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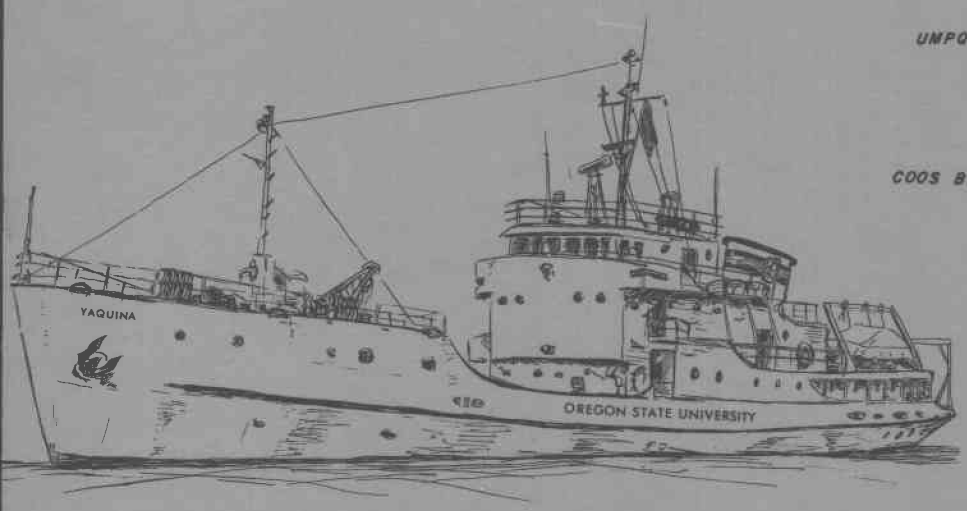

SURFACE TEMPERATURE AND SALINITY OBSERVATIONS AT PACIFIC NORTHWEST SHORE STATIONS FOR 1968

by

William Gilbert, Bruce Wyatt

Office of Naval Research
Contract Nonr 1286(10)
Project NR 083-102

Data Report No. 37 **Reference 69-7**

June 1969

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Corvallis, Oregon 97331

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John V. Byrne
Chairman

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INTRODUCTION

During 1968 the Department of Oceanography, Oregon State University, continued its program of shore sampling of ocean temperatures and salinities along the coast of the Pacific Northwest. Observations for 1960 through 1967 are contained in six Data Reports which are listed under references. The data in this report were collected at seven stations. Table 1 lists the station names and locations, sampling sites, and names of the observers at each station. The assistance of these observers is greatly appreciated.

PROCEDURE

The original goals of the shore sampling program were to obtain basic information about the distribution of temperature and salinity along the coast and to aid in monitoring offshore conditions. Detailed analysis of the early data showed that we can classify Oregon coastal waters into several types according to the major processes that affect them (Pattullo and Denner, 1965). These results led us to modify the sampling program to provide us with more detailed data.

In 1967 data were taken daily and generally at high tide. Sampling sites were located at points exposed to the open ocean where the influence of fresh water runoff was minimal.

Temperatures were taken with a calibrated thermometer contained in a plastic-lined, brass, protecting enclosure. The thermometers were calibrated against a standard and read to the nearest 0.1 C°. The observations are considered accurate to approximately $\pm$ 0.2 C°.

Most salinity data were determined by hydrometer readings and tables (Zerbe and Taylor, 1953). Hydrometers were calibrated against an inductive salinometer which has an accuracy of about $\pm$ 0.003‰ (Brown and Hamon, 1961). The accuracy of salinity determined by a corrected hydrometer is $\pm$0.2‰ for the Port Orford station and is believed to be representative of the accuracy of other stations. Newport salinities were bottled samples run on an inductive salinometer. Salinities greater than 34.40‰ are questionable.

Table II lists chronologically all the observations taken at each coast station in 1968. Table III is a summary of monthly means, maxima, minima, and numbers of observations for each station. All times are Pacific Standard Time (+8) except those from 0200 28 April to 0200 27 October 1968 when Daylight Standard Time was in effect.

Data for Port Orford 1967 is included because salinity values were incorrect in the 1967 data report.

Figure I shows the location of stations for 1968. Figures 2 through 8 are plots of the temperature and salinity data appearing in Table II. A light line is used in the graph to represent the yearly mean of the plotted values.

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Zerbe, W. B. and C. B. Taylor, 1953. Sea water temperature and density reduction tables, U. S. Dept. Comm., Coast and Geod. Surv. Spec. Publ. No. 298, 21 pp.

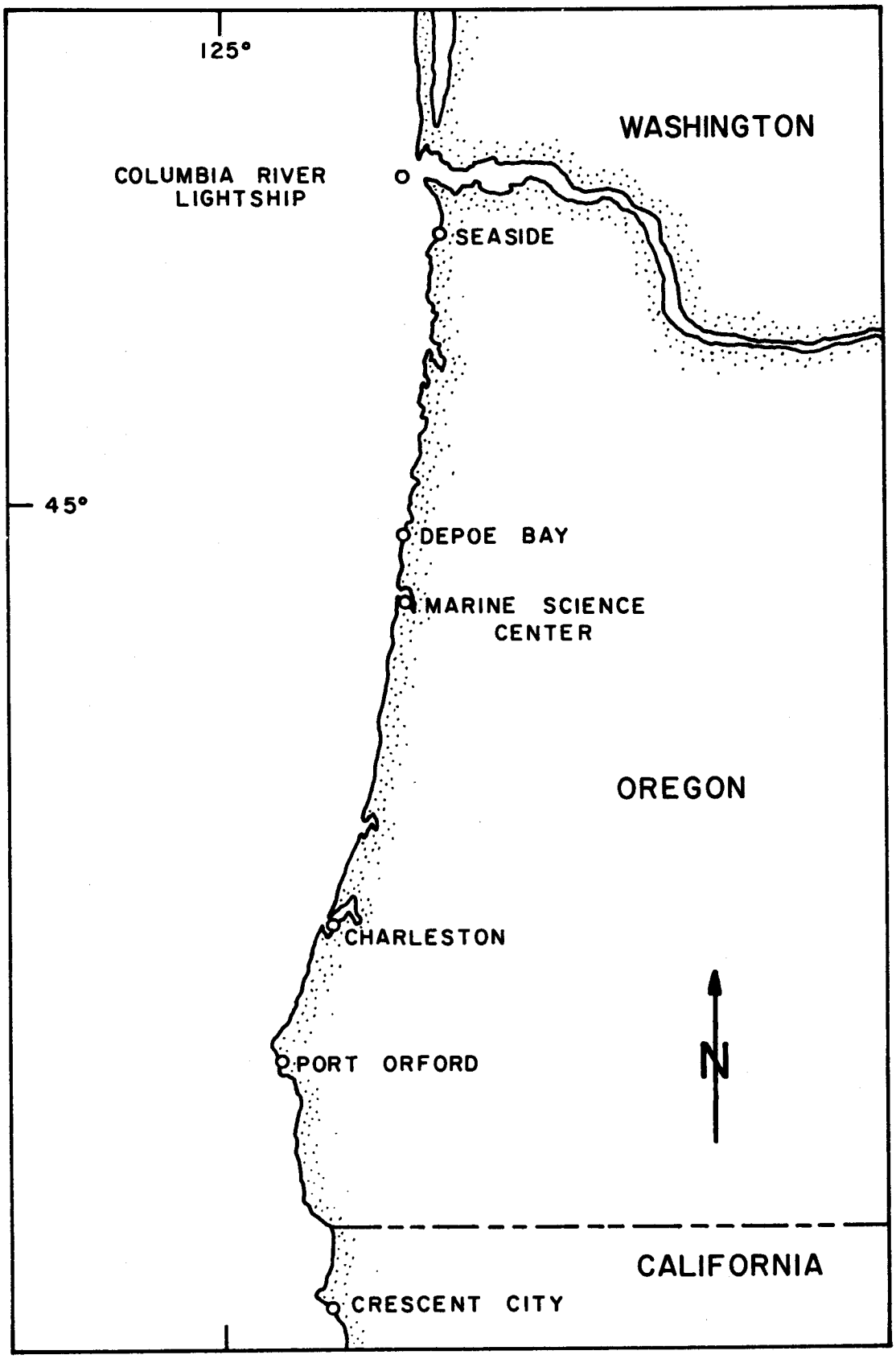

Figure 1. Location of Shore Stations.

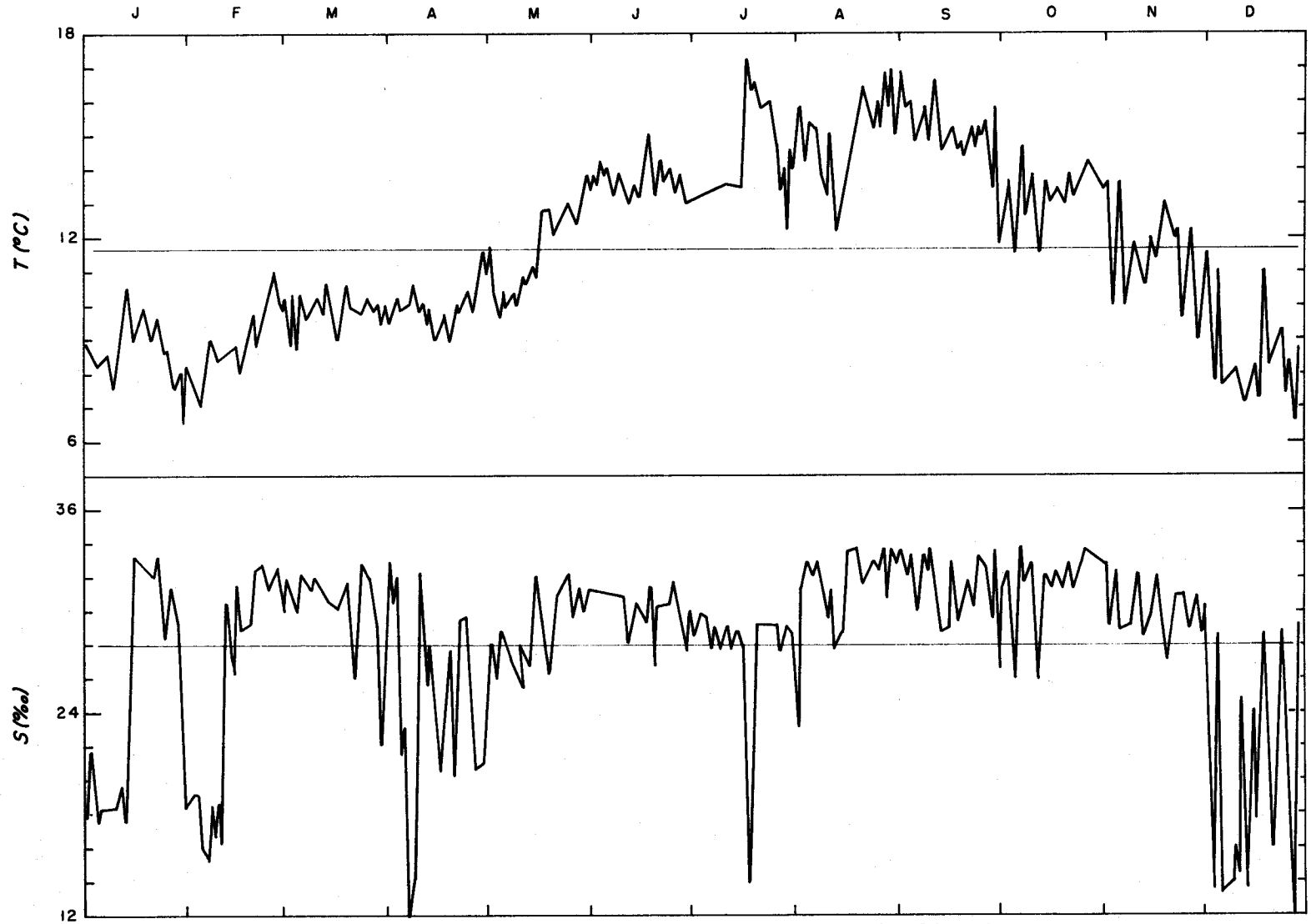

Figure 2. Daily temperature and salinity at Columbia River Lightship. Light line indicates yearly mean.

