data report

PHYSICAL AND CHEMICAL DATA

CCOFI Cruise 5601
5-18 January 1956

and

CCOFI Cruise 5602
3-21 February 1956

SIO Reference 60-5
27 August 1959
UNIVERSITY OF CALIFORNIA
SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

CCOFI CRUISE 5601
5–18 January 1956

and

CCOFI CRUISE 5602
3–21 February 1956

Sponsored by

Marine Research Committee

SIO Reference 60–5
10 November 1959

Approved for distribution:

Roger Revelle, Director
## CONTENTS

INTRODUCTION .................................................. iii

CRUISE 5601

List of Figures ................................................... v
Personnel .......................................................... vi
Tabulated Data .................................................... 1

Observations at 10 Meters (Net-Tow Stations) ..................... 1

CRUISE 5602

List of Figures ................................................... viii
Personnel .......................................................... ix
Tabulated Data .................................................... 8

Hydrographic Casts ............................................... 8

Observations at 10 Meters (Net-Tow Stations) ..................... 50

DISTRIBUTION LIST ............................................. 57
INTRODUCTION

The data presented in this report were collected on the eightieth and eighty-first consecutive cruises of the California Cooperative Oceanic Fisheries Investigations program. The R/V Horizon and the R/V Stranger of the Scripps Institution participated in the eightieth cruise, and the R/V Black Douglas of the U. S. Fish and Wildlife Service and the R/V Spencer F. Baird and the R/V Stranger of the Scripps Institution participated in the eighty-first cruise.

The data are tabulated at observed depths, and the interpolated and computed values are tabulated at standard depths. They are accompanied by charts of horizontal distribution. The presentation of data in this report does not constitute publication; however, the data contained in this report have been carefully edited and no modifications should be necessary before final publication.

STANDARD PROCEDURES

Processing of the Cruise 5602 data was carried out using the method described by Klein.1/ Certain approximations have been introduced for the determination of the integrated pressure terms which may result in errors whose maximum values are less than 0.5 dynamic centimeter at 0 over 200 decibars, 1.0 dynamic centimeter at 0 over 500 decibars, and 2.0 dynamic centimeters at 0 over 1000 decibars. The 125-meter level was introduced into the integration to obtain greater accuracy in the determination of ΔD. The interpolated values at 125 meters are not tabulated.

To indicate degree of accuracy, temperatures are recorded in tenths of a degree when obtained by bucket thermometer, thermograph, or bathythermograph, while temperatures from reversing thermometers are recorded in hundredths of a degree. Extrapolated values and values interpolated between remote observations are entered within parentheses. A hyphen is used to indicate a missing observed value. The time is the time of messenger release. When more than one cast was made on a station, messenger times and wire angles are given in the order of increasing depth. A line is left blank between the observed data of each cast.

1/Klein, Hans T. A new technique for processing physical oceanographic data. MS.
FOOTNOTES

Footnotes which appear frequently are "loose bottle cap" and "possible evaporation." To avoid any confusion as to their meaning the following explanation is included.

Laboratory personnel, before titrating the salinity samples, note any possible imperfections in the sealing of the bottles as follows:

Loose bottle cap: The cap is definitely loose so that it could be moved with very little applied pressure. The salinity values obtained from these samples may be usable depending on time and/or conditions of storage.

Possible evaporation: Either the cap was sealed with less than usual pressure, the bottle edge chipped, the rubber washer cracked, or the bale broke on opening, etc.

Use of the above values in interpolation depends upon consistency with other values of salinity and other properties, and these footnotes are supplemented with "falls on property curve" or "does not fall on property curve," depending upon whether the property curve was drawn through the value or not.

In addition to standard footnotes, three special notations are used without footnotes because their meaning is always the same.

To indicate a premature or a delayed reversal of the water-sampling device which results in certain depth and property errors, the following notation is used.

p: pretrip or posttrip.

Values which are not drawn through because they seem to be in error without apparent reason are indicated by one of the following notations.

r: rejected value (value seems to be definitely wrong),

u: uncertain value (value may be correct; occasionally it can influence the drawing of the property curve).

iv
FIGURES

1. CCOFI Cruise 5601, station positions
2. Surface currents measured by geomagnetic electrokinetograph (GEK)
3. Horizontal distribution of temperature at 10 meters
4. Horizontal distribution of salinity at 10 meters
CCOFI CRUISE 5601
5 - 18 JANUARY 1956
STATION POSITIONS
DIRECTION OF TRAVEL →
NET TOW STATION
HORIZON
5 - 13 JANUARY
PUNTA EUGENIA
18 - 20 JANUARY
FROM HO 0527
MENDOCINO

CCOF1 CRUISE 5601
5-18 JANUARY 1956
SURFACE CURRENTS
MEASURED BY GEK
CORRECTED FOR DROOP FACTOR

\[ \sqrt{5 \text{ CM/SEC}} \]
\[ \sqrt{10 \text{ CM/SEC}} \]

FIGURE 2
CCOFI CRUISE 5601
5 - 18 JANUARY 1956
10 METER TEMPERATURE
CONTOUR INTERVAL 1.0°C

FIGURE 3
PERSONNEL
Cruise 5601

SHIPS' CAPTAINS

Davis, Laurence E., R/V Stranger
Hopkins, Marvin, R/V Horizon

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

R/V Horizon

Vorobiov, Alexander V., Fishery Aid, U. S. Fish and Wildlife Service
Hinds, James W., Jr., Marine Technician

