X	X	X	X	X	33	3	6
10/30	37.1°	142.8°	1200	92	34	22	00	2	1025.7	2	07	61.9	54.0	67.2	7	X	X	X	X	X	33	3	5
10/30	36.8°	142.8°	1800	98	33	15	03	0	1027.8	7	20	59.0	51.9	66.1	8	0	0	0	6	X	33	3	6
10/31	37.5°	143.2°	0000	98	33	10	03	2	1028.1	6	07	59.2	51.8	67.1	7	7	2	4	0	0	33	4	5

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
10/31	37.8°	143.3°	0600	92	33	11	02	2	1028.8	1	0.3	62.0	54.1	67.5	7	X	X	X	X	X	33	5	5
10/31	38.2°	143.6°	1200	96	24	17	00	1	1027.4	7	1.0	62.0	54.2	63.0	9	X	X	X	X	X	25	5	5
10/31	38.7°	148.8°	1800	98	25	23	03	2	1026.1	6	0.7	62.0	56.9	62.2	7	6	2	4	6	0	28	3	5
11/1	38.8°	143.7°	0000	98	23	25	03	2	1023.7	7	1.7	65.0	60.0	63.2	6	6	4	4	0	0	23	3	5
11/1	39.0°	142.9°	0600	92	23	17	01	2	1024.0	2	0.7	64.9	61.0	62.3	9	X	X	X	X	X	25	3	5
11/1	39.0°	141.9°	1200	92	24	19	00	2	1024.0	6	0.5	64.2	61.5	62.2	9	X	X	X	X	X	25	3	5
11/1	39.1°	141.5°	1800	98	24	15	02	2	1024.0	3	0.5	66.0	59.0	62.1	8	8	8	4	X	X	25	3	4
11/2	39.3°	140.7°	0000	98	21	15	02	2	1023.7	7	1.0	65.8	61.8	63.2	8	8	4	4	X	X	25	3	4
11/2	39.4°	140.1°	0600	92	23	14	01	0	1024.4	2	1.0	64.1	61.7	63.6	3	X	X	X	X	X	25	4	4
11/2	39.2°	141.6°	1200	92	18	16	03	0	1024.0	7	0.7	64.0	62.0	62.8	9	X	X	X	X	X	22	4	4
11/2	39.2°	140.7°	1800	98	18	21	01	0	1024.4	2	0.7	65.0	62.0	62.6	0	0	0	9	0	0	20	4	4
11/3	40.0°	140.0°	0000	98	18	21	03	0	1022.4	7	1.4	67.0	63.5	63.0	3	3	4	4	0	0	20	4	4
11/3	40.6°	139.6°	0600	93	18	18	03	2	1022.4	4	0.0	63.6	61.1	59.9	7	X	X	X	X	X	21	4	4
11/3	41.2°	139.0°	1200	92	18	22	00	2	1020.7	7	0.9	63.0	61.1	59.9	9	X	X	X	X	X	21	4	4
11/3	41.6°	139.0°	1800	97	19	21	03	2	1020.0	3	0.2	63.0	60.5	60.1	7	7	8	4	0	0	20	4	5
11/4	41.0°	138.4°	0000	98	18	20	02	2	1018.6	7	1.4	64.0	60.8	60.8	7	7	4	4	0	0	20	4	5
11/4	40.5°	137.8°	0600	96	19	21	00	2	1018.6	6	0.3	63.7	61.1	61.1	9	X	X	X	X	X	20	4	5
11/4	40.6°	137.8°	1200	96	20	15	00	2	1017.6	7	0.7	66.5	62.5	60.6	9	X	X	X	X	X	20	4	4
11/4	40.6°	137.8°	1800	98	21	18	02	2	1016.6	3	0.3	63.0	60.5	61.0	7	7	4	4	0	0	18	3	5
11/5	40.5°	137.4°	0000	98	20	22	03	2	1015.9	4	0.2	63.8	61.0	60.4	8	8	4	4	X	X	18	3	5
11/5	40.3°	137.1°	0600	92	35	08	51	2	1019.6	2	1.7	59.4	58.0	62.1	9	X	X	X	X	X	49	X	3
11/5	40.3°	137.1°	1200	92	04	17	51	2	1021.3	2	0.7	54.0	51.4	60.0	9	X	X	X	X	X	05	3	3
11/5	40.0°	136.6°	1800	98	06	18	02	2	1023.7	2	1.7	59.0	57.9	61.4	8	8	8	4	X	X	00	3	4
11/6	40.0°	136.3°	0000	99	18	09	03	2	1024.0	5	0.0	67.7	63.1	62.0	6	3	8	4	4	9	35	3	3
11/6	40.3°	136.3°	0600	92	17	17	02	2	1025.1	1	0.7	62.9	61.0	61.0	9	X	X	X	X	X	49	X	3
11/6	40.3°	136.3°	1200	96	17	18	00	2	1023.7	7	0.7	61.8	59.5	61.2	9	X	X	X	X	X	04	X	3
11/6	40.2°	136.2°	1800	98	19	15	02	2	1024.7	2	0.7	61.3	59.7	61.0	8	8	4	4	X	X	18	4	4
11/7	39.6°	135.8°	0000	98	19	15	02	2	1022.7	7	1.7	62.8	61.0	62.0	8	8	4	4	X	X	18	4	4
11/7	39.5°	135.8°	0600	92	17	14	02	2	1023.4	2	1.2	63.2	61.1	61.9	9	X	X	X	X	X	18	3	3
11/7	39.6°	133.5°	1800	98	18	17	02	2	1022.4	3	0.7	63.7	61.2	61.7	7	7	8	4	0	0	18	3	3

