OCEANOGRAPHICAL OBSERVATIONS
IN THE INDIAN OCEAN IN 1965
H.M.A.S. *DIAMANTINA*
Cruise Dm3/65

OCEANOGRAPHICAL CRUISE REPORT NO. 51

DIVISION OF FISHERIES AND OCEANOGRAPHY
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION, AUSTRALIA 1969

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MELBOURNE, 1969

CONTENTS

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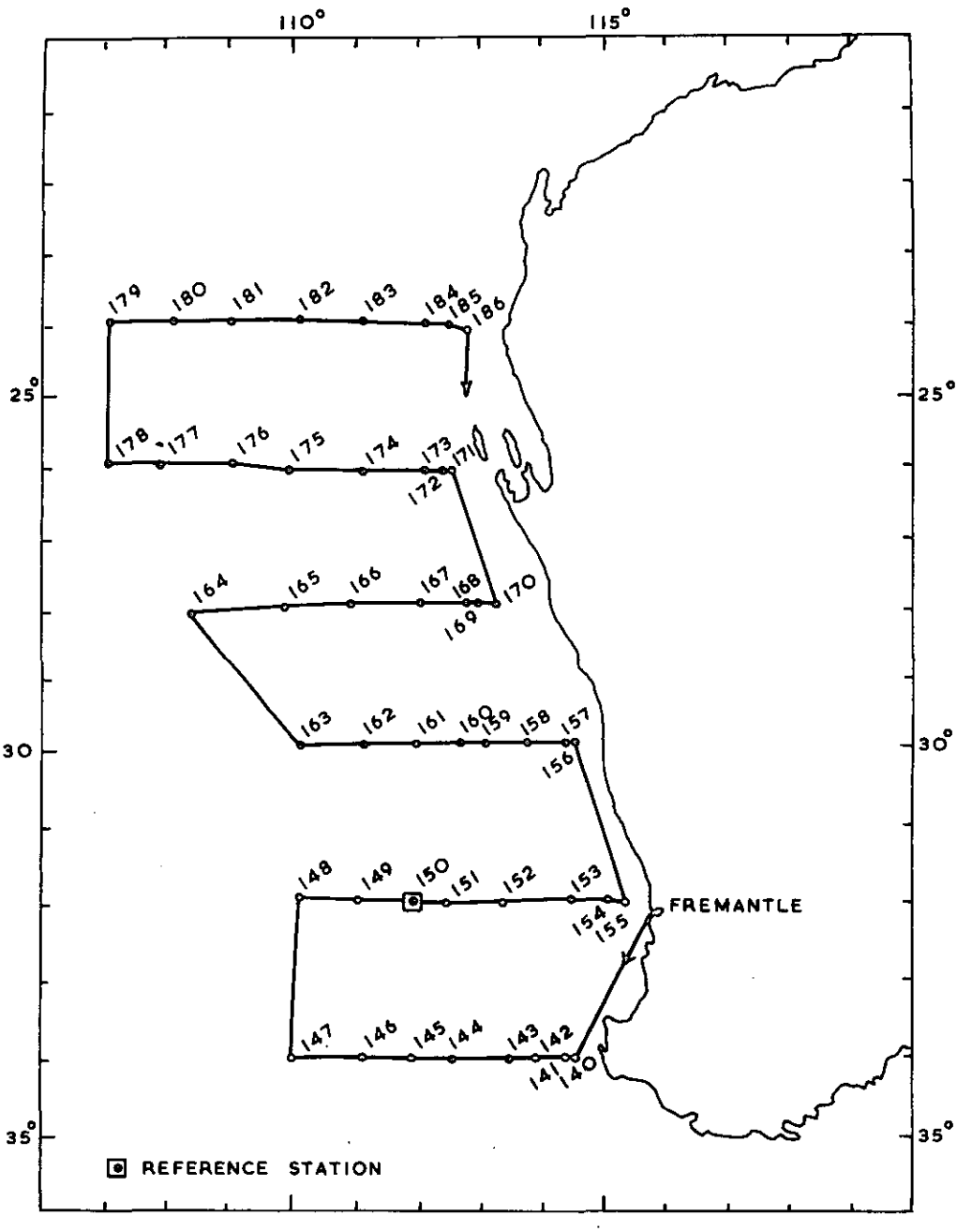

Fig. 1. Track chart Cruise Dm. 3/65

OCEANOGRAPHICAL CRUISE REPORT

No. 51

Oceanographical Observations in the Indian Ocean in 1965

H.M.A.S. Diamantina

Cruise Dm3/65

October 25-November 5, 1965

I. INTRODUCTION

This report records the data collected during the third cruise in 1965 of H.M.A.S. Diamantina, Royal Australian Navy oceanographical frigate.

Objectives

To study the distribution and growth of the larval stages of the western crayfish (Panulirus longipes cygnus).

To examine the hydrological conditions and circulation of water masses off the Western Australian coast.

Itinerary

The cruise began at Fremantle on October 25, worked a series of east-west sections off the Western Australian coast, and ended at Fremantle on November 5 (Fig. 1).

Scientific Personnel

J.L. Bannister (Cruise Leader)
N. Dyson
J.W. Prothero
L. R. Thomas

Water samples were collected, and salinity, oxygen, inorganic phosphate, and total phosphorus determinations were made in the ship's laboratory, by N. Dyson and J.W. Prothero. Nitrate analyses were done at Cronulla by J. Klye. Zooplankton and micronekton samples were collected by J.L. Bannister and L.R. Thomas.

The data were processed under the direction of W. Hedge, using computer programmes designed by A.D. Crooks. The track chart was prepared for publication by R. Breach.

II. WORK ACCOMPLISHED

Forty-seven stations were worked (Dm3/140/65-Dm3/186/65). Bathythermograph casts were made at 33 stations; surface and subsurface hydrology samples were collected at 38 stations, and zooplankton and micronekton samples were collected at 18 stations.

TABLE 1

WORK DONE AT EACH STATION

Station Number	BT	Hydrology Depth (m)	Zooplankton	Micronekton
140		175		
141			+	+
142	+	1500		
143	+	1500		
144			+	+
145	+	1500		
146	+	1500		
147	+	1500	+	+
148	+	1500	+	+
149	+	1500		
150	+	4900		
151			+	+
152	+	1500		
153	+	1500		
154			+	+
155		175		
156	+	170		
157			+	+
158	+	1500		
159	+	1500		
160			+	+
161	+	1500		
162	+	1500		
163	+	1500	+	+
164	+	1500	+	+
165	+	1500	+	+
166	+	1500		
167	+	1500		
168	+	700		
169			+	+
170		170		
171		175		

Station Number	BT	Hydrology Depth (m)	Zooplankton	Micronekton
172			+	+
173	+	500		
174	+	1500		
175	+	1500	+	+
176	+	1500		
177	+	1500		
178	+	1500	+	+
179	+	1500	+	+
180	+	1500		
181	+	1500		
182	+	1500	+	+
183	+	1500		
184	+	900		
185			+	+
186		175		

BT Bathythermograms

III. METHODS OF COLLECTION AND ANALYSIS OF SAMPLES

1. Physics

Temperature.—Water temperatures were taken with deep-sea reversing thermometers: protected thermometers with a range of -2° to 30°C, and unprotected thermometers with a range of either -2° to 30°C or -4° to 60°C. Temperatures are considered accurate to ±0.03 degC.

Bathythermograms.—A 900-ft bathythermograph was used at the stations indicated in Table 1. Slides were digitized according to the method of the U.S. National Oceanographic Data Center (1964), and the results were transferred to punched cards.

Thermometric Depth.—Depth calculations were made by the method described by Pollak (1950) and are considered accurate to ±15 m at depths greater than 1000 m, and to 1% at depths less than 1000 m.

Sigma-t.—Sigma-t values were computed from temperature and salinity values using the equations of Knudsen (La Fond 1951).

2. Chemistry

Salinity.—Salinity was measured on board with an inductive salinometer (Brown and Hamon 1961).

Dissolved Oxygen.—A version of the standard Winkler method was used to determine the amount of dissolved oxygen in the sea-water samples. The version used is a modification of that described by Thompson and Robinson (1939) and differs in some respects from the revision by Jacobsen, Robinson, and Thompson (1950). Potassium iodate was used as the iodometric standard, and the reagents necessary to fix the oxygen in solution were used at different concentrations (Rochford 1963).

Saturation values were computed using the simpler of the equations given by Richards and Corwin (1956) -

$$O_2\ (\%\ \text{Satn.}) = \frac{O_2\ (\text{ml/l}) \times (33.5 + T^\circ C) \times 100}{332.4 - (1.854 \times S‰)}\ .$$

Inorganic Phosphate.—The method of Atkins (1923) was used with 1 ml molybdate reagent (300 ml 10% w/v ammonium molybdate and 100 ml 50% v/v sulphuric acid) and 0.1 ml 1% w/v stannous chloride diluted afresh from a 40% stock solution in hydrochloric acid, which was kept under paraffin. The reagents were dispensed automatically by a piston dispenser.

Standard phosphate solutions were made up in distilled water. At air temperatures less than 25°C, analyses were carried out in batches of 10; readings were begun within 10 min of adding reagents, and completed within 10 min. At air temperatures greater than 25°C, batches of 6 were analysed; readings were begun within 5 min of adding reagents, and completed within 7 min. Each batch was compared with a distilled water blank and a 0.65 µg-atom/ml standard in a Hilger Spekker absorptiometer, using 4 cm cells and Ilford 608 filters. Each day a complete calibration was made using standards up to 3.25 µg-atom/l. Results are given as µg-atom/ml with no correction for salt error and are precise to ±10% for values less than 0.5 µg-atom/l and ±5% for higher values. To correct for salt effects the results given should be multiplied by 1.15.

