DISCOVERY REPORTS

VOLUME XXI

CAMBRIDGE
UNIVERSITY PRESS
LONDON: BENTLEY HOUSE
NEW YORK, TORONTO, BOMBAY
CALCUTTA, MADRAS: MACMILLAN

DISCOVERY REPORTS

Issued by the Discovery Committee
Colonial Office, London
on behalf of the Government of the Dependencies
of the Falkland Islands

VOLUME XXI

CAMBRIDGE
AT THE UNIVERSITY PRESS
1942

PRINTED IN GREAT BRITAIN BY WALTER LEWIS, M.A., AT THE UNIVERSITY PRESS, CAMBRIDGE

W. H. O. I.
WOODS HOLE, MASS.

CONTENTS

[*Discovery Reports. Vol. XXI, pp.* 1–226, *Plates I–IV, February,* 1941.]

DISCOVERY INVESTIGATIONS STATION LIST

1931–1933

CONTENTS

DISCOVERY INVESTIGATIONS
STATION LIST

1931–1933

(Plates I–IV)

INTRODUCTION

This list is a continuation of the Station Lists already published in *Discovery Reports*, vols. I, III and IV, and it gives particulars of the observations made by the R.R.S. 'Discovery II' from October 1931 to April 1933. It is drawn up on the same lines as before, but some alterations have been made in the method of recording hydrological data to facilitate comparison with the figures published in other reports. In 1936 the Association d'Océanographie Physique (1937) set up a committee to report on chemical methods and units, and in accordance with the findings of this committee, the nutrient salt concentrations are, in this Station List, expressed in milligramme-atoms of the particular element per cubic metre of sea-water, and the *p*H values are those *in situ* (Buch, 1929), corrected for temperature and salt error, but not for pressure. For *p*H estimation McClendon's Standards (1917) were used, and a correction was made for fading of the tubes. Even though the buffer solutions were sterilized with toluene it was found that the old solutions had faded, when compared with new solutions, by an amount corresponding to 0·01 *p*H per month.

In the estimation of the phosphate concentration 2 c.c. of ammonium molybdate and a trace of copper were used, and the resulting figures have been corrected for salt error by multiplying by a factor of 1·35 (1938). In working out the concentration of dissolved oxygen the volume of the added reagents (3 c.c.) has been subtracted from the volume of the oxygen sample bottle. The figures for oxygen concentration published in the previous Station Lists are from 0·5 to 2 per cent too low, the oxygen sample bottles used varying in volume between 150 and 200 c.c. Silica was measured by the method described by Atkins (1923) and Cooper (1933), and no correction has been made for salt error.

To convert the new units for nutrient salt concentrations to those used in previous Station Lists and reports, they must be multiplied by the following factors:

To convert	Multiply by
mg.-atoms N_2/m.^{3} to mg. nitrate or nitrite N_2/m.^{3}	14·0
mg.-atoms P/m.^{3} to mg. P_2O_5/m.^{3}	71·0
mg.-atoms Si/m.^{3} to mg. SiO_2/m.^{3}	60·1

To make the opposite conversions, from the old units to the new, the factors are:

To convert	Multiply by
mg. nitrate or nitrite N_2/m.^{3} to mg.-atoms N_2/m.^{3}	0·0714
mg. P_2O_5/m.^{3} to mg.-atoms P/m.^{3}	0·0141
mg. SiO_2/m.^{3} to mg.-atoms Si/m.^{3}	0·0167

At some stations in this list the depths of observations were measured by unprotected thermometers, and these are shown in the column headed "Depth by thermometer". The next column, "Depth (metres)", gives intermediate depths obtained graphically from the thermometric measurements, or, when unprotected thermometers were not used, from the length of wire paid out, on the assumption that the wire hung vertically.

Time is again expressed on the 24-hour system, the day ending with midnight (0000). The difference of the ship's time from Greenwich mean time (GMT) is noted in the "Remarks" column, this difference holding good until another entry is made. To convert ship's time to GMT the figure in the "Remarks" column is to be added or subtracted according to sign. Times in heavy type refer to biological observations made between sunset and sunrise.

The following symbols are used for nets, apparatus, etc.:

B	Oblique.
CPR	Continuous plankton recorder.
DC	Conical dredge. Mouth 16 in. in diameter (40·5 cm.) with canvas bag.
DGP	Pressure depth gauge: a modification of the Budenberg pattern.
DRL	Large rectangular dredge.
H	Horizontal.
KT	Kelvin tube.
N 4-T N 7-T	Nets with mesh of 4 or 7 mm. (0·16 in. or 0·28 in.) attached to back of trawl.
N 50	50 cm. tow-net. Mouth circular, 50 cm. in diameter (19·5 in.): 200 meshes to the linear inch.
N 70	70 cm. tow-net. Mouth circular, 70 cm. in diameter (27·5 in.): mesh graded, at cod-end 74 to the linear inch.
N 100	1 m. tow-net. Mouth circular, 1 m. in diameter (3·3 ft.): mesh graded, at cod-end of stramin with 10–12 meshes to the linear inch.
NH	Hand net.
NS	Seine net. Length 30 fathoms (55 m.): mesh at cod-end $1\frac{1}{2}$ in. (3·8 cm.).
OTL	Large otter trawl. Head rope 40 ft. long (12·2 m.): mesh at cod-end $1\frac{1}{4}$ in. (3·2 cm.).
Sh. Coll.	Shore collecting.
TYF	Young-fish trawl. A bag of stramin, with 10–12 meshes to the linear inch, attached to a circular frame 2 m. in diameter (6·6 ft.).
TYFS	Similar to TYF but with the stramin of the net lined for 8 ft. above the bucket with No. 60 silk netting for catching small organisms.
V	Vertical.

To the symbols for tow nets (N 450, N 100, N 70, N 50, TYF and TYFS) B, H or V is always added to indicate the direction in which the haul was taken. For determining the depths of horizontal and oblique nets, Kelvin tubes or depth gauges were constantly employed. Their use is indicated by symbols in the "Remarks" column, and where no such symbol appears it is to be understood that the depth was estimated.

The following symbols are used to denote meteorological observations:

b	blue sky whether with clear or hazy atmosphere, or sky not more than one-quarter clouded.
bc	sky between one-quarter and three-quarters clouded.
c	mainly cloudy (not less than three-quarters covered).

d drizzle or fine rain.
e wet air without rain falling.
f fog.
fe wet fog.
g gloomy.
h hail.
kq line squall.
l lightning.
m mist.
o overcast sky (i.e. the whole sky covered with unbroken cloud).
p passing showers.
q squalls.
r rain.
rs sleet (i.e. rain and snow together).
s snow.
t thunder.
tl thunderstorm.
u ugly, threatening sky.
v unusual visibility.
w dew.
z dust haze; the turbid atmosphere of dry weather.

At the end of the lists (p. 226) will be found a summary of the stations made by the R.R.S. 'Discovery II' from October 1931 to April 1933 with references to the charts on which the station positions are marked.

REFERENCES

Association d'Océanographie Physique, 1937. Proc. verb., No. 2, p. 56.

Buch, K., 1929. *On the determination of pH in sea water at different temperatures.* Journ. du Cons. iv, No. 3, pp. 267–80.

McClendon, J. F., 1917. *The standardization of a new colorimetric method for the determination of the hydrogen-ion concentration, CO_2 tension, and CO_2 and O_2 content of sea water, etc.* Journ. Biol. Chem., xxx, pp. 265–88.

Atkins, W. R. G., 1923. *The silica content of some natural waters and of culture media.* Journ. Mar. Biol. Ass. U.K., xiii, pp. 151–9.

Cooper, L. H. N., 1933. *Chemical constituents of biological importance in the English Channel, November 1930 to January 1932.* Part I. *Phosphate, silicate, nitrate, nitrite, ammonia.* Journ. Mar. Biol. Ass. U.K., xviii, pp. 677–728. Part II. *Hydrogen-ion concentration, excess base, carbon dioxide and oxygen.* Journ. Mar. Biol. Ass. U.K., xviii, pp. 729–54. Part III, June–December 1932. *Phosphate, silicate, nitrite, hydrogen-ion concentration, with a comparison with wind records.* Journ. Mar. Biol. Ass. U.K., xix, pp. 55–62.

—— 1938. *Salt error in determinations of phosphate in sea water.* Journ. Mar. Biol. Ass. U.K., xxiii, pp. 171–78.

R.R.S. 'DISCOVERY II',
STATIONS 701–1184

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
701	14° 39·3′ N, 25° 51·7′ W	1931 16 x	2000	—	NE	16	NE	3	bcw	1015·1	26·2	24·2	mod. NE swell
702	10° 59·3′ N, 27° 03·8′ W	17 x	2000	—	NE	13	NE	2	bc	1013·6	27·8	25·6	mod. conf. swell
703	07° 17′ N, 28° 01·9′ W	18 x	2000	—	Lt airs	1–3	—	0	b	1013·5	27·8	24·1	mod. SE swell
704	03° 37·7′ N, 29° 14′ W	19 x	2000	—	SE	10	SE	2	bc	1013·4	27·0	24·9	mod. SE swell
705	00° 03·4′ N, 30° 36·8′ W	20 x	2000	—	SE × E	10	SE × E	2	bc	1013·6	26·7	24·1	mod. SE × S swell
706	03° 26·2′ S, 32° 08·3′ W	21 x	2000	4302*	SE × E	18	SE × E	4	bc	1013·9	25·6	23·4	mod. SE swell
707	06° 44′ S, 33° 33′ W	22 x	2000	4409*	ESE	15	ESE	3	b	1014·9	26·1	23·0	mod. E × S swell
708	10° 20·6′ S, 34° 54·7′ W	23 x	2000	4000*	E	10	E	2	bc	1016·8	25·8	22·8	mod. ENE swell
709	14° 01·4′ S, 36° 30·7′ W	24 x	2000	4360*	E	5	E	1	b	1016·9	25·6	21·7	conf. SE × E swell
710	21° 45′ S, 39° 50′ W	26 x	2000	1583*	SSW	17	SSW	3–4	bc	1011·7	23·3	19·7	conf. swell
711	24° 40·7′ S, 41° 30·8′ W	27 x	2000	2487*	SSW	11	SSW	3	cr	1010·9	19·4	19·0	mod. SW swell
712	28° 02·1′ S, 43° 09·5′ W	28 x	2000	2994*	E	19	E	4	or	1016·2	20·3	19·5	heavy E × S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
701	5	0	—	27·22	36·09	23·49	—	—	—	—	—	—	**TYFB**	242–0	**2129**	**2219**	DGP. +2 hours
		600	—	8·74	35·04	27·21	—	—	—	—	—	1·72					
		850	—	6·75	34·84	27·35	—	—	—	—	—	2·19					
		1100	—	5·72	34·84	27·48	—	—	—	—	—	2·73					
		1350	—	5·15	34·93	27·62	—	—	—	—	—	3·47					
702	6	0	—	27·95	35·99	23·17	—	—	—	—	—	—	**TYFB**	236–0	**2059**	**2151**	DGP
		600	—	7·40	34·92	27·32	—	—	—	—	—	1·97					
		850	—	5·95	34·84	27·46	—	—	—	—	—	2·40					
		1100	—	5·16	34·79	27·51	—	—	—	—	—	2·67					
		1350	—	4·46	34·90	27·68	—	—	—	—	—	4·17					
703	7	0	—	28·45	34·38	21·80	—	—	—	—	—	—	**TYFB**	358–0	**2058**	**2148**	DGP
		600	—	7·43	34·76	27·19	—	—	—	—	—	1·79					
		850	—	5·49	34·65	27·36	—	—	—	—	—	2·45					
		1100	—	4·76	—	—	—	—	—	—	—	3·16					
704	9	0	—	27·73	35·71	23·04	—	—	—	—	—	—	**TYFB**	231–0	**2058**	**2149**	DGP
		600	—	6·14	34·52	27·17	—	—	—	—	—	2·62					
		850	—	4·65	34·49	27·33	—	—	—	—	—	3·23					
		1100	—	4·45	34·62	27·47	—	—	—	—	—	3·58					
705	10	0	—	26·68	36·10	23·67	—	—	—	—	—	—	**TYFB**	150–0	**2104**	**2155**	DGP
		600	—	5·50	34·54	27·28	—	—	—	—	—	3·00					
		800	—	4·55	34·54	27·39	—	—	—	—	—	3·17					
		1000	—	4·37	34·67	27·50	—	—	—	—	—	3·53					
		1200	—	4·37	34·79	27·60	—	—	—	—	—	3·77					
706	11	0	—	26·04	36·38	24·08	—	—	—	—	—	—	**TYFB**	354–0	**2058**	**2148**	DGP
		600	—	5·44	34·54	27·28	—	—	—	—	—	3·00					
		900	—	4·10	34·53	27·43	—	—	—	—	—	3·62					
		1200	—	4·28	34·74	27·57	—	—	—	—	—	3·91					
		1500	—	4·20	34·97	27·77	—	—	—	—	—	4·89					
707	12	0	—	26·28	36·29	23·94	—	—	—	—	—	—	**TYFB**	182–0	**2106**	**2156**	DGP
		600	—	5·96	34·54	27·22	—	—	—	—	—	2·47					
		900	—	4·07	34·54	27·44	—	—	—	—	—	3·50					
		1200	—	4·15	34·80	27·64	—	—	—	—	—	3·92					
		1500	—	4·16	34·98	27·78	—	—	—	—	—	4·84					
708	13	0	—	26·16	36·96	24·48	—	—	—	—	—	—	**TYFB**	208–0	**2125**	**2215**	DGP
		600	—	4·95	34·42	27·23	—	—	—	—	—	3·76					
		900	—	4·00	34·46	27·38	—	—	—	—	—	3·62					
		1200	—	3·96	34·69	27·56	—	—	—	—	—	3·83					
		1500	—	4·07	34·90	27·72	—	—	—	—	—	4·59					
709	14	0	—	26·20	37·15	24·61	—	—	—	—	—	—	**TYFB**	216–0	**2108**	**2158**	DGP
		600	—	5·54	34·41	27·16	—	—	—	—	—	4·21					
		900	—	3·71	34·41	27·37	—	—	—	—	—	4·06					
		1200	—	3·89	34·68	27·57	—	—	—	—	—	4·00					
		1500	—	4·10	34·88	27·70	—	—	—	—	—	4·49					
710	16	0	—	23·84	37·27	25·42	—	—	—	—	—	—	**TYFB**	294–0	**2100**	**2150**	DGP
		800	—	4·43	34·32	27·22	—	—	—	—	—	4·45					
		1000	—	3·71	34·34	27·32	—	—	—	—	—	4·47					
		1200	—	3·30	34·48	27·47	—	—	—	—	—	4·13					
		1400	—	3·48	34·61	27·56	—	—	—	—	—	4·08					
711	17	0	—	22·25	37·01	25·69	—	—	—	—	—	—	**TYFB**	290–0	**2128**	**2219**	DGP. +3 hours
		800	—	4·66	34·34	27·22	—	—	—	—	—	4·50					
		1200	—	3·29	34·56	27·53	—	—	—	—	—	3·88					
		1600	—	3·83	34·85	27·70	—	—	—	—	—	4·48					
		2000	—	3·51	34·96	27·82	—	—	—	—	—	5·00					
712	18	0	—	19·19	36·44	26·09	—	—	—	—	—	—	**TYFB**	224–0	**2111**	**2201**	DGP
		800	—	4·61	34·24	27·14	—	—	—	—	—	5·00					
		1200	—	3·14	34·45	27·45	—	—	—	—	—	4·13					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
712 *cont.*	28° 02·1′ S, 43° 09·5′ W	1931 28 x											
713	31° 37·1′ S, 45° 00′ W	29 x	2000	3703*	ENE	20	ENE	4	oe	1022·8	19·4	18·8	mod. ENE swell
714	35° 09·5′ S, 47° 00′ W	30 x	2000	4840*	NE × N	19–20	NE × N	4	bc	1021·5	18·1	16·9	mod. NE swell
715	38° 44·2′ S, 49° 18·7′ W	31 x	2000	5306*	W × N	9	W × N	2	or	1006·3	17·3	17·2	mod. conf. NW swell
716	42° 08·8′ S, 51° 35′ W	1 xi	2000	5715*	WNW	7	WNW	1–2	b	1003·2	10·6	9·3	mod. conf. swell
717	44° 42′ S, 53° 32·2′ W	2 xi	2000	—	WSW	27–31	WSW	6	bc	985·1	10·6	8·8	heavy WSW swell
718	47° 27·2′ S, 55° 10·2′ W	3 xi	2000	—	S	19	S	3	orrs	978·8	4·3	4·3	heavy conf. WSW swell
719	54° 00′ S, 60° 00′ W	13 xi	0545	108*	N	17	N	3	ord	1005·1	4·6	4·1	mod. conf. swell
720	53° 58′ S, 61° 10·5′ W	13 xi	1210	141*	W × N	10	W × N	3	om	1003·1	6·4	5·7	mod. conf. swell
721	53° 58·5′ S, 61° 59·1′ W	13 xi	1545	304*	W	7	W	2	o	1004·3	6·3	5·6	low NW swell
722	53° 55·8′ S, 64° 14′ W	14 xi	0145	130*	NW	4–6	NW	1	bc	1004·0	6·1	5·7	low NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
712	18	1600	—	3·33	34·74	27·67	—	—	—	—	—	4·26					
cont.		2000	—	3·63	34·94	27·80	—	—	—	—	—	5·06					
713	19	0	—	18·88	36·16	25·95	—	—	—	—	—	—	TYFB	200–0	2122	2212	DGP
		800	—	4·72	34·34	27·21	—	—	—	—	—	4·99					
		1200	—	3·06	34·58	27·57	—	—	—	—	—	4·01					
		1600	—	3·09													
		2000	—	3·39	34·87	27·76	—	—	—	—	—	4·85					
714	20	0	—	17·55	35·97	26·14	—	—	—	—	—	—	TYFB	246–0	2125	2214	DGP
		800	—	4·36	34·30	27·21	—	—	—	—	—	5·17					
		1200	—	2·82	34·27	27·34	—	—	—	—	—	4·84					
		1600	—	2·78	34·58	27·59	—	—	—	—	—	3·86					
		2000	—	2·99	34·84	27·78	—	—	—	—	—	4·47					
		2400	—	2·95	34·85	27·79	—	—	—	—	—	4·57					
715	21	0	—	15·76	34·29	25·27	—	—	—	—	—	—	TYFB	230–0	2135	2225	DGP
		600	—	4·37	34·24	27·17	—	—	—	—	—	5·57					
		1000	—	2·98	34·24	27·30	—	—	—	—	—	4·94					
		1400	—	2·76	34·45	27·49	—	—	—	—	—	4·22					
		1800	—	2·96	34·63	27·62	—	—	—	—	—	4·07					
		2200	—	3·19	34·81	27·74	—	—	—	—	—	4·73					
716	22	0	—	10·52	34·31	26·34	—	—	—	—	—	—	TYFB	212–0	2135	2225	DGP
		600	—	3·07	34·17	27·24	—	—	—	—	—	5·64					
		1000	—	2·67	34·34	27·42	—	—	—	—	—	4·69					
		1400	—	2·73	34·56	27·58	—	—	—	—	—	3·97					
		1800	—	2·68	34·68	27·68	—	—	—	—	—	4·21					
		2200	—	2·71	34·78	27·76	—	—	—	—	—	4·57					
717	23	0	—	13·28	35·50	26·74	—	—	—	—	—	—	TYFB	212–0	2113	2203	DGP. +4 hours
		800	—	3·71	34·27	27·26	—	—	—	—	—	5·68					
		1200	—	2·70	34·30	27·37	—	—	—	—	—	5·02					
		1600	—	2·63	34·34	27·42	—	—	—	—	—	4·83					
718	24	0	—	8·00	34·65	27·01	—	—	—	—	—	—	TYFB	262–0	2128	2218	DGP
		600	—	2·81	34·17	27·26	—	—	—	—	—	5·58					
		1000	—	2·60	34·42	27·47	—	—	—	—	—	4·85					
		1400	—	2·59	34·60	27·62	—	—	—	—	—	4·20					
		1800	—	2·87	34·79	27·75	—	—	—	—	—	4·64					
719	3	0	—	5·41	34·06	26·90	8·19	—	—	—	—	—	N 50 V	90–0	0550	0557	
		10	—	5·12	34·06	26·94	8·19	—	—	—	—	—	N 70 B	109–0	0641	0701	KT
		20	—	4·93	34·06	26·96	8·19	—	—	—	—	—	N 100 B				
		30	—	4·84	34·06	26·97	8·19	—	—	—	—	—	DC	108	0714	0718	
		40	—	4·82	34·06	26·97	8·19										
		50	—	4·74	34·06	26·98	8·19										
		60	—	4·74	34·06	26·98	8·18										
		80	—	4·73	34·06	26·98	8·18										
		100	—	4·72	34·06	26·98	8·18										
720	4	—	—	—	—	—	—	—	—	—	—	—	DC	141	1220	1225	
721	4	0	—	5·42	34·12	26·95	8·20	—	—	—	—	6·84	N 50 V	100–0	1550	1558	
		10	—	5·04	34·12	27·00	8·20	—	—	—	—	—	N 70 B	125–0	1700	1720	KT
		20	—	4·83	34·12	27·02	8·20	—	—	—	—	6·89	N 100 B				
		30	—	4·75	34·12	27·03	8·20	—	—	—	—	—	N 70 B	250–144	1700	1732	DGP
		40	—	4·57	34·12	27·05	8·20	—	—	—	—	6·87	N 100 B				
		50	—	4·46	34·12	27·06	8·20										
		60	—	4·42	34·12	27·07	8·20	—	—	—	—	6·89					
		80	—	4·36	34·12	27·07	8·19										
		100	—	4·30	34·12	27·08	8·19	—	—	—	—	6·81					
		150	—	4·26	34·12	27·08	8·19	—	—	—	—	6·81					
		200	—	4·22	34·12	27·09	8·19	—	—	—	—	6·77					
722	4	0	—	5·64	33·79	26·67	8·25	—	—	—	—	—	N 50 V	100–0	0200	0205	
		10	—	5·52	33·81	26·70	8·25	—	—	—	—	—	N 70 B	90–0	0244	0302	KT
		20	—	5·40	33·81	26·71	8·25	—	—	—	—	—	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
722 *cont.*	53° 55·8′ S, 64° 14′ W	1931 14 xi											
723	53° 56·5′ S, 66° 05′ W	14 xi	1020	91*	NW	10	NW	3	bc	1003·5	8·4	6·9	low NW swell
724	Fortescue Bay, Magellan Strait	16 xi	2030	—	SSW	14	SSW	2	c	1005·0	6·0	4·4	no swell
725	53° 23·6′ S, 74° 57·8′ W	17 xi	2000	1960*	W×N	6	W×N	2	—	1018·0	6·9	6·0	heavy WSW swell
726	55° 05·4′ S, 75° 00·1′ W	18 xi	0900	4281*	W×N	18	W×N	4	og	1018·7	6·9	6·4	mod. WSW swell
727	56° 13·4′ S, 75° 07·3′ W	18 xi	2000	4287*	W×S	17	W×S	4	c	1018·9	6·0	5·5	mod. W×S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³				O_2 c.c. litre	Gear	Depth (metres)	TIME		
								P	Nitrate + Nitrite N_2	Nitrite N_2	Si				From	To	
722 *cont.*	4	30	—	5·40	33·81	26·71	8·25										
		40	—	5·38	33·81	26·71	8·25										
		50	—	5·37	33·81	26·71	8·25										
		60	—	5·36	33·81	26·71	8·25										
		80	—	5·35	33·81	26·72	8·25										
		100	—	5·35	33·81	26·72	8·24										
723	4	0	—	6·30	33·04	25·99	8·23	—	—	—	—	6·64	N 50 V	80–0	1023	1030	
		10	—	6·26	33·04	26·00	8·23	—	—	—	—	—	N 70 B	79–0	1100	1112	KT
		20	—	6·24	33·04	26·00	8·23	—	—	—	—	6·68	N 100 B				
		30	—	6·24	33·04	26·00	8·23										
		40	—	6·24	33·04	26·00	8·23	—	—	—	—	6·23					
		50	—	6·24	33·04	26·00	8·23										
		60	—	6·24	33·04	26·00	8·23	—	—	—	—	6·41					
		80	—	6·22	33·04	26·00	8·23	—	—	—	—	6·55					
724	8	—	—	—	—	—	—	—	—	—	—	—	NS	0–5	—	—	Two hauls
725	8	0	—	6·84	33·94	26·63	8·20	—	—	—	—	6·49	N 50 V	100–0	2003	2012	+5 hours
		10	—	6·84	33·95	26·63	8·20	—	—	—	—	—	N 70 B	150–0	2146	2205	Estimated depth
		20	—	6·72	33·96	26·66	8·20	—	—	—	—	6·45	N 100 B				
		30	—	6·54	33·96	26·68	8·21	—	—	—	—	—	N 70 B	250–196	2146	2220	DGP
		40	—	6·46	33·96	26·70	8·20	—	—	—	—	6·45	N 100 B				
		50	—	6·32	33·99	26·74	8·20										
		60	—	5·95	34·04	26·82	8·20	—	—	—	—	6·40					
		80	—	5·81	34·05	26·85	8·20										
		100	—	5·57	34·06	26·89	8·21	—	—	—	—	6·88					
		150	—	5·32	34·07	26·92	8·21	—	—	—	—	6·47					
		200	—	5·11	34·14	27·01	8·17	—	—	—	—	6·25					
		290	—	4·92	34·22	27·08	8·18	—	—	—	—	6·30					
		390	—	4·94	34·23	27·10	8·18	—	—	—	—	6·13					
		580	—	4·61	34·23	27·13	8·12	—	—	—	—	5·95					
		780	—	4·17	34·25	27·19	8·18	—	—	—	—	5·31					
		970	—	3·61	34·35	27·34	8·15	—	—	—	—	4·50					
		1460	—	2·65	34·38	27·45	8·18	—	—	—	—	4·63					
		1750	1746	2·28	34·60	27·65	8·23	—	—	—	—	3·10					
726	9	0	—	7·01	33·72	26·44	8·28	—	—	—	—	6·94	N 50 V	100–0	0935	0942	
		10	—	6·95	33·72	26·44	8·28	—	—	—	—	—	N 70 B	108–0	1213	1233	KT
		20	—	6·27	33·85	26·63	8·27	—	—	—	—	6·50	N 100 B				
		30	—	5·82	33·98	26·80	8·23	—	—	—	—	—	N 70 B	270–190	1213	1246	DGP
		40	—	5·76	34·02	26·83	8·19	—	—	—	—	6·34	N 100 B				
		50	—	5·71	34·04	26·85	8·20										
		60	—	5·65	34·05	26·87	8·20	—	—	—	—	6·30					
		80	—	5·60	34·05	26·87	8·20	—	—	—	—	6·24					
		100	—	5·52	34·09	26·91	8·19	—	—	—	—	6·04					
		150	—	5·15	34·14	27·00	8·20	—	—	—	—	6·18					
		200	—	5·09	34·16	27·02	8·20	—	—	—	—	6·10					
		300	—	5·04	34·23	27·09	8·20	—	—	—	—	6·00					
		400	—	4·89	34·23	27·10	8·20	—	—	—	—	6·08					
		600	—	4·47	34·18	27·11	—	—	—	—	—	5·41					
		800	—	3·95	34·14	27·14	—	—	—	—	—	5·27					
		1000	987	3·34	34·33	27·33	—	—	—	—	—	4·23					
		1500	—	2·58													
		2000	—	2·18	34·64	27·69											
		2500	—	1·94													
		3000	—	1·78													
		3500	—	1·24	—	—	8·31	—	—	—	—	4·09					
		4000	4025	0·92	34·70	27·84	8·31	—	—	—	—	4·01					
727	9	0	—	5·91	34·03	26·82	8·20	—	—	—	—	6·79	N 50 V	100–0	2005	2010	
		10	—	5·91	34·03	26·82	8·20	—	—	—	—	—	N 70 B	124–0	2250	2311	KT
		20	—	5·81	34·04	26·84	8·20	—	—	—	—	6·69	N 100 B				
		30	—	5·31	34·13	26·97	8·21	—	—	—	—	—	N 70 B	310–170	2250	2323	DGP
		40	—	5·23	34·14	27·00	8·21	—	—	—	—	6·65	N 100 B				
		50	—	5·15	34·14	27·00	8·21										

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
727 *cont.*	56° 13·4′ S, 75° 07·3′ W	1931 18 xi											
728	57° 39·2′ S, 75° 08·5′ W	19 xi	0900	4726*	W	21	W	4	o	1018·6	5·5	4·9	mod. WSW swell
			1200	—	W×N	25	W×N	4	o	1019·3	6·3	5·6	heavy W swell
729	58° 26·7′ S, 75° 07·2′ W	19 xi	2000	4479*	W×S	24	W×S	4	o	1016·3	5·0	4·5	heavy WSW swell
		20 xi	0040	—	W×S	20	W×S	4	oe	1017·7	4·9	4·4	heavy WSW swell
730	59° 36·7′ S, 75° 05·3′ W	20 xi	0900	4819*	W	18	W	4	ome	1014·1	4·2	4·1	heavy conf. W swell

		HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				
								Mg.—atom m.³							TIME		
Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	Remarks
727 *cont.*	9	60	—	5·05	34·14	27·02	8·20	—	—	—	—	6·56					
		80	—	5·00	34·14	27·02	8·21										
		100	—	4·99	34·14	27·02	8·19	—	—	—	—	6·50					
		150	—	4·98	34·20	27·06	8·19	—	—	—	—	6·42					
		200	—	4·91	34·20	27·07	8·18	—	—	—	—	6·34					
		300	—	4·84	34·22	27·09	8·18	—	—	—	—	6·30					
		400	—	4·81	34·22	27·09	8·19	—	—	—	—	6·29					
		600	—	4·55	34·22	27·12	8·19	—	—	—	—	6·07					
		800	—	4·10	34·23	27·19	8·14	—	—	—	—	5·10					
		1000	—	3·47	34·31	27·31	8·11	—	—	—	—	4·51					
		1500	—	2·62	34·43	27·49	8·10	—	—	—	—	3·92					
		2000	—	2·20													
		2500	—	2·17	34·54	27·62	8·21										
		3000	—	1·76													
		3500	—	1·35	34·70	27·81											
		4000	—	0·92	34·70	27·84	8·28	—	—	—	—	3·90					
728	10	0	—	5·22	34·21	27·05	8·16	—	—	—	—	—	N 50 V	100–0	0900	0910	
		10	—	5·22	34·21	27·05	8·16	—	—	—	—	—	N 70 B }	160–0?	1341	1357	KT
		20	—	5·22	34·21	27·05	8·16	—	—	—	—	6·57	N 100 B }				
		30	—	5·20	34·21	27·05	8·16	—	—	—	—	—	N 70 B }	400–300?	1341	1410	DGP
		40	—	5·05	34·21	27·06	8·17	—	—	—	—	6·56	N 100 B }				
		50	—	4·98	34·21	27·07	8·17										
		60	—	4·93	34·21	27·08	8·17	—	—	—	—	6·59					
		80	—	4·90	34·21	27·08	8·17										
		100	—	4·85	34·22	27·09	8·17	—	—	—	—	5·85					
		150	—	4·80	34·22	27·09	8·18	—	—	—	—	6·47					
		200	—	4·79	34·22	27·09	8·18	—	—	—	—	6·47					
		300	—	4·72	34·21	27·10	8·17	—	—	—	—	6·41					
		400	—	4·54	34·20	27·11	8·17	—	—	—	—	6·34					
		600	—	4·28	34·20	27·14	8·23	—	—	—	—	6·32					
		800	—	3·98	34·20	27·17	8·16	—	—	—	—	5·43					
		990	—	3·34	34·25	27·28	8·17	—	—	—	—	4·57					
		1490	—	2·57	34·32	27·40	8·12	—	—	—	—	3·82					
		1990	—	2·23	34·66	27·70	8·09	—	—	—	—	3·62					
		2480	—	1·94	34·71	27·77	8·21	—	—	—	—	3·49					
		2980	—	1·63	34·72	27·80	8·22	—	—	—	—	3·83					
		3480	—	1·31	34·71	27·82	8·22	—	—	—	—	3·94					
		3970	—	0·92	—	—	8·22	—	—	—	—	4·59					
		4470	4474	0·61	—	—	8·23	—	—	—	—	4·63					
729	10	0	—	4·61	34·22	27·11	8·18	—	—	—	—	6·58	N 50 V	100–0	**2005**	**2014**	
		10	—	4·61	34·22	27·11	8·18	—	—	—	—	—	N 70 B }	102–0	**2306**	**2325**	KT
		20	—	4·61	34·22	27·11	8·18	—	—	—	—	6·64	N 100 B }				
		30	—	4·61	34·22	27·11	8·18	—	—	—	—	—	N 100 B	256–194	**2306**	**2337**	DGP
		40	—	4·61	34·22	27·11	8·18	—	—	—	—	6·64	N 70 B	358–174	**0001**	**0031**	DGP
		50	—	4·61	34·22	27·11	8·18										
		60	—	4·60	34·22	27·12	8·17	—	—	—	—	6·63					
		80	—	4·44	34·22	27·13	8·17										
		100	—	4·24	34·21	27·15	8·18	—	—	—	—	6·56					
		150	—	4·21	34·20	27·15	8·18	—	—	—	—	6·50					
		200	—	4·02	34·19	27·17	8·18	—	—	—	—	6·34					
		300	—	3·48	34·15	27·19	8·14	—	—	—	—	6·27					
		400	—	3·15	34·14	27·21	8·15	—	—	—	—	6·67					
		600	—	2·85	34·15	27·25	8·15	—	—	—	—	5·89					
		800	—	3·09	34·34	27·38	8·08	—	—	—	—	4·52					
		1000	—	2·86	34·39	27·44	8·09	—	—	—	—	4·32					
		1500	—	2·34	34·60	27·64	8·04	—	—	—	—	3·70					
		2000	—	2·12	34·70	27·75	8·18	—	—	—	—	3·73					
		2500	—	1·78	34·71	27·79	8·11	—	—	—	—	3·61					
		3000	—	1·50	34·70	27·80	8·24	—	—	—	—	3·96					
		3500	—	1·12	34·70	27·82	8·27	—	—	—	—	3·97					
		4000	4001	0·78	34·69	27·83	8·26	—	—	—	—	4·01					
730	11	0	—	3·24	34·14	27·21	8·14	—	—	—	—	6·77	N 50 V	100–0	0905	0914	
		10	—	3·23	34·14	27·21	8·15	—	—	—	—	—	N 70 B }	73–0	1203	1223	KT
		20	—	3·23	34·14	27·21	8·15	—	—	—	—	6·77	N 100 B }				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
730 *cont.*	59° 36·7′ S, 75° 05·3′ W	1931 20 xi											
731	60° 35·8′ S, 75° 03·7′ W	20 xi	2000	4643*	WSW	13	WSW	3	ofe	1012·7	2·5	2·5	mod. WSW swell
732	61° 58′ S, 75° 01·5′ W	21 xi	0900	4572*	WSW	7	WSW	2	o	1013·9	1·1	0·1	heavy conf. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
730 *cont.*	11	30	—	3·23	34·14	27·21	8·15	—	—	—	—	—	N 70 B	250–170	1203	1235	DGP
		40	—	3·22	34·14	27·21	8·15	—	—	—	—	6·76	N 100 B				
		50	—	3·02	34·14	27·23	8·15										
		60	—	2·89	34·14	27·24	8·15	—	—	—	—	6·86					
		80	—	2·79	34·14	27·25	8·15										
		100	—	2·82	34·14	27·24	8·15	—	—	—	—	6·61					
		150	—	2·67	34·13	27·24	8·15	—	—	—	—	6·40					
		200	—	2·42	34·13	27·26	8·17	—	—	—	—	6·47					
		300	—	2·42	34·14	27·28	8·11	—	—	—	—	6·00					
		390	—	2·42	34·19	27·32	8·08	—	—	—	—	5·48					
		590	—	2·37	34·32	27·42	8·07	—	—	—	—	4·56					
		780	—	2·44	34·45	27·51	8·07	—	—	—	—	3·91					
		980	—	2·36	34·54	27·60	8·05	—	—	—	—	3·80					
		1470	1477	2·13	34·67	27·72	8·08	—	—	—	—	3·68					
		1960	—	1·81	34·71	27·78	8·12	—	—	—	—	3·90					
		2420	—	1·51	34·72	27·81	8·17	—	—	—	—	3·94					
		2910	—	1·21	34·71	27·83	8·17	—	—	—	—	4·05					
		3390	—	0·92	34·70	27·84	8·18	—	—	—	—	4·15					
		3880	—	0·67	34·69	27·83	8·24	—	—	—	—	4·24					
		4360	4364	0·52	34·69	27·84	8·24	—	—	—	—	4·09					
731	11	0	—	1·81	33·96	27·18	8·14	—	—	—	—	7·14	N 50 V	100–0	2005	2012	
		10	—	1·81	34·04	27·24	8·14	—	—	—	—	—	N 70 B	62–0	2318	2338	KT
		20	—	1·83	34·04	27·23	8·14	—	—	—	—	7·14	N 100 B				
		30	—	1·92	34·05	27·24	8·14	—	—	—	—	—	N 70 B	246–170	2318	2349	DGP
		40	—	1·98	34·08	27·26	8·14	—	—	—	—	7·09	N 100 B				
		50	—	1·97	34·08	27·26	8·14										
		60	—	1·64	34·09	27·29	8·14	—	—	—	—	7·00					
		80	—	1·52	34·07	27·28	8·14										
		100	—	1·31	34·05	27·28	8·14	—	—	—	—	7·03					
		150	—	0·96	34·04	27·29	8·15	—	—	—	—	7·15					
		200	—	0·97	34·07	27·32	8·14	—	—	—	—	6·84					
		300	—	1·73	34·22	27·38	8·04	—	—	—	—	5·63					
		400	—	1·94	34·30	27·44	8·00	—	—	—	—	4·96					
		600	—	2·23	34·43	27·52	8·05	—	—	—	—	4·03					
		800	—	2·23	34·52	27·59	8·05	—	—	—	—	3·82					
		1000	995	2·23	34·61	27·67	8·05	—	—	—	—	3·62					
		1500	—	1·97	34·70	27·76	8·09	—	—	—	—	3·94					
		2000	—	1·61	34·71	27·80	8·09	—	—	—	—	4·05					
		2500	—	1·29	34·72	27·82	8·16	—	—	—	—	4·00					
		3000	—	1·00	34·71	27·84	8·25	—	—	—	—	4·22					
		3500	—	0·70	34·70	27·85	8·21	—	—	—	—	4·22					
		4000	—	0·50	34·69	27·84	8·21	—	—	—	—	4·26					
		4500	—	0·46	34·69	27·84	8·21	—	—	—	—	4·12					
732	12	0	—	1·66	34·04	27·25	8·15	—	—	—	—	7·23	N 50 V	100–0	0910	0920	
		10	—	1·61	34·04	27·25	8·15	—	—	—	—	—	N 70 B	80–0	1159	1219	KT
		20	—	1·61	34·04	27·25	8·15	—	—	—	—	7·18	N 100 B				
		30	—	1·61	34·04	27·25	8·15	—	—	—	—	—	N 70 B	278–170	1159	1229	DGP
		40	—	1·60	34·04	27·25	8·15	—	—	—	—	7·20	N 100 B				
		50	—	1·54	34·04	27·26	8·15										
		60	—	1·51	34·04	27·26	8·15	—	—	—	—	7·18					
		80	—	1·56	34·04	27·25	8·15										
		100	—	1·17	34·04	27·28	8·16	—	—	—	—	7·02					
		150	—	1·09	34·05	27·30	8·15	—	—	—	—	6·84					
		200	—	1·74	34·14	27·33	8·08	—	—	—	—	5·98					
		300	—	1·55	34·21	27·39	8·05	—	—	—	—	5·78					
		400	—	2·13	34·33	27·44	8·00	—	—	—	—	4·81					
		600	—	2·36	34·43	27·51	7·99	—	—	—	—	4·11					
		800	—	2·31	34·52	27·58	8·03	—	—	—	—	3·82					
		1000	990	2·23	34·60	27·65	8·00	—	—	—	—	3·84					
		1500	—	1·99	34·70	27·76	8·01	—	—	—	—	3·93					
		2000	—	1·64	34·71	27·80	8·11	—	—	—	—	3·91					
		2500	—	1·21	34·70	27·82	8·16	—	—	—	—	4·06					
		3000	—	1·01	34·70	27·83	8·16	—	—	—	—	4·23					
		3500	—	0·73	34·70	27·85	8·22	—	—	—	—	4·22					
		4000	—	0·51	34·69	27·84	8·18	—	—	—	—	4·20					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
733	62° 56·7′ S, 75° 02′ W	1931 21 xi	2000	4336*	WSW	6	WSW	1–2	om	1012·9	−2·3	−2·5	mod. W swell
		22 xi	0010	—	W	6	W	1	o	1010·8	−0·5	−0·7	mod. W swell
734	64° 14′ S, 74° 59·2′ W	22 xi	0900	3934*	SE	11	SE	2	ome	1010·1	−1·2	−1·2	mod. W swell
735	63° 55′ S, 73° 28·8′ W	22 xi	2000	3879*	SSE	5	SSE	1	b	1011·2	−1·7	−2·0	mod. W×N swell
736	63° 00·8′ S, 72° 13·5′ W	23 xi	0900	4082*	—	0	—	0	bm	1010·8	−1·1	−1·7	low NW×W swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	Time From	Time To	Remarks
		HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				
733	12	0	—	1.07	33.94	27.21	8.16	—	—	—	—	7.31	N 50 V	100–0	2006	2013	
		10	—	1.06	33.94	27.21	8.16	—	—	—	—	—	N 70 B	84–0	**2235**	**2255**	KT
		20	—	1.05	33.94	27.21	8.16	—	—	—	—	7.29	N 100 B				
		30	—	1.02	33.95	27.22	8.16	—	—	—	—	—	N 70 B	260–148	**2235**	**2308**	DGP
		40	—	1.11	33.96	27.23	8.16	—	—	—	—	7.28	N 100 B	260–0			
		50	—	1.43	34.01	27.24	8.16	—	—	—	—	—	N 100 B	300–140	**2334**	**0005**	DGP
		60	—	1.44	34.01	27.24	8.16	—	—	—	—	7.11					
		80	—	1.76	34.08	27.28	8.14										
		100	—	1.54	34.08	27.30	8.14	—	—	—	—	6.85					
		150	—	1.70	34.09	27.28	8.10	—	—	—	—	6.39					
		200	—	1.62	34.14	27.34	8.06	—	—	—	—	6.01					
		300	—	1.72	34.20	27.37	8.02	—	—	—	—	5.42					
		400	—	2.01	34.34	27.47	7.96	—	—	—	—	4.66					
		600	—	2.32	34.45	27.52	7.98	—	—	—	—	3.95					
		800	—	2.29	34.55	27.62	8.02	—	—	—	—	3.86					
		1000	997	2.22	34.62	27.68	8.02	—	—	—	—	3.66					
		1490	—	1.93	34.69	27.74	8.04	—	—	—	—	3.95					
		1990	—	1.57	34.71	27.80	8.14	—	—	—	—	3.76					
		2490	—	1.23	34.71	27.83	8.19	—	—	—	—	4.16					
		2990	—	0.93	34.70	27.84	8.19	—	—	—	—	3.88					
		3480	—	0.66	34.69	27.83	8.18	—	—	—	—	4.24					
		3980	3981	0.50	34.68	27.84	8.12	—	—	—	—	4.25					
734	13	0	—	−1.39	33.82	27.23	8.16	—	—	—	—	7.58	N 50 V	100–0	0918	0924	
		10	—	−1.45	33.82	27.24	8.16	—	—	—	—	—	N 70 B	104–0	1147	1208	KT
		20	—	−1.50	33.82	27.24	8.16	—	—	—	—	7.60	N 100 B				
		30	—	−1.52	33.82	27.24	8.16	—	—	—	—	—	N 70 B	314–184	1147	1219	DGP
		40	—	−1.60	33.83	27.25	8.16	—	—	—	—	7.56	N 100 B				
		50	—	−1.66	33.83	27.25	8.16										
		60	—	−1.75	33.94	27.33	8.15	—	—	—	—	7.42					
		80	—	−1.67	33.97	27.36	8.14										
		100	—	−1.00	34.11	27.45	8.08	—	—	—	—	6.49					
		150	—	0.67	34.27	27.50	8.00	—	—	—	—	5.22					
		200	—	1.29	34.38	27.55	7.96	—	—	—	—	4.62					
		300	—	1.82	34.53	27.63	7.94	—	—	—	—	4.03					
		400	—	2.14	34.60	27.66	7.94	—	—	—	—	3.86					
		600	—	2.02	34.67	27.73	8.08	—	—	—	—	3.90					
		800	—	1.92	34.68	27.74	8.14	—	—	—	—	3.92					
		1000	—	1.79	34.69	27.75	8.09	—	—	—	—	3.70					
		1500	—	1.43	34.70	27.80	8.13	—	—	—	—	4.08					
		2000	—	1.12	34.69	27.80	8.19	—	—	—	—	4.10					
		2500	—	0.82	34.69	27.82	8.20	—	—	—	—	4.15					
735	13	0	—	−1.39	33.84	27.24	8.16	—	—	—	—	7.58	N 50 V	100–0	2000	2012	
		10	—	−1.55	33.85	27.26	8.16	—	—	—	—	—	N 70 B	62–0	**2150**	**2210**	KT
		20	—	−1.68	33.86	27.26	8.16	—	—	—	—	7.58	N 100 B				
		30	—	−1.63	33.86	27.26	8.16	—	—	—	—	—	N 70 B	216–168	**2150**	**2223**	DGP
		40	—	−1.70	33.86	27.26	8.17	—	—	—	—	7.56	N 100 B				
		50	—	−1.73	33.86	27.26	8.17										
		60	—	−1.80	34.01	27.40	8.17	—	—	—	—	7.36					
		80	—	−1.60	34.10	27.46	8.13										
		100	—	−0.99	34.14	27.48	8.07	—	—	—	—	6.41					
		150	—	0.70	34.32	27.54	7.99	—	—	—	—	5.10					
		200	—	1.38	34.42	27.57	7.95	—	—	—	—	4.47					
		300	—	1.81	34.56	27.65	7.94	—	—	—	—	3.97					
		400	—	1.94	34.61	27.69	7.94	—	—	—	—	3.82					
		600	—	1.99	34.67	27.73	8.06	—	—	—	—	3.87					
		800	—	1.89	34.70	27.77	8.13	—	—	—	—	3.84					
		1000	—	1.77	34.71	27.79	8.08	—	—	—	—	3.87					
		1500	—	1.43	34.71	27.81	8.12	—	—	—	—	4.04					
		2000	—	1.11	34.70	27.82	8.13	—	—	—	—	4.11					
		2500	—	0.79	34.70	27.84	8.14	—	—	—	—	4.20					
		3000	—	0.56	34.69	27.84	8.20	—	—	—	—	4.22					
		3500	3497	0.43	34.68	27.85	8.10	—	—	—	—	4.33					
736	14	0	—	−0.96	33.86	27.24	8.18	—	—	—	—	7.78	N 50 V	100–0	0905	0911	
		10	—	−1.40	33.87	27.27	8.18	—	—	—	—	—	N 70 B	100–0	1042	1102	KT
		20	—	−1.53	33.87	27.28	8.18	—	—	—	—	7.74	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
736 *cont.*	63° 00·8′ S, 72° 13·5′ W	1931 23 xi											
737	62° 47·5′ S, 69° 24·8′ W	23 xi	2000	4343*	NNW	10	NNW	2	c	1009·2	−0·4	−0·8	low NW swell
738	61° 49·7′ S, 66° 53′ W	24 xi	0900	3917*	NNW	2	NNW	1	bc	1007·8	2·3	1·4	low NW swell
739	61° 25·9′ S, 64° 32′ W	24 xi	2000	3348*	NW × W	14	NW × W	3	ofed	1006·4	0·1	0·0	low NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. ° C.	S °/₀₀	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
736 *cont.*	14	30	—	−1·52	33·87	27·28	8·18	—	—	—	—	—	N 70 B	320–184	1042	1115	DGP
		40	—	−1·54	33·87	27·28	8·18	—	—	—	—	7·79	N 100 B	320–0			
		50	—	−1·63	33·87	27·28	8·18	—	—	—	—	—	N 100 B	216–140	1138	1208	DGP
		60	—	−1·81	33·93	27·33	8·14	—	—	—	—	7·55					
		80	—	−1·78	34·01	27·40	8·13										
		100	—	−1·61	34·04	27·41	8·09	—	—	—	—	7·00					
		150	—	−0·60	34·20	27·51	8·04	—	—	—	—	6·03					
		200	—	1·11	34·42	27·58	7·97	—	—	—	—	4·67					
		300	—	1·65	34·53	27·65	7·94	—	—	—	—	4·12					
		400	—	1·88	34·60	27·68	7·94	—	—	—	—	3·93					
		600	—	1·87	34·61	27·70	7·98	—	—	—	—	3·92					
		800	—	1·95	34·62	27·70	8·00	—	—	—	—	3·81					
		1000	—	1·97	34·64	27·71	8·00	—	—	—	—	3·80					
		1500	—	1·92	34·72	27·77	8·09	—	—	—	—	4·14					
		2000	—	1·12	34·72	27·83	8·10	—	—	—	—	4·34					
		2500	—	0·85	34·72	27·85	8·16	—	—	—	—	4·13					
		3000	—	0·63	34·70	27·85	8·12	—	—	—	—	4·31					
		3500	3505	0·45	34·69	27·85	8·07	—	—	—	—	4·39					
737	14	0	—	−1·12	33·56	27·02	8·18	—	—	—	—	7·80	N 50 V	100–0	2007	2013	
		10	—	−1·30	33·75	27·17	8·18	—	—	—	—	—	N 70 B	248–154	2214	2245	DGP. Nets towed ½ mile from pack-ice
		20	—	−1·41	33·77	27·18	8·18	—	—	—	—	7·85	N 100 B				
		30	—	−1·47	33·78	27·21	8·18	—	—	—	—	—	N 70 B	109–0	2301	2321	KT
		40	—	−1·51	33·78	27·21	8·18	—	—	—	—	7·86	N 100 B				
		50	—	−1·55	33·85	27·26	8·17										
		60	—	−1·71	33·93	27·32	8·16	—	—	—	—	7·50					
		80	—	−1·77	33·94	27·34	8·16										
		100	—	−1·67	33·97	27·36	8·15	—	—	—	—	7·32					
		150	—	−0·40	34·13	27·44	8·07	—	—	—	—	6·27					
		200	—	0·22	34·23	27·50	8·02	—	—	—	—	5·67					
		300	—	1·51	34·43	27·58	7·97	—	—	—	—	4·38					
		400	—	1·75	34·48	27·60	7·96	—	—	—	—	4·05					
		600	—	2·04	34·64	27·71	8·05	—	—	—	—	3·75					
		800	—	2·03	34·68	27·74	8·05	—	—	—	—	3·80					
		1000	—	1·88	34·72	27·78	8·05	—	—	—	—	3·96					
		1500	—	1·54	34·73	27·81	8·09	—	—	—	—	4·22					
		2000	—	1·22	34·73	27·84	8·12	—	—	—	—	4·06					
		2500	—	0·91	34·71	27·85	8·17	—	—	—	—	4·34					
		3000	—	0·62	34·70	27·86	8·12	—	—	—	—	4·26					
		3500	—	0·44	34·70	27·87	8·12	—	—	—	—	4·15					
738	15	0	—	−0·81	33·69	27·11	8·19	—	—	—	—	7·74	N 50 V	100–0	0905	0915	
		10	—	−1·03	33·72	27·14	8·19	—	—	—	—	—	N 70 B	89–0	1115	1135	KT
		20	—	−1·13	33·83	27·24	8·19	—	—	—	—	7·80	N 100 B				
		30	—	−1·28	33·84	27·24	8·19	—	—	—	—	—	N 70 B	160–85	1154	1224	DGP
		40	—	−1·33	33·84	27·24	8·19	—	—	—	—	7·75	N 100 B				
		50	—	−1·50	33·84	27·25	8·19										
		60	—	−1·62	33·84	27·25	8·18	—	—	—	—	7·61					
		80	—	−1·58	33·94	27·33	8·15										
		100	—	−1·47	33·96	27·35	8·14	—	—	—	—	7·16					
		150	—	−0·91	34·04	27·39	8·07	—	—	—	—	6·69					
		200	—	0·55	34·21	27·46	8·03	—	—	—	—	5·58					
		300	—	1·80	34·39	27·53	7·97	—	—	—	—	4·32					
		400	—	2·07	34·50	27·58	7·97	—	—	—	—	3·92					
		600	—	2·12	34·60	27·66	8·00	—	—	—	—	3·75					
		800	—	2·05	34·70	27·75	8·09	—	—	—	—	3·85					
		1000	—	1·93	34·71	27·77	8·08	—	—	—	—	3·83					
		1500	—	1·56	34·73	27·81	8·06	—	—	—	—	4·01					
		2000	—	1·25	34·71	27·82	8·16	—	—	—	—	4·05					
		2500	—	0·93	34·71	27·85	8·16	—	—	—	—	4·17					
		3000	—	0·79	34·70	27·84	8·12	—	—	—	—	4·25					
		3500	—	0·53	34·70	27·86	8·11	—	—	—	—	4·35					
739	15	0	—	−1·31	33·60	27·05	8·17	—	—	—	—	7·81	N 50 V	100–0	2010	2016	
		10	—	−1·40	33·60	27·05	8·17	—	—	—	—	—	N 70 B	172–85	2133	2203	DGP
		20	—	−1·40	33·76	27·18	8·17	—	—	—	—	7·81	N 100 B				
		30	—	−1·40	33·78	27·20	8·17	—	—	—	—	—	N 70 B	121–0	2219	2239	KT
		40	—	−1·40	33·79	27·21	8·17	—	—	—	—	7·78	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
739 *cont.*	61° 25·9′ S, 64° 32′ W	1931 24 xi											
740	60° 06·7′ S, 63° 35·9′ W	25 xi	0900	3920*	WSW	16	WSW	3	o	1006·7	1·7	0·8	low WSW swell
741	59° 53·7′ S, 61° 03·2′ W	25 xi	2000	4179*	W × S	15	W × S	3	o	1005·0	0·9	0·6	low W swell
742	59° 19·6′ S, 58° 35′ W	26 xi	0900	3631*	NNW	14	NNW	3	bc	1000·1	3·3	1·8	low W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
								Mg.—atom m.³							TIME		
		Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
739 *cont.*	15	50	—	−1·36	33·90	27·29	8·17										
		60	—	−1·51	33·96	27·35	8·16	—	—	—	—	7·50					
		80	—	−1·59	33·98	27·37	8·13										
		100	—	−1·61	34·00	27·38	8·12	—	—	—	—	7·28					
		150	—	−1·15	34·02	27·39	8·08	—	—	—	—	6·73					
		200	—	0·68	34·22	27·45	8·01	—	—	—	—	5·46					
		300	—	1·99	34·47	27·57	7·95	—	—	—	—	4·16					
		400	—	1·90	34·52	27·62	7·94	—	—	—	—	4·03					
		600	—	2·19	34·63	27·68	8·08	—	—	—	—	3·67					
		800	—	2·06	34·68	27·73	8·08	—	—	—	—	3·73					
		1000	—	1·99	34·71	27·77	8·09	—	—	—	—	3·91					
		1500	—	1·65	34·73	27·81	8·09	—	—	—	—	3·98					
		2000	—	1·30	34·72	27·82	8·15	—	—	—	—	4·07					
		2500	—	0·93	34·70	27·84	8·11	—	—	—	—	4·21					
		3000	—	0·58	34·70	27·86	8·20	—	—	—	—	4·28					
740	16	0	—	−0·59	33·96	27·32	8·17	—	—	—	—	7·76	**N 50 V**	100–0	0910	0915	
		10	—	−0·60	33·98	27·34	8·17	—	—	—	—	—	**N 70 B**	266–126	1056	1126	DGP
		20	—	−0·77	34·03	27·39	8·17	—	—	—	—	7·75	**N 100 B**				
		30	—	−0·94	34·04	27·39	8·16	—	—	—	—	—	**N 70 B**	128–0	1141	1201	KT
		40	—	−1·04	34·05	27·40	8·13	—	—	—	—	7·69	**N 100 B**				
		50	—	−1·08	34·05	27·41	8·12										
		60	—	−1·13	34·05	27·41	8·12	—	—	—	—	7·59					
		80	—	−1·19	34·10	27·45	8·08										
		100	—	−1·22	34·20	27·53	8·02	—	—	—	—	6·31					
		150	—	1·30	34·45	27·60	7·95	—	—	—	—	4·34					
		200	—	1·60	34·51	27·63	7·94	—	—	—	—	4·11					
		300	—	1·80	34·62	27·71	7·94	—	—	—	—	3·94					
		400	—	1·84	34·64	27·72	7·94	—	—	—	—	3·93					
		600	—	1·80	34·69	27·75	8·04	—	—	—	—	3·90					
		800	—	1·71	34·73	27·80	8·05	—	—	—	—	4·06					
		1000	—	1·63	34·73	27·81	8·09	—	—	—	—	4·01					
		1500	—	1·21	34·72	27·83	8·10	—	—	—	—	4·04					
		2000	—	0·90	34·72	27·85	8·10	—	—	—	—	4·14					
		2500	—	0·59	34·70	27·86	8·09	—	—	—	—	4·28					
		3000	—	0·49	34·70	27·86	8·21	—	—	—	—	4·31					
		3500	—	0·42	34·70	27·87	8·21	—	—	—	—	4·23					
741	16	0	—	−0·53	33·81	27·19	8·14	—	—	—	—	7·63	**N 50 V**	100–0	**2005**	**2019**	
		10	—	−0·68	33·85	27·23	8·14	—	—	—	—	—	**N 70 B**	286–126	**2143**	**2212**	DGP
		20	—	−0·71	33·89	27·26	8·14	—	—	—	—	7·64	**N 100 B**				
		30	—	−0·89	33·89	27·27	8·15	—	—	—	—	—	**N 70 B**	123–0	**2226**	**2246**	KT
		40	—	−0·91	33·89	27·27	8·12	—	—	—	—	7·66	**N 100 B**				
		50	—	−0·91	33·89	27·27	8·12										
		60	—	−0·92	33·89	27·27	8·11	—	—	—	—	7·63					
		80	—	−0·98	33·89	27·27	8·11										
		100	—	−1·10	33·94	27·32	8·12	—	—	—	—	7·48					
		150	—	−0·04	34·19	27·48	8·01	—	—	—	—	5·88					
		200	—	1·21	34·34	27·53	7·97	—	—	—	—	4·79					
		300	—	1·80	34·49	27·60	7·94	—	—	—	—	4·08					
		400	—	1·91	34·56	27·65	7·93	—	—	—	—	3·93					
		600	—	1·99	34·65	27·71	8·04	—	—	—	—	3·75					
		800	—	1·90	34·70	27·77	8·07	—	—	—	—	3·82					
		1000	—	1·81	34·70	27·77	8·03	—	—	—	—	3·91					
		1500	—	1·92	34·71	27·77	8·13	—	—	—	—	4·15					
		2000	—	1·07	34·73	27·85	8·09	—	—	—	—	4·14					
		2500	—	0·74	34·71	27·86	8·10	—	—	—	—	4·32					
		3000	—	0·54	34·70	27·86	8·10	—	—	—	—	4·31					
		3500	—	0·51	34·70	28·86	8·21	—	—	—	—	4·23					
742	17	0	—	−0·21	33·96	27·30	8·12	—	—	—	—	7·50	**N 50 V**	100–0	0905	0912	
		10	—	−0·29	33·96	27·30	8·11	—	—	—	—	—	**N 70 B**	178–110	1111	1141	DGP
		20	—	−0·30	33·96	27·30	8·11	—	—	—	—	7·49	**N 100 B**				
		30	—	−0·31	33·96	27·31	8·11	—	—	—	—	—	**N 70 B**	113–0	1155	1215	KT
		40	—	−0·37	33·98	27·33	8·11	—	—	—	—	7·44	**N 100 B**				
		50	—	−0·43	34·00	27·34	8·11										
		60	—	−0·61	34·04	27·38	8·10	—	—	—	—	7·44					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
742 *cont.*	59° 19·6′ S, 58° 35′ W	1931 26 xi											
743	59° 23′ S, 55° 54·1′ W	26 xi	2000	3633*	NNW	23	NNW	5	oe	991·5	1·1	1·0	mod. NW swell
744	60° 54·5′ S, 55° 45·6′ W	27 xi	0815	214*	NW	25	NW	5	o	979·0	1·8	1·1	heavy NW swell
745	57° 35·1′ S, 55° 47·1′ W	28 xi	0900	4036*	NW × W	10	NW × W	2	bc	994·8	2·7	1·8	heavy conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S°/₀₀	σt	pH	Mg.—atom m.³				O_2 c.c. litre	Gear	Depth (metres)	TIME		
								P	Nitrate + Nitrite N_2	Nitrite N_2	Si				From	To	
742 *cont.*	17	80	—	−1·00	34·11	27·45	8·06										
		100	—	−0·95	34·16	27·49	8·05	—	—	—	—	6·70					
		150	—	0·37	34·34	27·58	8·01	—	—	—	—	5·23					
		200	—	1·60	34·53	27·65	7·95	—	—	—	—	4·08					
		300	—	1·91	34·61	27·70	7·95	—	—	—	—	3·81					
		400	—	1·83	34·69	27·75	7·95	—	—	—	—	3·85					
		600	—	1·81	34·74	27·80	8·09	—	—	—	—	3·83					
		800	—	1·70	34·74	27·81	8·09	—	—	—	—	3·99					
		1000	—	1·48	34·73	27·82	8·09	—	—	—	—	4·14					
		1500	—	1·11	34·73	27·84	8·04	—	—	—	—	4·11					
		2000	—	0·73	34·71	27·86	8·08	—	—	—	—	4·27					
		2500	—	0·44	34·70	27·87	8·16	—	—	—	—	4·42					
		3000	—	0·10	34·70	27·88	8·21	—	—	—	—	4·39					
743	17	0	—	−0·42	33·98	27·33	8·10	—	—	—	—	7·56	**N 50 V**	100–0	**2016**	**2019**	
		10	—	−0·42	34·01	27·35	8·10	—	—	—	—	—	**N 70 B**	264–108	**2148**	**2219**	DGP
		20	—	−0·42	34·01	27·35	8·10	—	—	—	—	7·56	**N 100 B**				
