RELATIVE ABUNDANCE OF PLANKTON OFF NAPLES, FLORIDA, AND ASSOCIATED HYDROGRAPHIC DATA, 1956-57



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by

Alexander Dragovich



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ABSTRACT

Some chemical, physical, and plankton characteristics of the surface waters at Naples, Florida, have been investigated. Concentrations of inorganic phosphate, total phosphate, nitrate-nitrite nitrogen, carbohydrate, and protein were determined over a period of 17 months. Water temperatures, salinities, occurrence, and composition of phytoplankton and zooplankton were also recorded.

INTRODUCTION

This study adds to the hydrographic and biological data available for the Florida red tide area. It is the fifth report by the U.S. Bureau of Commercial Fisheries on field studies of the Florida red tide. The first four reports were by Graham, Amison, and (1954), Marvin (1955a), Marvin Finucane and Dragovich (1959), and Dragovich, Finucane, and May (1961). Other studies on planktonic forms of the Florida west coast have been made by King (1950), Davis (1948 and 1950), Davis and Williams (1950), and Gunter et al. (1948).

Knowledge of the species composition and relative abundance of planktonic forms, together with associated physical and chemical parameters, is important in characterizing a marine environment (Cleve, 1900, and Russell, 1939). Previous plankton analyses for the Florida red tide area provide comparatively little informa-

tion regarding coincident aquatic conditions. In this report values for salinity, temperature, inorganic phosphorus, total phosphorus, nitrate-nitrite nitrogen, carbohydrate, and protein are given with abundance estimates of 48 taxa of phytoplankton and 13 zooplankton taxa. These data cover the coastal waters off Naples, Florida, for the period March 1956 to August 1957.

MATERIALS AND METHODS

Surface samples of water were collected from Naples Pier at Naples, Florida (lat. 26°07.9'N., long. 81°48.5' W. Fig. 1). The mean low water depth at the pier was 5 feet with a mean tidal range of 2.1 feet. Three or four times a month water samples were taken with 2-liter Erlenmeyer flasks for chemical analysis. Immediately after collection the samples were transferred to 200 mm. pyrex culture vials, capped with solid polyethylene screw caps, and sealed with plastic electrician's tape. They were tested

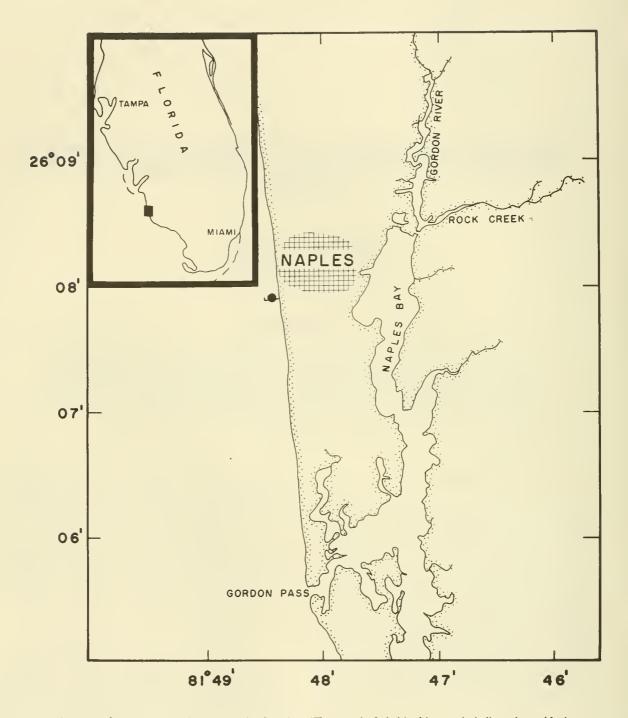


Figure 1.--Map of Naples area indicating station location. (The area included in this map is indicated as a black rectangle on the inset.)

for total and inorganic phosphorus, nitrate-nitrite nitrogen, carbohydrate, and protein.

Temperature, salinity, and plankton determinations were usually made 5 times a week. The particular collection method employed was chosen to permit detection of delicate or minute organisms which would have been fragmented or destroyed if collected with a plankton net. Water samples to be analyzed for plankton were collected like the chemical samples, in

2-liter Erlenmeyer flasks previously rinsed with a portion of sample water, and examined within 24 hours after collection.

The counting technique for Gymnodinium breve and preparation of the samples for the estimation of relative abundance of other organisms were those described by Finucane and Dragovich (1959). Abundance estimates of microorganisms other than G. breve were made as follows: three l-ml.portions of the sample were pipetted from just beneath the surface of the water and placed on a 3-depression slide. After microscopic examination of the three aliquots, the abundance of phytoplankton forms was recorded in terms of three categories: + = 1-24 cells per ml.; ++ = 25-99 cells per ml.; and +++ = 100 or more cells per ml. The same procedure was employed for zooplankton estimates, using these categories: x = 1-9 organisms per ml.; xx = 10-49 organisms per ml.; and xxx = 50-100 organisms per ml.

The following physical and chemical methods were employed:

Water temperature: determined with mercury thermometer calibrated to the nearest 10th of a degree centigrade.

Salinity: determined by Mohr-Knudsen method (Knudsen, 1901).

Nitrate-nitrite nitrogen: determined by the method of Zwicker and Robinson (1944) as modified by Marvin (1955b).

Inorganic phosphorus: determined according to the Robinson and Thompson (1948) method.

Total phosphorus: determined by the method of Harvey (1948).

<u>Carbohydrates</u>: determined by the method of Erdman and Little (1950) as modified by Zein-Eldin and May (1958).

<u>Protein</u>: determined by the method of Wangersky (Collier, 1958) as modified by Marvin et al., 1960.

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APPENDIX TABLES

EXPLANATION OF COLUMN HEADINGS AND SYMBOLS

| Time NO ₃ -NO ₂ | Eastern Standard Time Nitrate-nitrite nitrogen, |
|------------------------------------------|----------------------------------------------------|
| PO ₄ -P | μg. at./l. Phosphate phosphorus, |
| · | μg.at./1. |
| In. | Inorganic |
| Tot. | Total |
| Carbohydrat | e Arabinose equivalents, |
| · | mg./1. |
| Protein | Tyrosine equivalents, |
| | mg./1. |

Symbols for phytoplankton abundance:

+ 1-24 cells per ml. ++ 25-99 cells per ml.

+++ 100 or more cells per ml.

Symbols for zooplankton abundance:

x 1-9 organisms per ml. xx 10-49 organisms per ml. xxx 50-100 organisms per ml.

Table 1..-Relative abundance of plankton with associated hydrographic data

MARCH 1956

| Oay | - | 2 | 5 | 9 | 1 | 80 | 6 | 12 | 13 | 14 | 15 | 16 | 19 | | 21 2 | 22 2 | 23 2 | 26 27 | 7 28 | 29 | 30 | |
|----------------------|------|---|------|------|------|------|------|------|------|------|--------|---------|------|--------|------|---------|------|-------|------|----|------|--|
| Time | 0160 | 2 | 8060 | 1000 | 1030 | 0840 | 0060 | 9060 | 0843 | 9060 | 1615 1 | 1540 10 | 1615 | 1154 1 | | 1500 10 | | 0 | [" | | 0060 | |
| | | _ | | | | | | | | _ | | | _ | | | | | | | | | |
| BIOLOGICAL DATA | 1 | | | | | | | | | | | | | | | - | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | | | | |
| Amphidinium spp. | Ì | | Ī | | | | | | | | | | | | | | | | | | | |
| Cochlodinium spp. | | | | | | | | | | | | | + | | | - | _ | + | | | | |
| Gymodinium breve | | | | | | | | | | | 1 | - | | + | | | | | | | | |
| G. simplex | | | | | | | | | | | 1 | + | 1 | | | - | + | - | - | | | |
| G. splendens | | | | | | | | | | | 1 | | | | | | | | | | | |
| G. spp. | | | | | + | + | | + | + | + | + | + | | + | + | + | | ‡ | | + | + | |
| Gyrodinium spirale | | | İ | | , | | | | | | | | | | | | | | | | | |
| G. spp. | | | + | + | + | | | + | | | | + | + | + | | | | + | + | | + | |
| Torodinium spp. | | | | | | | | | | | | | | | | | - | | | | | |
| Polykrikos spp. | | | | | | | | Ī | | | | _ | | | | | | | | | | |
| Nematodinium spp. | | Ī | | | | | | | | | | | - | | | | _ | + | | | | |
| Pouchetia spp. | | | | | | + | | | | | | | _ | _ | | _ | - | | | | | |
| Oxyrrhis spp. | | Į | | | | | | | | | | | | | | | | | | _ | | |
| Ceratium furca | 1 | I | + | | | + | | | | | | + | | _ | + | | _ | | | | | |
| C. fusus | | Ī | | | | | | | _ | | | | | | | _ | | | | | | |
| C. tripos | | | | | | | | | _ | | | | | | | | | | | | | |
| Gonyaulax spp. | | | | | | | | | | | | | | | | | | | | | | |
| Peridiniopsis sup. | | + | | | | | + | | | | | | | + | | - | - | 1 | - | - | | |
| Peridinium de ressum | | | | | | | | | | | | | - | | | | - | | | | | |
| P. di itale | | | | | | | | | | | | 1 | - | + | + | - | + | | | | | |
| P. divergens | Ī | Ī | | | | | | | + | | | | | | | | | | - | - | | |
| P. spp. | | Ī | | | | | | | | | | | | | | - | + | - | - | _ | | |
| Olno hysis tripos | | | | 1 | | | | | | | | - | - | 1 | - | 1 | 1 | 1 | 1 | | | |
| D. spp. | | | | | | | | | | | | - | + | 1 | - | - | 1 | + | - | - | - | |
| Exuviella spp. | | | | | \ | | | | | | 1 | - | 1 | 1 | + | + | + | + | + | + | 1 | |
| Prorocentrum sp. | | | | 1 | | | | | | | + | + | + | + | + | + | + | 1 | + | + | 4 | |
| Silicoflagellidae | 1 | | | | | | | 1 | | 1 | + | + | + | + | + | + | + | + | + | + | 4 | |
| Euglena spp. | | | | | | | | | | | 1 | + | + | + | + | 1 | + | + | + | + | 1 | |
| Peranema spp. | | | | | | | | | | | | 1 | - | + | 1 | - | - | + | + | 1 | | |
| Melosira spp. | + | | | | + | ‡ | + | ‡ | ‡ | + | + | ‡ | + | - | + | | 1 | 1 | 1 | | | |
| Skeletonema spp. | | | | | | | | | | | | | + | + | 1 | + | - | 1 | + | + | - | |
| Chaetoceros spp. | | | | | + | | | | | | + | | | | + | + | + | | | - | | |
| Guinardía spp. | | | | | | | | | | | | | | - | | | | - | - | - | | |
| Rhizosolenia sur. | | | | | | | | | Ī | | | | | | | - | | | | - | | |
| Thalassiothrix spp. | Ī | Ī | | | | | | | | | | | | + | | - | - | - | | - | | |
| Navicula spr. | | | | | | | | | | | | | | | | 4 | | | | | - | |
| Pleurosigna spp. | | | | 1 | | | | | | | | | | | - | 1 | | 1 | | - | | |
| Nitzschia spp. | | | ĺ | | | 1 | | | | + | | + | | - | - | + | | | - | - | | |
| | | | | | | | | | | | | | | | - | | | | | | | |

Table 1. cont'd

| Day | - | 6 | 2 | 9 | 1 | 000 | 6 | 12 | 13 | 14 | 15 | 16 | 19 | 20 | 21 | | 23 | | | | 29 | 30 |
|------------------------|------|------|----------------|------|------|------|------|------|------|------|------|------|------|------|-----------|------|--------|-----------|---------|-------------|--------|------|
| Time | 0160 | | 88 | 1000 | 1030 | 0840 | 0060 | 2060 | - | 0905 | 1615 | | 1615 | | 1050 | | 1000 0 | 0918 0 | 0940 10 | 1050 10 | H | 0060 |
| | | - | | | | | | | | | | | | | | | | _ | | | | |
| BIOLOGICAL DATA | | | I | | | | | | 1 | 1 | 1 | 1 | 1 | | | 1 | | | 1 | + | + | |
| Unicellular plankton | | | | | | | | | | | Ì | | | | | | | - | + | + | + | - |
| Grammatophora app. | | | | | | | | | | | | 1 | 1 | | 1 | 1 | + | + | + | + | + | |
| Unidentified | : | : | | : | | 1 | 1 | 4 | | 1 | 1 | Ī | 4 | 1 | _ | 1 | - | - ‡ | + | ‡ — ‡ | | |
| phytoplankton | ‡ | ‡ | ‡ | = | ŧ | - | - | | T | 1 | 1 | 1 | t | + | + | + | + | + | - | + | ╀ | |
| Strombldium 8p. | | | 1 | | | | | | Ī | Ì | t | 1 | 1 | 1 | + | + | - | + | + | + | - | |
| Unidentified | | | | | | | | | Ī | | Ī | ‡ | Ī | Ī | _ | | _ | | | | | |
| Halterildae | | | | | | | 1 | | Ī | 1 | 1 | 1 | 1 | 1 | t | + | + | + | + | + | + | |
| Tintinnopsis spp. | | | | | | | | | | Ī | | 1 | 1 | 1 | 1 | + | + | + | + | + | + | + |
| Unidentified | | | | | | | | | | | Ī | Ī | Ī | Ī | | | _ | | _ | _ | | |
| Tintinnidae | | | | | | | | | | | 1 | ı | | 1 | 1 | + | + | + | 1 | + | + | |
| Vorticella spp. | | | | + | | | - | | | + | | | | | 1 | + | + | + | + | + | + | |
| Cothurnia sp. | | | | | | | | | | | | | | | | 1 | 1 | + | 1 | 1 | + | + |
| Pleuronema ap. | | | | | | | | | | ij | | | | | | | 1 | 1 | | + | + | |
| Unidentified cillates | | ‡ | + | + | + | | + | | + | + | + | | + | ‡ | + | + | ‡ | + | + | | + | + |
| Multicellular plankton | | | | | | | | | | Ī | | i | | _ | | | | | | | - | |
| Prosles sp. | | | | | | | | | | Ī | | | | | | 1 | 1 | 1 | + | + | + | + |
| Synchaeta sp. | | | | Į | | | | | | | | | | | 1 | + | + | + | 1 | + | + | |
| Unidentified Rotifera | | | × | × | | | | | | | | 1 | | 1 | 1 | 1 | + | + | + | + | + | - |
| Coperoda | | | | | | | | Ì | × | | 1 | 1 | | 1 | 1 | + | + | + | + | × | + | + |
| Ostracoda | | | | | | | | | | 1 | 1 | | 1 | 1 | 1 | 1 | + | + | + | + | + | + |
| Chaetoloda | | | | | | | | | | 1 | 1 | | 1 | 1 | 1 | + | + | + | + | + | + | - |
| Coelenterata | | | | | | | | | | Ī | | | | 1 | + | + | + | + | 1 | + | + | - |
| Naup111 | × | | | | | | | | | × | | | 1 | 1 | 1 | 1 | + | × | + | + | + | |
| Megalops and Zooea | | | | | | | | | | × | | | × | | × | + | + | + | + | × | + | 1 |
| Veliger | ļ | | | | | | | | | 1 | | | 1 | 1 | 1 | + | + | + | + | + | 1 | × |
| Trocho hore | | | | | | | | | | | | | | 1 | 1 | + | + | + | + | + | + | + |
| Echinoderm larvae | | | | | | | | | | | | 1 | 1 | | 1 | + | + | + | + | + | + | |
| Pisces larvae | | | | × | | | | | | 1 | 1 | 1 | + | T | \dagger | | + | \dagger | + | + | + | + |
| HYDROGRAPHIC DATA | | | | | | | | | Ì | | | -# | | -# | 7 | 1 | 1 | 1 | | 1 | 1 | |
| Temperature, °C. | 19.5 | 19.9 | 21.9 | 22.6 | 23.5 | 24.0 | 22.9 | 23.5 | 24.9 | 25.0 | 26.8 | ∞. | - | ω. | - | ٥ | 00 | 4 | - | 5 | 0, | |
| | 36.3 | | 36.3 36.2 36.3 | 36.3 | 36.3 | 36.4 | 36.4 | 36.5 | 36.6 | 36.4 | 36.6 | 37.0 | 36.8 | 37.0 | 37.1 | 37.0 | 37.1 | 37.0 | 36.2 36 | 36. | .8 36. | 8.0 |
| NO3-NO2 | | | | | | | | | | | | | | | | | 1 | + | + | + | 1 | + |
| In. PO4P | 1.5 | | | | | 0.5 | | | | | 0.2 | | | | | 3.2 | | | 1 | | 0.3 | |
| Tot. POL-P | 2.9 | | | | | 1.0 | | | | | 0.2 | | | | | 3,5 | | | 1 | | 0.7 | + |
| Carboh drate | 1.6 | | | | | 4.1 | | | | | 6.0 | | | | 1 | 1-1 | + | + | + | | 0.7 | + |
| Protein | 3.2 | | | | | | | | | | | | 1 | 1 | 1 | 0.1 | 1 | 1 | - | + | + | |

