OCEANOGRAPHICAL OBSERVATIONS
IN THE INDIAN OCEAN IN 1961
H.M.A.S. *DIAMANTINA*
Cruise Dm 1/61

OCEANOGRAPHICAL CRUISE REPORT NO. 7

DIVISION OF FISHERIES AND OCEANOGRAPHY
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION, AUSTRALIA 1963

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H.M.A.S. DIAMANTINA

Cruise Dm 1/61

made by

C.S.I.R.O. DIVISION OF FISHERIES AND OCEANOGRAPHY

CRONULLA, SYDNEY

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH

ORGANIZATION, AUSTRALIA

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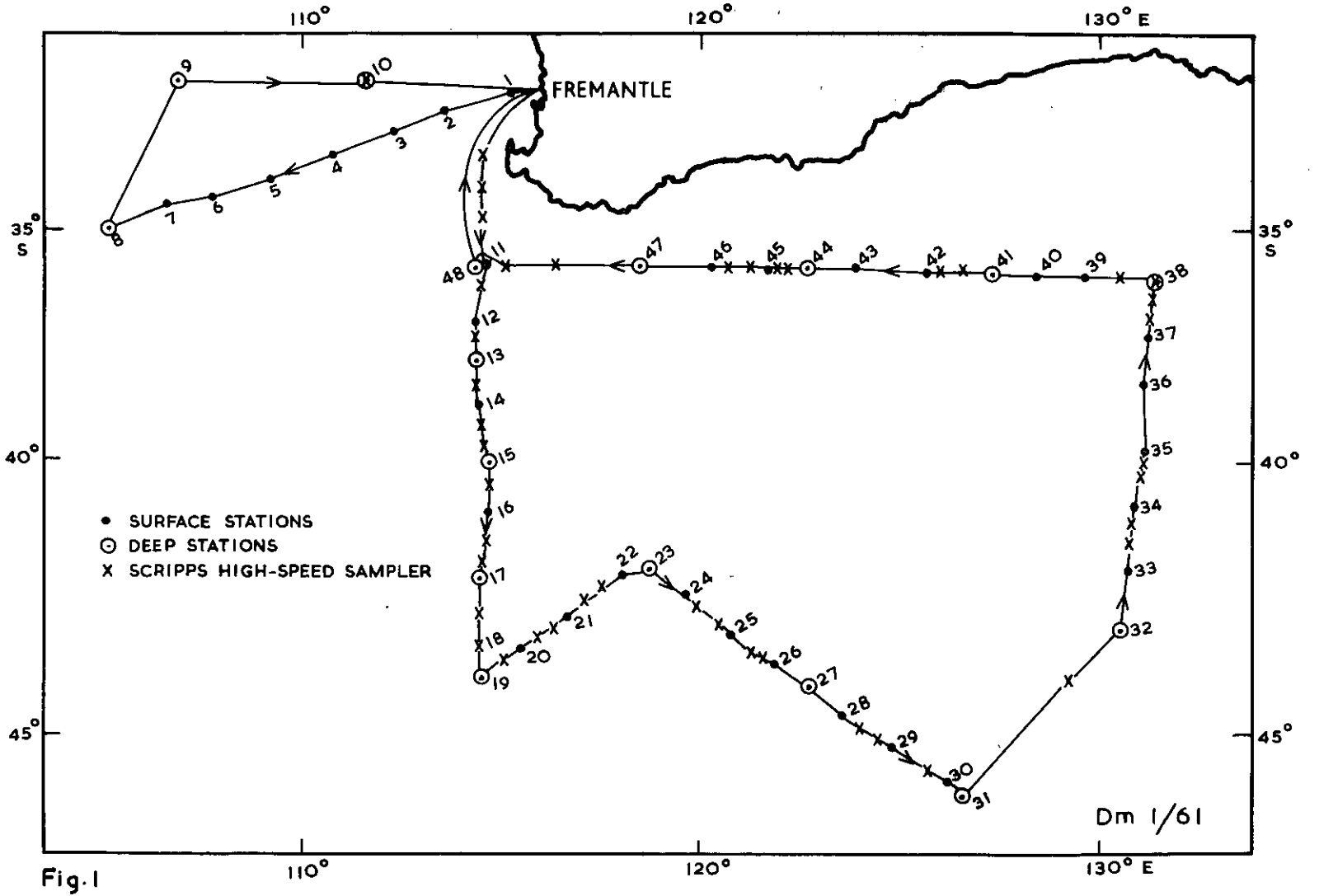
110°
120°
130° E
35° S
40°
45°
FREMANTLE
• SURFACE STATIONS
⊙ DEEP STATIONS
X SCRIPPS HIGH-SPEED SAMPLER
Dm 1/61

Fig. 1

OCEANOGRAPHICAL CRUISE REPORT

No. 7

Oceanographical Observations in the Indian Ocean in 1961

H.M.A.S. Diamantina

Cruise Dm 1/61

February 14 - March 10, 1961

I. INTRODUCTION

Data are recorded in this volume for the first cruise in 1961 of H.M.A.S. Diamantina, Royal Australian Navy frigate, in the Indian Ocean.

Objectives

During this cruise it was planned to locate and chart the Diamantina Deep, to examine the composition of water masses, to extend the network of oceanographical stations worked during Cruise Dm 1/60, to work lines of stations south of Australia in a plan involving intensive sampling by H.M.A.S. Gascoyne in an adjacent area to the east.

Itinerary

The cruise commenced at Fremantle on February 14, occupied SCOR-UNESCO Reference Station 1, and then a series of eight stations on a south-west line to the region in which the Diamantina Deep had been recorded on Cruise Dm 3/60. Bad weather hampered operations and the ship returned to Fremantle on February 21. The second part of the cruise commenced on February 26 to work south and then east into the Great Australian Bight (Figure 1).

Scientific Personnel

D.J. Rochford (14/2/61 - 21/2/61) Cruise Leader
D.J. Tranter (26/2/61 - 10/3/61) Cruise Leader
K. Abbott-Smith (14/2/61 - 21/2/61)
F. Davies
N. Dyson
T. Middleton
W. Prothero (26/2/61 - 10/3/61).

The analyses of hydrological samples were done in the ship's laboratory by Messrs Abbott-Smith, Davies, and Prothero. The primary production samples were taken and incubated aboard by Mr Dyson, and the counts were made at Cronulla by Mr Scott. The samples for pigment determination were taken aboard by Mr Dyson, and the analyses were done at Cronulla by Mr Wootton. Counts of phytoplankton were made aboard by Mr Middleton, and the identifications were made at Cronulla by Mr E.J.F. Wood. The zooplankton samples were weighed at Cronulla by Mr D.J. Tranter.

The data were processed under the direction of Mr Crooks by Mrs Derrick, Mrs Tarbett, and Misses Johnston, Lalor, and Wanstall. The plots were prepared for publication by Mr Breach and Mrs Walters.

II. WORK ACCOMPLISHED

Bathythermograph casts were made at 43 stations. Zooplankton, primary production, and pigment samples were taken at 16 stations, phytoplankton at 15. Surface hydrology samples were taken at 46 stations, and at 16 of these surface stations, deep hydrology casts were also made. The Scripps high speed sampler for zooplankton was used 39 times (Table 1).

TABLE 1

WORK DONE AT EACH STATION

Station Number	BT	Hydrology Surface	Hydrology Deep	Primary Production	Pig-ments	Phyto-plankton 1	Phyto-plankton 2	Phyto-plankton 3	Zoo-plankton 1	Zoo-plankton 2
1	+	+				+	+	+		+
2	+	+						+		
3	+	+								
4	+	+								
5	+	+						+		
6	+	+								
7	+	+								
8	+	+	+	+	+				+	
9	+	+	+	+	+	+	+		+	
10	+	+	+	+	+	+	+		+	
11										++
12		+		+					+	+
13	+	+	+		+	+	+			+
14	+	+								+
15	+	+	+	+	+	+	+		+	++
16	+	+								++
17	+	+	+	+	+	+	+		+	+
18	+	+								+
19	+	+	+	+	+	+	+		+	++
20	+	+								+
21	+	+								++
22	+	+								+
23	+	+	+	+	+	+	+		+	
24	+	+								++
25	+	+								+
26	+	+								+

BT Bathythermograms

Phytoplankton
1 Quantitative
2 Qualitative
3 Hardy Indicator

Zooplankton
1 Clarke-Bumpus sampler
2 Scripps high speed sampler
(++ indicate two hauls)

Station Number	BT	Hydrology Surface	Hydrology Deep	Primary Production	Pig-ments	Phyto-plankton 1	Phyto-plankton 2	Phyto-plankton 3	Zoo-plankton 1	Zoo-plankton 2
27	+	+	+	+	+	+	+		+	
28	+	+								+
29	+	+								++
30		+								+
31	+	+	+	+	+	+	+		+	
32	+	+	+	+	+	+	+		+	
33	+	+								++
34		+								+
35										+
36	+	+								
37	+	+								+
38	+	+	+	+	+	+	+		+	+
39	+	+								+
40	+	+								
41	+	+	+	+	+	+	+		+	++
42	+	+								
43	+	+								
44	+	+	+	+	+				+	+
45	+	+								++
46	+	+								+
47	+	+	+	+	+	+	+		+	
48	+	+	+	+	+	+	+		+	

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 -2° to 30°C, or -4° to 60°C. The readings are recorded in degrees Celsius.

Bathythermograph.- A 900 ft bathythermograph was used at the stations indicated in Table 1. Photographs of each slide are filed at Cronulla.

Thermometric Depth.- Depth calculations were made by the method described by Pollak (1950), and are considered accurate to $\pm$ 15 m below 1000 m and to 1% above that depth.

σ_t.- Sigma-t values were calculated by computer, using the Table of σ_t given by the United States Hydrographic Office (1951).

Dynamic Heights.- Dynamic heights were calculated from interpolated values of temperature and salinity using Tables 6, 7, and 9 given by La Fond (1951).

2. Chemistry

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

Dissolved Oxygen.- The standard Winkler method (Jacobsen, Robinson and Thompson 1950) was used with potassium iodate as the iodometric standard. Samples were collected in 275-300 ml capacity bottles and 100 ml duplicate aliquots were titrated to a starch end point. Values are given as ml/l. Duplicate titrations agreed to better than 0.03 ml/l of oxygen.

Oxygen Saturation.- Oxygen percentage saturation values were calculated by computer using the equations of Richards and Corwin (1956).

Inorganic Phosphate.- The method of Atkins (1923) was used with 1 ml molybdate reagent (300 ml 10% ammonium molybdate and 100 ml 50% sulphuric acid) and 0.1 ml 1% stannous chloride diluted afresh from a 40% stock solution in hydrochloric acid, which was kept under paraffin. The reagents were automatically dispensed by a piston dispenser. Standard phosphate solutions were made up in distilled water. Analyses were carried out in batches of 10 at air temperatures less than 25°C; readings were begun within 10 minutes after the reagents were added, and completed within a further 10 minutes. At air temperatures greater than 25°C batches of 6 were analysed within 5 minutes after reagents were added and completed within a further 7 minutes. Each batch was compared with a distilled water blank and a 0.65 µg at./l standard in a Hilger Spekker absorptiometer using 4 cm cells and Ilford 608 filters. Each week a complete check was made using standards up to 3.25 µg at./l. Results are given as µg at.P/l without any correction for salt error and are precise to ± 10% for values less than 0.5 µg at./l and + 5% for higher values. If it is wished 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% 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, 100 ml of distilled water and 2 drops of 2% phenophthalein were added. If alkaline, perchloric acid was added until a slight acidity persisted. The flasks were allowed to stand for about 24 hours to allow the salts to dissolve. Phosphate was then determined as described above for inorganic phosphate. Results are given as µg at./l, without salt correction. If it is wished to correct for salt effects, the results given should be multiplied by 1.15.

Nitrate.- Samples were taken, stored at sea in plastic bottles, and preserved with 2 drops of saturated $HgCl_2$. Nitrate was determined at Cronulla by the strychnidine method (Rochford 1947). The reagent was prepared by the addition of 0.64g strychnidine to a litre of nitrate-free sulphuric acid. 5 ml of this reagent were added, with minimum agitation, to 5 ml seawater or standard nitrate solution. The standards were made up

in a mixture of equal volumes of artificial sea-water and nitrate-free sulphuric acid. The standards and samples were shaken to distribute the reagent, and the colour developed for 2 hours. The solutions were read in a UNICAM SP 600 spectrophotometer at a wavelength of 530 mμ using a 5 mm cell. Samples with an absorbence greater than that of the standard corresponding to 14.4 μg at./l were diluted with artificial sea-water - sulphuric acid mixture before reading. Results are given in μg at./l.