R/V Stranger

Christiansen, Neils B., Marine Technician
Watson, Frank H., Fishery Aid, U. S. Fish and Wildlife Service
<table>
<thead>
<tr>
<th>Station</th>
<th>Date</th>
<th>Time GCT</th>
<th>Latitude North</th>
<th>Longitude West</th>
<th>Sounding (fm)</th>
<th>Wind Dir</th>
<th>Force</th>
<th>Weather</th>
<th>Sea</th>
<th>10 Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-51-H</td>
<td>1-5</td>
<td>2100</td>
<td>34°28.0'</td>
<td>120°32.0'</td>
<td>32</td>
<td>270°</td>
<td>4</td>
<td>cloudy</td>
<td>moderate</td>
<td>12.82</td>
</tr>
<tr>
<td>80.55-H</td>
<td>5</td>
<td>2250</td>
<td>34°19.5'</td>
<td>120°49.0'</td>
<td>400</td>
<td>280°</td>
<td>4</td>
<td>fog</td>
<td>rough</td>
<td>12.65a</td>
</tr>
<tr>
<td>80.60-H</td>
<td>6</td>
<td>0130</td>
<td>34°09.0'</td>
<td>121°11.0'</td>
<td>520</td>
<td>010°</td>
<td>4</td>
<td>missing</td>
<td>rough</td>
<td>12.86</td>
</tr>
<tr>
<td>80.70-H</td>
<td>6</td>
<td>0605</td>
<td>33°49.0'</td>
<td>121°52.0'</td>
<td>1850</td>
<td>190°</td>
<td>2</td>
<td>partly cloudy</td>
<td>rough</td>
<td>13.08</td>
</tr>
<tr>
<td>80.80-H</td>
<td>6</td>
<td>1030</td>
<td>33°29.0'</td>
<td>122°35.0'</td>
<td>2300</td>
<td>240°</td>
<td>1</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>14.12b</td>
</tr>
<tr>
<td>80.90-H</td>
<td>6</td>
<td>1435</td>
<td>33°10.5'</td>
<td>123°12.0'</td>
<td>2300</td>
<td>260°</td>
<td>1</td>
<td>partly cloudy</td>
<td>slight</td>
<td>14.60</td>
</tr>
<tr>
<td>83.40-H</td>
<td>7</td>
<td>1420</td>
<td>34°15.0'</td>
<td>119°22.0'</td>
<td>10</td>
<td>290°</td>
<td>1</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>12.58</td>
</tr>
<tr>
<td>83.43-H</td>
<td>7</td>
<td>1230</td>
<td>34°08.0'</td>
<td>119°35.0'</td>
<td>130</td>
<td>290°</td>
<td>2</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>12.21c</td>
</tr>
<tr>
<td>83.51-H</td>
<td>7</td>
<td>0730</td>
<td>33°51.0'</td>
<td>120°09.0'</td>
<td>190</td>
<td>290°</td>
<td>3</td>
<td>cloudy</td>
<td>moderate</td>
<td>13.14</td>
</tr>
<tr>
<td>83.60-H</td>
<td>7</td>
<td>0250</td>
<td>33°27.0'</td>
<td>120°51.0'</td>
<td>2300</td>
<td>-</td>
<td>-</td>
<td>cloudy</td>
<td>smooth</td>
<td>13.08</td>
</tr>
<tr>
<td>87.36-H</td>
<td>7</td>
<td>1900</td>
<td>33°49.5'</td>
<td>118°41.0'</td>
<td>600</td>
<td>290°</td>
<td>2</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>13.24</td>
</tr>
<tr>
<td>87.40-H</td>
<td>7</td>
<td>2130</td>
<td>33°40.0'</td>
<td>119°01.0'</td>
<td>480</td>
<td>290°</td>
<td>2</td>
<td>cloudy</td>
<td>moderate</td>
<td>13.76</td>
</tr>
<tr>
<td>87.50-H</td>
<td>8</td>
<td>0140</td>
<td>33°20.5'</td>
<td>119°39.0'</td>
<td>40</td>
<td>290°</td>
<td>4</td>
<td>partly cloudy</td>
<td>rough</td>
<td>13.80</td>
</tr>
<tr>
<td>87.60-H</td>
<td>8</td>
<td>0600</td>
<td>33°00.0'</td>
<td>120°20.5'</td>
<td>430</td>
<td>290°</td>
<td>2</td>
<td>partly cloudy</td>
<td>rough</td>
<td>13.78</td>
</tr>
<tr>
<td>90.28-H</td>
<td>9</td>
<td>1550</td>
<td>33°28.0'</td>
<td>117°46.0'</td>
<td>340</td>
<td>180°</td>
<td>2</td>
<td>fog</td>
<td>moderate</td>
<td>12.43</td>
</tr>
</tbody>
</table>

a) Alternate value, 14.78°C.

b) Alternate value, 13.90°C.