Table 2. -- Relative abundance of plankton with associated hydrographic data

APRIL 1956

| Time | 1030 | Time 1030 1050 0940 | 1 | 0955 0 | 0930 09 | 0920 0920 | 20 05 | 0930 0930 0955 | 30 08 | 5 0915 | 5 1030 | 0000 | 0900 0855 | 0935 | 0830 | 0835 | 0000 | 0935 0830 0835 0900 0835 0910 | 0100 | |
|----------------------|----------|---------------------|----|--------|---------|-----------|-------|----------------|-------|--------|--------|------|-----------|------|------|------|------|-------------------------------|------|--|
| | | _ | I— | | | - | - | _ | _ | _ | | _ | | _ | _ | | _ | _ | | |
| | | - | | | | | + | | | - | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | | |
| Amphidinium spp. | | | | | | | | | | | | | | | | | | | | |
| Cochlodinium spp. | | | | | | | | | | | | | | | | | | | | |
| Gymnodinium breve | | _ | _ | _ | | | | | | | | | | | | | L | L | | |
| | | | - | | | | - | | - | L | | | | L | | | L | | | |
| | | | - | | | + | | | | + | | L | | | | | L | L | | |
| | ‡ | + | L | - | + | ‡ | + | | | + | + | + | + | | | | + | L | + | |
| Gyrodinium spirale | | | L | H | + | | + | | | | | | | | | | | L | | |
| | ‡ | + | + | + | + + | +. | H | + | + | + | + | | + | + | | | | + | + | |
| Torodinium spp. | | | | | | | | | | | | | | | | | | | | |
| Polykrikos spp. | | | - | | | | _ | | | _ | | | | | | | | | | |
| Nematodinium spp. | | | - | | | | | | L | L | | | L | L | | L | | | | |
| Pouchetia spp. | | | | + | | | | | | _ | | | | | | L | | L | | |
| Oxyrrhis spp. | | | | _ | | - | _ | | | | | + | | | | | | L | | |
| Ceratium furce | + | | | _ | + | , | | | + | | | L | | | | | | | | |
| | | | | | | | | | - | | | | L | | | L | | L | | |
| | | | - | - | | | | | | | | L | L | L | | | | | | |
| Gonyaulax spp. | | | | | | | | | | | | | | | | | | | | |
| Peridiniopsis spp. | | - | | Ĺ | + | | L | | L | | | | | | | | | | | |
| Peridinium depressum | | | | _ | | | | | ı | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| P. divergens | | | | + | | | + | + | | | | | | | | | | | | |
| | | + | | | + | 1 | | | | | + | + | + | | | | | | | |
| Oinophysis tripos | - | | | | | _ | | | | | | | | | | | | | | |
| | - | | | | | | | | | | | | | | | | | | | |
| Exuviella spp. | | | | | | | | | | | | | | | | | | | | |
| Prorocentrum sp. | <u> </u> | | | | | | | | | | _ | | | | | | | _ | | |
| Silicoflagellidae | | | | _ | | | | | | | | | | | | | | | | |
| Euglena spp. | | | | | | | | | | | | | | | | | | | | |
| Peranema spp. | | | | _ | | | | | | _ | | | | | | | | | | |
| Melosira spp. | | + | + | + | | | + | + | + | + | | | | | | + | | | | |
| Skeletonema spp. | | | | | | | | | | | | | | | , | | | | | |
| Chaetoceros spp. | | + | | + | + | | | | | | | | | | | | | | | |
| Guinardia spp. | | | | _ | | | | | | | | | | | | | | | | |
| Rhizosolenia spp. | _ | _ | _ | | | | | | | | | | | | | | | | | |
| Thalassiothrix spp. | | | | | | | - | | | | | | | | | | | | | |
| Navicula spp. | | | | | | | | | | | | | | | | | | | | |
| Pleurosigma spp. | | | | | | | | | | | | - | _ | | _ | _ | | | | |
| | | | | | | | | | | | | | | - | | | | | | |

Table 2. coat'd

| Dav | 2 | 7 | 7 | 0 | | 24 | 4 4 | 1 | | | | | | | | | | | | |
|------------------------|------|-----------|-----------|------|------|------|------|------|------|--------|------|--------|------|--------|-----------|--------|----------|-----------|------------|------|
| Time | - | 1050 | 0940 0955 | 0955 | 0860 | 0350 | 0360 | 0660 | 0830 | 0955 (| 0915 | 1030 (| 0060 | 0855 0 | 0935 0 | 0830 0 | 0835 09 | 0900 0835 | 35 0910 | 0] |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | _ | _ | - | | | |
| Unicellular plankton | | | | | | | | | | | | i | i | | | | | | | |
| Grammatophora spp. | | | | | | | | | | | | | H | | | | + | | + | |
| Unidentified | : | | | | : | | | 1 | 11 | 1 | 1 | 1 | 1 | 1 | 4 | - | - | - ‡ | ‡ ‡ | |
| phytoplankton | ‡ | ‡ | + | ‡ | ‡ | ‡ | ţ | ŧ | = | = | 1 | 1 | | + | + | + | + | + | + | |
| Strombidium ap. | | | | | | | 1 | 1 | 1 | 1 | 1 | t | t | + | \dagger | + | 1 | + | + | |
| Unidentified | | | | | Ī | 1 | | | | | | Ī | | | | | | _ | _ | |
| Halteriidae | | | | | 1 | = | 1 | 1 | | 1 | t | 1 | 1 | - | + | + | + | + | 1 | |
| Tintinnopsis spp. | + | | | | + | + | | 1 | + | 1 | 1 | 1 | 1 | 1 | - | + | + | + | - | |
| Unidentified | | | | | | | | | | | | | i | i | | _ | | | _ | |
| Tintinnidae | | | | | | V | | | | | | 1 | 1 | 1 | - | 1 | | \dagger | 1 | |
| Vorticella spp. | + | | + | | | | | | | + | | + | | 1 | ‡ | + | | + | + | |
| Cothurnia sp. | | | | | | | | | ‡ | | | | | | | - | 1 | + | + | |
| Pleuronema sp. | | | | | | | | | | | | | | 1 | + | | 1 | + | + | |
| Unidentified ciliates | | + | + | + | | - | | | | + | + | + | + | + | + | + | + | + | + | - |
| Multicellular plankton | | | | | | | | | | | | | | | 7 | | | - | | |
| Progles so. | | | | | | | | | | | | | | | | | 1 | + | | |
| Symchapts an | | | | | | | | | | | | | i | | ĺ | N. | | | | |
| Unidentified Rotifers | | | | | | | | | 1 | | i | ı | × | × | | 1 | 1 | | 1 | |
| Copepoda | | | | | | | | | | | | | 1 | | 1 | | + | 1 | | |
| Ostracoda | | | | | | | | | | | Ì | | | | 1 | 1 | 1 | 1 | | |
| Chaetopoda | | | | | | | | | | | | | 1 | İ | 1 | 1 | + | + | 1 | 1 |
| Coelenterata | | | | | | | | | | | Ì | | | 1 | | 1 | Ì | + | + | |
| Nauplii | | | | × | × | | | | | × | | × | 1 | × | 1 | 1 | | + | × | |
| Megalops and Zooea | | | | | | | | | | | | | 1 | 1 | 1 | × | | × | + | |
| Veliger | | | | | | | | | | × | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Trochophore | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | + | 1 | 1 | |
| Echinoderm larvae | | | | | | | | | | | 1 | 1 | 1 | 1 | İ | 1 | + | + | + | |
| Piscea larvae | 4 | | | × | | T | | 1 | | 1 | T | Ť | t | t | t | t | + | + | - | |
| HYDROGRAPHIC DATA | 4 | | | | _ | | - 44 | - | _ | | - | | | | | | _ | 7 | - | |
| Temperature, °C. | 22.0 | 22.0 | 22.9 | 24.6 | 23.6 | 22.3 | 21.9 | - | 20.8 | 22.5 | 22.9 | | 7 | 21.5 | - | - | 23.8 23. | _ | - | 25.0 |
| Salinity A | 37.0 | 37.0 36.8 | 37.0 | 37.2 | _ | 37.2 | _ | | | - | | 37.6 | 37.4 | - | 36.9 | 36.9 3 | _ | 37.2 3 | 37.8 37 | 2 |
| NO3-NO2 | | | | | | | | | | | | | | 1 | 1 | 1 | | + | + | |
| In. PO4P | | | | 0.5 | | | | 3.2 | | | Ī | V | 0.2 | i | | | | 0.2 | | |
| Tot. POP | | | | 0.8 | | | | 4.2 | | | | | 0.2 | 1 | 1 | 1 | + | | + | |
| Carboh drate | | | | 0.5 | | | | 1.2 | | 1 | 1 | 1 | 1 | 1 | Ì | t | | 8.0 | + | |
| Thursday I. | | | | 0 | | | | - | | | | | | | | | | _ | | |

Table 3.--Relative abundance of plankton with associated hydrographic data

M A Y 1956

| 10 | | - | 0 | - | 1 | - | α | o | 10 | = | 14 | 15 | 16 | 17 | 18 | 1 | 2 23 | | 25 | | 29 | 31 | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|------|------|------|------|------|----|----|---|-----|----|-----|----|----------|----------|------|-----|----------|-----|----|-----|--|
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| A | BIOLOGICAL DATA | | | | | | | | | | | | | | | | | | | | | | |
| | Unicellular plankton | | | | | | | | | | | | | | | | | | | | | | |
| Free by the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control o | Amphidinium spp. | | | | | | | | | | | | | | | | | | | | | | |
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| 24. | Gymnodinium breve | | | | | | | | | + | | 1 | 1 | + | + | + | - | | | | | | |
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| ## # # # # # # # # # # # # # # # # # # | G. splendens | | | | | + | | | | | + | - | | 1 | + | | - | _ | | - | | | |
| 2pp. | G. spp. | | + | + | | + | | | | | | | + | | + | | | | + | + | + | + | |
| PD | Gyrodinium spirale | | | | | + | | | | | | | | + | \dashv | | | | | | | | |
| Pp | G. spp. | + | + | + | | | + | +. | | + | | + | | + | \dashv | | | | 4 | + | + | + | |
| Pp | Torodinium spp. | | | | | | | | | | | | | | _ | | | | _ | | _ | | |
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| Post | Pouchetia spp. | | | | | | | | - | | | | | | _ | | | | _ | | | | |
| Pop. | Oxyrrhis spp. | | | | | | | | _ | | | | | | | | | | | | | | |
| Post | Ceratium furca | | | | | | | | | | | | | | | | | + | | | _ | | |
| app. + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + | C. fusus | | | | | | | | | _ | | | | | | | | | | | | | |
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| P. | Dinophysis tripos | | | | | | | | | - | - | | | - | | | - | - | 4 | - | | | |
| Dr. daec | D. spp. | | | | | | | | | | | | | | | | | - | \dashv | | | | |
| pp. 4 + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + | Exuviella spp. | | | | | | | | | | - | + | | | | | | - | | - | - | | |
| dee + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + | Prorocentrum sp. | | | | | | | | | | | | | + | + | | - | 1 | | | | + | |
| P: + + + + + + + + + + + + + + + + + + + | Silicoflagellidae | | | | | | | | | | | | - | + | + | - | | - | 4 | - | - | | |
| p. + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + | Euglena spp. | | | | | | | | | | | - | - | | + | - | - | | - | | | | |
| p. + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + | Peranema spp. | | | | | | | | | | | | - | 1 | - | - | - | | 1 | | | | |
| p. + + + + + + + + + + + + + + + + + + + | Melosira spp. | | | | | + | | | | | | | - | - | - | | + | # | | + | + | | |
| pp. + + + + + + + + + + + + + + + + + + | Skeletonema spp. | | | | | | | | | | | | | - | - | \dashv | + | - | | - | | | |
| Pp. spp. spp. spp. spp. spp. spp. spp. s | Chaetoceros spp. | + | | | | + | + | | | | 1 | | | 1 | + | \dashv | + | | + | - | + | - | |
| Pp. + ++++++++++++++++++++++++++++++++++++ | Guinardia spp. | | | | | | + | ŧ | ŧ | ‡ | + | + | | + | | 1 | | - | 4 | - | - | + | |
| 9pp. + p. + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + | Rhizosolenia spp. | | | | | + | | ‡ | ‡ | ŧ | + | + | | | + | - | - | + | - | - | - | | |
| D. + + ++ + + + + + + + + + + + + + + + | Thalassiothrix spp. | | | | | | | | | | | | | | - | - | - | | 4 | | - | | |
| P. + + + + + + + + + + + + + + + + + + + | Navicula spp. | | | | | | | | | | 1 | + | 1 | - | - | - | | | + | - | 1 | | |
| + + + + + + + + + + + + + + + + + + + + | Pleurosigma spp. | | | | | | | | | | | | 1 | + | \dashv | + | + | + | - | + | - | 1 | |
| | Nitzschia spp. | | + | | | | | | | | - | + | 1 | + | + | - | 1 | 4 | + | - | + | _ | |

Table 3. cont'd

| Day | 1 | 2 | 3 | 7 | 7 | | 6 | 10 | 11 | 14 | 15 | 16 | 17 | | 21 | 22 | 23 | | | | | 31 |
|-------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|---------|----------|--------|---------|-----------|------|
| Time | Time 0908 0830 1040 | 0830 | 1040 | 0845 | 0630 | 0950 | 1035 | 0920 | 0820 | 0060 | 0847 | l L | 0935 | 1000 | 0060 | 1 1 | 0840 0 | 0830 0 | 0840 | 1000 08 | 0850 08 | 0850 |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | | | _ | | | _ | |
| 11-4-511-11-1-1-1-1-1-1 | | | | | | | | | | | | T | 1 | t | | | - | + | + | + | - | - |
| Unicellular plankton | | j | | | | | | | | | | | | | _ | - | - | _ | _ | | | _ |
| Grammato, hora spp. | | | | | | | | | | | | | | - | - | H | - | \vdash | - | - | - | + |
| Unidentified | | | | | | | | | | | | | | | | - | | - | - | - | | l |
| phytoplankton | ‡ | ‡ | ‡ | | ‡ | ‡ | + | ‡ | ‡ | ‡ | ++ | + | ‡ | ‡ | ‡ | ‡ | _ ‡ | ‡ | ‡ | + | + | ‡ |
| Strombidium sp. | | | | | | | | | | | | | - | | | - | - | - | H | - | ╀ | - |
| Unidentified | | | | | | | | | | | | | - | | | - | - | - | + | | | - |
| Halteriidae | | | | | | | | | | | | | | | | | | | | | | |
| Tintinnopsis spp. | | | | | | | | | | ‡ | | | | İ | | t | - | + | + | l | - | - |
| Unidentified | | | | | | | | | | | | | | | İ | | - | - | - | - | - | - |
| Tintinnidae | | | | | | | | | | | | _ | _ | | | | | _ | _ | | _ | |
| Vorticella spp. | | | | | | | | + | | 1 | | | | | | - | - | | + | + | | - |
| Cothurnia sp. | + | | | | | | | | | + | | | | - | | - | H | H | | | - | - |
| Pleuronema sp. | | | | | | | | | | + | | | - | | | - | - | - | - | | H | - |
| Unidentified ciliates | + | + | | | + | + | + | + | + | | | + | + | + | ‡ | + | + | + | | + + | | H |
| Multicellular plankton | | | | | | | | | | | | | | | | | - | - | - | | | - |
| Proales sp. | | | V | | | | | | | | | | | | | - | - | H | H | - | H | - |
| Synchaeta sp. | | | | | | | | | | | Ī | | | | | - | - | - | - | | - | - |
| Unidentified Rotifera | | | | | | | | | | | | - | | | | - | - | | - | | | |
| Coperoda | | | | | | | | | | 1 | | | | | - | - | | _ | - | | × | |
| Ostracoda | | | | | | | | | | | | | | | _ | - | _ | _ | | | _ | |
| Chaetopoda | | | | | | | | | | | | | | - | | | | _ | | | | _ |
| Coelenterata | | | | | | | | | | | | | | - | - | | | - | | | - | - |
| Nauplii | | × | | | | | | | | | | | | - | - | | - | ×× | L | × | | L |
| Megalops and Zooea | | | | | | | | × | | | | | | | | | | - | - | - | | - |
| Veliger | | | | | | | | | | | | | Ī | - | | | | _ | _ | - | | - |
| Trochophore | | | | | | | | | | | | | Ì | | | | _ | L | | | | - |
| Echinoderm larvae | | | | | | | | | | | | | | r | | | | - | | | | - |
| Pisces larvae | | | × | | | | | | | | | | | | | | | | | | | |
| HYDROCRAPHIC DATA | | | | | | | | | | | | | | | | | | | _ | | | |
| Temperature, °C. | 54.9 | 24.9 | 25.9 | 26.3 | 27.7 | 27.5 | 27.7 | 17.0 | 27.4 | 18.0 | 28.2 | 28.5 | 27.5 | 27.7 | 27.0 | 29.5 2 | 27.0 27 | .5 | 28.2 2 | 27.5 26 | 26.9 26 | 26.5 |
| Salinit, | 36.3 | 36.3 | 37.1 | 37.1 | 37.8 | 37.8 | 37.8 | 37.7 | 37.7 | 37.6 | 36.9 | 36.8 | 36.6 | 36.6 | 36.8 | 37.0 3 | 37.1 3 | 1. | 37.0 3 | 37.0 37 | 37.1 36.2 | .2 |
| NO3-NO2 | | | 0.3 | | | | | 0.3 | | | - | - | - | - | - | - | | 1.8 | - | ŀ | | 7.0 |
| In. PO4-P | | | 0.0 | | | | | 0.2 | | | | | 0.7 | | | - | | 0.3 | - | | 0 | 0.1 |
| Tot. PO4-P | | | 6.0 | | | | | 9.0 | | | | | | | | - | - | 9.0 | - | - | 0 | 4.0 |
| Carboh drate | | | 1.7 | | | | | 2.6 | | | | | 1.6 | | | - | | 1.6 | | | | |
| Protein | ľ | 1 | 0.1 | | | | | 0.0 | | | | | 0.0 | - | - | | | | | | 0 | 0.0 |
| | | | | | | | | | | | | | | | | | | | | | | |