3. Primary Production

Measurements of photosynthetic uptake of CO_2 were made by the ^{14}C method described by Jitts (1957) with the exceptions that radioactivity was measured on board with a windowless Geiger counter and the determination of ^{14}C stock activities was made by the method of Jitts and Scott (1961).

Incubation was done in a fluorescent light incubator with a constant illumination of about 1100 ft candles.

4. Pigments

Water samples were taken with a plastic sampler and filtered within one or two hours through HA Millipore filters. The filters were placed in envelopes and stored in metal desiccators over silica gel. The analyses were carried out at Cronulla using the method given by Humphrey (1960).

5. Phytoplankton

Samples were collected in a 5 l plastic sampler (Davis 1957) at 0, 25, 50, 75, 100, and 150 m. The samples were transferred to polythene bottles and centrifuged immediately at 5,000g in a continuous centrifuge (Davis 1957); each 5 l sample took 15 min. The residue in the cup was carefully washed into a graduated tube and diluted to 10 ml with sea-water.

Quantitative Examination.- All counts were made with a Petroff Hausser bacterial counting chamber. If the count was more than five per field, four fields were counted; if the count was less than five per field, ten fields were counted.

Organisms with chlorophyll were counted by using a Wild BG 12 fluorescence filter, a Wild OG 1 exclusion filter, an immersed condenser, and a high-power incandescent lamp. The chloroplasts appeared bright red in the blue-violet light.

Organisms without chlorophyll were calculated as the difference between total living organisms and organisms with chlorophyll. Total living organisms were counted after adding acridine orange to give a final concentration of 2 parts per million. The living organisms gave a green fluorescence in the blue-violet light produced by the filter system described above.

Total particles were counted with ordinary illumination.

Qualitative Examination.- Twenty minute tows were made with a modified Hardy Indicator. The plankton was washed off the metal grid (120 meshes/in.) with sea-water, and formalin was added to give a final concentration of 2%. Identifications were made at Cronulla (Tables 3 and 4).

6. Zooplankton

Zooplankton was collected with a modified Clarke-Bumpus unit. A new and more robust flowmeter was fitted which was designed and constructed at the Cronulla laboratory, and was calibrated in the flume tank designed for this purpose. The net was of nylon No. 4 mesh (62 meshes per inch).

Oblique hauls were made from 200 m to the surface and 400 to 200 m. Horizontal hauls were made at various depths. Depths were measured from wire angle and are only approximate. The speed of tow was 2 - 4 knots and the wire was recovered at about 10 m per min. The period of tow averaged half an hour and the volume filtered averaged 18 m^3.

High speed hauls were made with the Scripps high speed sampler (Ahlstrom et al 1958) in which the flowmeter had been omitted. The samples were taken at the surface when the ship was underway at about 12 knots. Approximate values for water filtered were obtained by multiplying the mouth area of the sampler by the distance towed. The conversion factor used was 0.897 m^3 per nautical mile.

The station numbers to which the underway samples are referred are those for adjacent hydrological stations (Table 1). The actual positions of stations are indicated in Figure 1.

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IV. DATA SHEETS AND TABLES

The data sheets for this cruise are arranged in six parts. Part 1 contains the data for hydrology deep stations, Part 2 gives the temperature and salinity data from surface sampling, Part 3 gives primary production data, Part 4 gives pigment data, Part 5 gives phytoplankton, and Part 6 gives quantitative zooplankton data.

Explanations of the headings used in the data sheets are given on the first page of each part.

Short vertical lines below certain headings indicate the positions of decimal points.

DATA

PART 1

HYDROLOGY

DEEP STATIONS

EXPLANATION OF HEADINGS

Part 1 Hydrology - Deep Stations

SHIP — The figures 11 are used to designate Diamantina.

CRUISE — Cruise numbers are allotted each year, beginning with 1 for the first cruise.

STATION — Stations are numbered consecutively for each ship for each year.

DATE — Given as year, month, day.

TIME — Given in Zone Time and is the time at the beginning of the first cast. The code letter used for the time zone (Table 2) follows the time.

TABLE 2

CODE FOR TIME ZONES

Longitude Exceeding	Up to but not exceeding	Time Zone (hrs)	Code
07°30'E. -	22°30'E.	-1	A
22°30'E. -	37°30'E.	-2	B
37°30'E. -	52°30'E.	-3	C
52°30'E. -	67°30'E.	-4	D
67°30'E. -	82°30'E.	-5	E
82°30'E. -	97°30'E.	-6	F
97°30'E. -	112°30'E.	-7	G
112°30'E. -	127°30'E.	-8	H
127°30'E. -	142°30'E.	-9	I
142°30'E. -	157°30'E.	-10	K
157°30'E. -	172°30'E.	-11	L
172°30'E. -	180°	-12	M
180° -	172°30'W.	+12	Y
172°30'W. -	157°30'W.	+11	X
157°30'W. -	142°30'W.	+10	W

Longitude Exceeding	Up to but not exceeding	Time Zone (hrs)	Code
142°30'W. -	127°30'W.	+9	V
127°30'W. -	112°30'W.	+8	U
112°30'W. -	97°30'W.	+7	T
97°30'W. -	82°30'W.	+6	S
82°30'W. -	67°30'W.	+5	R
67°30'W. -	52°30'W.	+4	Q
52°30'W. -	37°30'W.	+3	P
37°30'W. -	22°30'W.	+2	O
22°30'W. -	07°30'W.	+1	N
07°30'W. -	07°30'E.	0	Z

LATITUDE LONGITUDE — The position of each station is given in degrees and minutes.

SONIC DEPTH — Given in metres, measured at standard sound velocity of 800 fm (1463 m) per second.

MAX. SAMP. DEPTH — Maximum sampling depth is given to the nearest 100 m, and is in 100 m units.

AIR TEMP. WET DRY — Air temperatures are recorded from wet and dry bulb thermometers in °C and tenths.

WIND DIR. SPEED — Wind direction and speed are coded using Tables 8 and 9 in U.S. Hydrogr. Office (1955).

ANEM. HEIGHT — The average height of the anemometer above sea level is given in metres.

CLOUD TYPE AMT. — Cloud type and amount are coded using Tables 2 and 3 in U.S. Hydrogr. Office (1955).

VIS. — Visibility is coded using Table 4 in U.S. Hydrogr. Office (1955).

SEA DIR. AMT. — Sea direction and amount are coded using Tables 5 and 8 in U.S. Hydrogr. Office (1955).

SWELL DIR. AMT.	Sea swell direction and amount are coded using Tables 6 and 8 in U.S. Hydrogr. Office (1955).
ATMOS. PRESSURE	Atmospheric pressure is coded. The reading in millibars has the figure for 900 or 1000 omitted, so that 999.4 millibars is recorded as 994 and 1013.4 as 134.
WIRE ANGLES CAST 1 CAST 2	Wire angles are measured at the surface and expressed in degrees for each cast. No more than two wire angles are recorded; if there is a third cast, the shallow cast angle is neglected.
CAST	The cast numbers (corresponding to the wire angles) are shown.
DEPTH	Actual sampling depth given in metres, a blank at the top of this column indicates 0 m.
TEMP.	Sea temperatures are recorded in °C to two decimal places.
S‰	Salinities are recorded in parts per thousand to three decimal places.
σt	Sigma-t to three decimal places.
O_2	Oxygen is given in ml/l to two decimal places.
O_2 % SAT.	Oxygen percentage saturation.
INORG. P	Inorganic phosphate values are given in µg at./l to two decimal places.
TOTAL P	Values given as µg at./l to two decimal places.
NITRATE	Values given as µg at./l to one decimal place.

A blank indicates that no sample was available.

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	8	61	2	19	1315 G	3500 S	10510 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5575	50	17 2	21 7	28	6	16	7	9	9	28	3	23	4	13 0	25	25

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	D
2		1925	35719	25523	487	100	18		41	00	0
2	25	1906	35748	25594	528	108	15				
2	50	1613	35599	26195	587	114	13		43	00	0
2	74	1449	35546	26520	581	109	23				7
2	99	1405	35527	26600	552	103	33		52	01	9
2	149	1289	35341	26696	546	99	42			4	7
2	199	1220	35218	26737	558	100	51		86	04	0
2	298	1119	35033	26785	569	99	62		76	05	5
2	497	964	34778	26859	559	94	83		112	28	6
2	696	857	34621	26908	534	88	104		134	21	0
2	904	597	34428	27125	458	71	148		149	29	4
2	1095	404	34397	27324	434	64	176		180	30	0
1	1273	340	34498	27468	375	54	188		208	32	0
1	1471	310	34567	27552	358	52	190		197	41	0
1	1968	255	34699	27706	370	53	178		189	34	6
1	2466	212	34733	27769	381	53	178		194	42	0
1	2964	178	34742	27804	411	57	178		189	36	4
1	3467	149	34742	27825	440	61	169		186	32	0
1	3961	118	34730	27837	458	63	169		176	31	0
1	4459	99	34717	27839	475	65	170		181	28	6
1	4958	99	34717	27839	477	62	169		178	30	0

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	9	61	2	20	1030 G	3155 S	10700 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4938	45	16.1	20.0	26	5	16	8	8	3	26	3	27	1	15.8	20	20

CAST	DEPTH	TEMP.	$s‰$	σ_t	O_2	$\%$ O_2 SAT.	INORG. P		TOTAL P	NITRATE	D
2	.	2105	36008	25264	474	101	14		30	01	5
2	24	2089	36017	25313	498	106	10		.	.	5
2	48	1987	36013	25586	510	106	10		30	00	5
2	72	1743	35798	26038	569	113	11		.	.	
2	95	1559	35620	26334	599	115	18		38	01	1
2	143	1383	35478	26609	563	104	34		.	2	1
2	191	1311	35371	26675	563	103	42		5	4	0
2	287	1161	35107	26763	575	101	57		70	05	3
2	480	945	34758	26875	567	95	87		96	11	3
2	665	835	34597	26924	534	87	108		119	15	0
2	866	544	34408	27175	457	70	151		156	21	4
2	1066	380	34427	27372	409	60	180		184	20	1
1	1290	330	34526	27501	368	53	189		203	27	4
1	1484	296	34561	27560	362	52	187		205	27	0
1	1968	237	34711	27731	374	53	181		194	25	0
1	2450	195	34734	27783	391	55	184		194	25	4
1	2929	166	34739	27810	421	58	178		192	24	0
1	3416	136	34731	27826	445	61	173		186	24	0
1	3903	117	34725	27834	457	63	173		184	26	6
1	4392	106	34718	27835	474	65	173		186		

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	10	61	2	21	1000 G	3156 S	11148 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4938	45	15 6	17 8	17	4	16	8	8	7	17	4	20	4	17 1	20	30