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/8	38.9°	135.1°	0000	98	20	17	02	2	1021.7	7	1.2	64.5	62.4	62.3	8	8	8	4	X	X	20	3	3
11/8	38.5°	134.8°	0600	92	20	13	02	2	1023.0	4	0.0	64.0	62.1	61.8	9	X	X	X	X	X	20	3	3
11/8	38.5°	134.8°	1800	98	22	17	02	2	1022.7	3	0.7	63.7	62.1	61.8	8	8	8	4	X	X	20	3	3
11/9	38.1°	133.4°	0000	98	24	13	02	2	1021.0	7	1.0	63.9	61.7	62.4	8	0	0	0	4	X	30	3	3
11/9	37.8°	134.2°	0600	92	19	14	02	2	1021.3	3	0.2	63.5	61.2	62.2	9	X	X	X	X	X	16	3	3
11/9	37.8°	134.0°	1800	98	20	12	01	2	1021.7	3	0.7	63.9	62.0	62.3	7	6	4	4	0	1	20	3	3
11/10	38.1°	133.3°	0000	98	17	12	02	2	1020.3	7	0.7	63.7	61.0	62.3	7	6	8	4	6	1	17	3	3
11/10	38.4°	132.9°	0600	92	19	10	02	0	1021.3	1	0.5	62.4	58.7	62.0	9	X	X	X	X	X	17	3	3
11/10	38.6°	132.7°	1800	98	17	12	03	2	1021.0	2	0.9	62.7	59.2	61.7	7	7	4	4	0	0	17	3	3
11/11	38.8°	131.8°	0000	98	21	12	03	1	1020.7	6	0.7	63.0	60.4	62.0	6	3	8	4	3	9	20	3	3
11/11	39.0°	131.3°	0600	92	21	08	50	2	1021.0	2	0.9	60.5	59.7	61.4	9	X	X	X	X	X	27	4	3
11/11	39.1°	131.4°	1800	98	30	15	02	2	1023.7	2	2.0	60.7	58.1	61.2	8	8	8	4	0	0	28	3	3
11/12	39.8°	130.4°	0000	97	31	06	03	2	1022.7	7	0.7	58.8	58.0	60.3	8	8	8	4	0	0	28	3	3
11/12	40.0°	130.0°	0600	92	36	11	02	2	1024.7	2	1.5	59.3	58.0	61.2	8	8	8	3	0	0	49	X	2
11/12	40.0°	130.0°	1800	98	32	14	02	2	1027.4	2	2.0	60.2	56.9	60.2	7	8	8	4	0	0	35	2	2
11/13	40.4°	129.6°	0000	95	34	18	51	2	1025.7	7	1.0	58.1	58.0	60.6	8	8	8	3	0	0	35	X	3
11/13	40.7°	129.2°	0600	93	35	23	01	2	1027.1	2	0.7	57.0	52.8	60.9	6	4	8	4	6	0	34	3	3
11/13	40.6°	129.1°	1800	98	02	25	02	2	1031.2	2	1.5	55.0	48.2	60.0	7	7	8	4	0	0	03	3	7
11/14	39.4°	128.9°	0000	97	02	24	02	2	1029.8	7	0.9	56.9	51.2	59.0	8	8	8	4	X	X	03	3	6
11/14	39.5°	128.8°	0600	93	02	23	02	2	1029.5	2	0.7	56.7	51.2	59.2	8	8	8	4	X	X	02	3	6
11/14	38.7°	128.8°	1800	98	02	16	03	2	1027.4	6	0.2	57.7	52.3	61.5	7	7	8	4	0	0	03	3	6
11/15	37.7°	128.3°	0000	98	36	16	03	2	1024.7	7	1.7	57.8	51.8	62.0	7	7	2	4	0	0	04	3	5
11/15	37.4°	128.2°	0600	92	33	12	02	2	1025.4	1	0.7	58.1	55.0	61.4	8	8	8	4	X	X	03	3	4
11/15	37.8°	128.0°	1800	98	13	05	01	2	1027.1	2	0.3	59.5	53.0	61.0	7	7	4	4	0	0	34	3	2
11/16	37.3°	127.7°	0000	97	34	11	02	2	1026.8	6	0.7	59.2	53.9	60.6	7	7	8	4	0	0	34	3	2
11/16	37.0°	127.5°	0600	93	32	07	02	2	1027.8	3	0.7	60.4	58.0	60.6	8	8	8	4	X	X	35	4	2
11/16	37.0°	127.5°	1800	95	34	08	50	2	1029.1	2	1.0	61.8	58.9	60.6	8	8	8	4	X	X	33	3	2
11/17	36.3°	127.2°	0000	98	34	08	03	2	1027.8	7	0.7	59.5	57.2	59.4	7	7	4	4	X	X	34	3	2
11/17	36.4°	127.2°	0600	92	33	13	02	2	1029.1	2	0.7	60.1	58.6	59.1	8	8	8	3	X	X	33	3	2
11/17	36.5°	127.5°	1800	98	32	08	03	2	1030.1	2	0.7	62.8	60.7	60.2	6	4	5	4	0	6	33	3	2