Table 4..--Relative abundance of plankton with associated hydrographic data

J U N E 1956

| Time | н | | 1 | > | | 0 | | | | | | | | | | | | | | | |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|--------|--------|--------|--------|--------|-----------------------------------------|----------|--------|--------|--------|--------|--|
| 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 0850 | 1055 | 0060 | 1250 | 1033 | 1010 | 0560 | 0060 | 0840 | 0850 1 | 1005 1 | 1040 0 | 0 0060 | 0930 0 | 0930 0845 | +5 0910 | 0 0840 | 0 0845 | 5 0845 | 5 0830 | |
| 10101011 PARTS | _ | | | - | | _ | | _ | - | _ | _ | - | _ | - | - | | _ | _ | | | |
| BLULUGICAL DATA | | | | | | | | | | - | | | | - | | - | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | | | |
| Amphldinium spp. | | | | | | | | | | | | | | | | | | | | | |
| Cochlodinium spp. | | | | | | | | | | - | | | - | | | | | | | | |
| Gymnodinium breve | | | | | | | | | | | | | | - | - | | | 4 | | | |
| G. simplex | | | | | | | | | | - | | - | - | | - | | | | | | |
| G. splendens | | | | | | | | | | | | + | | + | | | | | + | | |
| G. spp. | + | + | | | | | | | + | + | + | + | + | | + + + + + + + + + + + + + + + + + + + + | | ‡ | + | ‡ | + | |
| Gyrodinium spirale | | | | | | | | | | | | | | | | | Н | | | | |
| G. spp. | + | | + | | | | + | + | + | + | + | + | - | | + | ‡ | ‡ | + | + | + | |
| Torodinium spp. | | | | + | | + | | | | | | | | _ | | | | | | _ | |
| Polykrikos spp. | | | | | | | | | | | | | _ | | | | | | | | |
| Nematodinium spp. | | | | | | | | | | | | | | | | | | | | | |
| Pouchetia spp. | | | | | | | | | | | | | | | | | | | | | |
| Oxyrrhis spp. | | | | | | | | | | | | | | | | _ | | _ | | | |
| Ceratium furca | | | | | | | | | + | | | | | _ | | | | | | | |
| C. fusus | | | | | | | | | + | | | | | | | | | _ | | | |
| C. tripos | | | | | | | | | | | | | | | | | | | | | |
| Conyaulax spp. | | | | | | - | | | | | | | | | | | | | | | |
| Peridiniopsis spp. | | | | | | _ | | | | | | | | | + | + | | | + | | |
| Peridinium depressum | | | | | | | | | | | | - | | - | | | | - | | | |
| P. digitale | | | | | | | | | | | - | | | | | | | - | - | | |
| P. divergens | | | | | | | ‡ | | | | | 4 | - | + | | | | - | + | | |
| P. spp. | | | | + | | | | | ‡ | | + | ‡ | + | + | + | + | | _ | | | |
| Dinophysis tripos | | | | | | | | | | | | - | - | | - | - | | _ | _ | | |
| D. spp. | | | | | | | | | | | | | - | | | | - | - | - | | |
| Exuviella spy. | | | | | | | | | | | | | - | | | + | + | - | - | | |
| Prorocentrum sp. | | | | + | | + | | + | | - | | | 4 | | | - | | - | | | |
| Silicoflamellidae | | | | | | | | | | - | | | | | | - | - | - | | | |
| Euglena spp. | | | | | | | | | | | | + | + | - | + | + | + | - | - | 1 | |
| Peranema spp. | | | | | | | | | | 1 | | + | | - | - | 1 | | 1 | 1 | | |
| Melosira spp. | | | | | + | | # | 1 | + | | 1 | + | + | 1 | - | + | - | - | | | |
| Skeletonema spp. | | | | | | | | | - | - | - | + | 1 | + | - | - | | - | | | |
| Chaetoceros spp. | + | + | + | ‡ | ‡ | ‡ | | + | - | ‡ | ‡ | | + | + | + | ‡ | + | + | | ‡ | |
| Gulnardia spp. | + | | | | + | + | | | + | - | - | | _ | - | | | | | | | |
| Rhizosolenia spp. | | | | | | | | | | | | | | | | - | | _ | | | |
| Thalassiothrix spp. | | | | | | | | + | | | | | | | | - | | - | | | |
| Navicula spp. | | | | | | | | | 1 | | | | - | | | - | | - | - | _ | |
| Pleurosiema spp. | | | | | | | | | | | | | | | | \dashv | - | 4 | | | |
| Nitzschia spp. | + | | | | | | + | | | | ‡ | | + | _ | + | + | + | | | | |

Table 4, cont'd

| ا ا | Day 1 | 7 | 2 | | 7 | œ | 11 | 12 | | | 15 | 18 19 20 | 6 | | | | 26 | 27 | 28 | 29 | |
|------------------------|---------------------|--------|--------|------|------|-----------|------|--------|--------|--------|---------|----------|---------|-----------|--------|--------|------|------|------|------|--|
| L | Time 0850 1055 0900 | 0 105 | 5 0900 | 1250 | 1033 | 1010 0940 | | 0060 | 0840 C | 0850 | 1005 10 | 070 | 000 | | 0 0845 | | 0840 | 0845 | 0845 | 0830 | |
| | | | | | | | | | | _ | _ | - | _ | | | _ | _ | _ | _ | _ | |
| BIOLOGICAL DATA | | | | | | | | | | _ | | _ | | | | | | | | | |
| Unicellular plankton | - | | | | | | | - | - | | _ | | | | | | _ | | | | |
| Grammatophora spp. | | | | - | | | | - | - | - | - | \vdash | - | - | | - | - | L | | | |
| Unidentified | | - | - | | | | | | | | | | _ | | | _ | | | | | |
| hytoplankton | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | + | ‡ | ‡ | т | ‡ | ‡ | ‡ | _ | ‡ | | ‡ | ‡ | |
| Strombidium sp. | | | | | | | | | | | | | | | | | | | | | |
| Unidentified | | | | _ | | | | | | | | _ | | | | _ | _ | | | | |
| Halterildae | | | | | | | | | | | _ | _ | | | | | _ | | | | |
| Tintinnopsis spp. | | | | | | , | | | | | | | | | _ | L | | | | | |
| Unidentified | | | | | | | | | - | | | | | | | | _ | | | | |
| Tintinnidae | | | | | | | | _ | | | _ | _ | | | _ | _ | | _ | | | |
| Vorticella sun. | | | | | | | | | _ | | _ | - | | | | | | | | | |
| Cothurnia sp. | | | | | | | | | - | | | - | | | | | | | | | |
| Pleuronema sp. | | | | | | | - | | - | | - | - | | | | - | | | | | |
| Unidentified ciliates | t tes | + | + | | + | + | + | + | + | + | + | ++ | + | | | ‡ | + | ‡ | | + | |
| Multicellular plankton | on | | | | | | - | - | | - | | - | - | | - | | | | | | |
| Proales sp. | | - | | | | | | - | - | - | - | | - | | - | L | | | | | |
| Synchaeta sp. | | | | | | | | - | | - | - | L | | | | | | | | | |
| Unidentified Rotifera | ra | | | | | - | - | - | - | - | L | | | | | - | | | | | |
| Corepoda | | | | | | | | - | | - | × | × | | | | | | | | | |
| Ostracoda | | | | | | | | | | | | | | | | | | | | | |
| Chaetopoda | | | | | | | | - | | _ | _ | | | | | | | | | | |
| Coelenterata | | _ | | | | | | | | | | | | | | | | | | | |
| Nauplii | | × | | | | | | | | × | | | | | | | | | | | |
| Megalops and Zooea | | | | | | | | | - | | × | × | | | | | 1 | | | | |
| Veliger | | _ | | | | | | | | × | | | _ | | | | | | | | |
| Trochophore | | | | | | | | | | | | | _ | _ | | | | | | | |
| Echinoderm larvae | _ | | | | | | | | | | | | | | | | | | | | |
| Pisces larvae | | | | | | | | | | | | | | | | | | | | | |
| HYDROGRAPHIC DATA | | | | | ļ | | | | | 1 | - | | | _ | | | | | | | |
| Temperature, °C. | 27.8 | 8 28.5 | | - | L | 28.5 | 27.8 | 27.5 2 | 27.2 2 | 15 | ш | н | 28.8 29 | - | i | - | i . | 1 | | ł | |
| Salinity, % | 37.0 | 0 37.2 | 2 37.5 | 37.4 | 37.6 | 37.7 | 37.4 | | 37.6 3 | 37.6 3 | 37.6 37 | 37.5 37 | 37.5 37 | 37.7 37.7 | 7 37.0 | 37.3 | 38.2 | 38.0 | 38.2 | 38.0 | |
| NO3-NO2 | | | | | 7.0 | | | _ | | 1.5 | _ | _ | | 0. | ׆ | | | | 0.3 | | |
| In. P04-P | | | | | 9.0 | | | - | | 0.2 | | - | | 0.5 | 10 | - | | | 1.0 | | |
| Tot. PO4-P | | | | | 1.0 | | | - | | 1.1 | | | | 0.3 | 3 | | | | | | |
| Carbohydrate | | | | | 1.6 | | | | | 1.7 | | | | | 0 | | | | - | | |
| Protein | - | - | _ | | 0 | - | | - | - | 7 0 | | _ | | 0 | 2 | | | | 0.0 | _ | |

Table 5.--Relative abundance of plankton with associated hydrographic data

JULY 1956

| | < | CLCC | | | C C | | | | | | | 000 | 1 | | | | | | | | | |
|----------------------|------|------|---------------------|------|------|-----------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Ливе | 0160 | 0660 | Time 0910 0950 0830 | 0825 | 0820 | 0950 0925 | - 1 | 0060 | 0935 | 0915 | 0915 | 0830 | 0845 | 0915 | 0060 | 0830 | 0845 | 0840 | 0830 | 0930 | 0830 | |
| C DATA | | | | | | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | | | | |
| Amphidinium spp. | | | | | | | | | | | | | | | | | | T | | | | |
| Cochlodinium spp. | | | | | | | | | | | | _ | | | | | | | | | | |
| Gymnodinium breve | | | | | | | | | | | | | | | | | | | | | | |
| G. simplex | | | | | | | | | | | | | | | | | | - | | | | |
| G. splendens | | | | | | | | | | | + | | | | | | - | - | | | + | |
| | + | + | + | + | + | | + | ‡ | | + | + | + | + | + | + | + | + | | + | + | + | |
| Gyrodinium spirale | | | | | | | | - | | | | | | | | | | | | | | |
| G. spp. | | | + | | + | + | ÷ | | + | + | | + | + | + | + | | + | | + | | | |
| Torodinium spp. | | | | + | | + | | | | | | | | | | | | - | | | | |
| Polykrikos spp. | | | | | | | | - | | | | + | | | | | | | | | | |
| Nematodinium spp. | | | | | | | | | | | | | | | | | | | | | | |
| Pouchetia spp. | | | | | | | | | | | | | | | | | | | | | | |
| Oxyrrhis spp. | | | | | | | - | - | | | | | | | | | | | | | | |
| Ceratium furca | | | | | | | | - | | | | | | | | | | | | | | |
| C. fusus | | | | | | | | | | | | | | | | | | | T | | T | |
| C. tripos | | | | | | | | | | | | | | | | | | | | | | |
| Gonyaulax spp. | | | | | | | | | | | | | | | | | | | | | | |
| Peridiniopsis spp. | | | | | | | | | | | | | | + | | | | | | | | |
| Peridinium depressum | | | | | | | | | | | | | | | | | | | | | | |
| P. digitale | | | | | | | | | | | | | | | | | | | | | | |
| P. divergens | | | | | | | | | | | | | | | | | | | | | | |
| | + | + | + | | + | | + | | | | + | | + | + | | | | + | | + | + | |
| Dinophysis tripos | | | | | | | | | - | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Exuviella spp. | | | | | | | | | | | | | | | | | | | - | | | |
| Prorocentrum sp. | | + | | | | | | | | | + | | | | | | | | | | + | |
| Silicoflagellidae | | | | | | | | | | | | | | | | | | | | | | |
| Euglena spp. | | | | | | | | | | | | | | | | | | | | | | |
| Peranema spp. | | | | | | | | | | | | | | | | | | | | | | |
| Melosira spp. | + | | | | + : | | | | | | | + | | | | | + | + | | + | + | |
| Skeletonema spp. | | | | | | | | | | | | | | | | | | | | | | |
| Chaetoceros spp. | | | + | + | + | | + | + | +. | | + | + | + | + | + | + | + | + | + | + | + | |
| Guinardia spp. | | | | + | | | | | | | | | | | | | | | | | | |
| Rhizosolenia spp. | | | | | + | + | | | | + | | | | | | | | | | | | |
| Thelassiothrix spp. | | | | | | + | | | | | | | | | | | | | + | | | |
| Navicula spp. | | | | | | + | | | | | | | | | | | | | | | | |
| Pleurosigma spp. | | | | | | | | | | | | | | | | | | | | | | |
| Nitzschia spp. | | | + | + | | + | | | + | | | | | | | | | | | | | |
| Oromna Pophora | | | | | | | | | | | | | | | | | | - | | | | |

30.2 30.0 38.1 37.9 ‡ + + 30.0 ‡ 30.0 30.0 38.4 38.1 0.0 0.3 ‡ + ‡ 24 0830 + 38.2 ‡ 30.5 23 ‡ 31.0 20 ‡ 0.0 0.0 19 0845 ‡ 30.4 18 ‡ 17 38.0 ‡ 30.0 16 ‡ 30.1 ‡ 0.3 0.3 ‡ 28.8 29.7 37.8 37.8 ‡ 10 ‡ 9 28.9 29.4 28.5 28.0 29.5 38.0 38.0 37.8 37.7 37.7 ‡ 6 0825 ‡ 0.2 0.6 3 5 0950 0830 ‡ ‡ × 0910 ‡ × Day Tintinuidae
Vorticella spb.
Cothuria sp.
Pleuronema sp.
Unidentified ciliates
Multicellular plankton Synchaeta sp.
Unidentified Rotifera
Colepcoa
Ostracoa
Chaetopoa
Colenterata
Nauplii
Metalops and Zooea BIOLOGICAL DATA
Unicellular plankton
Unidentified
thytoplankton
Strombidium sp. Trochorhore Echinoderm larvae Pisces larvae Tem erature, °C. Salinity NO -NO₂ In. PO₄-P Tintinnonsis srr Unidentified HYDROGRAPHIC DATA Halteriidae Carbohydrate Proales sm. Tot. PO4-P