Total Phosphorus.—100 ml samples were drawn from the Nansen bottles into 150 ml Pyrex conical flasks, 0.2 ml of 72% v/v perchloric acid was added, and digestion at 200°-250°C carried out immediately on a sand tray. After evaporation of water, heating was continued until fuming of the salt residue commenced. The samples were then allowed to cool and 100 ml of

distilled water and 2 drops of 2% w/v phenolpthalein were added. If alkaline, perchloric acid was added until a slight acidity persisted. The flasks were allowed to stand for about 24 hr to allow the salts to dissolve. Phosphate was then determined as described above for inorganic phosphate. Results are given as µg-atom/l with no correction for salt error. To correct for salt effects the results given should be multiplied by 1.15.

Nitrate.—After collection, water samples were stored in 50 ml plastic bottles and preserved with 0.5 ml of saturated $HgCl_2$. Nitrate was determined at Cronulla by the strychnidine method (Rochford 1947). The reagent was prepared by adding 0.64 g of strychnidine to a litre of nitrate-free sulphuric acid. Five ml of this reagent were added, without agitation, to 5 ml of sea-water or standard nitrate solution previously cooled to approx. 5°C. The standards were made up in artificial sea-water preserved with 10 ml/l of saturated $HgCl_2$. The standards and samples were allowed to stand undisturbed for 18 hr to develop the colour. The solutions were read in a Unicam SP 600 spectrophotometer at a wavelength of 530 nm using a 5 mm cell. Solutions with an absorbance greater than that of the standard corresponding to 7.1 µg-atom/l were diluted with a mixture of equal volumes of artificial sea-water and sulphuric acid before reading. Results are given in µg-atom/l.

3. Zooplankton

An N-70 plankton net was towed at the surface for 30 min at 2-3 kt at each of the micronekton stations.

The net was washed into the bucket which was then removed and the plankton stored in plastic bottles in neutralized 10% formalin. The samples were examined for crayfish larvae at Perth.

4. Micronekton

The midwater trawl or micronekton sampling consisted of horizontal or oblique tows with a 5-ft Isaacs-Kidd midwater trawl, a scaled-down version of the 6-ft trawl (King and Iversen 1962; Aron 1960). No flowmeter was used.

Oblique Tows 200-0 m.—The trawl was fitted with a depth recorder (Hamon, Tranter, and Heron 1963) and lowered from the stern while the ship's speed was 2 kt. When the trawl was clear of the ship, speed was increased to 5 kt and the wire was paid out at 40-50 m/min under a constant and minimum tension. After 600 m of wire had been paid out the ship's speed was reduced to 3 kt and further adjusted according to the reading of a

tension gauge. A final 100 m was then paid out making the total 700 m. After 5 min the wire was retrieved at a winch speed of 9 m/min. Tows were made at approximately 2200 h. The paying-out period averaged 15 min and the retrieval period 80 min.

Horizontal Tows.—Attempts were made to make simultaneous horizontal tows of two midwater trawls attached to the one wire, one net to operate at approximately 300 m and the other at 150 m. Closing devices operated by messengers were to stop fishing before the nets were hauled to the surface. Difficulties were encountered with this system, so that after Station 154 only oblique hauls were made with a single net.

Collection of Samples.—The net was washed from outside into the bucket which was then removed from the net. The net was checked for organisms caught in the meshes (e.g. leptocephali) and these were removed. Samples were stored in neutralized 10% formalin in plastic bottles; larger organisms were stored separately.

Examination of Samples.—Samples were examined for crayfish larvae at Perth.

REFERENCES

ARON, W. (1960).—The distribution of animals in the Eastern North Pacific. Univ. Wash. Dept. Oceanogr. Tech. Rep. 63.

ATKINS, W.R.G. (1923).—The phosphate content of fresh and salt waters and its relation to the growth of algal plankton. J. mar. biol. Ass. U.K. 13, 119-50.

BROWN, N.L., and HAMON, B.V. (1961).—An inductive salinometer. Deep-Sea Res. 3, 65-75.

HAMON, B.V., TRANTER, D.J., and HERON, A.C. (1963).—A simple integrating depth recorder. Deep-Sea Res. 10, 457-8.

JACOBSEN, J.P., ROBINSON, R.J., and THOMPSON, T.G. (1950).—A review of the determination of dissolved oxygen in seawater by the Winkler method. Publs scient. Ass. Oceanogr. phys. 11.

KING, J.E., and IVERSEN, R.T.B. (1962).—Midwater trawling for forage organisms in the Central Pacific 1951-56. Fishery Bull. Fish Wildl. Serv. U.S. 62(210), 275-7.

LA FOND, E.C. (1951).—Processing oceanographic data. U.S. Navy Hydrogr. Off. Publ. No. 614.

POLLAK, M.J. (1950).—Notes on determining the depths of sampling in serial oceanographic observations. J. mar. Res. 9, 17-20.

RICHARDS, F.A., and CORWIN, N. (1956).—Some oceanographic applications of the solubility of oxygen in sea-water. Limnol. Oceanogr. 1, 263-7.

ROCHFORD, D.J. (1947).—The preparation and use of Harvey's reduced strychnine reagent in oceanographical chemistry. Bull. Coun. scient. ind. Res., Melb. 220.

ROCHFORD, D.J. (1963).—SCOR-UNESCO chemical intercalibration tests; results of 2nd series, R.S. Vityaz, August 2-9, 1962, Australia. (Mimeogr.) (CSIRO : Cronulla.)

THOMPSON, T.G., and ROBINSON, R.J. (1939).—Notes on the determination of dissolved oxygen in seawater. J. mar. Res. 2, 1-8.

U.S. NATIONAL OCEANOGRAPHIC DATA CENTER (1964).—Manual for processing bathythermograph data. Part 1 Instructions for manually digitizing bathythermograph data. Publ. M-3. (U.S. Naval Oceanographic Office : Washington D.C.)

U.S. NAVY HYDROGRAPHIC OFFICE (1955).—Instruction manual for oceanographic observations. U.S. Navy Hydrogr. Off. Publ. No. 607.

IV. DATA

The hydrology data were processed in a C.D.C. 3600 Computer. An explanation of headings used is given at the beginning of each part, except for hydrology where it is given at the beginning of the surface listing.

DATA

PART 1

HYDROLOGY

SURFACE SAMPLES

EXPLANATION OF HEADINGS

Parts 1 and 2	Hydrology
STATION	Gives the station identification. For example, Dm3/140/65 signifies the 140th station worked by Diamantina during 1965, on her 3rd cruise for that year
DATE	Given as day/month/year
TIME	Given in Zone Time, and is the time at the beginning of the first cast. The code letter for the time zone follows the time. Zone Time throughout the cruise was Western Australian Standard Time, GMT +8 hr, Code H
LATITUDE LONGITUDE	Given in degrees and minutes
SONIC DEPTH	Given in metres, measured at standard sound velocity of 800 fm (1463 m) per second
AIR TEMP. WET DRY	Air temperatures recorded from wet and dry bulb thermometers in °C
WIND DIR. SP.	Wind direction and speed are coded using Tables 8 and 9 in U.S. Navy Hydrogr. Office (1955)
ANEM. HEIGHT	Average height of the anemometer above sea level, given in metres
CLOUD TYPE AMT.	Cloud type and amount are coded using Tables 2 and 3 in U.S. Navy Hydrogr. Office (1955)
WEA.	Weather is coded using Table 1 in U.S. Navy Hydrogr. Office (1955)
VIS.	Visibility is coded using Table 4 in U.S. Navy Hydrogr. Office (1955)
SEA DIR. AMT.	Sea direction and amount are coded using Tables 5 and 8 in U.S. Navy Hydrogr. Office (1955)

SWELL DIR. AMT.	Sea swell direction and amount are coded using Tables 6 and 8 in U.S. Navy Hydrogr. Office (1955)
BAROM. or ATMOS. PRESSURE	Atmospheric pressure given in millibars
WIRE ANGLES CAST1 CAST2 CAST3	Wire angles are measured at the surface and expressed in degrees for each cast
CAST	Gives the cast number
DEPTH	Sampling depth given in metres
TEMP.	Sea temperatures recorded in °C
SALINITY	Given in parts per thousand
SIGMA-T	Sigma-t to 2 decimal places
OXYGEN	Given in ml/l
OXYGEN % SAT.	Oxygen percentage saturation
INORG. P	Inorganic phosphorus, given in µg-atom P/l
NITRATE	Given in µg-atom N/l