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
11/18	36.1°	127.2°	0000	97	35	12	02	2	1027.8	7	1.2	62.1	60.3	59.0	8	8	8	4	X	X	32	3	3
11/18	35.7°	127.0°	0600	93	35	20	02	2	1027.8	1	0.7	59.3	55.6	59.3	6	4	8	4	4	0	34	3	4
11/19	34.6°	126.4°	0000	98	36	22	02	2	1023.4	6	1.5	58.4	55.0	61.6	6	6	2	4	0	0	30	4	9
11/19	34.0°	126.0°	0600	93	36	23	01	0	1022.4	8	0.5	58.8	56.0	62.3	1	0	0	0	1	0	03	4	8
11/19	33.1°	125.8°	1800	98	35	19	02	2	1021.3	2	0.7	59.5	54.5	62.0	7	7	4	4	0	0	03	4	8
11/20	32.5°	125.7°	0000	98	35	17	01	2	1019.3	7	1.4	59.0	54.5	62.8	3	3	1	4	0	0	34	4	8
11/20	32.6°	125.4°	0600	93	02	17	03	2	1020.0	2	0.7	59.0	54.0	62.2	6	5	2	4	4	0	02	3	7
11/20	33.4°	125.0°	1800	98	05	17	02	2	1022.7	2	1.9	59.6	56.0	62.4	6	0	0	9	0	8	03	3	5
11/21	34.1°	124.7°	0000	97	09	17	02	2	1023.0	3	0.2	59.1	56.7	61.3	8	0	0	9	0	7	06	3	4
11/21	34.8°	124.4°	0600	93	10	11	02	2	1026.8	2	1.9	58.8	53.1	60.5	0	0	0	9	0	0	06	3	3
11/21	34.7°	124.5°	1800	98	02	14	02	0	1027.1	1	0.7	56.3	52.3	58.9	0	0	0	9	0	0	02	3	3
11/22	35.7°	123.8°	0000	98	33	13	02	0	1024.4	7	1.0	55.0	53.0	53.8	0	0	0	9	0	0	33	3	2
11/22	36.5°	123.2°	0600	96	33	16	02	0	1023.4	4	0.2	55.7	52.0	55.1	0	0	0	9	0	0	33	3	3
11/22	36.8°	123.2°	1200	92	36	15	02	0	1022.0	7	0.7	54.0	51.0	53.0	0	0	0	9	0	0	35	3	3
11/28	37.8°	123.8°	0600	92	36	16	03	2	1019.6	2	0.7	51.9	49.0	51.6	8	X	X	X	X	X	36	4	4
11/28	37.8°	125.3°	1200	92	36	18	02	2	1021.3	2	0.7	53.7	52.5	52.5	9	X	X	X	X	X	34	4	4
11/28	38.0°	125.8°	1800	98	01	12	02	2	1023.0	2	1.4	55.5	52.5	58.0	8	8	4	4	X	X	35	4	4
11/29	38.0°	127.0°	0000	98	36	10	02	2	1023.0	4	0.0	57.6	53.9	59.3	7	7	4	4	0	0	49	X	2
11/29	38.0°	127.7°	0600	96	03	07	02	2	1024.7	2	1.0	56.8	55.6	61.3	7	X	X	X	X	X	49	X	2
11/29	38.0°	128.2°	1200	96	31	11	02	2	1026.1	2	0.7	58.0	54.2	60.0	7	X	X	X	X	X	49	X	2
11/29	37.5°	129.4°	1800	97	04	10	02	2	1027.8	2	0.9	57.0	55.0	60.0	8	8	5	4	X	X	27	6	3
11/30	36.9°	129.6°	0000	98	04	14	02	2	1026.4	6	0.7	58.8	56.0	61.2	7	7	8	4	0	0	27	3	3
11/30	36.5°	129.5°	0600	92	06	13	02	2	1026.8	1	0.2	58.1	56.0	61.3	9	X	X	X	X	X	07	3	3
11/30	36.0°	129.4°	1800	98	05	13	02	2	1026.4	2	0.7	59.7	57.4	61.0	7	7	8	4	0	0	07	2	3
12/1	35.0°	129.7°	0000	98	03	15	01	2	1024.7	6	1.0	60.0	56.0	60.7	7	7	4	4	0	0	03	2	3
12/1	34.5°	129.7°	0600	92	03	17	02	2	1024.7	4	0.0	59.7	57.2	60.0	9	X	X	X	X	X	03	2	3
12/1	34.4°	129.7°	1800	97	02	15	02	2	1024.4	2	0.7	59.4	55.9	60.6	8	8	5	4	X	X	03	2	3
12/2	33.6°	129.7°	0000	97	36	13	02	2	1022.0	7	1.7	60.0	57.8	61.6	8	8	5	4	X	X	02	2	2
12/2	33.5°	129.7°	0600	92	01	10	02	2	1022.0	4	0.0	59.5	54.2	61.9	8	8	5	4	X	X	02	2	3
12/3	32.5°	129.5°	0000	98	22	06	02	2	1019.0	6	0.7	61.0	53.7	64.0	8	8	4	4	X	X	49	X	0