Table 5. cont'd

Table 6,--Relative abundance of plankton with associated hydrographic data

AUGUST 1956

| 3.1 | 000 | | | | | | | | + | | | | | | | | + | | | | | | | - | | | | | | | | + | | | | ‡ | | | | + | |
|-----|---------------------|-----------------|----------------------|-----------------|-------------------|-------------------|------------|--------------|---------|--------------------|---------|-----------------|-----------------|-------------------|----------------|---------------|----------------|----------|-----------|----------------|--------------------|----------------------|-------------|--------------|---------|-------------------|-----------|----------------|------------------|-------------------|--------------|---------------|---------------|------------------|------------------|----------------|-------------------|---------------------|---------------|------------------|----------------|
| | | | | + | + | + | + | + - | + | + | + | | + | | + | + | + | + | 1 | + | + | t | 1 | | + | + | + | + | | 1 | 1 | + | | + | | | + | | + | - | |
| | | | + | + | 1 | 1 | + | + | + | + | + | 1 | + | + | + | + | + | + | + | + | + | 1 | + | + | + | + | \dagger | \dagger | † | + | + | | + | ‡ | | + | - | + | + | | |
| ١. | 0 0530 | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - | + | + | + | \dagger | + | + | + | | | | + | + | + | + | + | ‡ | |
| | 0845 0 | | | - | + | + | + | + | + | | + | 1 | + | + | + | + | + | + | + | + | + | + | - | | + | + | + | + | + | + | + | | + | | - | + | + | + | + | ‡ | |
| 24 |) H | | + | | + | + | + | + | + | 1 | + | + | + | + | + | 1 | + | + | + | + | + | + | + | 1 | + | + | + | 1 | + | + | + | + | + | + | - | + | + | \dagger | t | + | - |
| 23 | I ⊦ | | | - | + | + | | + | + | + | + | + | + | + | + | + | + | 1 | 1 | + | 1 | + | + | - | + | + | | + | + | + | + | + | | + | + | + | \dagger | + | + | + | |
| 22 | I ∔ | | | | + | + | | + | 1 | - | + | + | + | + | + | + | + | - | + | - | + | + | 1 | + | + | + | + | + | + | 1 | + | + | + | | | + | + | | + | + | + |
| | 0 0060 | | | - | | 1 | | 1 | + | - | + | + | + | + | + | 1 | 1 | + | 1 | 1 | | + | 1 | 1. | + | 1 | + | + | + | + | + | - | - | + | + | + | + | + | + | + | |
| 20 | 1 1 | | | | + | + | | | + | + | | - | + | + | + | 1 | + | 1 | | | 1 | + | + | 1 | + | + | + | + | + | + | + | + | + | + | - | + | + | + | + | 1 | 1 |
| 17 | 0830 0 | | | | | | - | + | + | + | + | 1 | + | + | 1 | 1 | | | | - | 1 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 16 | | | | | 1 | 1 | | | + | + | | | | + | + | 1 | | | | 1 | + | + | + | 1 | + | + | + | + | 1 | 1 | + | + | + | - | + | + | + | + | + | + | + |
| 15 | | | | | 1 | 1 | 1 | - | + | + | 1 | | + | | 1 | 1 | | 1 | | | - | + | + | + | 1 | | + | 1 | + | + | + | + | + | - | , | + | + | + | + | + | |
| 14 | | | | | | 1 | 1 | 1 | ‡ | 1 | + | | 1 | 1 | | 1 | | | 1 | | - | 1 | 1 | 1 | + | + | + | + | 1 | + | 1 | + | - | + | + | + | + | + | + | + | + |
| 13 | ارا | | | | | - | | - | ‡ | | + | - | | | 1 | - | + | | | | 1 | 1 | 1 | 1 | + | + | 1 | + | 1 | + | + | - | + | | + | † | + | + | + | + | 1 |
| 10 | | | | | | - | | | ‡ | | + | | | 1 | - | - | _ | | | | + | | 1 | 1 | + | + | - | + | + | + | + | + | + | + | + | + | | + | + | + | + |
| 6 | 45 | | _ | | | | | | ‡ | | + | - | - | 1 | + | | | | | | + | - | 1 | 1 | + | + | + | + | + | + | | 1 | + | + | + | + | + | + | | - | + |
| 000 | 45 | | | | | | | | + | | + | | - | - | - | | | | | | | | | 1 | + | 1 | 1 | | 1 | 1 | + | + | + | + | + | + | + | + | 1 | 1 | + |
| 7 | 0830 | | | - | | _ | | | + | | + | | | - | - | | | | | | + | | 1 | | + | 1 | | | 1 | 1 | + | + | + | + | + | + | 1 | 1 | + | + | + |
| 9 | 0945 0 | | | | | | | | + | | + | | | | | | | | | | | | | + | + | | + | | | | 1 | 1 | + | 1 | + | + | | + | + | + | + |
| ~ | | | | | | | | | + | | + | | | | | | | | | | | | | | + | - | | 1 | | | - | + | + | - | + | 1 | | 1 | 1 | + | + |
| 6 | 0480 | | | - | | _ | _ | + | + | | + | | | | | | | | | | + | | | | + | 1 | - | + | | 1 | | 1 | 1 | - | + | | | | | + | 1 |
| - | 0830 | | | | | | | | + | - | | | | | | | - | | - | | + | | | | + | 1 | | | | - | | | + | 1 | + | | | | | + | + |
| Jav | Time 0830 0849 0820 | | 51 | - | | | | | | | | | | | | | | | | | | um | | | | | | | | | | | | + | + | | | | | + | + |
| | -1 - | | Unicellular plankton | SPP | spp. | breve | | | | pirale | | ob. | op. | spp. | ٥. | | s c | | | 0. | s spp. | Peridinium depressum | | | | ripos | | р. | sp. | lidae | | | | spp. | spp. | ъ. | spp. | Thallasiothrix spp. | | spp. | Ď. |
| | | BIOLOGICAL DATA | lar p | Amphidinium spp | Cochlodinium spp. | Gymnodinium breve | olex | sudens | | Gyrodinium spirale | | Torodinium spp. | Polykrikos spp. | Nematodinium spp. | Pouchetia spp. | Oxyrrhis spp. | Ceratium furca | 18 | SOG | Gonyaulax spp. | Peridiniopsis spp. | nium de | itale | P. divergens | | Dinophysis tripos | | Exuviella spp. | Prorocentrum sp. | Silicoflagellidae | a spp. | Peranema spp. | Melosira spp. | Skeletonema spp. | Chaetoceros spp. | Guinardis spp. | Rhizosolenia spp. | siothr | Navicula spp. | Pleurosigma spp. | Nitzschla spp. |
| | | LOGICA | ricellu | Lmph1d1 | chloc | : ymnodi | G. simplex | G. splendens | G. spp. | yrodir | G. spp. | Torodir | Polykri | Vemato | Pouchet | Oxyrrh | Geratit | C. fusus | C. tripos | Sonyau | Peridir | Peridir | P. digitale | P. dive | P. spp. | Dinophy | D. spp. | Exuvie | Proroce | Silico | Euglena spp. | Perane | Melosi | Skelet | Chaeto | Guinar | Rhizos | Thalla | Navicu | Pleuro | Nitzsc |
| - | | BIO | in in | | 0 | 0 | 100 | 9 | 10 | 100 | 100 | L | 1 | Z | 1 | 0 | 10 | 10 | 10 | 100 | 1 | | 1 | 114 | 124 | T | 12 | 12.7 | 134 | 03 | 44 | | - | 1 | | ٦ | -1 | -1 | ~ | - | |

Table 6. cont'd

| 30 | Day 1 | | 2 | | 9 | - 1 | | 6 | i | 13 | 14 1 | 15 | 16 1 | | 20 | 21 | 22 | 23 | 24 | 27 | | 29 | | 31 |
|------------------------|-------|-----------|---------------------|--------|--------|--------|--------|---------|---------|---------|--------|--------|--------|--------|--------|--------|----------|---------|--------|-------|----------|-----|----------|------|
| Ti | me 08 | 830 0 | Time 0830 0840 0820 | - + | | 0830 | 0845 0 | 1845 0 | 0830 0 | 0915 0 | 0840 0 | 0930 0 | 0845 0 | 0830 0 | | | 1 8 | | | 845 0 | 0840 05 | 1 1 | 0855 1 | 1000 |
| | | | | | | | | | | | | | | | _ | | | | | L | _ | _ | _ | |
| SIOLOGICAL DATA | | | | | | | | | | V | 1 | | | | | | | | | | | | | |
| Unicellular plankton | | | | | - | - | | | - | - | - | | | | | | | | | | | | | |
| Grammato, hora s | | - | | - | - | - | - | - | | - | | - | - | - | - | - | | | - | + | + | - | + | |
| Unidentified | | | | | - | | - | | | f | | | | | | - | | | | - | - | | - | |
| phytorlankton | 7 | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | _ ‡ | ‡ | <u>+</u> | <u></u> | _ ‡ | | + | + | <u></u> | ‡ |
| Strombidium sn. | | | | | | | | | | | | | | | - | | - | | | | - | | | |
| Unidentified | | | | | | | | | | | | | | - | | | - | | | - | - | | | |
| Malteriidae | | | | | | | | | | | | 1 | | | | | | | | | | | _ | + |
| Tintinno sis sul. | 7 | + | + | | | | + | | - | | + | - | | | + | + | | + | + | - | | - | + | |
| Unidentified | | | | | - | | | | | | | | | | | | - | | - | _ | | - | - | |
| Tintinnidae | | | | | | - | | | | | | | | | | | | | | | | | | |
| Vorticella spu. | + | i | + | | + | | | | - | + | + | | | - | + | | | + | | | + | - | - | |
| Cothurnia sp. | | | | | | | | | | | | | | | - | | | | - | | | - | - | |
| Pleuronema si. | | | | | | 100 | | | | | | | | | - | | | | - | | | | - | |
| Unidentified ciliates | + | ì | + | + | + | + | | | + | | | + | + | + | + | + | | + | + | + | + | + | - | |
| Multicellular plankton | u | | | | | 1 | - | | - | | | | | | - | | | | | | | - | | |
| Proales sp. | | | | - | - | - | - | | | - | | | | | - | | | | | - | - | + | | |
| S'nchaeta sr. | | - | - | | | | | | - | 1 | - | - | | 1 | | | | | + | | | + | | > |
| Unidentified Rotifera | × | - | | | | 1 | - | - | - | - | 1 | - | | 1 | - | | | × | × | | | × | t | |
| Согевода | - | | × | | - | - | - | - | - | | - | , | - | 1 | - | | | | | | | 1 | - | |
| Ostracoda | - | - | | | - | - | 1 | - | - | - | - | | | - | | | | - | - | | - | 1 | - | |
| Chaeto oda | - | | - | | | | - | | - | - | | | | | | | | | t | | - | + | | |
| Coelenterata | | - | | - | - | | | | | | | | | | - | | | | - | - | + | - | + | |
| Nauplii | - | | | | × | ×× | - | | - | | | | | | - | | | - | | + | - | - | - | |
| Me alons and Zooea | | | × | × | H | ×× | - | | × | | - | | | - | > | | | , | | - | - | + | + | |
| Veli er | | | H | | - | | - | | - | - | - | 1 | 1 | - | - | | - | | H | - | - | - | H | |
| Trochodhore | | | | | | | | - | - | - | | | | | - | | | - | | | | | | |
| Echinoderm larvae | | | | | | - | | | | | | | | | | | - | | × | | | | _ | |
| Pisces larvae | | | | | | × | | | | | | | | | | | | | | | | | | |
| HYDROGRAPHIC DATA | | | H | | | | | | | | i | | | | | | | | | | | | | |
| Tem erature °C. | 30 | 30.0 | 31.0 30 | 30.1 3 | 31.9 3 | 31.2 3 | 31.0 3 | - | _ | _ | 31.0 3 | | - | 2- | - | | | 29.0 31 | 1.2 30 | 5 | 30.7 30. | 7 | 31.7 31. | 9.1 |
| 00 | 37 | 37.9 38.1 | | | 2 | ш | - | 38.1 38 | 38.2 38 | 38.2 30 | - | 38.3 3 | 38.0 3 | 38.0 3 | 0 | 38.2 3 | 38.2 3 | | 9 | 8 | 6 | 2 | 38,1 37, | 3' |
| NO3-NO2 | | - | | | | | | No. | - | | | - | | | | | _ | | | | <u> </u> | - | 6.0 | |
| In. PO4-P | | | 0.3 | | | | | - | - | - | - | - | | - | | | - | 0.7 | | - | - | 0 | . 2 | i |
| Tot. PO4-P | - | | 1.0 | - | | | | - | 1 | - | | - | 0.0 | | - | - | - | 6 | | | - | | | |
| Carboh drate | - | | 17.1 | - | 1 | | 1 | 1.0 | - | 1 | - | 1 | 1.0 | | - | - | - | 6.0 | - | + | | | 1.5 | |
| Protein | - | | 2.0 | - | - | - | - | 0.3 | - | - | | | 0.3 | - | - | - | | 0.3 | | - | - | | 0.1 | 1 |
| | - | 1 | | | - | | | | | | | | 2 | | | | | | - | - | | | | - |

Table 7. -- Relative abundance of plankton with associated hydrographic data

SEPTEMBER 1956

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26.4 26 27 28 0830 0830 0830 ‡ ‡ 1.4 ‡ + 27.8 27.0 35.9 35.9 ‡ + 25 0830 ‡ + 27.5 28.0 36.4 36.4 24 0845 ‡ + 20 21 0845 0830 ‡ + + 27.8 36.7 0.4 0.1 0.1 0.4 ‡ + + 28.6 27.5 28.0 27.8 26.5 27.0 27.5 29.0 27.7 28.0 37.4 37.2 37.1 37.3 37.3 38.5 37.4 37.2 37.3 38.3 38.3 0.4 17 18 19 0900 0832 0835 ‡ ‡ ×× ‡ + ‡ ‡ × 14 ‡ 0.3 0.9 0.3 11 12 13 0855 0830 0830 ‡ + ‡ + + ‡ 7 10 0842 0830 + + ‡ 0.6 0.3 6 0855 ‡ 29.9 28.4 37.6 37.7 4 5 0920 0845 ‡ ‡ ‡ × ‡ ×× ‡ ‡ Day Time Cothurnia sp.
Pleuronema sp.
Unidentified ciliates
Multicellular plankton Synchaeta sp. Unidentified Rotifera BIOLOGICAL DATA Unicellular plankton Megalops and Zooea Trochophore Echinoderm larvae Pisces larvae Grammatophora spp. Unidentified Tintinnopsis spp. Temperature, °C.
Salinity, %
NO₃-NO₂
In. PO₄-P phytoplankton Strombidium sp. Unidentified Halteriidae HYDROGRAPHIC DATA Vorticella spp. Copepoda
Ostracoda
Chaetopoda
Coelenterata Tintinnidae Tot. PO4-P Carbohydrate Protein Proales sp. Nauplii

Table 7. cont'd

Table 8.--Relative abundance of plankton with associated hydrographic data

OCTOBER 1956

| Day | - | 2 | 3 | 47 | 5 | 00 | 6 | 10 | 11 | 12 | 15 | 16 | 17 | 18 | 19 | 22 | 23 | 24 | 25 | 26 | 29 | 31 | |
|----------------------|------|------|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|----|-----|----|----|------|----|------|---|
| Time | 0060 | 0820 | Time 0900 0820 0830 0825 | 0825 | 0825 | 0060 | 0830 | 0830 | 0830 | 0830 | 0060 | 0830 | 0830 | 1005 | 0830 | | l L | | | 0830 | | 1045 | |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | | | | | |
| Ammhidinium spp. | | | | | | | | | | | | | | | | | | 1 | | 1 | 1 | 1 | |
| Cochlodinium sup. | | | | 1 | | | | | | | | | 1 | | | | | | | 1 | | | |
| Cymnodinium breve | | | | | | | | | | | | | | | | | | 1 | 1 | + | 1 | 1 | |
| G. simplex | | | | | | | | | | | | | | | | | | | | 1 | | | |
| G. splendens | + | | + | | + | | | | | | | | | | | + | | | 1 | - | | | |
| G. SUD. | + | + | + | + | + | + | + | | + | + | + | + | + | + | | + | ‡ | + | + | + | + | + | |
| Gyrodinium spirale | | | | | | | | | | | | | | | | | | | | | | | |
| G. Spp. | | | + | | | + | | | + | | | | + | + | | | + | | 1 | | + | 1 | |
| Torodinium spp. | | | | | | | | | | | | | | | | | | | | | | | |
| Polykrikos spp. | | 1 | | | | | | | | | | | | | | | | | 1 | 1 | 1 | + | |
| Nematodinium spp. | | | | | | | | | | | | | | | | | | | | | | | |
| Pouchetia spr. | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Oxyrrhis spp. | | | | | | | | | | | | | | | | | | | | | | | |
| Ceratium furca | + | | | + | | | | | | + | | | + | + | | + | + | + | + | | | | |
| C. fusus | | | | | | | | | | | | | | | | | | | | | | | |
| C. tripos | | | | | | | | | - | | | | | | | | | | | | | | |
| Gonyaulax spp. | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Peridiniopsis spp. | | | + | + | | | | | | | | | | | | | | | | | | 1 | |
| Peridinium depressum | | | | | | | | | | | | | | | | | | | | | | | |
| P. digitale | | | | | | | | | | | | | | | | | | | | 1 | | | |
| P. divergens | | | | | | | | | | | | | | | | | | | | | | | |
| P. spp. | + | + | + | + | + | + | + | ‡ | | + | + | + | + | + | # | + | ‡ | + | + | + | + | + | |
| Dinophysis tripos | | | | + | | | | | | | | | | | | | 1 | | | 1 | 1 | 1 | |
| D. spp. | | | | | | | | | | | | | | | | | 1 | + | 1 | | 1 | 1 | |
| Exuviella spp. | | | + | | | | | | | | | | + | | | | - | | | - | 1 | - | |
| Prorocentrum sp. | + | + | | + | + | + | | | ‡ | + | | | 1 | | | | + | 1 | | + | + | + | |
| Silicoflagellidae | | | | | | | | | | | | | 1 | | | | | 1 | 1 | + | 1 | 1 | |
| Euglena spp. | | | | | | | | | | | 1 | | 1 | | | | 1 | 1 | 1 | 1 | | † | |
| Peranema spp. | | | | | | | | | | | | | | 1 | | 1 | | 1 | 1 | † | | - | |
| Melosira spp. | + | + | | + | + | | + | | | | | 1 | | + | | | 1 | | 1 | 1 | 1 | + | |
| Skeletonema spp. | | | | | | | | | | | | + | | | | 1 | 1 | | † | 1 | + | 1 | |
| Chaetoceros spp. | + | | + | + | + | | + | | | + | | 1 | | | | 1 | + | | 1 | 1 | 1 | 1 | |
| Guinardia spp. | | | | | | | | | | | | | 1 | 1 | | | + | 1 | † | + | 1 | + | |
| Rhizosolenia spp. | | | | | | | | | | | | | | | | | | | 1 | + | 1 | 1 | |
| Thalassiothrix spp. | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | 1 | |
| Navicula spp. | | | | | | | + | | | | | 1 | 1 | | | | 1 | 1 | 1 | † | 1 | + | |
| Pleurosigma spp. | | | | | | | | | | 1 | 1 | | | 1 | | - | | 1 | + | 1 | | + | |
| Nitzschia spp. | | | | | | | | | | | + | | | | | - | 1 | 1 | 1 | 1 | 1 | - | 1 |

31 25.0 36.2 0.2 0.6 7.0 ‡ 29 ‡ + + + 26 ‡ 25 0830 0.8 0.3 0.7 ‡ + 24 ‡ × 23 25.0 24.8 26.0 35.6 35.7 35.4 ‡ 22 ‡ + + 19 ‡ ‡ 18001 0.5 1.3
 27.8
 27.0
 25.2
 23.5
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 24.8

 36.3
 36.6
 36.6
 36.0
 35.3
 34.5
 34.9
 1.0 ‡ + 17 ‡ 16 ‡ × 15 ‡ 12 ‡ 11 0.2 0.2 2.0 ‡ 10 ‡ ‡ × 9 27.8 ‡ × 0060 29.0 ‡ + ×× 5 0825 ‡ 1 2 3 4 0900 0820 0830 0825 28.0 0.0 0.5 # 27.2 28.0 36.5 36.7 ‡ + + ‡ + 27.5 ‡ Day Time Halteriidae
Tintinnopsis spp.
Undentified
Tintinnidae
Vorticella spp.
Cothurna sp.
Pleuronem sly.
Unidentified ciliates
Multicellular plankton Synchaeta sp.
Unidentified Rotifera
Copepoda
Ostracoda BIOLOGICAL DATA Unicellular plankton Megalops and Zooea Grammatophora spp. Unidentified phytoplankton Strombidium sp. Unidentified Temperature, °C. Salinity, ‰ NO3-NO2 HYDROGRAPHIC DATA Veliger Trochophore Echinoderm lary Pisces larvae Chaetopoda Coelenterata Proales su. Carbohydrate Tot. PO4-P In. PO4-P Nauplii