CAST	DEPTH	TEMP.	$s‰$	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	D
2		2287	35789	24587	451	99	10		29	018	
2	20	2272	35802	24640	498	109	10			10	
2	40	2111	35916	25178	516	110	11		28	005	
2	62	1959	35853	25535	534	111	12			6	
2	84	1733	35768	26040	563	112	12		34	005	
2	125	1476	35504	26430	587	111	21			15	
2	168	1369	35424	26596	563	104	38		51	024	
2	249	1252	35242	26693	546	98	53		62	049	
2	422	953	34762	26864	554	93	90		94	105	
2	574	845	34613	26922	528	87	110		114	250	
2	758	568	34420	27155	457	70	160		160	326	
2	968	386	34428	27367	403	59	184		184	306	
1	1264	318	34560	27539	362	52	198		198	334	
1	1461	290	34630	27620	358	51	197		197	288	
1	1953	232	34719	27742	374	53	189		195	300	
1	2442	197	34735	27783	391	55	189		195	306	
1	2926	170	34739	27807	415	58	187		192	306	
1	3405	144	34732	27821	427	59	181		181	256	
1	3889	128	34723	27825	439	60	184		193	240	
1	4378	123	34722	27825	451	59	184		185	258	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	13	61	2	26	1600 H	3754 S	11427 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4663	45	183	211	11	4	16	9	6	7	11	3	8	4	97	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	D
2		1929	35761	25545	522	103	21		32	007	
2	22	1902	35731	25610	528	104	18			005	
2	45	1880	35724	25643	534	109	19		30	006	
2	67	1606	35569	26187	593	115	19				
2	90	1484	35459	26376	587	111	22		36	005	
2	134	1350	35318	26555	563	103	41			031	
2	179	1272	35215	26633	563	102	47		54	045	
2	268	1135	35003	26731	569	100	63		67	076	
2	442	970	34771	26843	593	100	78		83	127	
2	617	894	34669	26888	558	92	99		100	147	
2	798	810	34568	26940	528	86	115		117	174	
2	985	606	34427	27113	468	72	150		152	201	
1	1132	423	34392	27299	451	67	183		183	368	
1	1310	344	34437	27416	415	60	185		185	314	
1	1770	269	34625	27630	374	53	189		189	350	
1	2216	231	34719	27740	391	53	183		183	310	
1	2665	199	34744	27796	427	57	172		174	270	
1	3100	163	34744	27816	433	58	170		171	290	
1	3546	127	34728	27825	439	58	175		175	280	
1	4024	104	34718	27827	474	62	175		175	300	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	15	61	2	27	608 H	4003 S	11450 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4572	45	17 2	17 8	09	1	16	ST 7	9	9			99	9	8 5	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	$\%\ ^{O_2}$ SAT.	INORG. P		TOTAL P	NITRATE	D
1		1757	35426	25723	533	102	17		34	010	
1	23	1738	35468	25800	545	103	13			006	
1	46	1727	35497	25850	551	105	13		37	011	
1	68	1463	35378	26361	599	113	23				
1	91	1371	35349	26534	569	105	31		45		
1	137	1252	35179	26644	563	101	44				
1	183	1162	35035	26707	575	101	55		66		
1	277	1043	34888	26809	575	99	67		80		
1	473	922	34719	26882	553	92	87		96		
1	672	835	34624	26940	557	91	101		115	050	
1	872	702	34876	27340	493	95	128		135	300	
1	1072	493	34385	27230	461	66	160		162	312	
2	1175	380	34403	27360	431	60	175		185		
2	1350	321	34478	27470	401	55	183		199	250	
2	1795	262	34647	27670	377	51	178		168	378	
2	2236	228	34728	27760	401	54	173		170	284	
2	2687	196	34755	27813	437	58	162		170	360	
2	3134	155	34751	27824	455	60	161		170	364	
2	3575	119	34728	27843	461	61	168		168	230	
2	3994	90	34710	27847	479	63	170		168	052	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	17	61	2	27	2000 H	4201 S	11430 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4389	43	11 7	14 4	22	5	16	7	9	9	22	3	23	4	12 4	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	D
2		1536	34958	25877	587	112	34		51	00	2
2	23	1522	34954	25906	575	109	37				2
2	46	1374	34780	26089	605	111	60		71	06	0
2	68	1118	34757	26571	599	104	73			9	1
2	91	1065	34772	26679	617	106	76		80	09	4
2	137	997	34763	26791	605	103	79			10	0
2	182	985	34784	26828	587	99	75		83	13	7
2	271	961	34760	26850	611	103	79		88	11	7
2	447	941	34743	26870	558	94	85		87	10	1
2	622	880	34648	26894	558	92	94		103	15	3
2	803	737	34501	26993	510	81	124		132	36	0
2	991	537	34377	27159	480	73	153		162	28	0
1	1140	416	34350	27274	474	70	170		181	33	0
1	1320	337	34402	27395	439	64	181		181	13	0
1	1762	262	34601	27622	403	57	180		183	32	6
1	2203	234	34724	27744	427	60	171		179	24	6
1	2654	199	34759	27801	451	63	166		172	27	6
1	3190	148	34748	27831	463	64	166		172	28	0
1	3528	105	34722	27839	474	65	168		179	28	0
1	3821	93	34713	27847	480	65	171		179		

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	19	61	2	28	915 H	4357 S	11430 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
	40	13 3	14 4	29	5	16	7	9	9	29	3	23	4	18 6	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	D
2		1253	34600	26194	629	113	55		56	075	
2	20	1246	34592	26202	635	114	55			55	
2	40	1200	34618	26310	623	110	62		73	061	
2	60	1137	34709	26499	611	107	67			106	
2	80	1118	34772	26583	611	106	69		75	124	
2	120	1049	34862	26770	587	101	77			147	
2	160	1014	34825	26810	611	104	76		81	147	
2	241	988	34801	26836	611	104	82		86	153	
2	400	960	34779	26867	581	98	80		84	174	
2	562	906	34669	26868	581	97	90		96	225	
2	738	779	34535	26960	522	84	117		117	333	
2	923	592	34408	27116	492	76	146		150	428	
1	1046	454	34350	27233	486	72	161		162	430	
1	1209	362	34365	27341	463	67	171		172	436	
1	1617	267	34539	27568	409	58	188		182	544	
1	2045	243	34684	27704	421	60	171		161	492	
1	2465	216	34756	27784	445	63	161		161	384	
1	2886	171	34755	27822	457	63	167		167	480	
1	3324	131	34738	27841	468	62	169		169	510	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	23	61	3	01	900 H	4201 S	11841 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4389	44	12|8	14|4	14	5	16	7	9	9	14	2	24	4	26|2	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	D
2		1599	34765	25587	587	113	21		46	05	5
2	23	1528	34775	25753	598	113	29			4	7
2	44	1342	34758	26138	605	110	44		64	06	4
2	66	1139	34750	26527	617	108	64			9	7
2	88	1063	34726	26646	617	106	70		78	11	8
2	132	1001	34720	26751	599	102	72			11	7
2	176	965	34716	26808	611	103	75		84	14	3
2	268	934	34699	26846	605	101	77		93	16	1
2	441	895	34671	26888	574	95	92		96	13	4
2	619	833	34594	26925	552	90	102		118	19	9
2	806	697	34477	27031	486	77	129		139	24	6
2	978	525	34386	27180	463	70	153		162	37	4
1	1174	392	34386	27327	451	66	171		173	43	4
1	1342	331	34443	27434	421	61	181		181	42	6
1	1795	262	34630	27645	379	54	176		192	39	2
1	2229	233	34722	27743	409	58	176		176	33	2
1	2686	202	34750	27791	439	61	170		177	24	0
1	3120	162	34750	27822	463	64	163		170	28	6
1	3571	114	34730	27840	474	65	164		180	33	6
1	3950	83	34712	27847	483	63	173		179	27	0

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	27	61	3	02	900 H	4404 S	12234 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4324	44	10.6	15.0	05	4	16	8	6	8	5	2	22	4	25.9	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	% O_2 SAT.	INORG P		TOTAL P	NITRATE	D
2		14.31	34.632	25.855	6.11	113	31		56	04.8	
2	22	14.22	34.623	25.866	6.11	113	32			3.9	
2	44	11.68	34.606	26.361	6.17	109	60		77	07.8	
2	65	10.97	34.659	26.534	6.11	106	68			8.8	
2	88	10.00	34.678	26.718	5.93	101	71		85	09.1	
2	132	9.53	34.673	26.794	5.93	100	75			10.8	
2	176	9.30	34.670	26.831	5.93	99	76		86	11.7	
2	264	9.29	34.702	26.857	6.11	102	81		92	11.0	
2	443	8.94	34.657	26.879	5.87	97	84		94	12.1	
2	623	8.58	34.614	26.901	5.69	94	94		105	17.3	
2	801	7.78	34.528	26.955	5.22	84	115		126	21.0	
2	990	6.09	34.413	27.098	4.68	72	139		150	24.5	
1	1142	4.56	34.347	27.229	4.86	72	157		161	32.0	
1	1313	3.65	34.372	27.343	4.57	67	167		173	32.8	
1	1736	2.71	34.567	27.587	3.97	57	178		186	36.6	
1	2158	2.41	34.701	27.720	4.15	59	166		166	28.0	
1	2596	2.14	34.757	27.787	4.45	63	157		167	25.4	
1	3005	1.65	34.756	27.825	4.63	64	165		170	26.2	
1	3506	1.15	34.728	27.837	4.74	65	161		169	27.0	
1	3905	.81	34.712	27.847	4.93	61	161		171	22.2	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	31	61	3	03	800 H	4600 S	12638 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
3931	43	13 9	15 6	36	99	16	8	8	8	36	4	36	4	13 2	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	$\%O_2$ SAT.	INORG. P		TOTAL P	NITRATE	D
2		1284	34615	26144	623	112	40		55	04 0	
2	20	1284	34606	26137	629	113	39			3 7	
2	37	1279	34604	26145	623	112	42		61	04 1	
2	55	1114	34653	26498	569	99	72			7 7	
2	75	1040	34646	26625	587	100	83		82	09 1	
2	112	945	34662	26799	558	94	84			9 8	
2	150	920	34654	26835	575	96	84		90	10 6	
2	222	907	34667	26866	617	103	85		94	11 2	
2	373	881	34643	26889	558	92	85		92	11 3	
2	528	874	34638	26896	593	98	89		97	12 7	
2	697	819	34565	26924	546	89	106		112	16 0	
2	884	678	34478	27058	486	77	134		136	19 1	
1	910	668	34456	27054	468	74	138		145	23 2	
1	1092	477	34364	27218	468	70	159		167	28 0	
1	1547	298	34469	27485	421	60	183		187	33 4	
1	1803	254	34640	27660	403	57	181		176	28 8	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	32	61	3	04	900 I	4304 S	13030 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5121	51	117	144	17	3	16	7	6	4	17	2	34	1	168	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	D
2		1466	34641	25786	599	112	24		46	01 6	
2	21	1453	34639	25812	605	113	21			1 1	
2	43	1302	34608	26103	581	105	50		67	04 1	
2	65	1048	34654	26618	615	105	66			7 6	
2	86	994	34647	26706	599	102	68		82	08 6	
2	130	939	34644	26796	599	100	76			8 3	
2	175	908	34637	26841	593	99	82		93	13 3	
2	263	881	34625	26873	599	99	86		98	12 1	
2	433	859	34614	26901	552	91	90		99	17 0	
2	604	808	34548	26926	552	90	106		117	17 0	
2	783	692	34466	27029	468	74	129		139	25 4	
2	959	507	34375	27193	463	70	154		163	34 2	
1	1140	379	34401	27352	433	63	166		173	31 6	
1	1310	318	34450	27451	409	59	177		191	34 6	
1	1759	260	34631	27647	379	54	177		182	46 8	
1	2200	229	34723	27747	379	53	176		181	34 8	
1	2631	201	34743	27790	415	58	173		184	33 6	
1	3068	174	34737	27807	439	59	168		182	35 6	
1	3505	141	34740	27829	451	62	164		167	28 0	
1	3959	110	34724	27838	463	63	172		181	29 6	
1	4528	85	34711	27847	474	64	173		180	28 4	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	38	61	3	06	1 I	3608 S	13123 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5303	54	16 7	19 4	05	3	16	7	9	9			22	4	14 4	00	00

CAST	DEPTH	TEMP.	s‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	D
2		1928	35380	25257	501	103	19		31	00	5
2	22	1922	35374	25268	496	102	21				
2	44	1899	35363	25318	513	105	21		36	00	0
2	67	1426	35248	26339	564	105	23				1
2	88	1340	35235	26511	524	96	35		44	00	7
2	133	1303	35248	26590	530	92	41			1	1
2	178	1270	35209	26632	535	97	42		49	02	6
2	266	1134	34978	26714	530	93	57		66	05	4
2	441	925	34713	26873	524	87	90		91	06	5
2	616	857	34626	26912	524	86	101		108	13	1
2	792	750	34517	26988	456	73	122		136	19	8
2	976	540	34412	27183	428	65	159		170	18	7
1	1129	402	34413	27339	406	60	175		185	25	2
1	1302	305	34483	27489	377	54	186		191	36	0
1	1740	254	34645	27664	360	51	185		197	39	8
1	2184	226	34723	27750	366	52	181		186	33	2
1	2620	193	34743	27793	389	54	178		178	33	6
1	3053	162	34739	27813	406	56	176		178	38	4
1	3503	141	34735	27825	423	58	172		178	39	0
1	3930	123	34726	27831	428	59	168		176	31	4
1	4367	101	34715	27835	445	61	173		178	35	8
1	4762	90	34711	27846	451	59	170		176	34	6