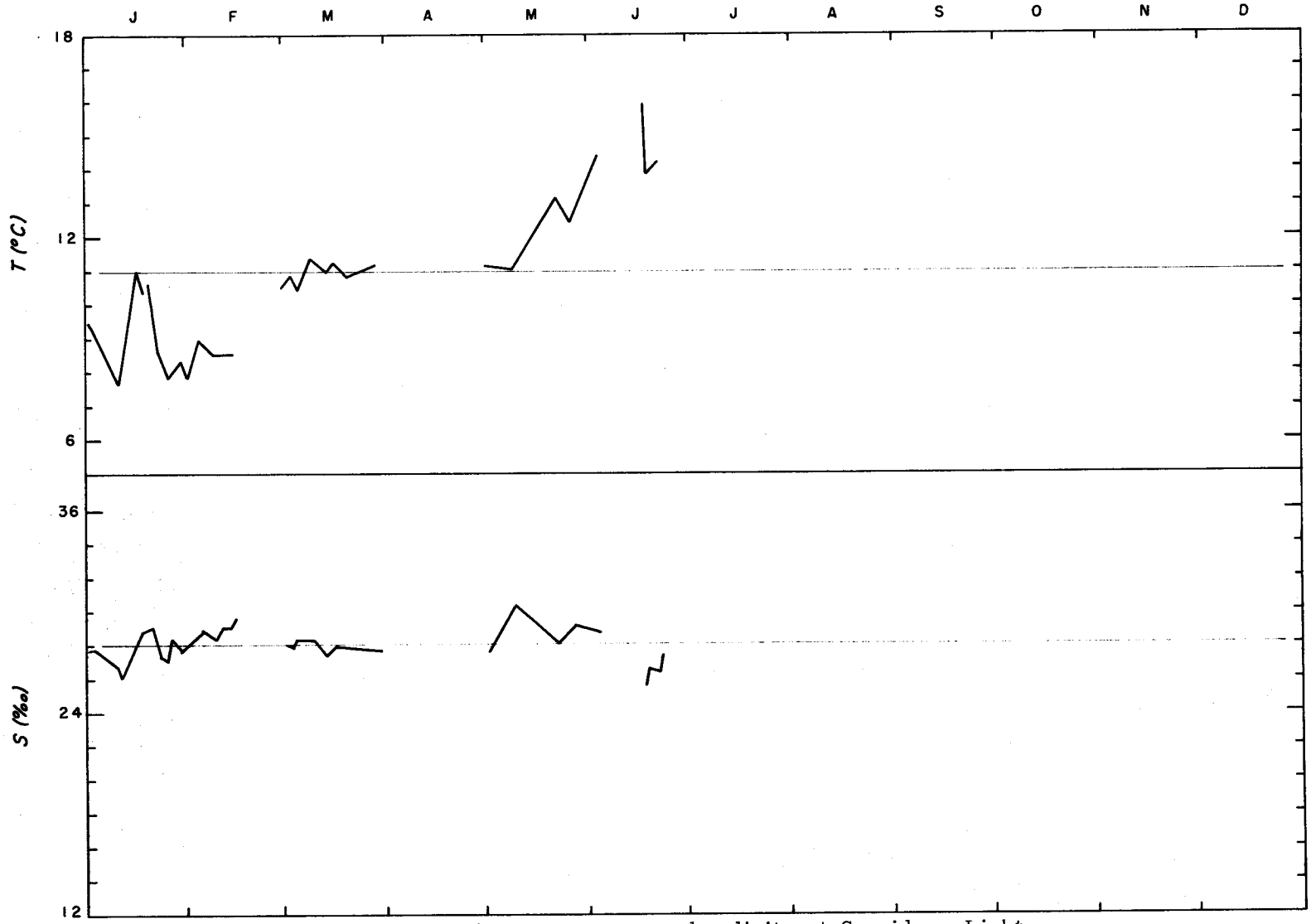

Figure 3. Daily temperature and salinity at Seaside. Light line indicates yearly mean.

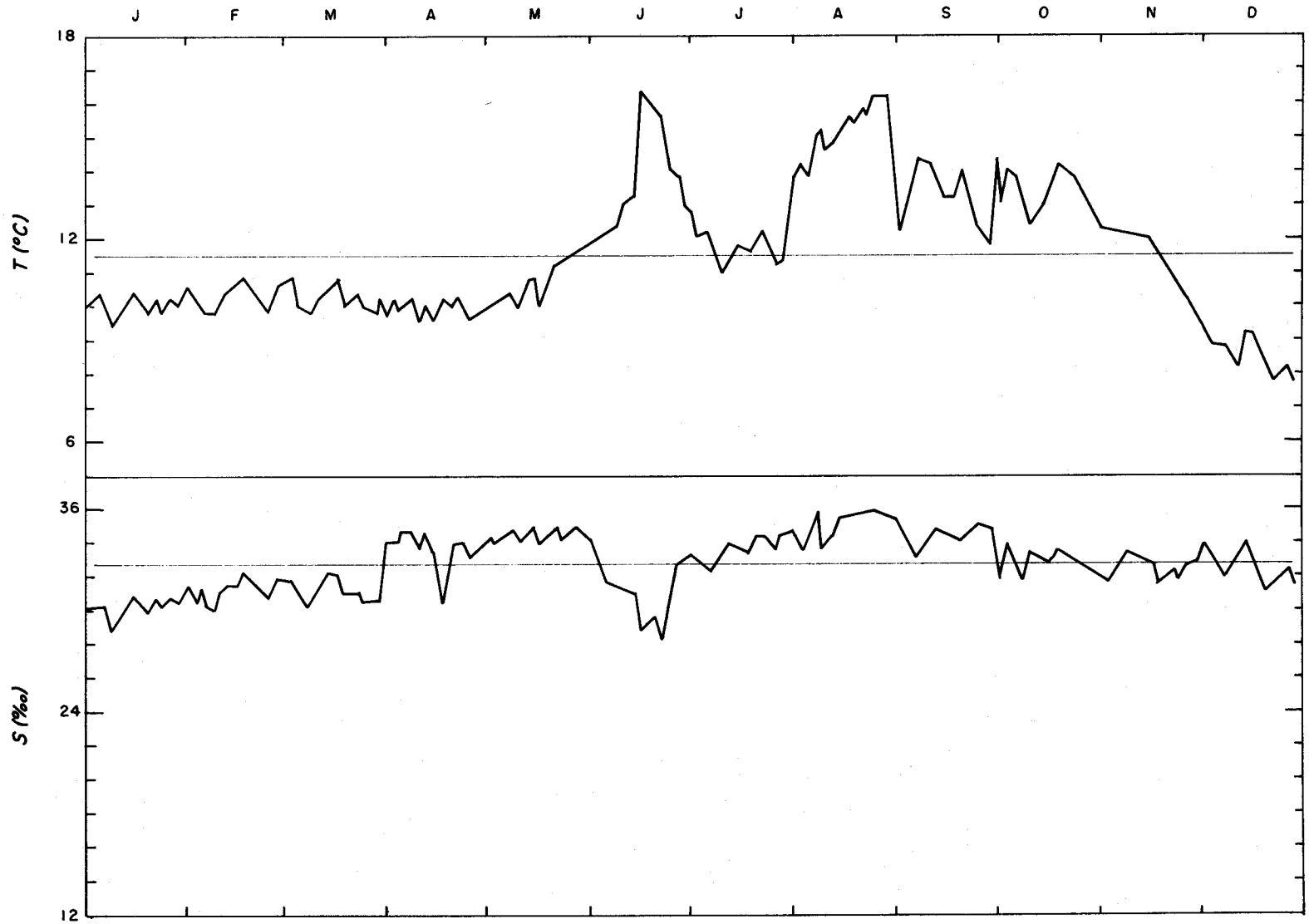

Figure 4. Daily temperature and salinity at Depoe Bay. Light line indicates yearly mean.

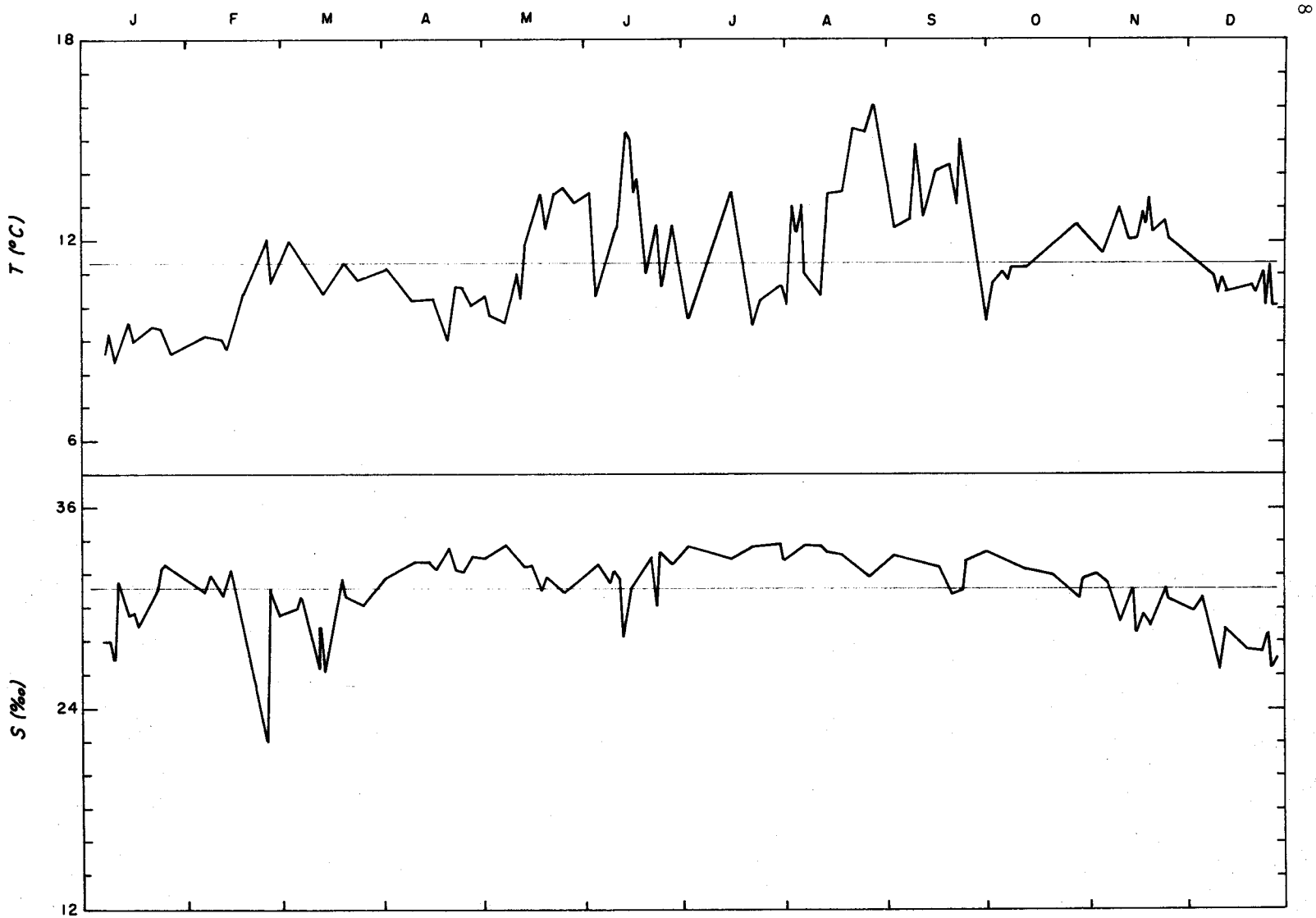

Figure 5. Daily temperature and salinity at Marine Science Center. Light line indicates yearly mean.