		30	—	−0·47	34·01	27·35	8·10	—	—	—	—	—	**N 70 B**	149–0	**2231**	**2251**	KT
		40	—	−0·47	34·01	27·35	8·07	—	—	—	—	7·53	**N 100 B**				
		50	—	−0·50	34·01	27·35	8·06										
		60	—	−0·58	34·02	27·37	8·07	—	—	—	—	7·52					
		80	—	−0·80	34·07	27·42	8·06										
		100	—	−0·59	34·12	27·45	8·02	—	—	—	—	6·42					
		150	—	0·93	34·38	27·58	7·96	—	—	—	—	4·86					
		200	—	1·62	34·48	27·61	7·94	—	—	—	—	4·21					
		300	—	1·75	34·56	27·66	7·94	—	—	—	—	4·01					
		400	—	1·87	34·67	27·74	7·94	—	—	—	—	3·95					
		600	—	1·72	34·70	27·78	8·04	—	—	—	—	3·97					
		800	—	1·71	34·73	27·80	8·08	—	—	—	—	3·95					
		1000	—	1·49	34·71	27·81	8·09	—	—	—	—	4·17					
		1500	—	1·09	34·71	27·83	8·11	—	—	—	—	4·09					
		2000	—	0·72	34·71	27·86	8·09	—	—	—	—	4·27					
		2500	—	0·43	34·71	27·88	8·09	—	—	—	—	4·39					
		3000	—	0·12	34·70	27·88	8·26	—	—	—	—	4·36					
744	17	0	—	−0·51	34·36	27·64	8·04	—	—	—	—	6·91	**N 50 V**	100–0	0818		
		10	—	−0·51	34·36	27·64	8·04	—	—	—	—	—	**N 70 V**	150–50			
		20	—	−0·51	34·36	27·64	8·04	—	—	—	—	6·84	,,	50–0	—	0838	
		30	—	−0·54	34·36	27·64	8·04	—	—	—	—	—	**N 70 B**	130–0	0856	0916	KT
		40	—	−0·59	34·36	27·64	8·04	—	—	—	—	6·78	**N 100 B**				
		50	—	−0·59	34·36	27·64	8·04										
		60	—	−0·60	34·36	27·64	8·04	—	—	—	—	6·73					
		80	—	−0·60	34·36	27·64	8·04										
		100	—	−0·69	34·37	27·65	8·03	—	—	—	—	6·42					
		150	—	−0·58	34·43	27·70	8·02	—	—	—	—	6·06					
		180	—	−0·22	34·49	27·72	8·01	—	—	—	—	5·68					
745	19	0	—	0·10	33·96	27·28	8·15	—	—	—	—	7·64	**N 50 V**	100–0	0905	0913	
		10	—	−0·01	33·96	27·29	8·15	—	—	—	—	—	**N 70 B**	260–104	1054	1125	DGP
		20	—	−0·06	33·96	27·29	8·15	—	—	—	—	7·65	**N 100 B**				
		30	—	−0·10	33·96	27·30	8·15	—	—	—	—	—	**N 70 B**	117–0	1138	1158	KT
		40	—	−0·48	33·96	27·31	8·15	—	—	—	—	7·68	**N 100 B**				
		50	—	−0·57	33·96	27·32	8·15										
		60	—	−0·69	33·96	27·32	8·14	—	—	—	—	7·58					
		80	—	−0·92	33·98	27·35	8·15										
		100	—	−0·35	34·04	27·37	8·08	—	—	—	—	6·65					
		150	—	0·61	34·20	27·45	8·00	—	—	—	—	5·79					
		200	—	1·31	34·29	27·47	7·98	—	—	—	—	5·09					
		300	—	1·99	34·39	27·51	7·95	—	—	—	—	4·33					
		400	—	2·03	34·47	27·57	7·95	—	—	—	—	4·10					
		600	—	2·02	34·55	27·64	8·09	—	—	—	—	3·78					
		800	—	2·04	34·67	27·73	8·08	—	—	—	—	3·78					
		1000	—	1·93	34·73	27·78	8·13	—	—	—	—	3·96					
		1500	—	1·55	34·72	27·80	8·09	—	—	—	—	3·96					
		2000	—	1·20	34·72	27·83	8·09	—	—	—	—	4·05					
		2500	—	0·98	34·72	27·84	8·19	—	—	—	—	4·10					
		3000	—	0·62	34·71	27·87	8·15	—	—	—	—	4·34					
		3500	—	0·39	—	—	8·24	—	—	—	—	4·30					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
		1931											
746	56° 21·5′ S, 55° 50·5′ W	28 xi	2000	5832*	E × N	6	E × N	1	ofe	997·1	3·3	3·1	mod. conf. W swell
			0000	—	E × N	10	E × N	2	me	995·4	2·8	2·7	mod. conf. W × S swell
747	55° 20′ S, 56° 14·6′ W	29 xi	0930	4008*	ENE	20	ENE	4	oe	985·2	5·3	5·3	mod. NNE swell
748	55° 29·4′ S, 54° 13·8′ W	29 xi	2100	2703*	NE × E	10	NE × E	3 conf.	ortl	976·4	4·4	4·4	mod. conf. NE swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	TIME To	Remarks
		HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				
746	19	0	—	3·41	34·11	27·16	8·14	—	—	—	—	7·00	**N 50 V**	100–0	**2010**	**2020**	
		10	—	2·71	34·05	27·17	8·15	—	—	—	—	—	**N 70 B**	306–124	**0034**	**0104**	DGP
		20	—	2·71	34·05	27·17	8·15	—	—	—	—	7·07	**N 100 B**				
		30	—	2·70	34·05	27·18	8·15	—	—	—	—	—	**N 70 B**	125–0	**0121**	**0141**	KT
		40	—	2·70	34·05	27·18	8·14	—	—	—	—	7·00	**N 100 B**				
		50	—	2·60	34·05	27·18	8·15										
		60	—	2·51	34·05	27·19	8·15	—	—	—	—	6·93					
		80	—	2·39	34·05	27·20	8·15										
		100	—	2·20	34·05	27·22	8·13	—	—	—	—	7·01					
		150	—	1·91	34·05	27·24	8·12	—	—	—	—	6·88					
		200	—	1·52	34·03	27·26	8·12	—	—	—	—	7·01					
		300	—	1·35	34·07	27·30	8·09	—	—	—	—	6·68					
		400	—	1·71	34·16	27·34	8·06	—	—	—	—	5·93					
		590	—	2·51	34·37	27·45	8·05	—	—	—	—	4·37					
		790	—	2·49	34·51	27·56	8·05	—	—	—	—	3·79					
		990	—	2·39	34·55	27·61	8·02	—	—	—	—	3·64					
		1480	—	2·08	34·70	27·75	8·07	—	—	—	—	3·69					
		1980	—	1·82	34·72	27·78	8·15	—	—	—	—	3·68					
		2470	—	1·48	34·72	27·81	8·31	—	—	—	—	3·84					
		2960	2964	1·01	34·71	27·84	8·23	—	—	—	—	3·93					
		3460	—	0·88	34·70	27·84	8·16	—	—	—	—	4·25					
		3950	—	0·59	34·70	27·86	8·15	—	—	—	—	4·34					
		4450	—	0·30	34·68	27·85	8·20	—	—	—	—	4·48					
		4940	—	0·27	34·67	27·85	8·25	—	—	—	—	4·41					
747	20	0	—	4·70	34·21	27·11	8·15	—	—	—	—	6·63	**N 50 V**	100–0	0935	0941	+4 hours
		10	—	4·68	34·21	27·11	8·15	—	—	—	—	—	**N 70 B**	282–148	1117	1147	DGP
		20	—	4·63	34·21	27·11	8·15	—	—	—	—	6·62	**N 100 B**				
		30	—	4·48	34·19	27·12	8·15	—	—	—	—	—	**N 70 B**	155–0	1200	1220	KT
		40	—	4·41	34·19	27·13	8·16	—	—	—	—	6·63	**N 100 B**				
		50	—	4·40	34·19	27·13	8·16										
		60	—	4·35	34·19	27·13	8·15	—	—	—	—	6·61					
		80	—	4·24	34·20	27·14	8·15										
		100	—	4·20	34·20	27·15	8·15	—	—	—	—	6·57					
		150	—	4·09	34·20	27·16	8·15	—	—	—	—	6·59					
		200	—	4·02	34·20	27·17	8·14	—	—	—	—	6·55					
		290	—	3·80	34·19	27·19	8·15	—	—	—	—	6·46					
		390	—	3·45	34·18	27·22	8·14	—	—	—	—	6·23					
		580	—	2·65	34·15	27·27	8·31	—	—	—	—	5·84					
		770	—	2·28	34·21	27·34	8·25	—	—	—	—	5·11					
		970	—	2·40	34·35	27·45	8·16	—	—	—	—	4·33					
		1450	—	2·41	34·58	27·63	8·17	—	—	—	—	3·45					
		1930	—	2·07	34·66	27·71	8·17	—	—	—	—	3·45					
		2420	—	1·86	34·74	27·80	8·18	—	—	—	—	3·66					
		2900	—	1·56	34·75	27·83	8·18	—	—	—	—	3·89					
		3380	3382	1·17	34·74	27·85	8·29	—	—	—	—	3·74					
748	20	0	—	4·38	34·14	27·09	8·16	—	—	—	—	6·75	**N 50 V**	100–0	2112	2118	
		10	—	4·37	34·14	27·09	8·16	—	—	—	—	—	**N 70 B**	204–138	2231	2300	DGP
		20	—	4·35	34·15	27·10	8·16	—	—	—	—	6·75	**N 100 B**				
		30	—	4·31	34·15	27·11	8·16	—	—	—	—	—	**N 70 B**	180–0	2315	2335	KT
		40	—	4·03	34·15	27·14	8·16	—	—	—	—	6·82	**N 100 B**				
		50	—	3·91	34·15	27·15	8·17										
		60	—	3·79	34·15	27·16	8·16	—	—	—	—	6·78					
		80	—	3·71	34·15	27·17	8·16										
		100	—	3·65	34·14	27·17	8·16	—	—	—	—	6·62					
		150	—	3·44	34·14	27·19	8·14	—	—	—	—	6·62					
		190	—	3·31	34·14	27·20	8·13	—	—	—	—	6·27					
		290	—	2·71	34·14	27·25	8·09	—	—	—	—	6·25					
		380	—	2·82	34·21	27·29	8·05	—	—	—	—	5·63					
		580	—	2·68	34·29	27·37	8·14	—	—	—	—	4·75					
		770	—	2·70	34·41	27·46	8·13	—	—	—	—	4·05					
		960	—	2·56	34·49	27·53	8·09	—	—	—	—	3·74					
		1440	—	2·20	34·66	27·70	8·09	—	—	—	—	3·63					
		1930	—	1·99	34·67	27·73	8·15	—	—	—	—	3·71					
		2410	2408	1·88	34·70	27·77	8·25	—	—	—	—	3·78					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
749	54° 07·9′ S, 54° 03·5′ W	1931 30 xi	1115	1540*	WNW	17	WNW	4	b	990·8	6·8	5·6	very heavy conf. W swell
750	53° 04·7′ S, 54° 04·7′ W	30 xi	2000	3136*	SE × S	19	SE × S	4	or	987·8	4·7	4·4	heavy W × N swell
751	51° 28·7′ S, 49° 17·7′ W	1 xii	2000	2458*	W	13	W	3	bc	1006·4	4·4	3·8	mod.-heavy WSW swell
752	52° 42·7′ S, 49° 16·8′ W	2 xii	0900	3563*	NW × W	10	NW × W	2	bc	1001·8	6·9	5·8	mod. conf. SW swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	TIME To	Remarks
		HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				
749	21	0	—	4·59	34·21	27·12	8·15	—	—	—	—	6·62	**N 50 V**	100–0	1120	1130	
		10	—	4·54	34·21	27·12	8·15	—	—	—	—	—	**N 70 B**	250–160	1253	1322	DGP
		20	—	4·53	34·21	27·12	8·15	—	—	—	—	6·62	**N 100 B**				
		30	—	4·52	34·21	27·12	8·15	—	—	—	—	—	**N 70 B**	166–0	1334	1354	KT
		40	—	4·51	34·21	27·13	8·15	—	—	—	—	6·65	**N 100 B**				
		50	—	4·49	34·21	27·13	8·15										
		60	—	4·44	34·21	27·13	8·15	—	—	—	—	6·63					
		80	—	4·38	34·20	27·13	8·15										
		100	—	4·19	34·19	27·15	8·14	—	—	—	—	6·51					
		150	—	4·10	34·17	27·14	8·14	—	—	—	—	6·48					
		200	—	3·91	34·14	27·14	8·14	—	—	—	—	6·40					
		300	—	3·66	34·14	27·17	8·15	—	—	—	—	6·22					
		400	—	3·33	34·14	27·20	8·11	—	—	—	—	6·22					
		600	—	2·77	34·20	27·29	8·18	—	—	—	—	5·44					
		800	—	2·65	34·29	27·37	8·09	—	—	—	—	4·59					
		1000	—	2·74	34·38	27·44	8·16	—	—	—	—	3·95					
		1200	—	2·51	34·48	27·54	8·17	—	—	—	—	3·49					
750	21	0	—	4·73	34·14	27·05	8·18	—	—	—	—	6·71	**N 50 V**	100–0	**2005**	**2012**	
		10	—	4·73	34·14	27·05	8·18	—	—	—	—	—	**N 100 B**	97–0	**2200**	**2220**	KT
		20	—	4·70	34·14	27·06	8·18	—	—	—	—	6·76	**N 100 B**	280–130	**2200**	**2230**	DGP
		30	—	4·62	34·14	27·06	8·18										
		40	—	4·61	34·14	27·07	8·18	—	—	—	—	6·66					
		50	—	4·51	34·14	27·08	8·18										
		60	—	4·42	34·14	27·09	8·18	—	—	—	—	6·73					
		80	—	4·22	34·14	27·11	8·18										
		100	—	4·12	34·14	27·12	8·18	—	—	—	—	5·62					
		150	—	3·81	34·16	27·16	8·18	—	—	—	—	6·57					
		200	—	3·62	34·17	27·19	8·15	—	—	—	—	6·55					
		300	—	3·32	34·14	27·20	8·14	—	—	—	—	6·36					
		400	—	3·05	34·16	27·23	8·13	—	—	—	—	4·33					
		600	—	2·69	34·23	27·33	8·25	—	—	—	—	5·23					
		800	—	2·57	34·32	27·40	8·22	—	—	—	—	4·31?					
		2170	2170	1·97	34·68	27·74	8·33	—	—	—	—	3·44					
751	22	0	—	2·60	34·12	27·24	8·17	—	—	—	—	6·84	**N 50 V**	100–0	**2008**	**2015**	
		10	—	2·60	34·12	27·24	8·17	—	—	—	—	—	**N 70 B**	104–0	**2124**	**2145**	KT
		20	—	2·60	34·12	27·24	8·17	—	—	—	—	6·85	**N 100 B**				
		30	—	2·56	34·12	27·25	8·17	—	—	—	—	—	**N 70 B**	269–138	**2124**	**2156**	DGP
		40	—	2·56	34·12	27·25	8·17	—	—	—	—	6·82	**N 100 B**				
		50	—	2·51	34·11	27·24	8·17										
		60	—	2·08	34·11	27·28	8·16	—	—	—	—	6·90					
		80	—	1·57	34·10	27·30	8·17										
		100	—	1·10	34·07	27·32	8·16	—	—	—	—	6·85					
		150	—	0·98	34·08	27·33	8·14	—	—	—	—	6·67					
		200	—	0·47	34·10	27·37	8·09	—	—	—	—	6·54					
		300	—	0·28	34·13	27·41	8·08	—	—	—	—	6·03					
		390	—	0·97	34·25	27·46	8·02	—	—	—	—	4·92					
		590	—	2·37	34·43	27·51	8·16	—	—	—	—	4·03					
		790	—	2·19	34·52	27·59	8·15	—	—	—	—	3·73					
		980	—	2·18	34·58	27·64	8·07	—	—	—	—	3·75					
		1480	—	2·00	34·71	27·77	8·07	—	—	—	—	3·82					
		1970	1967	1·56	34·72	27·80	8·22	—	—	—	—	3·78					
752	23	0	—	2·19	34·14	27·30	8·17	—	—	—	—	6·92	**N 50 V**	100–0	0915	0923	
		10	—	2·02	34·13	27·29	8·17	—	—	—	—	—	**N 70 B**	100–0	1031	1051	KT
		20	—	1·99	34·13	27·29	8·17	—	—	—	—	6·94	**N 100 B**				
		30	—	1·93	34·13	27·30	8·17	—	—	—	—	—	**N 70 B**	250–104	1031	1102	DGP
		40	—	1·83	34·12	27·30	8·17	—	—	—	—	6·94	**N 100 B**				
		50	—	1·82	34·12	27·31	8·17										
		60	—	1·67	34·12	27·32	8·17	—	—	—	—	6·92					
		80	—	1·30	34·11	27·33	8·17										
		100	—	1·30	34·11	27·33	8·16	—	—	—	—	6·72					
		150	—	0·80	34·07	27·34	8·16	—	—	—	—	6·79					
		200	—	0·59	34·10	27·37	8·17	—	—	—	—	6·68					
		300	—	0·16	34·13	27·41	8·13	—	—	—	—	6·29					
		390	—	0·37	34·14	27·42	8·13	—	—	—	—	6·20					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
752 *cont.*	52° 42·7′ S, 49° 16·8′ W	1931 2 xii											
753	54° 02·4′ S, 49° 12·5′ W	2 xii	2000	4766*	WSW	24	WSW	5	bc	995·7	3·9	2·9	mod. WSW swell
			0000	—	SW × W	24	WSW	5	b	997·4	3·9	2·7	mod. WSW swell
754	54° 54′ S, 49° 08·7′ W	3 xii	0900	4164*	S × W	25	S × W	5	csp	1001·4	2·5	1·8	heavy SW swell
755	55° 57·9′ S, 48° 59′ W	3 xii	2000	3606*	W	9	W	2	o	1006·7	0·9	0·7	mod. SW swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P (Mg.—atom m.³)	Nitrate + Nitrite N₂ (Mg.—atom m.³)	Nitrite N₂ (Mg.—atom m.³)	Si (Mg.—atom m.³)	O₂ c.c. litre	Gear	Depth (metres)	Time From	Time To	Remarks
752 *cont.*	23	590	—	2·14	34·35	27·47	8·16	—	—	—	—	4·61					
		790	—	2·39	34·48	27·55	8·13	—	—	—	—	3·82					
		980	—	2·36	34·57	27·62	8·11	—	—	—	—	3·80					
		1480	—	2·10	34·69	27·73	8·08	—	—	—	—	3·63					
		1970	—	1·88	34·73	27·79	8·12	—	—	—	—	3·73					
		2460	—	1·49	34·74	27·83	8·15	—	—	—	—	3·95					
		2950	2953	1·08	34·72	27·84	8·26	—	—	—	—	3·96					
753	23	0	—	2·59	34·15	27·27	8·17	—	—	—	—	6·75	**N 50 V**	100–0	**2015**	**2021**	
		10	—	2·59	34·15	27·27	8·17	—	—	—	—	—	**N 70 B**	280–110	**2258**	**2328**	DGP
		20	—	2·49	34·16	27·28	8·17	—	—	—	—	6·74	**N 100 B**				
		30	—	2·53	34·16	27·28	8·17	—	—	—	—	—	**N 70 B**	165–0	**2346**	**0007**	KT
		40	—	2·47	34·16	27·28	8·17	—	—	—	—	6·74	**N 100 B**				
		50	—	2·40	34·16	27·29	8·16										
		60	—	2·40	34·16	27·29	8·16	—	—	—	—	6·75					
		80	—	2·39	34·17	27·30	8·16										
		100	—	2·31	34·20	27·33	8·16	—	—	—	—	6·72					
		150	—	1·99	34·17	27·33	8·16	—	—	—	—	6·67					
		190	—	1·80	34·15	27·34	8·15	—	—	—	—	7·29					
		280	—	1·20	34·14	27·37	8·16	—	—	—	—	6·52					
		370	—	1·22	34·17	27·39	8·09	—	—	—	—	5·87					
		560	—	2·19	34·22	27·35	8·16	—	—	—	—	5·20					
		740	—	2·66	34·39	27·46	8·06	—	—	—	—	4·26					
		930	—	2·58	34·46	27·51	8·10	—	—	—	—	3·92					
		1400	—	2·26	34·66	27·70	8·12	—	—	—	—	3·58					
		1860	—	2·09	34·69	27·73	8·21	—	—	—	—	3·49					
		2330	—	1·77	34·71	27·79	8·21	—	—	—	—	3·70					
		2790	—	1·38	—	—	8·32	—	—	—	—	3·80					
		3260	—	0·99	34·69	27·81	8·39	—	—	—	—	3·98					
		3720	3720	0·50	34·69	27·84	8·39	—	—	—	—	4·02					
754	24	0	—	2·59	34·17	27·28	8·16	—	—	—	—	6·70	**N 50 V**	100–0	0905	0912	
		10	—	2·58	34·17	27·28	8·16	—	—	—	—	—	**N 70 B**	200–142	1132	1202	DGP. N 70 B slightly torn
		20	—	2·58	34·17	27·28	8·16	—	—	—	—	6·70	**N 100 B**				
		30	—	2·57	34·17	27·29	8·16	—	—	—	—	—	**N 70 B**	151–0	1216	1236	KT
		40	—	2·54	34·17	27·29	8·16	—	—	—	—	6·69	**N 100 B**				
		50	—	2·52	34·17	27·29	8·16										
		60	—	2·49	34·17	27·29	8·15	—	—	—	—	6·69					
		80	—	2·31	34·17	27·31	8·15										
		100	—	2·20	34·17	27·32	8·15	—	—	—	—	6·60					
		150	—	1·99	34·17	27·33	8·16	—	—	—	—	6·46					
		200	—	1·80	34·16	27·34	8·16	—	—	—	—	6·38					
		300	—	1·46	34·14	27·35	8·13	—	—	—	—	6·27					
		400	—	0·98	34·14	27·38	8·12	—	—	—	—	6·30					
		600	—	2·22	34·23	27·36	8·17	—	—	—	—	5·35					
		790	—	2·27	34·32	27·43	8·16	—	—	—	—	4·47					
		990	—	2·41	34·51	27·57	8·17	—	—	—	—	3·64					
		1490	—	2·12	34·66	27·71	8·03	—	—	—	—	3·81					
		1980	—	1·90	34·71	27·78	8·04	—	—	—	—	3·86					
		2480	—	1·60	34·71	27·80	8·13	—	—	—	—	3·94					
		2980	—	1·19	34·70	27·82	8·19	—	—	—	—	4·20					
		3470	3471	0·76	34·69	27·83	8·24	—	—	—	—	4·08					
755	24	0	—	0·80	33·88	27·19	8·16	—	—	—	—	7·50	**N 50 V**	100–0	**2003**	**2011**	
		10	—	0·80	33·88	27·19	8·16	—	—	—	—	—	**N 70 B**	210–130	**2142**	**2212**	DGP
		20	—	0·64	33·88	27·20	8·16	—	—	—	—	7·52	**N 100 B**				
		30	—	0·59	33·88	27·20	8·17	—	—	—	—	—	**N 70 B**	130–0	**2226**	**2246**	KT
		40	—	0·54	33·88	27·20	8·17	—	—	—	—	7·50	**N 100 B**				
		50	—	0·42	33·92	27·24	8·17										
		60	—	0·29	33·92	27·24	8·17	—	—	—	—	7·50					
		80	—	−0·10	33·92	27·27	8·16										
		100	—	−0·07	33·95	27·28	8·13	—	—	—	—	7·09					
		150	—	0·59	34·04	27·32	8·08	—	—	—	—	6·25					
		200	—	0·60	34·12	27·39	8·04	—	—	—	—	5·87					
		300	—	1·68	34·32	27·47	7·97	—	—	—	—	4·70					
		390	—	1·87	34·40	27·52	7·96	—	—	—	—	4·43					
		590	—	2·30	34·54	27·60	8·07	—	—	—	—	3·54					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
755 *cont.*	55° 57·9′ S, 48° 59′ W	1931 3 xii											
756	57° 28·7′ S, 48° 53·2′ W	4 xii	0900	3877*	N × W	11	N × W	2	ome	996·2	2·7	2·6	mod. NW swell
757	58° 03·5′ S, 48° 50·5′ W	4 xii	2000	3916*	WSW	17	W × S	4	ome	998·2	0·5	0·5	mod. WSW swell
			0000	—	SW × W	16	SW × W	4	oe	999·8	0·1	0·1	mod. WSW swell
758	58° 42·3′ S, 48° 45·9′ W	5 xii	0900	3994*	SW × W	11	SW × W	2	om	1004·5	−0·2	−0·4	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S °/₀₀	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	To	
755 *cont.*	24	780	—	2·13	34·62	27·69	8·11	—	—	—	—	3·59					
		980	—	1·92	34·65	27·72	8·07	—	—	—	—	3·87					
		1470	—	1·62	34·68	27·77	8·17	—	—	—	—	3·98					
		1960	—	1·21	34·71	27·83	8·17	—	—	—	—	4·07					
		2450	—	0·83	34·69	27·82	8·18	—	—	—	—	4·17					
		2940	2937	0·53	34·69	27·84	8·24	—	—	—	—	4·14					
756	25	0	—	0·81	33·87	27·18	8·18	—	—	—	—	7·45	N 50 V	100–0	0907	0914	
		10	—	0·79	33·88	27·19	8·18	—	—	—	—	—	N 70 B	310–126	1111	1141	DGP
		20	—	0·68	33·88	27·19	8·18	—	—	—	—	7·50	N 100 B				
		30	—	0·49	33·95	27·25	8·18	—	—	—	—	—	N 70 B	135–0	1156	1216	KT
		40	—	0·12	33·95	27·27	8·18	—	—	—	—	7·54	N 100 B				
		50	—	−0·21	33·95	27·29	8·17										
		60	—	−0·41	33·94	27·29	8·17	—	—	—	—	7·45					
		80	—	−0·21	33·97	27·31	8·14										
		100	—	−0·30	33·97	27·32	8·14	—	—	—	—	7·21					
		150	—	0·35	34·13	27·40	8·08	—	—	—	—	6·19					
		200	—	1·87	34·33	27·46	7·99	—	—	—	—	5·08					
		300	—	2·22	34·43	27·52	7·97	—	—	—	—	4·22					
		400	—	2·37	34·52	27·58	7·96	—	—	—	—	3·96					
		590	—	2·10	34·65	27·70	8·17	—	—	—	—	3·56					
		790	—	2·01	34·69	27·74	8·13	—	—	—	—	3·87					
		990	—	1·83	34·70	27·77	8·13	—	—	—	—	3·97					
		1480	—	1·31	34·70	27·81	8·12	—	—	—	—	4·03					
		1970	—	0·80	34·69	27·82	8·17	—	—	—	—	4·21					
		2460	—	0·38	34·68	27·85	8·18	—	—	—	—	4·40					
		2960	—	0·08	34·68	27·87	8·15	—	—	—	—	4·63					
		3450	3447	−0·11	34·67	27·87	8·25	—	—	—	—	4·43					
757	25	0	—	0·18	34·01	27·32	8·13	—	—	—	—	7·51	N 50 V	100–0	2005	2015	
		10	—	0·18	34·01	27·32	8·13	—	—	—	—	—	N 70 B	324–162	2233	2303	DGP
		20	—	0·18	34·01	27·32	8·13	—	—	—	—	7·46	N 70 B	156–0	2324	2344	KT
		30	—	−0·07	34·02	27·34	8·13	—	—	—	—	—	N 100 B				
		40	—	−0·10	34·02	27·35	8·13	—	—	—	—	7·33	N 100 B	320–136	0000	0030	DGP
		50	—	−0·11	34·02	27·35	8·13										
		60	—	−0·19	34·03	27·36	8·10	—	—	—	—	7·27					
		80	—	−0·11	34·09	27·40	8·10										
		100	—	−0·20	34·10	27·41	8·09	—	—	—	—	7·26					
		150	—	−0·18	34·27	27·55	8·04	—	—	—	—	6·44					
		200	—	0·00	34·36	27·61	8·00	—	—	—	—	6·00					
		300	—	0·23	34·44	27·67	7·98	—	—	—	—	5·49					
		400	—	1·10	34·59	27·73	7·96	—	—	—	—	4·61					
		600	—	1·31	34·66	27·77	8·06	—	—	—	—	4·26					
		800	—	1·22	34·68	27·80	8·12	—	—	—	—	4·26					
		1000	—	1·11	34·71	27·83	8·16	—	—	—	—	4·18					
		1500	—	0·66	34·71	27·86	8·18	—	—	—	—	4·38					
		2000	—	0·49	34·70	27·86	8·18	—	—	—	—	4·29					
		2500	—	0·19	34·68	27·86	8·18	—	—	—	—	4·52					
		3000	—	−0·06	34·66	27·85	8·17	—	—	—	—	4·63					
		3500	—	−0·15	34·66	27·86	8·29	—	—	—	—	4·37					
758	26	0	—	0·12	33·92	27·25	8·13	—	—	—	—	7·51	N 50 V	100–0	0908	0916	
		10	—	0·13	33·92	27·25	8·13	—	—	—	—	—	N 70 B	236–0	1046	1116	DGP
		20	—	0·09	33·92	27·26	8·13	—	—	—	—	7·51	N 100 B	236–162			
		30	—	−0·40	33·93	27·28	8·14	—	—	—	—	—	N 70 B	298–134	1134	1204	DGP
		40	—	−0·47	33·93	27·28	8·14	—	—	—	—	7·40	N 70 B	125–0	1219	1239	KT
		50	—	−0·71	33·96	27·32	8·14	—	—	—	—	—	N 100 B				
		60	—	−0·62	33·96	27·32	8·13	—	—	—	—	7·14					
		80	—	−0·49	34·03	27·37	8·09										
		100	—	0·50	34·20	27·45	8·02	—	—	—	—	5·68					
		150	—	1·47	34·32	27·49	7·97	—	—	—	—	4·69					
		200	—	2·05	34·45	27·55	7·94	—	—	—	—	4·08					
		300	—	2·21	34·56	27·62	7·94	—	—	—	—	3·76					
		400	—	2·10	34·61	27·68	7·94	—	—	—	—	3·80					
		600	—	2·01	34·70	27·76	8·10	—	—	—	—	3·75					
		800	—	1·70	34·71	27·79	8·13	—	—	—	—	3·79					
		1000	—	1·54	34·72	27·80	8·08	—	—	—	—	4·01					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
758 *cont.*	58° 42·3′ S, 48° 45·9′ W	1931 5 xii											
759	59° 06·5′ S, 48° 39·9′ W	5 xii	2000	3744*	SW	2–3	SW	1	fe	1008·9	−1·1	−1·1	mod. W × S swell
760	60° 21·6′ S, 48° 40·2′ W	6 xii	2000	2397*	N	22	N	4	om	1002·9	0·6	0·5	mod. NW swell
761	59° 46·3′ S, 45° 30·5′ W	7–8 xii	2115	3849*	W × S	16	conf.	3	om	989·2	−0·3	−0·3	heavy NNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
758 *cont.*	26	1500	—	1·03	34·71	27·84	8·18	—	—	—	—	4·28					
		2000	—	0·67	34·71	27·86	8·17	—	—	—	—	4·31					
		2500	—	0·12	34·67	27·85	8·19	—	—	—	—	4·59					
		3000	—	−0·09	34·66	27·86	8·15	—	—	—	—	4·67					
		3500	—	−0·23	34·66	27·86	8·23	—	—	—	—	4·61					
759	26	0	—	0·32	34·13	27·40	8·13	—	—	—	—	7·54	**N 50 V**	100–0	2004	2011	
		10	—	0·34	34·13	27·40	8·13	—	—	—	—	—	**N 70 V**	1000–750	**2147**		
		20	—	0·31	34·13	27·40	8·13	—	—	—	—	7·60	,,	750–500			
		30	—	0·30	34·13	27·40	8·13	—	—	—	—	—	,,	500–250			
		40	—	0·27	34·13	27·41	8·13	—	—	—	—	7·47	,,	250–100			
		50	—	0·06	34·17	27·46	8·12	—	—	—	—	—	,,	100–50			
		60	—	−0·02	34·19	27·48	8·09	—	—	—	—	7·59	,,	50–0	—	**2330**	
		80	—	−0·11	34·28	27·56	8·04	—	—	—	—	—	**N 70 B**	260–100	**2352**	**0022**	DGP. Upper depth estimated
		100	—	−0·31	34·38	27·65	8·03	—	—	—	—	6·31	**N 100 B**				
		150	—	−0·11	34·45	27·69	7·99	—	—	—	—	5·75	**N 70 B**	119–0	**0037**	**0057**	KT
		200	—	0·00	34·47	27·70	7·99	—	—	—	—	5·57	**N 100 B**				
		300	—	0·62	34·61	27·79	7·97	—	—	—	—	4·95					
		400	—	0·85	34·64	27·79	7·97	—	—	—	—	4·76					
		600	—	1·96	34·70	27·76	8·06	—	—	—	—	4·53					
		800	—	0·74	34·69	27·83	8·03	—	—	—	—	4·52					
		1000	—	0·73	34·72	27·86	8·08	—	—	—	—	4·38					
		1500	—	0·36	34·70	27·87	8·08	—	—	—	—	4·54					
		2000	2003	0·10	34·69	27·86	8·18	—	—	—	—	4·40					
		2500	2501	−0·04	34·68	27·87	8·19	—	—	—	—	4·45					
		3000	—	−0·17	34·67	27·87	8·14	—	—	—	—	4·77					
		3500	—	−0·29	34·66	27·87	8·14	—	—	—	—	4·98					
760	27	0	—	−1·00	34·16	27·49	8·10	—	—	—	—	7·56	**N 50 V**	100–0	2010		+3 hours