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	48	61	3	09	800 H	3558 S	11425 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5214	52	13 9	18 3	10	7	16	7	8	8	10	3	12	4	30 8	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	D
2		2010	35773	25342	511	107	10		30	02	4
2	22	2007	35782	25355	516	108	10				8
2	45	2002	35781	25369	522	109	10		31	01	1
2	66	1578	35489	26191	587	113	16				5
2	88	1446	35408	26421	575	108	22		35	00	4
2	131	1352	35328	26557	575	106	34			2	2
2	176	1297	35241	26602	558	101	42		53	03	5
2	264	1105	34947	26743	563	98	62		75	06	7
2	442	909	34700	26889	569	95	89		102	12	5
2	623	854	34628	26919	540	89	97		115	13	3
2	806	708	34487	27024	487	77	128		149	22	9
2	993	449	34390	27270	452	67	162		176	26	2
1	1154	347	34429	27407	428	62	162		181	35	0
1	1338	303	34514	27516	399	57	187		202	37	8
1	1785	248	34673	27692	387	55	184		188	35	4
1	2230	223	34737	27764	393	55	176		192	32	6
1	2667	186	34747	27801	428	60	173		189	30	8
1	3112	155	34745	27823	446	62	173		191	28	8
1	3546	130	34735	27833	446	61	170		185	36	6
1	3980	118	34726	27843	464	64	173		184	26	2
1	4630	97	34717	27841	473	62	173		190	26	0

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	44	61	3	07	1700 H	3557 S	12247 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4846	49	19 4	22 2	07	4	16	7	9	9	7	3	23	4	15 1	00	00

CAST	DEPTH	TEMP.	S‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	D
2		2066	35761	25183	521	110	10		22	01	0
2	23	2042	35781	25261	515	108	10				7
2	46	2025	35793	25316	521	109	10		24	00	5
2	69	1682	35581	26020	569	112	16				6
2	92	1523	35395	26240	587	107	20		27	00	3
2	138	1491	35379	26299	551	104	33			3	5
2	184	1340	35346	26590	551	97	38		43	03	5
2	276	1223	35150	26679	551	98	52		56	05	3
2	452	913	34689	26874	576	96	91		92	15	7
2	627	857	34639	26923	551	91	102		102	18	6
2	806	718	34631	27124	503	80	129		141	30	0
2	987	478	34403	27248	449	67	163		165	32	6
1	1077	400	34410	27338	437	64	178		180	46	6
1	1255	320	34465	27461	413	60	188		197	34	0
1	1702	259	34649	27663	383	54	188		188	53	8
1	2247	221	34725	27756	389	55	181		181	41	0
1	2582	187	34739	27794	431	60	177		182	41	4
1	3029	161	34737	27812	437	61	177		178	26	0
1	3470	137	34733	27826	449	62	170		175	24	0
1	3911	119	34719	27828	461	63	172		182	19	4
1	4385	98	34716	27823	479	65	172		180	51	8

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	47	61	3	08	1200 H	3553 S	11831 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4938	42	20 0	21 1	14	7	16	8	6	8	14	2	14	4	24 2	00	00

CAST	DEPTH	TEMP.	$s‰$	σ_t	O_2	$\%O_2$ SAT.	INORG. P		TOTAL P	NITRATE	D
2		2060	35818	25243	511	108	13		28	00	8
2	22	2054	35823	25262	516	109	12				1
2	43	1976	35748	25411	522	108	13		28		
2	65	1768	35549	25787	540	108	18				3
2	87	1567	35469	26199	569	109	20				
2	132	1360	35299	26519	563	104	35				8
2	175	1271	35191	26616	540	97	44		53		
2	260	1096	34955	26765	546	95	68		80	06	3
2	432	924	34712	26873	581	97	86		94	08	7
2	604	869	34640	26905	546	90	96		117	10	2
2	785	766	34526	26971	493	79	125		139	18	6
2	962	536	34398	27177	469	71	149			43	3
1	1113	394	34402	27338	428	63	178		185	42	6
1	1283	322	34476	27468	405	58	188		190	67	4
1	1706	260	34648	27661	375	53	178		184	61	0
1	2126	224	34724	27752	387	55	181		190		
1	2564	195	34742	27790	405	57	178		189	31	8
1	3000	165	34746	27816	428	59	169		194	29	0
1	3436	140	34738	27828	452	62	176		181	36	0
1	3637	132	34733	27833	452	62	176		192	51	0

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	41	61	3	06	1800 H	3602 S	12725 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5303	54	20 0	21 7	30	3	16	7	9	9	30	2	21	4	12 4	00	00

CAST	DEPTH	TEMP.	$s‰$	σ_t	O_2	$\%_o O_2$ SAT.	INORG. P		TOTAL P	NITRATE	D
3		2015	35476	25103	462	96	14		31	01	2
3	25	2003	35488	25142	473	99	18				3
3	50	1995	35484	25161	473	98	18		38	00	2
3	75	1527	35354	26201	542	103	20				1
3	95	1423	35331	26400	547	98	20		53	00	0
3	100	1397	35254	26407	537	99	25			00	0
3	150	1311	35266	26594	505	92	39			1	1
3	200	1285	35244	26628	505	91	40		35	01	2
1	210	1253	35254	26700	506	91	39		55	01	1
1	306	1123	35051	26791	500	87	60			3	8
1	418	979	34886	26917	500	85	78		85	06	0
1	513	903	34729	26920	500	83	94		105	11	9
1	1157	379	34420	27368	388	57	178		178	28	7
1	1340	301	34487	27496	351	50	183		183	33	4
1	1800	252	34659	27677	345	49	181		181	33	5
2	2230	224	34721	27750	351	49	177		177	43	0
2	2665	189	34737	27790	361	50	176		181	32	0
2	3107	160	34738	27814	377	52	170		187	46	0
2	3559	138	34731	27824	404	56	173		176	19	8
2	4000	121	34721	27828	414	57	169		178	33	0
2	4434	97	34710	27835	420	57	175		178	18	8
2	4832	90	34707	27846	428	58	173		183	19	8

DATA

PART 2

HYDROLOGY

SURFACE SAMPLING

EXPLANATION OF HEADINGS

Part 2 Hydrology - Surface Sampling

STATION	Stations are numbered consecutively for each ship for each year.
DATE	Is shown as year, month, day.
TIME	Given in Zone Time. The code letter used for the time zone (Table 2) follows the time.
LATITUDE LONGITUDE	The position of each station is given in degrees and minutes.
TEMP.	Sea temperatures are recorded in °C and are accurate to one decimal place.
S‰	Salinities are recorded in parts per thousand to one decimal place.

STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	S‰
1	61	2	14	1200H	3207S	11515E	2400	3578
2	61	2	14	1900H	3233S	11334E	2490	3561
3	61	2	14	2400G	3259S	11220E	2300	3587
4	61	2	15	600G	3328S	11050E	2230	3589
5	61	2	15	1200G	3359S	10917E	2050	3589
6	61	2	15	1800G	3423S	10751E	1980	3538
7	61	2	15	2400G	3429S	10645E	2010	3599
8	61	2	19	1300G	3500S	10510E	1925	3571
9	61	2	20	1030G	3155S	10700E	2105	3600
10	61	2	21	1000G	3156S	11148E	2287	3578
12	61	2	26	1200H	3702S	11424E	1850	3530
13	61	2	26	1600H	3754S	11427E	1929	3576
14	61	2	27	1H	3856S	11432E	1940	3566
15	61	2	27	600H	4003S	11450E	1757	3542
16	61	2	27	1400H	4051S	11441E	1680	3507
17	61	2	27	2000H	4201S	11430E	1536	3495
18	61	2	28	600H	4322S	11430E	1480	3456
19	61	2	28	920H	4357S	11430E	1253	3460
20	61	2	28	1800H	4326S	11534E	1540	3492
21	61	2	28	2400H	4250S	11646E	1580	3498
22	61	3	1	600H	4206S	11801E	1520	3472
23	61	3	1	900H	4201S	11841E	1599	3476
24	61	3	1	1800H	4231S	11936E	1510	3478
25	61	3	1	2400H	4309S	12043E	1430	3467
26	61	3	2	600H	4342S	12152E	1490	3465
27	61	3	2	900H	4404S	12234E	1431	3463
28	61	3	2	1800H	4433S	12335E	1400	3466
29	61	3	2	2400H	4508S	12451E	1400	3463
30	61	3	3	600H	4547S	12612E	1390	3471
31	61	3	3	800H	4600S	12638E	1284	3461
32	61	3	4	900I	4304S	13030E	1466	3464
33	61	3	4	1800I	4204S	13041E	1620	3471
34	61	3	4	2400I	4054S	13052E	1690	3487
36	61	3	5	1200I	3830S	13102E	1810	3491
37	61	3	5	1800I	3719S	13111E	1890	3513
38	61	3	6	11	3608S	13123E	1928	3538
39	61	3	6	1000I	3607S	12939E	1820	3539
40	61	3	6	1400I	3609S	12834E	2000	3554
41	61	3	6	1800H	3602S	12725E	2015	3547
42	61	3	7	600H	3602S	12547E	1990	3558
43	61	3	7	1200H	3556S	12357E	200	3551
44	61	3	7	1600H	3557S	12247E	2066	3576
45	61	3	8	1H	3557S	12141E	2000	3554
46	61	3	8	600H	3558S	12013E	2160	3587
47	61	3	8	1300H	3553S	11831E	2060	3581
48	61	3	9	800H	3558S	11425E	2010	3577

DATA

PART 3

PRIMARY PRODUCTION

EXPLANATION OF HEADINGS

Part 3 Primary Production

SHIP	The figures 11 are used to designate Diamantina.
CRUISE	Cruise numbers are allotted each year beginning with 1 for the first cruise.
STATION	Stations are numbered consecutively for each ship for each year.
TIME	Given in Zone Time (Table 2).
LATITUDE LONGITUDE	The position of each station is given in degrees and minutes
SONIC DEPTH	Given in m, measured at standard sound velocity of 800 fm (1463 m) per second.
MAX. SAMP. DEPTH	Depth of deepest observation to nearest 10 metres is recorded in units of 10 m.
DIST. FROM COAST	Distance of nearest land in miles.
METHOD OF INCUBATION	A zero indicates fluorescent light incubation.
STOCK NUMBER	Number of ^{14}C stock used.
STOCK ACTIVITY	The activity of ^{14}C stock used is recorded in millions of counts/min, i.e. 10.39×10^6 counts/min.
BACKGROUND	Background count is recorded in counts/min.
DEPTH	Actual sampling depth given in metres, a blank at the top of this column indicates 0 m.

LIGHT COUNT	The counts/min of the filter from the clear bottle.
DARK COUNT	The counts/min of the filter from the dark bottle.
NET COUNT	The difference between light and dark count.
INCUBATION PERIOD	Given in hours, and varies from 3.5 - 5.0.
RATE OF PRODUCTION A B	A is given in $mgC/hr/m^3$ to two decimal places. B is given in $gC/day/m^2$ to two decimal places for the layer from the surface to the depth indicated. A day has been taken to be equal to 10 hours.

An asterisk in the Net Count column indicates a negative net value which is assumed to equal zero for further calculations.