Table 8. cont'd

Table 9, -- Relative abundance of plankton with associated hydrographic data

NOVEMBER 1956

| Day | - | 1 2 5 6 | 5 | 9 | 7 | 8 | 6 | 1 | 14 | 15 | 16 | 19 | | 21 | 23 | 26 | - 1 | - 1 | 30 | |
|----------------------|------|---------|------|------|------|-----|---|------|------|------|------|--------|------|------|-----|-----|------|------|------|--|
| Time | 0840 | 0820 | 0060 | 0830 | 0830 | 1 1 | | 0825 | 0630 | 0160 | 0630 | 0845 (| 0060 | 0845 | ارا | ارا | 0840 | 0840 | 0825 | |
| 4840 1401001010 | | | | | _ | | | | | _ | _ | _ | _ | | | _ | _ | | _ | |
| BIULDGICAL DAIA | 1 | 1 | 1 | | i | - | | | | | - | | | | | | | | | |
| Unicellular plankton | | | J | | 1 | _ | | | | | | | | | | _ | | - | | |
| Amphidinium spp. | | | | | | | | | | | | | | | | | | | | |
| Cochlodinium spp. | | | | | | | | | | | | | | | | | - | - | | |
| Gymnodinium breve | | | | | | | | | | | | | | | | | | | | |
| G. simplex | | | | | - | | | | | | | | | | | | | - | | |
| G. splendens | | 7 | | | | | _ | | | | - | - | | | | | - | | | |
| G. SPB. | + | ‡ | + | ‡ | + | | + | L | | + | + | | + | | + | + | + | + | + | |
| Gyrodinium spirale | | | | | | | | | | | - | | | | | | | l | | |
| С. врр. | | | | | | + | + | | | + | - | | | + | | | - | | | |
| Torodinium spp. | + | | | | | | | L | | | | | | | - | _ | - | | | |
| Polykrikoa smp. | | | | | | | | L | | | - | - | | | - | - | | - | | |
| Nematodinium spp. | | | | | | | | | | | | - | | | - | - | - | | | |
| Pouchetia spp. | | | | | | | | | | | - | - | | | | | | - | | |
| Oxyrrhis spp. | | | | | | | | | | | - | | | | | | | - | | |
| Ceratium furca | | | | | | | | | | | | | | + | + | + | + | + | | |
| C. fusus | | | | | | | | | | | - | | | | | | | - | | |
| C. tripos | | | | | 1 | | ľ | | | | | - | | | - | | | - | | |
| Gonyaulax spp. | 1 | | | | | | | | | | | | | | - | | | | | |
| Peridiniopsis spp. | | | | | | | | | | | | - | - | | | | - | - | | |
| Peridinium depressum | | | | | | | | | | | | | | + | + | | - | - | | |
| P. diritale | | | | U | | | | | | | | | | | | | - | | | |
| P. divergens | | | | | | | | | | | | | | | | _ | | | | |
| P. spp. | + | + | + | + | | | | + | + | | - | | - | | + | + | | + | + | |
| Dinophysis tripos | | | | | | | | | | | | | | | | | | | | |
| D, spp, | | | | | | | | | | | | | | | | | | | | |
| Exuviella spp. | | | | | | | | | | | | | | | | | | + | | |
| Prorocentrum sp. | | | | | | | | | | | | | | | | | | | | |
| Silicoflacellidae | | | | | | | | | | | | | | | | | | | | |
| Euglena spp. | | | | | - | | | | | | | | | | | | | | | |
| Peranema spp. | | | | | - | | | | | | | _ | | | _ | | | | | |
| Melosira spp. | | | | | | | | | | | + | | | | | | + | | | |
| Skeletonema spp. | | | | | | | | | | | | | | | | _ | | _ | | |
| Chaetoceros spp. | | + | + | | J | | | - | | | | + | | | | _ | | | | |
| Guinardia 8pp. | | | | | | | | | | | | | | | | | | - | | |
| Rhizosolenia spp. | | | | | | | | | | | | | | | | | - | | | |
| Thalassiothrix spp. | | | | | | | | | | | | | - | | | | | | | |
| Navicula spp. | | + | | | | | | | | | | | | | | - | | | | |
| Pleurosigma spp. | | | | | | | | | | | | _ | | _ | _ | | | | | |
| Nitzschia spp. | | | | | + | | | | | | + | | | | | | | - | | |
| | | | | | | | | | | | | | | | | | | | | |

Table 9. cont'd

| Da | ty 1 | 2 | 5 | 9 | 7 | 00 | 6 | 13 | 14 | 15 | 16 | 19 | 20 | | 23 2 | | | | 30 |
|------------------------|-------|-----------|---------|--------------------------|--------|------|------|------|------|------|--------|--------|--------|---------|---------|---------|-----------|-----------|------|
| Th | те 08 | 40 087 | 20 090 | Time 0840 0820 0900 0830 | 0830 | 0830 | 0840 | 0825 | 0830 | 0160 | 0930 0 | 0845 0 | 0 0060 | 0845 08 | 0825 09 | 80 0060 | 0840 0840 | | 0825 |
| STOLOCICAL DATA | | | | | | | | | | | | | | _ | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | - | | | H | |
| Grammatonhora ann | | - | | | | | | | - | | | - | - | | + | - | | + | |
| Unidentified | | - | | | | | | | | | | - | | | - | - | - | - | |
| phytoplankton | + | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | + | ‡ | ‡ | ‡ | ‡ | + + + | ‡ | ++ |
| Stombidium sp. | | | | | | | | | | | | | | | | | | | |
| Unidentified | | | | | | | | | | | | | | | | | | | |
| Halteriidae | + | | + | + | | + | | + | + | | | | | 1 | + | | + | | |
| Tintinnopsis spp. | + | + | + | + | + | | | + | + | | | | | + | _ | | | + | |
| Unidentified | - | | | | | | | | | | - | - | - | - | | | | _ | |
| Tintinnidae | _ | | | | | | | | | | | | | | _ | | | - | |
| Vorticella spp. | + | + | + | + | + | | | + | | | | | | + | _ | | + | + | |
| Cothurnia sp. | | | | | | | | | | | | | | | | | | | |
| Pleuronema sp. | | | | | | | | | | | | | | | | | | _ | |
| Unidentified ciliates | + 83 | + | + | | + | + | + | + | ‡ | + | + | + | + | | + | + | + | + | |
| Multicallular plankton | ri, | | | | | | | | | | | | | | | | | | |
| Proales sp. | | | | | | | | | | | | | | | | | | | |
| Synchaeta sp. | | | | | | | | | | | | | | | | | | | |
| Unidentified Rotlfera | x × | | | | | | | | | | | | | | | | | × | |
| Copepoda | - | | | | | | | | | × | | | | | | | | | |
| Ostracoda | | | | | | | | | | | | | | | | | | - | |
| Chaetopoda | | | | | | | | | | | | | | | | | | - | |
| Coelenterata | | | | | | | | | | | | | | | | | | - | |
| Nauplii | | | | | | × | | | | | | | | | | | × | | |
| Megalops and Zooea | × | × | × | | | | | | | × | | | | _ | × | × | × | × | |
| Veliger | | | | | | | | | | | | | | | - | | | 1 | |
| Trochophore | | | | | | | × | | | | | | | | 1 | | | + | |
| Echinoderm larvae | | | | | | | | | | | | | | × | - | | | - | |
| Places larvae | | | | | | | | | | | | | | | + | + | | + | |
| HYDROGRAPHIC DATA | | | | | | | | | | | | | | | - | | | | |
| Temperature °C. | 24 | 24.5 24.0 | .0 24.0 | 0 23.0 | 3 23.3 | 23.5 | 22.8 | 20.0 | 21.0 | 21.0 | 22.1 2 | 22.0 2 | 22.0 2 | 22.0 19 | 19.0 19 | 19.8 18 | 18.5 17 | 17.0 18 | 18.8 |
| | 36 | + | | - | +- | - | +- | _ | +- | 35.8 | 35.8 3 | 36.1 3 | 36.3 3 | 36.2 36 | 36.2 36 | 36,3 36 | 36.1 36 | 36.0 36 | 36.2 |
| NO3-NO2 | 0 | 0.2 | | | | 2.2 | | | | 4.4 | | | | | 8.0 | | | | |
| In. PO4-P | 0 | 9.0 | | | | 0.3 | | | | 0.2 | | | | | 1.7 | | | | |
| Tot. PO4-P | 0 | 9.0 | | | | 0.5 | | | | 0.5 | | | | | 1.7 | | | | |
| Carbohydrate | 0 | 0.4 | | | | 0.5 | | | | 1.6 | | | | | 2.4 | | | | |
| Protein | 0 | 0.2 | _ | _ | _ | 0.5 | | | | 9.0 | | | | | | | | - | |

Table 10 .-- Relative abundance of plankton with asacciated hydrographic data

DECEMBER 1956

| NA NA | | - 1 | - 1 | ٩ | , | 2 | 1 1 | 77 | - 1 | - 1 | - 1 | | | | | | - 1 | 31 |
|----------------------|------|------|------|------|------|------|------|------|------|------|--------|--------|------|------|--------|--------|--------|------|
| Time | 0915 | 0945 | 0915 | 0060 | 0855 | 0915 | 0845 | 0825 | 0840 | 0825 | 0855 (| 0925 0 | 0060 | 0955 | 0830 0 | 0830 0 | 0830 (| 0850 |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | _ | _ | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | |
| Amphidinium spp. | | | | | | | | | | | | | - | | | | | |
| Cochlodinium spp. | | | | | | | | | | | | | _ | | | | | |
| Gymnodinlum breve | | | | | | | | | | | | | _ | | | | | |
| G. simplex | | | | | | | | | | | | | | | | | | |
| G. splendens | | | | | | | | | | | | | _ | - | | | | |
| G. spp. | + | + | + | + | | + | + | + | + | + | + | - | + | + | ‡ | | + | ‡ |
| Gyrodinium spirale | | | | | | | | | | | | | - | | | | | |
| G. spp. | | | + | | + | | + | | | + | | | | | | + | | ‡ |
| Torodintum spp. | | | | | | | | | | | | | | - | | | - | |
| Polykrikos spp. | | | | | | | | | | | | | | - | | - | | |
| Nematodinium spp. | | | | | | | | | | | | | | - | | - | | |
| Pouchetia spp. | | | | | | | | | | - | | | | - | | | | |
| Oxyrrhis spp. | | | | | | | | | | | | | | | | | | |
| Ceratium furca | | + | + | | | | + | + | + | + | + | ‡ | | - | | - | | + |
| C. fusus | | | | | | | | | | | | | - | | | - | | |
| C. tripos | | | | | | | | | | | | | - | - | | - | | |
| Gonyaulax spp. | | | | | | | | | | - | | | | - | | | | |
| Peridiniopsis spp. | | | | | | | | | | | | | | | | | | |
| Peridinium depressum | | | | | | | | | | | | | | | | | | |
| P. digitale | | | | | | | | | | | | | | | _ | | | |
| P. divergens | | | | | | | | | | | | | | | | | | |
| P. spp. | + | + | | + | + | | + | + | + | + | + | ‡ | + | + | + | | + | # |
| Dinophysis tripos | | | | | | | | | | | | _ | | | | | | |
| D. spp. | | | | | | | | | | | | | | | | | | |
| Exuviella spp. | | | | | | | | | | + | | | + | + | | + | | + |
| Prorocentrum sp. | | | | | | | | | | | | | | | + | | | + |
| Silicoflagellidae | | | | | | | | | | | | | | _ | | | | |
| Euglena spp. | | | | | | | | | | | | | | | | | | |
| Peranema spp. | | | | | | | | | | | | _ | | _ | | | | |
| Melosira spp. | | | + | | | | | | | | - | _ | + | + | + | | | |
| Skeletonema spp. | | | | | | | | | | | - | | | | | | _ | |
| Chaetoceros spp. | | | | + | | | + | + | | | | | + | + | + | + | | + |
| Guinardia spp. | | | | | | | | | | | | | + | | | | | |
| Rhizosolenia spp. | | | + | + | | | | | | | | | | | | | | |
| Thalassiothrix spp. | | | | | | | | | | | | - | | | | | | |
| Navicula spp. | | | | | | | | | | | | _ | | | | | | |
| Pleurosigma spp. | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Table 10. cont'd

| Day | - 1 | - 1 | 2 3 | 9 | 7 | | - 1 | - 1 | | - 1 | - 1 | - 1 | - 1 | 20 | | | - 1 | |
|------------------------|---------|------|------|------|------|------|--------|--------|--------|--------|---------|---------|---------|---------|-----------|--------------|-----------|----|
| Time | 1e 0915 | 0945 | 0915 | 0060 | 0855 | 0915 | 0845 (| 0825 (| 0840 | 0825 0 | 0855 0 | 0925 0 | 0 0060 | - 1 | 0830 0830 | 130 0930 | 30 0850 | 50 |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | - | - | - | - | | | |
| Grammatophora spp. | | | | | | | | | - | | - | + | - | + | \mid | - | H | |
| Unidentified | : | : | : | = | : | : | : | : | - | - | - | ├ | - | ⊬ | \vdash | ╀ | - | |
| phytoplankton | + | ‡ | ŧ | ţ | ŧ | ‡ | ‡ | ‡ | + | + | ‡ | ‡ | ‡ | ‡ | † ‡ | ‡ + ‡ | ‡ | |
| Strombidium sp. | | | | | | | | | | | | | | _ | | | _ | |
| Unidentified | + | | | | | + | + | | | | | | | | | | | |
| Marcel Luae | - | | | | T | | | 1 | | | + | + | + | + | + | + | + | |
| Unidentified | + | + | | | | + | + | + | + | + | + | + | + | + | + | + | + | |
| Tintinnidae | | | | | | | | | | | _ | | _ | | | _ | | _ |
| Vorticella spp. | - | | | + | + | + | + | + | + | + | - | + | + | + | + | + | + | |
| Cothurnia sp. | | | | | | | | | | | | H | + | + | 1 | + | H | |
| Pleuronema sp. | | | | | | | r | | | t | \mid | - | - | - | + | - | - | |
| Unidentified ciliates | + | + | ‡ | ‡ | ‡ | + | + | + | + | + | + | + | + | + | + | + | ‡ | |
| Multicellular plankton | | | | | | | - | | - | | - | - | - | | L | | - | |
| Proales sp. | | | | | | | - | | - | | - | H | | - | - | - | \vdash | |
| Synchaeta sp. | | | | | | | | | - | | - | - | - | | _ | - | | |
| Unidentified Rotifera | × | × | | | | × | × | × | - | | | - | _ | × | - | × | _ | |
| Copepoda | × | | | | | | | | × | | | | × | _ | × | × | - | |
| Ostracoda | | | | | | | | | - | | _ | - | - | - | - | - | | |
| Chaetopoda | | | | | | | | | - | | - | - | | - | | - | L | |
| Coelenterata | | | | | | | | | | | _ | - | | _ | - | L | - | |
| Nauplii | | | | | × | | | | | | _ | × | | - | - | - | | |
| Megalops and Zooea | | | | × | | | | | | | | | | | _ | × | × | |
| Veliger | | | | | | | | | | | _ | L | | - | - | L | | |
| Trochophore | | | | | | | | | | | | - | | | | L | | |
| Echinoderm larvae | | | | | | | - | | - | - | - | L | _ | × | - | L | L | |
| Pisces larvae | × | | | | | | | | | | | | | | | | | |
| HYDROGRAPHIC DATA | | | | | | _ | | | | | | - | | _ | _ | | | |
| Temperature, °C. | 18.0 | 18.0 | 18.2 | 17.7 | 19.0 | 19.8 | 20.0 | 20.02 | 21.0 2 | 21.4 2 | 22.0 22 | 22.4 2 | 22.0 23 | 22.0 22 | 21.5 19 | 19.5 18 | 18.2 17.5 | 3 |
| linity, 20 | 36.0 | 36.0 | | m | 36.3 | 36.4 | 36.5 | - | - | 36.6 3 | 36.5 36 | 36.6 30 | • | 36.5 36 | 36.6 36 | 36.8 36.8 | | 7 |
| NO3-NO2 | | | | 0.4 | | | | | 1.3 | | | _ | | 1.2 | | - | 1.6 | |
| In. PO4-P | | | | 0.3 | | | | - | 2.6 | | | - | | 0.2 | - | 0 | 8.0 | |
| Tot. PO4-P | | | | 1.6 | | 1.9 | | - | | | | _ | | 0.7 | - | 0 | 6.0 | |
| Carbohydrate | | | | 0.9 | | | | | 9.0 | | | | Ŭ | 0.8 | | | 1.5 | |
| Protein | _ | | | 0.6 | | | | _ | 0.2 | | _ | _ | | 1.3 | _ | | 1.0 | |

