Special Report No. 28

NORTHEAST PACIFIC OCEAN AND GULF OF ALASKA
PHYSICAL AND CHEMICAL DATA,
Summer and Fall 1955

A preliminary tabulation of oceanographic data
collected by vessels of the
U. S. Fish and Wildlife Service

Compiled by
Felix Favorite and Cuthbert M. Love

U. S. Fish and Wildlife Service
Contract Nos. 14-19-008-2369 and 14-19-008-2429
Office of Naval Research
Contract No. Nonr-477(10), Project NR 083-012

Reference 57-3
May 1957

RICHARD H. FLEMING
Executive Officer
ABSTRACT

This report tabulates physical and chemical observations collected during the summer and fall of 1955 in the North Pacific by the M. V. John N. Cobb of the U. S. Fish and Wildlife Service and by two chartered halibut schooners, the M. V. Paragon and M. V. Mitkof. The observations were made by personnel of the Department of Oceanography of the University of Washington.

These data were collected during the same period as the NORPAC cruises and thus this report may be considered supplementary to Special Report No. 22, "NORPAC 1955, M. V. Brown Bear, August 1 to September 19, 1955, Preliminary Data Report", Department of Oceanography, University of Washington, Reference 56-4.
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INTRODUCTION

This report contains oceanographic data collected during the summer and fall of 1955 as part of the exploratory fishing cruises of vessels of the U. S. Fish and Wildlife Service. The Department of Oceanography of the University of Washington contracted with the U. S. Fish and Wildlife Service to make oceanographic observations aboard the three vessels engaged in the salmon investigations for the International North Pacific Fisheries Commission, and aboard one of the vessels during an exploratory fishing cruise off the Washington and Oregon Coast. Preliminary reports of the oceanographic observers on these cruises have been reported previously in narrative form as Special Report 20, Reference 56-2, Department of Oceanography, University of Washington, (Gast et al., 1956).

Area and Station Numbers

Figure 1 shows the track followed and the locations of the stations occupied. The fishing stations (gill-net sets) on the John N. Cobb were renumbered by the Fish and Wildlife Service after the cruise had ended. The oceanographic stations were not renumbered; therefore, the numbers of the gill-net sets and the numbers of the oceanographic stations do not necessarily correspond. Table 1 in the appendix shows the correlation between the numbering of oceanographic stations and the revised numbering of gill-net sets for the John N. Cobb. It should be noted that there are two oceanographic stations numbered 23-36 for the John N. Cobb, one on 30 August and one on 12 September.
versus wire length, the L - Z curve method described by LaFond (1951). The data from the Mitkof and Paragon were tabulated against "estimated depth", or wire length, only. The density ($\rho_t$) values at both observed and standard depths were computed from tables of sea-water density.

Salinity determinations were done in Seattle at the laboratories of the Department of Oceanography. Copenhagen standard sea water was used as the standard in the determination of the salinity of the sea water.

On board the John N. Cobb, dissolved oxygen was determined by the modified Winkler method described by Thompson and Robinson (1939); and soluble inorganic phosphate was determined by the method of Thompson and Robinson (1948) using the EEP (Electric-Eye Photometer).

**Personnel**

Following is a list of the personnel assigned as observers from the Department of Oceanography:

**At Sea**

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<tr>
<th>Observer</th>
<th>Vessel</th>
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<td>Amidon, James L.</td>
<td>John N. Cobb</td>
<td>8 August - 18 September 1955 12 - 24 October 1955</td>
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<td>Gast, James A.</td>
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<td>4 July - 8 August 1955</td>
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<tr>
<td>Hebard, J. Frank</td>
<td>Mitkof</td>
<td>3 August - 14 September 1955</td>
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<td>Seelinger, Phillip E.</td>
<td>Paragon</td>
<td>31 July - 26 September 1955</td>
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<td>Wennekens, M. Pat (No observations)</td>
<td>John N. Cobb</td>
<td>23 - 28 June 1955</td>
</tr>
</tbody>
</table>
Ashore

Dursch, H. Robert  Research Assistant - Chemistry
Duxbury, Alyn C.  Research Assistant - Chemistry
Favorite, Felix  Research Assistant
Haselwood, Edith  Assistant Editor
Jackson, Hewitt R.  Senior Draftsman
Lord, Mrs. Marion E.  Lab. Technician - Chemistry
McLean, Wayne W.  Chief Lab. Technician - Chemistry
Morse, Betty Ann  Senior Lab. Technician
Owen, Robert W., Jr.  Student Helper
Semon, Darrelyn  Student Helper
Skellenger, Elinor M.  Typist
Sutton, Mary C.  Typist
Theodore, J. Athan  Student Helper

Some of the sea-going personnel were also engaged in the shore-side preparation of the data.
EXPLANATION OF PHYSICAL AND CHEMICAL DATA TABLES

Station positions are given to the nearest minute of latitude and longitude. The messenger time reported is the time the messenger was released on the first cast made on station. The time zone varied for each vessel depending on its location and the time zone used is indicated for each station. On all of the deeper stations (below 100 meters), the sampling was done in two casts. The wire angle listed first is that of the shallow cast and second is the wire angle on the deeper cast.

During the drawing of the smooth curves of property versus depth, from which the values at standard depths were interpolated (John N. Cobb), certain values obviously did not fit the smooth curve. These doubtful values have been tabulated; however, they are indicated in the tables by the following symbol:

b - This value not taken into account when drawing smooth curve of property versus depth.

The depth listed was determined with an echo-sounder. Barometric pressure is in inches of mercury. The following weather observations: weather (present weather), sea height, visibility, and clouds, are reported according to the numerical code given in U. S. Navy Hydrographic Office Publication No. 606-c, Bathythermograph Observations. For convenience, the codes for sea height, visibility, cloud type, cloud amount (cover), and appropriate sections from the present weather code from the above publication are reproduced herein.