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	8	61	2	19	1400 G	3500 S	10510 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
5575	20	615	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	116	6	110	400	0006	0000
25	103	7	96	400	0006	0002
50	154		154	400	0009	0004
75	220	13	207	400	0012	0007
100	117	11	106	400	0006	0009
150	75	16	59	400	0003	0012

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	9	61	2	20	1120 G	3155 S	10700 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4938	20	560	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	74	12	62	400	0004	0000
25	108	11	97	400	0006	0001
50	183	11	172	400	0010	0003
75	189	17	172	400	0010	0006
100	186	11	175	400	0010	0009
150	290	9	281	400	0017	0016

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	10	61	2	21	1100 G	3156 S	11148 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4938	20	260	0	7	10390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	340	43	297	400	0018	0000
25	372	15	357	400	0021	0005
50	315	19	296	400	0017	0010
75	289	9	280	400	0017	0014
100	183	9	174	400	0010	0017
150	34	3	31	400	0002	0020

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	13	61	2	26	1645 H	3754 S	11427 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4663	20	240	0	7	10390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	77	55	22	400	0001	0000
25	117	32	85	400	0005	0001
50	192	24	168	400	0010	0003
75	317	18	299	400	0018	0007
100	79	10	69	400	0004	0010
150	37	4	33	400	0002	0012

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	15	61	2	27	700 H	4003 S	11450 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4572	20	345	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT		INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	445	20	425		400	0025	0000
25	260	25	235		400	0014	0005
50	756	15	741		400	0044	0012
75	167	3	164		400	0010	0019
100	34	6	28		400	0002	0021
150	11	1	10		400	0001	0022

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	17	61	2	27	2045 H	4201 S	11430 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4389	20	445	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT		INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	595	31	564		400	0033	0000
25	695	36	659		400	0039	0009
50	296	11	285		400	0017	0016
75	71	74	3	*	400	0000	0016
100	21	1	20		400	0001	0016
150	5	291	286	*	400	0000	0016

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	19	61	2	28	1015 H	4357 S	11430 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
	20	568	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT		INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	769	19	750		400	0044	0000
25	1370	14	1356		400	0080	0016
50	740	6	734		400	0043	0031
75	130	3	127		400	0008	0037
100	36	4	32		400	0002	0038
150	9	97	88	*	400	0000	0038

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	23	61	2	01	1000 H	4201 S	11841 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4389	20	410	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	1322	19	1303	400	0077	0000
25	3081	15	3066	400	0181	0032
50	268	4	264	400	0016	0057
75	77	9	68	400	0004	0060
100	24		24	400	0001	0061
150	25	4	21	400	0001	0062

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	27	61	2	02	1000 H	4404 S	12234 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4324	20	615	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	511	18	493	400	0029	0000
25	837	13	824	400	0049	0010
50	366	7	359	400	0021	0019
75	162	9	153	400	0009	0023
100	67	2	65	400	0004	0025
150	19	1	18	400	0001	0026

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	31	61	2	03	900 H	4600 S	12638 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
3931	20	824	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	633	12	621	400	0037	0000
25	930	17	913	400	0054	0011
50	269	14	255	400	0015	0020
75	42	7	35	400	0002	0022
100	17	4	13	400	0001	0022
150	12		12	400	0001	0023

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	32	61	2	04	940 I	4304 S	13030 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
5121	20	650	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT		INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	1044	12	1032		400	0061	0000
25	1928	12	1916		400	0113	0022
50	252	3	249		400	0015	0038
75	76	2	74		400	0004	0040
100	19	8	11		400	0001	0041
150	2	5	3	*	400	0000	0041

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	38	61	2	06	200 I	3608 S	13123 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
5303	10	268	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	32	11	21	400	0001	0000
25	222	106	116	400	0007	0001
50	184	12	172	400	0010	0003
75	156	4	152	400	0009	0005
100	61	2	59	400	0003	0007

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	I	41	61	2	06	1850 I	3602 S	12725 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
5303	20	238	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	85	58	27	400	0002	0000
25	139	21	118	400	0007	0001
50	200	23	177	400	0010	0003
75	186	8	178	400	0011	0006
100	97	6	91	400	0005	0008
150	10	3	7	400	0000	0009

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	44	61	2	07	1750 H	3557 S	12247 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4846	20	130	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	114	53	61	400	0004	0000
25	201	23	178	400	0011	0002
50	206	20	186	400	0011	0005
75	323	12	311	400	0018	0009
100	197	4	193	400	0011	0013
150	12	5	7	400	0000	0016

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	47	61	2	08	1400 H	3553 S	11831 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
4938	20	80	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	148	39	109	400	0006	0000
25	269	25	244	400	0014	0003
50	470	21	449	400	0027	0008
75	798	10	788	400	0047	0017
100	39	4	35	400	0002	0023
150	7	6	1	400	0000	0024

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	48	61	2	09	1115 H	3558 S	11425 E

SONIC DEPTH	MAX. SAMP. DEPTH	DIST. FROM COAST	METHOD OF INCUBATION	STOCK NUMBER	STOCK ACTIVITY	BACKGROUND
5214	20	134	0	7	10 390	15

DEPTH	LIGHT COUNT	DARK COUNT	NET COUNT	INCUBATION PERIOD	RATE OF PRODUCTION A	RATE OF PRODUCTION B
	365	210	155	400	0009	0000
25	578	60	518	400	0031	0005
50	736	49	687	400	0041	0014
75	291	18	273	400	0016	0021
100	28	21	7	400	0000	0023
150	17	8	9	400	0001	0023

DATA

PART 4

PIGMENTS

EXPLANATION OF HEADINGS

Part 4 Pigments

SHIP	The figures 11 are used to designate Diamantina.
CRUISE	Cruise numbers are allotted each year, beginning with 1 for the first cruise.
STATION	Stations are numbered consecutively for each ship for each year.
DATE	Is given as year, month, day.
TIME	Given in Zone Time (Table 2).
LATITUDE LONGITUDE	The position of each station is given in degrees and minutes.
DEPTH	Actual sampling depth is given in metres, a blank at the top of this column indicates 0 m.
CHLOROPHYLL a b c	Chlorophyll a and b are given in mg/m^3, and chlorophyll c in $MSPU/m^3$, to two decimal places.
ASTACIN NON-ASTACIN	Astacin and non-astacin are given in $MSPU/m^3$ to two decimal places.

An asterisk in the body of the table indicates that a negative value was found. A blank indicates that the value was zero.

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	8	61	2	19	1400 G	3500 S	10510 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	14	9	46	6	1
25	13	9	58	11	3 *
50	11	8	49	12	1 *
75	19	14	92	10	4
100	15	9	75	11	2
150	7	6	38	7	2

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	9	61	2	20	1120 G	3155 S	10700 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	6	4	12	3	2
25	9	7	47	10	4 *
50	11	7	58	10	1 *
75	11	7	48	8	
100	16	9	64	10	1
150	13	10	62	8	1

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	10	61	2	21	1100 G	3156 S	11148 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN	
	12	10	65	12	5	*
25	12	11	50	8		
50	8	6	41	7	3	
75	17	13	110	16	4	*
100	11	9	60	8	2	
150	11	8	66	7	6	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	13	61	2	26	1645 H	3754 S	11427 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN	
	7	5	18	2	2	
25	10	9	73	8	1	*
50	11	10	46	7		
75	13	11	70	10	1	
100	15	9	49	9	1	
150	8	7	41	5	1	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	15	61	2	27	700 H	4003 S	11450 E

DEPTH	CHLOROPHYLL			ASTACIN	NON ASTACIN
	a	b	c		
	13	11	97	16	4 *
25	16	14	90	14	3 *
50	19	10	84	22	14 *
75	17	10	65	9	
100	12	8	53	6	3
150	7	5	30	5	1

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	17	61	2	27	2045 H	4201 S	11430 E

DEPTH	CHLOROPHYLL			ASTACIN	NON ASTACIN
	a	b	c		
	20	12	99	13	6 *
25	21	10	71	8	1
50	19	6	47	6	3
75	10	6	17	3	2
100	11	6	44	6	1
150	6	6	50	7	1 *

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	19	61	2	28	1015 H	4357 S	11430 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN	
	43	21	119	13	5	
25	43	21	133	15	5	
50	28	13	92	10	1	*
75	18	10	51	9		
100	12	8	53	5	3	
150	10	5	36	7	1	*

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	23	61	3	01	1000 H	4201 S	11841 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN	
	50	25	173	22	2	
25	46	30	199	27	5	*
50	21	10	52	7	3	
75	6	7	44	6	1	*
100	9	10	18	5	1	
150	16	9	62	7	1	*

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	27	61	3	02	1000 H	4404 S	12234 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	11	5	35	3	3
25	11	4	27	3	2
50	11	7	45	2	5
75	7	3	20	2	2
100	7	4	27	4	1
150	6	5	32	3	3

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	31	61	3	03	900 H	4600 S	12638 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	21	15	100	14	2 *
25	20	13	86	10	2 *
50	25	6	52	8	6
75	16	8	74	12	1 *
100	13	9	61	11	2 *
150	19	9	97	17	5 *

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	32	61	3	04	940 I	4304 S	13030 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	26	13	76	8	5
25	33	11	60	5	11
50	25	9	42	4	7
75	12	10	36	7	2 *
100	6	4	25	4	1
150	4	3	22	3	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	38	61	3	06	200 I	3608 S	13123 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	5	5	17	3	
25	9	4	29	6	
50	11	8	49	11	7 *
75	30	15	87	14	1 *
100	22	10	54	8	1 *
150	8	4	27	5	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	41	61	3	06	1850 I	3602 S	12725 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	6	7	41	7	1 *
25	11	10	60	11	5 *
50	8	6	56	8	1 *
75	18	14	76	9	
100	16	11	41	6	4
150	9	3	23	4	2

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	44	61	3	07	1750 H	3557 S	12247 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	11	7	48	7	1
25	13	8	54	7	2 *
50	5	4	26	2	1
75	16	11	45	9	
100	14	8	53	5	3
150	5	4	28	2	2

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	47	61	3	08	1400 H	3553 S	11831 E

DEPTH	CHLOROPHYLL			ASTACIN	NON ASTACIN
	a	b	c		
	5	3	20	3	1
75	26	10	62	4	8
100	7	3	21	2	4
150	5	3	20	1	3

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	1	48	61	3	09	1115 H	3558 S	11425 E

DEPTH	CHLOROPHYLL			ASTACIN	NON ASTACIN
	a	b	c		
	12	8	51	9	2 *
25	10	4	29	4	2
50	11	9	43	6	6 *
75	11	8	50	5	1
100	7	5	22	3	2
150	8	4	42	6	1

DATA

PART 5

PHYTOPLANKTON

EXPLANATION OF HEADINGS

Part 5 Phytoplankton

SHIP	The figures 11 are used to designate Diamantina.
CRUISE	Cruise numbers are allotted each year beginning with 1 for the first cruise.
STATION	Stations are numbered consecutively for each ship for each year.
DATE	Is given as year, month, day.
TIME	Given in Zone Time (Table 2).
LATITUDE LONGITUDE	The position of each station is given in degrees and minutes.
DEPTH	Actual sampling depth is given in metres, a blank at the top of this column indicates 0 m.
ORGANISMS WITH CHLOROPHYLL / WITHOUT CHLOROPHYLL	The counts of organisms with and without chlorophyll are expressed as log numbers per litre.
TOTAL PARTICLES	The counts of total particles are expressed as log numbers per litre.

A blank indicates that the value was zero.

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	9	61	2	20	1035 G	3155 S	10700 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
				5800	
25				5720	
50		5000		5400	
75				5680	
100		5100		5680	
125		5000		5040	
150				6600	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	10	61	2	21	1000 G	3155 S	11148 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
				5570	
25		4400		6590	
50		4700		6780	
75				5150	
100		5000		5320	
125				5080	
150		4400		5090	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	13	61	2	26	1600 H	3754 S	11421 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
				5250	
25	4000			4810	
50				4780	
75	4000			4600	
100				4720	
125				5350	
150	4600			5370	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	15	61	2	27	600 H	4003 S	11450 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
				5030	
25				4650	
50				4630	
75	5000			4780	
100	4300			5760	
125				5480	
150				5160	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	17	61	2	27	2000 H	4201 S	11430 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
				5000	
25				5010	
50		4300		4780	
75				5470	
100				4570	
125				5320	
150				5070	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	19	61	2	28	930 H	4357 S	11430 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	5850	6790		6960	
25	5700	7150		6910	
50	5300	4900		7090	
75		4900		6730	
100	5300	4000		5290	
125				5230	
150				6530	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	23	61	3	01	900 H	4201 S	11841 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	4850			6840	
25	4950			6490	
50	5300			5280	
75	5200			4890	
100	4780			5260	
125	4700			4650	
150	4300			4980	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	27	61	3	02	900 H	4404 S	12234 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	4600			5790	
25	5110			6990	
50	4480			6450	
75	5200			6450	
100	4000			5350	
125	4850			4970	
150	4000			6490	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	31	61	3	03	845 H	4600 S	12638 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	4780			6560	
25	5180			5890	
50	5260			6880	
75	4600			5150	
100	4780			6470	
125	4480			5100	
150	4000			4510	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	32	61	3	04	920 I	4304 S	13030 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	4000			6630	
25	6560			6600	
50	5260			7020	
75				6780	
100	4000			6830	
125				6650	
150				6270	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	38	61	3	06	100 I	3608 S	13123 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
				4480	
25				5230	
50				4900	
75		5320		6670	
100		5080		5040	
125		4700		6720	
150		4300		4720	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	41	61	3	06	1800 H	3602 S	12725 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
		4300		6600	
25		5080		6670	
50				6790	
75		4600		6830	
100		5080		5430	
125		4000		6460	
150		5000		6610	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	47	61	3	08	1300 H	3553 S	11831 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	4300			5380	
25				5420	
50	5300			5280	
75				5490	
100				6580	
125	4000			6480	
150				6850	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	01	48	61	3	09	800 H	3558 S	11428 E

DEPTH	CHLOROPHYLL a	CHLOROPHYLL b	CHLOROPHYLL c	ASTACIN	NON ASTACIN
	5600			6800	
25	5700			6570	
50	5600			6490	
75	5110			6540	
100				5020	
125				5120	
150				5470	

TABLE 3

OCCURRENCE OF DIATOMS

Numbers refer to stations at which organism was found

Actinocyclus intermittens 10.