c) Alternate value, 12.07°C.
<table>
<thead>
<tr>
<th>Station</th>
<th>Date</th>
<th>Time (GCT)</th>
<th>Latitude North</th>
<th>Longitude West</th>
<th>Sounding (ft)</th>
<th>Wind Dir</th>
<th>Wind Force</th>
<th>Weather</th>
<th>Sea</th>
<th>10 Meters T</th>
<th>10 Meters S</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.30-H</td>
<td>1-9</td>
<td>1415</td>
<td>33°25.0'</td>
<td>117°55.0'</td>
<td>300</td>
<td>120°</td>
<td>3</td>
<td>fog</td>
<td>moderate</td>
<td>13.08</td>
<td>33.59</td>
</tr>
<tr>
<td>90.45-H</td>
<td>9</td>
<td>0720</td>
<td>32°55.5'</td>
<td>118°55.5'</td>
<td>870</td>
<td>310°</td>
<td>4</td>
<td>clear</td>
<td>rough</td>
<td>13.60</td>
<td>33.60</td>
</tr>
<tr>
<td>90.55-H</td>
<td>9</td>
<td>0225</td>
<td>32°33.0'</td>
<td>119°39.5'</td>
<td>550</td>
<td>310°</td>
<td>3</td>
<td>clear</td>
<td>rough</td>
<td>12.95</td>
<td>33.52</td>
</tr>
<tr>
<td>90.60-H</td>
<td>9</td>
<td>0000</td>
<td>32°24.0'</td>
<td>120°00.0'</td>
<td>590</td>
<td>310°</td>
<td>4</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>13.72</td>
<td>33.25</td>
</tr>
<tr>
<td>90.70-H</td>
<td>8</td>
<td>1935</td>
<td>32°06.5'</td>
<td>120°39.0'</td>
<td>2000</td>
<td>310°</td>
<td>4</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>16.03a)</td>
<td>33.08</td>
</tr>
<tr>
<td>90.80-H</td>
<td>8</td>
<td>1515</td>
<td>31°46.0'</td>
<td>121°19.5'</td>
<td>2300</td>
<td>220°</td>
<td>1</td>
<td>partly cloudy</td>
<td>rough</td>
<td>14.90</td>
<td>33.53</td>
</tr>
<tr>
<td>93.27-H</td>
<td>9</td>
<td>2000</td>
<td>32°56.0'</td>
<td>117°29.0'</td>
<td>200</td>
<td>180°</td>
<td>1</td>
<td>fog</td>
<td>moderate</td>
<td>13.24</td>
<td>33.60</td>
</tr>
<tr>
<td>93.30-H</td>
<td>9</td>
<td>2130</td>
<td>32°51.0'</td>
<td>117°30.0'</td>
<td>410</td>
<td>310°</td>
<td>1</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>14.21b)</td>
<td>33.58</td>
</tr>
<tr>
<td>93.40-H</td>
<td>10</td>
<td>0210</td>
<td>32°31.5'</td>
<td>118°13.0'</td>
<td>820</td>
<td>310°</td>
<td>2</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>13.65</td>
<td>33.55</td>
</tr>
<tr>
<td>93.50-H</td>
<td>10</td>
<td>0635</td>
<td>32°11.0'</td>
<td>118°53.0'</td>
<td>220</td>
<td>300°</td>
<td>1</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>13.50</td>
<td>33.55</td>
</tr>
<tr>
<td>97.30-H</td>
<td>10</td>
<td>2020</td>
<td>32°16.5'</td>
<td>117°08.0'</td>
<td>30</td>
<td>320°</td>
<td>2</td>
<td>cloudy</td>
<td>rough</td>
<td>11.28</td>
<td>33.58</td>
</tr>
<tr>
<td>97.32-H</td>
<td>10</td>
<td>1845</td>
<td>32°11.0'</td>
<td>117°20.0'</td>
<td>750</td>
<td>300°</td>
<td>2</td>
<td>cloudy</td>
<td>rough</td>
<td>14.11</td>
<td>33.63</td>
</tr>
<tr>
<td>97.40-H</td>
<td>10</td>
<td>1530</td>
<td>31°56.5'</td>
<td>117°50.0'</td>
<td>1000</td>
<td>320°</td>
<td>3</td>
<td>cloudy</td>
<td>rough</td>
<td>13.63</td>
<td>33.58</td>
</tr>
<tr>
<td>97.50-H</td>
<td>10</td>
<td>1045</td>
<td>31°37.0'</td>
<td>118°30.0'</td>
<td>1300</td>
<td>300°</td>
<td>1</td>
<td>partly cloudy</td>
<td>rough</td>
<td>14.30</td>
<td>33.62</td>
</tr>
<tr>
<td>100.29-H</td>
<td>11</td>
<td>0100</td>
<td>31°47.0'</td>
<td>116°43.5'</td>
<td>50</td>
<td>310°</td>
<td>2</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>12.16</td>
<td>33.51</td>
</tr>
<tr>
<td>100.30-H</td>
<td>11</td>
<td>0150</td>
<td>31°42.0'</td>
<td>116°45.0'</td>
<td>250</td>
<td>350°</td>
<td>4</td>
<td>cloudy</td>
<td>moderate</td>
<td>13.26</td>
<td>33.53</td>
</tr>
</tbody>
</table>

a) Alternate value, 16.31°C.
b) Alternate value, 14.40°C.
<table>
<thead>
<tr>
<th>Station</th>
<th>Date Time GCT</th>
<th>Latitude North</th>
<th>Longitude West</th>
<th>Sounding (fm)</th>
<th>Wind Dir</th>
<th>Wind Force</th>
<th>Weather</th>
<th>Sea</th>
<th>10 Meters T °S</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.40-H</td>
<td>1-11 0625</td>
<td>31° 20.0'</td>
<td>117° 28.0'</td>
<td>1090</td>
<td>300°</td>
<td>3</td>
<td>cloudy</td>
<td>moderate</td>
<td>14.50</td>
</tr>
<tr>
<td>100.50-H</td>
<td>11 1045</td>
<td>31° 01.0'</td>
<td>118° 07.0'</td>
<td>360</td>
<td>300°</td>
<td>3</td>
<td>cloudy</td>
<td>moderate</td>
<td>13.92</td>
</tr>
<tr>
<td>100.60-H</td>
<td>11 1520</td>
<td>30° 40.0'</td>
<td>118° 48.0'</td>
<td>1600</td>
<td>320°</td>
<td>3</td>
<td>partly cloudy</td>
<td>rough</td>
<td>13.56</td>
</tr>
<tr>
<td>100.70-H</td>
<td>11 1930</td>
<td>30° 21.5'</td>
<td>119° 28.0'</td>
<td>2200</td>
<td>300°</td>
<td>2</td>
<td>cloudy</td>
<td>moderate</td>
<td>14.44</td>
</tr>
<tr>
<td>100.80-H</td>
<td>12 0010</td>
<td>30° 01.0'</td>
<td>120° 07.0'</td>
<td>2170</td>
<td>330°</td>
<td>4</td>
<td>cloudy</td>
<td>moderate</td>
<td>15.63</td>
</tr>
<tr>
<td>103.30-H</td>
<td>12 2235</td>
<td>31° 07.0'</td>
<td>116° 25.0'</td>
<td>40</td>
<td>320°</td>
<td>2</td>
<td>haze</td>
<td>moderate</td>
<td>12.93</td>
</tr>
<tr>
<td>103.35-H</td>
<td>12 2030</td>
<td>30° 56.5'</td>
<td>116° 47.0'</td>
<td>1030</td>
<td>310°</td>
<td>3</td>
<td>haze</td>
<td>moderate</td>
<td>14.55b)</td>
</tr>
<tr>
<td>103.40-H</td>
<td>12 1800</td>
<td>30° 47.0'</td>
<td>117° 06.0'</td>
<td>930</td>
<td>360°</td>
<td>3</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>13.78</td>
</tr>
<tr>
<td>103.50-H</td>
<td>12 1320</td>
<td>30° 25.5'</td>
<td>117° 43.5'</td>
<td>1500</td>
<td>300°</td>
<td>4</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>14.53</td>
</tr>
<tr>
<td>103.60-H</td>
<td>12 0840</td>
<td>30° 07.0'</td>
<td>118° 24.0'</td>
<td>2000</td>
<td>300°</td>
<td>3</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>15.68</td>
</tr>
<tr>
<td>107.32-H</td>
<td>13 0310</td>
<td>30° 26.0'</td>
<td>116° 11.0'</td>
<td>400</td>
<td>320°</td>
<td>2</td>
<td>clear</td>
<td>moderate</td>
<td>12.55</td>
</tr>
<tr>
<td>107.35-H</td>
<td>13 0440</td>
<td>30° 20.0'</td>
<td>116° 22.5'</td>
<td>970</td>
<td>280°</td>
<td>2</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>13.26</td>
</tr>
<tr>
<td>107.40-H</td>
<td>13 0730</td>
<td>30° 10.0'</td>
<td>116° 42.5'</td>
<td>1400</td>
<td>310°</td>
<td>2</td>
<td>fog</td>
<td>moderate</td>
<td>14.08</td>
</tr>
<tr>
<td>107.50-H</td>
<td>13 1145</td>
<td>29° 50.0'</td>
<td>117° 22.0'</td>
<td>1650</td>
<td>320°</td>
<td>4</td>
<td>cloudy</td>
<td>rough</td>
<td>15.78</td>
</tr>
<tr>
<td>107.60-H</td>
<td>13 1355</td>
<td>29° 27.0'</td>
<td>117° 58.0'</td>
<td>1900</td>
<td>320°</td>
<td>5</td>
<td>cloudy</td>
<td>rough</td>
<td>16.32</td>
</tr>
</tbody>
</table>