*, ***, or a blank indicate no data available

CRUISE	STATION NUMBER	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND DN.	WIND AMT.	SEA DN.	SEA AMT.	SWELL DN.	SWELL AMT.	WEA.	VIS.	BAROM.
3	140	65	10	25	2000	H 34 00	S 114 33	E 18.6	35.63	23	3	23	3	23	1	18	7	1040.3
3	141	65	10	25	2035	H 34 00	S 114 29	E		22	3	22	3	23	1	18	7	1040.1
3	142	65	10	26	0130	H 34 00	S 113 56	E 18.3	35.69	20	3	21	2	22	4	19	8	960.1
3	143	65	10	26	0430	H 34 00	S 113 29	E 16.6	35.72	00	1	20	1	20	1	18	7	950.1
3	144	65	10	26	0912	H 34 00	S 112 33	E		25	1	24	2	25	1	20	6	1030.3
3	145	65	10	26	1520	H 33 59	S 111 56	E 16.1	35.56	24	3	20	2	26	4	19	7	1000.1
3	146	65	10	26	1935	H 33 59	S 111 06	E 17.4	35.71	24	4	24	3	24	1	18	7	960.3
3	147	65	10	27	0045	H 34 00	S 110 00	E 16.5	35.71	24	4	27	3	24	1	17	8	970.2
3	148	65	10	27	1140	H 31 55	S 110 10	E 17.2	35.79	20	4	20	2	22	1	18	8	990.1
3	149	65	10	27	1713	H 31 57	S 111 00	E 18.4	35.72	24	3	24	3	24	1	17	7	1040.2
3	150	65	10	27	2120	H 32 00	S 111 52	E 19.3	35.63	24	3	24	3	22	1	17	6	966.2
3	151	65	10	28	0215	H 32 01	S 112 27	E		19	4	19	3	19	1	16	6	970.0
3	152	65	10	28	0655	H 32 01	S 113 22	E 19.3	35.64	18	3	18	2	20	1	16	7	1040.1
3	153	65	10	28	1133	H 31 57	S 114 26	E 19.6	35.63	19	1	19	3	22	1	17	8	1030.2
3	154	65	10	28	1430	H 31 58	S 115 01	E		18	3	18	3	18	1	15	7	1040.1
3	155	65	10	28	1720	H 31 57	S 115 12	E 19.5	35.61	19	5	17	3	20	1	15	8	960.1
3	156	65	10	29	0215	H 29 55	S 114 27	E 20.2	35.58	15	5	15	3	24	1	13	7	990.2
3	157	65	10	29	0305	H 29 55	S 114 24	E		15	5	15	3	24	1	13	7	970.2
3	158	65	10	29	0700	H 29 56	S 113 42	E 20.1	35.58	15	3	18	2	18	1	16	7	960.2
3	159	65	10	29	1030	H 29 57	S 113 01	E 20.0	35.65	18	2	18	2	18	1	16	7	1010.2
3	160	65	10	29	1320	H 29 57	S 112 37	E		20	3	20	2	24	1	15	8	1000.1
3	161	65	10	29	1700	H 29 57	S 111 57	E 19.3	35.76	25	2	26	2	25	1	14	8	960.2
3	162	65	10	29	2137	H 29 58	S 111 03	E 20.0	35.65	18	2	18	3	20	1	14	6	995.0
3	163	65	10	30	0230	H 29 59	S 110 07	E 18.6	35.87	23	3	23	2	22	1	14	8	960.1
3	164	65	10	30	1500	H 28 03	S 108 23	E 18.1	35.87	23	5	23	3	23	1	17	8	1020.1
3	165	65	10	30	2306	H 27 59	S 109 54	E 19.9	35.69	24	5	24	3	25	1	18	7	1022.5
3	166	65	10	31	0442	H 27 54	S 110 49	E 19.8	35.72	22	5	22	3	22	1	17	7	970.3
3	167	65	10	31	1023	H 27 49	S 112 01	E 19.0	35.71	22	5	22	3	22	1	19	7	1010.1
3	168	65	10	31	1410	H 27 49	S 112 43	E 20.0	35.66	24	5	24	3	22	1	18	7	1000.2
3	169	65	10	31	1535	H 27 50	S 112 54	E		20	5	24	3	22	1	16	7	970.2
3	170	65	10	31	1800	H 27 52	S 113 14	E 20.7	35.53	24		26	3	24	1	17	7	1020.3
3	171	65	11	1	0230	H 26 02	S 112 28	E 21.6	35.41	19	5	19	3	22	1	17	7	1000.3
3	172	65	11	1	0350	H 26 02	S 112 22	E		19	5	19	3	22	1	17	7	1000.3
3	173	65	11	1	0600	H 26 02	S 112 05	E 21.7		19	4	19	3	20	1	18	7	1040.3
3	174	65	11	1	1038	H 26 02	S 111 03	E 20.8	35.52	18	6	22	3	22	1	20	7	960.1
3	175	65	11	1	1555	H 26 02	S 109 57	E 20.6	35.54	16	4	16	3	20	1	20	7	1000.3
3	176	65	11	1	2230	H 25 58	S 109 02	E 20.1	35.68	20	5	20	3	20	1	19	7	950.2
3	177	65	11	2	0330	H 25 53	S 107 54	E 18.9	35.68	20	1	19	3	23	1	18	7	1000.2
3	178	65	11	2	0735	H 25 49	S 107 02	E 19.7	35.65	19	3	19	3	19	1	21	7	1000.2
3	179	65	11	2	1718	H 23 56	S 107 02	E 21.3	35.27	22	2	17	2	17	1	14	7	960.3

CRUISE	STATION NUMBER	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND DN.	WIND AMT.	SEA DN.	SEA AMT.	SWELL DN.	SWELL AMT.	WEA.	VIS.	BAROM.
3	180	65	11	2	2335	H 23 54	S 108 08	E 19.5	35.70	17	4	17	3	21	1	17	7	1040.1
3	181	65	11	3	0435	H 23 53	S 109 09	E 20.3	35.62	16	2	17	2	18	1	14	7	970.2
3	182	65	11	3	0935	H 23 52	S 110 14	E 21.7	35.36	21	2	20	2	21	1	16	7	1030.2
3	183	65	11	3	1455	H 23 53	S 111 07	E 21.9	35.39	23	2		2	21	1	14	7	1040.0
3	184	65	11	3	1935	H 23 58	S 112 06	E 22.0	35.34	23	2		2	21	1	13	7	990.0
3	185	65	11	3	2135	H 24 00	S 112 24	E		22	3	22	2	20	1	14	7	1030.1
3	186	65	11	4	0015	H 24 06	S 112 49	E 21.8	35.40	25	4	24	2	20	1	13	7	960.1

DATA

PART 2

HYDROLOGY

DEEP STATIONS

STATION	DATE	TIME	LATITUDE	LONGITUDE
CM 3/ 140/63	25/10/65	2000 H	34 00 S	114 33 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
176	15.6	13.9	23	3	16	8	5	7	23	3	23	1	1018.4	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.64	35.635	25.62	5.12	96	0.15	***	0.3
1	10	18.65	35.635	25.61	5.32	100	0.13	***	0.2
1	20	18.65	35.632	25.61	5.31	100	0.09	***	0.2
1	30	18.67	35.631	25.61	5.31	100	0.13	***	0.2
1	40	18.63	35.631	25.62	5.31	100	0.14	***	0.2
1	50	18.59	35.632	25.63	5.28	99	0.09	***	0.2
1	75	18.06	35.701	25.81	5.09	95	0.20	***	0.5
1	100	17.50	35.746	25.98	5.10	94	0.20	***	0.6
1	125	17.03	35.739	26.09	5.17	94	0.22	***	0.5
1	148	16.65	***	***	5.26	***	0.20	***	0.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 142/65	26/10/65	0130 W	34 00 S	113 56 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
1681	11.1	14.4	20	3	16	9	3	8	21	2	22	4	1019.6	15	0	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	18.31	35.690	25.74	5.31	99	0.16	***	0.1
2	24	18.29	35.699	25.75	5.34	100	0.14	***	0.2
2	48	16.41	35.705	26.21	5.41	97	0.20	***	0.1
2	72	16.11	35.688	26.27	5.47	98	0.20	***	0.2
2	97	15.23	35.627	26.42	5.50	97	0.22	***	0.5
2	146	14.08	35.486	26.56	5.51	95	0.31	***	1.2
2	195	12.92	35.301	26.66	5.55	93	0.44	***	2.8
1	285	11.41	35.047	26.75	5.57	90	0.63	***	6.2
1	475	9.14	34.697	26.88	5.53	85	0.95	***	12.7
1	674	7.73	34.534	26.97	4.99	74	1.25	***	20.3
1	687	4.77	34.394	27.24	5.02	70	1.70	***	28.9
1	1067	3.73	34.482	27.42	3.67	50	1.97	***	32.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 143/65	26/10/65	0430 H	34 00 S	113 29 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
3272	12,2	14,4	00	1	16	6	5	7	20	1	20	1	1018.5	8	0	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	16.62	35.724	26.18	5.53	100	0.20	***	0.3
2	25	16.63	35.724	26.18	5.53	100	0.20	***	0.2
2	50	16.06	35.748	26.33	5.61	100	0.19	***	0.1
2	75	15.47	35.696	26.42	4.62	82	0.27	***	0.6
2	100	14.90	35.622	26.49	5.35	93	0.31	***	1.4
2	150	13.86	35.458	26.59	5.32	91	0.44	***	3.3
2	197	12.73	35.275	26.68	5.42	90	0.50	***	4.9
1	283	11.15	35.013	26.78	5.56	89	0.68	***	8.6
1	475	8.98	34.670	26.88	5.52	85	1.02	***	15.9
1	668	7.57	34.521	26.98	4.93	73	1.36	***	22.6
1	862	4.81	34.381	27.23	4.50	63	1.69	***	29.4
1	1058	3.55	34.436	27.41	4.06	55	1.85	***	33.2
1	1257	3.23	34.534	27.51	3.59	48	1.94	***	37.8
1	1458	2.88	34.599	27.60	3.63	48	1.98	***	39.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 145/65	26/10/65	1520 H	33 59 S	111 56 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
2747	13,3	15,8	24	3	16	9	9	7	20	2	26	4	1019.9	8	5	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	16.07	35.559	26.18	5.74	103	0.18	***	0.5
2	25	15.22	35.546	26.36	5.83	102	0.19	***	0.4
2	50	14.16	35.491	26.55	5.68	98	0.29	***	1.2
2	75	14.09	35.515	26.58	5.63	97	0.27	***	1.1
2	100	13.18	35.345	26.64	5.60	94	0.39	***	2.5
2	150	12.15	35.142	26.69	5.71	94	0.47	***	4.0
2	200	11.38	35.029	26.75	5.73	93	0.57	***	5.9
1	294	10.78	***	***	5.83	***	0.67	***	7.0
1	491	8.89	34.653	26.88	5.56	85	1.02	***	15.5
1	687	6.80	34.471	27.05	4.69	68	1.43	***	25.3
1	884	4.43	34.397	27.28	4.28	59	1.79	***	34.0
1	1080	3.64	34.485	27.44	3.62	49	1.99	***	37.8
1	1277	3.22	34.548	27.53	3.55	48	2.03	***	35.9
1	1475	2.89	34.603	27.60	3.57	48	2.01	***	37.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 146/65	26/10/65	1935 H	33 59 S	111 06 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
2102	13.3	15.6	24	4	16	8	6	7	24	3	24	1	1018.6	8	5	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	17.37	35.714	25.99	5.45	100	0.13	***	0.6
2	25	16.92	35.693	26.08	5.48	100	0.12	***	0.5
2	50	15.42	35.668	26.41	5.66	100	0.21	***	0.2
2	75	15.09	35.631	26.46	5.64	99	0.21	***	0.0
2	100	14.69	35.583	26.51	5.53	96	0.22	***	0.8
2	150	13.45	35.402	26.63	5.56	94	0.35	***	2.5
2	200	12.31	35.218	26.72	5.61	93	0.47	***	4.2
1	293	10.81	34.958	26.80	5.57	89	0.70	***	8.4
1	489	8.81	34.646	26.89	6.02	92	1.04	***	16.8
1	687	6.37	34.446	27.09	4.56	66	1.57	***	28.0
1	885	3.89	34.397	27.34	4.24	58	1.86	***	34.7
1	1084	3.41	34.493	27.46	3.71	50	2.04	***	37.0
1	1283	3.05	34.551	27.54	3.64	49	1.96	***	37.4
1	1482	2.74	***	***	3.63	***	1.94	***	35.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 147/65	27/10/65	0045 H	34 00 S	110 00 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	WIRE ANGLES CAST2	WIRE ANGLES CAST3
2522	13.3	15.6	24	4	14	*	*	8	27	3	24	1	1017.7	20	10	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	16.46	35.710	26.20	5.51	99	0.13	***	0.5
2	24	16.16	35.692	26.26	5.56	100	0.16	***	0.4
2	48	15.51	35.657	26.38	5.66	100	0.14	***	0.2
2	73	14.45	35.545	26.53	5.58	97	0.21	***	0.6
2	97	14.22	35.531	26.57	5.67	98	0.21	***	0.4
2	146	13.46	35.412	26.64	5.65	96	0.29	***	1.3
2	195	12.50	35.254	26.71	5.63	93	0.42	***	3.4
1	278	11.11	35.032	26.80	5.65	91	0.58	***	7.5
1	463	9.07	34.697	26.89	5.51	85	0.94	***	15.3
1	648	7.51	34.522	26.99	4.91	73	1.29	***	24.7
1	832	4.69	34.388	27.25	4.47	62	1.67	***	32.6
1	1020	3.59	34.448	27.41	3.96	54	1.86	***	37.0
1	1207	3.14	34.527	27.52	3.73	50	1.90	***	37.4
1	1396	2.79	34.589	27.60	3.75	50	1.87	***	37.8