Actinoptychus splendens 9, 15.

Asteromphalus beaumontii 9.
A. heptactis 47.
A. hookeri 15, 19, 23, 27.

Chaetoceros affine 44.
C. compressum 31.
C. criophilum 15, 19, 23, 27, 31.
C. dadayi 13, 47, 48.
C. divisum 15.
C. dichaeta 13, 15.
C. laciniosum 27.
C. messanense 10, 41.
C. paradoxum 41.
C. pendulum 38.
C. peruvianum 8, 19.
C. schimperianum 10, 13.
C. teres 9.
C. vistulae 9.

Cladopyxis brachiolata 9, 10, 15.

Corethron criophilum 8.
C. hystrix 10, 19, 23, 27, 31, 32.

Coscinodiscus centralis 41.
C. curvatulus 8, 10.
C. excentricus 38.
C. marginatus 27.
C. oculus-iridis 8, 9, 10, 13, 15, 19, 27, 31, 41, 48.
C. radiatus 15, 23.

Cymatosira lorenzianum 10.

Cymbella cistula 13.

Surirella elongata 10.
S. rattrayi 9.

Thalassiosira gravida 31.
T. subtilis 31.

Tropidoneis antarctica 38.

TABLE 4

OCCURRENCE OF DINOFLAGELLATES

Numbers refer to stations at which organisms were found.

Amphisolenia palmata 41, 48.

Centrodinium intermedium 15.

Ceratium breve 48.
C. buceros 8, 9, 13, 15, 23, 38, 48.
C. candelabrum 13, 44, 47, 48.
C. carriense 8, 44.
C. compressum 44.
C. contortum 41, 44.
C. extensum 15, 47.
C. furca 8, 10, 13, 15, 27, 31, 38, 44, 47, 48.
C. fusus 8, 9, 13, 15, 19, 23, 27, 31, 32, 41, 44, 47, 48.
C. geniculatum 27.
C. inflexum 10.
C. karsteni 15, 48.
C. kofoidi 13.
C. macroceros 9, 41.
C. massiliense 9, 13.
C. pentagonum 8, 9, 10, 13, 15, 19, 23, 27, 31, 32, 38, 41, 44, 47, 48.
C. platycorne 9.
C. pulchellum 8, 9, 10, 13, 15, 19, 23, 27, 31, 47.
C. symmetricum 38, 44.
C. trichoceros 23, 44.

Ceratocorys armata 41.
C. horrida 13, 15.

Cladopyxis brachiolata 8, 9, 41.

DATA

PART 6

ZOOPLANKTON

ZOOPLANKTON BIOMASS : OBLIQUE HAULS 200-0 m

STATION	DATE	TIME	LATITUDE	LONGITUDE	VOLUME FILTERED m^3	BIOMASS mg/m^3
8	19.2.61	1715	35°00'S.	105°10'E.	11.9	13
9	20.2.61	1333	31°55'S.	107°00'E.	8.8	4
10	21.2.61	1318	31°56'S.	111°48'E.	16.3	10
31	3.3.61	1050	46°00'S.	126°38'E.	22.0	48
32	4.3.61	1155	43°04'S.	130°30'E.	11.5	30
44	7.3.61	1615	35°57'S.	122°47'E.	19.5	30

ZOOPLANKTON BIOMASS : OBLIQUE HAULS 400-200 m

8	19.2.61	1715	35°00'S.	105°10'E.	4.3	2
9	20.2.61	1333	31°55'S.	107°00'E.	14.6	5
10	21.2.61	1318	31°56'S.	111°48'E.	30.8	4
32	4.3.61	1155	43°04'S.	130°30'E.	14.9	67

ZOOPLANKTON BIOMASS : HORIZONTAL HAULS

STATION	DATE	TIME	LATITUDE	LONGITUDE	DEPTH m	VOLUME FILTERED m^3	BIOMASS mg/m^3
13	26.2.61	1910	37°54'S.	114°27'E.	0	13.6	22
		1910	37°54'S.	114°27'E.	50	17.4	30
15	27.2.61	0855	40°03'S.	114°50'E.	0	10.9	13
		0855	40°03'S.	114°50'E.	200	5.0	2
		0855	40°03'S.	114°50'E.	400	7.3	3
17		2250	42°01'S.	114°30'E.	0	26.2	89
		2250	42°01'S.	114°30'E.	50	23.2	177
		2250	42°01'S.	114°30'E.	100	35.1	28
19	28.2.61	1200	43°57'S.	114°30'E.	0	18.8	6
		1200	43°57'S.	114°30'E.	200	24.4	11
		1200	43°57'S.	114°30'E.	400	11.5	11
23	1.3.61	1215	42°01'S.	118°41'E.	0	26.9	17
		1215	42°01'S.	118°41'E.	100	29.4	12
27	2.3.61	1200	44°04'S.	122°33'E.	0	34.0	1
		1200	44°04'S.	122°33'E.	200	40.8	13
		1200	44°04'S.	122°33'E.	400	37.9	9
31	3.3.61	1050	46°00'S.	126°38'E.	50	17.2	12
		1050	46°00'S.	126°38'E.	100	19.1	9
38	6.3.61	0025	36°08'S.	131°23'E.	0	19.5	27
		0025	36°08'S.	131°23'E.	50	2.6	27
		0025	36°08'S.	131°23'E.	100	20.6	24
47	8.3.61	1215	35°52'S.	118°31'E.	0	18.9	13
		1215	35°52'S.	118°31'E.	50	35.0	5
48	9.3.61	0825	35°58'S.	114°25'E.	0	21.4	19
		0825	35°58'S.	114°25'E.	200	22.6	10
		0825	35°58'S.	114°25'E.	400	27.0	17

ZOOPLANKTON BIOMASS : HIGH SPEED SAMPLER

STATION	DATE	TIME	LATITUDE	LONGITUDE	VOLUME FILTERED m^3	BIOMASS mg/m^3
1	25.2.61	1200-1530	32°07'S.	115°15'E.	53	9
11a	25.2.61	1600-2000	35°55'S.	114°40'E.	59	45
11b	25.2.61	2030-2400	35°55'S.	114°40'E.	49	16
11c	26.2.61	0020-0400	35°55'S.	114°40'E.	37	28
12	26.2.61	0630-1030	37°02'S.	114°24'E.	59	12
13	26.2.61	1200-1600	37°54'S.	114°27'E.	60	1
14	26.2.61	2015-2400	38°56'S.	114°32'E.	50	11
15a	27.2.61	0010-0410	40°03'S.	114°50'E.	53	12
15b	27.2.61	0420-0545	40°03'S.	114°50'E.	19	37
16a	27.2.61	1015-1345	40°51'S.	114°41'E.	47	0
16b	27.2.61	1415-1800	40°51'S.	114°41'E.	50	4+72 P.
17	27.2.61	1800-1945	42°01'S.	114°30'E.	22	226 P.
18	28.2.61	0000-0400	43°22'S.	114°30'E.	53	3
19a	28.2.61	0400-0800	43°57'S.	114°30'E.	52	3
19b	28.2.61	1305-1705	43°57'S.	114°30'E.	47	3
20	28.2.61	1815-2105	43°26'S.	115°34'E.	33	21
21	28.2.61	2115-2400	42°50'S.	116°46'E.	33	59
21	1.3.61	0030-0300	42°50'S.	116°46'E.	30	25
22	1.3.61	0310-0600	42°06'S.	118°01'E.	33	103
24	1.3.61	2115-2315	42°31'S.	119°36'E.	25	71

P. = Phytoplankton

ZOOPLANKTON BIOMASS : HIGH SPEED SAMPLER

STATION	DATE	TIME	LATITUDE	LONGITUDE	VOLUME FILTERED m^3	BIOMASS mg/m^3
24	1.3.61	1800-2100	42°31'S.	119°36'E.	37	158
25	2.3.61	2400-0300	43°09'S.	120°43'E.	37	18
26	2.3.61	0300-0600	43°42'S.	121°52'E.	37	57
28	2.3.61	1800-2100	44°33'S.	123°35'E.	35	29
29	3.3.61	0300-0600	45°08'S.	124°51'E.	35	95
29	3.3.61	2100-2400	45°08'S.	124°51'E.	35	17
30	4.3.61	0300-0600	45°47'S.	126°12'E.	35	25
33	4.3.61	1845-2100	42°04'S.	130°41'E.	30	28
33	4.3.61	2112-2400	42°04'S.	130°41'E.	37	9
34	5.3.61	0010-0300	40°54'S.	130°52'E.	27	27
35	5.3.61	0305-0555	39°46'S.	131°03'E.	37	29
37	5.3.61	1815-2100	37°19'S.	131°11'E.	38	6+1500 P.
38	5.3.61	2105-2350	36°08'S.	131°23'E.	38	93
39	6.3.61	0400-0600	36°07'S.	129°39'E.	30	64
41	7.3.61	2330-0335	36°02'S.	127°25'E.	54	10+94*
41	7.3.61	0345-0600	36°02'S.	127°25'E.	30	35+104*
44	7.3.61	1945-2200	35°57'S.	122°47'E.	27	51+471*
45	7.3.61	2200-2400	35°57'S.	121°41'E.	27	49
45	8.3.61	0012-0300	35°57'S.	121°41'E.	37	27
46	8.3.61	0310-0550	35°58'S.	120°13'E.	23	17

P. = Phytoplankton
* = Pyrosoma

V. FIGURES

Figs 2-9 Hydrology - Vertical Sections

10 Primary Production

HYDROLOGY

VERTICAL SECTIONS

Vertical sections for temperature (°C), salinity (‰), oxygen (ml/l), inorganic phosphate (µg at./l), total phosphorus (µg at./l), and nitrate (µg at./l) were prepared from the data in Part 1 for Stations 33-48.

Fig. 2 Temperature to 400 m.

Fig. 3 Temperature 400 m to bottom.

Fig. 4 Salinity to 400 m.

Fig. 5 Salinity 400 m to bottom.

Fig. 6 Oxygen surface to bottom.

Fig. 7 Inorganic phosphate surface to bottom.

Fig. 8 Total phosphorus surface to bottom.

Fig. 9 Nitrate surface to bottom.

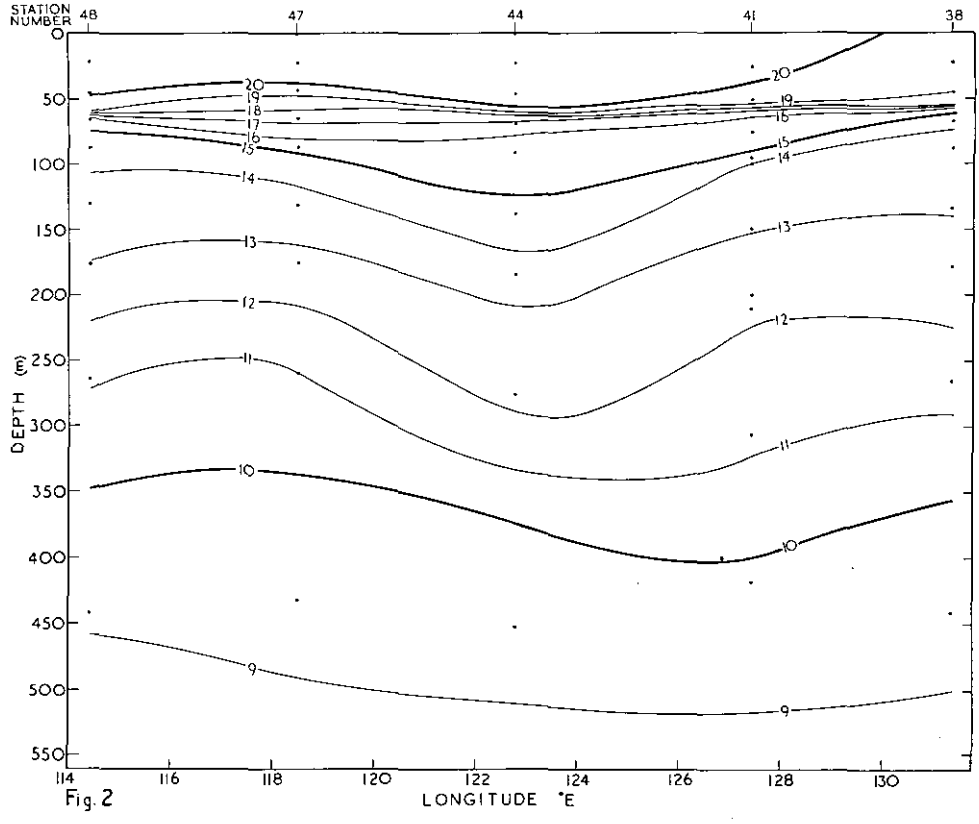

STATION NUMBER
48
47
44
41
38
DEPTH (m)
0
50
100
150
200
250
300
350
400
450
500
550
20
19
18
17
16
15
14
13
12
11
10
9
114
116
118
120
122
124
126
128
130
LONGITUDE °E