a) Possible evaporation.

b) Alternate value, 14.68°C.
<table>
<thead>
<tr>
<th>Station</th>
<th>Date</th>
<th>Time GCT</th>
<th>Latitude North</th>
<th>Longitude West</th>
<th>Sounding (fm)</th>
<th>Wind Dir</th>
<th>Wind Force</th>
<th>Weather</th>
<th>Sea</th>
<th>10 Meters T</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>110.33-S</td>
<td>1-17</td>
<td>1910</td>
<td>29°51.0'</td>
<td>115°53.0'</td>
<td>47</td>
<td>330°</td>
<td>2</td>
<td>clear</td>
<td>very rough</td>
<td>12.46</td>
<td>33.53</td>
</tr>
<tr>
<td>110.35-S</td>
<td>17</td>
<td>2028</td>
<td>29°46.5'</td>
<td>116°00.0'</td>
<td>700</td>
<td>290°</td>
<td>2</td>
<td>clear</td>
<td>very rough</td>
<td>12.66</td>
<td>33.52</td>
</tr>
<tr>
<td>110.40-S</td>
<td>17</td>
<td>2238</td>
<td>29°37.0'</td>
<td>116°19.5'</td>
<td>1200</td>
<td>320°</td>
<td>5</td>
<td>clear</td>
<td>high</td>
<td>14.54</td>
<td>33.57</td>
</tr>
<tr>
<td>110.50-S</td>
<td>18</td>
<td>0205</td>
<td>29°18.0'</td>
<td>116°52.5'</td>
<td>2000</td>
<td>320°</td>
<td>4</td>
<td>clear</td>
<td>high</td>
<td>15.18</td>
<td>33.57</td>
</tr>
<tr>
<td>110.60-S</td>
<td>18</td>
<td>0625</td>
<td>28°57.0'</td>
<td>117°38.5'</td>
<td>2000</td>
<td>340°</td>
<td>5</td>
<td>clear</td>
<td>very rough</td>
<td>15.88</td>
<td>33.66</td>
</tr>
<tr>
<td>110.70-S</td>
<td>18</td>
<td>1042</td>
<td>28°37.0'</td>
<td>118°17.0'</td>
<td>2000</td>
<td>360°</td>
<td>3</td>
<td>clear</td>
<td>very rough</td>
<td>15.90</td>
<td>33.66</td>
</tr>
<tr>
<td>110.80-S</td>
<td>18</td>
<td>1452</td>
<td>28°17.0'</td>
<td>118°55.0'</td>
<td>2000</td>
<td>320°</td>
<td>3</td>
<td>clear</td>
<td>very rough</td>
<td>15.70</td>
<td>33.61</td>
</tr>
<tr>
<td>113.30-S</td>
<td>17</td>
<td>1430</td>
<td>29°22.5'</td>
<td>115°17.5'</td>
<td>33</td>
<td>320°</td>
<td>3</td>
<td>clear</td>
<td>very rough</td>
<td>12.79</td>
<td>33.61</td>
</tr>
<tr>
<td>113.35-S</td>
<td>17</td>
<td>1210</td>
<td>29°09.5'</td>
<td>115°37.0'</td>
<td>550</td>
<td>320°</td>
<td>6</td>
<td>clear</td>
<td>very rough</td>
<td>14.50</td>
<td>33.55</td>
</tr>
<tr>
<td>113.40-S</td>
<td>17</td>
<td>0900</td>
<td>28°59.5'</td>
<td>115°58.0'</td>
<td>1000</td>
<td>320°</td>
<td>6</td>
<td>clear</td>
<td>very rough</td>
<td>15.11</td>
<td>33.58</td>
</tr>
<tr>
<td>113.50-S</td>
<td>17</td>
<td>0425</td>
<td>28°41.0'</td>
<td>116°37.5'</td>
<td>2000</td>
<td>330°</td>
<td>7</td>
<td>clear</td>
<td>very rough</td>
<td>14.52</td>
<td>33.57</td>
</tr>
<tr>
<td>113.60-S</td>
<td>16</td>
<td>2340</td>
<td>28°22.5'</td>
<td>117°15.5'</td>
<td>2000</td>
<td>330°</td>
<td>6</td>
<td>partly cloudy</td>
<td>very rough</td>
<td>15.10</td>
<td>33.58</td>
</tr>
<tr>
<td>113.70-S</td>
<td>16</td>
<td>1930</td>
<td>28°02.0'</td>
<td>117°55.0'</td>
<td>2000</td>
<td>340°</td>
<td>6</td>
<td>cloudy</td>
<td>rough</td>
<td>15.94</td>
<td>33.67</td>
</tr>
<tr>
<td>117.26-S</td>
<td>15</td>
<td>1645</td>
<td>28°56.0'</td>
<td>114°41.0'</td>
<td>40</td>
<td>310°</td>
<td>3</td>
<td>cloudy</td>
<td>rough</td>
<td>14.84</td>
<td>33.62</td>
</tr>
<tr>
<td>117.30-S</td>
<td>15</td>
<td>1859</td>
<td>28°45.0'</td>
<td>114°59.5'</td>
<td>55</td>
<td>320°</td>
<td>6</td>
<td>cloudy</td>
<td>rough</td>
<td>14.60</td>
<td>33.53</td>
</tr>
<tr>
<td>117.35-S</td>
<td>15</td>
<td>2115</td>
<td>28°38.0'</td>
<td>115°16.0'</td>
<td>105</td>
<td>320°</td>
<td>5</td>
<td>cloudy</td>
<td>moderate</td>
<td>14.68</td>
<td>33.55</td>
</tr>
<tr>
<td>117.40-S</td>
<td>16</td>
<td>0312</td>
<td>28°28.0'</td>
<td>115°33.5'</td>
<td>600</td>
<td>320°</td>
<td>6</td>
<td>clear</td>
<td>rough</td>
<td>14.72</td>
<td>33.58</td>
</tr>
<tr>
<td>117.50-S</td>
<td>16</td>