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 148/65	27/10/65	1140 H	31 55 S	110 10 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5081	13.3	16.1	20	4	16	9	8	8	20	2	22	1	1018.9	8	12	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	17.17	35.794	26.10	5.46	100	0.15	***	0.3
2	24	16.83	35.820	26.20	5.48	100	0.16	***	0.2
2	48	16.15	35.771	26.32	5.54	99	0.17	***	0.4
2	72	15.91	35.741	26.36	5.59	100	0.19	***	0.2
2	96	15.27	35.675	26.45	5.44	96	0.24	***	0.6
2	144	14.17	35.548	26.59	5.54	95	0.32	***	1.3
2	193	13.20	35.381	26.67	5.51	93	0.42	***	3.3
1	286	11.79	35.139	26.76	5.43	89	0.56	***	6.8
1	478	9.38	34.736	26.87	5.47	85	0.89	***	14.3
1	671	7.91	34.559	26.96	5.02	75	1.23	***	22.2
1	864	5.13	34.403	27.21	4.45	62	1.69	***	34.7
1	1058	4.10	34.478	27.38	3.62	50	1.95	***	36.4
1	1253	3.30	34.517	27.49	3.67	49	1.93	***	35.9
1	1449	2.97	34.606	27.60	3.53	47	1.99	***	37.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 149/65	27/10/65	1713 H	31 57 S	111 00 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5176	13.9	15.6	24	3	16	*	*	7	24	3	24	1	1017.4	17	10	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	18.42	35.716	25.73	5.26	99	0.12	***	0.6
2	23	17.35	35.782	26.05	5.40	99	0.12	***	0.3
2	47	16.94	35.795	26.16	5.46	99	0.11	***	0.3
2	71	16.42	35.800	26.28	5.45	98	0.12	***	0.1
2	95	16.30	35.800	26.31	5.45	98	0.15	***	0.2
2	143	16.17	35.785	26.33	5.36	96	0.16	***	0.2
2	191	15.06	35.627	26.46	5.27	92	0.27	***	1.2
1	287	13.36	35.402	26.65	5.58	94	0.36	***	2.4
1	478	10.73	34.964	26.82	5.62	90	0.68	***	8.9
1	670	8.76	34.656	26.91	5.39	82	0.99	***	15.9
1	863	6.28	34.452	27.11	4.58	66	1.45	***	25.3
1	1055	4.04	34.434	27.35	4.02	55	1.78	***	34.7
1	1249	3.50	34.524	27.48	3.50	47	1.91	***	37.0
1	1444	3.07	34.586	27.57	3.52	47	1.91	***	35.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 150/65	27/10/65	2120 H	32 00 S	111 52 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5081	14.4	15.6	24	3	16	8	8	6	24	3	22	1	1017.6	12	10	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	19.31	35.630	25.44	5.19	99	0.11	0.35	2.2
2	23	19.17	35.638	25.48	5.18	99	0.12	***	1.9
2	46	18.67	35.661	25.63	5.16	97	0.11	0.31	1.1
2	70	18.65	35.667	25.64	5.16	97	0.12	***	1.7
2	92	18.38	35.699	25.73	5.16	97	0.11	0.34	1.9
2	140	17.85	35.770	25.92	5.10	95	0.19	***	1.6
2	185	16.23	35.739	26.28	5.31	95	0.21	0.37	1.0
2	282	14.41	35.535	26.53	5.23	90	0.35	0.51	2.5
2	376	12.20	35.186	26.71	5.52	91	0.49	***	6.0
2	472	10.23	34.871	26.83	5.57	88	0.64	0.90	11.4
2	664	8.70	34.640	26.90	5.45	83	1.00	1.15	18.0
2	858	6.33	34.447	27.09	4.54	65	1.47	1.68	30.2
1	865	6.33	34.441	27.09	4.55	66	1.54	1.70	29.2
1	1059	4.20	34.424	27.33	4.05	56	1.83	2.06	35.1
1	1448	3.13	34.562	27.55	3.53	47	2.01	2.19	37.8
1	1935	2.46	34.693	27.71	3.69	49	2.01	2.08	36.2
1	2424	2.06	34.756	27.79	3.85	50	1.99	2.11	36.6
1	2914	1.74	34.732	27.80	4.08	53	1.93	2.06	35.5
1	3405	1.48	34.729	27.82	4.21	54	1.89	1.94	35.1
1	3897	1.29	34.724	27.83	4.35	56	1.81	1.86	35.1
1	4390	1.20	34.718	27.83	4.47	57	1.83	1.89	34.3
1	4784	1.12	34.717	27.83	4.60	59	1.81	1.96	34.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 152/65	28/10/65	0655 H	32 01 S	113 22 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSU-E	WIRE ANGLES CAST1	CAST2	CAST3
4797	14.4	16.7	18	3	16	6	5	7	18	2	20	1	1016.4	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.35	35.645	25.44	5.17	99	0.10	***	0.5
1	24	18.94	35.649	25.55	5.25	99	0.09	***	0.4
1	48	17.95	35.727	25.86	5.16	96	0.12	***	0.4
1	72	17.03	35.788	26.13	5.45	99	0.10	***	0.3
1	97	15.77	35.708	26.36	5.36	95	0.17	***	0.5
1	146	14.87	35.653	26.52	5.39	94	0.24	***	1.3
1	195	14.11	35.546	26.60	5.48	94	0.29	***	1.7
1	294	11.98	35.171	26.74	5.46	89	0.53	***	6.8
1	491	9.50	34.760	26.87	5.54	86	0.87	***	14.4
1	688	7.91	34.562	26.96	5.05	75	1.20	***	22.3
1	885	4.81	34.393	27.24	4.48	62	1.65	***	32.5
1	1083	3.58	34.439	27.40	4.12	56	1.85	***	34.0
1	1280	3.06	34.532	27.53	3.75	50	1.94	***	35.5
1	1477	2.87	34.621	27.62	3.53	47	1.93	***	35.9

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 37 153/65	28/10/65	1133 H	31 57 S	114 26 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
3557	15.0	17.8	19	1	16	1	6	8	19	3	22	1	1017.3	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.62	35.625	25.36	5.16	99	0.12	***	0.7
1	24	19.54	35.615	25.37	5.20	100	0.10	***	0.3
1	48	19.51	35.612	25.38	5.17	99	0.12	***	0.2
1	72	18.98	35.552	25.47	5.16	98	0.12	***	0.2
1	97	18.88	35.554	25.49	5.09	96	0.14	***	0.2
1	146	18.48	35.691	25.70	5.02	94	0.17	***	0.4
1	195	17.08	35.756	26.09	5.14	94	0.20	***	0.5
1	292	13.70	35.418	26.59	5.33	91	0.43	***	2.9
1	488	9.36	34.768	26.90	5.50	85	0.98	***	14.8
1	682	6.65	34.494	27.09	4.69	68	1.44	***	28.0
1	877	4.19	34.422	27.33	4.11	56	1.84	***	35.5
1	1072	3.76	34.489	27.43	3.62	49	1.98	***	37.8
1	1267	3.32	34.568	27.53	3.44	46	2.01	***	38.9
1	1462	2.99	34.618	27.60	3.52	47	1.97	***	38.5