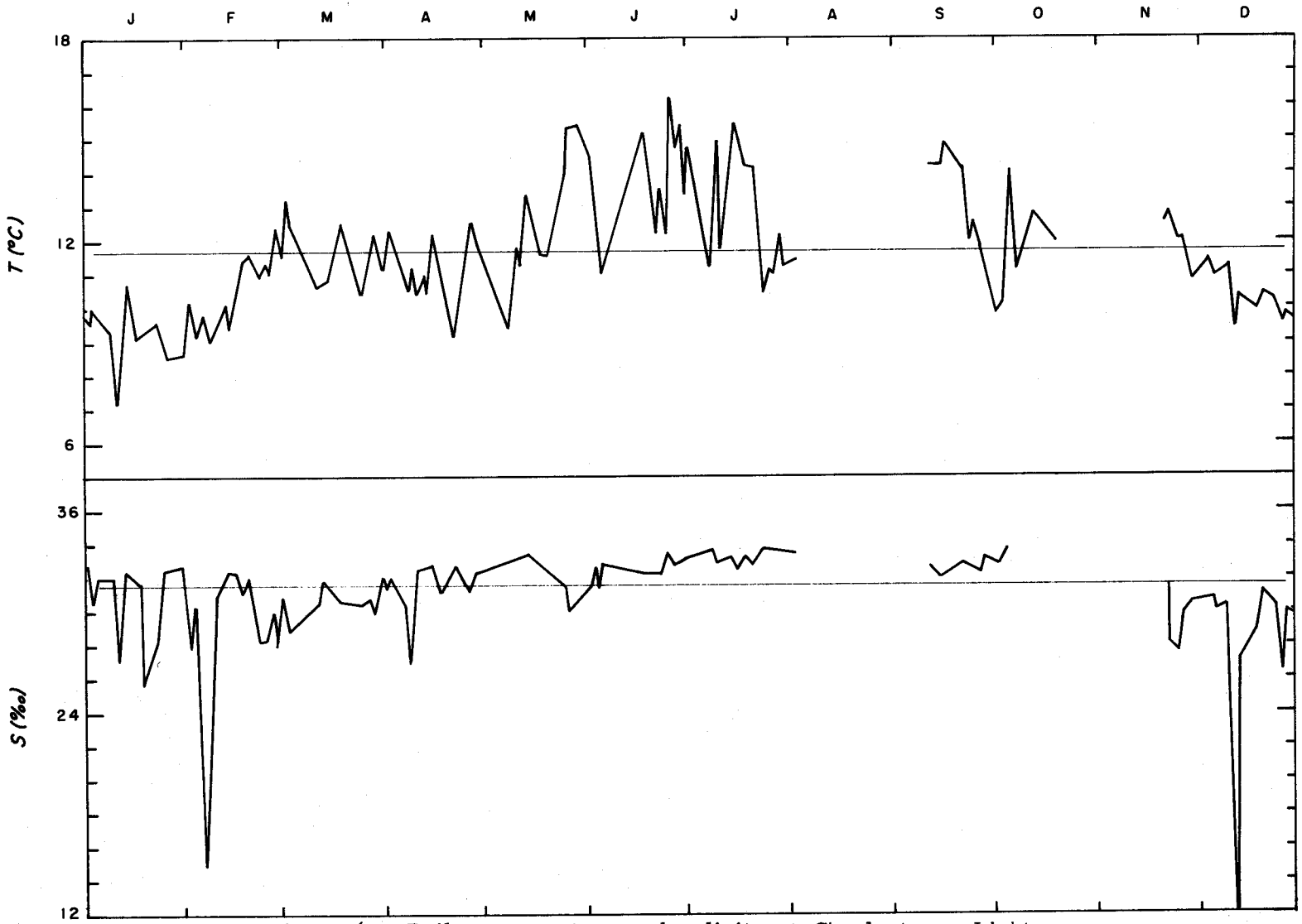

Figure 6. Daily temperature and salinity at Charleston. Light line indicates yearly mean.

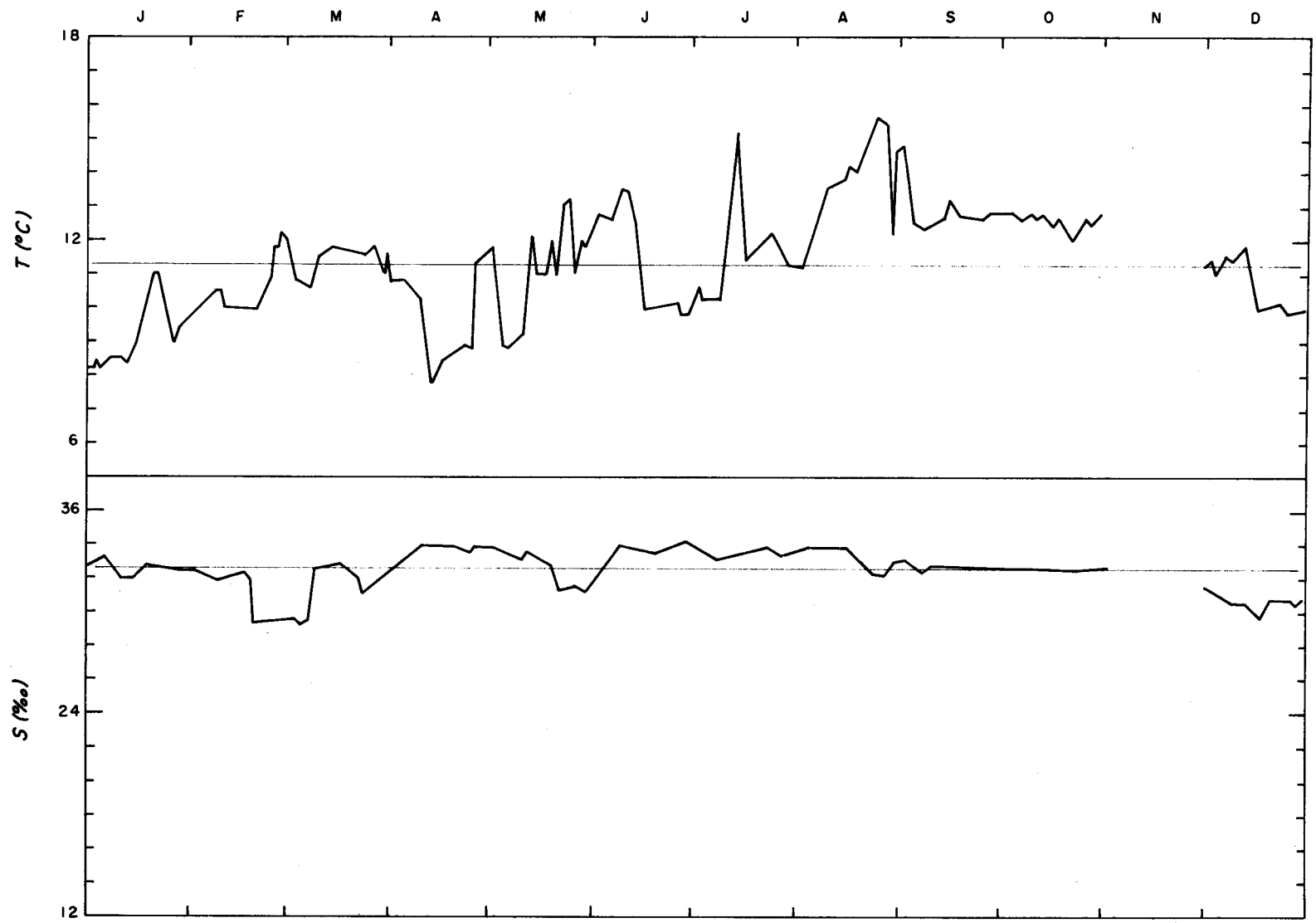

Figure 7. Daily temperature and salinity at Port Orford. Light line indicates yearly mean.

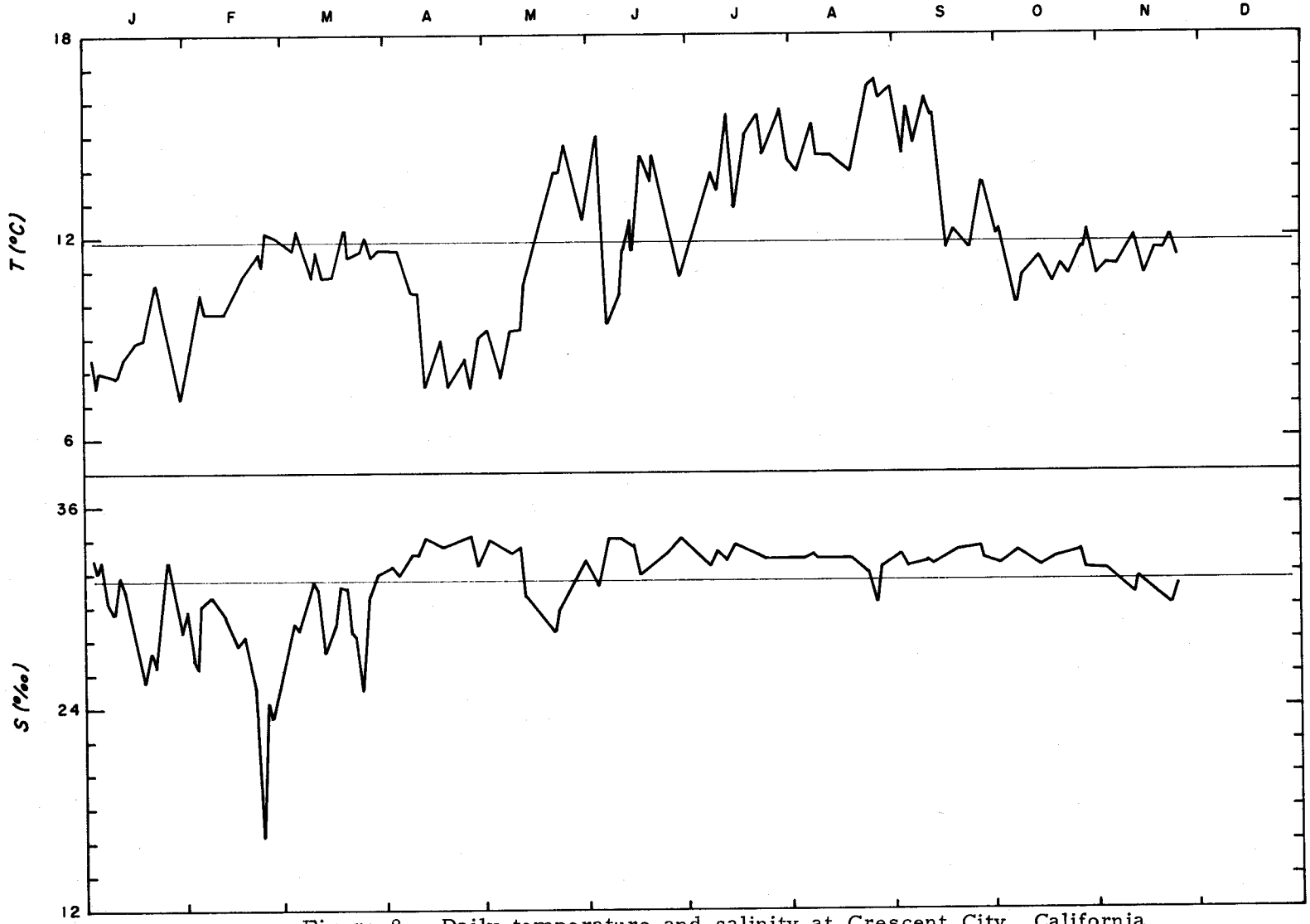

Figure 8. Daily temperature and salinity at Crescent City, California. Light line indicates yearly mean.

TABLE I. LIST OF SHORE STATIONS.

Station Name and Location	Sampling Site	Observer
Columbia River Lightship 46°11.2'N, 124°11.0'W	Five miles southwest of Columbia River South Jetty	U. S. Coast Guard WLV-535, WLV-604
Seaside 45°59.7'N, 123°55.6'W	At pump outlet into Seaside Aquarium settling tank from surf inlet pipe	Mr. John O'Brian
Depoe Bay 44°49.4'N, 124°04.0'W	At pump outlet into Depoe Bay Aquarium settling tank from surf inlet pipe	Mr. William Kukaska
Marine Science Center 44°37.2'N, 124°01.5'W	At pump outlet into the Center from bottom of Yaquina Bay	Mr. Douglas Coughenower
Charleston 43°21.0'N, 124°19.0'W 43°20.9'N, 124°19.7'W	From surface of bay From surface inside bay mouth	Miss Gayann Hall Mr. Alan McGie (last 2 months)
Port Orford 42°44.6'N, 124°30.6'W	Off east side of Port Orford Pier	Mr. Herman Carlson
Crescent City, California 41°44.6'N, 124°11.7'W	Off end of Crescent City Municipal Wharf	Mr. Darold Richcreek

TABLE II. TEMPERATURE AND SALINITY OBSERVATIONS.