<td>0707</td>
<td>28°08.0'</td>
<td>116°15.0'</td>
<td>2500</td>
<td>310°</td>
<td>5</td>
<td>clear</td>
<td>rough</td>
<td>15.46</td>
<td>33.60</td>
</tr>
<tr>
<td>Station</td>
<td>Date</td>
<td>Time GCT</td>
<td>Latitude North</td>
<td>Longitude West</td>
<td>Sounding (fm)</td>
<td>Wind Dir</td>
<td>Force</td>
<td>Weather</td>
<td>Sea</td>
<td>10 Meters</td>
<td>T</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
<td>----------</td>
<td>----------------</td>
<td>----------------</td>
<td>---------------</td>
<td>-----------</td>
<td>-------</td>
<td>---------</td>
<td>-----</td>
<td>------------</td>
<td>---</td>
</tr>
<tr>
<td>117.60-S</td>
<td>1-16</td>
<td>1050</td>
<td>27°48.5'</td>
<td>116°53.0'</td>
<td>2000</td>
<td>320°</td>
<td>6</td>
<td>clear</td>
<td>very rough</td>
<td>15.99</td>
<td>33.68</td>
</tr>
<tr>
<td>117.70-S</td>
<td>16</td>
<td>1508</td>
<td>27°28.0'</td>
<td>117°33.0'</td>
<td>2000</td>
<td>320°</td>
<td>6</td>
<td>cloudy</td>
<td>rough</td>
<td>15.88</td>
<td>33.67</td>
</tr>
<tr>
<td>118.39-S</td>
<td>16</td>
<td>0018</td>
<td>28°18.5'</td>
<td>115°24.0'</td>
<td>145</td>
<td>340°</td>
<td>4</td>
<td>cloudy</td>
<td>rough</td>
<td>15.28</td>
<td>33.66</td>
</tr>
<tr>
<td>119.33-S</td>
<td>16</td>
<td>0825</td>
<td>28°19.0'</td>
<td>114°53.0'</td>
<td>58</td>
<td>330°</td>
<td>5</td>
<td>missing</td>
<td>moderate</td>
<td>15.58</td>
<td>33.67</td>
</tr>
<tr>
<td>120.25-S</td>
<td>15</td>
<td>1240</td>
<td>28°23.0'</td>
<td>114°15.0'</td>
<td>32</td>
<td>320°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>14.94</td>
<td>33.64</td>
</tr>
<tr>
<td>120.30-S</td>
<td>15</td>
<td>1025</td>
<td>28°13.0'</td>
<td>114°34.0'</td>
<td>50</td>
<td>330°</td>
<td>5</td>
<td>missing</td>
<td>moderate</td>
<td>15.46</td>
<td>33.67</td>
</tr>
<tr>
<td>120.40-S</td>
<td>14</td>
<td>1606</td>
<td>27°53.0'</td>
<td>115°13.5'</td>
<td>20</td>
<td>340°</td>
<td>4</td>
<td>cloudy</td>
<td>moderate</td>
<td>15.28</td>
<td>33.75</td>
</tr>
<tr>
<td>120.45-S</td>
<td>14</td>
<td>1358</td>
<td>27°43.0'</td>
<td>115°33.0'</td>
<td>1200</td>
<td>360°</td>
<td>5</td>
<td>clear</td>
<td>moderate</td>
<td>16.50</td>
<td>33.87</td>
</tr>
<tr>
<td>120.50-S</td>
<td>14</td>
<td>1102</td>
<td>27°34.5'</td>
<td>115°53.5'</td>
<td>2100</td>
<td>330°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>15.06</td>
<td>33.65</td>
</tr>
<tr>
<td>120.55-S</td>
<td>14</td>
<td>0859</td>
<td>27°24.0'</td>
<td>116°12.0'</td>
<td>1860</td>
<td>300°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>16.36</td>
<td>33.69</td>
</tr>
<tr>
<td>120.60-S</td>
<td>14</td>
<td>0650</td>
<td>27°14.0'</td>
<td>116°30.5'</td>
<td>2000</td>
<td>020°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>16.84</td>
<td>33.82</td>
</tr>
<tr>
<td>120.70-S</td>
<td>14</td>
<td>0232</td>
<td>26°55.5'</td>
<td>117°13.0'</td>
<td>2200</td>
<td>360°</td>
<td>2</td>
<td>clear</td>
<td>moderate</td>
<td>17.28</td>
<td>33.85</td>
</tr>
<tr>
<td>123.37-S</td>
<td>13</td>
<td>1134</td>
<td>27°24.0'</td>
<td>114°40.0'</td>
<td>39</td>
<td>220°</td>
<td>2</td>
<td>clear</td>
<td>slight</td>
<td>16.82</td>
<td>33.91</td>
</tr>
<tr>
<td>123.40-S</td>
<td>13</td>
<td>1305</td>
<td>27°18.0'</td>
<td>114°51.5'</td>
<td>200</td>
<td>calm</td>
<td>clear</td>
<td>slight</td>
<td>16.61</td>
<td>34.14</td>
<td></td>
</tr>
<tr>
<td>123.50-S</td>
<td>13</td>
<td>1635</td>
<td>26°57.0'</td>
<td>115°30.0'</td>
<td>2000</td>
<td>var.</td>
<td>cloudy</td>
<td>slight</td>
<td>15.45</td>
<td>33.82</td>
<td></td>
</tr>
<tr>
<td>123.55-S</td>
<td>13</td>
<td>1825</td>
<td>26°46.5'</td>
<td>115°49.0'</td>
<td>2000</td>
<td>320°</td>
<td>2</td>
<td>cloudy</td>