		10	—	−1·01	34·17	27·50	8·10	—	—	—	—	—	**N 70 V**	1000–750			
		20	—	−1·02	34·18	27·51	8·10	—	—	—	—	7·58	,,	750–500			
		30	—	−1·23	34·19	27·53	8·10	—	—	—	—	—	,,	500–250			
		40	—	−1·28	34·20	27·53	8·09	—	—	—	—	7·43	,,	250–100			
		50	—	−1·40	34·22	27·55	8·08	—	—	—	—	—	,,	100–50			
		60	—	−1·30	34·23	27·56	8·05	—	—	—	—	7·25	,,	50–0	—	**2220**	
		80	—	−1·48	34·32	27·64	8·05	—	—	—	—	—	**N 70 B**	260–140	**2255**	**2325**	DGP
		100	—	−1·40	34·35	27·67	8·04	—	—	—	—	6·88	**N 100 B**				
		150	—	−1·28	34·40	27·69	8·04	—	—	—	—	6·64	**N 70 B**	176–0	**2339**	**2359**	KT
		200	—	−1·10	34·45	27·73	8·01	—	—	—	—	6·44	**N 100 B**				
		300	—	−0·75	34·53	27·79	7·99	—	—	—	—	5·80					
		400	—	−0·51	34·57	27·81	8·00	—	—	—	—	5·29					
		600	—	0·10	34·64	27·83	8·08	—	—	—	—	4·86					
		800	—	−0·07	34·64	27·84	8·12	—	—	—	—	4·86					
		1000	—	−0·10	34·65	27·85	8·09	—	—	—	—	4·82					
		1500	—	−0·19	34·65	27·85	8·14	—	—	—	—	4·81					
		1990	1991	−0·31	34·65	27·86	8·19	—	—	—	—	4·71					
761	28	0	—	−0·87	33·86	27·24	8·09	—	—	—	—	7·62	**N 50 V**	100–0	**2120**	**2130**	
		10	—	−0·82	33·88	27·27	8·09	—	—	—	—	—	**N 70 B**	290–140	**2341**	**0011**	DGP
		20	—	−0·79	33·92	27·30	8·09	—	—	—	—	7·57	**N 100 B**				
		30	—	−0·92	34·02	27·38	8·08	—	—	—	—	—	**N 70 B**	151–0	**0027**	**0047**	KT
		40	—	−1·00	34·12	27·46	8·05	—	—	—	—	7·26	**N 100 B**				
		50	—	−1·02	34·13	27·46	8·05										
		60	—	−0·99	34·20	27·52	8·04	—	—	—	—	7·03					
		80	—	−0·80	34·37	27·66	8·04										
		100	—	−0·71	34·38	27·66	8·02	—	—	—	—	6·56					
		150	—	−0·80	34·43	27·71	8·02	—	—	—	—	6·44					
		200	—	−0·85	34·44	27·72	8·00	—	—	—	—	6·28					
		300	—	−0·37	34·54	27·78	7·99	—	—	—	—	5·84					
		400	—	0·66	34·64	27·80	7·97	—	—	—	—	4·80					
		600	—	0·39	34·63	27·81	8·08	—	—	—	—	4·79					
		800	—	0·63	34·67	27·82	8·17	—	—	—	—	4·42					
		1000	—	0·28	34·66	27·83	8·18	—	—	—	—	4·30					
		1500	—	0·10	34·66	27·84	8·08	—	—	—	—	4·68					
		2000	—	−0·02	34·66	27·85	8·08	—	—	—	—	4·66					
		2500	—	−0·18	34·66	27·86	8·13	—	—	—	—	4·80					
		3000	3012	−0·29	34·66	27·87	8·19	—	—	—	—	4·68					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
762	59° 50·7′ S, 43° 34·5′ W	1931 8 xii	0900	4662*	W	22	W	4		996·9	−0·5	−0·6	mod.-heavy NW swell
			1200	—	NW × W	17	NW × W	3	—	1000·5	0·5	0·2	mod. W swell
763	59° 35·5′ S, 42° 40·1′ W	8 xii	2000	3261*	NW	21	NW	3	ome	1001·9	−0·8	−0·8	mod. NW swell
764	58° 48·9′ S, 42° 19·7′ W	9 xii	0900	3813*	N × W	25	N × W	3	o	997·5	0·5	0·3	low NW swell
			1200	—	N × W	35	N × W	5	ome	993·2	1·0	0·9	mod. NW swell
765	58° 11·3′ S, 41° 16·3′ W	9 xii	2130	—	NW × W	24	NW × W	4	oe	997·3	0·6	0·6	heavy NW swell
766	58° 51′ S, 36° 54′ W	10 xii	1718	2699*	S × W	7–10	S × W	2	o	1002·1	1·1	1·1	mod. WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
762	29	0	—	−1·22	33·94	27·32	8·20	—	—	—	—	8·28	**N 50 V**	100–0	0905		
		10	—	−1·25	33·94	27·32	8·20	—	—	—	—	—	**N 70 V**	1000–750			
		20	—	−1·28	33·95	27·33	8·19	—	—	—	—	8·21	,,	750–500			
		30	—	−1·32	33·96	27·34	8·19	—	—	—	—	—	,,	500–250			
		40	—	−1·40	33·96	27·35	8·16	—	—	—	—	7·85	,,	250–100			
		50	—	−1·54	34·14	27·50	8·09	—	—	—	—	—	,,	100–50			
		60	—	−1·49	34·22	27·55	8·06	—	—	—	—	7·03	,,	50–0	—	1135	
		80	—	−1·31	34·31	27·62	8·04	—	—	—	—	—	**N 70 B**	235–145	1159	1230	DGP
		100	—	−1·09	34·38	27·68	8·04	—	—	—	—	6·59	**N 100 B**				
		150	—	−0·46	34·48	27·73	8·00	—	—	—	—	5·74	**N 70 B**	128–0	1249	1309	KT
		200	—	0·00	34·56	27·77	7·99	—	—	—	—	5·40	**N 100 B**				
		300	—	1·11	34·73	27·84	7·97	—	—	—	—	4·53					
		400	—	1·17	34·73	27·84	7·97	—	—	—	—	4·58					
		590	—	0·79	34·70	27·84	8·12	—	—	—	—	4·51					
		790	—	0·50	34·68	27·84	8·16	—	—	—	—	4·53					
		990	—	0·28	34·67	27·84	8·18	—	—	—	—	4·51					
		1480	—	0·10	34·67	27·85	8·17	—	—	—	—	4·64					
		1970	—	−0·06	34·66	27·85	8·13	—	—	—	—	4·72					
		2470	—	−0·19	34·66	27·86	8·17	—	—	—	—	4·76					
		2960	—	−0·28	34·66	27·87	8·18	—	—	—	—	4·89					
		3450	—	−0·38	34·66	27·87	8·23	—	—	—	—	4·88					
		3940	3944	−0·41	34·66	27·87	8·27	—	—	—	—	4·72					
763	29	0	—	−1·02	33·67	27·09	8·22	—	—	—	—	—	**N 50 V**	50–0	2010		
													,,	100–20			
													N 70 V	1000–750			
													,,	750–500			
													,,	500–250			
													,,	250–100			
													,,	100–50			
													,,	50–0	—	**2200**	
													N 70 B	280–130	**2230**	**2300**	DGP
													N 100 B				
													N 70 B	124–0	**2314**	**2335**	KT
													N 100 B				
764	0	0	—	−1·07	33·79	27·20	8·20	—	—	—	—	8·30	**N 50 V**	100–50	0908		
		10	—	−1·08	33·79	27·21	8·20	—	—	—	—	—	,,	50–0			
		20	—	−1·10	33·79	27·21	8·20	—	—	—	—	8·31	**N 70 V**	1000–750			
		30	—	−1·20	33·89	27·28	8·19	—	—	—	—	—	,,	750–500			
		40	—	−1·30	33·99	27·37	8·15	—	—	—	—	7·85	,,	500–250			
		50	—	−1·31	34·05	27·41	8·15	—	—	—	—	—	,,	250–100			
		60	—	−1·37	34·12	27·47	8·11	—	—	—	—	7·56	,,	100–50			
		80	—	−1·48	34·21	27·55	8·10	—	—	—	—	—	,,	50–0	—	1220	
		100	—	−1·49	34·22	27·55	8·08	—	—	—	—	6·93	**N 70 B**	239–109	1307	1337	DGP
		150	—	−1·19	34·34	27·65	8·05	—	—	—	—	6·58	**N 100 B**				
		200	—	−0·60	34·46	27·72	8·02	—	—	—	—	5·94	**N 70 B**	132–0	1351	1411	KT
		300	—	−0·13	34·56	27·78	8·01	—	—	—	—	5·99	**N 100 B**				
		400	—	0·25	34·62	27·82	8·01	—	—	—	—	5·20					
		600	—	0·28	—	—	8·17	—	—	—	—	5·04					
		800	—	0·30	34·66	27·83	8·18	—	—	—	—	4·36					
		1000	—	0·30	34·67	27·84	8·12	—	—	—	—	4·48					
		1500	—	0·13	34·66	27·84	8·17	—	—	—	—	4·78					
		2000	—	−0·01	—	—	8·18	—	—	—	—	5·02					
		2500	—	−0·16	34·66	27·86	8·17	—	—	—	—	4·63					
		3000	—	−0·29	34·66	27·87	8·33	—	—	—	—	4·48					
		3500	—	−0·31													
765	1	0	—	0·40	33·96	27·27	8·17	—	—	—	—	—	**N 50 V**	100–40	**2135**		
													,,	50–0	—	**2150**	
													N 70 B	206–114	**2207**	**2236**	DGP
													N 100 B				
													N 70 B	104–0	**2249**	**2309**	KT
													N 100 B				
766	1	0	—	−1·31	33·82	27·23	8·18	—	—	—	—	8·05	**N 50 V**	100–50	1720		
		10	—	−1·38	33·83	27·24	8·18	—	—	—	—	—	,,	50–0			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
766 *cont.*	58° 51′ S, 36° 54′ W	1931 10 xii											
767	57° 02·6′ S, 36° 47·2′ W	11 xii	0900	3599*	SE×S	17	SE×S	3	0	1000·3	−0·3	−0·9	low conf. swell
768	56° 20·6′ S, 36° 34·7′ W	11 xii	1700	3555 gy. M. bl. Sh.	SE×S	18	SE×S	4	0	995·5	−0·3	−0·7	low conf. swell
			2247	3544*	SE×S	13	SE×S	4	0	999·1	−0·9	−1·4	
769	55° 15·4′ S, 36° 16·4′ W	12 xii	0510	1128*	SW×S	15	SW×S	3	0	999·4	−1·1	−1·4	low conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
766 *cont.*	1	20	—	−1·51	33·87	27·28	8·18	—	—	—	—	8·04	N 70 V	1000–750			
		30	—	−1·52	33·87	27·28	8·18	—	—	—	—	—	,,	750–500			
		40	—	−1·52	33·88	27·29	8·17	—	—	—	—	7·92	,,	500–250			
		50	—	−1·59	34·04	27·41	8·14	—	—	—	—	—	,,	250–100			
		60	—	−1·63	34·05	27·42	8·10	—	—	—	—	7·44	,,	100–50			
		80	—	−1·60	34·13	27·48	8·09	—	—	—	—	—	,,	50–0	—	1910	
		100	—	−1·49	34·22	27·55	8·08	—	—	—	—	7·14	N 70 B	230–110	2011	2041	DGP
		150	—	−1·36	34·30	27·62	8·04	—	—	—	—	6·66	N 100 B				
		200	—	−0·74	34·41	27·69	8·02	—	—	—	—	5·92	N 70 B	102–0	2055	2115	KT
		300	—	0·21	34·56	27·76	7·98	—	—	—	—	5·09	N 100 B				
		400	—	0·86	34·65	27·79	7·98	—	—	—	—	4·82					
		600	—	1·00	34·70	27·83	8·12	—	—	—	—	4·27					
		800	—	0·83	34·70	27·84	8·16	—	—	—	—	4·31					
		1000	—	0·63	34·68	27·83	8·16	—	—	—	—	4·34					
		1500	—	0·13	34·68	27·86	8·17	—	—	—	—	4·40					
		2000	—	0·02	34·67	27·86	8·12	—	—	—	—	4·59					
		2500	—	−0·19	34·67	27·87	8·34	—	—	—	—	4·32					
767	2	0	—	0·00	33·94	27·27	8·19	—	—	—	—	8·19	N 70 V	1000–750	0911		Drift ice and bergs in vicinity
		10	—	0·00	33·95	27·28	8·19	—	—	—	—	—	,,	750–500			
		20	—	−0·02	33·96	27·29	8·18	—	—	—	—	8·03	,,	500–250			
		30	—	0·10	34·13	27·41	8·17	—	—	—	—	—	,,	250–100			
		40	—	0·04	34·14	27·44	8·14	—	—	—	—	7·59	,,	100–50			
		50	—	−0·15	34·15	27·46	8·14	—	—	—	—	—	,,	50–0			
		60	—	−0·20	34·15	27·46	8·14	—	—	—	—	7·41	N 50 V	100–50			
		80	—	−0·28	34·18	27·48	8·13	—	—	—	—	—	,,	50–25			
		100	—	−0·30	34·19	27·50	8·12	—	—	—	—	7·34	,,	25–0	—	1105	
		150	—	−0·27	34·28	27·56	8·07	—	—	—	—	6·68	N 70 B	270–118	1120	1150	DGP
		200	—	−0·10	34·35	27·62	8·02	—	—	—	—	6·09	N 100 B				
		300	—	1·76	34·50	27·61	7·96	—	—	—	—	4·99	N 70 B	107–0	1202	1222	KT
		400	—	1·71	34·65	27·73	7·96	—	—	—	—	4·20	N 100 B				
		600	—	1·44	34·66	27·76	8·16	—	—	—	—	4·06					
		800	—	1·37	34·70	27·81	8·02	—	—	—	—	4·22					
		1000	—	1·15	34·69	27·80	8·08	—	—	—	—	4·33					
		1500	—	0·81	34·69	27·82	8·08	—	—	—	—	4·25					
		2000	—	0·41	34·68	27·85	8·13	—	—	—	—	4·39					
		2500	—	0·29	34·67	27·84	8·22	—	—	—	—	4·25					
		3000	2998	0·04	34·66	27·85	8·30	—	—	—	—	4·30					
768	2	0	—	0·60	34·02	27·31	8·21	—	—	—	—	8·14	N 70 V	1000–750	1724		
		10	—	0·60	34·02	27·31	8·21	—	—	—	—	—	,,	750–500			
		20	—	0·60	34·02	27·31	8·21	—	—	—	—	8·14	,,	500–250			
		30	—	0·49	34·03	27·32	8·18	—	—	—	—	—	,,	250–100			
		40	—	0·38	34·03	27·33	8·17	—	—	—	—	7·77	,,	100–50			
		50	—	0·30	34·03	27·33	8·17	—	—	—	—	—	,,	50–0			
		60	—	0·25	34·03	27·34	8·16	—	—	—	—	7·50	N 50 V	100–50			
		80	—	0·25	34·03	27·34	8·14	—	—	—	—	—	,,	50–0	—	1910	
		100	—	0·20	34·05	27·35	8·13	—	—	—	—	7·28?	N 70 B	248–120	2135	2206	DGP
		150	—	0·25	34·14	27·43	8·07	—	—	—	—	6·59	N 100 B				
		200	—	0·34	34·21	27·47	8·03	—	—	—	—	6·18	N 70 B	119–0	2220	2240	KT
		300	—	1·71	34·49	27·60	7·95	—	—	—	—	4·36	N 100 B				
		400	—	1·98	34·54	27·63	7·94	—	—	—	—	4·10					
		600	—	2·00	34·60	27·67	8·15	—	—	—	—	3·77					
		800	—	1·96	34·69	27·74	8·04	—	—	—	—	3·85					
		1000	—	1·83	34·72	27·78	8·04	—	—	—	—	3·94					
		1500	—	1·31	34·71	27·82	8·26	—	—	—	—	3·87					
		2000	—	0·91	34·69	27·82	8·18	—	—	—	—	4·19					
		2500	—	0·51	34·68	27·84	8·12	—	—	—	—	4·25					
		3000	—	0·21	34·67	27·85	8·28	—	—	—	—	4·13					
769	3	0	—	0·85	33·96	27·24	8·27	—	—	—	—	8·64	N 70 V	1000–770	0515		
		10	—	0·84	33·96	27·24	8·27	—	—	—	—	—	,,	750–500			
		20	—	0·68	33·97	27·26	8·21	—	—	—	—	8·13	,,	500–250			
		30	—	0·41	33·97	27·28	8·16	—	—	—	—	—	,,	250–100			
		40	—	0·38	33·97	27·28	8·14	—	—	—	—	7·39	,,	100–50			
		50	—	0·30	33·98	27·29	8·13	—	—	—	—	—	,,	50–0			
		60	—	0·30	33·99	27·30	8·13	—	—	—	—	7·20	N 50 V	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
769 *cont.*	55° 15·4′ S, 36° 16·4′ W	1931 12 xii											
770	3 miles S 60° E of Jason I, South Georgia	12 xii	1555	—	NNW	7–10	NNW	2	c	997·2	3·9	2·9	low SE swell
771	53° 43·7′ S, 37° 09·6′ W	15 xii	1315	133*	ESE	24	ESE	4	o	991·6	2·9	2·1	mod. NW swell
772	53° 24·3′ S, 37° 11·3′ W	15 xii	1642	1121*	ESE	10	ESE	3	o	991·9	2·2	1·7	mod. conf. N swell
773	53° 03·8′ S, 37° 14′ W	15–16 xii	2208	2847*	ESE	11–16	ESE	3	f	991·4	1·4	1·4	mod. conf. E swell
774	52° 43·4′ S, 37° 17·5′ W	16 xii	0517	1867*	SE	8	SE	1	ce	991·1	1·2	1·2	mod. conf. SE swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	Time From	Time To	Remarks
		HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				
769 *cont.*	3	80	—	0·20	34·02	27·33	8·12	—	—	—	—	—	N 50 V	50–0	—	0710	
		100	—	0·19	34·05	27·35	8·12	—	—	—	—	7·25	N 70 B	342–150	0729	0800	DGP
		150	—	0·20	34·06	27·36	8·09	—	—	—	—	7·03	N 100 B				
		200	—	0·39	34·17	27·44	8·03	—	—	—	—	6·19	N 70 B	144–0	0814	0834	KT
		300	—	1·63	34·42	27·55	7·96	—	—	—	—	4·38	N 100 B				
		400	—	1·66	34·49	27·61	7·95	—	—	—	—	4·20					
		600	—	1·89	34·67	27·74	8·17	—	—	—	—	3·68					
		800	—	1·75	34·70	27·78	8·07	—	—	—	—	3·89					
		1000	—	1·55	34·70	27·79	8·07	—	—	—	—	3·99					
770	3	0	—	3·40	33·66	26·80	8·09	—	—	—	—	—	N 50 V	100–0	1600	1607	
771	6	0	—	2·53	34·01	27·16	8·15	—	—	—	—	7·51	N 50 V	100–50	1320		+ 1½ hours
		10	—	2·44	34·00	27·16	8·15	—	—	—	—	—	,,	50–0			
		20	—	2·18	33·98	27·17	8·16	—	—	—	—	7·52	N 70 V	100–50			
		30	—	1·80	33·98	27·20	8·16	—	—	—	—	—	,,	50–0	—	1355	
		40	—	1·11	34·02	27·28	8·16	—	—	—	—	7·45	N 70 B	104–0	1418	1437	KT
		50	—	0·69	34·04	27·31	8·12	—	—	—	—	—	N 100 B				
		60	—	0·50	34·05	27·33	8·12	—	—	—	—	7·14					
		80	—	0·30	34·13	27·40	8·07										
		100	—	0·38	34·15	27·41	8·05	—	—	—	—	6·28					
		125	—	0·60	34·22	27·46	8·01	—	—	—	—	5·80					
772	6	0	—	1·73	34·04	27·24	8·16	—	—	—	—	7·65	N 50 V	100–50	1645		
		10	—	1·68	34·04	27·25	8·16	—	—	—	—	—	,,	50–0			
		20	—	1·41	34·04	27·27	8·16	—	—	—	—	7·67	N 70 V	1000–750			
		30	—	1·00	34·04	27·29	8·16	—	—	—	—	—	,,	750–500			
		40	—	0·91	34·04	27·30	8·15	—	—	—	—	7·49	,,	500–250			
		50	—	0·68	34·05	27·32	8·12	—	—	—	—	—	,,	250–100			
		60	—	0·45	34·05	27·34	8·13	—	—	—	—	7·37	,,	100–50			
		80	—	0·21	34·06	27·36	8·12	—	—	—	—	—	,,	50–0	—	1840	
		100	—	0·20	34·08	27·38	8·12	—	—	—	—	7·23	N 70 B	222–110	1859	1929	DGP
		150	—	0·56	34·22	27·46	8·03	—	—	—	—	5·90	N 100 B				
		200	—	1·03	34·33	27·52	7·99	—	—	—	—	5·17	N 70 B	133–0	1942	2002	KT
		300	—	1·71	34·47	27·59	7·95	—	—	—	—	4·22	N 100 B				
		400	—	1·79	34·54	27·65	7·95	—	—	—	—	4·04					
		600	—	1·91	34·64	27·72	8·06	—	—	—	—	3·82					
		800	—	1·82	34·67	27·74	8·06	—	—	—	—	4·04					
		1000	—	1·66	34·67	27·75	8·12	—	—	—	—	3·89					
773	7	0	—	1·62	34·04	27·25	8·15	—	—	—	—	7·49	N 70 V	1000–750	2228		
		10	—	1·61	34·04	27·25	8·15	—	—	—	—	—	,,	750–500			
		20	—	1·59	34·04	27·25	8·15	—	—	—	—	7·55	,,	500–250			
		30	—	1·42	34·04	27·26	8·15	—	—	—	—	—	,,	250–100			
		40	—	1·31	34·04	27·27	8·15	—	—	—	—	7·45	,,	100–50			
		50	—	1·25	34·04	27·28	8·14	—	—	—	—	—	,,	50–0			
		60	—	1·01	34·04	27·29	8·14	—	—	—	—	7·42	N 50 V	100–50			
		80	—	0·69	34·05	27·32	8·15	—	—	—	—	—	,,	50–0	—	0012	
		100	—	0·52	34·05	27·33	8·13	—	—	—	—	7·31	N 70 B	240–170	0042	0114	DGP
		150	—	−0·13	34·07	27·39	8·08	—	—	—	—	7·08	N 100 B				
		200	—	0·04	34·14	27·44	8·05	—	—	—	—	6·47	N 70 B	130–0	0128	0150	KT
		300	—	1·49	34·43	27·58	7·95	—	—	—	—	4·35	N 100 B				
		400	—	1·82	34·55	27·65	7·94	—	—	—	—	3·91					
		600	—	1·92	34·61	27·70	7·98	—	—	—	—	3·85					
		800	—	1·79	34·67	27·74	8·04	—	—	—	—	3·82					
		1000	—	1·67	—	—	7·99	—	—	—	—	3·98					
		1500	—	1·27	34·70	27·81	8·30	—	—	—	—	3·73					
		2000	—	0·84	34·68	27·82	8·18	—	—	—	—	4·18					
		2500	—	0·58	34·67	27·83	8·27	—	—	—	—	4·08					
774	7	0	—	1·95	33·98	27·19	8·16	—	—	—	—	7·40	N 50 V	100–50	0523		
		10	—	1·62	33·98	27·21	8·16	—	—	—	—	—	,,	50–0			
		20	—	1·48	33·98	27·22	8·17	—	—	—	—	5·95	N 70 V	1000–800			
		30	—	0·99	33·99	27·26	8·16	—	—	—	—	—	,,	750–500			
		40	—	0·80	34·02	27·30	8·16	—	—	—	—	7·35	,,	500–250			
		50	—	0·60	34·03	27·32	8·13	—	—	—	—	—	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
774 *cont.*	52° 43·4′ S, 37° 17·5′ W	1931 16 xii											
775	50° 48·3′ S, 37° 21·6′ W	16 xii	2130	4910*	NW	19	NW	4	o	989·2	4·3	4·1	mod. conf. NW swell
776	49° 29′ S, 37° 22·5′ W	17 xii	0930	5263*	NW × W	30	NW × W	5	c	979·7	6·0	5·1	no swell
			1200	—	W	35	W	7	oq	978·4	5·1	4·0	heavy WNW swell
777	50° 52·3′ S, 36° 14·5′ W	18 xii	0730	5033*	WSW	22–27	WSW	5	o	984·0	2·9	2·7	heavy W swell
			1200	—	WSW	17	WSW	4	o	985·3	4·4	3·4	heavy W × N swell
778	52° 05·7′ S, 35° 22·7′ W	18 xii	2000	4372*	SW × W	11–16	SW × W	3	o	985·5	2·1	1·7	mod. conf. S swell
			0000	—	SW × W	8	SW × W	2	oe	986·3	1·7	1·6	mod. conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
774 *cont.*	7	60	—	0·44	34·04	27·33	8·13	—	—	—	—	6·68	N 70 V	100–50			
		80	—	0·37	34·05	27·34	8·13	—	—	—	—	—	,,	50–0	—	0715	
		100	—	0·20	34·08	27·38	8·08	—	—	—	—	6·94	N 70 B	250–100	0727	0757	Estimated depth
		150	—	0·19	34·15	27·44	8·06	—	—	—	—	6·44	N 100 B				
		200	—	1·71	34·34	27·49	7·98	—	—	—	—	4·80	N 70 B	137–0	0812	0832	KT
		300	—	1·71	34·48	27·60	7·95	—	—	—	—	4·12	N 100 B				
		400	—	1·80	34·52	27·62	7·95	—	—	—	—	3·96					
		600	—	1·94	34·62	27·70	8·16	—	—	—	—	3·64					
		800	—	1·82	34·69	27·75	8·23	—	—	—	—	3·62					
		1000	—	1·64	—	—	8·07	—	—	—	—	5·49					
		1500	—	1·09	34·71	27·83	8·13	—	—	—	—	4·13					
775	8	0	—	3·73	34·15	27·17	8·20	—	—	—	—	—	N 70 B	288–112	2143	2213	DGP
													N 100 B				
													N 70 B	106–0	2225	2245	KT
													N 100 B				
776	8	0	—	5·29	34·12	26·97	8·23	—	—	—	—	7·03	N 70 V	1000–750	0937		
		10	—	5·28	34·13	26·97	8·23	—	—	—	—	—	,,	750–500			
		20	—	5·26	34·14	26·99	8·23	—	—	—	—	7·01	,,	500–250			
		30	—	5·25	34·14	26·99	8·23	—	—	—	—	—	,,	250–100			
		40	—	4·84	34·14	27·04	8·19	—	—	—	—	6·88	,,	100–50			
		50	—	4·29	34·09	27·05	8·19	—	—	—	—	—	,,	50–0			
		60	—	3·51	34·02	27·08	8·19	—	—	—	—	7·07	N 50 V	100–50			
		80	—	3·13	34·05	27·14	8·15	—	—	—	—	—	,,	50–0	—	1139	
		100	—	3·01	34·05	27·15	8·14	—	—	—	—	6·82	N 70 B	356–170	1326	1355	DGP
		150	—	1·86	34·01	27·21	8·11	—	—	—	—	6·96	N 100 B				
		200	—	1·52	34·01	27·24	8·12	—	—	—	—	6·73	N 70 B	120–0	1411	1431	KT
		300	—	1·81	34·16	27·34	8·02	—	—	—	—	5·54	N 100 B				
		400	—	2·09	34·29	27·41	7·99	—	—	—	—	4·83					
		600	—	2·07	34·39	27·51	8·01	—	—	—	—	4·16					
		800	—	2·29	34·54	27·61	8·07	—	—	—	—	3·63					
		1000	—	2·19	34·61	27·67	8·21	—	—	—	—	3·65					
		1500	—	2·04	34·72	27·77	8·17	—	—	—	—	3·97					
		1990	—	1·60	34·72	27·80	8·22	—	—	—	—	4·00					
		2490	—	1·09	34·70	27·82	8·27	—	—	—	—	3·98					
		2990	—	0·66	34·69	27·83	8·32	—	—	—	—	3·91					
		3490	—	0·28	34·67	27·84	8·40	—	—	—	—	3·86					
		3990	—	0·12	34·66	27·84	8·14	—	—	—	—	4·34					
		4480	4482	0·03	34·65	27·84	8·33	—	—	—	—	4·02					
777	9	0	—	3·32	33·98	27·07	8·21	—	—	—	—	7·32	N 50 V	100–50	0734		
		10	—	3·32	33·98	27·07	8·21	—	—	—	—	—	,,	50–0			
		20	—	3·32	33·98	27·07	8·21	—	—	—	—	7·35	N 70 V	1000–750			
		30	—	3·31	33·98	27·07	8·21	—	—	—	—	—	,,	750–500			
		40	—	3·23	33·98	27·08	8·20	—	—	—	—	7·31	,,	500–250			
		50	—	2·99	33·99	27·11	8·18	—	—	—	—	—	,,	250–100			
		60	—	2·49	33·99	27·15	8·17	—	—	—	—	7·13	,,	100–50			
		80	—	2·01	33·99	27·19	8·16	—	—	—	—	—	,,	50–0	—	0940	
		100	—	1·72	34·00	27·21	8·13	—	—	—	—	6·93	N 70 B	200–98	1031	1102	DGP
		150	—	0·88	34·00	27·27	8·11	—	—	—	—	6·99	N 100 B				
		200	—	1·03	34·07	27·32	8·09	—	—	—	—	6·41	N 70 B	115–0	1118	1140	KT
		300	—	1·11	34·18	27·40	8·03	—	—	—	—	5·61	N 100 B				
		400	—	1·97	34·37	27·49	7·97	—	—	—	—	4·44					
		600	—	2·11	34·52	27·60	8·03	—	—	—	—	3·76					
		800	—	2·24	34·64	27·69	8·07	—	—	—	—	3·76					
		1000	—	2·22	—	—	8·17	—	—	—	—	4·07					
		1500	—	1·83	34·71	27·78	8·08	—	—	—	—	3·97					
		2000	—	1·30	34·71	27·82	8·09	—	—	—	—	4·05					
		2500	—	0·94	34·70	27·83	8·19	—	—	—	—	4·20					
		3000	—	0·58	34·68	27·84	8·24	—	—	—	—	4·17					
		3500	—	0·34	34·66	27·83	8·40	—	—	—	—	4·02					
778	10	0	—	2·89	33·94	27·07	8·20	—	—	—	—	7·49	N 50 V	100–50	2005		
		10	—	2·88	33·94	27·07	8·20	—	—	—	—	—	,,	50–0			
		20	—	2·82	33·94	27·08	8·20	—	—	—	—	7·48	N 70 V	1000–770			
		30	—	2·09	33·96	27·16	8·20	—	—	—	—	—	,,	750–500			
		40	—	1·50	33·97	27·21	8·19	—	—	—	—	7·57	,,	500–250			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
778 *cont.*	52° 05·7′ S, 35° 22·7′ W	1931 18–19 xii											
779	53° 27·3′ S, 34° 31·8′ W	19 xii	0900	3445*	SW × S	4–6	SW × S	2	o	986·0	1·1	0·9	low S swell
780	54° 23′ S, 33° 54·5′ W	19 xii	1945	4484*	SE × E	9	SE × E	2	oe	985·5	0·4	0·4	mod. conf. E swell
781	54° 24·4′ S, 34° 32·4′ W	20 xii	0142	2943*	E	1–6	—	1	s	985·2	0·2	0·1	low conf. SE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. ° C.	S °/₀₀	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	To	
778 *cont.*	10	50	—	1·30	33·97	27·22	8·16	—	—	—	—	—	N 70 V	250–100			
		60	—	1·27	33·97	27·23	8·16	—	—	—	—	7·40	,,	100–50			
		80	—	1·11	33·97	27·24	8·16	—	—	—	—	—	,,	50–0	—	2205	
		100	—	0·81	33·97	27·26	8·15	—	—	—	—	7·35	N 70 B	252–102	2259	2329	DGP
		150	—	0·29	34·07	27·36	8·06	—	—	—	—	6·59	N 100 B				
		200	—	1·12	34·27	27·47	7·99	—	—	—	—	5·11	N 70 B	119–0	2344	0004	KT
		300	—	1·63	34·44	27·58	7·94	—	—	—	—	4·23	N 100 B				
		400	—	1·78	34·54	27·65	7·95	—	—	—	—	4·02					
		600	—	1·92	34·63	27·71	8·00	—	—	—	—	3·80					
		800	—	1·82	34·66	27·73	8·11	—	—	—	—	3·74					
		1000	—	1·79	34·70	27·77	8·06	—	—	—	—	4·01					
		1500	—	1·28	34·70	27·81	8·15	—	—	—	—	4·06					
		2000	—	0·88	34·70	27·84	8·32	—	—	—	—	4·03					
		2500	—	0·50	34·68	27·84	8·17	—	—	—	—	4·24					
		3000	—	0·25	34·67	27·85	8·16	—	—	—	—	4·49					
		3500	—	0·06	34·67	27·86	8·12	—	—	—	—	4·36					
779	10	0	—	0·90	34·07	27·33	8·12	—	—	—	—	7·40	N 70 V	1000–750	0935		
		10	—	0·89	34·07	27·33	8·12	—	—	—	—	—	,,	750–500			
		20	—	0·82	34·07	27·33	8·12	—	—	—	—	7·40	,,	500–250			
		30	—	0·72	34·07	27·34	8·13	—	—	—	—	—	,,	250–100			
		40	—	0·64	34·07	27·34	8·12	—	—	—	—	7·38	,,	100–50			
		50	—	0·52	34·07	27·35	8·12	—	—	—	—	—	,,	50–0			
		60	—	0·50	34·07	27·35	8·11	—	—	—	—	7·40	N 50 V	100–50			
		80	—	0·42	34·08	27·37	8·11	—	—	—	—	—	,,	50–0	—	1145	
		100	—	0·10	34·14	27·43	8·08	—	—	—	—	7·14	N 70 B	280–140	1202	1232	DGP
		150	—	0·30	34·26	27·51	8·01	—	—	—	—	5·92	N 100 B				
		200	—	1·31	34·47	27·62	7·95	—	—	—	—	4·55	N 70 B	146–0	1244	1304	KT