COLUMBIA RIVER LIGHTSHIP 1968

DATE		TIME	T	S
JAN.	1	1354	9.4	17.2
	2	1442	8.8	17.9
	3	1524	8.6	21.7
	4	1612	8.5	18.6
	5	0530	8.2	17.6
	6	0612	8.4	18.3
	8	0736	8.5	18.2
	10	0912	7.5	18.3
	11	1000	8.2	19.0
	12	1048	8.4	19.6
	13	1130	10.2	17.5
	14	1212	10.5	19.1
	15	1248	10.0	32.6
	16	1330	9.0	33.2
	17	1412	9.5	33.1
	19	1542	9.9	32.1
	21	0524	9.0	32.6
	22	0612	9.0	31.7
	23	0706	9.6	33.1
	24	0806	9.2	32.0
	25	0906	8.6	28.4
	26	1012	8.7	29.4
	27	1112	7.9	31.3
	28	1206	7.6	29.9
	29	1300	7.5	29.3
	30	1348	8.0	19.9
	31	1430	8.5	18.2
FEB.	1	1512	8.2	18.9
	3	0436	7.6	19.3
	4	0512	7.4	19.0
	5	0548	7.0	15.8
	6	0630	8.4	16.3
	7	0718	8.6	15.2
	8	0818	9.0	18.5
	9	0918	8.6	16.6
	10	1012	8.4	16.6
	11	1106	8.4	16.3
	12	1154	8.4	30.5
	13	1236	8.6	26.5
	14	1318	8.7	27.6
	15	1400	8.6	26.2
	16	1448	8.8	31.5
	17	0330	8.0	28.8
	20	0530	9.4	29.2
	21	0624	9.7	32.4
	22	0736	8.8	31.9
	23	0854	9.7	32.6
	24	1006	9.8	32.4
	25	1106	10.1	31.3
	26	1200	10.2	31.3
	27	1248	11.0	31.2
	28	1336	10.9	32.5
	29	1412	10.1	31.3
MAR.	1	0248	9.8	29.9
	2	0318	10.2	31.9
	3	0348	8.8	30.7
	4	0418	10.3	31.1
	5	0448	8.7	30.0
	6	0530	10.3	32.0
	7	0618	10.1	32.0
	8	0724	9.6	31.6
	9	0836	9.7	31.2
	10	0942	9.8	31.9
	11	1042	10.2	31.1
	13	1224	9.7	31.5
	14	1306	10.6	30.5
	16	0218	9.8	30.5
	17	0248	9.0	30.0
	18	0330	9.4	30.4
	19	0406	9.7	30.8
	20	0454	10.6	31.6
	21	0600	9.9	29.8
	22	0718	10.0	26.0
	23	0842	9.8	30.2
	24	0954	9.7	32.6
	25	1100	10.0	32.9
	26	1148	10.2	31.3
	27	1236	10.1	31.9
	28	0106	9.8	29.9
	29	0136	10.0	29.0
	30	0206	9.4	22.1
	31	0230	10.0	32.0
APR.	1	0300	10.0	31.3
	2	0324	9.5	32.9
	3	0400	10.0	30.5
	4	0442	10.2	31.9
	5	0530	9.8	21.4
	6	0636	10.1	23.0
	7	0800	9.9	11.3
	8	0912	10.0	13.8
	9	1018	10.6	14.2
	10	1112	10.1	21.9
	11	1206	9.8	32.2
	12	0030	10.0	27.3
	13	0100	9.4	25.6
	14	0142	9.9	27.9
	15	0218	9.1	27.0
	16	0300	9.0	24.9
	17	0342	9.3	20.5
	18	0442	9.7	21.7
	19	0548	9.6	22.2
	20	0700	8.9	27.6
	21	2154	9.4	20.2
	22	2242	10.0	26.7
	23	2318	9.8	29.4
	24	2354	10.1	28.7
	25	1218	10.4	29.6
	26	0024	10.1	23.5
	27	0054	9.8	21.2
	28	0124	10.5	20.5
	29	0254	10.4	21.5
	30	0318	11.6	20.9
MAY	1	0348	10.9	25.0
	2	0424	11.7	28.0
	3	0506	10.4	27.6
	4	0554	9.9	26.0
	5	0706	9.6	28.8
	6	2200	10.4	28.0
	7	2242	9.9	28.7
	8	2324	10.2	27.0
	9	0006	10.3	27.4
	10	0048	10.0	26.6
	11	1348	10.4	27.9
	12	0130	10.8	25.4
	13	0212	10.6	28.2
	14	0254	10.7	26.7
	15	0342	11.2	28.7
	16	0430	10.8	32.0
	17	0524	12.2	29.8
	18	0630	12.8	29.6
	19	2118	12.8	26.5
	20	2206	12.8	26.2
	21	2248	12.1	28.3
	22	2330	12.4	30.9
	23	0006	12.6	31.3
	24	0042	12.6	30.8
	25	1348	13.0	32.1
	26	0112	12.8	32.0
	27	0148	12.6	29.6
	28	0218	12.4	30.9
	29	0248	12.6	31.3
	30	0324	13.6	29.9
	31	0400	13.8	30.9
JUNE	1	0442	13.4	31.2
	2	0536	13.8	30.7
	3	2018	13.5	31.4
	4	2106	14.2	30.4
	5	2154	13.8	31.2
	6	2236	14.0	30.9
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	8	0042	13.2	30.5
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	10	0100	13.8	30.5
	11	0148	13.4	30.7
	12	0236	13.2	28.1
	13	0330	13.0	29.1
	14	0418	13.5	29.8
	15	0518	13.4	30.4
	16	1942	13.2	30.2
	17	2024	13.8	30.7
	18	2112	15.0	29.3
	19	2154	15.0	31.3
	20	2242	13.2	26.6
	21	2324	13.4	30.2
	22	0036	14.2	30.4
	23	0001	13.6	30.3
	24	0042	13.8	30.5
	25	0048	14.0	30.0
	26	0154	13.5	31.6
	27	0230	13.3	29.8
	28	0306	13.8	29.0
	29	0348	13.2	28.9
	30	0430	13.0	27.5
JULY	1	1842	13.0	29.9
	2	1924	13.0	28.5
	3	2012	13.2	29.3
	4	2106	13.0	29.8
	5	2200	13.3	29.0
	6	2254	13.1	29.5
	7	2354	13.4	27.7
	8	1336	13.0	28.9
	9	0048	13.6	28.5
	10	0142	13.2	27.7
	11	0230	13.4	28.1
	12	0318	13.6	29.0
	13	0412	13.4	27.6
	14	0500	13.4	28.5
	15	1848	13.4	28.7
	16	1930	13.4	27.9
	17	2012	13.7	27.9
	18	2100	17.2	13.9
	19	2148	16.3	14.7
	20	2242	16.5	28.0
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	22	1306	15.8	29.1
	23	0018	15.8	29.0
	25	0142	16.0	28.7
	26	0218	15.6	29.3
	27	0300	14.6	29.0
	28	0336	13.4	27.6
	29	1718	14.0	28.5
	30	1754	12.2	29.0
	31	1836	14.5	28.6
AUG.	1	1924	14.0	27.9
	2	2024	15.4	23.1
	3	2130	15.8	31.2
	4	2236	14.2	31.7
	5	2342	15.2	32.8
	6	1324	15.4	32.1
	7	0036	15.0	32.1
	8	0136	15.2	32.8
	9	0224	13.8	31.4
	10	0312	13.6	31.4
	11	0354	13.2	29.5
	12	1718	15.0	31.2
	13	1754	13.4	27.7
	14	1830	12.2	29.1
	15	1912	13.4	28.5
	16	2000	13.8	28.9
	17	2100	14.4	33.4
	18	2200	14.4	33.4
	19	2300	15.6	33.4
	20	2354	15.5	33.7
	21	1324	16.4	31.7
	22	0042	16.4	31.6
	24	0206	15.8	32.6
	25	0248	15.2	32.8
	26	1600	16.0	32.3
	27	1636	15.2	32.8
	28	1712	16.8	33.5
AUG.	29	1754	15.8	30.7
	30	1848	16.9	33.5
	31	1954	15.0	32.7
SEP.	1	2112	15.2	32.8
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	3	2336	15.8	33.1
	4	1306	16.2	32.1
	5	0036	16.0	33.2
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	7	0212	15.2	30.0
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	10	1624	14.8	32.2
	11	1700	16.4	33.5
	12	1730	16.6	31.2
	14	1900	14.6	28.6
	15	2012	14.8	29.3
	16	2124	14.6	28.9
	17	2230	15.2	32.8
	18	2330	14.8	30.0
	19	1242	14.6	29.3
	20	0018	14.8	30.4
	21	0106	14.4	30.9
	22	1418	14.8	31.7
	23	1448	15.2	30.5
	24	1541	14.6	30.2
	25	1554	15.2	33.1
	26	1636	15.0	32.2
	27	1724	15.4	32.3
	28	1824	15.0	31.4
	29	1936	13.4	29.4
	30	2106	15.8	33.4
OCT.	1	2224	11.8	26.5
	2	2330	12.4	31.3
	3	1230	12.4	30.9
	4	1312	13.6	32.2
	5	1342	12.5	31.2
	6	1418	11.5	25.9
	7	1442	13.8	32.7
	8	1512	14.6	33.6
	9	1542	12.6	31.7
	10	1612	13.1	32.2
	11	1642	13.8	32.7
	12	1724	12.4	31.3
	13	1812	11.5	25.8
	15	2042	13.6	32.0
	16	2154	13.0	31.4
	17	2300	13.2	31.3
	18	1154	13.4	32.2
	20	1300	13.2	31.3
	21	1336	13.0	31.4
	22	1412	13.8	32.7
	23	1448	13.2	31.2
	24	1530	13.6	31.7
	25	1612	13.6	32.3
	26	1706	13.6	32.7
	27	1706	14.2	33.6
	30	0924	13.8	32.8
	31	1012	13.6	32.7
NOV.	1	1054	13.4	32.2
	2	1130	13.6	32.7
	3	1206	11.4	29.0
	4	1236	10.0	29.9
	5	1306	13.4	32.2
	6	1336	13.6	28.7
	7	1406	10.0	29.9
	8	1436	11.4	29.0
	9	1512	11.4	29.0
	10	1548	11.8	29.5
	11	1642	11.5	30.7
	12	1742	11.4	32.1
	13	1900	10.6	28.5
	14	0836	10.8	30.2
	15	0918	12.0	29.5
	16	1000	11.5	30.7
	17	1042	11.4	32.0
	18	1118	12.5	30.8
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	21	1324	12.5	27.6
	22	1412	12.0	29.9
	23	1500	12.2	30.8
	24	1554	9.6	
	25	1700	10.4	30.9
	26	1812	11.5	
	27	0748	12.2	28.9
	28	0836	11.0	29.5
	29	0924	9.0	30.8
	30	1006	10.4	28.6
DEC.	1	1048	10.5	30.2
	2	1124	11.5	29.1
	4	1236	7.8	13.4
	5	1306	11.0	28.5
	6	1342	7.6	13.2
	8	1448	8.0	13.8
	9	1530	8.0	14.0
	10	1618	8.1	15.9
	11	1712	7.9	14.4
	12	0648	7.4	24.6
	13	0736	7.1	13.4
	14	0824	7.3	17.1
	15	0912	7.4	23.9
	16	1000	8.2	17.5
	17	1048	7.2	23.1
	18	1136	7.4	24.6
	19	1224	11.0	28.5
	20	1312	8.2	17.5
	21	1406	8.4	15.9
	24	1648	9.2	28.7
	25	0606	7.4	24.6
	26	0654	8.4	16.4
	27	0742	7.8	13.4
	28	0830	6.6	8.8
	29	0918	8.7	29.1