Extrapolated values in the tables are enclosed in parentheses.
**CODES USED FOR REPORTING WEATHER CONDITIONS**

*Taken from U. S. Navy Hydrographic Office Publication No. 606-c, Bathythermograph Observations*

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M. V. JOHN N. COBB CRUISE NO. 23

STATION 23-8

56° 16'N, 137° 04'W - W of Sitka

6 July 1955

Weather: Cl
Barometer: 30.05 in

Messenger time: 1559(+8)
Sea height: 2
Wind: 071°, 3 (Beaufort)

Visibility: 8
Clouds: 0, amt 8
Air temperature: dry 52°F

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<th>S‰</th>
<th>Density (g/l)</th>
<th>O₂ (mg/L)</th>
<th>PO₄ -P (μg/L)</th>
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</table>
M.V. John N. Cobb

STATION 23-9

57° 40'N, 137° 36'W - SW of Cape Spencer

7 July 1955

Weather: O2
Barometer: 30.07 in
Wind: -, 0
Visibility: 7
Clouds: 0, amt 9
Air temperature: not reported

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<th>T (°C)</th>
<th>S (%)</th>
<th>Density (°B)</th>
<th>O₂ (mg/l)</th>
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M. V. John N. Cobb

**STATION 23-10**

57° 44'N, 139° 08'W

11 July 1955

Weather: 02
Barometer: 29.96 in

Messenger time: 2317 (+8)
Sea height: 1
Wind: 118°, 1 (Beaufort)
Visibility: 7
Clouds: amt 9
Air temperature: dry 49°F

<table>
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<th>T (°C)</th>
<th>S' (o/oo)</th>
<th>Density (g/L)</th>
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**INTERPOLATED**

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* This depth is questionable.
M. V. John N. Cobb

STATION 23-11

57° 38'N, 141° 20'W

12 July 1955

Weather: 01
Barometer: 30.03 in
Sea height: 1
Wind: -, 0
Visibility: 7
Clouds: -, amt 8
Air temperature: dry 50°F

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Note: The values in parentheses are interpolated.
M.V. John N. Cobb

STATION 23-12
57° 26'N, 193° 29'W

13 July 1955

Weather: 02
Barometer: 30.30 in

Sea height: 2
Wind: 300°, 3 (Beaufort)

Visibility: 8
Clouds: -, amt 7
Air temperature: dry 50°F

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M.V. John N. Cobb

STATION 23-13
57° 16'N, 145° 26'W

14 July 1955 Weather 60 Barometer: not reported
Messenger time: 2031 (+8) Sea height: 4 Wind: -, 4 (Beaufort)
Visibility: 7 Clouds: -, amt 9
Air temperature: not reported

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M.V. John N. Cobb

STATION 23-14

$57^\circ 10' \text{N}, 147^\circ 30' \text{W}$

15 July 1955

Weather: 45

Barometer: 29.99 in

Sea height: 3

Wind: 252°, 5 (Beaufort)

Visibility: 6

Clouds: -, amt 9

Air temperature: dry 49°F

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M.V. John N. Cobb

STATION 23-15

56° 59'N, 149° 39'W

16 July 1955

Weather: not reported  Barometer: not reported

Sea height: 2  Wind: not reported

Visibility: not reported  Clouds: not reported

Air temperature: not reported

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**STATION 23-16**

56° 11'N, 151° 06'W - SE of Kodiak Island

17 July 1955

Weather: 02
Sea height: 2
Visibility: 7
Air temperature: dry 46°F

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**STATION 23-17**

55° 35'N, 152° 44'W

21 July 1955  
Messenger time: 1904 (+10)  
Weather: 02  
Barometer: 30.21 in  
Sea height: 1  
Wind: 215°, 1 (Beaufort)  
Visibility: 8  
Clouds: -, amt 0  
Air temperature: dry 57°F

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M.V. John N. Cobb

STATION 23-18

54° 32'N, 152° 47'W

22 July 1955

Weather: l5

Sea height: 2

Visibility: 6

Air temperature: dry 53°F

Barometer: 30.19 in

Wind: 270°, 3 (Beaufort)

Clouds: -, amt 9

22: July 1955

Messenger time: 1700 (+10)

Sea height: 2

Wind: 270°, 3 (Beaufort)

Visibility: 6

Clouds: -, amt 9

Air temperature: dry 53°F

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M.V. John N. Cobb

**STATION 23-19**

53° 25'N, 152° 36'W

23 July 1955

Weather: 60
Sea height: 3
Visibility: 3
Clouds: -, amt 9
Air temperature: dry 49°F

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STATION 23-45
53° 38'N, 154° 44'W
24 July 1955

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Barometer: 29.88 in
Sea height: 5
Wind: 270°, 3 (Beaufort)
Visibility: 3
Clouds: - , amt 9
Air temperature: dry 49°F

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M.V. John N. Cobb

STATION 23-46
53° 47'n, 156° 23'W
25 July 1955

Weather: 45
Sea height: 2
Visibility: 4
Air temperature: dry 49°F

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* This depth is questionable.
**M.V. John N. Cobb**

**STATION 23-47**

53° 28'N, 158° 45'W

26 July 1955  
Weather: not reported  
Barometer: not reported  
Sea height: not reported  
Wind: not reported  
Visibility: not reported  
Clouds: not reported  
Air temperature: not reported

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M.V. John N. Cobb

STATION 2348
53° 10'N, 161° 30'W

29 July 1955
Weather: 45
Barometer: 30.10 in
Wind: 220°, 2 (Beaufort)
Visibility: not reported

Clouds: -, amt 9
Air temperature: dry 49°F

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M.V. John N. Cobb

STATION 23-49
52° 45’N, 163° 27’W

30 July 1955

Weather: 45

Barometer: 29.96 in

Sea height: 1

Wind: 220°, 1 (Beaufort)

Visibility: 4

Clouds: -, amt 9

Air temperature: dry 50°F

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INTERPOLATED
M.V. John N. Cobb