		300	—	1·71	34·59	27·69	7·95	—	—	—	—	4·03	N 100 B				
		400	—	1·82	34·67	27·74	7·95	—	—	—	—	3·93					
		600	593	1·62	34·69	27·77	8·11	—	—	—	—	3·78					
		800	—	1·45	34·70	27·80	8·11	—	—	—	—	4·01					
		1000	—	1·37	34·69	27·79	8·12	—	—	—	—	3·94					
		1500	—	1·19	34·69	27·80	8·12	—	—	—	—	4·01					
		2000	—	0·92	34·68	27·82	8·12	—	—	—	—	4·09					
		2500	—	0·48	34·67	27·83	8·13	—	—	—	—	4·38					
		3000	3000	0·21	34·66	27·84	8·18	—	—	—	—	4·22					
780	10	0	—	0·58	33·99	27·29	8·24	—	—	—	—	8·14	N 70 V	1000–750	1955		
		10	—	0·57	33·99	27·29	8·23	—	—	—	—	—	,,	750–500			
		20	—	0·32	33·99	27·30	8·23	—	—	—	—	8·05	,,	500–250			
		30	—	0·09	34·00	27·32	8·18	—	—	—	—	—	,,	250–100			
		40	—	−0·03	34·01	27·33	8·17	—	—	—	—	7·76	,,	100–50			
		50	—	−0·29	34·07	27·39	8·15	—	—	—	—	—	,,	50–0			
		60	—	−0·38	34·09	27·41	8·13	—	—	—	—	7·42	N 50 V	100–50			
		80	—	−0·49	34·12	27·44	8·13	—	—	—	—	—	,,	50–0	—	2140	
		100	—	−0·58	34·15	27·48	8·09	—	—	—	—	7·11	N 70 B	202–133	2233	2303	DGP
		150	—	−0·40	34·25	27·54	8·04	—	—	—	—	6·54	N 100 B				
		200	—	0·29	34·38	27·61	7·99	—	—	—	—	5·59	N 70 B	114–0	2317	2337	KT
		300	—	0·90	34·51	27·68	7·96	—	—	—	—	4·80	N 100 B				
		400	—	1·40	34·60	27·71	7·96	—	—	—	—	4·27					
		600	—	1·49	34·67	27·77	8·11	—	—	—	—	4·04					
		800	—	1·32	34·68	27·79	8·01	—	—	—	—	4·14					
		1000	—	1·10	34·69	27·80	8·07	—	—	—	—	4·20					
		1500	—	0·70	34·69	27·83	8·16	—	—	—	—	4·17					
		2000	—	0·36	34·68	27·85	8·08	—	—	—	—	4·32					
		2500	—	0·18	34·67	27·85	8·13	—	—	—	—	4·51					
		3000	—	0·00	34·66	27·85	8·28	—	—	—	—	4·39					
		3500	—	−0·06	34·66	27·85	8·23	—	—	—	—	4·39					
781	11	0	—	0·89	34·06	27·32	8·17	—	—	—	—	7·79	N 50 V	100–50	0140		
		10	—	0·89	34·06	27·32	8·17	—	—	—	—	—	,,	50–0			
		20	—	0·71	34·07	27·34	8·17	—	—	—	—	7·75	N 70 V	1000–780			
		30	—	0·41	34·08	27·37	8·17	—	—	—	—	—	,,	750–500			
		40	—	0·14	34·09	27·38	8·16	—	—	—	—	7·63	,,	500–250			
		50	—	0·01	34·10	27·40	8·13	—	—	—	—	—	,,	250–100			
		60	—	0·00	34·10	27·40	8·13	—	—	—	—	7·48	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
781 *cont.*	54° 24·4′ S, 34° 32·4′ W	1931 20 xii											
782	54° 25·9′ S, 35° 10·1′ W	20 xii	0658	1247*	ESE	9	ESE	2	oesp	984·3	0·5	0·3	mod. conf. E swell
783	54° 27·3′ S, 35° 47·5′ W	20 xii	1159	210*	SE × S	8	SE × S	3	o	983·8	1·8	1·0	mod. SE swell
784	55° 00′ S, 36° 54·5′ W	20 xii	2050	254*	SSE	18	SSE	3	osp	984·1	1·2	0·7	low conf. swell
785	54° 45·1′ S, 37° 52·3′ W	21 xii	0133	258*	S	19	S	4	os	985·5	0·7	0·3	mod. conf. S swell
786	54° 30·2′ S, 38° 50·6′ W	21 xii	0651	214*	S	22–27	S	4	c	989·4	1·7	0·6	mod. S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S°/₀₀	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
781 *cont.*		80	—	−0·11	34·11	27·42	8·13	—	—	—	—	—	**N 70 V**	50–0	—	0330	
		100	—	−0·26	34·14	27·45	8·08	—	—	—	—	7·73?	**N 70 B**	182–128	0351	0421	DGP
		150	—	0·00	34·24	27·52	8·01	—	—	—	—	6·21	**N 100 B**				
		200	—	0·54	34·34	27·57	7·98	—	—	—	—	5·43	**N 70 B**	139–0	0434	0454	KT
		300	—	1·60	34·47	27·60	7·96	—	—	—	—	4·45	**N 100 B**				
		400	—	1·69	34·57	27·67	7·96	—	—	—	—	4·01					
		600	—	1·82	34·69	27·75	8·02	—	—	—	—	3·87					
		800	—	1·63	34·70	27·79	8·11	—	—	—	—	3·92					
		1000	—	1·42	34·70	27·80	8·17	—	—	—	—	3·88					
		1500	—	0·94	34·70	27·83	8·08	—	—	—	—	4·21					
		2000	—	0·51	34·69	27·84	8·27	—	—	—	—	4·14					
		2490	2490	0·31	34·68	27·85	8·21	—	—	—	—	4·23					
782	11	0	—	0·81	33·99	27·27	8·17	—	—	—	—	7·65	**N 70 V**	1000–750	0703		
		10	—	0·80	33·99	27·28	8·17	—	—	—	—	—	,,	750–500			
		20	—	0·73	33·99	27·28	8·16	—	—	—	—	7·47	,,	500–250			
		30	—	0·72	33·99	27·28	8·16	—	—	—	—	—	,,	250–100			
		40	—	0·69	34·00	27·28	8·16	—	—	—	—	7·42	,,	100–50			
		50	—	0·69	34·00	27·28	8·15	—	—	—	—	—	,,	50–0			
		60	—	0·59	34·01	27·30	8·12	—	—	—	—	7·28	**N 50 V**	100–50			
		80	—	0·40	34·02	27·32	8·12	—	—	—	—	—	,,	50–0	—	0830	
		100	—	0·36	34·04	27·33	8·12	—	—	—	—	7·19	**N 70 B**	204–116	0858	0928	DGP
		150	—	0·30	34·14	27·42	8·06	—	—	—	—	6·58	**N 100 B**				
		200	—	0·60	34·24	27·49	8·01	—	—	—	—	5·69	**N 70 B**	99–0	0941	1001	KT
		300	—	1·40	34·43	27·58	7·95	—	—	—	—	4·46	**N 100 B**				
		400	—	1·70	34·53	27·64	7·94	—	—	—	—	3·99					
		600	—	1·91	34·62	27·71	8·04	—	—	—	—	3·78					
		800	—	1·79	34·67	27·74	8·11	—	—	—	—	3·77					
		1000	996	1·63	34·70	27·79	8·15	—	—	—	—	3·97					
783	11	0	—	1·68	33·90	27·14	8·15	—	—	—	—	7·57	**N 50 V**	100–50	1209		Water bottle touched bottom at 152 m.
		10	—	1·61	33·90	27·14	8·15	—	—	—	—	—	,,	50–0			
		20	—	1·44	33·90	27·15	8·16	—	—	—	—	7·62	**N 70 V**	160–100			
		30	—	1·27	33·90	27·17	8·15	—	—	—	—	—	,,	100–50			
		40	—	0·90	33·94	27·22	8·15	—	—	—	—	7·51	,,	50–0	—	1220	
		50	—	0·70	33·95	27·24	8·16	—	—	—	—	—	**N 70 B**	88–0	1251	1309	KT
		60	—	0·67	33·96	27·25	8·15	—	—	—	—	7·44	**N 100 B**				
		80	—	0·60	33·96	27·26	8·12										
		100	—	0·50	33·99	27·29	8·12	—	—	—	—	7·27					
		150	—	0·36	34·04	27·33	8·11	—	—	—	—	7·06					
784	12	0	—	2·76	33·87	27·03	8·35	—	—	—	—	9·38	**N 50 V**	100–50	2057		
		10	—	2·54	33·87	27·05	8·35	—	—	—	—	—	,,	50–0	—	2110	
		20	—	1·58	33·87	27·12	8·36	—	—	—	—	8·96	**N 70 B**	109–0	**2145**	**2205**	KT
		30	—	0·90	33·90	27·19	8·21	—	—	—	—	—	**N 100 B**				
		40	—	0·49	33·92	27·23	8·16	—	—	—	—	7·40					
		50	—	0·36	33·97	27·28	8·11										
		60	—	0·30	33·98	27·29	8·11	—	—	—	—	7·15					
		80	—	0·30	34·03	27·33	8·06										
		100	—	0·23	34·07	27·37	8·06	—	—	—	—	6·59					
		150	—	0·30	34·11	27·39	8·05	—	—	—	—	6·33					
		200	—	0·60	34·17	27·43	8·00	—	—	—	—	5·78					
785	12	0	—	1·73	33·90	27·13	8·30	—	—	—	—	8·51	**N 50 V**	100–50	**0140**		Water bottle touched bottom at 222 m.
		10	—	1·80	33·90	27·13	8·30	—	—	—	—	—	,,	50–0	—	**0153**	
		20	—	1·12	33·96	27·22	8·21	—	—	—	—	7·42	**N 70 B**	95–0	0301	0321	KT
		30	—	0·81	33·96	27·25	8·17	—	—	—	—	—	**N 100 B**				
		40	—	0·70	33·96	27·25	8·16	—	—	—	—	7·62					
		50	—	0·62	33·96	27·26	8·16										
		60	—	0·60	33·96	27·26	8·15	—	—	—	—	7·59					
		80	—	0·43	33·96	27·27	8·10										
		100	—	0·10	33·99	27·31	8·10	—	—	—	—	7·19					
		150	—	0·82	34·07	27·33	8·05	—	—	—	—	6·91					
		200	—	0·72	34·26	27·49	7·99	—	—	—	—	5·46					
786	12	0	—	1·52	33·91	27·16	8·25	—	—	—	—	8·07	**N 50 V**	100–50	0700		
		10	—	1·58	33·91	27·15	8·25	—	—	—	—	—	,,	50–0	—	0713	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
786 *cont.*	54° 30·2′ S, 38° 50·6′ W	1931 21 xii											
787	54° 14·4′ S, 39° 47·4′ W	21 xii	1137	1944*	SSW	20	SSW	4	csp	992·0	1·5	0·0	mod. S × W swell
788	54° 00·2′ S, 40° 24·7′ W	21 xii	1550	2724*	SW × S	17	SW × S	4	csp	993·9	1·7	0·0	mod. S swell
789	53° 58·5′ S, 39° 50·6′ W	21 xii	2047	788*	SW	17–21	SW	4	o	995·0	0·6	0·0	mod. SW swell
790	53° 56·8′ S, 39° 16′ W	22 xii	0142	397*	SSW	16	SSW	3	c	995·1	−0·6	−1·0	mod. SW swell
791	53° 55·6′ S, 38° 45·7′ W	22 xii	0522	177*	SW × W	13	SW × W	3	bc	994·7	0·6	−0·8	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
786	12	20	—	1·59	33·91	27·15	8·25	—	—	—	—	8·11	N 70 B	82–0	0749	0809	KT
cont.		30	—	1·69	33·92	27·16	8·16	—	—	—	—	—	N 100 B				
		40	—	1·40	33·91	27·17	8·16	—	—	—	—	7·69					
		50	—	0·25	33·92	27·25	8·16										
		60	—	−0·02	33·93	27·26	8·16	—	—	—	—	7·42					
		80	—	−0·10	33·97	27·31	8·15										
		100	—	−0·09	34·05	27·37	8·11	—	—	—	—	6·93					
		150	—	0·19	34·10	27·39	8·06	—	—	—	—	6·47					
		200	—	0·74	34·26	27·49	7·99	—	—	—	—	5·38					
787	12	0	—	1·50	33·87	27·13	8·15	—	—	—	—	—	N 50 V	100–50	1140		
													,,	50–0	—	1152	
													N 70 B	200–148	1215	1244	DGP
													N 100 B				
													N 70 B	154–0	1257	1317	KT
													N 100 B				
788	12	0	—	1·58	33·84	27·09	8·17	—	—	—	—	7·44	N 50 V	100–50	1557		
		10	—	1·58	33·84	27·09	8·17	—	—	—	—	—	,,	50–0			
		20	—	1·56	33·84	27·10	8·17	—	—	—	—	7·46	N 70 V	1000–750			
		30	—	1·49	33·85	27·11	8·17	—	—	—	—	—	,,	750–500			
		40	—	0·88	33·87	27·17	8·17	—	—	—	—	7·58	,,	500–250			
		50	—	0·80	33·87	27·18	8·17	—	—	—	—	—	,,	250–100			
		60	—	0·62	33·88	27·20	8·17	—	—	—	—	7·51	,,	100–50			
		80	—	0·19	33·90	27·23	8·14	—	—	—	—	—	,,	50–0	—	1736	
		100	—	0·20	33·92	27·25	8·13	—	—	—	—	6·96	N 70 B	280–100	1754	1824	DGP
		150	—	0·60	34·07	27·35	8·07	—	—	—	—	6·04	N 100 B				
		200	—	1·05	34·16	27·39	8·02	—	—	—	—	5·57	N 70 B	119–0	1834	1854	KT
		300	—	1·80	34·34	27·49	7·96	—	—	—	—	4·54	N 100 B				
		390	—	1·72	34·40	27·53	7·96	—	—	—	—	4·37					
		590	—	2·08	34·50	27·58	7·96	—	—	—	—	3·94					
		790	—	2·00	34·60	27·67	8·21	—	—	—	—	3·75					
		980	—	1·95	34·61	27·69	8·17	—	—	—	—	3·71					
		1470	—	1·52	34·69	27·78	8·12	—	—	—	—	3·95					
		1960	—	1·15	34·69	27·80	8·08	—	—	—	—	4·16					
		2450	2453	0·69	34·68	27·83	8·23	—	—	—	—	4·06					
789	12	0	—	1·12	33·90	27·18	8·18	—	—	—	—	7·67	N 70 V	500–250	2055		Stray on wire
		10	—	1·12	33·90	27·18	8·18	—	—	—	—	—	,,	250–100			
		20	—	1·12	33·90	27·18	8·18	—	—	—	—	7·75	,,	100–50			
		30	—	1·09	33·90	27·18	8·18	—	—	—	—	—	,,	50–0			
		40	—	0·94	33·93	27·21	8·17	—	—	—	—	7·73	N 50 V	100–50			
		50	—	0·84	33·93	27·21	8·17	—	—	—	—	—	,,	50–0	—	2230	
		60	—	0·70	33·94	27·23	8·17	—	—	—	—	7·64	N 70 B	222–104	2244	2314	DGP
		80	—	0·20	33·96	27·28	8·13	—	—	—	—	—	N 100 B				
		100	—	0·29	33·98	27·29	8·13	—	—	—	—	7·23	N 70 B	118–0	2329	2349	KT
		150	—	0·11	34·04	27·34	8·08	—	—	—	—	6·76	N 100 B				
		200	—	0·21	34·10	27·39	8·04	—	—	—	—	6·33					
		300	—	1·10	34·37	27·56	7·97	—	—	—	—	4·93					
		400	—	1·52	34·52	27·65	7·95	—	—	—	—	4·30					
		600	—	1·93	34·65	27·71	7·97	—	—	—	—	3·86					Water bottle touched bottom at 600 m.
790	13	0	—	1·32	33·96	27·21	8·22	—	—	—	—	8·19	N 50 V	100–50	0150		
		10	—	1·32	33·96	27·21	8·22	—	—	—	—	—	,,	50–0			
		20	—	1·31	33·96	27·21	8·22	—	—	—	—	8·18	N 70 V	350–250			Stray on wire
		30	—	1·30	33·96	27·21	8·22	—	—	—	—	—	,,	250–100			,, ,,
		40	—	0·90	33·98	27·26	8·17	—	—	—	—	7·60	,,	100–50			
		50	—	0·79	33·98	27·27	8·17	—	—	—	—	—	,,	50–0	—	0258	
		60	—	0·62	33·99	27·29	8·12	—	—	—	—	7·39	N 70 B	97–0	0309	0328	KT
		80	—	0·50	34·04	27·32	8·12	—	—	—	—	—	N 100 B				
		100	—	0·45	34·05	27·34	8·12	—	—	—	—	7·10					
		150	—	0·37	34·14	27·42	8·06	—	—	—	—	6·36					
		200	—	0·63	34·23	27·48	8·02	—	—	—	—	5·77					
		300	—	1·48	34·49	27·62	7·95	—	—	—	—	4·37					
791	13	0	—	1·23	34·01	27·26	8·17	—	—	—	—	7·80	N 50 V	100–50	0527		
		10	—	1·23	34·01	27·26	8·17	—	—	—	—	—	,,	50–0			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
791 *cont.*	53° 55·6′ S, 38° 45·7′ W	1931 22 xii											
792	3 miles S 60° E of Jason I, South Georgia	22 xii	1652	—	NW	6	NW	2	o	991·5	1·4	−0·3	low NW swell
793	3 miles S 60° E of Jason I, South Georgia	1932 5 i	1803	—	W × N	14	W × N	3	c	1004·6	2·8	1·1	mod. conf. swell
794	53° 42·4′ S, 32° 53·2′ W	6 i	0900	3318*	SSW	6	SSW	3	o	1004·3	0·7	0·0	heavy conf. SSW swell
			1200	—	NNW	10	NNW	2	o	1003·9	1·7	0·8	heavy conf. swell
795	53° 44·6′ S, 31° 02·1′ W	6 i	2000	3919*	NNW	14	NNW	3	o	1003·1	0·9	0·4	mod. conf. swell
796	53° 47·1′ S, 28° 14·9′ W	7 i	0900	4945*	N × W	22	N × W	4	od	994·6	2·7	2·6	mod. conf. swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
791 *cont.*	13	20	—	1·22	34·01	27·26	8·17	—	—	—	—	7·79	**N 70 V**	100–50			
		30	—	1·18	34·01	27·26	8·17	—	—	—	—	—	,,	50–0	—	0555	
		40	—	0·93	33·99	27·27	8·16	—	—	—	—	7·54	**N 70 B**	110–0	0628	0646	KT
		50	—	0·80	33·99	27·28	8·16	—	—	—	—	—	**N 100 B**				
		60	—	0·78	33·99	27·28	8·16	—	—	—	—	7·47					
		80	—	0·74	33·99	27·28	8·12										
		100	—	0·64	34·01	27·30	8·12	—	—	—	—	7·30					
		150	—	0·42	34·05	27·34	8·07										
792	13	0	—	3·17	32·82	26·15	8·15	—	—	—	—	—	**N 50 V**	100–0	1850	1900	
793	27	0	—	2·58	33·68	26·89	8·20	—	—	—	—	—	**N 50 V**	100–0	1813	1820	
794	28	0	—	0·55	34·07	27·35	8·13	—	—	—	—	7·42	**N 50 V**	100–0	0905	0925	
		10	—	0·53	34·08	27·36	8·12	—	—	—	—	—	**N 100 B**	250–0	1216	1246	DGP
		20	—	0·52	34·08	27·36	8·12	—	—	—	—	7·42	**N 70 B**	202–98	1312	1343	DGP
		30	—	0·50	34·08	27·36	8·12	—	—	—	—	—	**N 100 B**				
		40	—	0·50	34·08	27·36	8·12	—	—	—	—	7·44	**N 70 B**	102–0	1358	1418	KT
		50	—	0·50	34·08	27·36	8·12	—	—	—	—	—	**N 100 B**				
		60	—	0·55	34·09	27·36	8·12	—	—	—	—	7·45					
		80	—	−0·42	34·14	27·46	8·12										
		100	—	−0·57	34·18	27·50	8·08	—	—	—	—	7·10					
		150	—	−0·13	34·31	27·58	8·02	—	—	—	—	6·06					
		200	—	1·30	34·45	27·60	7·96	—	—	—	—	4·84					
		300	—	1·32	34·66	27·77	7·95	—	—	—	—	4·26					
		400	—	1·50	34·68	27·78	7·98	—	—	—	—	4·16					
		600	596	1·50	34·69	27·78	8·01	—	—	—	—	4·23					
		800	—	1·22	34·70	27·82	8·11	—	—	—	—	4·22					
		1000	—	1·02	34·72	27·84	8·11	—	—	—	—	4·33					
		1500	—	0·62	34·71	27·87	8·06	—	—	—	—	4·41					
		2000	—	0·32	34·69	27·85	8·05	—	—	—	—	4·55					
		2500	—	0·11	34·67	27·85	8·18	—	—	—	—	4·48					
		3000	—	−0·01	34·66	27·85	8·17	—	—	—	—	4·68					
795	29	0	—	0·55	33·96	27·26	8·12	—	—	—	—	7·46	**N 50 V**	100–0	2016	2025	
		10	—	0·54	33·96	27·26	8·12	—	—	—	—	—	**N 70 B**	310–124	2230	2300	DGP
		20	—	0·49	33·96	27·26	8·12	—	—	—	—	7·48	**N 100 B**				
		30	—	0·41	33·96	27·27	8·13	—	—	—	—	—	**N 70 B**	124–0	2314	2334	KT
		40	—	0·40	33·96	27·27	8·11	—	—	—	—	7·46	**N 100 B**				
		50	—	−0·02	34·01	27·33	8·12										
		60	—	−0·80	34·10	27·44	8·09	—	—	—	—	7·50					
		80	—	−1·01	34·14	27·48	8·08										
		100	—	−1·02	34·17	27·50	8·07	—	—	—	—	7·13					
		150	—	−0·79	34·28	27·59	8·03	—	—	—	—	6·29					
		200	—	−0·04	34·45	27·68	8·00	—	—	—	—	5·34					
		300	—	0·61	34·61	27·79	7·96	—	—	—	—	4·67					
		400	—	0·78	34·67	27·82	7·97	—	—	—	—	4·50					
		600	—	0·70	34·68	27·83	8·01	—	—	—	—	4·40					
		800	—	0·57	34·68	27·84	8·01	—	—	—	—	4·40					
		1000	—	0·49	34·67	27·83	8·02	—	—	—	—	4·49					
		1500	—	0·22	34·67	27·85	8·06	—	—	—	—	4·54					
		2000	—	0·01	34·67	27·86	8·07	—	—	—	—	4·66					
		2500	—	−0·09	34·67	27·87	8·22	—	—	—	—	4·64					
		3000	—	−0·14	34·67	27·87	8·16	—	—	—	—	4·77					
796	29	0	—	1·93	33·96	27·17	8·15	—	—	—	—	7·12	**N 50 V**	100–0	0910	0914	+2 hours
		10	—	1·92	33·96	27·17	8·16	—	—	—	—	—	**N 70 B**	248–102	1200	1230	DGP
		20	—	1·91	33·96	27·17	8·16	—	—	—	—	7·13	**N 100 B**				
		30	—	1·91	33·96	27·17	8·16	—	—	—	—	—	**N 70 B**	131–0	1240	1300	KT
		40	—	1·91	33·96	27·17	8·16	—	—	—	—	7·13	**N 100 B**				
		50	—	1·83	33·96	27·17	8·16										
		60	—	1·80	33·96	27·18	8·16	—	—	—	—	7·11					
		80	—	0·33	34·04	27·33	8·07										
		100	—	0·39	34·11	27·39	8·06	—	—	—	—	6·53					
		150	—	1·19	34·32	27·51	7·96	—	—	—	—	4·80					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
796 *cont.*	53° 47·1′ S, 28° 14·9′ W	1932 7 i											
797	54° 44·7′ S, 27° 20·8′ W	7 i	2000 0000	6377* 7076*	N × E NE × N	27 28	N × E NE × N	5 5	o orsq	985·1 979·8	2·2 1·2	1·8 1·0	mod. conf. NNE swell heavy NNW swell
798	54° 50·5′ S, 25° 56′ W	8 i	0900	5010*	NE	22	NE	5	o	979·3	1·7	1·7	heavy conf. NE swell
799	54° 43·7′ S, 24° 30′ W	8 i	2000 0000	4282* —	E E × S	19 18	E E × S	4 4	ors oe	984·0 987·7	1·2 1·3	1·1 1·1	heavy conf. NE swell heavy NNE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
796 *cont.*	29	200	—	1·58	34·45	27·58	7·94	—	—	—	—	4·21					
		300	—	1·70	34·54	27·65	7·94	—	—	—	—	4·01					
		400	—	1·90	34·61	27·70	7·94	—	—	—	—	3·89					
		600	—	1·82	34·67	27·74	8·01	—	—	—	—	3·87					
		800	—	1·89	34·72	27·78	8·05	—	—	—	—	4·08					
		1000	—	1·78	34·74	27·81	8·11	—	—	—	—	4·14					
		1500	—	1·08	34·71	27·84	8·12	—	—	—	—	4·21					
		2000	—	0·56	34·69	27·84	8·12	—	—	—	—	4·37					
		2500	—	0·23	34·68	27·86	8·12	—	—	—	—	4·76					
		3000	—	0·06	34·67	27·86	8·17	—	—	—	—	4·55					
797	0	0	—	0·76	33·99	27·28	8·11	—	—	—	—	7·36	N 70 B	250–122	2016	**2046**	DGP
		10	—	0·74	34·03	27·31	8·11	—	—	—	—	—	N 100 B				
		20	—	0·73	34·03	27·31	8·11	—	—	—	—	7·34	N 70 B	153–0	**2101**	**2121**	KT
		30	—	0·71	34·04	27·31	8·11	—	—	—	—	—	N 100 B				
		40	—	0·69	34·05	27·32	8·11	—	—	—	—	7·38	N 50 V	100–0	**2139**	**2145**	
		50	—	0·60	34·05	27·33	8·11										
		60	—	0·46	34·05	27·34	8·10	—	—	—	—	7·38					
		80	—	−0·65	34·09	27·42	8·08										
		100	—	−0·70	34·14	27·47	8·04	—	—	—	—	5·64					
		150	—	0·30	34·39	27·62	7·96	—	—	—	—	5·36					
		200	—	1·10	34·52	27·67	7·95	—	—	—	—	4·50					
		300	—	1·32	34·60	27·72	7·94	—	—	—	—	4·21					
		400	—	1·32	34·64	27·76	7·95	—	—	—	—	4·28					
		500	—	1·35	34·68	27·79	8·07	—	—	—	—	4·06					
		600	—	1·30	34·68	27·79	8·01	—	—	—	—	4·16					
		800	—	1·10	34·67	27·79	8·07	—	—	—	—	4·29					
		1000	—	0·78	34·70	27·85	8·22	—	—	—	—	4·30					
		1500	—	0·45	34·70	27·87	8·02	—	—	—	—	4·45					
		2000	—	0·19	34·67	27·85	8·39	—	—	—	—	4·39					
		2500	—	0·02	34·67	27·86	8·13	—	—	—	—	4·50					
		3000	—	−0·12	34·67	27·87	8·22	—	—	—	—	4·44					
		3500	3518	−0·23	34·66	27·86	8·18										
798	0	0	—	0·96	—	—	8·11	—	—	—	—	7·33	N 70 B	242–116	0918	0948	DGP. Salinity samples lost
		10	—	0·96	—	—	8·11	—	—	—	—	—	N 100 B				
		20	—	0·94	—	—	8·11	—	—	—	—	7·34	N 70 B	137–0	1002	1022	KT
		30	—	0·91	—	—	8·11	—	—	—	—	—	N 100 B				
		40	—	0·90	—	—	8·11	—	—	—	—	7·32	N 50 V	100–0	1027	1038	
		50	—	0·86	—	—	8·11										
		60	—	0·80	—	—	8·11										
		80	—	0·08	—	—	8·09										
		100	—	−0·30	—	—	8·08	—	—	—	—	7·34					
		150	—	−0·22	—	—	8·02	—	—	—	—	6·45					
		200	—	0·80	—	—	7·96	—	—	—	—	5·02					
		300	—	1·29	—	—	7·94	—	—	—	—	4·40					
		390	—	1·70	—	—	7·95	—	—	—	—	4·04					
		590	—	1·62	—	—	8·01										
		780	—	1·42	—	—	8·00	—	—	—	—	4·12					
		980	—	1·21	—	—	8·12	—	—	—	—	4·18					
		1470	—	0·62	—	—	8·12	—	—	—	—	4·33					
		1960	—	0·38	—	—	8·11	—	—	—	—	4·48					
		2440	—	0·20	—	—	8·23	—	—	—	—	4·54					
		2930	—	0·02	—	—	8·08	—	—	—	—	4·56					
		3420	—	−0·15	—	—	8·23	—	—	—	—	4·44					
		3910	—	−0·32	—	—	8·33	—	—	—	—	4·64					
		4400	4402	−0·36	—	—	8·28	—	—	—	—	4·60					
799	1	0	—	1·30	—	—	8·12	—	—	—	—	7·29	N 50 V	100–0	**2010**	**2020**	Most salinity samples lost
		10	—	1·30	—	—	8·12	—	—	—	—	—					
		20	—	1·30	—	—	8·12	—	—	—	—	7·26	N 70 B	334–130	**2309**	**2339**	DGP
		30	—	1·30	—	—	8·12	—	—	—	—	—	N 100 B				
		40	—	1·28	—	—	8·12	—	—	—	—	7·28	N 70 B	131–0	**2351**	**0011**	KT
		50	—	1·23	—	—	8·12	—	—	—	—	—	N 100 B				
		60	—	1·02	—	—	8·12	—	—	—	—	7·29					
		80	—	0·31	—	—	8·08										
		100	—	−0·18	—	—	8·04	—	—	—	—	7·21					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
799 *cont.*	54° 43·7′ S, 24° 30′ W	1932 8–9 i											
800	54° 33·3′ S, 22° 28·4′ W	9 i	0900	2958*	ESE	13	ESE	3	om	992·2	1·7	1·4	heavy conf. NE swell
801	54° 26·4′ S, 21° 11·1′ W	9 i	1742	2492*	E×S	15	E×S	3	o	994·9	2·0	1·3	heavy conf. E swell
802	54° 15′ S, 19° 11·1′ W	10 i	0400	4342*	ESE	11	ESE	3	o	997·7	1·4	0·6	mod. conf. E swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	TIME To	Remarks
				HYDROLOGICAL OBSERVATIONS (Mg.—atom m.³: P, Nitrate + Nitrite, Nitrite, Si)									BIOLOGICAL OBSERVATIONS				
799 *cont.*	1	150	—	−0·12	—	—	8·00	—	—	—	—	6·59					
		200	—	0·73	—	—	7·96	—	—	—	—	5·10					
		300	—	1·28	—	—	7·93	—	—	—	—	4·25					
		400	—	1·39	—	—	7·92	—	—	—	—	4·17					
		590	—	1·50	—	—	8·12	—	—	—	—	3·99					
		790	—	1·62	—	—	8·17	—	—	—	—	3·95					
		990	—	1·40	—	—	8·16	—	—	—	—	4·04					
		1480	—	0·72	—	—	8·09	—	—	—	—	4·30					
		1970	—	0·41	—	—	8·08	—	—	—	—	4·39					
		2470	—	0·22	34·68	27·86	8·09	—	—	—	—	4·47					
		2960	—	0·10	34·66	27·84	8·09	—	—	—	—	4·63					
		3450	3453	−0·03	34·66	27·85	8·18	—	—	—	—	4·62					
800	1	0	—	0·83	33·77	27·08	8·12	—	—	—	—	7·36	**N 50 V**	100–0	0909	0916	
		10	—	0·83	33·77	27·08	8·12	—	—	—	—	—	**N 70 B**	310–140	1045	1115	DGP
		20	—	0·89	33·78	27·10	8·12	—	—	—	—	7·36	**N 100 B**				
		30	—	0·92	33·78	27·10	8·12	—	—	—	—	—	**N 70 B**	144–0	1126	1146	KT
		40	—	0·93	33·79	27·11	8·12	—	—	—	—	7·36	**N 100 B**				
		50	—	0·94	33·80	27·11	8·12										
		60	—	0·96	33·81	27·12	8·12	—	—	—	—	7·34					
		80	—	0·88	33·83	27·14	8·12										
		100	—	0·66	33·91	27·21	8·12	—	—	—	—	7·33					
		150	—	0·61	34·19	27·45	7·97	—	—	—	—	5·54					
		200	—	1·40	34·41	27·56	7·95	—	—	—	—	4·47					
		300	—	1·62	34·55	27·67	7·93	—	—	—	—	4·08					
		400	—	1·79	34·60	27·69	7·93	—	—	—	—	3·99					
		600	—	1·86	34·70	27·77	8·11	—	—	—	—	3·92					
		800	—	1·62	34·70	27·79	8·08	—	—	—	—	4·10					
		1000	—	1·37	34·70	27·81	8·08	—	—	—	—	4·17					
		1500	—	0·72	34·68	27·83	8·06	—	—	—	—	4·41					
		2000	—	0·39	34·68	27·85	8·08	—	—	—	—	4·46					
		2500	—	0·19	34·67	27·85	8·18	—	—	—	—	4·56					
801	2	0	—	1·71	33·89	27·12	8·14	—	—	—	—	7·29	**N 50 V**	100–0	1744	1753	
		10	—	1·71	33·89	27·12	8·14	—	—	—	—	—	**N 70 B**	210–128	1857	1927	DGP
		20	—	1·71	33·89	27·12	8·14	—	—	—	—	7·28	**N 100 B**				
		30	—	1·70	33·89	27·13	8·14	—	—	—	—	—	**N 70 B**	104–0	1938	**1958**	KT
		40	—	1·69	33·89	27·13	8·13	—	—	—	—	7·31	**N 100 B**				
		50	—	1·70	33·89	27·13	8·13										
		60	—	1·71	33·90	27·13	8·13	—	—	—	—	7·30					
		80	—	1·53	33·96	27·20	8·11										