SEASIDE 1968

DATE	TIME	T	S
JAN. 1	1200	9.5	27.7
2	1315	9.4	27.8
4	1600	9.0	27.5
5	0500	8.8	27.5
6	0600	8.7	27.3
7	0700	8.5	27.3
8	0830	8.2	26.7
9	0900	8.1	27.0
10	0930	7.7	26.6
11	1030	7.6	26.1
17	1300	11.0	28.8
19	1315	10.3	29.0
20	1430	10.6	29.0
22	0500	9.4	28.0
23	0600	8.6	27.3
24	0700	8.3	27.3
25	0800	8.2	27.1
26	0910	7.8	28.4
27	1030	8.0	28.0
28	1130	7.9	28.2
29	1200	8.3	27.7
JAN. 30	1240	8.3	28.0
31	1340	8.1	27.9
FEB. 1	1430	7.8	28.2
2	1500	8.1	28.3
3	1610	8.4	28.7
4	1500	8.9	28.8
8	0700	8.5	28.4
10	0800	8.6	29.0
13	1000	8.4	29.0
14	1030	8.7	29.6
15	1130	8.5	29.6
MAR. 1	1330	10.5	28.0
2	1400	10.6	28.0
3	1430	10.8	27.9
4	1520	10.7	28.3
5	1600	10.6	28.3
6	1700	10.4	28.3
9	2130	11.3	28.3
10	2200	11.3	28.0
13	2359	11.0	27.5
15	0100	11.0	27.9
MAR. 16	0200	11.2	28.0
18	0300	11.1	27.8
21	0900	10.8	27.7
22	0930	10.9	27.7
23	1030	10.9	27.8
24	1100	11.0	27.9
29	0100	11.1	27.7
MAY 1	0230	11.1	27.7
9	1030	11.0	30.3
19	2000	12.5	28.7
20	2130	12.8	28.8
21	2200	13.0	28.4
22	2300	13.1	28.2
23	2330	13.1	28.3
27	2335	12.4	29.1
JUNE 4	2000	14.4	28.6
18	1930	15.9	25.6
19	2030	13.8	26.6
22	2130	14.2	26.5
23	2220	13.7	27.4

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DATE	TIME	T	S
JAN. 1	0730	9.8	29.9
2	0825	10.0	30.2
3	0930	10.2	30.4
4	1035	10.2	30.4
5	1124	10.4	30.4
6	1200	10.2	30.2
7	0700	10.0	30.2
8	0745	9.4	29.1
9	0830	9.4	28.8
12	0950	9.8	29.9
13	1032	10.0	30.2
14	1115	10.2	30.7
15	1252	10.4	30.9
16	1230	10.2	30.7
19	1442	10.0	30.2
20	1535	9.8	29.9
21	1634	10.0	30.2
22	1752	10.2	30.7
24	0730	9.8	30.2
25	0814	10.0	30.5
26	0917	10.2	30.7
29	1205	10.0	30.5
FEB. 1	1412	10.6	31.4
2	1458	10.4	31.0
3	1538	10.6	30.9
4	1630	10.4	30.5
5	1722	10.0	31.3
6	1832	9.8	30.2
9	0815	9.8	30.0
10	0914	10.0	31.0
11	1012	10.2	31.3
12	1050	10.4	31.5
13	1132	10.4	31.5
16	1348	10.6	31.4
17	1435	10.8	31.9
18	1525	10.8	32.2
19	1630	10.6	31.9
20	1745	10.4	31.8
23	0755	10.2	31.3
24	0910	10.0	31.0
25		9.8	30.7
26	1100	10.2	31.3
27	1210	10.4	31.5
28	1240	10.6	31.9
MAR. 2	1430	10.8	31.7
3	1515	10.8	31.9
4	1555	10.2	31.3
5	1648	10.0	31.0
8	0700	9.8	30.2
9	0755	9.8	30.5
10	0835	10.0	30.7
11	0940	10.2	31.3
14	1215	10.4	31.8
15	1255	10.6	32.2
16	1345	10.4	32.1
17	1430	10.8	32.4
18	1526	10.4	31.5
19	1630	10.0	31.0
22	0730	10.2	31.0
23	0748	10.4	31.3
24	0856	10.2	30.5
25	1000	10.0	30.7
29	1315	9.8	31.0
30	1345	10.2	30.5
APR. 1	1454	9.7	34.1
2	1530	10.0	34.1
3	1620	10.2	34.0
4	1735	9.8	34.1
5	1845	10.0	34.6
8	0815	10.2	34.7
9	0920	10.2	34.5
10	1012	9.8	34.1
11	1108	9.6	33.7
12	1155	10.0	34.6
13	1245	9.8	33.7
14	1336	9.6	33.6
15	1435	9.6	33.5
18	1732	10.2	30.5
21	0735	10.0	34.0
22	0836	10.2	
23	0942	10.2	
24	1032	10.0	34.0
APR. 25	1115	9.8	33.5
26	1155	9.6	33.2
27	1245	9.8	33.5
MAY 1	1642	9.8	34.1
2	1722	9.8	34.4
3	1812	10.0	34.0
7	0840	10.2	34.5
8	0955	10.4	34.7
9	1050	10.2	34.7
10	1155	10.0	34.4
11	1242	10.0	34.1
12	1337	10.4	34.7
13	1432	10.6	34.5
14	1524	10.8	34.9
15	1625	10.8	34.9
16	1720	10.6	34.5
17	1825	10.0	34.0
21	0913	11.2	34.6
22	1015	11.2	34.9
23	1112	11.4	34.2
24	1158	11.2	34.4
28	1450	11.4	34.9
29	1534	11.6	
JUNE 1	1742	11.8	34.2
2	1830	11.8	34.0
5	0812	12.0	32.4
6	0915	12.2	31.7
7	1034	12.2	31.9
8	1145	12.4	31.7
9	1232	12.4	31.7
10	1335	12.8	31.5
11	1430	13.0	31.3
14	1705	13.2	31.0
15	1745	13.4	30.6
16	1842	16.3	28.7
19	0832	16.0	29.4
20	0945	15.8	29.7
21	1046	15.8	29.4
22	1136	15.6	28.4
23	1218	15.0	28.3
24	1316	14.6	29.6
25	1352	14.0	31.0
28	1542	13.8	32.6
29	1616	13.0	
JULY 1	1742	12.8	33.1
2	1824	12.6	33.4
3	1915	12.0	33.0
6	1025	12.2	32.7
7	1130	12.0	32.2
8	1236	11.8	33.0
9	1324	11.4	33.1
10	1418	11.2	33.2
11	1510	11.0	33.7
12	1542	11.2	33.5
13	1635	11.6	34.0
14	1705	11.8	33.6
15	1755	11.8	34.0
19	0904	11.6	33.4
20	1017	11.8	34.0
21	1115	12.0	34.4
23	1250	12.2	34.1
24	1336	12.0	34.4
27	1512	11.2	33.5
29	1618	11.4	34.5
AUG. 1	1824	13.8	34.7
3	0855	14.2	34.0
4	1005	14.0	33.6
5	1135	13.8	34.0
6	1220	14.2	34.2
7	1318	14.8	34.9
8	1358	15.0	35.3
9	1434	15.2	35.8
10	1505	14.6	33.7
13	1655	14.8	34.5
14	1728	15.2	35.0
15	1832	15.4	35.4
18	0942	15.6	35.7
19	1052	15.4	35.1
20	1146	15.6	35.4
22	1204	15.8	35.8
23	1232	15.6	35.4
24	1308	16.0	35.8
AUG. 25	1355	16.2	36.0
28	1612	16.0	35.8
29	1656	16.2	35.5
SEP. 1	0900	12.6	35.4
2	1015	12.2	34.4
3	1120	12.4	34.1
4	1155	12.6	34.1
6	1312	13.8	33.6
7	1356	14.0	33.1
8	1430	14.3	33.5
11	1610	14.2	34.2
12	1635	13.8	34.7
13	1712	13.6	34.9
14	1810	13.4	34.6
15	1912	13.2	34.7
18	1110	13.2	34.5
19	1145	13.6	34.4
20	1218	13.8	34.2
21	1252	14.0	34.0
22	1318	13.6	34.6
23	1354	13.0	34.7
24	1425	12.8	35.0
25	1456	12.4	35.1
28	1724	12.0	34.7
29	1835	11.8	35.0
OCT. 1	1000	14.3	33.5
2	1045	13.0	31.8
3	1135	13.2	33.1
4	1215	14.0	34.0
7	1340	13.8	32.6
8	1414	13.4	32.7
9	1445	13.0	31.8
10	1514	12.6	33.4
11	1547	12.4	33.5
15	0836	13.0	32.8
16	0930	13.6	32.7
19	1130	14.2	33.6
20	1158	14.0	33.4
24	1435	13.8	32.6
25	1514	13.6	33.0
26	1610	13.2	32.6
30	0822	12.6	32.3
31	0930	12.4	31.9
NOV. 1	0950	12.2	32.2
2	1035	12.4	31.9
3	1107	12.0	31.7
4	1136	12.4	31.9
8	1335	12.0	33.2
9	1412	12.2	33.5
10	1445	12.0	33.0
11	1540	12.2	33.2
15	0816	12.0	32.7
16	0911	11.8	32.7
17	0946	11.6	32.3
18	1020	11.4	31.6
19	1105	11.4	31.8
23	1405	11.0	32.4
24	1455	10.8	31.9
25	1555	10.6	32.4
26	1656	10.2	32.6
29	0826	9.8	32.8
30	0907	9.6	33.0
DEC. 1	1115	9.4	33.7
2	1315	9.2	34.0
3	1422	9.0	33.4
4	1445	8.8	33.1
7	1625	8.6	32.8
8	1720	8.8	32.1
12	2145	8.2	33.0
13	0832	8.8	33.6
14	0923	9.2	34.2
15	1015	9.0	33.4
16	1123	9.2	33.1
19	1324	8.6	31.5
20	1430	8.4	31.1
21	1554	8.2	31.4
22	1620	7.8	31.9
23	1710	7.8	31.7
26	0742	8.2	32.2
27	0835	8.0	32.4
28	0912	7.8	31.9
29	1013	7.8	31.7