STATION 23-50

52°10'N, 165°25'W

31 July 1955

Weather: 45
Sea height: 2
Wind: - 3 (Beaufort)
Visibility: 4
Clouds: -, amt 9
Air temperature: dry 49°F

Mess 'enger time: 1955 (+10)

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Station 23-31

53° 20' N, 165° 25' W - S of Avatanak Island

1 August 1955

Weather: 02
Sea height: 1
Visibility: 8
Clouds: 0, amt 7
Air temperature: dry 51°F

| Depth (m) | °C | % | Density (g/L) | %O₂ | PO₄-P (μg-at/L) |
|----------|----|---|--------------|-----|-----------------
| 0        | 10.34 | 31.78 | 24.40 | 0.616 | 0.67 |
| 10       | 8.34  | 31.82 | 24.76 | 0.625 | 0.69 |
| 19       | 5.11  | 32.08 | 25.37 | 0.600 | 1.25 |
| 49       | 4.21  | 32.20 | 25.57 | 0.625 | 1.30 |
| 98       | 4.50  | 32.58 | 25.83 | 0.658 | 1.59 |
| 245      | 4.70  | 33.89 | 26.85 | 0.614 | 2.25 |
| 471      | 3.93  | 34.13 | 27.12 | 0.612 | 2.74 |
| 940      | 3.11  | 34.37 | 27.40 | 0.036 | 2.48 |

Interpolated

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M.V. John N. Cobb

STATION 23-53

53°43'N, 160°13'W - S of Shumagin Islands
4 August 1955

Weather: 02
Barometer: 30.00 in
Sea height: 3
Wind: not reported
Visibility: 6
Clouds: -, amt 9
Air temperature: not reported

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</table>
M.V. John N. Cobb

STATION 23-54

55° 35'N, 152° 44'W - SE of Shumagin Islands

5 August 1955

Weather: 02
Barometer: 30.02 in

Messenger time: 2152 (+10)
Sea height: 6
Wind: 300°, 6 (Beaufort)
Visibility: 8
Clouds: -, amt 2
Air temperature: dry 50°F

Depth (m) | Temperature (°C) | Salinity (%o0) | Density (°t) | O₂ (mg-at/L) | PO₄ (μg-at/L)
--- | --- | --- | --- | --- | ---
0 | 11.78 | 32.23 | 21.50 | 0.536 | 0.71
10 | 11.78 | 32.23 | 21.50 | 0.537 | 0.60
20 | 9.96 | 32.34 | 24.90 | 0.530 | 0.87
49 | - | - | - | 0.579 | 1.24
98 | 3.92 | 33.31 | 26.17 | 0.416 | 1.86
234 | 4.05 | 33.99 | 27.00 | 0.050 | 2.62
467 | 3.62 | 34.19 | 27.20 | 0.039 | 2.59
914 | 2.83 | 34.38 | 27.43 | 0.042 | 2.53

INTERPOLATED

Depth (m) | Temperature (°C) | Salinity (%o0) | Density (°t) | O₂ (mg-at/L) | PO₄ (μg-at/L)
--- | --- | --- | --- | --- | ---
0 | 11.78 | 32.23 | 21.50 | 0.536 | 0.71
10 | 11.78 | 32.23 | 21.50 | 0.537 | 0.60
20 | 9.96 | 32.34 | 24.90 | 0.530 | 0.87
50 | 6.50 | 32.72 | 25.50 | 0.579 | 1.24
100 | 3.92 | 33.32 | 26.19 | 0.400 | 1.88
250 | 4.04 | 34.02 | 27.02 | 0.048 | 2.62
500 | 3.57 | 34.21 | 27.22 | 0.039 | 2.58
900 | 2.90 | 34.36 | 27.41 | 0.042 | 2.53
1000 | (2.75) | (34.40) | (27.46) | (0.042) | (2.52)
M.V. John N. Cobb

STATION 23-55

55° 01'N, 155° 32'W - 3 of Chirikof Island

6 August 1955  
Weather: 03  
Barometer: 30.00 in

Messenger time: 2000 (+10)  
Sea height: 5  
Wind: 260°, 5 (Beaufort)

Visibility: 8  
Clouds: -, amt 9

Air temperature: dry 54°F

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<th>Density (g/L)</th>
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</table>
**M.V. John N. Cobb**

**STATION 23-A**

57° 22'N, 150° 19'W

10 August 1955

**Weather:** 03

**Barometer:** 30.00 in

**Wind:** 240°, 2 - 3 (Beaufort)

**Visibility:** 9

**Clouds:** - , amt h

**Air temperature:** dry 56°F

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<th>Density (ρ)</th>
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| **INTERPOLATED** | | | | | |
| 0         | 11.94  | 32.18 | 24.43       | 0.566         | 0.51            |
| 10        | 11.56  | 32.20 | 24.52       | 0.578         | 0.40            |
| 20        | 10.20  | 32.25 | 24.78       | 0.571         | 0.48            |
| 50        | 5.67   | 32.83 | 25.90       | 0.539         | 1.77            |
| 100       | 5.15   | 33.24 | 26.26       | 0.402         | 2.03            |
| 250       | (4.57) | 33.93 | (26.92)     | 0.131         | 2.26            |
| 500       | -      | (34.11) | -           | (0.056)       | (2.50)          |

* This depth is questionable.
M.V. John N. Cobb

STATION 23-26

56° 30' N, 148° 48' W

10 August 1955

Weather: 03
Barometer: 30.03 in

Sea height: 3
Wind: 351°, 3 (Beaufort)