		100	—	0·41	34·03	27·33	8·11	—	—	—	—	7·28					
		150	—	−0·11	34·14	27·45	8·02	—	—	—	—	6·74					
		200	—	0·92	34·35	27·56	7·96	—	—	—	—	5·05					
		300	—	1·73	34·52	27·63	7·94	—	—	—	—	4·13					
		400	—	1·83	34·63	27·71	7·93	—	—	—	—	4·09					
		600	—	1·71	34·67	27·75	8·00	—	—	—	—	3·94					
		800	—	1·61	34·69	27·77	8·10	—	—	—	—	4·04?					
		1000	—	1·63	34·70	27·79	8·10	—	—	—	—	4·22					
		1500	—	1·12	34·70	27·82	8·11	—	—	—	—	4·19					
		2000	—	0·65	34·68	27·83	8·12	—	—	—	—	4·32					
802	2	0	—	2·11	33·93	27·12	8·15	—	—	—	—	7·14	**N 50 V**	100–0	**0405**	**0415**	
		10	—	2·11	33·93	27·12	8·15	—	—	—	—	—	**N 70 B**	320–70	0633	0704	DGP. Depths uncertain
		20	—	2·12	33·93	27·12	8·15	—	—	—	—	7·15	**N 100 B**				
		30	—	2·11	33·93	27·12	8·15	—	—	—	—	—	**N 70 B**	126–0	0721	0741	KT
		40	—	2·11	33·93	27·12	8·15	—	—	—	—	7·12	**N 100 B**				
		50	—	2·11	33·93	27·12	8·15										
		60	—	2·10	33·93	27·13	8·15	—	—	—	—	7·13					
		80	—	1·92	33·95	27·16	8·15										
		100	—	1·08	33·99	27·26	8·11	—	—	—	—	6·85					
		150	—	0·71	34·09	27·35	8·06	—	—	—	—	6·42					
		200	—	0·73	34·17	27·42	8·01	—	—	—	—	5·88					
		300	—	1·77	34·42	27·54	7·95	—	—	—	—	4·36					
		400	—	1·98	34·51	27·60	7·94	—	—	—	—	4·00					
		600	—	2·08	34·61	27·68	8·09	—	—	—	—	3·68					
		800	—	2·01	34·69	27·74	8·05	—	—	—	—	3·84					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
802 *cont.*	54° 15′ S, 19° 11·1′ W	1932 10 i											
803	53° 24·7′ S, 22° 19·1′ W	10 i	2100	4142*	W×S	10	W×S	2	o	1002·0	2·9	2·8	mod. conf. E swell
804	55° 30·3′ S, 21° 02·6′ W	11 i	2000	4932*	SSE	14	SSE	3	b	1005·7	−0·1	−1·2	low SE swell
			0000	—	S	6	S	1	c	1007·1	−0·2	−1·3	low conf. swell
805	56° 41·4′ S, 20° 38·2′ W	12 i	0906	4303*	SSW	10	SSW	3	o	1007·1	0·0	−1·7	low S swell
			1200	—	S	8	S	2	—	1007·6	−0·2	−2·1	low S swell
806	57° 27·2′ S, 21° 28·8′ W	12 i	2000	4057*	S	10	S	2	o	1009·0	−1·1	−2·3	low S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
802 *cont.*	2	1000	—	2·10	34·74	27·78	8·05	—	—	—	—	4·06					
		1500	—	1·50	34·73	27·82	8·11	—	—	—	—	4·11					
		2530	2526	0·51	34·68	27·84	8·16	—	—	—	—	4·39					
803	3	0	—	2·70	33·94	27·09	8·15	—	—	—	—	—	**N 50 V**	100–0	**2104**	**2111**	
													N 70 B	308–130	**2130**	**2200**	DGP
													N 100 B				
													N 70 B	120–0	**2211**	**2231**	KT
													N 100 B				
804	4	0	—	0·53	33·54	26·92	8·15	—	—	—	—	7·57	**N 50 V**	100–0	**2007**		
		10	—	0·57	33·55	26·93	8·15	—	—	—	—	—	**N 70 V**	750–500			
		20	—	0·61	33·57	26·94	8·15	—	—	—	—	7·55	,,	500–250			
		30	—	0·48	33·57	26·94	8·15	—	—	—	—	—	,,	250–100			
		40	—	0·41	33·69	27·05	8·14	—	—	—	—	7·57	,,	100–50			
		50	—	−0·08	33·80	27·16	8·10	—	—	—	—	—	,,	50–0	—	**2230**	
		60	—	−0·39	33·81	27·19	8·11	—	—	—	—	7·63	**N 70 B**	290–104	**2300**	**2330**	DGP
		80	—	−0·67	33·90	27·27	8·10	—	—	—	—	—	**N 100 B**				
		100	—	−0·59	33·99	27·35	8·06	—	—	—	—	6·90	**N 70 B**	130–0	**2348**	**0008**	KT
		140	—	−0·04	34·20	27·48	8·00	—	—	—	—	6·04	**N 100 B**				
		190	—	1·11	34·43	27·60	7·99	—	—	—	—	4·65					
		280	—	1·51	34·54	27·67	7·98	—	—	—	—	4·20					
		380	—	1·65	34·62	27·73	7·94	—	—	—	—	4·12					
		570	—	1·57	34·69	27·77	8·03	—	—	—	—	4·03					
		760	—	1·43	34·70	27·80	8·04	—	—	—	—	4·18					
		950	—	1·22	34·70	27·82	8·08	—	—	—	—	4·22					
		1420	—	0·73	34·69	27·83	8·08	—	—	—	—	4·30					
		1890	1893	0·40	34·69	27·85	8·05	—	—	—	—	4·55					
805	4	0	—	0·58	33·53	26·91	8·15	—	—	—	—	7·53	**N 70 V**	1000–750	0919		
		10	—	0·59	33·53	26·91	8·15	—	—	—	—	—	,,	750–500			
		20	—	0·58	33·53	26·91	8·15	—	—	—	—	7·53	,,	500–250			
		30	—	0·20	33·58	26·98	8·16	—	—	—	—	—	,,	250–100			
		40	—	0·11	33·64	27·02	8·16	—	—	—	—	7·62	,,	100–50			
		50	—	−0·08	33·87	27·22	8·16	—	—	—	—	—	,,	50–0			
		60	—	−0·17	33·96	27·30	8·11	—	—	—	—	7·67	**N 50 V**	100–0	—	1051	
		80	—	−0·29	33·99	27·33	8·10	—	—	—	—	—	**N 70 B**	274–138	1218	1249	DGP
		100	—	−0·49	34·06	27·39	8·10	—	—	—	—	7·40	**N 100 B**				
		150	—	−0·49	34·14	27·46	8·04	—	—	—	—	6·70	**N 70 B**	122–0	1300	1322	KT
		200	—	0·92	34·44	27·63	7·93	—	—	—	—	4·83	**N 100 B**				
		300	—	1·38	34·60	27·72	7·93	—	—	—	—	4·23					
		400	—	1·50	34·65	27·75	7·94	—	—	—	—	4·16					
		580	582	1·63	34·70	27·79	8·04	—	—	—	—	4·04					
		770	—	1·44	34·72	27·81	8·14	—	—	—	—	4·12					
		970	—	1·13	34·73	27·84	8·08	—	—	—	—	4·20					
		1450	—	0·59	34·70	27·86	8·04	—	—	—	—	4·40					
		1930	—	0·34	34·70	27·87	8·04	—	—	—	—	4·35					
		2420	—	0·11	34·69	27·86	8·15	—	—	—	—	4·74					
		2900	—	−0·09	34·68	27·88	8·16	—	—	—	—	4·47					
		3370	—	−0·24	34·68	27·88	8·16	—	—	—	—	4·63					
806	5	0	—	0·51	33·60	26·97	8·12	—	—	—	—	7·48	**N 70 V**	1000–800	**2005**		
		10	—	0·40	33·65	27·02	8·12	—	—	—	—	—	,,	750–500			
		20	—	0·34	33·65	27·02	8·12	—	—	—	—	7·46	,,	500–250			
		30	—	0·31	33·66	27·02	8·12	—	—	—	—	—	,,	250–100			
		40	—	0·12	33·69	27·06	8·11	—	—	—	—	7·49	,,	100–50			
		50	—	−0·08	33·81	27·17	8·12	—	—	—	—	—	,,	50–0			
		60	—	−0·10	33·92	27·27	8·09	—	—	—	—	7·51	**N 50 V**	100–0	—	**2144**	
		80	—	−0·30	33·99	27·33	8·09	—	—	—	—	—	**N 70 B**	216–144	**2213**	**2243**	DGP
		100	—	−0·38	34·06	27·39	8·08	—	—	—	—	6·99	**N 100 B**				
		150	—	0·22	34·24	27·51	7·98	—	—	—	—	5·86	**N 70 B**	116–0	**2254**	**2314**	KT
		200	—	1·34	34·49	27·63	7·93	—	—	—	—	3·72	**N 100 B**				
		300	—	1·68	34·61	27·71	7·92	—	—	—	—	4·12					
		400	—	1·71	34·63	27·72	7·95	—	—	—	—	4·10					
		590	—	1·64	34·69	27·77	8·01	—	—	—	—	4·12					
		790	—	1·52	34·76	27·84	8·02	—	—	—	—	4·16					
		980	—	1·21	34·75	27·86	8·03	—	—	—	—	4·24					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
806 *cont.*	57° 27·2′ S, 21° 28·8′ W	1932 12 i											
807	58° 47·7′ S, 21° 40·4′ W	13 i	0830	4062*	WNW	10	WNW	2	o	1007·5	−0·8	−1·1	low WNW swell
808	59° 56′ S, 22° 20·7′ W	13 i	2000	4442*	NNE	19	NNE	3	os	999·7	−0·8	−1·0	no swell
809	61° 09·9′ S, 22° 36·9′ W	14 i	0924	4529*	NE	14	NE	2	o	988·5	0·3	0·0	no swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N₂	Nitrite N₂	Si	O₂ c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
806 *cont.*	5	1480	—	0·59	34·70	27·86	8·13	—	—	—	—	4·37					
		1970	—	0·30	34·70	27·87	8·08	—	—	—	—	4·42					
		2460	—	0·08	34·68	27·87	8·08	—	—	—	—	4·67					
		2950	2953	0·02	34·67	27·86	8·13	—	—	—	—	4·65					
807	5	0	—	−0·43	33·39	26·85	8·14	—	—	—	—	7·62	**N 50 V**	100–0	0835		+4 hours
		10	—	−0·40	33·41	26·87	8·14	—	—	—	—	—	**N 70 V**	1000–770			
		20	—	−0·39	33·43	26·89	8·14	—	—	—	—	7·61	,,	750–500			
		30	—	−0·67	33·51	26·96	8·15	—	—	—	—	—	,,	500–250			
		40	—	−1·09	33·71	27·14	8·14	—	—	—	—	7·54	,,	250–100			
		50	—	−0·79	33·85	27·24	8·11	—	—	—	—	—	,,	100–50			
		60	—	−0·79	33·96	27·33	8·11	—	—	—	—	7·49	,,	50–0	—	1017	
		80	—	−1·22	34·00	27·37	8·10	—	—	—	—	—	**N 70 B**	262–84	1109	1139	DGP
		100	—	−1·29	34·12	27·47	8·06	—	—	—	—	6·71	**N 100 B**				
		150	—	−0·49	34·32	27·60	8·00	—	—	—	—	5·64	**N 70 B**	137–0	1150	1210	KT
		200	—	0·12	34·49	27·70	7·99	—	—	—	—	4·96	**N 100 B**				
		300	—	0·90	34·63	27·78	7·97	—	—	—	—	4·40					
		400	—	0·84	34·68	27·82	7·97	—	—	—	—	4·40					
		600	—	0·67	34·67	27·82	8·08	—	—	—	—	4·34					
		800	—	0·50	34·67	27·83	8·08	—	—	—	—	4·28					
		990	—	0·41	34·66	27·83	8·08	—	—	—	—	4·37					
		1490	—	0·22	34·66	27·84	8·04	—	—	—	—	4·51					
		1990	—	0·03	34·66	27·85	8·15	—	—	—	—	4·45					
		2490	—	−0·13	34·66	27·86	8·15										
		2980	—	−0·30	34·66	27·87	8·15	—	—	—	—	4·89					
		3480	3477	−0·39	34·66	27·87	8·15	—	—	—	—	4·85					
808	6	0	—	0·12	33·53	26·93	8·12	—	—	—	—	7·41	**N 50 V**	100–0	**2012**		
		10	—	0·40	33·64	27·01	8·12	—	—	—	—	—	**N 70 V**	1000–750			
		20	—	0·42	33·69	27·05	8·12	—	—	—	—	7·43	,,	750–500			
		30	—	0·32	33·77	27·11	8·12	—	—	—	—	—	,,	500–250			
		40	—	0·23	33·87	27·21	8·12	—	—	—	—	7·46	,,	250–100			
		50	—	0·39	34·01	27·31	8·11	—	—	—	—	—	,,	100–50			
		60	—	0·20	34·04	27·34	8·11	—	—	—	—	7·42	,,	50–0	—	**2206**	
		80	—	−0·18	34·07	27·39	8·08	—	—	—	—	—	**N 70 B**	250–100	**2236**	**2306**	DGP
		100	—	−0·67	34·11	27·44	8·07	—	—	—	—	7·37	**N 100 B**				
		150	—	−0·69	34·23	27·54	8·03	—	—	—	—	6·80	**N 70 B**	120–0	**2316**	**2336**	KT
		190	—	−0·19	34·35	27·62	8·01	—	—	—	—	5·84	**N 100 B**				
		290	—	1·03	34·61	27·76	7·95	—	—	—	—	4·60					
		390	—	1·31	34·66	27·77	7·95	—	—	—	—	4·36					
		580	—	1·17	34·70	27·82	8·06	—	—	—	—	4·24					
		770	—	1·01	34·70	27·83	8·06	—	—	—	—	4·22					
		960	—	0·81	34·70	27·84	8·02	—	—	—	—	4·37?					
		1440	—	0·43	34·70	27·86	8·11	—	—	—	—	4·25					
		1920	—	0·25	34·69	27·86	8·16	—	—	—	—	4·37					
		2400	—	0·08	34·68	27·87	8·16	—	—	—	—	4·43					
		2880	2883	−0·11	34·68	27·88	8·18	—	—	—	—	4·62					
809	6	0	—	−1·09	32·82	26·41	8·13	—	—	—	—	7·60	**N 70 V**	1000–750	0935		
		10	—	−1·17	32·84	26·43	8·13	—	—	—	—	—	,,	750–300			
		20	—	−1·51	33·81	27·23	8·10	—	—	—	—	7·21	,,	750–500			
		30	—	−1·59	33·98	27·37	8·09	—	—	—	—	—	,,	500–250			
		40	—	−1·59	34·08	27·45	8·09	—	—	—	—	6·93	,,	250–100			
		50	—	−1·62	34·19	27·54	8·09	—	—	—	—	—	,,	100–50			
		60	—	−1·69	34·29	27·61	8·09	—	—	—	—	6·71	,,	50–0			
		80	—	−1·71	34·34	27·66	8·08	—	—	—	—	—	**N 50 V**	100–0	—	1159	
		100	—	−1·69	34·36	27·68	8·05	—	—	—	—	6·49	**N 70 B**	196–104	1221	1251	DGP
		150	—	−1·51	34·44	27·74	8·03	—	—	—	—	6·03	**N 100 B**				
		200	—	−0·69	34·52	27·77	7·98	—	—	—	—	5·25	**N 70 B**	128–0	1306	1326	KT
		300	—	0·26	34·66	27·84	7·96	—	—	—	—	4·30	**N 100 B**				
		390	—	0·41	34·69	27·85	7·95	—	—	—	—	4·21					
		590	—	0·40	34·69	27·85	8·06	—	—	—	—	4·20					
		780	—	0·33	34·69	27·85	8·06	—	—	—	—	4·26					
		980	984	0·26	34·68	27·86	8·07	—	—	—	—	4·26					
		1470	—	0·04	34·67	27·86	8·08	—	—	—	—	4·56					
		1990	—	−0·10	34·67	27·87	8·08	—	—	—	—	4·69					
		2490	—	−0·28	34·67	27·87	8·17	—	—	—	—	4·70					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
809 *cont.*	61° 09·9′ S, 22° 36·9′ W	1932 14 i											
810	61° 30·7′ S, 23° 12·3′ W	14 i	2000	4276*	N × E	5	N × E	1	om	987·7	−0·8	−0·9	no swell
811	62° 44′ S, 23° 18·4′ W	15 i	1740	5125*	W	10	W	2	om	989·0	−1·1	−1·1	no swell
812	64° 12·5′ S, 22° 57′ W	16 i	0846	5013*	S	15	S	3	o	989·8	−0·9	−1·1	no swell
813	64° 55·9′ S, 23° 13′ W	16 i	2000	5013*	SE × S	15	SE × S	2	o	991·9	−2·5	−2·9	no swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	Time From	Time To	Remarks
809 *cont.*	6	2980	—	−0·36	34·66	27·87	8·17	—	—	—	—	4·84					
		3480	—	−0·42	34·66	27·87	8·18	—	—	—	—	4·84					
		3980	3978	−0·50	34·66	27·88	8·18	—	—	—	—	5·09					
810	7	0	—	−0·76	33·33	26·81	8·09	—	—	—	—	—	**N 70 B** **N 100 B**	304–130	**2019**	**2049**	DGP
													N 70 B **N 100 B**	166–0	**2101**	**2121**	KT
811	8	0	—	−1·55	33·68	27·12	8·10	—	—	—	—	7·46	**N 70 V**	1000–750	1740		
		10	—	−1·56	33·68	27·12	8·11	—	—	—	—	—	,,	750–500			
		20	—	−1·58	33·72	27·16	8·11	—	—	—	—	7·46	,,	500–250			
		30	—	−1·61	34·17	27·52	8·10	—	—	—	—	—	,,	250–100			
		40	—	−1·69	34·34	27·66	8·09	—	—	—	—	6·96	,,	100–50			
		50	—	−1·78	34·38	27·70	8·06	—	—	—	—	—	,,	50–0			
		60	—	−1·81	34·40	27·71	8·05	—	—	—	—	6·72	**N 50 V**	100–0	—	**1900**	
		80	—	−1·86	34·42	27·72	8·04	—	—	—	—	—					
		100	—	−1·83	34·43	27·74	8·04	—	—	—	—	6·39	**N 70 B** **N 100 B**	113–0	**1939**	**1959**	KT. Nets towed in a circle among light ice
		150	—	−1·47	34·46	27·75	8·01	—	—	—	—	5·99					
		200	—	−0·17	34·60	27·81	7·97	—	—	—	—	4·76					
		300	—	0·39	34·65	27·82	7·94	—	—	—	—	4·28					
		400	—	0·41	34·69	27·85	7·95	—	—	—	—	4·29					
		590	—	0·41	34·69	27·85	8·04	—	—	—	—	4·07					
		790	—	0·34	34·69	27·85	8·01	—	—	—	—	4·22					
		990	—	0·25	34·69	27·86	8·01	—	—	—	—	4·38					
		1490	—	0·02	34·68	27·87	8·11	—	—	—	—	4·50					
		1980	—	−0·14	34·67	27·87	8·16	—	—	—	—	4·61					
		2470	—	−0·24	34·67	27·87	8·20	—	—	—	—	4·68					
		2970	2969	−0·32	34·66	27·87	8·16	—	—	—	—	4·86					
812	8	0	—	−1·26	33·82	27·23	8·08	—	—	—	—	7·53	**N 70 V**	1000–750	0850		
		10	—	−1·27	33·82	27·23	8·09	—	—	—	—	—	,,	750–500			
		20	—	−1·20	34·13	27·47	8·08	—	—	—	—	7·30	,,	500–250			
		30	—	−1·27	34·17	27·51	8·09	—	—	—	—	—	,,	250–100			
		40	—	−1·55	34·32	27·64	8·08	—	—	—	—	6·93	,,	100–50			
		50	—	−1·67	34·37	27·68	8·08	—	—	—	—	—	,,	50–0			
		60	—	−1·75	34·45	27·75	8·07	—	—	—	—	6·62	**N 50 V**	100–0	—	1045	
		80	—	−1·78	34·46	27·76	8·04	—	—	—	—	—	**N 70 B**				
		100	—	−1·66	34·52	27·80	8·04	—	—	—	—	6·18	**N 100 B**	318–102	1212	1242	DGP
		150	—	−0·20	34·63	27·84	7·97	—	—	—	—	4·71	**N 70 B**				
		200	—	0·14	34·64	27·83	7·95	—	—	—	—	4·38	**N 100 B**	137–0	1252	1312	KT
		300	—	0·35	34·68	27·85	7·94	—	—	—	—	4·12					
		400	—	0·39	34·70	27·87	7·94	—	—	—	—	4·16					
		590	—	0·46	34·70	27·86	7·97	—	—	—	—	4·07					
		790	—	0·31	34·70	27·87	8·06	—	—	—	—	4·23					
		990	—	0·21	34·70	27·88	8·07	—	—	—	—	4·18					
		1480	—	0·01	34·69	27·87	8·12	—	—	—	—	4·51					
		1980	1980	−0·19	34·68	27·88	8·17	—	—	—	—	4·61					
		2470	—	−0·30	34·67	27·88	8·07	—	—	—	—	4·88					
		2970	—	−0·32	34·66	27·87	8·17	—	—	—	—	4·75					
		3460	—	−0·39	34·66	27·87	8·17	—	—	—	—	4·84					
		3960	—	−0·45	34·66	27·87	8·17	—	—	—	—	5·00					
		4450	4453	−0·54	34·66	27·88	8·16	—	—	—	—	5·20					
813	9	0	—	−1·48	33·49	26·97	8·06	—	—	—	—	7·49	**N 50 V**	100–0	2005		
		10	—	−1·47	33·49	26·97	8·06	—	—	—	—	—	**N 70 V**	1000–800			
		20	—	−1·28	33·88	27·28	8·06	—	—	—	—	7·27	,,	750–525			
		30	—	−1·39	34·15	27·51	8·05	—	—	—	—	—	,,	500–250			
		40	—	−1·51	34·37	27·68	8·05	—	—	—	—	6·72	,,	250–100			
		50	—	−1·67	34·42	27·71	8·06	—	—	—	—	—	,,	100–50			
		60	—	−1·71	34·44	27·75	8·06	—	—	—	—	6·49	,,	50–0	—	**2140**	Stray on wire
		80	—	−1·78	34·44	27·75	8·03	—	—	—	—	—					DGP. Closing depth of **N 70 B** estimated
		100	—	−1·73	34·50	27·79	8·03	—	—	—	—	6·25	**N 70 B**	340–100	**2215**	**2245**	
		150	—	−0·68	34·58	27·82	7·97	—	—	—	—	5·26	**N 100 B**	340–0			
		200	—	0·21	34·66	27·84	7·95	—	—	—	—	—	**N 70 B**				
		300	—	0·41	34·69	27·85	7·94	—	—	—	—	4·15	**N 100 B**	135–0	**2301**	**2321**	KT
		400	—	0·41	34·69	27·85	7·94	—	—	—	—	4·16					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
813 *cont.*	64° 55·9′ S, 23° 13′ W	1932 16 i											
814	66° 02·8′ S, 22° 35·1′ W	17 i	0900	4976*	SW × W	12	SW × W	3	bc	991·3	0·9	−1·0	no swell
			1200	—	S	15	S	2	osp	991·3	−2·1	−2·2	low conf. swell
815	66° 57·3′ S, 22° 38·3′ W	17–18 i	2025	4910*	SW × S	16	SW × S	2	osp	992·6	−2·4	−3·1	low ESE swell
816	68° 09·6′ S, 22° 01·7′ W	18 i	0910	4918*	SW × S	16	SW × S	2	o	992·3	−1·4	−2·8	no swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
813 *cont.*	9	600	—	0·35	34·68	27·85	8·00	—	—	—	—	4·07					
		800	—	0·29	34·68	27·85	8·01	—	—	—	—	4·10					
		1000	—	0·21	34·68	27·86	8·01	—	—	—	—	4·41					
		1500	—	0·01	34·67	27·86	8·11	—	—	—	—	4·43					
		2000	—	−0·18	34·66	27·86	8·16	—	—	—	—	4·55					
		2500	—	−0·29	34·66	27·87	8·16	—	—	—	—	4·75					
		3000	3002	−0·34	34·66	27·87	8·16	—	—	—	—	4·82					
814	9	0	—	−1·20	33·77	27·18	8·05	—	—	—	—	7·26	**N 70 V**	1000–750	0916		
		10	—	−1·29	33·79	27·21	8·06	—	—	—	—	—	,,	750–500			
		20	—	−1·30	33·88	27·28	8·06	—	—	—	—	7·19	,,	500–250			
		30	—	−1·39	34·13	27·48	8·06	—	—	—	—	—	,,	250–100			
		40	—	−1·57	34·32	27·64	8·05	—	—	—	—	6·54	,,	100–50			
		50	—	−1·69	34·40	27·71	8·06	—	—	—	—	—	,,	50–0			
		60	—	−1·72	34·43	27·73	8·06	—	—	—	—	6·28	**N 50 V**	100–0	—	1047	
		80	—	−1·70	34·44	27·75	8·02	—	—	—	—	—	**N 70 B**	280–140	1208	1239	DGP
		100	—	−1·67	34·48	27·78	8·02	—	—	—	—	5·95	**N 100 B**				
		125	—	−0·78	34·56	27·81	7·99	—	—	—	—	5·25	**N 70 B**	133–0	1252	1312	KT
		150	—	0·11	34·66	27·84	7·95	—	—	—	—	4·47	**N 100 B**				
		200	—	0·41	34·67	27·84	7·94	—	—	—	—	4·22					
		300	—	0·50	34·69	27·84	7·94	—	—	—	—	4·12					
		400	—	0·44	34·69	27·85	7·93	—	—	—	—	4·13					
		600	—	0·38	34·70	27·86	8·02	—	—	—	—	4·11					
		800	—	0·32	34·69	27·85	8·03	—	—	—	—	4·24					
		1000	—	0·22	34·69	27·86	8·08	—	—	—	—	4·21					
		1500	—	0·02	34·68	27·87	8·04	—	—	—	—	4·59					
		2000	2002	−0·14	34·67	27·87	8·14	—	—	—	—	4·70					
		2500	—	−0·26	34·67	27·87	8·05	—	—	—	—	4·84					
		3000	—	−0·31	34·66	27·87	8·15	—	—	—	—	4·83					
		3500	—	−0·38	34·66	27·87	8·15	—	—	—	—	4·91					
		4000	—	−0·41	34·66	27·87	8·20	—	—	—	—	4·90					
		4500	—	−0·51	34·65	27·87	8·20	—	—	—	—	5·03					
815	10	0	—	−1·20	33·62	27·07	8·07	—	—	—	—	7·43	**N 70 V**	1000–750	**2027**		
		10	—	−1·20	33·62	27·07	8·07	—	—	—	—	—	,,	750–520			
		20	—	−1·32	34·04	27·40	8·08	—	—	—	—	7·09	,,	500–250			
		30	—	−1·46	34·34	27·66	8·08	—	—	—	—	—	,,	250–100			
		40	—	−1·61	34·43	27·73	8·08	—	—	—	—	6·60	,,	100–50			
		50	—	−1·69	34·46	27·76	8·08	—	—	—	—	—	,,	50–0			
		60	—	−1·69	34·47	27·77	8·04	—	—	—	—	6·51	**N 50 V**	100–0	—	**2227**	
		80	—	−1·76	34·50	27·79	8·04	—	—	—	—	—	**N 70 B**	314–188	**2310**	**2340**	DGP
		100	—	−1·39	34·56	27·83	8·04	—	—	—	—	6·04	**N 100 B**				
		150	—	0·22	34·66	27·84	7·95	—	—	—	—	4·43	**N 70 B**	140–0	**2350**	**0010**	KT
		200	—	0·36	34·69	27·85	7·95	—	—	—	—	4·30	**N 100 B**				
		300	—	0·48	34·69	27·84	7·92	—	—	—	—	4·19					
		400	—	0·43	34·69	27·85	7·92	—	—	—	—	4·17					
		600	—	0·39	34·70	27·87	7·97	—	—	—	—	4·14					
		800	—	0·32	34·70	27·87	8·02	—	—	—	—	4·15					
		1000	—	0·22	34·69	27·86	8·07	—	—	—	—	4·20					
		1500	—	0·01	34·68	27·87	8·07	—	—	—	—	4·52					
		1990	1993	−0·15	34·67	27·87	8·06	—	—	—	—	4·69					
816	10	0	—	−1·09	33·25	26·76	8·11	—	—	—	—	7·41	**N 70 V**	1000–770	0920		
		10	—	−1·09	33·25	26·76	8·11	—	—	—	—	—	,,	750–500			
		20	—	−1·32	34·33	27·63	8·11	—	—	—	—	6·48	,,	500–260			
		30	—	−1·47	34·42	27·71	8·11	—	—	—	—	—	,,	250–110			
		40	—	−1·49	34·42	27·71	8·10	—	—	—	—	6·36	,,	100–50			
		50	—	−1·50	34·44	27·74	8·10	—	—	—	—	—	,,	50–0			
		60	—	−1·52	34·44	27·74	8·06	—	—	—	—	6·24	**N 50 V**	100–0	—	1106	
		80	—	−1·39	34·47	27·76	8·05	—	—	—	—	—	**N 70 B**	256–80	1340	1410	DGP
		100	—	−0·98	34·51	27·77	8·04	—	—	—	—	5·67	**N 100 B**				
		150	—	0·50	34·67	27·83	7·96	—	—	—	—	4·32	**N 70 B**	133–0	1422	1442	KT
		200	—	0·71	34·69	27·83	7·96	—	—	—	—	4·21	**N 100 B**				
		300	—	0·72	34·69	27·83	7·97	—	—	—	—	4·20					
		400	—	0·62	34·69	27·84	7·98										
		590	—	0·49	34·69	27·84	7·99	—	—	—	—	4·13					
		790	—	0·42	34·69	27·85	8·14	—	—	—	—	4·04					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
816 *cont.*	68° 09·6′ S, 22° 01·7′ W	1932 18 i											
817	69° 59′ S, 23° 53′ W	19 i	0444	4449*	SSW	11	SSW	2	o	988·9	−5·6	−6·0	no swell
818	68° 11·3′ S, 24° 52·8′ W	20 i	1123	4815*	SW × W	12	SW × W	2	c	990·7	−2·0	−2·7	no swell
819	67° 23·9′ S, 25° 40·7′ W	20 i	2025	4742*	Lt airs	1–2	—	0	o	992·4	−4·7	−5·1	no swell
820	65° 44·9′ S, 28° 29·9′ W	21 i	2005	4878*	E × S	19	E × S	2	os	988·6	−2·7	−2·8	no swell
821	65° 00·5′ S, 32° 32·8′ W	22 i	2005	4892*	NE × E	15	NE × E	2	os	984·3	−1·8	−1·9	no swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
816 *cont.*	10	990	—	0·31	34·68	27·85	8·15	—	—	—	—	4·39					
		1480	—	0·13	34·67	27·85	8·15	—	—	—	—	4·40					
		1980	1977	−0·06	34·66	27·85	8·14	—	—	—	—	4·49					
		2470	—	−0·20	—	—	8·14	—	—	—	—	4·74					
		2970	—	−0·28	—	—	8·23	—	—	—	—	4·86					
817	11	0	—	−1·24	33·53	26·99	8·08	—	—	—	—	7·30	N 70 V	1000–770	0505		
		10	—	−1·23	33·53	26·99	8·08	—	—	—	—	—	,,	750–0			
		20	—	−1·23	33·83	27·24	8·07	—	—	—	—	6·91	,,	750–500			
		30	—	−1·48	34·33	27·64	8·03	—	—	—	—	—	,,	500–250			
		40	—	−1·54	34·33	27·64	8·03	—	—	—	—	6·07	,,	250–100			
		50	—	−1·55	34·35	27·67	8·03	—	—	—	—	—	,,	100–50			
		60	—	−1·55	34·39	27·70	8·03	—	—	—	—	5·94	,,	50–0			
		80	—	−1·33	34·43	27·73	8·02	—	—	—	—	—	N 50 V	100–0	—	0725	
		100	—	−0·75	34·51	27·77	7·99	—	—	—	—	5·43	N 70 B	260–126	0808	0838	DGP
		150	—	0·46	34·62	27·80	7·96	—	—	—	—	4·50	N 100 B				
		200	—	0·89	—	—	7·93	—	—	—	—	4·23	N 70 B	132–0	0856	0916	KT
		300	—	0·89	—	—	7·93	—	—	—	—	4·24	N 100 B				
		400	—	0·81	—	—	7·96	—	—	—	—	4·33					
		600	—	0·68	34·69	27·83	8·00	—	—	—	—	4·30					
		800	—	0·55	34·70	27·85	8·01	—	—	—	—	4·22					
		1000	—	0·44	34·70	27·86	8·11	—	—	—	—	4·19					
		1500	—	0·21	34·68	27·86	8·11	—	—	—	—	4·34					
		2000	—	0·03	34·68	27·87	8·06	—	—	—	—	4·58					
		2500	—	−0·13	34·67	27·87	8·16	—	—	—	—	4·53					
		3000	—	−0·22	34·67	27·87	8·16	—	—	—	—	4·70					
		3500	—	−0·28	34·66	27·87	8·20	—	—	—	—	4·75					
		4000	—	−0·30	34·66	27·87	8·20	—	—	—	—	4·78					
818	13	0	—	−1·45	33·46	26·93	8·04	—	—	—	—	—	N 70 B N 100 B	77–0	1126	1146	KT
819	13	0	—	−1·68	33·64	27·09	8·03	—	—	—	—	—	N 70 B N 100 B	105–0	2027	2047	KT
820	14	0	—	−1·40	33·82	27·23	8·07	—	—	—	—	7·39	N 70 V	1000–765	2015		
		10	—	−1·39	33·82	27·23	8·06	—	—	—	—	—	,,	750–510			
		20	—	−1·39	33·87	27·27	8·06	—	—	—	—	7·33	,,	500–250			
		30	—	−1·39	34·00	27·38	8·06	—	—	—	—	—	,,	250–110			
		40	—	−1·60	34·43	27·73	8·06	—	—	—	—	6·65	,,	100–50			
		50	—	−1·67	34·43	27·73	8·03	—	—	—	—	—	,,	50–0			
		60	—	−1·71	34·45	27·75	8·02	—	—	—	—	6·47	N 50 V	100–0	—	2227	