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DATE	TIME	T	S
JAN. 8	0900	8.6	27.98
9	0820	9.2	27.98
10	0820	8.6	26.87
11	0825	8.3	26.84
12	0915	8.7	31.50
15	1150	9.5	29.42
16	1155	9.0	29.47
17	1330	9.0	29.64
18	1400	9.0	28.77
22	1710	9.4	30.06
23	0815	9.4	31.01
24	0840	9.3	31.13
25	0825	9.3	32.31
26	0850	9.1	32.44
28	0940	8.6	32.07
FEB. 7	0820	9.1	30.88
8	0820	9.0	31.32
9	0825	9.0	31.85
12	1025	9.0	30.92
13	1125	9.0	30.60
14	1145	8.7	30.80
15	1410	8.9	32.18
19	1550	10.4	28.25
26	1550	12.0	22.03
27	1145	10.8	31.00
29	1325	11.4	29.83
MAR. 1	1445	11.5	29.53
4	1540	11.9	29.82
6	1650	11.5	29.84
7	0815	11.3	29.89
8	0820	11.3	30.44
12	1010	10.5	26.96
13	1320	10.5	26.21
14	1140	10.4	28.79
15	1315	10.4	26.18
18	1545	11.0	28.91
20	1720	11.2	31.64
21	1700	11.3	30.65
22	0825	11.0	30.63
25	1035	10.8	30.54
26	1035	10.8	30.04
27	1135	10.8	30.06
28	1145	10.9	30.55
APR. 1	1440	11.0	31.45
2	1555	11.0	31.79
3	1750	11.1	31.70
11	1030	10.1	32.54
16	1545	10.1	32.64
17	1705	10.2	32.56
18	1650	10.0	32.19
22	0810	9.0	33.41
24	1350	10.6	32.15
25	1150	10.5	32.40
26	1315	10.5	32.08
29	1510	10.0	32.98
MAY 3	1705	10.3	32.90
4	1650	9.7	33.13
9	1045	9.5	33.58
10	1135	10.1	33.39
13	1555	10.9	33.13
14	1530	10.2	32.85
15	1645	11.8	32.34
MAY 17	1625	12.1	32.37
20	1405	13.3	30.84
21	0915	12.3	31.75
22	1050	12.6	31.63
23	1310	13.4	31.26
24	1215	13.3	31.30
27	1545	13.5	30.79
29	1555	13.4	31.26
30	1500	13.1	31.39
JUNE 4	1110	13.4	
5	0810	11.0	32.18
6	0920	10.3	32.45
10	1625	12.1	31.45
11	1550	12.1	32.02
12	1525	12.3	31.86
13	1640	13.2	31.60
14	1040	14.8	28.12
15	1535	15.2	29.18
16	1725	15.0	30.94
17	1650	13.4	31.20
18	1610	13.8	31.43
19	1635	12.0	31.78
20	1630	11.5	32.27
21	1620	11.0	32.95
22	1605	11.0	32.86
23	1915	12.2	32.23
24	1620	12.4	29.93
25	2350	11.0	33.09
26	1630	10.6	33.09
27	1815	12.0	32.89
28	1935	12.0	32.90
29	1720	12.4	32.45
30	1710	12.0	32.96
JULY 1	1630	11.0	32.99
4	0900	9.6	33.55
17	0815	13.4	32.77
18	0825	11.9	33.08
19	1010	11.8	33.12
22	1350	10.0	33.43
23	1345	9.4	33.61
24	1635	9.8	33.54
25	1530	10.1	33.54
AUG. 1	0825	10.6	33.67
2	1315	10.0	32.82
3	2130	11.8	32.82
4	1650	13.0	32.83
5	0940	12.2	33.41
6	1425	13.0	33.41
7	1110	13.0	33.13
8	2340	11.0	33.58
9	1630	10.8	33.58
12	1640	10.5	33.62
13	1710	10.3	33.62
15	1650	13.4	33.22
19	1310	13.4	33.05
20	1155	13.8	32.99
22	1305	15.0	32.79
23	1425	15.3	32.33
26	1600	15.2	32.18
27	1530	15.3	31.79
28	1605	15.5	31.76
29	1700	16.0	31.95
SEP. 3	1140	13.0	32.85
4	1150	12.3	33.07
9	1450	12.6	32.81
10	1615	14.5	32.55
11	1650	14.8	32.41
13	1425	12.7	32.58
16	1140	14.0	32.22
17	1050	14.0	32.30
21	1600	14.2	30.74
22	1310	13.8	30.62
23	2000	13.0	30.60
24	0940	15.0	30.71
25	0950	14.0	30.92
26	1600	13.6	32.63
27	1510	12.8	32.87
28	1630	12.0	32.87
29	1540	11.6	32.69
OCT. 1	1010	9.8	33.21
2	1050	9.5	33.25
3	1425	10.1	33.09
4	1315	10.6	32.90
7	1350	11.0	32.76
9	1410	10.7	32.86
10	1530	11.1	32.57
14	0830	11.1	32.09
15	0955	11.2	32.40
22	1430	11.9	31.83
29	0810	12.4	30.65
30	0855	12.3	30.41
31	0850	12.1	31.73
NOV. 4	1155	11.9	31.95
6	1345	11.6	31.59
7	1355	11.7	31.45
11	1525	12.9	29.02
13	1655	12.3	29.83
14	0810	12.0	30.04
15	0815	12.0	31.03
16	0920	12.0	28.42
17	1310	12.2	28.42
18	0950	12.8	29.43
19	0920	12.4	29.00
20	1650	13.2	28.70
21	1135	12.2	29.57
25	1550	12.5	31.21
26	1630	12.0	30.42
DEC. 3	1040	11.3	29.73
6	1140	11.1	30.59
9	1350	10.9	28.15
10	1510	10.8	28.78
11	1610	10.3	26.23
12	1620	10.8	28.14
13	0825	10.4	28.66
21	1530	10.6	27.24
22	1400	10.4	27.26
24	0900	11.0	27.24
25	1940	10.0	28.21
26	0910	11.2	28.39
27	1135	10.0	26.35
28	0925	10.0	26.79
30	0835	9.5	30.84

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DATE	TIME	T	S
JAN. 1	1305	9.7	33.0
2	1320	9.7	32.6
3	1405	9.6	30.5
4	1530	10.0	30.6
5	1554	9.7	31.8
6	1635	9.7	31.8
9	0750	9.3	31.9
10	0850	8.5	29.3
11	0900	7.2	27.0
12	1055	7.8	28.6
13	1010	8.9	32.2
14	1145	10.7	32.3
17	1255	9.1	31.9
18	1335	9.2	31.7
19	1440	9.2	25.7
23	1640	9.6	28.2
25	0735	8.8	32.3
26	0850	8.6	32.6
27	0955	8.6	32.6
28	1134	8.7	32.4
29	1245	8.6	32.3
30	1230	8.6	32.6
31	1315	8.6	32.3
FEB. 2	1435	10.2	27.8
4	1604	9.2	30.3
6	1805	9.8	14.8
8	0805	9.0	25.3
10	1000	9.6	31.0
11	0900	9.8	
13	1230	10.1	31.9
14	1155	9.4	32.3
16	1335	10.0	32.3
18	1520	11.4	31.0
20	1720	11.6	31.9
23	1925	10.9	28.2
25	1010	11.3	28.2
26	1040	11.0	28.8
27	1125	11.4	30.0
28	1230	12.4	27.9
MAR. 1	1335	11.5	30.9
2	1506	13.2	30.0
3	1550	12.5	28.8
11	0930	10.6	30.3
12	1030	10.7	30.6
13	1110	10.7	31.7
14	1150	11.2	31.3
15	1207	10.8	31.1
18	1505	12.2	30.5
19	1610	12.5	30.7
25	0940	10.4	30.3
26	1030	11.0	30.7
27	1115	11.1	30.7
28	1155	12.2	29.9
29	1230	11.6	30.0
30	1300	12.0	31.4
31	1400	11.1	32.1

DATE	TIME	T	S
APR. 1	1420	11.2	31.3
2	1535	12.3	31.9
6	1900	11.0	30.3
8	0835	10.5	26.9
9	0955	11.2	29.3
10	0930	10.4	32.4
13	1220	11.0	32.6
14	1415	10.4	32.7
15	1415	11.8	32.7
16	1500	12.2	31.5
18	1800	10.6	31.1
22	0820	9.1	32.7
24	1020	10.8	31.9
25	1120	10.8	32.1
26	1140	11.7	31.1
27	1220	12.5	32.1
28	1430	12.6	32.3
29	1440	11.9	32.2
MAY 8	0940	9.4	32.6
9	1040	9.8	32.8
10	1100	10.7	32.2
11	1300	11.8	33.0
12	1316	11.2	32.8
13	1410	12.3	32.8
14	1515	13.3	33.4
18	1940	11.6	32.7
19	2000	11.5	32.7
20	0815	11.5	32.2
25	1245	14.0	31.4
26	1305	15.3	30.0
29	1510	15.4	
JUNE 2	0735	14.4	31.4
3	0810	12.4	32.6
4	0830	12.2	31.4
5	0900	11.0	32.8
18	1930	15.2	32.2
22	1215	12.2	32.2
23	1210	13.5	32.2
25	1400	12.2	33.4
26	1530	16.2	33.0
27	1452	14.7	32.7
29	1645	15.4	33.0
30	1650	13.4	33.0
JULY 1	1730	14.7	33.2
8	1257	11.2	33.6
9	1300	13.8	33.5
10	1430	14.9	32.8
11	1445	11.7	33.2
13	1630	12.9	33.2
14	1745	14.4	33.2
15	1745	15.4	32.7
16	1812	15.4	32.4
18	1945	14.2	33.2
20	0958	14.1	33.0
21	1058	14.1	32.7
23	1236	12.4	33.4

DATE	TIME	T	S
JULY 24	1400	10.4	33.7
25	1350	10.8	33.6
26	1640	11.1	33.4
27	1630	11.0	33.9
29	1604	12.1	33.6
30	1625	11.2	33.9
31	1720	11.4	33.2
AUG. 1	1810	11.4	33.4
2	1920	11.4	33.4
SEP. 12	1800	14.2	32.6
15	2000	14.2	32.1
16	1905	14.8	32.1
21	1320	14.1	32.8
22	1330	14.1	32.8
24	1410	12.0	32.7
25	1520	12.5	32.3
27	1745	11.8	32.2
28	1830	0	33.2
29	1840	0	33.0
OCT. 2	1030	9.8	32.8
4	1152	10.1	33.1
5	1400	13.2	33.6
6	1440	14.0	
7	1410	11.7	
8	1352	11.1	
11	1520	12.0	
12	1600	12.0	
13	1710	12.8	
20	1155	11.9	
NOV. 21	1124	12.5	28.6
22	1255	12.8	31.5
22	1258	12.8	28.1
25	1507	12.0	27.7
26	1615	12.0	29.7
29	1150	10.8	30.5
DEC. 2	1054	10.9	30.7
3	1014	11.1	30.7
4	1424	11.4	30.8
5	1148	11.2	30.8
6	1150	10.9	30.0
9	1345	10.9	30.4
10	1430	11.2	29.2
11	1530	10.0	20.4
12	1642	9.4	9.4
13	1638	10.3	27.0
18	1105	9.9	28.8
19	1039	9.9	29.6
20	1132	10.3	31.2
21	1358	10.4	31.2
23	1400	10.2	30.5
24	1455	10.0	30.2
26	1642	9.5	26.5
27	0824	9.8	30.0
30	0835	9.5	29.7
31	0918	9.2	29.9

PORT ORFORD 1967(CORRECTED)

DATE	TIME	T	S
SEP. 4	1530	14.5	33.4
5	1400	14.5	33.4
6	1300	14.5	33.2
7	1230	14.2	33.1
8	1400	14.2	33.1
9	1230	14.0	32.8
10	1430	15.0	33.3
11	1500	15.8	33.6
12	1345	16.8	33.8
13	1800	15.0	32.8
14	1530	13.9	31.9
15	1430	13.9	32.5
16	1430	14.0	32.8
18	1440	12.0	32.7
20	1600	10.6	32.0
21	1500	10.8	32.4
22	1400	10.8	32.4
23	1300	10.6	32.0
24	1230	10.6	32.0
28	1440	11.2	32.0
29	1400	11.6	32.2
30	1500	10.6	32.0
OCT. 1	1000	11.2	31.5
2	0950	11.0	31.3
4	1100	12.0	32.7
5	1000	12.0	32.7
6	0945	12.6	33.4

DATE	TIME	T	S
OCT. 7	0930	12.8	33.8
8	0900	12.8	33.1
9	1000	12.8	32.8
10	0930	12.6	32.5
11	1300	12.8	32.5
12	1200	13.2	32.2
13	1230	13.8	32.2
14	1000	13.8	32.5
15	1200	13.0	32.5
16	1300	12.6	32.5
17	0930	12.4	32.7
18	1200	12.4	32.9
19	1330	12.4	32.9
20	1430	11.0	32.9
21	1430	11.0	32.7
23	1200	11.2	32.4
25	1300	11.8	32.5
26	1400	12.0	32.7
27	1500	12.1	32.7
28	1600	12.0	32.4
29	1500	12.0	32.7
30	1430	11.8	32.4
NOV. 1	1200	11.8	32.7
2	1300	12.0	32.7
3	1430	11.8	32.4
4	1600	12.0	32.7
21	1200	12.0	32.4

DATE	TIME	T	S
NOV. 22	1100	11.8	32.7
23	1000	11.8	32.7
24	1430	12.0	32.9
25	1500	12.0	33.2
26	1400	12.0	33.2
28	1540	11.2	33.2
29	1530	11.0	33.2
30	1600	11.0	33.2
DEC. 1	1500	10.2	33.6
2	1430	10.0	33.1
3	1500	10.0	33.6
6	1200	9.9	
7	1100	10.0	33.6
13	1100	10.2	33.1
14	1000	10.0	33.3
15	1000	10.2	33.6
17	1530	10.4	33.3
20	1500	10.0	33.6
21	1600	10.2	33.3
22	1530	10.0	33.6
26	1300	9.4	33.4
27	1400	9.5	33.2
28	1530	9.9	33.4
29	1200	8.5	33.1
30	1040	8.0	33.2
31	1100	8.0	32.9