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 155/65	28/10/65	1720 H	31 57 S	115 12 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
188	15.0	18.3	19	5	16	5	2	8	17	3	20	1	1015.6	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.48	35.608	25.38	5.25	100	0.09	***	0.3
1	10	19.48	35.600	25.37	5.22	100	0.08	***	0.3
1	20	19.40	35.600	25.40	5.22	100	0.09	***	0.3
1	30	19.37	35.602	25.40	5.19	99	0.09	***	0.1
1	40	19.27	35.600	25.43	5.27	100	0.09	***	0.2
1	50	19.18	35.615	25.46	5.25	100	0.09	***	0.2
1	74	18.96	35.611	25.52	5.23	99	0.10	***	0.1
1	99	18.68	35.631	25.60	5.19	98	0.10	***	0.1
1	123	18.37	35.692	25.73	5.10	96	0.11	***	0.2
1	148	18.04	35.728	25.84	5.05	94	0.14	***	0.4
1	171	17.62	35.748	25.96	5.08	94	0.17	***	0.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 156/65	29/10/65	0215 H	29 55 S	114 27 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
188	15.0	18.3	15	5	16	9	2	7	15	3	24	1	1013.9	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.22	35.576	25.16	5.14	100	0.15	***	0.2
1	10	20.11	35.569	25.18	5.15	100	0.12	***	0.2
1	20	20.14	35.573	25.18	5.14	100	0.10	***	0.2
1	30	20.16	35.569	25.17	5.12	99	0.11	***	0.1
1	40	20.13	35.574	25.18	5.15	100	0.11	***	0.0
1	50	19.92	***	***	5.16	***	0.10	***	0.2
1	74	19.71	35.593	25.31	5.06	97	0.11	***	0.2
1	99	19.51	35.633	25.39	4.87	93	0.21	***	0.3
1	123	19.19	35.687	25.52	4.91	93	0.20	***	0.4
1	148	18.82	35.665	25.59	5.16	97	0.16	***	0.2
1	169	18.69	35.702	25.66	5.14	97	0.20	***	0.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 158/65	29/10/65	0700 H	29 56 S	113 42 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSU-E	WIRE ANGLES CAST1	CAST2	CAST3
2990	14.4	18.3	15	3	14	9	4	7	18	2	18	1	1016.6	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.10	35.580	25.20	5.13	99	0.09	***	0.0
1	25	20.07	35.572	25.20	5.13	99	0.08	***	0.1
1	50	19.91	35.569	25.24	5.13	99	0.08	***	0.2
1	75	19.69	35.592	25.31	5.05	97	0.08	***	0.2
1	100	18.98	35.710	25.59	4.87	92	0.13	***	0.6
1	149	17.62	35.793	25.99	4.95	91	0.16	***	0.9
1	198	15.90	35.712	26.34	5.20	93	0.23	***	1.0
1	297	13.11	35.345	26.66	5.38	90	0.41	***	3.5
1	495	9.40	34.754	26.88	***	***	0.90	***	14.0
1	692	7.63	34.539	26.99	4.90	73	1.23	***	21.7
1	889	4.70	34.441	27.29	3.98	55	1.79	***	33.4
1	1087	3.80	34.514	27.44	3.46	47	1.96	***	35.1
1	1285	3.57	34.573	27.51	3.23	44	2.00	***	35.9
1	1483	3.09	34.611	27.59	3.41	46	1.96	***	36.6

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 159/65	29/10/65	1030 H	29 57 S	113 01 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
4967	15.0	19.4	18	2	16	8	8	7	18	2	18	1	1016.1	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.04	35.654	25.27	5.14	99	0.08	***	0.5
1	24	18.47	35.747	25.75	5.34	100	0.07	***	0.5
1	48	17.69	35.764	25.95	5.25	97	0.10	***	0.3
1	72	16.66	35.743	26.18	5.19	94	0.15	***	0.6
1	97	15.89	35.697	26.33	5.19	93	0.21	***	0.9
1	145	14.85	35.597	26.48	5.31	93	0.25	***	1.6
1	194	13.64	35.415	26.60	5.32	90	0.38	***	3.1
1	292	11.50	35.088	26.77	5.54	90	0.57	***	7.0
1	489	9.03	34.687	26.89	5.52	85	0.95	***	14.9
1	686	6.37	34.452	27.09	***	***	1.46	***	25.0
1	883	3.99	34.404	27.33	4.23	58	1.80	***	32.1
1	1081	3.60	34.522	27.47	3.47	47	1.99	***	32.5
1	1280	3.14	34.588	27.57	3.44	46	1.93	***	33.6
1	1479	2.87	34.648	27.64	3.44	46	1.93	***	34.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 161/65	29/10/65	1700 H	29 57 S	111 57 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5176	14.4	18.3	25	2	16	1	6	8	26	2	25	1	1014.6	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.25	35.761	25.56	5.32	101	0.14	***	0.8
1	24	18.69	35.764	25.70	5.35	101	0.11	***	0.5
1	48	18.00	35.754	25.87	5.43	101	0.13	***	0.2
1	72	16.82	35.803	26.19	5.37	98	0.17	***	0.3
1	96	16.19	35.725	26.28	5.42	97	0.15	***	0.3
1	144	15.16	35.650	26.46	5.39	95	0.22	***	0.8
1	192	13.78	35.432	26.58	5.40	92	0.33	***	2.0
1	287	11.53	35.075	26.76	5.53	90	0.63	***	7.4
1	475	8.88	34.659	26.89	5.51	84	0.99	***	16.3
1	659	7.05	34.489	27.03	4.77	70	1.37	***	25.0
1	842	4.56	34.414	27.28	4.19	58	1.84	***	32.1
1	1028	3.80	34.484	27.42	3.64	49	1.97	***	35.1
1	1220	3.36	34.553	27.52	3.45	46	2.01	***	35.5
1	1415	2.90	34.598	27.60	3.62	48	1.94	***	35.5

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 162/65	29/10/65	2137 H	29 58 S	111 03 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5479	15.6	17.8	18	2	16	5	9	6	18	3	20	1	1014.9	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.04	35.647	25.26	5.17	100	0.10	***	0.5
1	25	19.95	35.635	25.28	5.17	100	0.07	***	0.4
1	50	19.71	35.658	25.36	5.19	100	0.10	***	0.2
1	75	18.28	35.823	25.85	5.34	100	0.11	***	0.1
1	100	18.11	35.816	25.89	5.33	99	0.10	***	0.1
1	150	16.77	35.811	26.21	5.28	96	0.14	***	0.3
1	198	15.74	35.729	26.38	5.21	93	0.23	***	1.1
1	297	12.87	35.290	26.66	5.41	90	0.41	***	4.3
1	494	9.79	34.796	26.85	5.57	87	0.79	***	11.5
1	689	8.24	34.587	26.93	5.20	78	1.06	***	19.6
1	877	5.19	34.406	27.20	4.42	62	1.57	***	29.5
1	1065	3.87	34.452	27.39	3.87	53	1.82	***	33.2
1	1259	3.54	34.540	27.49	3.41	46	1.88	***	35.1
1	1454	3.11	***	***	3.50	***	1.90	***	34.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
CM 3/ 163/65	30/10/65	0230 H	29 59 S	110 07 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSU E	WIRE ANGLES CAST1	CAST2	CAST3
5556	12.8	16.7	23	3	16	4	3	8	23	2	22	1	1014.6	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.59	35.868	25.81	5.28	99	0.15	***	0.5
1	25	18.10	35.835	25.91	5.35	100	0.15	***	0.4
1	49	17.82	35.847	25.98	5.38	100	0.15	***	0.3
1	74	17.42	35.829	26.07	5.33	98	0.19	***	0.2
1	98	16.71	35.801	26.22	5.26	95	0.21	***	0.4
1	147	15.32	35.700	26.46	5.26	93	0.29	***	1.4
1	197	14.22	35.537	26.57	5.28	91	0.41	***	2.5
1	295	11.84	35.153	26.76	5.46	89	0.64	***	6.5
1	490	9.16	34.716	26.89	5.50	85	1.00	***	11.3
1	683	7.26	34.517	27.02	4.80	71	1.45	***	19.0
1	878	4.32	34.450	27.34	3.88	53	1.97	***	28.0
1	1074	3.98	34.523	27.43	3.38	46	2.09	***	29.5
1	1270	3.67	34.556	27.49	3.29	45	2.09	***	31.0
1	1465	3.28	34.581	27.55	3.42	46	2.07	***	33.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 164/65	30/10/65	1500 H	28 03 S	108 23 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5458	13.3	16.7	23	5	16	6	5	8	23	3	23	1	1017.2	12	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.12	35.866	25.92	5.42	101	0.17	***	0.5
1	24	18.07	35.866	25.94	5.42	101	0.15	***	0.5
1	48	16.23	35.754	26.29	5.72	103	0.16	***	0.3
1	72	14.84	35.634	26.51	5.65	99	0.25	***	1.2
1	96	14.25	35.546	26.57	5.39	93	0.37	***	2.3
1	144	13.47	35.428	26.65	5.35	91	0.42	***	3.4
1	192	12.65	35.282	26.70	5.39	90	0.54	***	4.9
1	288	11.18	35.041	26.79	5.52	89	0.70	***	7.1
1	476	9.34	34.737	26.88	5.52	85	0.93	***	13.7
1	664	7.82	34.567	26.98	4.98	74	1.23	***	18.7
1	858	4.88	34.427	27.26	4.21	59	1.76	***	25.3
1	1056	3.98	34.504	27.42	3.53	48	1.97	***	32.9
1	1254	3.61	34.577	27.51	3.22	44	1.96	***	37.0
1	1453	3.10	34.622	27.60	3.38	45	1.92	***	34.8