Visibility: 7
Clouds: -, amt 8

Air temperature: dry 53° F

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</table>
M.V. John N. Cobb

STATION 23-27

56° 24' N, 146° 23' W

11 August 1955

Weather: 03
Sea height: 4
Visibility: 7

Air temperature: dry 51°F

Barometer: 30.10 in
Wind: - 4 (Beaufort)
Clouds: - , ant 9

<table>
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<tr>
<th>Depth (m)</th>
<th>T (°C)</th>
<th>S (°/oo)</th>
<th>Density (°C)</th>
<th>O₂ (mg-at/L)</th>
<th>PO₄ (-P) (μg-at/L)</th>
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<th>O₂ (mg-at/L)</th>
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* These depths are questionable.
M.V. John N. Cobb

**STATION 23-28**

56° 05'N, 144° 20'W

17 August 1955

Weather: 03

Barometer: 29.87 in

Wind: 315°, 2-3 (Beaufort)

Visibility: 9

Air temperature: dry 56°F

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M.V. John N. Cobb

STATION 23-29

56° 13.5'N, 142° 34.0'W - Peabody Seamount

17 August 1955

Weather: 
Barometer: 30.00 in

Messenger time: 1837 (+10)

Sea height: 0

Wind: 135°, 1 (Beaufort)

Visibility: 9

Clouds: -, amt 1

Air temperature: dry 53°F

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M.V. John N. Cobb

STATION 23-30
56° 10'N, 140° 41'W

18 August 1955 Weather: 02

Messenger time: 2326 (± 8) Sea height: 3

Barometer: 30.13 in Wind: 225°, 4 (Beaufort)

Visibility: 8 Clouds: -, amt 9

Air temperature: dry 50°F

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<th>PO₄-P (μg-at/L)</th>
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**STATION 23-31**

56° 17' N, 138° 39' W

19 August 1955

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* These values are questionable.
M. V. John N. Cobb

STATION 23-31a

56° 18' N, 138° 37' W

20 August 1955

Weather: 02
Barometer: 30.23 in

Wind: 225°, 2-3 (Beaufort)

Visibility: 8

Clouds: -, amt 9

Air temperature: dry 54° F

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M.V. John N. Cobb

STATION 23-32

56° 19.5'N, 136° 40.5'W - SW of Sitka

21 August 1955

Weather: 01
Barometer: 30.23 in

Sea height: 2
Wind: 315°, 3 (Beaufort)

Visibility: 9
Clouds: - , amt 8

Air temperature: dry 55°F

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<th>Density (g/L)</th>
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M.V. John N. Cobb

STATION 23-32a

56° 19'N, 136° 44.5'W - SW of Sitka

22 August 1955

Messenger time: 1509 (+8)
Weather: 03
Sea height: 2
Visibility: 9
Air temperature: dry 54°F

Barometer: 30.21 in
Wind: 270°, 3-l (Beaufort)
Clouds: -, amt 8

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<th>PO₄ (-P, ug-at/L)</th>
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Barometer: 30.21 in
Wind: 270°, 3-l (Beaufort)
Clouds: -, amt 8
Air temperature: dry 54°F
M.V. John N. Cobb

STATION 23-B

56° 56.8'N, 135° 41.3'W - Entrance to Sitka Sound

26 August 1955
Messenger time: 1136 (+8)

Weather: not reported   Barometer: not reported
Sea height: not reported  Wind: not reported
Visibility: not reported  Clouds: not reported
Air temperature: not reported

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<th>Depth (m)</th>
<th>T (°C)</th>
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* All depths are questionable.
**M.V. John N. Cobb**

**STATION 23-33**

55° 34' N, 135° 24' W - SW of Cape Ommaney

27 August 1955  
Weather: 02  
Barometer: 30.28 in

Messenger time: 1106 (+8)  
Sea height: 2  
Wind: 225°, 4 (Beaufort)

Visibility: 6  
Clouds: -, amt 9  
Air temperature: dry 54°F

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<th>O₂ mg-at/L</th>
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</table>
## M.V. John N. Cobb

### STATION 23-31

**Location:** 55° 11' N, 136° 48' W

- **Date:** 29 August 1955
- **Weather:** 01
- **Sea height:** 1
- **Visibility:** 8
- **Air temperature:** dry 58°F
- **Barometer:** 30.10 in
- **Wind:** 292°, 3 (Beaufort)
- **Clouds:** -, amt 7

### Depth and Temperature

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<th>S ‰</th>
<th>Density (g/cm³)</th>
<th>O₂ (mg-at/L)</th>
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M.V. John N. Cobb

**STATION 23-35**

55° 03'N, 139° 18'W

30 August 1955

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**INTERPOLATED**

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M.V. John N. Cobb

STATION 23-36

55° 01'N, 141° 30'W

30 August 1955

Weather: not reported
Barometer: not reported
Sea height: not reported
Wind: not reported
Visibility: not reported
Clouds: not reported
Air temperature: not reported

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### M.V. John N. Cobb

**STATION 23-65**

57° 38' N, 137° 37.5' W - SW of Cape Spencer

5 September 1955

**Weather:** Cl

**Barometer:** 30.34 in

**Sea height:**

- **Wind:** 270°, 2 (Beaufort)
- **Visibility:** 9
- **Clouds:** -, amt 3
- **Air temperature:** dry 52°F

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M.V. John N. Cobb

STATION 23-6h

57° 46'N, 139° 27'W

6 September 1955

Messenger time: 1717 (+8)

Sea height: 1

Weather: 02

Barometer: 30.31 in

Wind: 292, 3 (Beaufort)

Visibility: 9

Air temperature: dry 51°F

Clouds: - , amt 3

Depth m   T °C   S °/oo   Density Gt   O2 mg-at/L   PO4-P µg-at/L

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M.V. John N. Cobb

STATION 23-63

57° 35'N, 141° 22'W

7 September 1955

Weather: 02
Sea height: 3
Visibility: 9
Clouds: -, amt 2
Air temperature: dry 50°F

Barometer: 30.30 in
Wind: 270, 4 (Beaufort)