Fig. 2

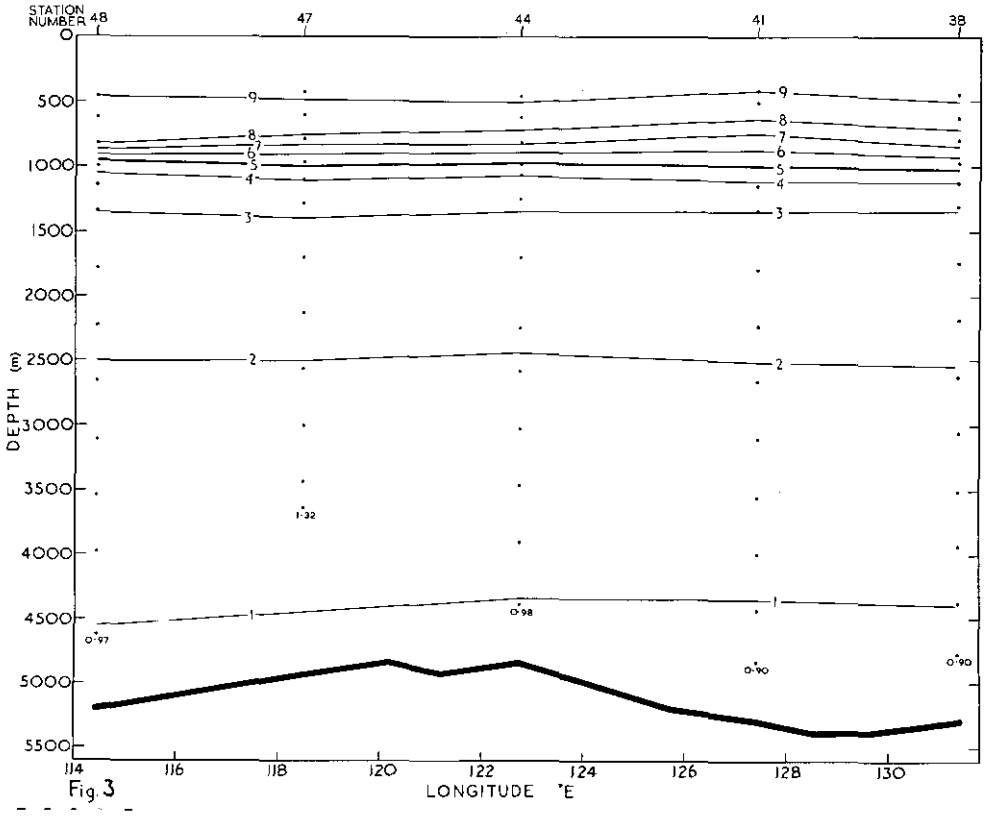
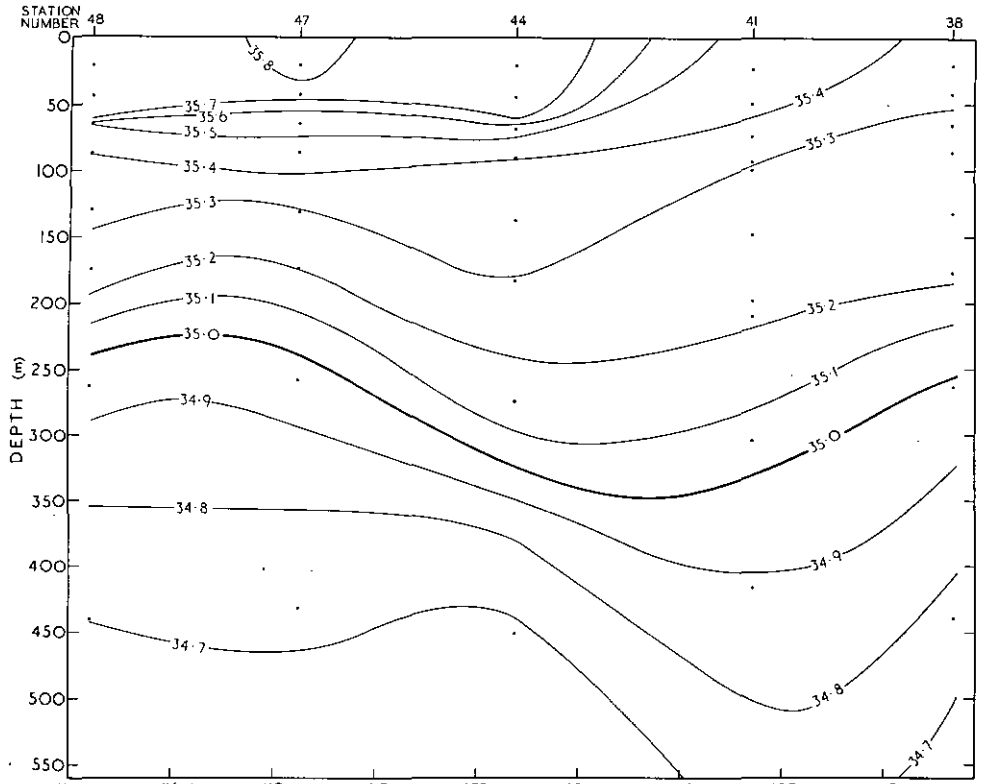
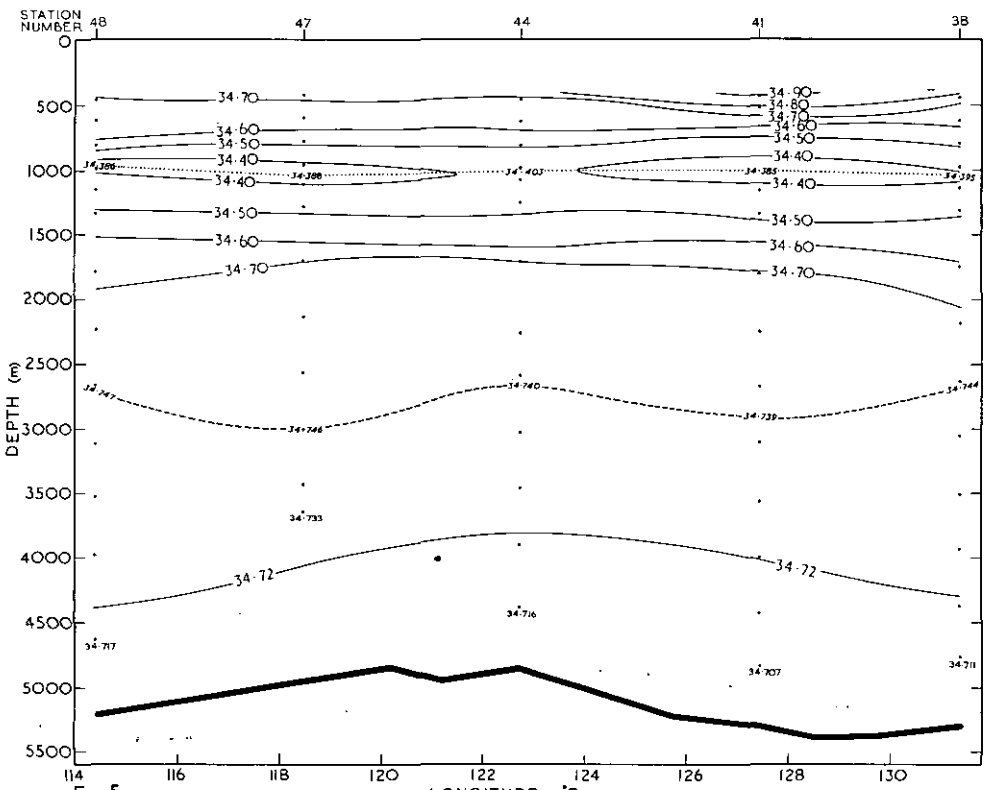

STATION NUMBER
48
47
44
41
38
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
9
8
7
6
5
4
3
2
1
1·32
0·98
0·97
0·90
0·90
114
116
118
120
122
124
126
128
130
LONGITUDE °E

Fig. 3


STATION NUMBER
48
47
44
41
38
DEPTH (m)
0
50
100
150
200
250
300
350
400
450
500
550
35·8
35·7
35·6
35·5
35·4
35·3
35·2
35·1
35·0
34·9
34·8
34·7
114
116
118
120
122
124
126
128
130
LONGITUDE °E
Fig. 4


STATION NUMBER
48
47
44
41
38
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
34·70
34·60
34·50
34·40
34·90
34·80
34·386
34·403
34·385
34·395
34·747
34·746
34·740
34·739
34·744
34·733
34·72
34·716
34·717
34·707
34·711
114
116
118
120
122
124
126
128
130
LONGITUDE °E
Fig. 5

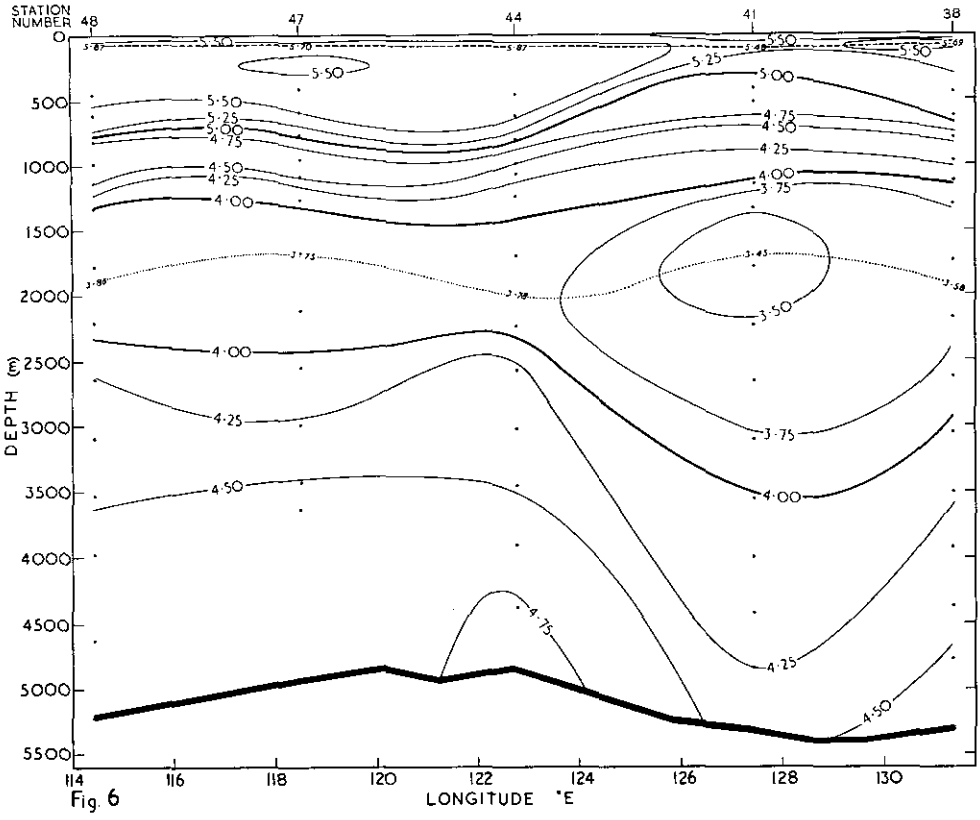

STATION NUMBER
48
47
44
41
38
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
5·50
5·25
5·00
4·75
4·50
4·25
4·00
3·75
3·50
114
116
118
120
122
124
126
128
130
LONGITUDE °E