Table 11. -- Relative abundance of plankton with associated hydrographic data

JANUARY 1957

| Day | 1 | 2 | 1 2 3 | 4 | 7 | 8 | 6 | 10 | 11 | 14 | 15 | 16 | 17 | 18 | 21 | 22 | | 24 | 1 | 28 | | | 31 |
|----------------------|------|------|-------|------|------|------|------|------|------|------|------|--------|------|------|------|----|------|----|--------|----|--------|--------|------|
| Time | 0855 | 1050 | 0835 | 0820 | 0400 | 0835 | 0835 | 0835 | 0845 | 0160 | 0855 | 0937 (| 0925 | 0835 | 0060 | | 0920 | | 0830 0 | | 0825 0 | 0825 0 | 0840 |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | _ | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | | ┞ | | | |
| Amphidinium spp. | | | | | | | | | | | H | | | | l | | t | | - | - | - | + | |
| Cochlodinium spp. | | | | | | | | | | | | | | | | _ | | | | - | | - | |
| Gymnodinium breve | + | | | | | | | | | | | | | | | | | | _ | | | _ | |
| G. simplex | | + | | | | | | + | | | | | | | | | | - | - | L | | H | |
| G. splendens | | | | | | | | | | | _ | | | | | | - | | | | | - | |
| G. spp. | + | | | + | + | + | + | ‡ | ‡ | + | + | | + | + | + | + | + | + | + | + | + | ‡ | + |
| Gyrodinium spirale | | | | | | | | | | | | | | | | | | | | | L | | |
| G. spp. | + | + | + | | | | + | | | | _ | | | | | | | ‡ | | | | _ | |
| Torodinium spp. | | | | | | | | | | | | | | | | | + | | | | | + | + |
| Polykrikos spp. | | | | | | | | | _ | | _ | | | - | | | | + | + | | + | - | + |
| Nematodinium spp. | | | | | | | | | | | | | | - | | - | | | - | | | - | |
| Pouchetla spp. | | | | | | | | | | | - | - | | | | - | | | _ | | | - | 1 |
| Oxyrrhis app. | | | | | | | | | | | | | | | | - | | | - | | | - | |
| Ceratium furca | + | + | | | | | | | | | + | | - | | | | - | + | + | | | | |
| C. fusus | | | | | | | | | | | | | | | - | - | | | - | | | - | |
| C, tripos | | | | | | | | | | | | | | | | - | | | | | | | |
| Gonyaulax spp. | | | | | | | | | | | | - | | | | - | | | - | | | | |
| Peridiniopsis spp. | | | + | | | | | | _ | | | | | | | | | | | | | | |
| Peridinium depressum | | | | | | | | | | | | | | - | | | | - | | | | | |
| P. digitale | | | | | | | | | | | | | | | | _ | | | _ | | | | |
| P. divergens | | | | | | | | Ī | | | | | | | | | | _ | | | | | |
| P. spp. | + | | | + | + | | | + | + | | | | + | + | + | + | + | + | + | + | + | | + |
| Olnophysis tripos | | | | | | | | _ | _ | | | | | | | | - | | | | _ | _ | |
| O. spp. | | | | | | | | | | | | | | | | | | | | | | _ | |
| Exuviella spp. | | | | | | | | | | | + | | | + | | | | | | + | | - | |
| Prorocentrum sp. | | | | | + | | | | | + | + | | | + | + | | | | - | _ | | | |
| Silicoflagellidae | | | | | + | + | | ‡ | + | + | ‡ | | + | + | + | | | ‡ | + | + | | | |
| Euglena spp. | | | | | | | | | | | | | | | | - | | | | - | | | |
| Peranema spp. | | | | | | | | | | | | | | | | | _ | | _ | | | | |
| Melosira spp. | + | + | + | + | + | | | | | | | | + | | | | + | | + | + | + | + | + |
| Skeletonema app. | | | | | | | | | | | | | | | | | | | | | | _ | |
| Chaetoceros spp. | + | + | + | | + | | | | + | + | _ | - | + | | | + | + | | | | | | + |
| Guinardia spp. | | | | | | | | | _ | | | | | | | | | | _ | | | + | |
| Rhizosolenia spp. | | | | | | | | | _ | | | | | | | _ | _ | | | | | | |
| Thalassiothrix spp. | | | | | | | | | | | | | | | | | _ | | _ | | | _ | |
| Navicula spp. | | | | | | | + | | | | | | | | _ | _ | | | _ | | | _ | |
| Pleurosigma spp. | | | | | | | | | | Ī | | | | | | | | | | | | | |
| Nitzschia spp. | + | + | + | | | | + | | | | | | | | - | | + | | | | | | |
| | | | | | | | | | - | | | | | | | | | | | | - | | |

Table 11. cont'd

| nah | - 1 | - 1 | - 1 | 4 | - 1 | - 1 | - 1 | 2 | | 14 | 15 | - 1 | | | | 22 | 23 | 24 | 25 | 28 | 29 | 30 | 31 |
|------------------------|---------|------|------|------|------|------|------|------|------|------|------|----------|-------------------|----------|------|-----------|-----------|-----------|--------|---------|-----------|-----------|------|
| Time | me 0855 | 1050 | 0835 | - 1- | 0940 | 0835 | 0835 | 0835 | 0845 | 0910 | 0855 | 0937 | 0925 | 0835 | 0060 | 0940 0920 | 0550 | 0960 | 0830 0 | 0830 0 | 0825 0 | l | 0840 |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | l | ľ | | l | | - | \dagger | 1 | |
| Grammatophora spp. | | | | | | L | | | | | | 1 | 1 | T | T | + | \dagger | † | + | + | + | + | 1 |
| Unidentified | - | - | = | | : | : | : | | | | | | | | | t | | + | - | - | + | + | |
| Strombiding of | F | + | ‡ | ‡ - | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | | 1 | ‡ | ‡ | ‡ | ‡ | + | | + | + | + | ‡ | ‡ |
| Seromoidium sp. | + | - | | ۲ | | | | | | | | | | | | _ | | | | _ | _ | _ | |
| Unidentified | + | | | _ | | | | | - | | : | | | | | | - | | | - | | - | |
| naiterildae | + | | | | | | | | + | + | ‡ | | + | + | + | | | | | _ | | | |
| Tintinnopsis spp. | + | | | + | + | + | | + | + | + | | | + | + | + | + | + | | ‡ | + | + | - | |
| Unidentifled | | _ | | | | | | | | | | | | | | | | + | ╀ | + | + | + | |
| Tintinnidae | _ | _ | + | | | | | | | | ‡ | | _ | | | | | _ | _ | | | _ | |
| Vorticella spp. | + | | + | | + | | + | + | + | + | + | | + | + | + | + | + | + | + | - | | - | |
| Cothurnia sp. | | | | | L | | | | | | | | | | + | + | + | - | + | + | \dagger | \dagger | |
| Pleuronema sp. | | | L | | | | | | | | | | | T | T | Ì | + | \dagger | t | + | - | + | |
| Unidentifled ciliates | + | + | | + | + | + | | + | + | + | + | | | + | + | + | | | - | | | - | - |
| Multicellular plankton | _ | | | | L | | | | | | | | T | | | + | + | - | + | + | + | \dagger | |
| Proales sp. | | | L | | | | | | | T | 1 | + | t | T | | + | + | + | + | + | + | \dagger | 1 |
| Synchaeta sp. | | | | L | | | | | | | T | | T | | | + | \dagger | + | + | + | + | + | |
| Unidentified Rotifera | × | | | | | | | | | | T | | 1 | × | | + | × | + | × | | + | + | |
| Copepoda | × | | | × | | L | | | | × | | T | T | × | × | | + | | + | | + | | |
| Ostracoda | | | | | | | | | | | | | - | | T | | + | H | + | + | + | + | |
| Chaetopoda | | | | | | | | | | | T | | | T | | | \dagger | + | + | + | 1 | + | |
| Coelenterata | | | | L | | | | | | | T | T | | † | T | | + | t | 1 | + | + | + | |
| Nauplii | | | × | × | | | | | | | | | | × | | t | + | - | × | × | | × | |
| Megalops and Zooea | × | | | × | × | | | | × | × | T | <u> </u> | t | × | × | × | × | + | t | + | - | + | |
| Veliger | | | | | | L | | | | | | r | | T | t | | + | + | + | × | | × | |
| Trochophore | | | | | | L | | | | | | | | r | r | - | - | + | - | + | | + | |
| Echinoderm larvae | | | | | | | | | | | | | | | T | + | - | t | + | + | + | + | |
| Pisces larvae | | | | | | | | | | | | | | | | | - | - | - | - | + | H | |
| HYDROGRAPHIC DATA | | | | | | | | | | | | | | | | | | | | | | | |
| Tem erature, °C. | 8.0 | - | | | | 19.5 | 19.0 | 19.5 | 20.0 | 20.0 | 19.0 | 21.0 | 22.0 | 17.5 | 18.0 | 19.0 | 19.5 | 20.0 1 | 19.5 2 | 21.0 21 | 21.4 19 | 19.5 21 | 21.9 |
| Salinity, L | 36.9 | 36.7 | 36.7 | 36.7 | 36.3 | 36.3 | 36.3 | 36.4 | 36.2 | 36.1 | 36.2 | 36.3 | 36,1 | + | 36.1 | 36.2 3 | 36.2 3 | +- | +- | | + | 1 | 36.9 |
| NO3-NO2 | | | 0.4 | | | | | 0.2 | | | | - | | | | | | 0.1 | - | - | | 0.5 0 | 0.3 |
| In. PO4-P | | | 1.0 | - | | | | 0.3 | | | | | 1.0 | | | | H | 0.1 | - | - | | 0.1 | 0.2 |
| Tot. POP | | | 1.0 | | | | | 0.5 | | | | | | <u> </u> | | t | | 0.7 | + | - | | + | 90 |
| Carbohydrate | | | 1.5 | | | | | 2.2 | | | | | 6.0 | | | t | + | 8.0 | - | - | | + | 9 |
| Protein | | | 9.0 | | | | | 1.0 | | | | - | 3.5 | - | | - | - | 0.3 | - | - | | ╁ | 0.5 |
| | | | | | | | | | | | | | The second second | | | | | | | | | 4 | |

Table 12:-Relative abundance of plankton with associated hydrographic data

FEBRUARY 1957

| 28 | 0845 | | | | Ī | | | | + | | | | | | | | | | | | | | | | + | | | | | | | | + | | + | | | | | |
|-----|----------------|-----------------|----------------------|------------------|-------------------|-------------------|------------|--------------|---------|--------------------|---------|-----------------|-----------------|-------------------|----------------|---------------|----------------|----------|-----------|----------------|--------------------|----------------------|-------------|--------------|---------|-------------------|---------|----------------|------------------|-------------------|--------------|---------------|---------------|------------------|------------------|----------------|-------------------|---------------------|---------------|------------------|
| 27 | 0825 | | | | | | | | + | | + | | + | | | | | | | | | | | | + | | | | | | 1 | | + | | | | | | | |
| 26 | 0825 | | | | | | | | + | | | | | | | | | | | | | | | | + | | | | | | | | + | | + | | | | | |
| 25 | 0160 | | | | | | | | + | | | | | | | | | | | | | | | | + | | | | | | | | + | | | | | | | |
| 21 | 0835 | | | | | | | + | +1 | | + | | + | | | | | | | | | | | | + | | | | | + | | | + | | + | | | | | |
| 20 | 0855 | | | | | | | + | + | | | | | | | | + | | | | | | | | | | | | | | | | + | | + | | | | | |
| 19 | 0835 | | | | + | | | | + | | + | + | | | | | | | | | | | | | | | | | + | | | | | | + | | + | | | |
| 18 | 0060 | | | | | + | | + | ‡ | | + | + | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 0830 | | | | | | | | + | | | | | | | | | | | | | | | | + | | | | | | | | | | | + | | | + | |
| 14 | 0835 | | | | | | | + | + | | + | | | | | | + | | | | | | | | + | | | | + | | | | | | | | | | | |
| 13 | 0820 | | | | | | | + | + | | + | | | | | | | | | | | | | | + | | | | + | + | | | + | | + | | | | | |
| 12 | 0160 | | | | | | | | + | | | | | | | | + | | | | | | | | | | | | | + | | | | | | | | | | |
| 11 | 1015 | | | | | + | | + | + | | + | | + | | | | | | | | | | | | + | | | | | + | | | + | | + | | | | | |
| ∞ | Ł I | | | | | | | | + | | + | | | | | | | | | | | | | | | | | | | | | | | | + | | | | | _ |
| 7 | 1010 | | | | | | | | + | | + | | + | | | | | | | | | | | | | | | | | | | | | | ‡ | | | | | |
| 9 | 0835 | | | | | | | | + | | | + | | | | | | | L | | | | | | + | | | | | | | + | + | | + | + | | | | _ |
| 2 | 0850 0925 0835 | | | | | | | | + | | _ | + | | | | | | | | | | | | | + | | | | | | | + | + | | + | | | | | |
| | | | . | | | | | | + | | + | | | | | | | | | | | | | | + | | | | | | | | + | | + | | | | | _ |
| -7 | Time 1015 | | | | | | | | + | | + | | | | | | | | | | | | | | + | | | | | | | + | + | | + | | | | | |
| Day | Time | Ą | lankton | spp. | a spp. | breve | | | | spirale | | 3pp. | 3pp. | a spp. | pp. | 5. | ca | | | pp. | is spp. | lepressum | | 5 | | ripos | | .dc | n sp. | llidae | | ٥. | ٥. | spp. | spp. | pp. | s spp. | cix spp. | ٥. | spp. |
| | | SIOLOGICAL DATA | Unicellular plankton | Amphidinium spp. | Cochlodinium spp. | Gymnodinium breve | G. simplex | G. splendens | G. spp. | Gyrodinium spirale | G. app. | Torodinium spp. | Polykrikos spp. | Nematodinium spp. | Pouchetia spp. | Oxyrrhis spp. | Ceratium furca | C. fusus | C. tripos | Gonyaulax spp. | Peridiniopsis spp. | Peridinium depressum | P. digitale | P. divergens | P. spp. | Dinophysis tripos | D. spp. | Exuviella spp. | Prorocentrum sp. | Silicoflagellidae | Euglena spp. | Peranema spp. | Melosira spp. | Skeletonema spp. | Chaetoceros spp. | Guinardia spp. | Rhizosolenia spp. | Thalassiothrix spp. | Navicula spp. | Pleurosigma spp. |

| 23.0 | 22.2 | 23.2 | 22.9 | 23.1 | 23.0 | 24.2 | 23.0 | 22.2 | 21.0 | 20.0 | 20.9 | 21.3 | 22.5 | 21.9 | 21.3 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 28 × 27 20 21 25 26 0855 0835 0910 0825 × × + + + + × + × + × 18 19 0900 0835 ‡ + ‡ + 15 × + 14 ‡ ×× 12 13 0910 0850 ‡ × + + + ‡ ‡ 11 1015 + 7 8 1010 0930 ‡ + ‡ 6 0835 ‡ + 5 0925 ‡ + + + Day 1 4 Time 1015 0850 ‡ ‡ Tintinnidae
Vorticella spp.
Cothurnia sp.
Pleuronema sp.
Unidentified ciliates Multicellular plankton
Proales sp.
Synchaeta sp.
Unidentified Rotifera Chaecopoda
Coelenterata
Navplil
Megalops and Zocea
Veliger
Tochophore
Echinoderm larvae
Fisces larvae BIOLOGICAL DATA Unicellular plankton Nitzschia spp.
Grammatophora spp.
Unidentified
phytoplankton
Strombidium sp.
Unidentified
Halteriidae HYDROGRAPHIC DATA Temperature, °C. Salinity, % Tintinnopsis spp. Unidentified Carbohydrate NO3-NO₂ In. PO₄-P Tot. PO₄-P Ostracoda Copepoda

Table 12. cont'd

Table 13, -- Relative abundance of plankton with associated hydrographic data

MARCH 1957

| /7 Q7 C 7 77 17 07 61 | 18 19 20 21 22 25 26 27 29 |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 0825 0910 0840 0950 0915 0900 0910 0840 0835 +++++++++++++++++++++++++++++++++++ | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0910 0840 0840 0840 0840 0840 0840 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0910 0840 0840 0840 0840 0840 0840 0840 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 010 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 |
| 0910 0840 0940 0910 0840 0840 0840 0840 0840 0840 0840 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0910 0840 0940 0915 0900 0910 0840 0840 0840 | 0910 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 |
| 0840 0940 0915 0900 0910 0840 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 1 + + + + + + + + + + + + + + + + + + |
| 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0840 0940 0915 0900 0910 0840 0840 1 + + + + + + + + + + + + + + + + + + |
| 0840 0940 0915 0900 0910 0840 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 1 + + + + + + + + + + + + + + + + + + |
| 0840 0940 0915 0900 0910 0840 0840 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 0840 0940 0915 0900 0910 0840 0840 1 + + + + + + + + + + + + + + + + + + |
| 0840 0940 0915 0900 0910 0840 0840 0840 0840 0840 0840 0840 08 | 0840 0940 0915 0900 0910 0840 0840 1 + + + + + + + + + + + + + + + + + + |
| 0840 0940 0915 0900 0910 0840 0840 1 + + + + + + + + + + + + + + + + + + | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 1 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0340 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0340 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0912 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0840 0940 0915 0900 0910 0840 0840 | 0840 0940 0915 0900 0910 0840 0840 |
| 0,00 0,00 0,00 0,000 0,000 0,000 0,000 | 0700 0700 0100 0000 3100 0700 0700 |
| | |

29 27 0840 + 25 26 0910 0840 + + × × ×× + 22 + 21 0915 ‡ ‡ 20 ‡ 19 ‡ 18 XX 15 ‡ × + + 14 ‡ × + 13 ‡ × + 12 + + + 11 0855 ‡ 8 × × + 7 + + 0840 × 5 0830 (‡ 0920 ‡ 0830 Tintinnidae
Vorticella spp.
Cothurnia sp.
Pleuronema sp.
Unidentified ciliates
Multicellular plankton Day Time Synchaeta sp.
Unidentified Rotifera
Copepoda
Ostracoda
Chaetopoda Unicellular plankton Grammatophora spp. Unidentified phytoplankton Strombidium sp. Unidentified Trochophore Echinoderm larvae Pisces larvae Megalops and Zooea Tintinnopsis spp. Unidentified BIOLOGICAL DATA Halteriidae Coelenterata Proales sp. Nauplii