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**M.V. John N. Cobb**

**STATION 23-62**

57° 25'N, 143° 26'W

8 September 1955

Weather: 02

Barometer: 30.23 in

Sea height: 3

Wind: 202°, 3-4 (Beaufort)

Visibility: 8

Air temperature: dry 50°F

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**STATION 23-61**

57° 14'N, 145° 29'W

9 September 1955

- **Weather:** 16
- **Barometer:** 30.18 in
- **Sea height:** 3
- **Wind:** 135°, 3 (Beaufort)
- **Visibility:** 6
- **Clouds:** -, amt 9
- **Air temperature:** dry 52°F

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</table>
M.V. John N. Cobb

STATION 23-C
56° 03' N, 142° 36' W

12 September 1955
Weather: 03
Sea height: 2
Visibility: 9
Air temperature: dry 49°F

Barometer: 29.66 in
Wind: 158°, 3 (Beaufort)
Clouds: -, amt 4

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**M.V. John N. Cobb**

**STATION 23-36**

55° 00'N, 141° 27'W

12 September 1955

Weather: 03
Barometer: 29.66 in

Messenger time: 2012 (+8)
Sea height: 3
Wind: 158°, 3 (Beaufort)
Visibility: 8
Clouds: -, amt 5
Air temperature: dry 50°F

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900 (3.15)  (34.35)  (27.37)  (0.036)  (2.40)
M. V. PARAGON

STATION 1

50° 00'N, 175° 00'W

12 August 1955

Weather: hazy

Messenger time: 1425 (+11)

Sea height: calm

Wire angle: 0°, 0°

Visibility: 8

Barometer: 30.30 in

Wind: south 5 - 10 mph

Clouds: amt 7

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STATION 2

49° 00'N, 175° 00'W

13 August 1955

Weather: cloudy

Messenger time: 1625 (+11)

Sea height: calm

Wire angle: 0°, 0°

Visibility: 8

Barometer: 30.30 in

Wind: west 0 - 5 mph

Clouds: amt 8

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M. V. Paragon

**STATION 3**

48° 00' N, 175° 00' W

14 August 1955

Weather: foggy

Barometer: 30.20 in

Messenger time: 2121 (+11)

Sea height: calm

Wind: west 5 mph

Wire angle: 0°, 0°

Visibility: 6

Clouds: amt 8

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**STATION 4**

47° 00' N, 175° 00' W

15 August 1955

Weather: foggy

Barometer: 30.20 in

Messenger time: 1620 (+11)

Sea height: calm

Wind: west 0 - 5 mph

Wire angle: 0°, 0°

Visibility: 4

Clouds: amt 8

<table>
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M. V. Paragon

**STATION 5**

46° 00'N, 175° 00'W

16 August 1955

- Weather: fog
- Sea height: calm
- Visibility: 6

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**STATION 6**

45° 00'N, 175° 00'W

17 August 1955

- Weather: cloudy
- Sea height: calm
- Visibility: 7

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M. V. Paragon

**STATION 7**

45° 00' N, 177° 30' W  
Overcast

18 August 1955  
Weather: foggy  
Sea height: calm  
Visibility: 7

Messenger time: 2150 (+11)  
Wire angle: 0°, 0°

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**STATION 8**

45° 00' N, 180°

19 August 1955  
Weather: fog  
Sea height: calm  
Visibility: 7

Messenger time: 2140 (+11)  
Wire angle: 0°, 0°

<table>
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<tr>
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<th>T °C</th>
<th>S °/oo</th>
</tr>
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</table>
### M. V. Paragon

#### STATION 9

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<th>Visibility</th>
<th>Wire Angle</th>
<th>Barometer</th>
<th>Wind</th>
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<td>7</td>
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<td>SW 10 - 15 mph</td>
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#### OBSERVED

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<td>rough</td>
<td>7</td>
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<td>west 15 mph</td>
<td>amt 8</td>
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</table>

<table>
<thead>
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<th>S%</th>
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<td>250</td>
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</tr>
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<td>34.00</td>
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</tbody>
</table>
M. V. Paragon

### STATION 11

46° 00' N, 175° 00' E

22 August 1955  
Weather: cloudy  
Barometer: 29.20 in

Messenger time: 1810 (+11)  
Sea height: rough  
Wind: SW 15 - 20 mph

Wire angle: 0°, 0°  
Visibility: 7  
Clouds: amt 8

<table>
<thead>
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<th>S (%/oo)</th>
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### STATION 12

47° 00' N, 175° 00' E

23 August 1955  
Weather: cloudy  
Barometer: 30.10 in

Messenger time: 1815 (+11)  
Sea height: rough  
Wind: west 20 - 25 mph

Wire angle: 0°, 0°  
Visibility: 7  
Clouds: amt 8  
Air temperature: dry 58°F

<table>
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<tr>
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<th>T (°C)</th>
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</thead>
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</table>
M. V. Paragon

**STATION 13**

48° 00'N, 175° 00'E

24 August 1955

**Messenger time:** 1640 (+11)

**Weather:** cloudy  
**Barometer:** 30.10 in

**Wire angle:** 0°, 0°  
**Sea height:** rough  
**Wind:** SW 5 - 10 mph  
**Visibility:** 7  
**Clouds:** amt 8

**Air temperature:** dry 59°F  
**Barometer:** 30.10 in

<table>
<thead>
<tr>
<th>Estimated Depth (m)</th>
<th>T (°C)</th>
<th>S (°/oo)</th>
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<tr>
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</table>

**STATION 14**

49° 00'N, 175° 00'E

25 August 1955

**Messenger time:** 1655 (+11)

**Weather:** cloudy  
**Barometer:** 28.89 in

**Wire angle:** 0°, 0°  
**Sea height:** rough  
**Wind:** SW 25 - 30 mph  
**Visibility:** 7  
**Clouds:** amt 8

**Air temperature:** dry 59°F  
**Barometer:** 28.89 in

<table>
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</table>
M. V. Paragon