<td>slight</td>
<td>16.30</td>
<td>33.65</td>
</tr>
<tr>
<td>127.34-S</td>
<td>13</td>
<td>0755</td>
<td>26°55.5'</td>
<td>114°06.0'</td>
<td>42</td>
<td>040°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>16.16</td>
<td>33.90</td>
</tr>
<tr>
<td>127.40-S</td>
<td>13</td>
<td>0535</td>
<td>26°43.5'</td>
<td>114°29.5'</td>
<td>1700</td>
<td>330°</td>
<td>3</td>
<td>clear</td>
<td>moderate</td>
<td>17.12</td>
<td>33.80</td>
</tr>
<tr>
<td>127.50-S</td>
<td>13</td>
<td>0123</td>
<td>26°25.0'</td>
<td>115°05.5'</td>
<td>1800</td>
<td>020°</td>
<td>3</td>
<td>clear</td>
<td>moderate</td>
<td>17.28</td>
<td>33.81</td>
</tr>
<tr>
<td>Station</td>
<td>Date</td>
<td>Time</td>
<td>Latitude North</td>
<td>Longitude West</td>
<td>Sounding (fm)</td>
<td>Wind Dir</td>
<td>Wind Force</td>
<td>Weather</td>
<td>Sea</td>
<td>10 Meters T</td>
<td>10 Meters S</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------</td>
<td>----------------</td>
<td>---------------</td>
<td>--------------</td>
<td>-----------</td>
<td>------------</td>
<td>------------</td>
<td>---------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>127.55-S</td>
<td>1-12</td>
<td>2328</td>
<td>26°14.5'</td>
<td>115°26.5'</td>
<td>2900</td>
<td>330°</td>
<td>3</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>15.30</td>
<td>33.62</td>
</tr>
<tr>
<td>130.30-S</td>
<td>12</td>
<td>1032</td>
<td>26°28.0'</td>
<td>113°30.0'</td>
<td>43</td>
<td>060°</td>
<td>2</td>
<td>clear</td>
<td>slight</td>
<td>17.40</td>
<td>33.80</td>
</tr>
<tr>
<td>130.35-S</td>
<td>12</td>
<td>1300</td>
<td>26°17.0'</td>
<td>113°50.0'</td>
<td>160</td>
<td>060°</td>
<td>4</td>
<td>clear</td>
<td>slight</td>
<td>17.20</td>
<td>33.79</td>
</tr>
<tr>
<td>130.40-S</td>
<td>12</td>
<td>1505</td>
<td>26°06.5'</td>
<td>114°09.0'</td>
<td>1100</td>
<td>300°</td>
<td>3</td>
<td>cloudy</td>
<td>moderate</td>
<td>16.80</td>
<td>33.78</td>
</tr>
<tr>
<td>130.50-S</td>
<td>12</td>
<td>1845</td>
<td>25°45.0'</td>
<td>114°47.0'</td>
<td>2000</td>
<td>220°</td>
<td>2</td>
<td>cloudy</td>
<td>moderate</td>
<td>17.00</td>
<td>33.89</td>
</tr>
<tr>
<td>133.25-S</td>
<td>12</td>
<td>0605</td>
<td>26°04.5'</td>
<td>112°48.0'</td>
<td>45</td>
<td>300°</td>
<td>2</td>
<td>clear</td>
<td>moderate</td>
<td>17.83</td>
<td>34.02</td>
</tr>
<tr>
<td>133.30-S</td>
<td>12</td>
<td>0405</td>
<td>25°54.5'</td>
<td>113°97.0'</td>
<td>106</td>
<td>300°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>18.25</td>
<td>34.14</td>
</tr>
<tr>
<td>133.40-S</td>
<td>12</td>
<td>0025</td>
<td>25°33.5'</td>
<td>113°47.5'</td>
<td>1200</td>
<td>310°</td>
<td>4</td>
<td>partly cloudy</td>
<td>rough</td>
<td>17.22</td>
<td>33.72</td>
</tr>
<tr>
<td>137.23-S</td>
<td>11</td>
<td>1406</td>
<td>25°34.0'</td>
<td>112°18.5'</td>
<td>40</td>
<td>280°</td>
<td>2</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>18.92</td>
<td>34.21</td>
</tr>
<tr>
<td>137.30-S</td>
<td>11</td>
<td>1655</td>
<td>25°20.5'</td>
<td>112°45.0'</td>
<td>200</td>
<td>290°</td>
<td>1</td>
<td>partly cloudy</td>
<td>slight</td>
<td>17.58</td>
<td>34.13</td>
</tr>
<tr>
<td>137.40-S</td>
<td>11</td>
<td>2026</td>
<td>25°00.0'</td>
<td>113°26.0'</td>
<td>1200</td>
<td>300°</td>
<td>4</td>
<td>partly cloudy</td>
<td>moderate</td>
<td>17.21</td>
<td>33.76</td>
</tr>
<tr>
<td>140.30-S</td>
<td>11</td>
<td>0918</td>
<td>24°45.5'</td>
<td>112°24.0'</td>
<td>56</td>
<td>360°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>19.22</td>
<td>34.14</td>
</tr>
<tr>
<td>140.35-S</td>
<td>11</td>
<td>0709</td>
<td>24°36.5'</td>
<td>112°41.0'</td>
<td>900</td>
<td>300°</td>
<td>4</td>
<td>clear</td>
<td>moderate</td>
<td>18.00</td>