PORT ORFORD 1968

DATE		TIME	T	S
JAN.	1	1530	8.2	32.9
	2	1600	8.2	32.7
	3	1100	8.2	32.7
	4	1200	8.4	32.9
	5	1300	8.2	33.2
	6	1400	8.4	33.2
	8	1435	8.5	32.8
	10	1545	8.5	32.2
	11	1540	8.5	31.9
	13	1530	8.4	32.0
	14	1345	8.5	31.9
	15	1200	8.8	31.9
	16	1200	9.0	32.2
	18	1130	9.8	32.5
	19	1000	10.4	32.8
	20	1200	10.8	32.7
	21	1305	11.0	32.4
	22	1300	11.0	32.7
	23	1400	10.5	32.4
	24	1330	10.0	32.5
	25	1000	9.5	32.7
	26	1040	9.0	32.5
	27	1100	9.0	32.5
	28	1140	9.4	32.4
FEB.	2	1100	9.9	32.5
	3	1140	10.0	32.5
	4	1200	10.1	32.2
	5	1300	10.2	31.9
	6	1600	10.4	32.0
	7	1500	10.4	32.0
	8	1400	10.5	31.8
	9	1630	10.5	31.8
	10	1520	10.5	32.0
	11	1440	10.0	32.2
	16	1400	10.0	31.9
	17	1500	9.9	32.2
	18	1430	9.9	32.2
	19	1500	10.0	31.9
	20	1430	9.9	29.2
	21	1530	10.0	29.5
	22	1400	10.2	29.5
	23	1100	10.5	29.3
	24	1230	10.6	29.6
	25	1430	10.9	30.0
	26	1500	11.8	29.6
	27	1100	11.8	29.6
	28	1130	12.2	30.0
	29		12.0	29.6
MAR.	1	1100	12.0	29.6
	4	1330	10.8	29.6
	5	1300	10.9	29.3
	6	1015	10.8	29.3
	7	1100	10.8	30.0
	8	1230	10.6	29.6
	9	1130	11.0	32.0
	10	1330	11.5	32.5
	11	1345	11.5	32.8
	12	1100	11.5	32.5
	13	1200	11.6	32.8
	14	1300	11.8	32.7
	15	1130	11.8	32.9
	16	1300	11.6	32.7
	17	1200	11.6	32.8
	18	1300	11.8	32.9
	19	1430	11.6	32.5
	21	1230	11.8	32.4
	23	1300	11.8	32.0
	24	1200	11.5	31.1
	25	1340	11.6	31.3
	26	1630	11.8	31.5
	27	1530	11.8	31.5
	28	1445	11.6	31.4
	29	1500	11.4	31.9
	30	1620	11.0	32.0
	31	1430	11.6	32.5
APR.	1	1100	10.8	32.5
	2	1200	10.8	32.5
	3	1100	10.8	32.7
	5	1000	10.8	33.0
	7	1100	10.6	33.1
	8	1000	10.4	33.1
	9	1400	10.4	33.4
	10	1520	10.2	33.9
	11	1400	9.0	33.9
	12	1300	8.5	34.0
	13	1220	7.8	34.2
	14	1100	7.9	34.0
	15	1230	7.8	33.9
	16	1300	8.0	34.2
	17	1430	8.4	34.0
	19	1530	8.5	34.0
	20	1500	8.5	33.9
	21	1530	8.6	33.9
	23	1600	8.8	33.6

DATE		TIME	T	S
APR.	24	1630	8.9	33.9
	25	1430	8.8	33.6
	26	1500	8.8	33.6
	27	1300	11.3	33.9
	28	1430	11.2	33.9
	29	1530	11.3	33.9
	30	1545	11.5	33.9
MAY	1	1200	11.5	33.9
	2	1430	11.8	33.9
	3	1500	10.0	33.4
	4	1400	9.8	33.8
	5	1300	8.9	33.6
	6	1230	8.9	33.6
	7	1300	8.8	33.4
	8	1430	8.9	33.2
	9	1530	9.0	33.4
	11	1600	9.2	33.1
	12	1500	10.8	33.5
	13	1530	12.0	33.5
	14	1500	12.1	33.5
	15	1220	11.0	33.5
	16	1300	11.2	33.2
	18	1430	11.0	33.0
	19	1500	11.2	32.9
	20	1430	12.0	32.7
	21	1500	11.0	31.7
	22	1100	12.0	31.4
	23	1200	13.0	31.3
	24	1300	13.0	31.6
	25	1100	13.2	31.4
	26	1300	12.0	31.6
	27	1430	11.0	31.6
	28	1500	11.6	31.4
	29	1640	12.0	31.2
	30	1730	11.8	31.3
	31	1300	12.0	31.4
JUNE	1	1300	12.8	31.8
	2	1430	12.6	32.1
	3	1345	12.8	32.3
	4	1500	12.6	32.6
	5	1440	12.5	32.7
	6	1530	12.6	33.1
	7	1400	12.6	33.4
	8	1545	12.8	33.6
	9	1300	13.0	33.9
	10	1600	13.5	34.0
	12	1530	13.4	33.9
	13	1500	13.0	33.9
	14	1300	12.5	33.9
	15	1250	10.9	33.8
	16	1300	10.6	33.6
	17	1440	10.0	33.6
	18	1435	9.9	33.8
	19	1500	9.9	33.5
	21	1630	10.0	33.6
	22	1540	10.0	33.6
	23	1450	10.1	33.6
	24	1500	9.9	33.8
	25	1600	10.0	33.8
	26	1400	10.1	34.0
	27	1520	10.2	34.0
	28	1600	9.8	33.9
	29	1430	9.9	34.2
	30	1400	9.8	34.2
JULY	1	1100	10.2	34.0
	2	1240	10.4	33.9
	3	1315	10.6	33.8
	4	1300	10.2	33.4
	5	1430	10.4	33.5
	6	1500	10.2	33.4
	7	1345	10.4	33.4
	8	1400	10.4	33.4
	9	1500	10.2	33.1
	10	1600	11.0	33.2
	11	1530	12.0	33.2
	12	1440	12.8	33.4
	13	1430	14.0	33.9
	14	1330	15.2	33.2
	15	1400	14.0	33.8
	16	1530	12.0	33.5
	17	1315	11.4	33.8
	18	1430	11.5	33.6
	20	1520	11.6	33.4
	21	1445	11.8	33.8
	24	1640	12.2	33.9
	25	1545	12.2	33.8
	27	1340	11.8	33.6
	28	1430	11.6	33.4
	29	1440	11.4	33.4
	31	1230	11.2	33.6
AUG.	1	1245	11.2	33.6
	3	1115	11.2	33.9
	4	1400	11.4	33.6
	5	1530	11.8	33.9

DATE		TIME	T	S
AUG.	6	1630	12.0	33.9
	7	1500	12.6	33.9
	8	1550	12.8	33.9
	9	1540	13.2	33.8
	10	1630	13.5	33.8
	11	1640	13.6	33.8
	12	1530	13.5	33.9
	14	1430	13.6	33.9
	16	1600	13.8	33.9
	17	1545	14.2	33.8
	18	1430	14.0	33.4
	19	1340	14.0	33.1
	20	1600	14.4	33.0
	21	1500	14.6	33.1
	23	1415	15.0	32.6
	24	1400	15.4	33.0
	25	1500	15.6	32.2
	27	1200	15.4	32.2
	28	1100	15.4	32.2
	29	1000	14.7	32.6
	30	1400	12.2	32.9
	31	1500	14.6	33.1
SEP.	1	1530	14.6	33.0
	2	1340	14.8	33.1
	3	1400	14.2	33.2
	5	1110	12.5	32.9
	9	1200	12.3	32.5
	10	1400	12.6	32.6
	11	1120	12.5	32.9
	13	1440	12.6	32.9
	14	1300	12.6	32.7
	15	1500	12.9	32.9
	16	1435	13.2	32.9
	17	1140	12.8	32.7
	18	1200	12.8	32.9
	20	1500	12.6	32.9
	21	1600	12.8	32.7
	22	1530	12.6	32.9
	23	1645	12.8	32.7
	24	1600	12.6	32.6
	25	1700	12.6	32.7
	26	1700	12.5	32.6
	28	1640	12.8	32.9
	29	1520	12.6	32.7
	30	1640	12.8	32.7
OCT.	1	1610	12.8	32.6
	2	1640	12.8	32.7
	5	1530	12.8	32.6
	8	1530	12.6	32.6
	11	1440	12.8	32.6
	12	1500	12.6	32.9
	14	1530	12.8	32.7
	15	1545	12.6	32.9
	17	1600	12.4	32.7
	18	1545	12.6	32.7
	19	1530	12.4	32.6
	21	1430	12.2	32.6
	22	1345	12.0	32.5
	23	1400	12.0	32.6
	24	1540	12.2	32.5
	26	1600	12.6	32.9
	27	1500	12.6	32.7
	28	1400	12.4	32.6
	30	1530	12.6	32.6
	31	1430	12.8	32.9
DEC.	1	1300	11.2	31.7
	2	1430	11.3	31.6
	3	1500	11.4	31.6
	4	1530	11.0	31.2
	5	1110	11.0	31.3
	7	1500	11.5	31.0
	8	1440	11.5	30.9
	9	1430	11.4	30.9
	10	1540	11.4	30.6
	11	1430	11.6	30.6
	12	1340	11.5	30.6
	13	1200	11.8	30.7
	14	1300	11.4	30.6
	15	1400	10.8	30.2
	16	1400	10.4	30.1
	17	1430	10.0	30.1
	18	1530	9.9	29.8
	19	1430	9.9	30.1
	20	1340	10.0	30.6
	21	1000	10.0	30.9
	22	1000	10.0	30.6
	23	1140	10.2	30.9
	26	1400	9.8	30.9
	27	1500	10.0	30.9
	28	1445	9.9	30.6
	29	1500	9.8	30.6
	30	1430	9.9	30.9
	31	1445	10.0	30.6

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DATE	TIME	T	S
JAN. 3	1200	8.4	32.8
4	1410	8.4	32.9
5	0940	7.5	32.1
6	0955	8.0	32.8
8	1420	8.0	30.3
10	1255	7.8	29.7
11	1035	7.8	31.8
13	0930	8.4	30.8
17	1155	8.9	27.3
19	0945	8.9	25.5
21	1205	9.7	27.3
22	1140	10.0	26.4
23	1400	10.6	27.7
25	1600	9.7	32.3
26	1505	9.2	32.7
27	1050	8.6	32.1
30	0915	7.2	28.5
FEB. 1	1050	8.4	29.8
3	0855	9.2	26.8
4	1035	9.7	26.3
5	1510	10.3	30.1
6	0950	9.7	29.8
8	1150	9.7	30.6
12	1400	9.7	29.4
14	1100	10.0	28.5
16	1515	10.3	27.6
18	1330	10.8	28.2
21	1450	11.1	25.1
23	1330	11.6	16.4
24	0940	11.1	22.8
25	1250	12.2	24.3
26	1320	12.0	23.3
28	1050	12.0	24.6
MAR. 4	1020	11.6	29.0
5	1630	12.2	28.5
10	0950	10.8	31.5
11	1300	11.6	31.0
13	1450	10.8	27.3
16	1110	10.8	28.9
18	1455	11.6	31.2
20	1430	12.2	31.1
21	0800	11.4	28.5
23	0945	11.6	28.2
25	1050	11.6	25.0
26	1135	12.0	29.0
27	1020	11.6	30.6
28	0915	11.4	31.4
30		11.6	31.9
APR. 3	1305	11.6	32.4
5	1445	11.6	31.8