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 165/65	30/10/65	2306 H	27 59 S	109 54 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5649	12.2	15.6	24	5	16	4	6	7	24	3	25	1	1018.2	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.85	35.688	25.34	5.19	100	0.15	***	0.1
1	24	19.83	35.684	25.35	5.19	100	0.14	***	0.3
1	48	19.46	35.699	25.45	5.28	101	0.14	***	0.2
1	72	18.54	35.738	25.72	4.92	92	0.23	***	0.6
1	97	18.04	35.788	25.88	5.07	94	0.20	***	0.4
1	145	17.00	35.804	26.15	5.06	92	0.25	***	0.7
1	193	15.71	35.698	26.37	5.09	90	0.30	***	1.5
1	290	13.15	35.330	26.64	5.34	90	0.49	***	3.5
1	486	9.36	34.734	26.87	5.54	86	0.95	***	11.1
1	683	7.51	34.528	27.00	4.91	73	1.36	***	16.0
1	880	4.67	34.419	27.27	4.18	58	1.81	***	27.7
1	1078	3.91	34.513	27.43	3.51	48	2.04	***	31.4
1	1276	3.44	34.572	27.52	3.31	45	2.02	***	35.7
1	1474	3.11	34.630	27.60	3.26	44	2.02	***	36.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 166/65	31/10/65	0442 H	27 54 S	110 49 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5649	12.2	16.1	22	5	16	8	4	7	22	3	22	1	1017.7	15	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.78	35.720	25.39	5.20	100	0.09	***	3.7
1	23	19.78	35.654	25.34	5.20	100	0.10	***	0.3
1	45	19.72	35.666	25.36	5.20	100	0.14	***	0.3
1	68	18.60	35.764	25.73	5.25	99	0.15	***	0.1
1	90	18.05	35.774	25.87	5.13	96	0.16	***	0.3
1	135	17.00	35.777	26.13	5.00	91	0.22	***	0.7
1	180	15.88	35.705	26.34	5.22	93	0.23	***	0.9
1	271	13.04	35.319	26.65	5.38	90	0.46	***	3.7
1	554	9.39	34.738	26.87	5.51	85	0.91	***	14.6
1	640	7.69	34.593	27.02	5.06	75	1.15	***	19.5
1	828	4.93	34.440	27.26	4.10	57	1.71	***	33.2
1	1017	4.18	34.510	27.40	3.42	47	1.93	***	34.6
1	1209	3.59	34.561	27.50	3.31	45	1.96	***	36.4
1	1404	3.16	34.610	27.58	3.37	45	1.94	***	35.7

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 167/65	31/10/65	1023 H	27 49 S	112 01 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
3179	12.4	17.4	22	5	16	8	2	7	22	3	22	1	1019.1	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.01	35.710	25.58	5.32	101	0.18	***	0.5
1	24	18.99	35.709	25.58	5.25	100	0.17	***	0.4
1	48	18.55	35.728	25.71	5.24	99	0.19	***	0.2
1	72	17.96	35.780	25.90	5.07	94	0.21	***	***
1	95	17.26	35.790	26.07	5.05	93	0.23	***	0.7
1	142	15.88	35.710	26.34	5.20	93	0.29	***	0.9
1	188	14.83	35.618	26.50	5.38	94	0.31	***	1.5
1	281	12.95	35.343	26.69	5.59	94	0.46	***	3.1
1	466	9.48	34.764	26.88	5.60	87	0.87	***	13.5
1	652	8.01	34.577	26.96	5.12	77	1.21	***	20.4
1	840	4.90	34.461	27.28	4.34	60	1.76	***	32.5
1	1033	4.02	34.515	27.42	3.44	47	2.00	***	36.4
1	1229	3.80	34.597	27.51	2.97	40	2.10	***	37.5
1	1426	3.24	34.623	27.58	3.24	43	2.02	***	37.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 168/65	31/10/65	1410 H	27 49 S	112 43 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
779	17.8	13.8	24	5	16	8	2	7	24	3	22	1	1018.0	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.99	35.665	25.29	5.20	100	0.15	***	0.4
1	25	19.92	35.659	25.30	5.22	101	0.14	***	0.2
1	50	18.73	35.703	25.65	5.26	99	0.13	***	0.1
1	75	18.32	35.724	25.77	5.27	99	0.14	***	0.1
1	100	18.02	35.740	25.85	5.19	97	0.18	***	0.1
1	149	17.08	35.767	26.10	5.12	94	0.23	***	0.6
1	198	15.59	35.678	26.38	5.34	95	0.29	***	1.0
1	297	10.60	34.937	26.82	5.58	89	0.74	***	10.4
1	495	7.36	34.529	27.02	4.90	72	1.29	***	21.5
1	692	5.06	34.450	27.25	4.04	57	1.75	***	30.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 170/65	31/10/65	1800 H	27 52 S	113 14 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
174	13.3	18.3	24	*	16	6	4	7	26	3	24	1	1017.2	10	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.75	35.526	24.98	5.20	102	0.18	***	0.4
1	10	20.73	35.522	24.98	5.14	101	0.13	***	0.1
1	20	20.74	35.520	24.98	5.13	100	0.15	***	0.1
1	29	20.74	35.516	24.98	5.12	100	0.15	***	0.1
1	39	20.70	35.525	24.99	5.12	100	0.17	***	0.1
1	48	20.55	35.544	25.05	5.10	100	0.15	***	0.0
1	72	20.34	35.548	25.11	4.83	94	0.21	***	0.4
1	96	20.22	35.560	25.15	4.89	95	0.21	***	0.3
1	120	20.12	35.580	25.19	4.86	94	0.20	***	0.3
1	144	19.54	35.635	25.38	4.85	93	0.21	***	0.4
1	168	19.12	35.666	25.52	4.72	90	0.29	***	0.9

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 171/65	1/11/65	0230 H	26 02 S	112 28 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
155	15,0	18,9	19	5	16	2	5	7	19	3	22	1	1017,0	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.64	35.413	24.65	5.06	101	0.15	***	0.2
1	10	21.63	35.402	24.64	5.07	101	0.13	***	0.4
1	20	21.66	35.399	24.64	5.03	100	0.14	***	0.2
1	30	21.65	35.395	24.63	5.05	101	0.14	***	0.1
1	40	21.24	35.439	24.78	5.08	100	0.16	***	0.1
1	50	20.97	35.491	24.90	4.99	98	0.15	***	0.1
1	75	20.20	35.573	25.16	4.93	96	0.21	***	0.2
1	100	19.67	35.639	25.35	4.80	92	0.23	***	0.5
1	125	19.53	35.663	25.41	4.73	91	0.25	***	0.7
1	150	18.88	35.725	25.62	5.00	95	0.19	***	0.3
1	175	18.36	35.750	25.77	4.92	92	0.25	***	0.5

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 173/65	1/11/65	0600 H	26 02 S	112 05 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
647	14.4	18.3	19	4	16	8	8	7	19	3	20	1	1018.4	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.67	35.398	24.63	5.03	100	0.16	***	0.0
1	25	21.69	35.398	24.62	5.02	100	0.15	***	0.1
1	49	21.69	35.395	24.62	5.02	100	0.15	***	0.1
1	74	20.08	35.601	25.22	5.10	99	0.15	***	0.2
1	98	19.62	35.664	25.39	4.84	93	0.17	***	0.6
1	147	18.04	35.778	25.87	4.99	93	0.21	***	0.3
1	196	17.45	35.791	26.03	5.06	93	0.23	***	0.6
1	292	13.71	35.410	26.58	5.35	91	0.43	***	3.0
1	485	8.95	***	***	5.43	***	1.01	***	12.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 174/65	1/11/65	1038 H	26 02 S	111 03 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
2522	14,4	20,0	18	6	16	6	4	7	22	3	22	1	1020.6	20	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.79	35.525	24.97	5.13	101	0.14	***	0.3
1	24	20.77	35.525	24.98	5.14	101	0.13	***	0.3
1	47	20.79	35.524	24.97	5.11	100	0.14	***	0.3
1	71	20.76	35.546	24.99	5.10	100	0.15	***	0.1
1	94	19.82	35.612	25.29	4.94	95	0.18	***	0.3
1	138	18.72	35.774	25.70	4.77	90	0.24	***	0.8
1	182	18.07	35.794	25.88	5.10	95	0.20	***	0.4
1	268	15.91	35.698	26.32	5.15	92	0.31	***	1.1
1	442	11.08	35.022	26.80	5.55	89	0.69	***	6.7
1	616	8.80	34.669	26.91	5.41	83	1.01	***	15.0
1	790	5.92	34.444	27.14	4.51	64	1.55	***	26.5
1	972	4.73	34.542	27.36	3.05	42	1.98	***	35.4
1	1164	4.13	34.597	27.47	2.80	38	2.04	***	36.8
1	1358	3.62	34.619	27.54	3.00	41	2.05	***	36.8