<td>34.20</td>
</tr>
<tr>
<td>140.40-S</td>
<td>11</td>
<td>0459</td>
<td>24°26.0'</td>
<td>113°02.5'</td>
<td>2000</td>
<td>330°</td>
<td>4</td>
<td>partly cloudy</td>
<td>rough</td>
<td>19.50</td>
<td>33.98</td>
</tr>
<tr>
<td>143.26-S</td>
<td>9</td>
<td>1334</td>
<td>24°19.0'</td>
<td>111°48.0'</td>
<td>38</td>
<td>320°</td>
<td>2</td>
<td>partly cloudy</td>
<td>slight</td>
<td>19.64</td>
<td>34.34</td>
</tr>
<tr>
<td>143.30-S</td>
<td>10</td>
<td>2215</td>
<td>24°10.5'</td>
<td>112°94.0'</td>
<td>120</td>
<td>320°</td>
<td>4</td>
<td>clear</td>
<td>rough</td>
<td>20.13</td>
<td>34.19</td>
</tr>
<tr>
<td>143.35-S</td>
<td>11</td>
<td>0030</td>
<td>24°02.0'</td>
<td>112°22.5'</td>
<td>1500</td>
<td>330°</td>
<td>4</td>
<td>clear</td>
<td>rough</td>
<td>20.42</td>
<td>34.36</td>
</tr>
<tr>
<td>147.20-S</td>
<td>9</td>
<td>0911</td>
<td>23°56.0'</td>
<td>111°03.5'</td>
<td>80</td>
<td>330°</td>
<td>4</td>
<td>clear</td>
<td>rough</td>
<td>21.68</td>
<td>34.60</td>
</tr>
<tr>
<td>147.25-S</td>
<td>9</td>
<td>0624</td>
<td>23°46.5'</td>
<td>111°22.0'</td>
<td>188</td>
<td>300°</td>
<td>5</td>
<td>clear</td>
<td>rough</td>
<td>20.40</td>
<td>34.40</td>
</tr>
<tr>
<td>Station</td>
<td>Date</td>
<td>Time</td>
<td>Latitude</td>
<td>Longitude</td>
<td>Sounding</td>
<td>Wind</td>
<td>Weather</td>
<td>Sea</td>
<td>10 Meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
<td>------</td>
<td>----------</td>
<td>-----------</td>
<td>----------</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
<td>-----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>North</td>
<td>West</td>
<td>(fm)</td>
<td>Dir</td>
<td>Force</td>
<td></td>
<td>T</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>147.30-S</td>
<td>1-9</td>
<td>0359</td>
<td>23°36.0'</td>
<td>111°41.5'</td>
<td>40</td>
<td>310°</td>
<td>3</td>
<td>clear</td>
<td>rough</td>
<td>20.92</td>
<td></td>
</tr>
<tr>
<td>150.19-S</td>
<td>8</td>
<td>1800</td>
<td>23°24.0'</td>
<td>110°39.0'</td>
<td>110</td>
<td>290°</td>
<td>4</td>
<td>partly cloudy</td>
<td>rough</td>
<td>21.23</td>
<td>34.65</td>
</tr>
<tr>
<td>150.25-S</td>
<td>8</td>
<td>2045</td>
<td>23°12.0'</td>
<td>111°01.5'</td>
<td>650</td>
<td>320°</td>
<td>4</td>
<td>partly cloudy</td>
<td>rough</td>
<td>20.45</td>
<td>34.33</td>
</tr>
<tr>
<td>150.30-S</td>
<td>8</td>
<td>2316</td>
<td>23°02.0'</td>
<td>111°19.5'</td>
<td>1500</td>
<td>320°</td>
<td>4</td>
<td>partly cloudy</td>
<td>rough</td>
<td>21.26</td>
<td>34.34</td>
</tr>
<tr>
<td>153.16-S</td>
<td>8</td>
<td>1330</td>
<td>22°55.0'</td>
<td>110°07.0'</td>
<td>185</td>
<td>020°</td>
<td>8</td>
<td>clear</td>
<td>moderate</td>
<td>22.74</td>
<td>34.69</td>
</tr>
<tr>
<td>153.20-S</td>
<td>8</td>
<td>1135</td>
<td>22°47.0'</td>
<td>110°22.5'</td>
<td>1000</td>
<td>320°</td>
<td>2</td>
<td>clear</td>
<td>slight</td>
<td>21.25</td>
<td>34.54</td>
</tr>
<tr>
<td>153.30-S</td>
<td>8</td>
<td>0635</td>
<td>22°27.0'</td>
<td>110°58.5'</td>
<td>1700</td>
<td>330°</td>
<td>3</td>
<td>clear</td>
<td>rough</td>
<td>22.36</td>
<td>34.63</td>
</tr>
<tr>
<td>157.10-S</td>
<td>7</td>
<td>1732</td>
<td>22°32.5'</td>
<td>109°23.0'</td>
<td>1000</td>
<td>330°</td>
<td>3</td>
<td>clear</td>
<td>slight</td>
<td>23.62</td>
<td>34.61</td>
</tr>
<tr>
<td>157.20-S</td>
<td>7</td>
<td>2205</td>
<td>22°13.0'</td>
<td>110°09.0'</td>
<td>1600</td>
<td>330°</td>
<td>3</td>
<td>clear</td>
<td>slight</td>
<td>22.05</td>
<td>34.65</td>
</tr>
<tr>
<td>157.30-S</td>
<td>8</td>
<td>0230</td>
<td>21°53.5'</td>
<td>110°38.0'</td>
<td>1700</td>
<td>320°</td>
<td>3</td>
<td>clear</td>
<td>rough</td>
<td>22.78</td>
<td>34.60</td>
</tr>
</tbody>
</table>
DISTRIBUTION LIST