		80	—	−1·79	34·50	27·79	8·02	—	—	—	—	—	N 70 B	110–0	2243	2303	KT
		100	—	−1·79	34·50	27·79	8·02	—	—	—	—	6·36	N 100 B				
		150	—	−1·56	34·51	27·79	8·02	—	—	—	—	5·98					
		200	—	0·12	34·68	27·86	7·96	—	—	—	—	4·38					
		300	—	0·30	34·69	27·85	7·95	—	—	—	—	4·23					
		400	—	0·41	34·70	27·87	7·95	—	—	—	—	4·12					
		600	—	0·41	34·70	27·87	8·01	—	—	—	—	4·07					
		800	—	0·33	34·70	27·87	8·00	—	—	—	—	4·14					
		1000	—	0·23	34·70	27·88	8·05	—	—	—	—	4·30					
		1490	—	0·02	34·68	27·87	8·10	—	—	—	—	4·43					
		1990	1991	−0·16	34·68	27·88	8·10	—	—	—	—	4·66					
821	15	0	—	−1·74	33·72	27·16	8·06	—	—	—	—	7·23	N 50 V	100–0	2022		Station worked in a pool among pack-ice
		10	—	−1·70	33·72	27·16	8·06	—	—	—	—	—	N 70 V	1000–750			
		20	—	−1·48	34·19	27·54	8·06	—	—	—	—	7·03	,,	750–500			
		30	—	−1·52	34·40	27·70	8·06	—	—	—	—	—	,,	500–250			
		40	—	−1·60	34·42	27·71	8·06	—	—	—	—	6·83	,,	250–110			
		50	—	−1·70	34·43	27·73	8·05	—	—	—	—	—	,,	100–50			
		60	—	−1·77	34·43	27·73	8·05	—	—	—	—	6·74	,,	50–0	—	2148	
		80	—	−1·79	34·49	27·78	8·02										
		100	—	−1·80	34·50	27·79	8·02	—	—	—	—	6·58					
		150	—	−1·56	34·52	27·80	8·01	—	—	—	—	6·28					
		200	—	−0·29	34·61	27·83	7·96	—	—	—	—	4·90					
		300	—	0·31	34·68	27·85	7·94	—	—	—	—	4·23					
		400	—	0·34	34·68	27·85	7·94	—	—	—	—	4·17					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
821 *cont.*	65° 00·5′ S, 32° 32·8′ W	1932 22 i											
822	63° 53·7′ S, 33° 25·1′ W	23 i	2000	4951*	S	12	S	2	o	979·5	−1·7	−2·0	no swell
823	61° 24·4′ S, 36° 03·6′ W	27 i	0600	4929*	SSW	22	SSW	2	o	975·9	−1·6	−2·0	low NW swell
			1036	—	SSW	12	SSW	2	—	976·3	−0·7	−1·1	low NW swell
824	59° 57·4′ S, 36° 06·6′ W	27 i	2015	1240*	SW×S	12	SW×S	3	o	979·0	−0·9	−1·4	mod. NNW swell
825	56° 31·2′ S, 36° 00·5′ W	28 i	2000	3824*	NE×N	10	NE×N	2	ofe	983·8	1·8	1·6	mod. conf. W swell
826	3 miles S 60° E of Jason I, South Georgia	8 ii	2109	—	Lt airs	0–2	NW	1	r	976·9	3·3	3·3	mod. NW swell
827	Port Stanley Harbour, Falkland Islands	17 ii	0130	—	Lt airs	0–1		—	e	990·3	1·7	0·0	—
828	51° 44·3′ S, 55° 57′ W	17 ii	2000	1009*	SW	13	SW	3	bc	1003·2	8·6	7·8	mod. SSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
821 *cont.*	15	600	—	0·40	34·70	27·86	7·99	—	—	—	—	3·99					
		800	—	0·32	34·69	27·85	7·99	—	—	—	—	4·13					
		1000	—	0·23	34·68	27·86	7·99	—	—	—	—	4·42					
		1500	—	0·02	34·68	27·87	8·13	—	—	—	—	4·49					
		2000	—	−0·14	34·68	27·88	8·18	—	—	—	—	4·53					
		2500	—	−0·29	34·67	27·88	8·14	—	—	—	—	4·80					
		3000	—	−0·31	34·67	27·88	8·18	—	—	—	—	4·86					
		3500	3500	−0·38	34·66	27·87	8·14	—	—	—	—	4·93					
822	16	0	—	−1·40	33·87	27·27	8·02	—	—	—	—	—	**N 70 B**	244–130	**2016**	**2046**	DGP
													N 100 B				
													N 70 B	146–0	**2056**	**2116**	KT
													N 100 B				
823	20	0	—	−0·52	32·83	26·40	8·28	—	—	—	—	8·44	**N 70 V**	1000–750	0618		Station worked at edge of pack-ice. +5 hours
		10	—	−0·54	32·83	26·40	8·28	—	—	—	—	—	,,	750–500			
		20	—	−0·50	32·84	26·41	8·28	—	—	—	—	8·38	,,	500–250			
		30	—	−1·31	33·88	27·28	8·08	—	—	—	—	—	,,	250–100			
		40	—	−1·43	33·99	27·38	8·08	—	—	—	—	7·10	,,	100–50			
		50	—	−1·56	34·26	27·59	8·04	—	—	—	—	—	,,	50–0			
		60	—	−1·64	34·34	27·66	8·03	—	—	—	—	6·53	**N 50 V**	100–0	—	0745	
		80	—	−1·69	34·40	27·71	8·03	—	—	—	—	—	**N 70 B**	312–119	0928	1001	DGP
		100	—	−1·64	34·42	27·71	8·03	—	—	—	—	6·05	**N 100 B**				
		150	—	−1·42	34·43	27·73	8·02	—	—	—	—	5·87	**N 70 B**	179–0	1014	1034	KT
		200	—	−0·89	34·54	27·80	7·98	—	—	—	—	5·40	**N 100 B**				
		300	—	−0·17	34·60	27·81	7·98	—	—	—	—	4·88					
		400	—	0·20	34·67	27·85	7·98	—	—	—	—	4·66					
		590	—	0·41	34·69	27·85	7·98	—	—	—	—	4·49					
		790	—	0·24	34·68	27·86	8·01	—	—	—	—	4·52					
		990	—	0·21	34·68	27·86	8·02	—	—	—	—	4·57					
		1480	1478	0·08	34·68	27·87	8·01	—	—	—	—	4·74					
		1970	—	−0·09	34·68	27·88	8·07	—	—	—	—	4·90					
		2460	—	−0·33	34·68	27·89	8·12	—	—	—	—	5·07					
		2960	—	−0·49	34·67	27·88	8·11	—	—	—	—	5·27					
824	20	0	—	−0·18	32·91	26·45	8·21	—	—	—	—	—	**N 70 B**	300–104	**2029**	**2059**	DGP
													N 100 B				
													N 70 B	157–0	**2111**	**2131**	KT
													N 100 B				
825	21	0	—	2·13	33·96	27·15	8·19	—	—	—	—	—	**N 70 B**	117–0	**2015**	**2035**	KT
													N 100 B				
													N 70 B	310–100	**2051**	**2121**	DGP
													N 100 B				
826	2	0	—	2·60	33·40	26·67	8·14	—	—	—	—	—	**N 50 V**	100–0	**2128**	**2135**	+1 hour
827	10	—	—	—	—	—	—	—	—	—	—	—	**NH**	0	**0130**	**0131**	+3 hours
828	10	0	—	7·81	34·07	26·60	8·17	—	—	—	—	6·49	**N 50 V**	100–0	**2005**	**2012**	
		10	—	7·81	34·07	26·60	8·17	—	—	—	—	—	**N 70 B**	250–100	**2146**	**2216**	Depth estimated
		20	—	7·81	34·07	26·60	8·17	—	—	—	—	6·51	**N 100 B**				
		30	—	7·81	34·07	26·60	8·17	—	—	—	—	—	**N 70 B**	141–0	**2228**	**2248**	KT
		40	—	7·72	34·07	26·61	8·18	—	—	—	—	6·50	**N 100 B**				
		50	—	7·69	34·07	26·61	8·18										
		60	—	7·53	34·08	26·65	8·18	—	—	—	—	6·52					
		80	—	5·90	34·14	26·91	8·14										
		100	—	5·18	34·15	27·01	8·14	—	—	—	—	6·42					
		150	—	4·57	34·15	27·08	8·10	—	—	—	—	6·43					
		200	—	4·39	34·15	27·10	8·10	—	—	—	—	6·52					
		300	—	4·22	34·15	27·12	8·10	—	—	—	—	6·46					
		400	—	4·09	34·15	27·13	8·10	—	—	—	—	6·37					
		590	—	3·60	34·15	27·18	8·21	—	—	—	—	6·11					
		790	787	3·12	34·15	27·23	8·16	—	—	—	—	5·62					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
829	51° 42·8′ S, 50° 31·7′ W	1932 18 ii	2100	2264*	SSW	20	SSW	5	o	1011·0	6·8	5·0	heavy conf. SW swell
830	52° 32·1′ S, 44° 51·3′ W	19–20 ii	2100	3410*	NW	20	NW	4	o	1011·6	5·6	4·7	mod. conf. SSW swell
831	53° 19·3′ S, 39° 32·1′ W	20–21 ii	2000	4031*	NW × W	30	NW × W	6	ome	998·3	5·5	5·5	heavy NW swell
832	3 miles S 60° E of Jason I, South Georgia	22 ii	1902	—	N × W	29	NNW	5	or	978·3	2·3	1·8	heavy N × W swell
833	53° 58·3′ S, 35° 50′ W	22 ii	2200	241*	NNW	38	NNW	6	or	976·1	1·9	1·7	heavy N swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
829	12	0	—	6·29	34·06	26·79	8·14	—	—	—	—	6·70	N 70 B	270–84	2121	2152	DGP
		10	—	6·28	34·06	26·80	8·14	—	—	—	—	—	N 100 B				
		20	—	6·27	34·06	26·80	8·14	—	—	—	—	6·67	N 70 B	140–0	2205	2225	KT
		30	—	6·25	34·06	26·80	8·14	—	—	—	—	—	N 100 B				
		40	—	6·13	34·06	26·82	8·14	—	—	—	—	6·69	N 50 V	100–0	2240	2250	
		50	—	5·50	34·06	26·89	8·14										
		60	—	5·12	34·08	26·96	8·14	—	—	—	—	6·70					
		80	—	4·50	34·11	27·05	8·11										
		100	—	4·01	34·14	27·13	8·11	—	—	—	—	6·46					
		150	—	3·51	34·14	27·18	8·07	—	—	—	—	6·35					
		190	—	3·30	34·14	27·20	8·07	—	—	—	—	6·34					
		280	—	2·61	34·14	27·26	8·08	—	—	—	—	6·24					
		380	—	2·57	34·21	27·32	8·02	—	—	—	—	5·52					
		560	—	2·54	34·34	27·43	8·04	—	—	—	—	4·61					
		750	—	2·15	34·46	27·55	7·93	—	—	—	—	4·03					
		940	—	2·27	34·52	27·59	7·97	—	—	—	—	3·95					
		1410	—	1·95	34·66	27·72	8·04	—	—	—	—	3·91					
		1880	1879	1·64	34·69	27·77	8·04	—	—	—	—	4·17					
830	13	0	—	5·13	33·91	26·82	8·14	—	—	—	—	7·00	N 50 V	100–0	2112	2121	
		10	—	5·14	33·91	26·82	8·14	—	—	—	—	—	N 70 B	117–0	2307	2327	KT
		20	—	5·15	33·91	26·82	8·14	—	—	—	—	7·00	N 100 B				
		30	—	5·16	33·91	26·82	8·14	—	—	—	—	—	N 70 B	356–140	2340	0011	DGP
		40	—	5·16	33·96	26·86	8·14	—	—	—	—	7·01	N 100 B				
		50	—	4·81	33·96	26·90	8·14										
		60	—	3·99	33·97	26·99	8·14	—	—	—	—	6·95					
		80	—	2·76	33·98	27·12	8·12										
		100	—	2·09	33·98	27·18	8·08	—	—	—	—	6·79					
		150	—	1·41	34·05	27·28	8·07	—	—	—	—	6·62					
		200	—	1·60	34·14	27·34	8·02	—	—	—	—	6·00					
		300	—	1·61	34·22	27·39	7·98	—	—	—	—	5·37					
		400	—	2·11	34·34	27·46	7·94	—	—	—	—	4·44					
		590	—	2·24	34·49	27·56	7·97	—	—	—	—	4·07					
		790	—	2·04	34·61	27·69	7·93	—	—	—	—	3·95					
		990	—	2·05	34·63	27·70	8·02	—	—	—	—	3·87					
		1480	—	1·79	34·68	27·75	8·03	—	—	—	—	4·06					
		1980	—	1·36	34·69	27·79	8·08	—	—	—	—	4·33					
		2470	2473	0·96	34·69	27·81	8·07	—	—	—	—	4·41					
		2970	—	0·55	34·67	27·83	8·06	—	—	—	—	4·64					
831	14	0	—	3·32	33·93	27·02	8·19	—	—	—	—	7·36	N 50 V	100–0	2017	2026	
		10	—	3·32	33·93	27·02	8·19	—	—	—	—	—	N 70 B	250–100	2300	2330	Estimated depth
		20	—	3·32	33·93	27·02	8·19	—	—	—	—	7·38	N 100 B				
		30	—	3·32	33·93	27·02	8·19	—	—	—	—	—	N 70 B	130–0	2341	0001	KT
		40	—	3·31	33·93	27·02	8·19	—	—	—	—	7·38	N 100 B				
		50	—	3·17	33·93	27·03	8·19										
		60	—	2·83	33·94	27·07	8·15	—	—	—	—	7·09					
		80	—	2·20	33·97	27·16	8·15										
		100	—	0·70	34·04	27·31	8·07	—	—	—	—	7·08					
		150	—	0·10	34·14	27·43	8·03	—	—	—	—	6·63					
		200	—	0·44	34·25	27·50	7·98	—	—	—	—	5·76					
		300	—	1·30	34·43	27·59	7·95	—	—	—	—	4·62					
		400	—	1·70	34·52	27·63	7·93	—	—	—	—	4·13					
		590	—	1·77	34·61	27·71	8·01	—	—	—	—	4·09					
		790	—	1·71	34·66	27·74	7·98	—	—	—	—	4·06					
		980	—	1·67	34·68	27·76	7·98	—	—	—	—	4·08					
		1480	—	1·68	—	—	7·96	—	—	—	—	4·20					
		1970	—	0·56	34·68	27·84	8·03	—	—	—	—	4·59					
		2460	—	0·36	34·67	27·84	8·08	—	—	—	—	4·68					
		2950	—	0·16	34·66	27·84	8·13	—	—	—	—	4·75					
		3450	3447	−0·02	34·67	27·86	8·08	—	—	—	—	4·90					
832	16	0	—	2·50	33·73	26·93	—	—	—	—	—	—	N 50 V	100–0	1905	1915	Bad stray on wire. +2 hours
833	16	0	—	2·40	34·01	27·17	—	—	—	—	—	—	N 50 V	100–0	2205	2215	
													N 70 B	173–0	2232	2252	KT
													N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
834	52° 17·1′ S, 31° 01′ W	1932 23 ii	2000	3438*	WNW	24	WNW	5	bc	976·8	2·4	1·7	heavy NW swell
835	49° 13·5′ S, 22° 29·2′ W	25 ii	1005	—	WNW	30	WNW	6	o	991·3	5·3	4·3	heavy WNW swell
836	45° 28′ S, 11° 40·4′ W	27 ii	0920	3943*	WNW	14	WNW	4 conf.	o	1011·2	8·3	7·8	heavy W swell
837	44° 44′ S, 09° 38′ W	27 ii	2005	3696*	NW × W	26	NW × W	5	oe	1011·3	10·0	9·5	heavy WNW swell
838	42° 56′ S, 04° 52·2′ W	28 ii	2000	4166*	WSW	19	WSW	4	o	1012·6	9·4	8·3	mod. W swell
839	41° 04·4′ S, 00° 14·3′ W	29 ii	2000	—	S × W	23	S × W	5	bc	1021·4	8·9	6·7	heavy SW swell
840	39° 21′ S, 04° 20·5′ E	1 iii	2000	—	W	10	W	2	c	1028·2	10·6	5·7	heavy SSW swell
841	37° 46′ S, 08° 39·3′ E	2 iii	2000	—	WNW	20	WNW	4	bc	1024·1	15·0	12·7	mod. SSW swell
842	36° 04·8′ S, 13° 34·5′ E	3 iii	2000	—	SW × W	19	SW × W	4	o	1019·5	17·8	16·6	mod. conf. SW swell
843	34° 36·5′ S, 17° 56′ E	4 iii	1800	—	S × W	14	S × W	3	c	1017·2	20·4	17·6	mod. S swell
844	35° 10·3′ S, 19° 06·1′ E	8 iv	2000	189	NE × E	3	NE	1	bc	1012·8	20·5	20·1	mod. SSE swell
845	38° 08′ S, 20° 56·1′ E	9–10 iv	2000	4460*	WNW	19	WNW	3	bc	1013·9	18·9	16·7	heavy E × N swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	TIME To	
834	17	0	—	2·00	33·96	27·16	—	—	—	—	—	—	N 50 V	100–0	2009	2012	Stray on wire
													N 70 B N 100 B	250–100	2031	2102	Estimated depth
													N 70 B N 100 B	146–0	2118	2138	KT
835	19	0	—	4·54	33·96	26·93	—	—	—	—	—	—	N 70 B N 100 B	115–0	1017	1037	KT. +1 hour
836	20	0	—	7·08	34·04	26·67	—	—	—	—	—	—	N 70 B N 100 B	102–0	0924	0944	KT
													N 70 B N 100 B	250–100	0959	1028	Estimated depth
837	21	0	—	9·05	34·13	26·44	—	—	—	—	—	—	N 70 B N 100 B	250–100	2025	2055	Estimated depth
													N 70 B N 100 B	125–0	2110	2130	KT
838	22	0	—	10·10	34·23	26·36	—	—	—	—	—	—	N 70 B N 100 B	250–100	2016	2046	Estimated depth
													N 70 B N 100 B	137–0	2058	2118	KT
839	23	0	—	12·78	34·47	26·04	—	—	—	—	—	—	N 70 B N 100 B	250–100	2019	2049	Estimated depth. GMT
													N 70 B N 100 B	132–0	2104	2124	KT
840	24	0	—	14·20	34·43	25·73	—	—	—	—	—	—	N 70 B N 100 B	250–100	2017	2047	Estimated depth
													N 70 B N 100 B	101–0	2059	2119	KT
841	25	0	—	16·80	34·79	25·42	—	—		—	—	—	N 70 B N 100 B	320–140	2013	2043	DGP. −1 hour
													N 70 B N 100 B	130–0	2053	2113	KT
842	26	0	—	19·20	35·54	25·41	—	—	—	—	—	—	N 70 B N 100 B	280–140 280–0	2009	2049	DGP
													N 70 B N 100 B	155–0	2050	2110	KT
843	27	0	—	20·30	35·46	25·05	—	—	—	—	—	—	N 70 B N 100 B	144–0	1807	1827	KT. −2 hours
844	3	0	—	20·13	35·44	25·08	8·16	—	—	—	4·3	4·74	N 50 V	100–0	2026	2028	
		10	—	20·06	35·48	25·13	8·16	—	—	—	4·4	—	N 70 B N 100 B	155–0	2057	2117	KT
		20	—	19·94	35·54	25·21	8·16	—	—	—	4·6	4·79					
		30	—	19·94	35·54	25·21	8·16	—	—	—	4·5						
		40	—	19·93	35·54	25·22	8·16	—	—	—	5·1	4·74					
		50	—	19·83	35·54	25·24	8·16	—	—	—	5·1						
		60	—	17·34	35·34	25·71	8·14	—	—	—	6·2	3·11					
		80	—	12·01	35·16	26·72	8·13	—	—	—	9·4						
		100	—	10·78	35·00	26·84	8·03	—	—	—	15·4	3·49					
		150	—	8·50	34·69	26·97	8·00	—	—	—	15·6	3·82					
845	4	0	—	18·67	35·36	25·40	8·18	—	—	—	5·2	5·06	N 70 V	1000–750	2045		
		10	—	18·67	35·37	25·41	8·18	—	—	—	5·2	—	,,	750–0			
		20	—	18·67	35·37	25·41	8·18	—	—	—	5·2	5·05	,,	750–500			
		30	—	17·63	35·31	25·62	8·19	—	—	—	5·2	—	,,	500–250			
		40	—	17·15	35·38	25·79	8·20	—	—	—	5·2	5·12	,,	250–100			
		50	—	16·72	35·30	25·83	8·20	—	—	—	5·2	—	,,	100–50			
		60	—	16·00	35·20	25·92	8·16	—	—	—	5·6	5·09	,,	50–0			
		80	—	13·92	35·02	26·24	8·13	—	—	—	5·6	—	N 50 V	100–0	—	2308	
		100	—	14·34	35·28	26·35	8·13	—	—	—	9·6	4·34	N 70 B N 100 B	242–180	2328	0000	DGP
		150	—	12·60	35·10	26·57	8·10	—	—	—	9·6	4·54					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
845 *cont.*	38° 08′ S, 20° 56·1′ E	1932 9–10 iv											
846	40° 41·3′ S, 23° 02′ E	10 iv	2005	4959*	SW × W	18	SW × W	4	bc	1016·4	14·4	11·9	mod. conf. swell
			0000	—	WSW	19	WSW	3	o	1018·7	14·2	11·1	mod. conf. swell
847	43° 07·4′ S, 25° 04·6′ E	11 iv	2000	5260*	WNW	10	WNW	2	bc	1017·3	11·7	9·5	heavy conf. W swell
			0000	—	NW × W	11–16	NW × W	3	o	1017·6	12·5	10·2	heavy conf. W swell
848	45° 48·4′ S, 27° 13·6′ E	12 iv	2000	5560*	NE × N	18	NE × E	3	bc	1009·3	8·6	7·9	mod. conf. SW swell
			0000	—	NNE	23	NNE	4	or	1004·8	9·8	9·7	mod. conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
845 *cont.*	4	200	—	11·89	35·05	26·66	8·10	—	—	—	13·1	4·73	N 70 B	148–0	0015	0035	KT
		300	—	9·77	34·79	26·85	8·11	—	—	—	10·9	4·84	N 100 B				
		390	—	7·58	34·49	26·95	8·11	—	—	—	11·6	5·02					
		590	574	5·91	34·43	27·14	8·08	—	—	—	24·5	4·47					
		790	—	4·38	34·41	27·30	8·03	—	—	—	32·0	4·17					
		980	—	3·07	34·39	27·42	8·01	—	—	—	36·6	4·27					
		1470	—	2·81	34·68	27·67	8·01	—	—	—	54·7	3·97					
		1970	—	2·66	—	—	—	—	—	—	—	4·64					
		2460	—	2·50	34·84	27·83	8·11	—	—	—	43·8	4·79					
		2950	—	2·33	34·84	27·84	8·12	—	—	—	42·9	4·84					
		3440	—	2·11	34·84	27·86	8·12	—	—	—	51·0	4·78					
		3930	3931	1·21	34·76	27·86	8·08	—	—	—	71·1	4·47					
846	5	0	—	17·07	35·22	25·69	8·22	—	—	—	4·3	5·32	N 70 V	1000–760	2012		
		10	—	17·03	35·20	25·68	8·22	—	—	—	4·2	—	,,	750–500			
		20	—	15·81	35·06	25·85	8·22	—	—	—	4·2	5·48	,,	500–220			
		30	—	15·20	35·03	25·97	8·24	—	—	—	4·2	—	,,	250–100			
		40	—	15·11	35·03	25·99	8·24	—	—	—	4·2	5·49	,,	100–50			
		50	—	14·93	35·03	26·03	8·23	—	—	—	4·2	—	,,	50–0			
		60	—	14·82	35·02	26·05	8·23	—	—	—	4·3	5·38	N 50 V	100–0	—	2220	
		80	—	13·53	34·94	26·26	8·16	—	—	—	5·0	—	N 70 B	370–170	0146	0216	DGP
		100	—	13·06	35·11	26·49	8·11	—	—	—	10·0	4·30	N 100 B				
		150	—	11·60	35·03	26·71	8·12	—	—	—	10·5	4·65	N 70 B	128–0	0230	0250	KT
		200	—	11·10	35·01	26·79	8·08	—	—	—	10·9	4·61	N 100 B				
		300	—	9·81	34·85	26·88	8·10	—	—	—	14·2	4·58					
		400	—	7·40	34·61	27·07	8·02	—	—	—	21·8	4·30					
		600	—	4·63	34·39	27·26	8·00	—	—	—	30·0	4·53					
		800	—	3·66	34·43	27·39	8·02	—	—	—	39·3	4·26					
		1000	—	3·11	34·50	27·50	7·96	—	—	—	48·6	3·91					
		1500	—	2·78	34·75	27·73	8·02	—	—	—	52·8	4·11					
		2000	—	2·56	34·82	27·81	8·11	—	—	—	45·1	4·62					
		2500	—	2·37	34·82	27·83	8·17	—	—	—	47·4	4·52					
		3000	—	2·13	34·81	27·84	8·14	—	—	—	50·6	4·78					
		3500	—	1·63	34·79	27·86	8·09	—	—	—	57·7	4·67					
		4000	—	1·06	34·74	27·86	8·09	—	—	—	77·0	4·58					
		4500	—	0·82	34·71	27·85	8·09	—	—	—	84·0	4·64					
847	6	0	—	15·13	35·10	26·04	8·16	—	—	—	6·7	5·45	N 70 V	1000–775	2030		
		10	—	15·12	35·10	26·04	8·16	—	—	—	6·7	—	,,	750–515			
		20	—	15·11	35·10	26·04	8·16	—	—	—	6·7	5·43	,,	500–250			
		30	—	15·03	35·09	26·05	8·16	—	—	—	6·7	—	,,	250–100			
		40	—	15·03	35·09	26·05	8·16	—	—	—	6·7	5·44	,,	100–50			
		50	—	15·02	35·09	26·06	8·16	—	—	—	6·7	—	,,	50–0			
		60	—	14·83	35·05	26·06	8·17	—	—	—	6·7	5·39	N 50 V	100–0	—	2219	
		80	—	13·65	35·01	26·29	8·13	—	—	—	6·9	—	N 70 B	270–196	0015	0046	DGP
		100	—	12·71	34·93	26·41	8·10	—	—	—	6·9	5·06	N 100 B				
		150	—	11·50	34·82	26·57	8·10	—	—	—	6·9	5·11	N 70 B	119–0	0059	0119	KT
		200	—	11·22	34·86	26·64	8·07	—	—	—	6·9	4·95	N 100 B				
		290	—	9·71	34·76	26·83	8·09	—	—	—	10·0	4·89					
		390	—	7·51	34·47	26·95	8·05	—	—	—	11·9	5·14					
		590	—	6·04	34·40	27·09	8·06	—	—	—	22·9	4·57					
		780	—	4·28	34·34	27·26	7·98	—	—	—	30·4	4·64					
		980	977	3·65	34·43	27·39	7·98	—	—	—	43·1	4·07					
		1470	—	2·85	34·67	27·66	7·99	—	—	—	52·9	3·92					
		1950	—	2·63	34·77	27·76	7·99	—	—	—	50·6	4·52					
		2320	—	2·51	34·81	27·81	8·05	—	—	—	42·6	4·69					
		2790	—	2·28	34·81	27·82	8·11	—	—	—	48·5	4·69					
		3250	—	1·91	34·81	27·85	8·06	—	—	—	56·3	4·63					
		3710	—	1·37	34·76	27·85	8·12	—	—	—	74·3	4·56					
		4180	4179	—	34·71	—	8·02	—	—	—	83·2	4·59					
848	7	0	—	6·97	33·87	26·56	8·11	—	—	—	6·1	6·50	N 70 V	1000–770	2000		
		10	—	6·95	33·87	26·56	8·11	—	—	—	6·1	—	,,	750–500			
		20	—	6·91	33·87	26·57	8·11	—	—	—	6·1	6·51	,,	500–230			
		30	—	6·90	33·87	26·57	8·11	—	—	—	6·1	—	,,	250–100			
		40	—	6·89	33·87	26·57	8·11	—	—	—	6·1	6·50	,,	100–50			
		50	—	6·89	33·87	26·57	8·11	—	—	—	6·1	—	,,	50–0			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
848 *cont.*	45° 48·4′ S, 27° 13·6′ E	1932 12–13 iv											
849	48° 14·6′ S, 29° 23·7′ E	14 iv	0000	5527*	NW×W	35	NW×W	5	bc	998·2	7·8	5·7	heavy NW swell
			0400	—	NW×W	29	NW×W	5	o	997·2	7·9	5·8	heavy NW swell
850	50° 43·8′ S, 31° 44′ E	15 iv	0000	5492*	W×N	22	W×N	6	bc	995·8	2·9	1·8	heavy WNW swell
			0400	—	W×N	20	W×N	5	o	997·1	3·2	2·2	heavy WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
848 *cont.*	7	60	—	6·89	33·87	26·57	8·11	—	—	—	6·1	6·48	N 50 V	100–0	—	2135	
		80	—	6·80	33·89	26·59	8·11	—	—	—	6·1	—	N 70 B	270–166	2355	0025	DGP
		100	—	6·70	33·91	26·62	8·11	—	—	—	6·1	6·53	N 100 B				
		150	—	5·34	34·09	26·93	8·08	—	—	—	9·6	6·27	N 70 B	117–0	0037	0057	KT
		200	—	5·39	34·23	27·04	8·07	—	—	—	12·3	5·91	N 100 B				
		300	—	4·90	34·26	27·12	8·02	—	—	—	17·7	5·40					
		400	—	4·20	34·23	27·18	8·02	—	—	—	20·8	5·47					
		600	—	3·41	34·25	27·27	8·00	—	—	—	31·2	5·13					
		800	—	2·94	34·34	27·39	8·04	—	—	—	42·6	4·42					
		1000	—	2·64	34·42	27·47	7·99	—	—	—	55·1	4·14					
		1500	—	2·58	34·67	27·68	7·96	—	—	—	63·5	3·92					
		2000	—	2·43	34·78	27·78	8·04	—	—	—	64·6	4·27					
		2500	2497	2·24	34·80	27·82	8·06	—	—	—	58·5	4·61					
		3000	—	1·66	34·76	27·82	8·02	—	—	—	85·1	4·46					
		3500	—	1·13	34·71	27·83	8·06	—	—	—	87·1	4·46					
		4000	—	0·74	34·70	27·85	8·06	—	—	—	96·0	4·52					
		4500	—	0·39	34·69	27·85	8·14	—	—	—	101·2	4·56					
		5000	—	0·22	34·69	27·86	8·04	—	—	—	110·2	4·75					
849	8	0	—	7·72	34·08	26·62	8·09	—	—	—	6·1	6·34	N 70 V	1000–0	0010		
		10	—	7·72	34·08	26·62	8·09	—	—	—	6·1	—	,,	1000–750			
		20	—	7·71	34·09	26·62	8·09	—	—	—	6·1	6·33	,,	750–500			
		30	—	7·70	34·09	26·62	8·09	—	—	—	6·1	—	,,	500–250			
		40	—	7·81	34·09	26·61	8·09	—	—	—	6·1	6·32	,,	250–100			
		50	—	8·00	34·17	26·65	8·09	—	—	—	6·1	—	,,	100–50			
		60	—	8·04	34·18	26·65	8·09	—	—	—	6·1	6·25	,,	50–0			
		80	—	8·06	34·18	26·65	8·09	—	—	—	6·1	—	N 50 V	100–0	—	0245	
		100	—	8·05	34·18	26·65	8·09	—	—	—	6·1	6·27	N 70 B	300–110	0430	0500	DGP
		150	—	7·10	34·27	26·85	8·09	—	—	—	8·8	5·92	N 100 B	300–0			
		190	—	6·28	34·25	26·94	8·06	—	—	—	12·1	5·88	N 70 B	71–0	0529	0549	KT
		280	—	6·12	34·36	27·05	8·01	—	—	—	18·3	5·07	N 100 B				
		380	—	4·68	34·26	27·15	8·01	—	—	—	20·2	5·34	N 100 B	210–125	0529	0600	DGP
		570	—	3·83	34·25	27·23	8·03	—	—	—	27·2	5·09					
		760	734	3·25	34·33	27·34	8·02	—	—	—	39·0	4·61					
		960	—	3·06	34·49	27·49	7·93	—	—	—	51·7	4·05					
		1430	—	2·57	34·66	27·67	7·94	—	—	—	61·2	3·98					
		1910	1912	2·41	34·79	27·79	8·00	—	—	—	61·2	4·24					
		2470	—	2·06	34·79	27·82	8·00	—	—	—	58·2	4·51					
		2960	—	1·63	34·79	27·86	8·00	—	—	—	68·0	4·59					
		3460	—	1·08	34·74	27·86	8·00	—	—	—	85·3	4·52					
		3950	—	0·73	34·71	27·86	8·02	—	—	—	94·1	4·52					
		4450	—	0·43	34·70	27·86	8·03	—	—	—	99·2	4·59					
		4940	4940	0·27	34·70	27·87	8·08	—	—	—	101·9	4·73					
850	9	0	—	1·90	34·02	27·22	8·07	—	—	—	40·0	7·31	N 70 V	1000–720	0020		
		10	—	1·90	34·02	27·22	8·07	—	—	—	40·0	—	,,	750–485			
		20	—	1·90	34·02	27·22	8·07	—	—	—	40·0	7·26	,,	500–260			
		30	—	1·90	34·02	27·22	8·07	—	—	—	40·0	—	,,	250–100			
		40	—	1·90	34·02	27·22	8·08	—	—	—	40·0	7·26	,,	100–50			
		50	—	1·90	34·02	27·22	8·08	—	—	—	40·0	—	,,	50–0			
		60	—	1·90	34·02	27·22	8·08	—	—	—	40·4	7·26	N 50 V	100–0	—	0245	
		80	—	1·90	34·02	27·22	8·08	—	—	—	40·8	—	N 70 B	100–0	0528	0548	Estimated depth