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
12/3	32.3°	129.5°	0600	92	14	02	02	2	1019.3	4	0.0	61.5	55.9	64.0	8	8	4	4	X	X	49	X	1
12/3	32.0°	129.7°	1800	98	21	06	01	2	1019.6	2	0.7	63.1	56.7	64.8	7	2	2	4	6	0	04	5	1
12/4	31.0°	130.0°	0000	98	17	08	02	2	1018.0	7	1.0	63.1	58.9	64.7	7	5	2	4	0	8	49	X	1
12/4	30.6°	130.6°	0600	92	26	02	02	2	1020.0	2	1.2	63.8	60.0	65.2	9	X	X	X	X	X	49	X	1
12/4	30.3°	131.5°	1200	92	31	03	01	1	1019.6	8	0.3	63.0	59.0	65.6	9	X	X	X	X	X	49	X	1
12/4	30.3°	132.4°	1800	97	29	02	20	2	1020.3	2	0.9	61.4	59.7	65.3	7	5	7	4	4	0	49	X	1
12/5	29.9°	133.6°	0000	99	36	06	02	2	1019.0	6	1.0	64.6	59.0	67.0	7	4	2	4	4	2	49	X	1
12/5	29.7°	134.7°	0600	96	25	00	00	0	1019.6	1	1.0	64.9	61.9	66.7	3	X	X	X	X	X	49	X	1
12/5	29.5°	135.6°	1200	96	14	02	00	0	1019.6	7	0.3	64.2	57.2	67.4	9	X	X	X	X	X	49	X	1
12/5	29.1°	136.6°	1800	98	14	05	02	2	1020.3	2	1.0	65.7	58.8	68.9	6	1	2	4	6	0	34	5	1
12/6	28.8°	137.5°	0000	98	15	10	03	2	1018.6	7	1.7	68.3	62.8	69.3	6	5	4	4	0	8	18	2	2
12/6	28.6°	138.4°	0600	92	15	12	01	1	1018.6	4	0.0	68.0	65.3	69.3	3	X	X	X	X	X	18	2	3
12/6	28.4°	139.5°	1800	98	32	16	01	5	1017.3	2	1.7	71.5	67.6	70.2	4	4	8	4	0	0	18	2	4
12/7	28.1°	140.5°	0000	98	33	15	02	0	1015.9	6	1.5	70.8	67.6	70.0	4	4	2	4	0	0	34	2	4
12/7	27.8°	141.1°	0600	92	01	12	00	0	1017.6	2	1.4	69.8	66.1	70.5	4	X	X	X	X	X	01	3	3
12/7	27.5°	141.7°	1200	92	22	06	00	0	1018.0	6	0.3	69.5	64.5	70.8	4	X	X	X	X	X	20	2	2
12/7	27.1°	143.0°	1800	98	12	06	01	0	1019.6	2	1.5	69.1	64.8	70.8	2	2	1	4	0	0	36	4	4
12/8	26.8°	144.0°	0000	98	14	09	03	1	1018.0	7	2.0	71.6	66.0	71.8	5	4	2	4	0	1	02	3	4
12/8	26.4°	144.8°	0600	92	13	13	03	1	1019.6	1	1.2	71.0	68.0	71.7	7	X	X	X	X	X	01	3	4
12/8	26.2°	145.6°	1200	92	14	18	00	2	1019.0	7	1.5	72.0	70.0	72.7	9	X	X	X	X	X	49	X	4
12/8	25.7°	146.7°	1800	96	14	17	02	2	1020.7	2	1.7	71.9	68.9	72.8	8	8	8	4	X	X	18	2	4
12/9	25.4°	147.5°	0000	97	15	18	01	2	1020.0	7	1.4	74.0	70.2	74.1	7	7	2	4	0	0	16	2	5
12/9	25.1°	148.5°	0600	92	13	19	01	2	1021.3	2	1.7	73.0	69.1	75.3	5	5	2	4	0	0	14	2	4
12/9	24.8°	149.2°	1200	92	11	18	00	2	1021.0	7	1.4	73.5	72.0	75.3	7	X	X	X	X	X	14	2	4
12/9	24.7°	150.0°	1800	97	13	21	01	2	1021.3	2	1.0	74.0	68.0	75.5	6	6	2	4	0	0	14	2	5
12/10	24.2°	151.0°	0000	97	10	20	01	2	1019.6	7	1.7	74.9	71.0	75.2	3	3	4	4	0	0	14	2	5
12/10	24.0°	151.8°	0600	93	13	21	50	2	1021.7	2	1.5	73.2	70.0	74.4	8	8	2	4	X	X	13	2	4
12/10	23.5°	152.7°	1200	93	13	20	00	0	1020.3	7	1.7	74.5	68.7	74.3	3	X	X	X	X	X	13	2	4
12/10	23.1°	153.6°	1800	98	12	18	03	2	1021.0	2	1.4	75.8	69.2	75.0	6	6	4	4	0	7	13	2	4
12/11	22.8°	154.4°	0000	98	12	17	02	2	1019.6	7	2.0	75.0	72.0	77.3	6	4	2	4	0	2	13	2	5