Mr. D. L. Alverson, Chief
North Pacific Fisheries Exploration and
Gear Research
Bureau of Commercial Fisheries
2725 Montlake Boulevard
Seattle 2, Washington

Mr. William Anderson
Bureau of Commercial Fisheries
Brunswick, Georgia

Mr. William E. Batzler
Code 2232
U. S. Navy Electronics Laboratory
San Diego 52, California

British Joint Services
(Navy Staff)
1910 K Street N. W.
Washington, D. C.

Mr. J. G. Burnett, Chairman
Marine Research Committee
P. O. Box 807
Los Altos, California

Librarian (4)
Department of Fish and Game
California State Fisheries Laboratory
Terminal Island, California

Library
Oceanographic Group
Central Fisheries Experiment Station
Pusan, Korea

Dr. Ernest R. Anderson
Code 2233
U. S. Navy Electronics Laboratory
San Diego 52, California

Mr. Thomas S. Austin
Bureau of Commercial Fisheries
Biological Laboratory
P. O. Box 3830
Honolulu 12, Hawaii

Dr. Rolf Bolin
Hopkins Marine Station
Pacific Grove, California

Librarian
Bureau of Commercial Fisheries
Biological Laboratory
P. O. Box 3830
Honolulu 12, Hawaii

Dr. Wayne V. Burt
Assoc. Prof. of Oceanography
School of Science
Oregon State College
Corvallis, Oregon

Mr. Ray Cannon
Ocean Fish Protective Association
645 N. Serrano Street
Los Angeles 4, California

Mr. Harold B. Clemens, Jr.
Marine Resources Operations
California State Fisheries Laboratory
Terminal Island, California
Chief, Division of Fisheries
Commonwealth Scientific and Industrial Research Organization
P. O. Box 21
Crunulla, N. S. W., Australia

Mr. R. S. Croker, Director
California Department of Fish and Game
Marine Fisheries Laboratory Branch
772 Capitol Avenue
Sacramento 14, California

Deutsches Hydrographisches Institut
Bernhard-Nocht-Str. 78
Hamburg 4, Germany

Director of Research
Fish Commission of Oregon
Route 1, Box 31A
Clackamas, Oregon

Dr. Paul M. Fye
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts

Dr. William J. Hargis, Jr., Director
Virginia Fisheries Laboratory
Gloucester Point, Virginia

Dr. Robert W. Hiatt
University of Hawaii
Honolulu 12, Hawaii

Dr. G. M. Cresswell
Department of Earth Sciences
Stanford Research Institute
Menlo Park, California

Herrn Professor Dr. A. Defant
Sternwartestrasse 38
Innsbruck
Austria

Chief
Division of Biological Research
U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington 25, D. C.

Dr. Richard H. Fleming
University of Washington
Oceanographic Laboratories
Seattle 5, Washington

Hancock Library of Biology and Oceanography
Allan Hancock Foundation
University of Southern California
Los Angeles 7, California

Mr. John Hawk
c/o Seafarers' International Union of North America
450 Harrison Street
San Francisco 5, California

Mr. T. Hirano
Tokai Regional Fisheries Research Laboratory
Tsukishima
Tokyo, Japan
Director
Instituto de Geofísica
Torre de Ciencias, 3er piso
Universidad Nacional Autónoma de México
Villa Obregón, D. F.
México

Japan Meteorological Agency
Oceanographical Section
Tokyo, Japan

Dr. E. Koto
Institute of Fisheries
Hokkaido University
Hakodate, Japan

Cdr. J. R. Lumby, Director
IGY WDC-A, Oceanography
Texas A. and M. College
College Station, Texas

Mr. Joseph Mardisich
Franco-Italian Packing Company
Fish Harbor Wharf
Terminal Island, California

Mr. Jotaro Maszuwa
Japan Meteorological Agency
Oceanographical Section
Tokyo, Japan

Dr. Hugh J. McLellan
Department of Oceanography
Texas A. and M. College
College Station, Texas

Dr. R. C. Miller, Director
California Academy of Science
Golden Gate Park
San Francisco 18, California

Mr. Milton C. James
Pacific Marine Fishery Commission
340 State Office Building
1400 S. W. Fifth Avenue
Portland 1, Oregon

Dr. H. Kitamura
Oceanographic Section
Kobe Marine Observatory
Kobe, Japan

Dr. E. C. LaFond
Code 2250
U. S. Navy Electronics Laboratory
San Diego 52, California

Dr. John Lyman
National Science Foundation
Washington 25, D. C.

Mr. John C. Marr
Bureau of Commercial Fisheries
Biological Laboratory
P. O. Box 3830
Honolulu 12, Hawaii

Dr. J. L. McHugh, Chief
Division of Biological Research
Bureau of Commercial Fisheries
Washington 25, D. C.

Mr. Arthur H. Mendonca
c/o R. E. Booth Company, Inc.
280 Battery Street
San Francisco 11, California

Librarian
Ministry of Agriculture, Fisheries and Food
Fisheries Laboratory
Lowestoft, Suffolk
England
Mr. D. Shoji
Japanese Hydrographic Office
Tsukiji
Tokyo, Japan

Mr. Henry M. Stommel
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts

Dr. Y. Takenouti
Oceanographical Section
Japan Meteorological Agency
Chuo-ku
Tokyo, Japan

Department of Oceanography
Texas A. and M. College
College Station, Texas

Dr. M. Uda
Tokyo University of Fisheries
Minato-ku
Tokyo, Japan

Library, Code 2420 (2)
U. S. Navy Electronics Laboratory
San Diego 52, California

University of California (2)
Serials Department
General Library
Berkeley 4, California

Librarian
University of Washington
Oceanographic Laboratories
Friday Harbor, Washington

Mr. W. E. Stewart
c/o California State Chamber of Commerce
350 Bush Street
San Francisco 4, California

Miss Margaret Storey, Librarian
Natural History Museum
Stanford, California

Mr. Norman Tebble
Annelida Section
British Museum (Natural History)
Cromwell Road
London SW7, England

Dr. John P. Tully
Pacific Oceanographic Group
P. O. Drawer 6
Nanaimo, B. C.
Canada

U. S. Hydrographic Office (2)
Navy Department
Washington 25, D. C.
Attn: Dr. Boyd E. Olson
Division of Oceanography

University of California
Department of Zoology
Berkeley 4, California

Director
University of Miami
Marine Laboratory
Coral Gables, Florida

Librarian (2)
University of Washington
Oceanographic Laboratories
Seattle 5, Washington