DATE	TIME	T	S
APR. 9	1020	10.3	33.1
11	0900	10.3	33.1
13	1045	7.5	34.1
18	1420	8.9	33.6
20	0855	7.5	33.7
25	1300	8.4	34.2
27	1745	7.5	34.2
29	1240	8.9	32.5
MAY 2	1220	9.2	34.0
6	0855	7.8	33.6
7	0955	8.4	33.7
9	0810	9.2	33.2
12	1435	9.2	33.6
13	1425	10.6	30.6
20	1820	13.0	29.1
22	0840	13.9	28.4
23	1050	13.9	29.7
25	1910	14.7	30.3
31	1047	12.5	32.7
JUNE 4	1410	15.0	31.2
7	0840	9.4	34.1
11	1220	10.3	34.1
12	1435	11.6	33.7
14	1510	12.5	33.5
15	1855	11.6	33.7
17	1520	14.4	31.9
18	1545	14.4	32.1
20	1045	13.6	32.4
21	1225	14.4	32.4
25	1010	12.5	33.2
29	1515	10.8	34.1
JULY 5	1725	12.8	32.9
8	1435	13.9	32.3
10	1355	13.4	33.3
13	1805	15.6	32.7
15	2020	12.8	33.6
18	1450	15.0	33.5
22	1410	15.6	33.2
23	1230	15.0	33.1
24	1435	14.4	32.8
29	1400	15.8	32.9
31	1925	14.4	32.8
AUG. 1	1255	14.2	32.5
3	1540	13.9	32.8
6	1355	15.0	32.9
8	1750	15.3	33.1
9	1250	14.4	32.8
10	1510	14.4	32.8
13	1815	14.4	32.8
19	1040	13.9	32.8

DATE	TIME	T	S
AUG. 24	1450	16.4	32.1
26	1225	16.6	30.8
27	2010	16.6	30.2
28	1425	16.1	32.3
31	0830	16.4	32.5
SEP. 3	0945	14.4	33.1
4	1305	15.6	32.9
5	1405	15.8	32.3
7	1035	14.7	32.7
9	1200	15.3	32.7
10	1205	16.1	32.5
11	1210	15.6	32.7
13	1215	15.6	32.5
16	0800	12.5	32.8
17	0915	11.6	32.8
19	1200	12.2	33.2
24	1210	11.6	33.5
25	1515	12.0	33.6
26	1425	12.8	33.3
27	1350	13.4	33.5
28	1600	13.6	32.8
OCT. 2	1215	12.0	32.5
3	1010	12.2	32.5
7	1215	10.6	33.1
8	1315	10.0	33.3
9	1250	10.0	33.1
10	1330	10.8	33.1
15	1015	11.4	32.4
19	0815	10.6	32.8
21	1045	11.1	32.9
23	0905	11.1	32.9
24	0915	10.8	32.8
25	1205	11.1	32.9
27	1325	11.6	33.3
28	1245	11.6	32.3
29	1415	12.2	32.1
31	1110	11.1	32.1
NOV. 1	0915	10.8	32.0
4	1030	11.1	32.1
5	0955	11.1	31.6
7	1015	11.1	31.6
12	1545	12.0	30.7
13	1540	11.6	31.6
15	1125	10.8	31.5
18	1125	11.6	30.7
21	1105	11.6	30.2
23	1350	12.0	30.1
25	1445	11.4	31.2
30	0930	10.0	31.0

TABLE III. MONTHLY MEAN TEMPERATURE AND SALINITY.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
COLUMBIA RIVER LIGHTSHIP 1968													
TEMPERATURE													
MEAN	8.71	8.94	9.83	9.90	11.58	13.65	14.14	14.93	15.21	13.14	11.61	8.32	11.66
MAX.	10.50	11.00	10.60	11.60	13.80	15.00	17.20	16.90	16.80	14.60	13.60	11.50	
MIN.	6.50	7.00	8.70	8.90	9.60	13.00	12.20	12.20	13.40	11.50	9.00	6.60	
RANGE	4.00	4.00	1.90	2.70	4.20	2.00	5.00	4.70	3.40	3.10	4.60	4.90	
NO. OF OBS.	27	26	29	30	31	30	30	30	29	27	30	25	
SALINITY													
MEAN	24.81	25.45	30.57	24.38	28.78	30.08	27.70	31.32	31.51	31.38	30.01	19.98	28.00
MAX.	33.20	32.60	32.90	32.90	32.10	31.60	29.90	33.70	33.50	33.60	32.70	30.20	
MIN.	17.20	15.20	22.10	11.30	25.00	26.60	13.90	23.10	28.60	25.80	28.60	8.80	
RANGE	16.00	17.40	10.80	21.60	7.10	5.00	16.00	10.60	4.90	7.80	4.10	21.40	
NO. OF OBS.	27	26	29	30	31	30	30	30	29	27	28	25	

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
SEASIDE 1968													
TEMPERATURE													
MEAN	8.71	8.43	10.89		12.38	14.40							10.96
MAX.	11.00	8.90	11.30		13.10	15.90							
MIN.	7.60	7.80	10.40		11.00	13.70							
RANGE	3.40	1.10	.90		2.10	2.20							
NO. OF OBS.	23	9	17		8	5							
SALINITY													
MEAN	27.66	28.84	27.95		28.69	26.94							28.02
MAX.	29.00	29.60	28.30		30.30	28.60							
MIN.	26.10	28.20	27.50		27.70	25.60							
RANGE	2.90	1.40	.80		2.60	3.00							
NO. OF OBS.	23	9	17		8	5							

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
DEPOE BAY 1968													
TEMPERATURE													
MEAN	10.01	10.32	10.25	9.92	10.58	13.67	11.77	15.10	13.20	13.34	11.45	8.54	11.51
MAX.	10.40	10.80	10.80	10.20	11.60	16.30	12.80	16.20	14.30	14.30	12.40	9.40	
MIN.	9.40	9.80	9.80	9.60	9.80	11.80	11.00	13.80	11.80	12.40	9.60	7.80	
RANGE	1.00	1.00	1.00	.60	1.80	4.50	1.80	2.40	2.50	1.90	2.80	1.60	
NO. OF OBS.	22	22	20	21	20	21	20	21	22	18	19	20	
SALINITY													
MEAN	30.22	31.25	31.23	33.79	34.49	30.95	33.54	35.03	34.43	32.85	32.46	32.61	32.74
MAX.	30.90	32.20	32.40	34.70	34.90	34.20	34.50	36.00	35.40	34.00	33.50	34.20	
MIN.	28.80	30.00	30.20	33.20			32.20	33.60	33.10	31.80	31.50	31.10	
RANGE	2.10	2.20	2.20	1.50	34.90	34.20	2.30	2.40	2.30	2.20	2.00	3.10	
NO. OF OBS.	22	22	20	19	19	20	20	21	22	18	19	20	

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
NEWPORT (MARINE SCIENCE CENTER) 1968													
TEMPERATURE													
MEAN	9.00	9.75	11.01	10.34	11.84	12.36	10.78	12.96	13.41	11.06	12.25	10.55	11.28
MAX.	9.50	12.00	11.90	11.10	13.50	15.20	13.40	16.00	15.00	12.40	13.20	11.30	
MIN.	8.30	8.70	10.40	9.00	9.50	10.30	9.40	10.00	11.60	9.50	11.60	9.50	
RANGE	1.20	3.30	1.50	2.10	4.00	4.90	4.00	6.00	3.40	2.90	1.60	1.80	
NO. OF OBS.	15	11	17	12	16	24	9	20	17	13	15	15	
SALINITY													
MEAN	29.83	29.97	29.45	32.32	32.12	31.82	33.29	32.93	32.08	32.29	30.01	28.17	31.19
MAX.	32.44	32.18	31.64	33.41	33.58	33.09	33.61	33.67	33.07	33.25	31.95	30.84	
MIN.	26.84	22.03	26.18	31.45	30.79	28.12	32.77	31.76	30.60	30.41	28.42	26.23	
RANGE	5.60	10.15	5.46	1.96	2.79	4.97	.84	1.91	2.47	2.84	3.53	4.61	
NO. OF OBS.	15	11	17	12	16	23	9	20	17	13	15	15	

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
CHARLESTON 1968													
TEMPERATURE													
MEAN	9.06	10.44	11.49	11.22	12.14	13.57	12.86	11.40	13.46	11.86	12.15	10.30	11.66
MAX.	10.70	12.40	13.20	12.60	15.40	16.20	15.40	11.40	14.80	14.00	12.80	11.40	
MIN.	7.20	9.00	10.40	9.10	9.40	11.00	10.40	11.40		9.80	10.80	9.20	
RANGE	3.50	3.40	2.80	3.50	6.00	5.20	5.00	0	14.80	4.20	2.00	2.20	
NO. OF OBS.	23	16	17	18	13	12	20	2	8	10	6	20	
SALINITY													
MEAN	31.15	28.78	30.65	31.51	32.38	32.49	33.27	33.40	32.58	33.17	29.35	28.35	31.42
MAX.	33.00	32.30	32.10	32.70	33.40	33.40	33.90	33.40	33.20	33.60	31.50	31.20	
MIN.	25.70	27.90	28.80	26.90	0	31.40	32.40	33.40	32.10		27.70	9.40	
RANGE	7.30	4.40	3.30	5.80	33.40	2.00	1.50	0	1.10	33.60	3.80	21.80	
NO. OF OBS.	23	15	17	18	12	12	20	2	10	3	6	20	

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
PORT ORFORD 1968													
TEMPERATURE													
MEAN	9.17	10.51	11.45	9.55	11.06	11.35	11.57	13.60	12.92	12.53		10.66	11.31
MAX.	11.00	12.20	12.00	11.50	13.20	13.50	15.20	15.60	14.80	12.80		11.80	
MIN.	8.20	9.90	10.60	7.80	8.80	9.80	10.20	11.20	12.30	12.00		9.80	
RANGE	2.80	2.30	1.40	3.70	4.40	3.70	5.00	4.40	2.50	.80		2.00	
NO. OF OBS.	24	24	27	26	29	28	26	26	23	20		28	
SALINITY													
MEAN	32.53	31.04	31.63	33.63	32.66	33.51	33.55	33.35	32.81	32.67		30.75	32.56
MAX.	33.20	32.50	32.90	34.20	33.90	34.20	34.00	33.90	33.20	32.90		31.70	
MIN.	31.90	29.20	29.30	32.50	31.20	31.80	33.10	32.20	32.50	32.50		29.80	
RANGE	1.30	3.30	3.60	1.70	2.70	2.40	.90	1.70	.70	.40		1.90	
NO. OF OBS.	24	24	27	26	29	28	26	26	23	20		28	

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
CRESCENT CITY, CALIFORNIA 1968													
TEMPERATURE													
MEAN	8.85	10.49	11.52	9.25	11.13	12.54	14.43	15.20	13.93	11.14	11.26		11.78
MAX.	10.50	12.20	12.20	11.60	14.70	15.00	15.80	16.60	16.10	12.20	12.00		
MIN.	7.20	8.60	10.80	7.50	7.80	9.40	12.80	13.90	11.60	10.00	10.00		
RANGE	3.40	3.80	1.40	4.10	6.90	5.60	3.00	2.70	4.50	2.20	2.00		
NO. OF OBS.	17	16	15	10	11	12	11	13	16	16	12		
SALINITY													
MEAN	33.18	28.47	29.54	33.27	31.72	33.03	33.01	32.34	32.93	32.76	31.19		31.49
MAX.	32.90	30.60	31.90	34.20	34.00	34.10	33.60	33.10	33.60	33.30	32.10		
MIN.	25.50	14.40	25.00	31.80	28.40	31.20	32.30	30.20	32.30	32.10	30.10		
RANGE	7.40	14.20	6.90	2.40	5.60	2.90	1.10	2.90	1.30	1.20	2.00		
NO. OF OBS.	17	16	15	10	11	12	11	13	16	16	12		

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
PORT ORFORD 1967 (CORRECTED)													
TEMPERATURE													
MEAN									13.18	12.26	11.72	9.69	11.71
MAX.									16.80	13.80	12.80	10.40	
MIN.									10.50	11.00	11.00	8.00	
RANGE									6.30	2.80	1.80	2.40	
NO. OF OBS.									22	27	13	18	
SALINITY													
MEAN									32.70	32.60	32.46	33.35	32.88
MAX.									33.80	33.80	33.20	33.60	
MIN.									31.90	31.36	32.40	32.90	
RANGE									1.90	2.50	.80	.70	
NO. OF OBS.									22	27	13	17	

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13. ABSTRACT

During 1967 the Department of Oceanography, Oregon State University, continued its program of shore sampling of ocean temperatures and salinities along the coast of the Pacific Northwest. Daily observations for six stations are listed along with monthly maxima, minima, and means of temperature and salinity.

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Shore stations						
Temperature						
Salinity						
Surface temperature						
Surface salinity						
Oregon Coast						