Fig. 6

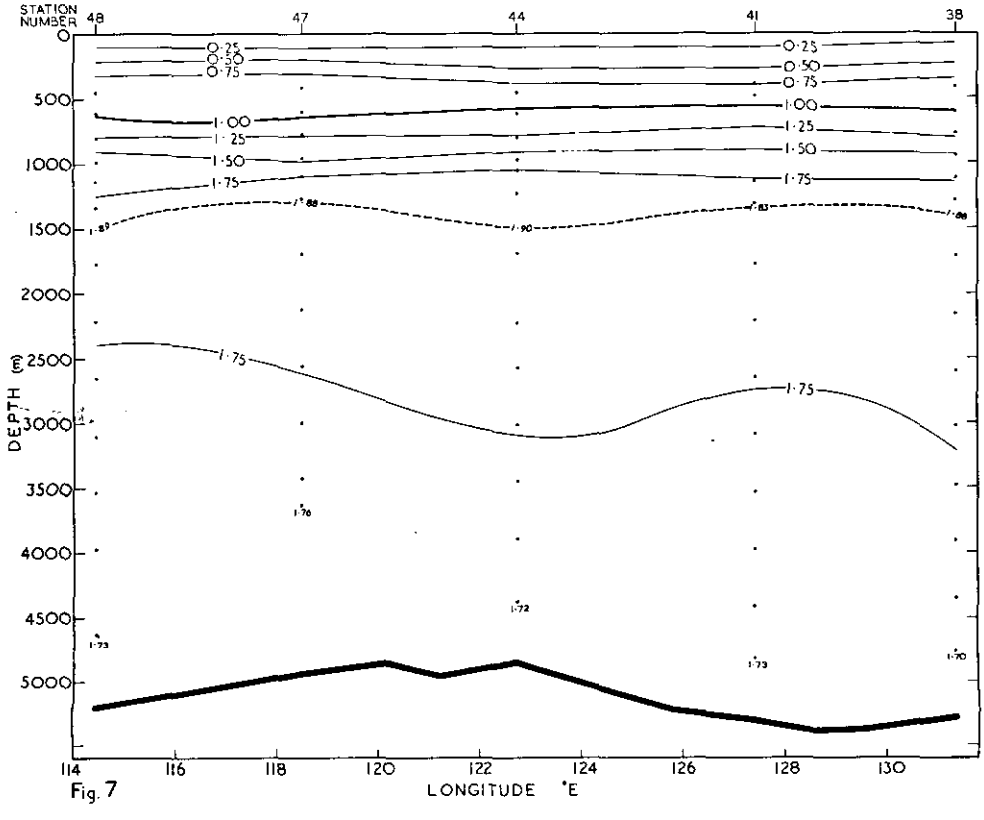
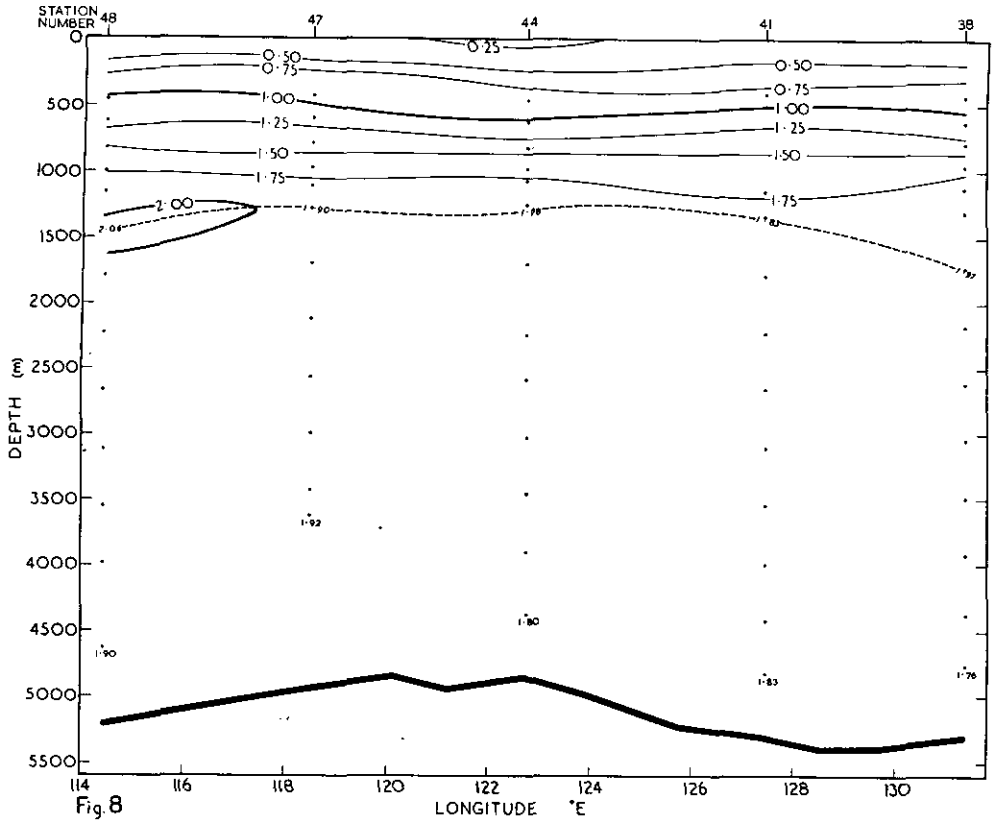
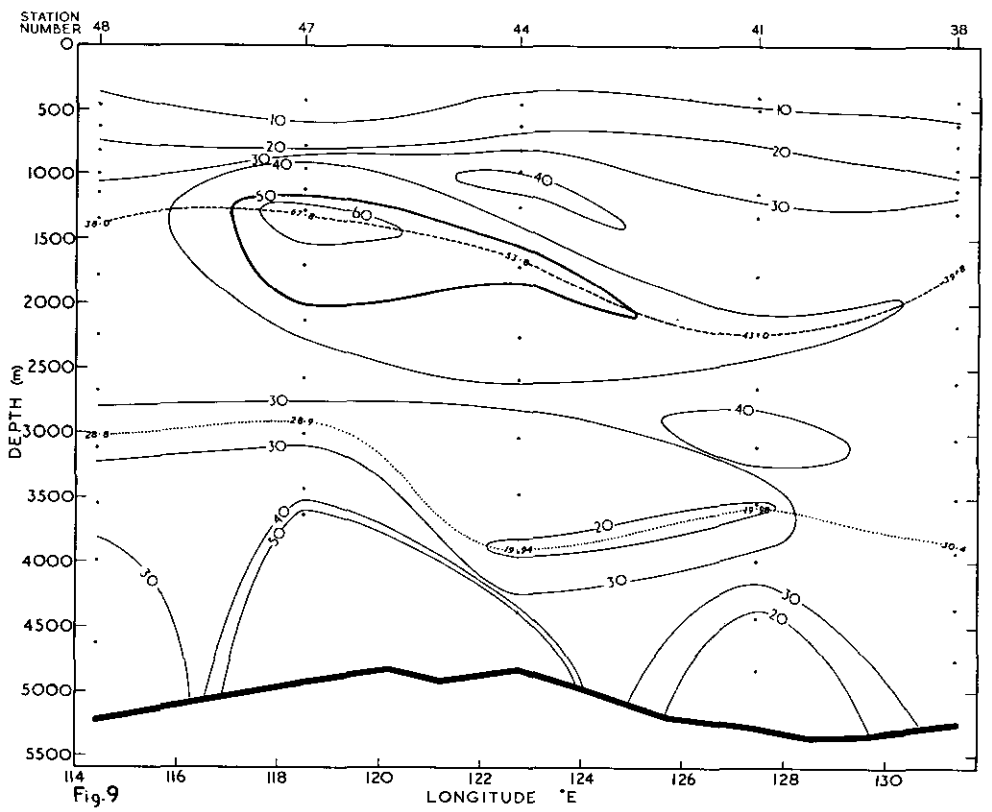

STATION NUMBER
48
47
44
41
38
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
0·25
0·50
0·75
1·00
1·25
1·50
1·75
114
116
118
120
122
124
126
128
130
LONGITUDE °E

Fig. 7


STATION NUMBER
48
47
44
41
38
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
DEPTH (m)
0·25
0·50
0·75
1·00
1·25
1·50
1·75
2·00
114
116
118
120
122
124
126
128
130
LONGITUDE °E
Fig.8


STATION NUMBER
48
47
44
41
38
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
DEPTH (m)
10
20
30
40
50
60
114
116
118
120
122
124
126
128
130
LONGITUDE °E
Fig.9

PRIMARY PRODUCTION

Fig. 10 Vertical profiles of hourly rates of primary production at each ^{14}C station. Sampling times are given below the station number.

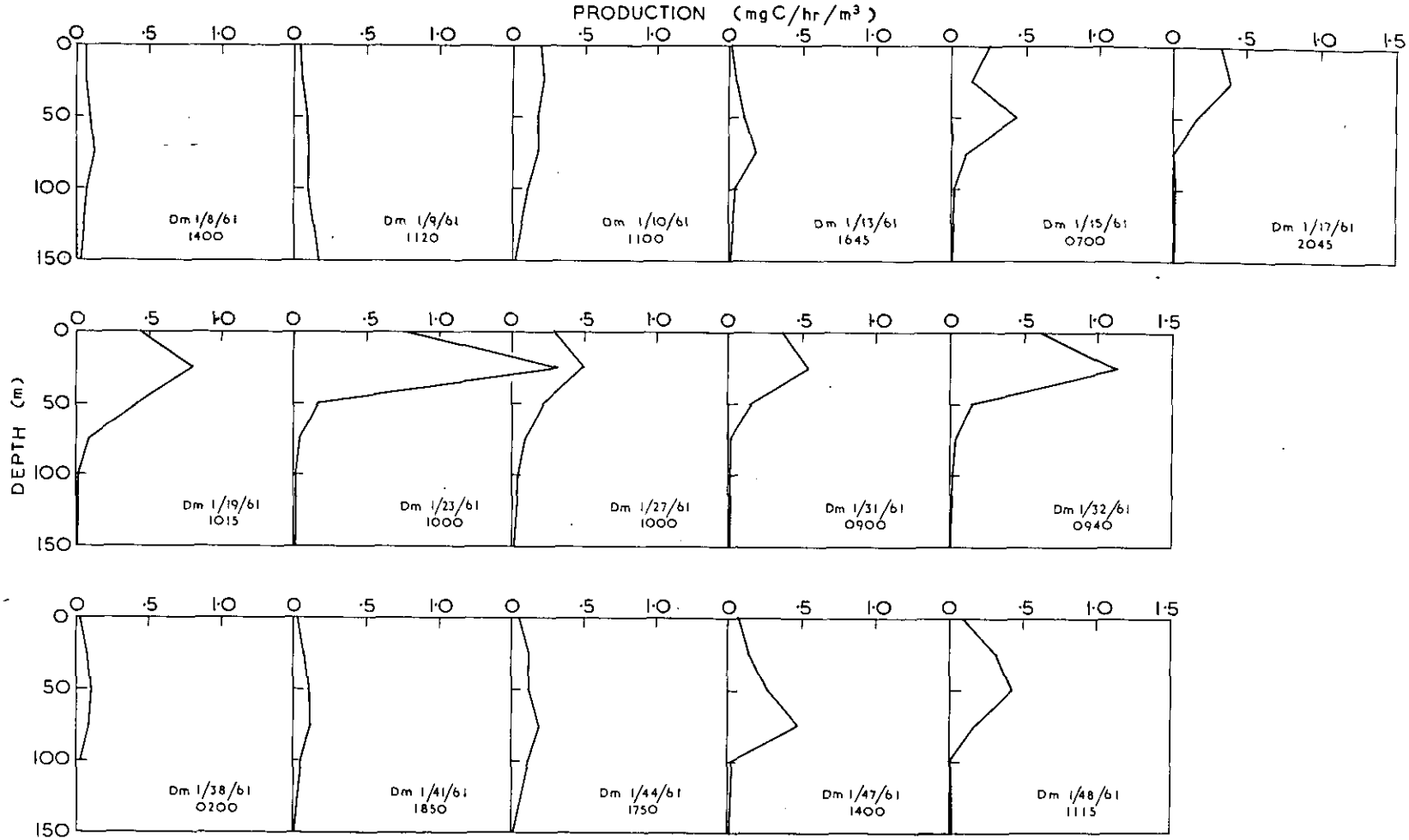

PRODUCTION (mgC/hr/m³)
0 ·5 1·0 1·5
DEPTH (m)
0
50
100
150
Dm 1/8/61 1400
Dm 1/9/61 1120
Dm 1/10/61 1100
Dm 1/13/61 1645
Dm 1/15/61 0700
Dm 1/17/61 2045
Dm 1/19/61 1015
Dm 1/23/61 1000
Dm 1/27/61 1000
Dm 1/31/61 0900
Dm 1/32/61 0940
Dm 1/38/61 0200
Dm 1/41/61 1850
Dm 1/44/61 1750
Dm 1/47/61 1400
Dm 1/48/61 1115

Fig. 10

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* Cruise 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.