STATION 15
50° 00'N, 175° 00'E

26 August 1955
Weather: clear
Barometer: 30.06 in
Messenger time: 2015 (+11)
Sea height: rough
Wind: NW 5 - 10 mph
Visibility: 7
Clouds: amt 8
Air temperature: dry 53°F

<table>
<thead>
<tr>
<th>Estimated Depth (m)</th>
<th>T °C</th>
<th>S °/oo</th>
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<td>34.24</td>
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STATION 16
50° 00'N, 177° 30'E

27 August 1955
Weather: clear
Barometer: 30.20 in
Messenger time: 2050 (+11)
Sea height: calm
Wind: north 5 - 10 mph
Visibility: 7
Clouds: amt 8

<table>
<thead>
<tr>
<th>Estimated Depth (m)</th>
<th>T °C</th>
<th>S °/oo</th>
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<tbody>
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<tr>
<td>0</td>
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<td>34.20</td>
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</table>
2 September 1955
Messenger time: 1855 (+11)
Wire angle: 0°, 0°

Weather: cloudy
Sea height: 3
Visibility: 7

Estimated Depth (m) | T (°C) | S (%)
---|---|---
0 | 10.70 | 32.88
50 | 4.72 | 33.25
100 | 3.75 | 33.11
250 | 3.74 | 33.59
500 | 3.70 | 34.18

3 September 1955
Messenger time: 1555 (+11)
Wire angle: 0°, 0°

Weather: cloudy
Sea height: 1
Visibility: 7
Air temperature: dry 53°F

Estimated Depth (m) | T (°C) | S (%)
---|---|---
0 | 10.50 | 32.93
50 | 5.33 | 33.22
100 | 3.74 | 33.22
250 | 3.23 | 34.00
500 | 3.36 | 34.20
M. V. Paragon

**STATION 19**

<table>
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</thead>
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*Observed*  

**STATION 29**

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<tr>
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*Questionable value.*
### M. V. Paragon

#### STATION 28

<table>
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<tbody>
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<td>13 September 1955</td>
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<tr>
<td>Messenger time: 1755 (+11)</td>
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<tr>
<td>Wire angle: 0°, 0°</td>
</tr>
<tr>
<td>Weather: overcast</td>
</tr>
<tr>
<td>Barometer: 29.76 in</td>
</tr>
<tr>
<td>Wind: NE 10 mph</td>
</tr>
<tr>
<td>Visibility: 7</td>
</tr>
<tr>
<td>Clouds: amt 8</td>
</tr>
<tr>
<td>Air temperature: dry 49°F</td>
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<table>
<thead>
<tr>
<th>Estimated Depth m</th>
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#### STATION 27

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<tr>
<td>Barometer: 30.00 in</td>
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<tr>
<td>Wind: NE 10 mph</td>
</tr>
<tr>
<td>Clouds: amt 8</td>
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<tr>
<td>Air temperature: dry 50°F</td>
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<table>
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</table>
M. V. Paragon

STATION 26
47° 00'N, 175° 00'E

15 September 1955
Messenger time: 1715 (+11)
Wire angle: 0°, 0°

Weather: cloudy
Sea height: 3
Visibility: 7
Air temperature: dry 52°F

Estimated Depth
m

T°C
0 12.00
50 5.12
100 3.96
250 3.85
500 3.37

S %/oo
33.02
33.56
33.59
33.76
34.10

STATION 35
47° 00'N, 177° 30'E

16 September 1955
Messenger time: 2215 (+11)
Wire angle: 0°, 0°

Weather: partly cloudy
Sea height: 2
Visibility: 7
Air temperature: dry 49°F

Estimated Depth
m

T°C
0 11.30
50 6.36
100 5.50
250 3.77
500 3.51

S %/oo
33.19
33.67
33.68
33.86
34.23
M. V. Paragon

**STATION 36**

48° 00'N, 177° 30'W

18 September 1955

- **Messenger time:** 1715 (+11)
- **Weather:** fog
- **Sea height:** 7
- **Wire angle:** 0°, 0°
- **Visibility:** 1
- **Air temperature:** dry 53°F
- **Barometer:** 29.68 in
- **Wind:** south 25 mph
- **Clouds:** amt 8

| Estimated Depth (m) | T°C | S°C/
<table>
<thead>
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**STATION 33**

50° 00'N, 175° 00'W

20 September 1955

- **Messenger time:** 0700 (+11)
- **Weather:** cloudy
- **Sea height:** 3
- **Wire angle:** 0°, 0°
- **Visibility:** 7
- **Air temperature:** dry 49°F
- **Barometer:** 29.91 in
- **Wind:** SW 20 - 25 mph
- **Clouds:** amt 8

| Estimated Depth (m) | T°C | S°C/
<table>
<thead>
<tr>
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</tbody>
</table>
## M. V. MITKOF CRUISE NO. 1

### STATION F-1

**52° 02'N, 164° 43'W**

11 August 1955  
**Messenger time:** 1442 (+10)  
**Weather:** fog  
**Barometer:** 30.23 in  
**Wire angle:** 0°, 0°  
**Sea height:** large swell  
**Wind:** SW 14 - 20 mph  
**Visibility:** 6  
**Air temperature:** dry 50°F  

<table>
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<th>°C</th>
<th>°/oo</th>
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### STATION F-2

**51° 06'N, 164° 42'W**

12 August 1955  
**Messenger time:** 1748 (+10)  
**Weather:** overcast  
**Barometer:** 30.31 in  
**Wire angle:** 0°, 12°  
**Sea height:** slight swell  
**Wind:** west 12 - 15 mph  
**Visibility:** 7  
**Air temperature:** dry 55°F  

<table>
<thead>
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<th>°C</th>
<th>°/oo</th>
</tr>
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</tbody>
</table>
M. V. Mitkof

**STATION F-3**

50° 00'N, 165° 25'W

13 August 1955

Messenger time: 1809(+10)