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 175/65	1/11/65	1555 H	26 02 S	109 57 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
4221	14.4	18.9	16	4	16	6	5	7	16	3	20	1	1020.0	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.64	35.544	25.03	5.10	100	0.15	***	0.5
1	25	20.60	35.540	25.03	5.14	100	0.13	***	0.2
1	49	20.48	35.576	25.09	5.14	100	0.13	***	0.1
1	74	20.42	35.595	25.12	5.12	100	0.13	***	0.2
1	98	20.15	35.602	25.20	5.02	97	0.13	***	0.0
1	147	18.82	35.731	25.64	4.84	91	0.20	***	0.3
1	196	17.76	35.807	25.97	4.92	91	0.24	***	0.4
1	293	14.69	35.571	26.50	5.21	91	0.39	***	1.1
1	487	10.10	34.881	26.86	5.55	87	0.81	***	5.6
1	679	8.05	34.593	26.97	5.07	76	1.23	***	11.3
1	870	4.98	34.457	27.27	3.91	55	1.81	***	22.4
1	1063	4.29	34.555	27.42	3.01	41	2.09	***	23.4
1	1259	3.66	34.598	27.52	3.04	41	2.07	***	17.9
1	1457	3.24	34.644	27.60	3.14	42	2.12	***	27.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 176/65	1/11/65	2230 H	25 58 S	109 02 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
4184	15.0	18.9	20	5	16	8	7	7	20	3	20	1	1019.5	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.06	35.683	25.29	5.23	101	0.14	***	0.4
1	25	20.03	35.688	25.30	5.20	101	0.14	***	0.1
1	49	20.04	35.685	25.29	5.28	102	0.14	***	0.2
1	74	19.71	35.680	25.37	5.22	100	0.13	***	0.2
1	98	18.99	35.742	25.61	5.13	97	0.16	***	0.2
1	146	17.81	35.804	25.95	4.91	91	0.23	***	0.8
1	195	16.91	35.777	26.15	4.96	90	0.30	***	0.9
1	292	13.44	35.385	26.62	5.33	90	0.46	***	2.7
1	487	7.79	34.586	27.00	5.03	75	1.22	***	13.1
1	682	4.90	34.427	27.25	4.25	59	1.70	***	16.8
1	879	4.15	34.510	27.40	3.36	46	1.95	***	15.7
1	1077	3.74	34.576	27.50	3.14	43	2.03	***	22.1
1	1275	3.21	34.620	27.58	3.28	44	1.97	***	***
1	1474	2.88	34.659	27.65	3.41	45	1.96	***	18.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 177/65	2/11/65	0330 H	25 53 S	107 54 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
4987	12.2	17.2	20	1	16	8	9	7	19	3	23	1	1018.0	8	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.90	35.683	25.59	5.26	100	0.20	***	0.2
1	24	18.63	35.786	25.73	5.32	100	0.17	***	0.3
1	48	18.55	35.809	25.77	5.31	100	0.17	***	0.1
1	72	17.88	35.805	25.94	5.07	94	0.21	***	0.4
1	97	17.35	35.812	26.07	5.04	93	0.25	***	0.7
1	145	16.50	35.802	26.27	5.24	95	0.26	***	0.6
1	194	15.18	35.688	26.48	5.41	95	0.32	***	1.0
1	290	12.92	35.348	26.70	5.42	91	0.52	***	***
1	482	9.78	34.825	26.87	5.57	87	0.89	***	5.2
1	672	8.06	34.584	26.96	5.10	76	1.23	***	12.0
1	860	5.30	34.441	27.22	4.28	60	1.75	***	13.6
1	1053	4.46	34.540	27.39	3.13	43	2.08	***	20.7
1	1247	3.68	34.578	27.51	3.16	43	2.06	***	19.1
1	1443	3.21	34.613	27.58	3.34	45	2.01	***	24.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 178/65	2/11/65	0735 H	25 49 S	107 02 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
5837	13.9	18.3	19	3	16	8	8	7	19	3	19	1	1021.0	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.74	35.654	25.35	5.20	100	0.13	***	0.2
1	23	19.75	35.652	25.34	5.21	100	0.12	***	0.2
1	47	19.75	35.652	25.34	5.19	100	0.13	***	0.1
1	70	19.77	35.652	25.34	5.20	100	0.14	***	0.2
1	94	19.19	35.682	25.51	5.06	96	0.16	***	0.3
1	140	18.38	35.783	25.79	5.16	97	0.15	***	0.4
1	187	17.40	35.820	26.07	5.26	97	0.20	***	0.3
1	278	15.44	35.715	26.44	5.39	95	0.29	***	0.8
1	463	11.21	35.069	26.81	5.59	90	0.66	***	3.8
1	649	8.91	34.676	26.90	5.43	83	1.00	***	5.9
1	836	6.18	34.462	27.13	4.48	64	1.51	***	18.8
1	1023	4.70	34.557	27.38	2.87	40	2.02	***	22.4
1	1213	4.18	34.601	27.47	2.84	39	2.02	***	19.5
1	1408	3.81	34.625	27.53	2.86	39	2.02	***	20.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 179/65	2/11/65	1718 H	23 56 S	107 02 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSU-E	WIRE ANGLES CAST1	CAST2	CAST3
4127	15.0	13.3	22	2	16	8	7	7	17	2	17	1	1014.6	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.35	35.268	24.62	5.05	100	0.16	***	0.3
1	24	21.21	35.258	24.65	5.08	100	0.19	***	0.2
1	48	20.50	35.423	24.97	4.67	91	0.30	***	0.7
1	72	19.99	35.594	25.24	5.16	100	0.19	***	0.0
1	97	19.81	35.641	25.32	5.17	100	0.18	***	0.1
1	144	19.73	35.645	25.34	5.16	99	0.18	***	0.1
1	191	18.83	35.732	25.64	4.80	91	0.26	***	0.4
1	281	15.99	35.726	26.33	5.05	90	0.34	***	0.8
1	467	11.14	35.040	26.80	5.41	87	0.75	***	6.6
1	661	8.60	34.646	26.93	5.29	80	1.16	***	9.8
1	857	5.98	34.535	27.21	3.40	49	1.86	***	19.5
1	1054	4.73	34.585	27.40	2.75	38	2.17	***	29.0
1	1251	4.05	34.605	27.49	2.81	38	2.02	***	27.0
1	1447	3.50	34.628	27.56	3.04	41	2.02	***	25.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 180/65	2/11/65	2335 H	23 54 S	108 08 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
2690	15.0	20.6	17	4	16	6	7	7	17	3	21	1	1017.4	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.51	35.698	25.44	5.18	99	0.12	***	0.4
1	25	19.17	35.732	25.55	5.22	99	0.12	***	0.2
1	49	18.81	35.779	25.68	5.32	101	0.12	***	0.3
1	74	18.67	35.783	25.72	5.26	99	0.12	***	0.0
1	98	18.40	35.787	25.79	4.92	92	0.20	***	0.6
1	147	17.53	35.805	26.02	4.93	91	0.25	***	1.1
1	197	16.56	35.797	26.25	5.22	94	0.22	***	0.5
1	295	14.08	35.516	26.59	5.28	91	0.40	***	2.8
1	490	10.40	34.913	26.83	5.60	89	0.77	***	11.2
1	685	8.21	34.595	26.95	5.16	78	1.12	***	19.5
1	880	5.10	34.448	27.25	4.08	57	1.72	***	33.9
1	1075	4.34	34.571	27.43	2.89	40	1.98	***	38.5
1	1271	3.86	34.619	27.52	2.84	39	2.00	***	38.5
1	1468	3.41	34.652	27.59	3.03	41	1.98	***	39.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 181/65	3/11/65	0435 H	23 53 S	109 09 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
3462	14,4	17.8	16	2	16	8	6	7	17	2	18	1	1014.7	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.34	35.622	25.17	5.20	101	0.13	***	0.3
1	25	20.11	35.670	25.26	5.17	100	0.14	***	0.3
1	50	19.65	35.723	25.42	5.18	99	0.16	***	0.1
1	75	18.78	35.767	25.68	5.27	100	0.16	***	0.5
1	100	18.53	35.779	25.75	4.91	92	0.22	***	0.7
1	148	17.56	35.812	26.02	5.05	93	0.21	***	0.5
1	198	16.54	35.784	26.24	5.18	94	0.27	***	0.6
1	296	12.84	35.314	26.69	5.41	90	0.53	***	4.0
1	491	9.70	34.826	26.89	5.57	87	0.86	***	12.3
1	684	7.51	34.547	27.01	4.93	73	1.45	***	21.3
1	878	4.95	34.518	27.32	3.31	46	1.96	***	34.9
1	1073	4.41	34.604	27.45	2.69	37	2.14	***	32.7
1	1270	3.86	34.626	27.52	2.81	38	2.14	***	36.3
1	1467	3.43	34.652	27.59	3.06	41	2.10	***	36.9

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 182/65	3/11/65	0935 H	23 52 S	110 14 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
4702	14.4	18.9	21	2	16	6	7	7	20	2	21	1	1016.3	10	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.72	35.364	24.59	5.03	100	0.17	***	0.5
1	24	21.68	35.357	24.60	5.02	100	0.15	***	0.8
1	48	21.71	35.357	24.59	5.00	100	0.16	***	0.6
1	72	21.67	35.354	24.60	4.95	99	0.15	***	0.4
1	97	20.63	35.451	24.96	4.76	93	0.21	***	1.0
1	145	19.15	35.663	25.51	4.55	87	0.31	***	1.2
1	194	17.79	35.745	25.91	4.62	86	0.34	***	1.6
1	288	15.01	35.581	26.43	4.91	86	0.45	***	2.9
1	476	10.74	34.963	26.81	5.42	86	0.81	***	11.2
1	664	8.29	34.615	26.95	5.08	77	1.19	***	18.3
1	851	5.63	34.510	27.23	3.51	50	1.84	***	31.9
1	1043	4.18	34.517	27.41	3.39	46	2.05	***	33.4
1	1239	3.68	34.575	27.50	3.13	42	2.03	***	35.0
1	1436	3.34	34.638	27.59	3.09	42	2.00	***	35.6

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 183/65	3/11/65	1455 H	23 53 S	111 07 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
3537	15.0	19.4	23	2	16	*	*	7	*	2	21	1	1014.4	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.90	35.392	24.56	5.04	101	0.17	***	0.7
1	24	21.50	35.413	24.69	5.08	101	0.14	***	0.3
1	48	20.42	35.416	24.99	5.08	99	0.14	***	0.3
1	72	20.41	35.534	25.08	5.04	98	0.14	***	0.2
1	97	19.89	35.584	25.25	4.89	94	0.17	***	0.4
1	145	18.91	35.701	25.60	4.62	87	0.28	***	1.2
1	193	17.63	35.781	25.98	4.83	89	0.28	***	1.1
1	289	14.12	35.492	26.56	5.18	89	0.47	***	***
1	481	9.84	34.812	26.85	5.51	86	0.84	***	***
1	674	7.67	34.548	26.99	4.96	74	1.44	***	21.1
1	868	5.24	34.528	27.29	3.32	47	1.90	***	37.1
1	1062	4.64	34.605	27.42	2.58	36	2.13	***	37.4
1	1258	3.94	34.613	27.51	2.82	38	2.11	***	36.3
1	1454	3.47	34.642	27.58	3.01	41	2.02	***	33.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 184/65	3/11/65	1935 H	23 58 S	112 06 E