20.9 21.5 21.5 21.5 21.5 21.6 18.8 19.5 20.2 20.8 21.3 22.5 22.8 24.0 23.8 22.9 24.8 23.5 20.9 22.0 35.7 35.8 35.8 35.8 35.8 35.0 35.1 34.9 35.0 35.0 35.0 35.4 34.8 34.8 34.8 34.8 35.0 35.0 35.8 34.4 34.6

1.0

Temperature, °C. Salinity, % NO3-NO2

Carbohydrate Protein

In. PO4-P Tot. PO4-P

HYDROGRAPHIC DATA

1.0

Table 13. cont'd

Table 14. -- Relative abundance of plankton with associated hydrographic data

A P R I L 1957

| 30 | | | | + | + | | | | + | | | | | | | | | | | | | | | | + | | | | + | | | | | | + | | | | | |
|-------------|----------|-----------------|----------------------|------------------|-------------------|-------------------|------------|--------------|---------|-------------------|---------|-----------------|-----------------|-------------------|----------------|---------------|----------------|----------|-----------|----------------|--------------------|----------------------|-------------|--------------|------------|-------------------|---------|----------------|------------------|-------------------|--------------|---------------|---------------|------------------|------------------|----------------|-------------------|---------------------|---------------|------------------|
| 29 | 2000 | 1 | | | + | | | | + | | + | | | | | | | | | | | | | | + | | | | + | | | | + | | + | | + | | | |
| 26 | | | | | | + | | | + | | + | | | | | | | | | | | | | | + | | | | | | | | | | + | | | | | |
| 25 | | | | | + | + | | | + | | + | | | | | | | | | | | | | | + | | | | + | | | | + | | + | | + | | | |
| 24 | | | | + | + | + | | | + | | + | | | | | | | | | + | + | | | | + | | | | + | + | | + | + | | | + | + | | | |
| 23 | | | | | | | | | + | | + | | | | | | | | | | | | | | + | | | | + | | | | + | | + | | + | | | |
| 22 | | | | | | | | | + | | + | | | _ | | | | | | | | | | | + | | | | | | | | + | | + | | + | | | |
| 19 | | | | | Ī | | | | + | | | | | | | | | | | | _ | | | | + | | | | Ì | + | | | + | | | | + | | | |
| 18 | Н | | | | | | _ | | + | | + | | | | | _ | _ | | - | | | | | | + | Ī | | | | | | | + | | + | | + | | | |
| 17 | H | | | | | | | | + | | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |
| 16 | F | | | | + | | | | + | | + | | | | | | | | | | | | | | + | | | | + | | | | + | | | | + | | | |
| 15 | Е | | | | | | | | + | | + | | | | | | | | | | | | | | + | | | | + | | | | + | | | | | | | |
| 12 | Ŧ | | | | + | | | | + | | + | | | | | | | | | | | | | | + | | | | | | | | + | | Ī | | + | | | |
| 11 | \vdash | | | | + | | | | + | | + | + | | | | | | | | | | | | | + | | | | | | | | + | | | | + | | | |
| 0820 | | | | | | | | | + | | | | | _ | | | | | | | | | | | + | | | | + | | | | + | | + | _ | + | | | _ |
| 9 | П | | | | Ī | | | | + | | + | | | | | | | | | | | | | | + | | | | | | | | + | | | + | + | | | _ |
| 8 | Ŀ | | ì | | | + | + | | + | | + | + | _ | | | | | _ | - | + | | | | | + | | | | + | + | | + | + | | + | + | + | | | |
| 5 0815 | r | | Ī | | | | | | + | | + | | | | _ | | | | | | | | | | + | | | | | | | | + | | | | | | | |
| | в | | | | | | | | + | | + | | | | | | | - | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 200 | | | | | | | | ‡ | i | ‡ | Ī | Ī | | | | - | | | | | | | | + | | | | | + | | | | ‡ | | | + | | | |
| Day 1 2 3 4 | 0.20 | | | | + | | | | + | | + | | | | | | + | - | | | + | - | | | + | | | | | | | | | | | | | | | |
| 1 000 | 727 | | H | - | + | | | | + | - | | i | | V | i | | + | | | + | + | - | | | + | | | | + | + | | | | | + | _ | | | + | + |
| ay | TIME | Ħ | | | | | | | | | | i | | | | | | | | | ŀ | 6 | | | | | _ | | | | | _ | | | | _ | _ | | | _ |
| alt | 4 | BIOLOGICAL DATA | Unicellular plankton | Amphidinium spp. | Cochlodinium spp. | Granodinium breve | G. simplex | G. splendens | G. spp. | Grodinium spirale | G. SUL. | Torodinium spp. | Polykrikos spp. | Nematodinium sup. | Pouchetia spp. | Oxyrrhis spp. | Ceratium furca | C. fusus | C. tripos | Gonyaulax spp. | Peridinionsis spp. | Peridinium derressum | P. di itale | P. divergens | P. 8 p. I. | Dinophysis tripos | D. spp. | Exuviella spp. | Prorocentrum sp. | Silicoflagellidae | Euglena spp. | Peranema app. | Melosira spp. | Skeletonema spp. | Chaetoceros spp. | Guinardia spp. | Rhizosolenia spp. | Thalassiothrix spp. | Navicula spp. | Pleurosigma spp. |

Table 14. cont'd

| Day | - 1 | - 1 | | 4 | - 1 | - 1 | H | - 1 | - 1 | | | 16 17 | | 3 19 | | | 25 | 26 | 59 | 30 | |
|----------------------------------|---------|------|------|------|------|------|----------|---------|---------|-----------|-----------|---------|-----------|---------|--------|------|------|------|------|------|------|
| Time | ne 0925 | 0825 | 0930 | 0910 | 0835 | 0855 | 1020 | 0820 08 | 0830 | 1320 08 | 0850 0835 | | 0830 0820 | 20 0835 | 5 0825 | 0830 | 0830 | 0835 | 0830 | 0160 | |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | Ī | | İ |
| Grammatophora spn. | | | | | | + | | + | | + | + | - | - | - | 1 | | | | T | Ì | † |
| Unidentified | ‡ | ‡ | ‡ | ‡ | + | ‡ | ‡ | + | + | + | ‡ | ‡ | ‡ | + | + | + | # | + | + | + | 1 |
| Strombidium sp. | | | | | | | ╁ | + | t | \dagger | + | ╀ | ╀ | ╀ | | | | | 1 | 1 | |
| Unidentified | | | | | | | | | | | | | | | | | | | | | |
| Halterildae | + | | + | | | + | | | + | | | + | | | | | + | | _ | | |
| Tintinnopsis spp. | + | + | | | + | + | + | + | - | - | + | + | + | + | + | + | | + | + | + | + |
| Unidentified | | | | | | | | | | - | | | | | | | | | | | T |
| Tintinnidae | | | | | | | | | | | _ | _ | _ | | | | | | | | _ |
| Vorticella spp. | + | + | + | | + | + | | + | + | + | + | + | | + | + | + | + | + | | + | + |
| Cothurnia sp. | | | | | | | - | | - | | | | | | | | | | | T | |
| Pleuronema sp. | | | | | | | | - | - | | | | | | | | | | | | T |
| Unidentified ciliates | + | + | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Multicellular plankton | - | | | | | - | | | | - | L | | | | | | | | | | T |
| Proales sp. | | | | | | | | | | | | - | | - | | | | | T | T | T |
| S'nchaeta sp. | | | | | | | | | | - | | | | - | | | | | T | r | |
| Unidentified Rotifera | | × | | | × | × | × | × | × | × | × | × | × | × | × | × | × | * | , | , | > |
| Copenoda | | × | | | × | | | | - | | | H | × | | × | | × | | × | × | + |
| Ostracoda | | | | | | | | | - | - | | | | | | | | | | | |
| Chaetopoda | | | | | | | | - | | | × | | | - | | × | | | × | × | T |
| Coelenterata | | | | | | | | | - | - | | | | | | | | | İ | | |
| Nauplii | | | | × | | | | | | | | | - | | | | | | T | | |
| Megalops and Zooea | × | × | | | × | × | | | _ | × | ~ | × | | _ | × | × | × | | | | |
| Veliger | | | | | | × | | | | | | | | | | | × | | | | |
| Trochophore | | | | | | | | | | | | | | | | | | | - | | |
| Echinoderm larvae | | | | | | - | | | | _ | | | | | | | | | | | |
| Piaces larvae | | | | | | + | | | | | | | | | | | | | | | |
| HYDROGRAPHIC DATA | | | | | | _ | - | | | | | | | | | | | | | | |
| Temperature, °C. | 21.0 | 11 | 23.5 | 23.4 | S | 25.5 | 26.4 25. | 9 | 26.0 27 | 9. | 25.0 24.4 | .4 24.0 | .0 24.4 | 4 24.5 | 5 24.5 | 24.3 | 25.0 | 25.5 | 25.2 | 25.1 | 25.0 |
| Salinity, % | 34.6 | 34.6 | 35,2 | 35.1 | 35.3 | L_ | 35.0 35. | 2 | - | 0 | - | ⊢ | - | _ | - | _ | ـــ | _ | - | | |
| NO ₃ -NO ₂ | | | | 1.5 | | | _ | | 9.0 | | | - | H | _ | | 0.9 | | 1.0 | | | _ |
| In. PO4-P | | | | 0.3 | | | | 0 | 4.0 | 0 | 0.5 | | 0.2 | 2 | | 0.4 | | 0.1 | | | |
| Tot. PO4-P | | | | 1.2 | | | | 0 | 0.5 | - | 1.0 | | 9.0 | 9 | | 0.4 | | 9.0 | | | |
| Carbohydrate | | | | 0.5 | | - | | | 1.5 | 0 | 0.2 | | 0.2 | 2 | | 0.3 | | 0.2 | | | |
| rotein | | | | 0.7 | | | | 3 | 0.7 | 0 | 0.5 | | 0. | 3 | | 0.5 | | 0.5 | | | |
| | | | | | | | | | | | | | | | | | | | | | |

Table 15.--Relative abundance of plankton with associated hydrographic data

M A Y 1957

| nay | 4 | 7 | - 1 | ٥ | - | 0 | 1 | 2 | 1 | 4 | 5 | - 1 | - (| 1 | 1 | - | 1 | 47 |
|----------------------|---------|--------|------|------|------|------|------|------|------|------|--------|-----------|--------|--------|-----------|---------|---|------|
| Time | ne 0830 | 0 0840 | 0835 | 0915 | 0830 | 0825 | 0830 | 0830 | 0360 | 0825 | 0910 0 | 0750 0 | 0840 0 | 0 0060 | 0825 0900 | 00 0835 | | 0840 |
| ATAC TACTOCIOTA | _ | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | ľ | | | - | + | | | - | - | |
| Amphidanism one | + | | | | | | T | T | + | T | + | \dagger | + | - | | + | + | |
| Cook lodinium onn | + | + | | + | | + | + | T | + | + | t | + | + | $^{+}$ | -4 | - | + | |
| Schrodilliam spp. | - | - - | | - | | - | | - | + | - | + | | + | t | | | + | |
| Cymnodinium breve | | + | | | | | ۲ | + | 1 | 1 | 1 | + | + | - | - | 1 | - | |
| G. simplex | | | | | | | | | | | | | | | | | | |
| G. splendens | | | | +. | | + | | + | | + | | | | _ | | | | |
| G. spp. | + | + | + | + | + | + | + | + | + | + | - | | + | + | + | + | + | |
| Gyrodinium spirale | | | | | | | | | - | | _ | | _ | | | | - | |
| G. spp. | + | + | + | + | | + | | | | + | | - | - | + | + | | + | |
| Torodinium spp. | + | | | | | + | | + | - | | | - | | - | | | - | |
| Polykrikos spp. | | | | | | | | + | - | | | - | ľ | + | | | | |
| Nematodinium spp. | | | | | | | | ľ | - | | | - | | L | _ | | | |
| Pouchetia spp. | | | | | | | | | | | | | | | | | _ | |
| Oxyrrhis spp. | | | | | | | | | | | | - | | | | | - | |
| Ceratium furca | | | | | + | + | | | | - | - | - | ľ | + | | | - | |
| C. fusus | | | | | | | | | | - | - | | H | | | | | |
| C. tribos | | | | | | | | | T | r | - | \vdash | - | - | | - | | |
| Gonyaulax spp. | | | | | | | | | + | + | H | - | - | - | | - | | |
| Peridiniopsis spp. | | | | | | | | | | | | | | | | | | |
| Peridinium depressum | | | | | | | | | | | | - | | | | | - | |
| P. digitale | - | | | | | | | | | | | | _ | | | | | |
| P. divergens | | | | | | | | | | | - | | _ | - | | | | |
| P. spp. | + | + | | + | + | + | + | + | + | + | | | + | + | + | + | | |
| Dinophysis tripos | | | | | | | | T | T | | | | - | + | | | - | |
| D. spp. | | | | | | | | T | | | | - | - | - | | - | - | |
| Exuviella spp. | | | + | | | + | | | | - | | | | - | | | | |
| Prorocentrum sp. | + | | | | + | + | | + | | | | | | _ | | | | |
| Silicoflagellidae | + | + | | | | + | | + | | + | | | + | _ | | | | |
| Euglena spp. | | | | | | | + | | | | | | + | + | + | + | | |
| Peranema spp. | | | | | | | | | | | | | | _ | | | | |
| Melosira spp. | | | | | + | + | | + | + | | | | + | + | | - | | |
| Skeletonema spp. | _ | | | | | | | | | | | | | | | | | |
| Chaetoceros spp. | | + | + | + | | + | | + | + | + | | | + | + | + | + | + | |
| Guinardía spp. | | | | | + | | | + | + | | | | | _ | | | | |
| Rhizosolenia spp. | | | | | + | | | | + | | | | | - | | | | |
| Thalassiothrix spp. | | | | | | | | | | | | | | - | | | | |
| Navicula spp. | | | | | | | | | | | | - | | | | | | |
| Pleurosigma spp. | | | | | | | | | | | - | - | | - | | | - | |
| | | | | | | | | | | _ | | _ | _ | - | | | | |

Table 15. cont'd

| ified this spir. Ified this spir. Ified tidae this spir. Ified spir. Ified spir. Ified spir. Ified ciliates this spir. Ified spir. Ified Rolifera x Spir. a a a a a a a a a a a a a a a a a a a | ++ + + ×× | ‡ ++ | + + | + + | | | 1 | 1 | | | |
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| iates + + + + + + + + + inkton | + + ×× | | + | + | | | | 1 | + | - | |
| ifera x x x x x x x x x x x x x x x x x x x | + + ×× | | + | | | | | | + | | |
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| ifera x x x x x x x x x x x x x x x x x x x | | 4 | | + | | | | + | | + | |
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| ifera x x x x x x x x x x x x x x x x x x x | | + | | 1 | | | 1 | + | 1 | | 1 |
| ae x x x x x x x x x x x x x x x x x x x | | | + | + | | | + | + | + | - | - |
| lifera x x x 200 200 25.0 25.9 26.5 35.3 35.2 35.3 | | | | | | İ | y | | 1 | - | |
| ifera x x x x 25.6 25.9 26.5 35.3 35.2 35.3 35.3 | | | | | | | | 1 | | - | 1 |
| rifera x x x can be as as as as as as as as as as as as as | +++ | | | | | | | | | 1 | |
| 25.6 25.9 26.5 | + | × | × | | | | 1 | × | × | × | |
| se x x x x 3.3 25.9 26.5 35.3 35.3 35.3 35.3 | | | × | × | | | | × | | × | |
| ae x x x x 2 | | | | | | | 1 | 1 | + | 1 | + |
| se x x x x se 25.6 25.9 26.5 35.3 35.3 35.3 35.3 | | × | | | | | 1 | - | + | - | - |
| ae x x x x x x x x x x x x x x x x x x x | | | | | | | 1 | | + | + | + |
| ae x x x x x x x x x x x x x x x x x x x | | | | × | - | | × | × | + | 1 | |
| 25.6 25.9 26.5 | | × | × | × | | | 1 | + | + | × | 1 |
| 25.6 25.9 26.5 35.3 35.2 35.3 | × | | | | | | | × | + | + | + |
| 25.6 25.9 26.5 35.3 35.2 35.3 | | | | | - | 1 | + | + | + | + | |
| 25.6 25.9 26.5 35.3 35.2 35.3 | | | | | | | 1 | + | 1 | 1 | + |
| 25.6 25.9 26.5 35.3 35.2 35.3 | + | × | | + | - | | \dagger | - | | _ | |
| 25.6 25.9 26.5 35.3 35.2 35.3 | | | | | | -# | | | 1 | | |
| 35.3 35.2 35.3 | 25.1 | _ | 24.8 | 26.8 27.1 | .1 27.2 | 26.7 | \dashv | ∞. | | 29. | 53 |
| | 35.5 | 35.6 35. | 35.4 | - | 35 | 35.4 | 5 | 35.8 35 | 7 | 8 35.6 | 36.0 |
| NO ₃ -NO ₂ | | 0.2 | 2 | | | 0.8 | | _ | | 0.2 | |
| In. PO4-P | | 9.0 | 9 | | | 0.3 | | | | 0.3 | |
| Tot. PO4-P | | 17.4 | | | | 2.4 | | | 1 | 1.0 | |
| 9 | | 0. | 7 | | | 1.4 | | | | 0.7 | |