Wire angle: 0°, 0°

Weather: high fog

Sea height: calm

Visibility: 7

Air temperature: dry 52°F

<table>
<thead>
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<th>S (%/oo)</th>
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**STATION F-4**

49° 00'N, 165° 07'W

14 August 1955

Messenger time: 1808(+10)

Wire angle: -, -

Weather: fog

Sea height: calm

Visibility: 5

Air temperature: dry 58°F

<table>
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<th>S (%/oo)</th>
</tr>
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</tbody>
</table>
M. V. Mitkof

**STATION F-5**  
48° 00' N, 164° 55' W

15 August 1955  
Messenger time: 2006(+10)  
Wire angle: -, -  

Weather: fog  
Sea height: swell  
Visibility: 3  
Air temperature: dry 58°F  
Barometer: 30.40 in

<table>
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<th>S °/oo</th>
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**STATION F-6**  
47° 00' N, 165° 00' W

16 August 1955  
Messenger time: 1752(+10)  
Wire angle: -, -  

Weather: high fog  
Sea height: low swell  
Visibility: 4  
Air temperature: dry 61°F  
Barometer: 30.31 in

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<td>34.37</td>
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</table>
M. V. Mitkof

**STATION F-7**

46° 00'N, 164° 57'W

17 August 1955

|---------------------------|--------------|-------------------|----------------------|----------------------|------------------|--------------|------------------|------------------------|

No samples taken - No data collected

**STATION F-8**

44° 59'N, 165° 17'W

18 August 1955

|----------------------------|--------------|-------------------|----------------------|----------------------|------------------|--------------|------------------|------------------------|

<table>
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</table>
M. V. Mitkof

**STATION F-9**

45° 00'N, 167° 37'W

19 August 1955

- Weather: overcast
- Sea height: calm
- Visibility: 9
- Air temperature: dry 63°F

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**STATION F-10**

140° 50'N, 177° 03'W

20 August 1955

- Weather: overcast
- Sea height: calm
- Visibility: 9
- Air temperature: dry 65°F

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<tbody>
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<tr>
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M. V. Mitkof

STATION F-13
47° 56' N, 170° 07' W

23 August 1955
Messenger time: not given
Wire angle: -, -

Weather: patch high fog
Sea height: med. swell
Visibility: 6
Air temperature: dry 63°F

Estimated Depth

S °/oo

OBSERVED

0 32.52
10 32.58
30 32.67
50 32.67
100 32.88
250 33.76
500 34.10
1000 34.38

STATION F-14
49° 03' N, 170° 13' W

24 August 1955
Messenger time: not given
Wire angle: -, 40°

Weather: high fog
Sea height: light swell
Visibility: -
Air temperature: dry 55°F

Estimated Depth

S °/oo

OBSERVED

0 32.66
10 32.58
30 32.70
50 32.84
100 32.88
250 33.87
500 34.14
1000 34.37
M. V. Mitkof

STATION F-15
50° 00'N, 170° 08'W

25 August 1955
Messenger time: not given
Wire angle: - , 0°
Weather: overcast
Sea height: med. swell
Visibility: 3
Air temperature: dry 56°F
Barometer: not given

Estimated Depth
m

<table>
<thead>
<tr>
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<th>S°/oo</th>
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<tbody>
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<tr>
<td>500</td>
<td></td>
</tr>
<tr>
<td>1000</td>
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</table>

STATION F-17
50° 00'N, 175° 00'W

2 September 1955
Messenger time: 1530 (+10)
Wire angle: - , 0°
Weather: partly cloudy
Sea height: heavy swell
Visibility: 9
Air temperature: dry 50°F
Barometer: 30.20 in

Estimated Depth
m

<table>
<thead>
<tr>
<th>Depth (m)</th>
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<tbody>
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OBSERVED

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**STATION F-19**

4 September 1955
Messenger time: 1813(+10)
Wire angle: -, 30°

Weather: overcast
Sea height: light swell
Visibility: 6
Air temperature: dry 55°F

Barometer: 30.34 in
Wind: south 10 mph
Clouds: 6, amt 8

<table>
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<tbody>
<tr>
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<td>34.33</td>
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</table>
M. V. Mitkof

**STATION F-39**

51° 03'N, 154° 35'W

21 September 1955

- Messenger time: not given
- Wire angle: -

Weather: overcast
Sea height: light swell
Visibility: 7
Air temperature: dry 56°F

<table>
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<tbody>
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**STATION F-41**

50° 05'N, 154° 42'W

23 September 1955

- Messenger time: not given
- Wire angle: -

Weather: partly sunny
Sea height: med. swell
Visibility: 7
Air temperature: dry 48°F

<table>
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<tbody>
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</tr>
<tr>
<td>100</td>
<td>32.82</td>
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</tbody>
</table>
M. V. Mitkof

STATION F-h2
47° 57'N, 155° 00'W

24 September 1955
Weather: sunny
Sea height: med. swells
Visibility: 7
Air temperature: dry 50°F

Wire angle: -

Estimated Depth
m

S 0°/100

OBSERVED

0 32.60
10 32.57
30 32.58
50 32.74
100 32.94

STATION F-h3
47° 57'N, 154° 52'W

27 September 1955
Weather: cloudy
Sea height: med. swell
Visibility: 7
Air temperature: dry 52°F

Wire angle: -

Estimated Depth
m

S 0°/100

OBSERVED

0 32.64
10 32.60
30 32.60
50 32.80
100 32.83
M. V. Mitkof

STATION F-44

47° 57’N, 135° 00’W

30 September 1955
Messenger time: not given
Wire angle: -

Weather: cloudy
Sea height: med. swell
Visibility: 4
Air temperature: dry 58°F

Estimated Depth
m

0
10
30
50
100

S

%oo

OBSERVED

32.43
32.45
32.47
32.60
32.73

STATION F-45

47° 56’N, 129° 52’W

2 October 1955
Messenger time: not given
Wire angle: -

Weather: cloudy
Sea height: med. swell
Visibility: 7
Air temperature: dry 57°F

Estimated Depth
m

0
10
30
50
100

S

%oo

OBSERVED

32.29
32.29
32.30
32.54
32.71
M. V. Mitkof

STATION F-46

48° 08'N, 125° 27'W - SW of Swiftsure Lightship

4 October 1955
Messenger time: not given
Wire angle: -

Weather: cloudy
Sea height: med. swell
Visibility: 7
Air temperature: dry 51°F

Barometer: 30.40 in
Wind: SW 10 mph
Clouds: 0, amt 8

Estimated Depth

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>OBSERVED</th>
</tr>
</thead>
<tbody>
<tr>
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</table>
M. V. MITKOF CRUISE NO. 2