SONIC DE-TH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSU-E	WIRE ANGLES CAST1	CAST2	CAST3
969	15.0	19.4	23	2	16	*	*	7	*	2	21	1	1013.2	10	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.98	35.343	24.50	5.01	100	0.17	***	0.3
1	25	21.96	35.335	24.50	5.03	101	0.15	***	0.2
1	50	21.80	35.355	24.56	4.95	99	0.16	***	0.3
1	75	21.62	35.425	24.67	4.97	99	0.17	***	0.2
1	100	20.77	35.398	24.88	4.43	87	0.30	***	1.3
1	148	20.23	35.531	25.12	4.62	90	0.29	***	1.1
1	197	18.57	35.727	25.70	4.74	89	0.32	***	1.0
1	295	14.43	35.500	26.50	5.24	91	0.44	***	3.0
1	490	9.35	34.737	26.87	5.55	86	0.96	***	13.6
1	686	5.69	34.495	27.21	3.86	55	1.76	***	29.4
1	883	5.21	34.626	27.38	2.45	34	2.09	***	34.9

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 3/ 186/65	4/11/65	0015 H	24 06 S	112 49 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
188	16.1	20.0	25	4	16	8	4	7	24	2	20	1	1013.6	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.79	35.397	24.60	5.04	101	0.18	***	0.3
1	10	21.84	35.397	24.58	5.04	101	0.19	***	0.4
1	20	21.76	35.404	24.61	5.04	101	0.18	***	0.1
1	30	21.74	35.409	24.62	5.00	100	0.18	***	0.2
1	40	21.70	35.428	24.65	5.04	100	0.18	***	0.3
1	50	21.59	35.456	24.70	5.02	100	0.17	***	0.2
1	75	21.05	35.585	24.95	4.80	95	0.20	***	0.4
1	100	20.33	35.580	25.14	4.68	91	0.28	***	0.6
1	125	20.10	35.607	25.22	4.76	92	0.28	***	0.6
1	150	19.66	35.603	25.33	4.68	90	0.28	***	0.8
1	168	17.66	35.698	25.91	4.75	88	0.38	***	1.0

DATA

PART 3

CRAYFISH LARVAE

EXPLANATION OF HEADINGS

Part 3	Crayfish Larvae
STN	Gives the station number
DATE	Given in day/month/year
LATITUDE LONGITUDE	Given in degrees and minutes
TIME	Given in Zone Time, and is the time at the beginning of the tow. The code letter for the time zone follows the time. Zone Time throughout the cruise was Western Australian Standard Time, GMT +8 hr, Code H
DURATION	Duration of tow given in minutes
DEPTH	Sampling depth given in metres

A blank indicates no crayfish larvae in sample
* Scyllarid
+ Plus 2 casts

SURFACE PLANKTON SAMPLES

STN	DATE	LATITUDE	LONGITUDE	TIME	DURATION	DEPTH	PHYLLOSOMA Panulirus longipes cygnus Stage IV	V	VI	VII	VIII	IX	XI	Panulirids	Other genera	PUERULUS Panulirus longipes cygnus
141	25/10/65	34 00 S.	114 29 E.	2218 H	32	0									6*	
144	26/10/65	34 00 S.	112 33 E.	1030 H	30	0										
147	27/10/65	34 00 S.	110 00 E.	0306 H	31	0			1						3	
148	27/10/65	31 54.5 S.	110 10 E.	1344 H	30	0									1	
151	28/10/65	32 01.3 S.	112 26.5 E.	0313 H	33	0		1	1	1	3				4	
154	28/10/65	31 58 S.	115 01 E.	1423 H	30	0									1	
157	29/10/65	29 55 S.	114 24 E.	0327 H	30	0										
160	29/10/65	29 56.5 S.	112 37.0 E.	1350 H	30	0										
163	30/10/65	29 58.5 S.	110 07 E.	0405 H	30	0								1	6	
164	30/10/65	28 03 S.	108 23 E.	1616 H	31	0										
165	31/10/65	27 58.5 S.	109 54 E.	0031 H	32	0				1	2				1	1*
169	31/10/65	27 50 S.	112 54 E.	1603 H	30	0										
172	1/11/65	26 02 S.	112 21.5 E.	0407 H	31	0										
				0443 H	30	0										
175	1/11/65	26 02 S.	109 57 E.	1817 H	31	0										
				1852 H	29	0										
178	2/11/65	25 49 S.	107 02 E.	0909 H	31	0										
				0943 H	30	0										
179	2/11/65	23 56 S.	107 02 E.	1846 H	31	0										
				1920 H	20	0						1				
182	3/11/65	23 51.5 S.	110 14 E.	1049 H	31	0										
				1122 H	29	0										
185	3/11/65	24 00 S.	112 23.5 E.	2150 H	30	0									2	
				2225 H	30	0									1	

MIDWATER TRAWL SAMPLES

STN	DATE	LATITUDE	LONGITUDE	TIME	DURATION	DEPTH	PHYLLOSOMA							PUERULUS	
							Panulirus longipes cygnus Stage						Other Palinurids	Other genera	Panulirus longipes cygnus
							IV	V	VI	VII	VIII	IX			
141	25/10/65	34 00 S.	114 29 E.	2215 H	111	300–0								2*	
				2215 H	66	190–0								5*	
144	26/10/65	34 00 S.	112 33 E.	0954 H	146	200–0							1	1	
				0954 H	66	190–0					1			17	
147	27/10/65	34 00 S.	110 00 E.	0236 H	61	215									
				0236 H	57	70								2	
148	27/10/65	31 54.5 S.	110 10 E.	1314 H	81	245–150	1							2	
				1314 H	78	150–0								7	
151	28/10/65	32 01.3 S.	112 26.5 E.	0243 H	82	245–150								3	
				0243 H	79	150–0								3+	
154	28/10/65	31 58 S.	115 01 E.	1453 H	59	300									
				1453 H	56	150						1		7	
157	29/10/65	29 55 S.	114 24 E.	0319 H	70	300–0					1			9	
160	29/10/65	29 56.5 S.	112 37.0 E.	1345 H	70	300–0		1						4	
163	30/10/65	29 58.5 S.	110 07 E.	0358 H	71	215–0								1	
164	30/10/65	28 03 S.	108 23 E.	1614 H	69	205–0									
165	31/10/65	27 58.5 S.	109 54 E.	0025 H	77	165–0			2	1	1			2	1
169	31/10/65	27 50 S.	112 54 E.	1605 H	68	215–0					4				
172	1/11/65	26 02 S.	112 21.5 E.	1411 H	67	245–0					1				
175	1/11/65	26 02 S.	109 57 E.	1816 H	70	200–0				1					
178	2/11/65	25 49 S.	107 02 E.	0913 H	67	215–0								1	
179	2/11/65	23 56 S.	107 02 E.	1845 H	66	200–0									
182	3/11/65	23 51.5 S.	110 14 E.	1052 H	67	190–0									
185	3/11/65	24 00 S.	112 23.5 E.	2155 H	67	240–0							1		

OCEANOGRAPHICAL CRUISE REPORTS

1. Oceanographical observations in the Indian Ocean in 1959. H.M.A.S. *Diamantina* Cruises Dm1/59 and Dm2/59.
2. Oceanographical observations in the Indian Ocean in 1960. H.M.A.S. *Diamantina* Cruise Dm1/60.
3. Oceanographical observations in the Indian Ocean in 1960. H.M.A.S. *Diamantina* Cruise Dm2/60.
4. Oceanographical observations in the Indian Ocean in 1960. H.M.A.S. *Diamantina* Cruise Dm3/60.
5. Oceanographical observations in the Pacific Ocean in 1960. H.M.A.S. *Gascoyne* Cruises G1/60 and G2/60.
6. Oceanographical observations in the Pacific Ocean in 1960. H.M.A.S. *Gascoyne* Cruise G3/60.
7. Oceanographical observations in the Indian Ocean in 1961. H.M.A.S. *Diamantina* Cruise Dm1/61.
8. Oceanographical observations in the Pacific Ocean in 1961. H.M.A.S. *Gascoyne* Cruise G1/61.
9. Oceanographical observations in the Indian Ocean in 1961. H.M.A.S. *Diamantina* Cruise Dm2/61.
10. Oceanographical observations in the Indian and Pacific Oceans in 1961. H.M.A.S. *Gascoyne* Cruise G2/61.
11. Oceanographical observations in the Indian Ocean in 1961. H.M.A.S. *Diamintina* Cruise Dm3/61.
12. Oceanographical observations in the Pacific Ocean in 1961. H.M.A.S. *Gascoyne* Cruise G3/61.
13. Oceanographical observations in the Pacific Ocean in 1962. H.M.A.S. *Gascoyne* Cruise G1/62.
14. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm1/62.
15. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm2/62.
16. Oceanographical observations in the Pacific and Indian Oceans in 1962. H.M.A.S. *Gascoyne* Cruises G2/62 and G3/62.
17. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Gascoyne* Cruise G4/62.
18. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm3/62.
19. Oceanographical observations in the Pacific Ocean in 1962. H.M.A.S. *Gascoyne* Cruise G5/62.
20. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm4/62.
21. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G1/63.
22. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G2/63.
23. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm1/63.
24. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm2/63.
25. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm3/63.
26. Oceanographical observations in the Pacific Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G3/63.
29. Oceanographical observations in the Pacific Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G4/63.
30. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm6/63.
31. Oceanographical observations in the Pacific Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G5/63.
32. Oceanographical observations in the Pacific Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G1/64.
33. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm1/64.
34. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G2/64.

OCEANOGRAPHICAL CRUISE REPORTS

(Continued)

35. Oceanographical observations in the Indian and Pacific Oceans in 1964. H.M.A.S. *Gascoyne* Cruise G3/64.
36. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm2/64.
38. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm4/64.
39. Oceanographical observations in the Pacific Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G4/64.
40. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm5/64.
41. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G5/64.
42. Oceanographical observations in the Pacific Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G6/64.
43. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G2/65.
44. Oceanographical observations in the Pacific Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G3/65.
45. Oceanographical observations in the Pacific Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G4/65.
46. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G5/65.
49. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Diamantina* Cruise Dm2/65.
51. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Diamantina* Cruise Dm3/65.
53. Oceanographical observations in the Indian Ocean in 1966. H.M.A.S. *Diamantina* Cruise Dm1/66.
54. Oceanographical observations in the Indian Ocean in 1966. H.M.A.S. *Diamantina* Cruise Dm2/66.