Table 16. -- Relative abundance of plankton with associated hydrographic data

JUNE 1957

| nay | | ш | | , | | | | | 9 | | | | | | | | 1 | 1 | |
|----------------------|--------|------|------|------|------|------|------|--------|------|------|--------|--------|-----------|---------|---------|--------|------|------|------|
| Time | e 0855 | 0820 | 0825 | 1000 | 0825 | 0910 | 0660 | 0849 C | 0840 | 0840 | 0845 0 | 0815 0 | 0840 0905 | 05 0845 | 45 0920 | 0001 0 | 0955 | 0835 | 0830 |
| | | | | | | | | _ | | | | | | | | | | | |
| SIULUGICAL DATA | | | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | _ | | | _ | | _ | | | | | | | |
| Amphidinium spp. | | | | | | | | | - | H | ┝ | - | L | | | | | | |
| Cochlodinium spp. | | + | | | | | | | | + | + | + | + | + | | | + | + | |
| Gymnodinium breve | | | | + | + | | | | | - | + | - | | - | | | | | |
| G. simplex | | | | | | | | | - | - | | - | | | | | _ | | |
| G. splendens | + | | | + | | | + | | + | + | + | + | + | + | | | + | _ | |
| G. spp. | + | + | + | ‡ | ‡ | + | + | + | + | + | + | + | + | + | + | + | + | ‡ | + |
| Gyrodinium spirale | | | | | | | | | - | | | L | | - | | | | L | |
| G. spp. | | | + | | | | + | | - | + | + | Ĺ | + | | + | L | _ | L | + |
| Torodinium spp. | | | | + | + | | + | | | | | + | | - | _ | - | L | L | |
| Polykrikos spp. | | | | | | | | | - | | | | | _ | | | | L | |
| Mematodinium spp. | | | | | | | | | - | | | | | _ | | | | L | |
| Pouchetia spp. | | | | | | | | - | - | - | - | - | | - | | | | | |
| Oxyrrhis spp. | | | | | | | | - | - | | | - | | L | | | | | |
| Ceratiun furca | | | | | + | | | | | | | - | + | | | | | L | |
| C. fusus | | | | | | | | | - | | - | | L | - | | | | | |
| C. tribos | | | | | | | | | - | | - | - | - | - | | - | | L | |
| Gonyaulax spp. | | | | ‡ | ‡ | | + | - | - | + | + | + | + | - | - | L | L | | |
| Peridiniopsis spp. | | | | + | | | | + | | | + | - | - | | | | + | | + |
| Peridinium depressum | | | | | | | | | - | | | - | | + | | | | | |
| P. digitale | | | | | | | | | - | - | | - | _ | | | | _ | L | |
| P. divergens | | | | | | + | | - | | - | - | - | | | | | | + | |
| P. spp. | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | + |
| Dinophysis tripos | | | | | | | | - | | - | - | - | | | | | | | |
| D. spp. | | | | | | | | - | | - | - | - | | - | - | - | L | L | |
| Exuviella spp. | | | | | | | | | + | - | - | - | + | | | | | _ | |
| Prorocentrum sp. | + | | | + | + | + | | | | - | + | + | _ | | _ | + | L | | |
| Silicoflagellidae | | | | | | | | + | | H | - | _ | | + | _ | | _ | _ | |
| Euglena spp. | + | | + | + | + | + | | + | | - | + | | | L | + | + | L | | |
| Persnema spp. | | | | | | | - | | | - | | _ | _ | | | | | L | |
| Melosira spp. | + | | + | | | | | + | | - | | + | + | | _ | | + | | |
| Skeletonema spp. | | | | | | | | - | | - | | | | | _ | | | | |
| Chaetoceros spp. | + | + | | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Guinardia spp. | | | | | | | | - | | - | | - | | | _ | | | | |
| Rhizosolenia spp. | | | | | | + | | | | - | + | - | _ | - | _ | | | | |
| Thalassiothrix app. | | | | | | | | | | | | | | | | | | | |
| Navicula spp. | | | | | | | | - | | | | + | + | - | - | _ | | | |
| Pleurosigma spp. | | | | | | | | | | - | | - | | - | - | _ | L | | |
| | | | | | | | | | | _ | _ | _ | | _ | _ | _ | | | |

Table 16. cont'd

| 27 28 | 0835 0830 | | | | | ‡ | | | | | | | | | | | | м | | | | | | | × | | | | | | | - | 36.2 36.1 | 0.5 | 0.7 | 5.2 | 0.3 |
|-------|-----------|-----------------|----------------------|-------------------|-----------------|---------------|-----------------|--------------|-------------|-------------------|--------------|-------------|-----------------|---------------|----------------|-----------------------|------------------------|-------------|---------------|-----------------------|----------|-----------|------------|--------------|---------|--------------------|---------|-------------|-------------------|---------------|-------------------|------------------|-----------|---------|-----------|-------------------------|--------------|
| 26 | 0955 | _ | | T | + | ‡ | | | | | | | | | | | | | | | | | | | | | | | | | | | 36.7 | | | | |
| 25 | 1000 | | | | | + | | | + | | | + | + | | | + | | | | | | | | | | | | | | 1 | | 29.5 | 36.3 | | | | |
| 54 | 0920 | | | | T | + | | | | | | | + | | | + | | | | | | | | | | × | | | | | | 29.0 | 36.8 | | | | |
| 21 | 0845 | | | | | + | | | | | | + | | | | + | | | | × | | | | | | | | | | | | 29.8 | 36.7 | | | | |
| 20 | 0905 | | | | Ì | + | | | | | | | | | | + | | | | × | | | | | | | | | | | | 29.5 | 36.9 | 0.5 | 0.7 | 1.0 | 0.5 |
| 19 | 0840 | | | \dagger | T | + | | | _ | | | + | | | | | | Ī | | × | | | | | | | | | | | | 28.6 | 36.8 | | | | |
| 18 | 0815 | | | | | + | | | | | | + | + | | | + | | | | × | | | | | | | × | Ī | | | | - | \vdash | | | | |
| 17 | 0845 | | | | T | + | | | | Ī | | + | + | | | + | | Ī | | × | | | | | × | × | × | | | | | 28.3 | 36.7 | 0.5 | 9.0 | 1.7 | 1.4 |
| 14 | 0840 | | | | T | + | | | | | | + | | | | | | Ī | | × | | | | | × | × | | | | | | 28.8 | 36.9 | | | | |
| 13 | 0840 | | | T | | + | | | | | | | | _ | | + | | | | | | | | | | × | | | | | | 28.4 | 33.1 | 1,0 | 9.0 | 1,0 | 1 2 |
| 12 | 0849 | | | | T | + | | | | | | + | | | | | | | | | | | | × | | | | | | | | 28.7 | | | | | |
| 11 | 0830 | | | | Ī | + | | | | | | + | | | | + | | | | × | | × | | | | | | | | | | 28.5 | | | | | |
| 10 | 0160 | | | + | Ī | + | | | | | | + | | | | + | | | | × | | XX | | | | | × | | | | | 27.9 | 36,3 | | | | |
| 7 | 0825 | | | | | ‡ | | | | Ī | | + | | | | + | | | | | | | | | | | | | | | | 29.5 | 35.7 | | | | |
| 9 | 1000 | | | | | ‡ | | | + | | | | | | | + | | | | | | | | | | | | | | | | 31.0 | 36.0 | 0.2 | 1.2 | 12.7 | 1 2 |
| 2 | 0825 | | | | Ī | ‡ | | | + | | | | | | | + | | | | | × | | | | | × | | | | | | 29.1 | 35.9 | | | | |
| 4 | 0820 | | | | | + | | | + | | | + | | | | + | | | | | | | | | | | | | | | | 29.4 | 36.0 | | | | |
| 3 | 0855 | | | | | + | | | | | | + | | | | + | | | | × | | | | | × | × | | | | | | 28.5 | 35.8 | | | | |
| Day | Time | SIOLOGICAL DATA | Integliator plontion | Caramotostora con | The done of the | phytoplankton | Strombidium sp. | Unidentified | Halteriidae | Tintinnopsis spp. | Unidentified | Tintinnidae | Vorticella spp. | Cothurnla sp. | Pleuronema sp. | Unidentified ciliates | Multicellular plankton | Proales sp. | Synchaeta sp. | Unidentified Rotifera | Copepoda | Ostracoda | Chaetopoda | Coelenterata | Nauplii | Megalops and Zooea | Veliger | Trochophore | Echinoderm larvae | Pisces larvae | HYDROGRAPHIC DATA | Temperature, °C. | | NO3-NO2 | In. PO4-P | Tot. PO ₄ -P | Carbohydrata |

Table 17. -- Relative abundance of plankton with associated hydrographic data

J U L Y 1957

| | 082 | Time 0845 0915 0820 0845 | 5 0845 | 5 0945 | 0830 | 0835 | 0830 | 0915 | 0905 | 0830 | 1000 | 0915 | 1010 | 23 | 24 0835 | 25 0835 | 26 0835 (| 29 0720 | 30 0835 (| 0060 |
|---|-----|--------------------------|--------|--------|------|------|------|------|------|------|------|------|------|----|------------|------------|--------------|------------|--------------|------|
| _ | | _ | _ | _ | | | | | | | | Ī | | | | | | | | |
| + | - 8 | 1 | 1 | - | - | | | | | | | 1 | | | | | | 1 | 1 | |
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| - | | | | | | | | | | | | + | 1 | | | | | + | | |
| - | - 1 | | - | | | | | | | | | | 1 | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | |
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| H | | ļ | H | + | - | - | | | | | | † | | | | T | + | | | |
| 1 | | 1 | 1 | 1 | 1 | - | 1 | - | - | | | | - | 1 | | 1 | - | - | T | - |
| - | | - | + | - | - | - | | - | - | | | T | - | - | | | | - | - | |
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| + | - | + | + | - | | | | | | | | 1 | 1 | | | | 1 | | 1 | |
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| | М | | | | | | | | | | | | | | | | | | | |
| H | ш | + | + | + | | | | | | + | | | | + | | | | ‡ | + | |
| - | П | + | + | | | | | | | | + | | | | + | | + | + | | + |
| Н | + | + | + | | + | + | | | | + | | | | + | | | _ | + | | + |
| H | | | | | | | | | | | | | | | | | | | | |
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| ł | J | 1 | | + | 1 | | | | | | T | Ť | | 1 | 1 | T | T | + | + | I |
| + | 1 | + | + | + | | | | | | | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | T |
| H | П | | | | | | | | | | | | | | | | | + | 1 | 1 |
| | 1 | - | | | | | | | | | | | | | | | | + | | |
| | | | | | | | | | | | | | | | | | | | | |
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30.5 31 31.0 30.0 30.0 30.0 30.5 30.7 31.5 35.5 35.4 35.2 30 0.8 0.7 29 07 20 26 0835 + 0.4 1.1 25 0835 24 0835 23 0825 × × + 22 + 35.5 19 # 30.8 30.3 30.3 36.0 35.9 35.5 0.3 1000 17 + 16 × 30.0 30.2 30.5 30.1 30.0 30.4 35.8 36.1 36.2 36.0 35.6 35.1 15 12 × 7.008 0.5 11 10 + 9 × 8 + 30.0 1.6 5 × + + 3 0820 30.0 30.0 35.1 35.1 ‡ Day 1 2 Time 0845 0915 + + 30.5 × + Tintinnopsis spp.
Unidentified
Unidentified
Tintinnidae
Vorticella spp.
Cothurnia sp.
Pleuronema sp.
Pleuronema sp.
Unidentified ciliates
Multicellular plankton
Proales sp.
Syncheta sp.
Unidentified Rotifera
Gopepoda
Garacoda
Ghaetopoda
Chaetopoda BIOLOGICAL DATA Unicellular plankton Unidentified Megalops and Zooea Trochophore Echinoderm larvae Pisces larvae HYDROGRAPHIC DATA Temperature, °C. phytoplankton Strombidium sp. Unidentified Salinity, % NO3-NO2 Carbohydrate Protein Halterlidae In. PO4-P Tot. PO4-P Nauplii

Table 17. cont'd

Table 18. -- Relative abundance of plankton with associated hydrographic data

AUGUST 1957

| Bav | - | 2 | 5 | 9 | 7 | 00 | 6 | 12 | 13 | | 15 | 16 19 | 9 20 | 21 | 22 | 23 | 26 | 27 | 28 | |
|----------------------|----------------|------|-----------|------|------|------|--------|--------|------|--------|---------|-----------|---------|-----|-----------|----|----|-----|----|--|
| Time | Time 0835 0900 | 0060 | 0900 0820 | 0820 | 0835 | 0840 | 0835 (| 0910 0 | 0060 | 0 0060 | 0850 08 | 0820 1030 | 30 0840 | l t | 0830 0840 | ľ | | . 7 | | |
| | | | | | | | | | _ | | | | | | | | | _ | | |
| BIOLOGICAL DATA | | | | | | | | | | | | | | | | | | | | |
| Unicellular plankton | | | | | | | | | | | | | | | | | | | | |
| Amphidinium app. | | | | | | | | | | | | | | | | - | | | | |
| Cochlodinium spp. | | | | | | | | | | | - | | 1 | | | | | | | |
| Gymnodinium breve | | | | | | | | | | | | - | 1 | | | | | | | |
| G. simplex | | | | | | | | | | - | | | - | 1 | - | | | | | |
| G. splendens | | | | | + | | + | + | + | ‡ | | | - | - | - | | | \$ | | |
| G. app. | + | ‡ | + | ‡ | ‡ | + | + | + | + | ‡ | | | - | 1 | - | | # | ‡ | | |
| Gyrodinium spirale | | | | | | | | | | | | | - | - | - | | | | | |
| С. врп. | + | | | | | | | | | | | | - | | - | | | | | |
| Torodinium spl. | | | | | | | 1 | | | | - | | + | | | | | 1 | | |
| Polykrikos sam. | | | | + | + | | | - | + | | 1 | - | | | - | - | | | | |
| Nematodinium spp. | | | | | | | | | | | - | | + | - | | | | | | |
| Pouchetia spp. | | | | | | | | | | | | | | - | | | | | | |
| Oxyrrhis spp. | | | | | | | | | | | | | - | - | - | | | | | |
| Ceratium furca | | + | + | + | + | | + | | | | | | | | | | | | | |
| C. fusus | | | | | + | | | | | | | | | | | | - | | | |
| C. tripos | | | + | | | | | | | | | | - | - | | | | | | |
| Gonyaulax spp. | + | + | + | | | + | + | + | + | | | | - | - | - | - | | | | |
| Peridinionsis sun. | | + | + | + | + | + | | | | | | - | - | - | | - | | | | |
| Peridinium depressum | | | | + | | | | | | | - | | - | + | - | + | | 1 | | |
| P. di itale | | | | | | | | 1 | 1 | | + | 1 | + | 1 | + | | 1 | | | |
| P. diver ens | | + | + | + | + | | | | | | 1 | - | + | + | | | - | | | |
| P. Spp. | + | + | + | + | + | + | + | + | + | ŧ | | | + | 1 | | | 1 | | | |
| Dino h sis tri os | | | | | | | | | | + | 1 | | | - | - | | 1 | - | | |
| D. spp. | + | | | ‡ | | | | 1 | | + | | | | + | - | 1 | 1 | 1 | | |
| Exuviella sup. | | | | | _ | | | 1 | | 1 | | + | + | + | | + | | 1 | 1 | |
| Prorocentrum sw. | | 1 | ‡ | ‡ | ŧ | + | ŧ | + | + | | - | | 1 | 1 | + | - | | 1 | | |
| Silicofla ellidae | + | | | | | | | 1 | - | 1 | | + | + | | + | | 1 | - | | |
| Euslena spp. | + | | + | | | | | | + | | - | | - | + | - | | | - | | |
| Peranema spp. | | | | 1 | | | | 1 | 1 | 1 | 1 | | 1 | - | + | 1 | | - | | |
| Melosira app. | | | | | + | + | + | + | + | | + | | 1 | - | | + | | - | 1 | |
| Skeletonema spir. | | | | | | | | | 1 | - | - | | 1 | - | 1 | | | 1 | | |
| Chaetoceros spp. | + | + | + | 1 | + | | + | + | | 1 | | | | | - | | | 1 | | |
| Guinardia spp. | | + | | | | | | + | | | | | - | 1 | 1: | | | - | | |
| Rhizosolenis spp. | | | | | | | | | | | - | - | 1 | - | ‡ | 1 | 1 | ţ | = | |
| Thalassiothrix sup. | | | | | | | | | | | + | 1 | 1 | - | | | | 1 | | |
| Navicula spp. | | | | | | | | | | 1 | + | 1 | 1 | | + | 1 | | 1 | | |
| Pleurosinma spp. | | | | | | | | | - | 1 | - | - | - | 1 | 1 | 1 | | 1 | # | |
| Nitzschia spp. | | | | | | + | + | + | + | | | | | - | | + | | | | |

30.1 30.5 30.1 29.0 30.0 30.0 30.0 30.0 30.2 31.0 29.5 30.1 30.0 29.5 31.0 30.0 30.7 31.0 30.8 29.5 30.0 30.0 30.0 30.4 35.3 32.4 35.3 32.4 33.7 33.5 34.3 34.8 34.8 35.0 34.8 35.1 34.8 35.1 34.8 34.8 34.8 34.9 28 22 23 26 27 0840 0930 0940 0945 + ‡ + Unidentified ciliates Multicellular plankton Proales sp. Synchaeta ap. Unidentified Rotifera Unicellular plankton Chaeropoda Coelenterata Nauplii Megalops and Zooea Grammatophora spp. Unidentified Trochophore Echinoderm larvae Halterildae Tintinnopala app. Unidentified Temperature °C, Salinity W NO3-NO2 HYDROGRAPHIC DATA Strombidium an. Unidentified Vorticella spp. phytoplankton Pleuronema sp. BIOLOGICAL DATA Cothurnia sp. Pisces larvae Tintinnidae Carbohydrate Protein Copepoda Ostracoda Tot. PO4-P In. PO4-P

Table 18. cont'd