STATION 1

42° 40'N, 124° 41'W - SW of Cape Blanco

17 October 1955

Messenger time: 0954(+8)

Wire angle: -, -

Weather: foggy
Sea height: calm
Visibility: 3

Barometer: 30.09 in

Clouds: -, amt 9

Air temperature: dry 51°F

<table>
<thead>
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<th>Density (σt)</th>
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**OBSERVED**

**INTERPOLATED**

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<td>(33.96)</td>
<td>(26.55)</td>
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</tbody>
</table>
M. V. Mitkof

**STATION 2**

45° 04' N, 124° 31' W - NW of Cape Blanco

18 October 1955

Messenger time: 0826 (+8)

Weather: overcast

Sea height: calm

Wind: not reported

Visibility: 6

Clouds: -,amt 9

Air temperature: not reported

<table>
<thead>
<tr>
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M. V. Mitkof

STATION 3
42° 59'N, 125° 02'W - West of Cape Blanco

18 October 1955
Messenger time: 1350(+8)
Wire angle: -, -

Weather: overcast
Barometer: not reported
Sea height: moderate
Wind: SE 14 kn
Visibility: 7
Swell
Clouds: - amt 9
Air temperature: not reported

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| 20               | 12.09| 32.61| 24.74       |
| 30               | 11.30| 32.96| 24.99       |
| 50               | 8.78 | 33.51| 26.01       |
| 75               | 8.28 | 33.71| 26.25       |
| 100              | 7.96 | 33.81| 26.36       |
| 150              | 7.48 | 33.93| 26.53       |
| 200              | 7.04 | 34.00| 26.65       |
| 300              | 6.17 | 34.68| 26.83       |
| 400              | 5.38 | 34.14| 26.97       |
| 500              | 4.93 | 34.20| 27.07       |
| 600              | 4.61 | 34.25| 27.15       |
| 800              | 4.12 | 34.37| 27.27       |

| INTERPOLATED     |      |      |             |
|                  |      |      |             |
| 0                | 12.64| 32.44| 24.50       |
| 10               | 12.52| 32.48| 24.56       |
| 20               | 12.09| 32.61| 24.74       |
| 30               | 11.30| 32.96| 24.99       |
| 50               | 8.78 | 33.51| 26.01       |
| 75               | 8.28 | 33.71| 26.25       |
| 100              | 7.96 | 33.81| 26.36       |
| 150              | 7.48 | 33.93| 26.53       |
| 200              | 7.04 | 34.00| 26.65       |
| 300              | 6.17 | 34.68| 26.83       |
| 400              | 5.38 | 34.14| 26.97       |
| 500              | 4.93 | 34.20| 27.07       |
| 600              | 4.61 | 34.25| 27.15       |
| 800              | 4.12 | 34.37| 27.27       |
STATION H

46° 29' N, 124° 26' W - NW of Columbia River

21 October 1955
Weather: overcast
Wire angle: --

Barometer: 30.44 in
Sea height: calm
Visibility: 7
Air temperature: dry 55°F

Clouds: 0, amt 6

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M. V. Mitkof

STATION 5

46° 28' N 124° 10' W - NW of Columbia River

23 October 1955

Weather: sunny
Sea height: calm
Visibility: 7
Air temperature: dry 56°F

Estimated Depth

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ZOOPLANKTON DISPLACEMENT VOLUME

The volume of the plankton samples was determined by use of a mercury immersion plankton-volume determiner (Yentsch and Hebard, 1957). The volume is calculated after the amount of water filtered by the net has been determined. The assumption is made that the net sampled at 100 percent efficiency; however, in all probability this is not true and the values therefore may be somewhat low. All of the larger organisms were removed before the volumes were determined. The organisms have been identified and tabulations are being prepared to show their abundance and occurrence in relation to latitude and longitude, temperature, salinity, depth, and catch of salmon. This information will be issued as a special report in the near future.
ZOOPLANKTON DISPLACEMENT VOLUMES
M. V. John N. Cobb

Depth of Hauls: 400 meters
Time of Hauls: Approximately 1700 - 2000

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**ZOOPLANKTON DISPLACEMENT VOLUMES**

M. V. Paragon

**Time of Hauls:** Approximately 1700 - 2000

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**ZOOPLANKTON DISPLACEMENT VOLUMES**

M. V. Mitkof

**Depth of Hauls:** 400 meters  
**Time of Hauls:** Approximately 1700 - 2000

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Correlation between the numbering of oceanographic stations and the revised numbering of gill-net sets for the John N. Cobb.

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* Oceanographic station 23-14 was located approximately 27 miles east of Gill-net Set No. 13.
TABLE 1 - continued

Correlation between the numbering of oceanographic stations and the revised numbering of gill-net sets for the John N. Cobb.

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NOTE: OCEANOGRAPHIC STATION NUMBERS DO NOT NECESSARILY CORRESPOND WITH GILL-NET SET NUMBERS (SEE TABLE 1, PAGE 87.)

Figure 1. Oceanographic and exploratory fishing stations occupied by vessels of the U.S. Fish and Wildlife Service, summer and fall of 1955.