Table 9.--Log of ship's weather observations, Charles H. Gilbert cruise 31, recorded on U.S.W.B. Form 1210F in International Ship Weather Code (cont'd)

Date, 1956	Latitude, N.	Longitude, W.	Time, GCT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
12/11	22.5°	155.2°	0600	92	13	26	00	2	1019.0	8	0.7	73.6	71.8	75.6	2	X	X	X	X	X	11	2	5
12/11	21.7°	156.9°	1800	97	14	20	02	2	1017.3	3	1.4	76.0	68.5	76.0	7	3	2	4	0	2	11	3	6

Table 10.--Light penetration and water color, Charles H. Gilbert cruise 31, October - December 1956

Date, 1956	Time, LCT[1/]	Latitude, N.	Longitude, W.	Sea[2/]	Cloud cover[2/]	Water color (Forel)	Secchi, meters	Photometer depth, meters			
								Percent transmission			
								50	10	5	1
10/24	1415	26.0°	153.7°	3	6	1	24	-	58	82	-
10/25	1410	28.7°	151.6°	3	6	3	34	-	36	69	125
10/26	1440	31.6°	149.5°	2	4	3	38	-	39	71	114
10/28	1330	36.8°	144.8°	2	8	2	28	-	40	63	112
11/8	1230	38.3°	134.5°	2	9	4	25	-	34	67	100

[1/] Time lowering began, Secchi disk and photometer lowered at same time.

[2/] For coded values see H. O. Pub. 606-C.