		100	—	1·80	34·02	27·23	8·08	—	—	—	50·0	7·25	N 100 B				
		150	—	0·98	34·09	27·33	8·04	—	—	—	51·3	7·11	N 100 B	254–140	0528	0558	Closing depth estimated
		200	—	0·21	34·19	27·47	8·01	—	—	—	59·3	6·84					
		300	—	0·34	34·44	27·66	7·95	—	—	—	69·0	5·45					
		390	—	1·33	34·59	27·72	7·92	—	—	—	69·0	4·31					
		590	—	1·56	34·68	27·77	7·93	—	—	—	70·3	4·08					
		780	—	1·53	34·70	27·79	8·04	—	—	—	73·0	4·11					
		980	981	1·40	34·70	27·80	8·03	—	—	—	77·5	4·22					
		1480	—	0·86	34·71	27·85	8·00	—	—	—	82·5	4·55					
		1970	1964	0·59	34·70	27·86	8·00	—	—	—	88·3	4·66					
		2500	—	0·38	34·70	27·86	8·00	—	—	—	94·9	4·88					
		3000	—	0·09	34·69	27·87	8·01	—	—	—	97·3	4·82					
		3500	—	−0·12	34·69	27·88	8·06	—	—	—	97·3	4·98					
		4000	—	−0·22	34·69	27·88	8·06	—	—	—	97·3	5·07					
		4500	—	−0·22	34·69	27·88	8·10	—	—	—	97·3	5·05					
		5000	—	−0·20	34·69	27·88	8·15	—	—	—	97·3	5·08					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
851	56° 22·1′ S, 37° 22·3′ E	1932 17 iv	0005	5058*	W × N	30–35	W × N	6	bcqsp	979·0	−0·7	−1·0	heavy W swell
			0400	—	W × N	35	W × N	6	bcsp	979·2	0·0	−0·3	heavy W swell
852	58° 39·5′ S, 40° 03·9′ E	18 iv	0000	5427*	E	5	SSE	1	o	986·3	−0·3	−1·1	heavy conf. W swell
			0400	—	SE × S	15	SE × S	2	osp	987·8	−0·3	−1·0	heavy W swell
853	61° 00·2′ S, 43° 11·1′ E	19 iv	0000	5365*	S	9	S	2	c	993·8	−2·0	−3·2	mod. conf. ESE and SW swells
			0400	—	S × W	10	S × W	2	osp	994·2	−1·9	−2·8	mod. conf. ESE and SW × W swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
851	11	0	—	1·10	33·87	27·15	8·08	—	—	—	33·3	7·23	**N 100 B**	125–0	0411	0431	KT. −3 hours
		10	—	1·10	33·87	27·15	8·08	—	—	—	33·3	—	**N 100 B**	320–190	0411	0442	DGP
		20	—	1·10	33·87	27·15	8·08	—	—	—	33·3	7·27					
		30	—	1·10	33·87	27·15	8·08	—	—	—	33·3						
		40	—	1·10	33·87	27·15	8·08	—	—	—	33·3	7·29					
		50	—	1·10	33·87	27·15	8·08	—	—	—	33·3						
		60	—	1·10	33·87	27·16	8·08	—	—	—	33·3	7·24					
		80	—	1·10	33·88	27·17	8·08	—	—	—	33·3						
		100	—	1·10	33·93	27·20	8·08	—	—	—	33·3	7·30					
		150	—	0·00	34·25	27·52	7·99	—	—	—	54·2	6·51					
		200	—	0·58	34·36	27·58	7·95	—	—	—	60·3	5·61					
		290	—	1·08	34·48	27·65	7·92	—	—	—	70·3	4·80					
		390	—	1·53	34·62	27·73	7·92	—	—	—	73·0	4·19					
		590	—	1·69	34·68	27·76	7·98	—	—	—	74·4	4·08					
		780	—	1·60	34·71	27·80	8·08	—	—	—	77·5	4·16					
		980	—	1·44	34·71	27·81	7·98	—	—	—	79·1	4·33					
		1470	—	1·54	34·72	27·80	8·03	—	—	—	79·1	4·43					
		1960	1954	0·59	34·71	27·86	8·04	—	—	—	88·3	4·43					
		2430	—	0·40	34·69	27·85	8·04	—	—	—	102·6	4·66					
		2910	—	0·15	34·68	27·86	8·04	—	—	—	102·6	4·77					
		3400	—	−0·01	34·67	27·86	8·05	—	—	—	82·5	4·85					
		3880	—	−0·13	34·67	27·87	8·05	—	—	—	92·6	5·06					
		4370	4365	−0·24	34·67	27·87	8·14	—	—	—	102·6	5·09					
852	12	0	—	0·41	33·87	27·19	8·09	—	—	—	33·6	7·37	**N 70 V**	1000–790	0000		
		10	—	0·43	33·87	27·19	8·09	—	—	—	33·6	—	,,	750–500			
		20	—	0·43	33·87	27·19	8·09	—	—	—	33·6	7·37	,,	500–250			
		30	—	0·42	33·87	27·19	8·09	—	—	—	33·6	—	,,	250–100			
		40	—	0·42	33·87	27·19	8·09	—	—	—	33·6	7·38	,,	100–50			
		50	—	0·41	33·87	27·19	8·09	—	—	—	33·9	—	,,	50–0			
		60	—	0·41	33·87	27·19	8·09	—	—	—	33·9	7·36	**N 50 V**	100–0	—	0145	
		80	—	0·11	33·91	27·24	8·09	—	—	—	38·7	—	**N 100 B**	370–155	0345	0415	DGP
		100	—	−0·70	34·14	27·46	8·04	—	—	—	47·5	6·87	**N 70 B**	119–0	0429	0449	KT
		150	—	0·23	34·31	27·56	7·98	—	—	—	60·3	5·83	**N 100 B**				
		200	—	1·08	34·47	27·64	7·92	—	—	—	66·6	4·80					
		300	—	1·60	34·58	27·69	7·90	—	—	—	71·6	4·14					
		400	—	1·74	34·63	27·72	7·92	—	—	—	77·5	4·17					
		600	—	1·71	34·73	27·80	7·92	—	—	—	79·1	4·18					
		800	—	1·61	34·74	27·82	7·96	—	—	—	79·1	4·60					
		1000	—	1·45	34·73	27·82	8·04	—	—	—	84·4	4·37					
		1500	—	0·89	34·72	27·85	8·12	—	—	—	88·3	4·38					
		2000	2000	0·51	34·70	27·86	8·09	—	—	—	99·9	4·33					
		2500	—	0·31	34·70	27·87	8·04	—	—	—	105·5	4·60					
		3000	—	0·12	34·69	27·86	8·03	—	—	—	108·5	4·74					
		3500	—	−0·01	34·68	27·87	8·09	—	—	—	102·6	4·85					
		4000	—	−0·16	34·67	27·87	8·08	—	—	—	102·6	5·11					
		4500	—	−0·23	34·67	27·87	8·05	—	—	—	102·6	5·17					
		5000	5010	−0·29	34·67	27·88	8·13	—	—	—	108·5	5·19					
853	13	0	—	0·01	33·87	27·22	8·09	—	—	—	33·9	7·37	**N 70 V**	1000–750	0010		
		10	—	0·01	33·87	27·22	8·09	—	—	—	33·9	—	,,	750–500			
		20	—	0·01	33·87	27·22	8·09	—	—	—	33·9	7·39	,,	500–250			
		30	—	0·01	33·87	27·22	8·09	—	—	—	33·9	—	,,	250–100			
		40	—	0·01	33·87	27·22	8·09	—	—	—	33·9	7·41	,,	100–50			
		50	—	0·01	33·87	27·22	8·09	—	—	—	33·9	—	,,	50–0			
		60	—	0·01	33·87	27·22	8·09	—	—	—	33·9	7·38	**N 50 V**	100–0	—	0143	
		80	—	−1·20	34·10	27·45	8·06	—	—	—	44·7	—	**N 70 B**	190–108	0355	0425	DGP
		100	—	−1·00	34·21	27·53	8·03	—	—	—	52·0	6·79	**N 100 B**				
		150	—	1·00	34·46	27·63	7·92	—	—	—	66·6	4·84	**N 70 B**	119–0	0435	0455	KT
		190	—	1·42	34·54	27·67	7·90	—	—	—	75·9	4·45	**N 100 B**				
		290	—	1·68	34·64	27·73	7·90	—	—	—	79·1	4·17					
		390	—	1·71	34·67	27·75	7·93	—	—	—	80·8	4·11					
		580	—	1·70	34·73	27·80	7·93	—	—	—	82·5	4·21					
		770	—	1·56	34·75	27·83	7·95	—	—	—	84·4	4·36					
		960	—	1·34	34·75	27·85	8·02	—	—	—	88·3	4·37					
		1450	—	0·88	34·73	27·86	8·03	—	—	—	94·9	4·47					
		1930	—	0·51	34·70	27·86	8·03	—	—	—	102·6	4·59					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
853 *cont.*	61° 00·2′ S, 43° 11·1′ E	1932 19 iv											
854	63° 30·2′ S, 46° 24·9′ E	20 iv	0000	4227*	NE × N	20	NE × N	4	os	992·7	−1·9	−2·4	mod. conf. NE swell
			0400	—	NE × N	18	NE × N	3	osp	992·4	−2·8	−3·4	mod. NE swell
855	65° 15′ S, 48° 43·7′ E to	20 iv	1828	3132*	E × N	23	E × N	3	osp	994·7	−5·7	−6·2	low conf. WNW and ENE swells
	65° 10·4′ S, 48° 43·7′ E		2258	—	E	28	E	4	o	992·9	−5·6	−6·1	mod. N swell
856	61° 06·6′ S, 53° 39·8′ E	22 iv	2010	5325*	S × E	35–40	S	6	oq	988·6	−3·4	−3·7	heavy conf. SSW and S swells
857	60° 40·1′ S, 59° 23·7′ E	23 iv	2000	4977*	S × W	11	S × W	3	o	995·6	−3·9	−4·3	mod. S × E swell
			0000	—	S	11	S	3	o	995·7	−3·9	−4·4	mod. S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³				O_2 c.c. litre	Gear	Depth (metres)	TIME		
								P	Nitrate + Nitrite N_2	Nitrite N_2	Si				From	To	
853 *cont.*	13	2410	—	0·30	34·69	27·85	8·08	—	—	—	105·5	4·43					
		2890	2893	0·09	34·68	27·87	8·13	—	—	—	108·5	4·45					
		3370	—	−0·05	34·67	27·86	8·04	—	—	—	108·5	4·94					
		3860	—	−0·20	34·67	27·87	7·99	—	—	—	108·5	5·09					
		4340	—	−0·22	34·67	27·87	8·00	—	—	—	111·7	5·22					
		4820	—	−0·30	34·67	27·88	8·10	—	—	—	111·7	5·02					
854	14	0	—	−0·80	34·01	27·37	8·08	—	—	—	52·0	7·27	**N 70 V**	1000–750	0005		
		10	—	−0·80	34·01	27·37	8·08	—	—	—	52·0	—	,,	750–500			
		20	—	−0·78	34·01	27·37	8·08	—	—	—	52·0	7·27	,,	500–250			
		30	—	−0·78	34·01	27·37	8·08	—	—	—	52·0	—	,,	250–100			
		40	—	−0·78	34·01	27·37	8·08	—	—	—	52·0	7·28	,,	100–50			
		50	—	−0·78	34·01	27·37	8·08	—	—	—	52·0	—	,,	50–0			
		60	—	−0·45	34·21	27·51	8·04	—	—	—	58·4	6·34	**N 50 V**	100–0	—	0142	
		80	—	0·68	34·57	27·74	7·91	—	—	—	74·4	—	**N 70 B**	248–94	0255	0330	DGP
		100	—	1·29	34·64	27·76	7·89	—	—	—	75·9	4·09	**N 100 B**				
		150	—	1·40	34·69	27·78	7·89	—	—	—	77·5	4·09	**N 70 B**	119–0	0342	0402	KT
		200	—	1·45	34·71	27·81	7·90	—	—	—	77·5	4·10	**N 100 B**				
		300	—	1·41	34·73	27·82	7·91	—	—	—	79·1	4·24					
		400	—	1·40	34·74	27·83	7·93	—	—	—	79·1	4·28					
		600	—	1·17	34·74	27·85	7·96	—	—	—	80·8	4·38					
		800	—	0·98	34·74	27·86	8·00	—	—	—	84·4	4·41					
		990	—	0·80	34·72	27·85	7·96	—	—	—	94·9	4·53					
		1490	—	0·44	34·70	27·86	8·06	—	—	—	97·3	4·50					
		1990	—	0·21	34·69	27·86	7·97	—	—	—	97·3	4·85					
		2480	—	−0·03	34·68	27·87	8·03	—	—	—	97·3	4·86					
		2980	—	−0·18	34·67	27·87	8·03	—	—	—	99·9	5·05					
		3470	—	−0·28	34·66	27·87	8·03	—	—	—	99·9	5·19					
		3970	3966	−0·39	34·66	27·87	8·12	—	—	—	99·9	5·31					
855	15	0	—	−1·65	34·07	27·44	8·05	1·60	—	—	56·7	7·51	**N 70 V**	1000–750	1830	—	Streams of drift ice in vicinity. Loose pack to SE
		60	—	−1·65	34·07	27·44	8·05	1·60	—	—	56·7	7·61	,,	750–500			
		80	—	−1·60	34·07	27·44	8·05	1·60	—	—	56·7	—	,,	500–230			
		100	—	−1·68	34·12	27·48	8·05	1·88	—	—	56·7	7·56	,,	250–100			
		150	—	0·04	34·44	27·68	7·97	1·90	—	—	71·6	5·45	,,	100–50			
		200	—	0·80	34·58	27·74	7·93	1·92	—	—	74·4	4·63	,,	50–0			
		290	—	1·19	34·66	27·78	7·94	1·88	—	—	77·5	4·41	**N 50 V**	100–0	—	2035	Depth of **N 50 V** haul estimated
		390	—	1·12	—	—	7·94	1·86	—	—	86·3	4·43					
		580	—	0·76	34·70	27·85	7·95	1·96	—	—	97·3	4·57	**N 70 B**	125–0	2310	2330	KT
		780	—	0·64	34·69	27·83	8·03	2·11	—	—	99·9	4·52	**N 100 B**				
		970	—	0·49	34·67	27·83	7·98	2·03	—	—	99·9	4·54	**N 70 B**	280–154	2310	2340	DGP
		1460	—	0·07	34·66	27·85	7·99	1·98	—	—	105·5	4·76	**N 100 B**				
		1940	—	−0·13	34·66	27·86	8·09	2·01	—	—	105·5	4·94					
		2430	2432	−0·32	34·66	27·87	8·04	1·92	—	—	105·5	5·10					
856	17	0	—	0·22	33·81	27·16	8·11	1·65	—	—	—	7·31	**N 100 B**	89–0	2230	2250	KT
		10	—	0·22	33·81	27·16	8·11	1·67	—	—	—	—	**N 100 B**	224–120	2230	2310	DGP
		20	—	0·22	33·81	27·16	8·11	1·65	—	—	—	7·31					
		30	—	0·22	33·81	27·16	8·11	1·65									
		40	—	0·22	33·81	27·16	8·11	1·65	—	—	—	7·34					
		50	—	0·22	33·81	27·16	8·11	1·67									
		60	—	0·22	33·81	27·16	8·11	1·65	—	—	—	7·29					
		80	—	0·21	33·82	27·17	8·11	1·69									
		100	—	−1·27	33·99	27·37	8·08	1·90	—	—	—	7·23					
		150	—	0·20	34·20	27·47	7·97	2·01	—	—	—	5·78					
		200	—	1·12	34·40	27·57	7·93	2·17	—	—	—	4·67					
		300	—	1·80	34·57	27·66	7·90	2·13	—	—	—	3·89					
		400	—	1·90	34·61	27·70	7·88	2·07	—	—	—	3·87					
		600	—	1·88	34·70	27·77	7·95	1·98	—	—	—	4·03					
		800	—	1·76	34·76	27·82	7·94	2·00	—	—	—	4·23					
		1000	—	1·22	34·74	27·85	8·05	1·92	—	—	—	4·32					
		1500	—	0·70	34·73	27·87	8·06	1·92	—	—	—	4·23					
857	18	0	—	0·00	33·81	27·17	8·13	1·82	—	—	—	7·31	**N 70 V**	1000–750	2005		
		10	—	0·01	33·81	27·17	8·13	1·82	—	—	—	—	,,	750–500			
		20	—	0·01	33·81	27·17	8·13	1·81	—	—	—	7·31	,,	500–250			
		30	—	0·01	33·81	27·17	8·13	1·79	—	—	—	—	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
857 *cont.*	60° 40·1′ S, 59° 23·7′ E	1932 23–24 iv											
858	60° 10·1′ S, 63° 54·8′ E	24 iv	2000	4801*	S	16	S	3	o	1000·9	−4·7	−5·2	mod. conf. swell
			0000	—	S	17	S	3	o	1003·0	−5·1	−5·7	mod. SE swell
859	59° 19·1′ S, 68° 51·8′ E	25 iv	2000	4534*	NNE	25–30	Conf.	5	osq	987·1	−2·1	−2·4	heavy conf. N swell
			0000	—	NNE	25–30	NNE	5	osq	980·8	−0·8	−1·3	heavy NNE swell
860	57° 56·4′ S, 73° 58·8′ E	26 iv	2000	3251*	SW × W	12	SW × W	4	o	981·7	0·0	−0·7	heav. conf. W × N swell
			0000	—	W × S	16	W × S	4	o	982·2	0·2	−0·5	mod. conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
857 *cont.*	18	40	—	0·01	33·81	27·17	8·13	1·79	—	—	—	7·34	**N 70 V**	100–50			
		50	—	0·00	33·81	27·17	8·13	1·79	—	—	—	—	,,	50–0			
		60	—	0·00	33·81	27·17	8·13	1·79	—	—	—	7·28	**N 50 V**	100–0	—	**2155**	
		80	—	−1·10	34·02	27·39	8·10	1·96	—	—	—	—	**N 70 B**	119–0	**0132**	**0152**	KT
		100	—	−1·16	34·08	27·44	8·06	1·98	—	—	—	6·78	**N 70 B**				
		150	—	1·20	34·43	27·59	7·94	2·17	—	—	—	4·61	**N 100 B**	262–140	**0132**	**0202**	DGP
		200	—	1·61	34·54	27·66	7·97	2·07	—	—	—	4·01	**N 100 B**	130–0	**0212**	**0232**	DGP
		300	—	1·89	34·50	27·60	7·96	2·00	—	—	—	4·46					
		400	—	1·89	34·58	27·67	7·94	2·00	—	—	—	3·98					
		600	—	1·73	34·73	27·80	8·04	1·92	—	—	—	3·90					
		800	—	1·75	34·75	27·82	8·04	1·88	—	—	—	4·07					
		1000	—	1·62	34·76	27·83	8·03	1·88	—	—	—	4·23					
		1500	—	1·13	34·73	27·84	8·03	1·88	—	—	—	4·39					
		2000	—	0·73	34·70	27·85	8·04	1·92	—	—	—	4·48					
		2500	—	0·42	34·68	27·85	8·10	1·92	—	—	—	4·41					
		3000	—	0·23	34·67	27·85	8·09	1·92	—	—	—	4·58					
		3500	—	0·04	34·66	27·85	8·09	1·90	—	—	—	4·77					
858	19	0	—	0·52	33·78	27·12	8·13	1·82	—	—	—	7·22	**N 70 V**	1000–750	**2005**		−4 hours
		10	—	0·57	33·78	27·12	8·13	1·82	—	—	—	—	,,	750–500			
		20	—	0·58	33·78	27·12	8·13	1·82	—	—	—	7·23	,,	500–250			
		30	—	0·50	33·78	27·12	8·13	1·82	—	—	—	—	,,	250–100			
		40	—	0·50	33·78	27·12	8·13	1·82	—	—	—	7·25	,,	100–50			
		50	—	0·48	33·78	27·12	8·13	1·82	—	—	—	—	,,	50–0			
		60	—	0·42	33·78	27·13	8·13	1·82	—	—	—	7·22	**N 50 V**	100–0	—	**2150**	
		80	—	0·41	33·78	27·13	8·13	1·82	—	—	—	—	**N 70 B**				
		100	—	−0·69	33·95	27·31	8·09	2·05	—	—	—	7·33	**N 100 B**	88–0	**2336**	**2356**	KT
		150	—	−0·50	34·12	27·44	8·03	2·17	—	—	—	6·45	**N 70 B**				
		200	—	1·40	34·40	27·55	7·92	2·30	—	—	—	4·51	**N 100 B**	264–130	**2336**	**0006**	DGP
		300	—	1·90	34·52	27·62	7·89	2·40	—	—	—	3·92					
		400	—	1·99	34·59	27·67	7·89	2·38	—	—	—	3·80					
		600	—	2·01	34·68	27·74	7·95	2·17	—	—	—	3·86					
		800	—	1·93	34·74	27·79	7·97	2·19	—	—	—	4·06					
		1000	—	1·79	34·75	27·81	8·07	1·94	—	—	—	4·18					
		1500	—	1·40	34·76	27·84	8·07	2·11	—	—	—	4·36					
		2000	2005	0·90	34·72	27·85	8·11	2·11	—	—	—	4·41					
		2490	—	0·63	34·70	27·85	8·03	2·13	—	—	—	4·51					
		2990	—	0·34	34·68	27·85	8·08	2·15	—	—	—	4·48					
		3490	—	0·11	34·68	27·86	8·08	2·15	—	—	—	4·66					
		3990	—	−0·09	34·67	27·87	8·19	2·15	—	—	—	4·77					
		4490	4488	−0·20	34·66	27·86	8·14	2·15	—	—	—	4·91					
859	20	0	—	0·71	33·78	27·11	8·09	1·81	—	—	—	7·21	**N 70 V**	1000–750	**2015**		−5 hours
		10	—	0·74	33·78	27·11	8·09	1·82	—	—	—	—	,,	750–500			
		20	—	0·77	33·79	27·12	8·09	1·81	—	—	—	7·20	,,	500–250			
		30	—	0·78	33·79	27·12	8·09	1·81	—	—	—	—	,,	100–50			
		40	—	0·78	33·79	27·12	8·09	1·81	—	—	—	7·19	,,	50–0			
		50	—	0·78	33·79	27·12	8·09	1·82	—	—	—	—	,,	25–0			
		60	—	0·79	33·79	27·12	8·09	1·82	—	—	—	7·20	**N 50 V**	100–0	—	**2240**	
		80	—	0·55	33·84	27·16	8·10	1·82	—	—	—	—	**N 70 B**				
		100	—	−0·50	33·97	27·32	8·06	2·19	—	—	—	7·50	**N 100 B**	100–0	**2351**	**0011**	KT
		150	—	−0·01	34·14	27·44	8·00	2·19	—	—	—	6·22	**N 70 B**				DGP. Closing depth
		200	—	1·40	34·41	27·56	7·91	2·41	—	—	—	4·48	**N 100 B**	210–140	**2351**	**0023**	estimated
		290	—	1·83	34·52	27·62	7·89	2·45	—	—	—	3·92					
		390	—	1·98	34·59	27·67	7·89	2·41	—	—	—	3·79					
		590	—	2·03	34·66	27·72	7·93	2·36	—	—	—	3·81					
		780	—	2·04	34·76	27·80	7·96	2·22	—	—	—	3·95					
		980	—	1·90	34·76	27·81	7·96	2·20	—	—	—	4·17					
		1460	—	1·52	34·76	27·84	7·97	2·05	—	—	—	4·33					
		1950	—	1·16	34·75	27·86	8·00	2·07	—	—	—	4·42					
		2440	—	0·74	34·72	27·86	8·02	2·09	—	—	—	4·48					
		2930	—	0·42	34·70	27·86	7·98	2·11	—	—	—	4·53					
		3420	—	0·20	34·69	27·86	8·01	2·15	—	—	—	4·68					
		3900	3902	−0·09	34·68	27·88	8·10	2·19	—	—	—	4·70					
860	21	0	—	0·61	33·78	27·12	8·10	2·05	—	—	—	7·23	**N 70 V**	1000–750	**2015**		
		10	—	0·61	33·78	27·12	8·10	2·05	—	—	—	—	,,	750–520			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
860 *cont.*	57° 56·4′ S, 73° 58·8′ E	1932 26–27 iv											
861	56° 28·9′ S, 79° 18·2′ E	27 iv	2000	2293*	W	13	W	2	bcsp	985·1	−1·2	−1·4	mod. W swell
			0000	—	WSW	19	WSW	4	bc	983·7	−0·5	−1·2	mod. W×N swell
862	55° 33·8′ S, 83° 00·4′ E	28 iv	2000	3815*	SSW	15–18	SSW	3	c	989·3	−1·4	−2·7	low W swell
863	54° 15·3′ S, 88° 22·4′ E	29 iv	2000	4696*	N×E	24	N×E	5	os	983·8	0·0	−0·9	mod. conf. SE swell
			0000	—	WNW	24	WNW	5	os	979·9	1·6	0·6	mod. conf. SE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	TIME To	
860 *cont.*	21	20	—	0·61	33·78	27·12	8·10	2·05	—	—	—	7·24	**N 70 V**	500–250			
		30	—	0·61	33·78	27·12	8·10	2·05	—	—	—	—	,,	250–100			
		40	—	0·61	33·78	27·12	8·10	2·05	—	—	—	7·24	,,	100–50			
		50	—	0·61	33·78	27·12	8·10	2·05	—	—	—	—	,,	50–0			
		60	—	0·61	33·78	27·12	8·10	2·05	—	—	—	7·22	**N 50 V**	100–0	—	**2330**	
		80	—	0·60	33·78	27·12	8·10	2·05	—	—	—	—	**N 70 B**	119–0	**2349**	**0009**	KT
		100	—	−0·30	33·90	27·25	8·06	2·24	—	—	—	7·20	**N 100 B**				
		150	—	0·19	34·13	27·41	7·99	2·53	—	—	—	6·01	**N 70 B**	300–100	**2349**	**0020**	DGP
		200	—	1·50	34·38	27·54	7·91	2·72	—	—	—	4·57	**N 100 B**				
		300	—	1·96	34·52	27·61	7·89	2·72	—	—	—	3·88					
		400	—	2·06	34·61	27·67	7·89	2·62	—	—	—	3·74					
		590	—	2·13	34·67	27·72	7·92	2·53	—	—	—	3·98					
		790	—	2·04	34·72	27·77	7·92	2·41	—	—	—	4·07					
		990	—	1·89	34·75	27·81	7·95	2·38	—	—	—	4·20					
		1490	—	1·45	34·76	27·84	7·98	2·38	—	—	—	4·41					
		1980	—	1·01	34·73	27·85	7·98	2·38	—	—	—	4·55					
		2480	—	0·70	34·71	27·86	8·00	2·38	—	—	—	4·49					
		2970	2964	0·45	34·69	27·85	8·10	2·38	—	—	—	4·17					
861	22	0	—	0·72	34·04	27·31	8·09	2·22	—	0·42	—	7·03	**N 70 V**	1000–750	**2005**		
		10	—	0·72	34·04	27·31	8·09	2·22	—	0·42	—	—	,,	750–550			
		20	—	0·72	34·04	27·31	8·09	2·22	—	0·45	—	7·03	,,	500–250			
		30	—	0·72	34·04	27·31	8·09	2·22	—	0·46	—	—	,,	250–0			
		40	—	0·72	34·04	27·31	8·09	2·22	—	0·46	—	7·06	,,	250–100			
		50	—	0·72	34·04	27·31	8·09	2·22	—	0·46	—	—	,,	100–50			
		60	—	0·72	34·04	27·31	8·09	2·22	—	0·44	—	7·03	,,	50–0			
		80	—	0·72	34·04	27·31	8·08	2·22	—	0·43	—	—	**N 50 V**	100–0	—	**2315**	
		100	—	0·08	34·27	27·54	7·96	2·57	—	0·29	—	5·56	**N 70 B**	109–0	**0019**	**0039**	KT
		150	—	0·78	34·49	27·67	7·92	2·62	—	0·07	—	4·54	**N 100 B**				
		200	—	1·40	34·60	27·71	7·91	2·57	—	0·05	—	4·16	**N 70 B**	254–110	**0019**	**0049**	DGP
		300	—	1·60	34·68	27·77	7·92	2·53	—	0·00	—	4·04	**N 100 B**				
		400	—	1·80	34·72	27·78	7·93	2·49	—	0·00	—	4·02					
		600	—	1·66	34·75	27·82	7·98	2·43	—	0·00	—	4·22					
		800	—	1·52	34·75	27·84	8·08	2·26	—	0·00	—	4·29					
		1000	—	1·22	34·72	27·83	8·08	2·24	—	0·00	—	4·27					
		1500	—	0·79	34·70	27·84	8·09	2·43	—	0·00	—	4·45					
		2000	—	0·49	34·69	27·84	8·09	2·38	—	0·00	—	4·45					
862	23	0	—	1·80	33·88	27·11	8·11	2·30	—	0·35	—	7·00	**N 70 V**	1000–750	**2015**		−6 hours
		10	—	1·81	33·88	27·11	8·11	2·30	—	0·36	—	—	,,	750–300			
		20	—	1·81	33·88	27·11	8·11	2·30	—	0·34	—	7·02	,,	750–500			
		30	—	1·81	33·88	27·11	8·11	2·30	—	0·35	—	—	,,	500–250			
		40	—	1·81	33·88	27·11	8·11	2·30	—	0·36	—	7·03	,,	250–100			
		50	—	1·81	33·88	27·11	8·11	2·30	—	0·34	—	—	,,	100–50			
		60	—	1·81	33·88	27·11	8·11	2·30	—	0·34	—	6·98	,,	50–0			
		80	—	1·76	33·89	27·12	8·08	2·30	—	0·33	—	—	**N 50 V**	100–0	—	**2230**	
		100	—	1·32	34·03	27·27	8·04	2·51	—	0·30	—	6·53	**N 70 B**	102–0	**2313**	**2333**	KT
		150	—	1·60	34·34	27·49	7·93	3·16	—	0·04	—	4·74	**N 100 B**				
		200	—	1·95	34·46	27·56	7·91	2·89	—	0·02	—	4·18	**N 70 B**	220–98	**2313**	**2343**	DGP
		300	—	1·98	34·60	27·67	7·91	2·79	—	0·06	—	4·03	**N 100 B**				
		400	—	2·10	34·65	27·70	7·96	2·72	—	—	—	4·03					
		600	—	1·84	34·69	27·75	8·02	2·45	—	—	—	4·00					
		800	—	1·75	34·72	27·79	8·02	2·53	—	—	—	4·21					
		1000	—	1·62	34·75	27·83	7·98	2·53	—	—	—	4·38					
		1500	—	1·19	34·71	27·83	8·01	2·53	—	—	—	4·50					
		2000	—	0·80	34·70	27·84	8·08	2·53	—	—	—	4·43					
		2500	—	0·48	34·69	27·84	8·04	2·53	—	—	—	4·66					
		3000	—	0·18	34·68	27·86	8·14	2·57	—	0·00	—	4·62					
863	24	0	—	1·97	33·85	27·08	8·12	2·30	—	0·41	—	7·03	**N 50 V**	100–0	**2009**		
		10	—	1·97	33·85	27·08	8·12	2·30	—	0·39	—	—	**N 70 V**	1000–750			
		20	—	1·97	33·85	27·08	8·12	2·30	—	0·40	—	7·06	,,	750–500			
		30	—	1·98	33·85	27·07	8·12	2·32	—	0·41	—	—	,,	500–250			
		40	—	1·95	33·87	27·09	8·12	2·32	—	0·40	—	7·02	,,	250–100			
		50	—	1·61	33·90	27·14	—	2·41	—	0·38	—	—	,,	100–50			
		60	—	1·59	33·90	27·14	8·08	2·45	—	0·38	—	6·84	,,	50–0	—	**2217**	
		80	—	1·28	34·00	27·24	8·03	2·57	—	0·29	—	—	**N 70 B**	90–0	**0127**	**0147**	KT
		100	—	1·09	34·11	27·35	7·99	2·85	—	0·19	—	5·88	**N 100 B**				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
863 *cont.*	54° 15·3′ S, 88° 22·4′ E	1932 29–30 iv											
864	53° 11·7′ S, 93° 10·6′ E	30 iv	2000	4475*	NW	40–45	NW × W	6	orq	975·7	5·1	4·5	heavy WNW swell
865	52° 48·4′ S, 94° 56′ E	1 v	0615	—	W	25	W	6	o	994·8	3·2	2·5	mod. WNW swell
866	51° 22·6′ S, 96° 26·4′ E	1 v	2000	3693*	NW	18	NW	4	orq	1003·3	4·9	4·2	mod. conf. NW swell
			0000	—	NW	35	NW	6	orq	1002·7	5·7	5·6	heavy conf. NW swell
867	49° 25·5′ S, 98° 21·8′ E	2 v	2000	3519*	SW	24	SW	5	orq	1000·7	3·2	3·1	heavy conf. NW swell
			0000	—	W × S	24	W × S	5	o	1003·1	3·5	3·0	heavy conf. NW swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	Time From	Time To	Remarks
		HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				
863 *cont.*	24	150	—	1·48	34·25	27·43	7·94	3·00	—	0·07	—	4·99	N 70 B	200–82	0127	0159	DGP
		200	—	1·92	34·41	27·53	7·93	2·68	—	0·00	—	4·41	N 100 B				
		300	—	1·98	34·50	27·59	7·91	2·85	—	0·00	—	4·15					
		390	—	1·89	34·58	27·67	7·91	2·85	—	0·00	—	4·06					
		590	—	1·91	34·68	27·75	7·98	2·51	—	0·00	—	4·12					
		790	—	1·90	34·70	27·76	8·04	2·45	—	0·00	—	4·19					
		990	—	1·79	34·74	27·80	8·03	2·45	—	—	—	4·28					
		1480	—	1·31	34·71	27·82	7·99	2·49	—	—	—	4·44					
		1970	—	1·09	34·70	27·82	8·04	2·49	—	—	—	4·51					
		2460	—	0·78	34·68	27·83	8·00	2·49	—	—	—	4·58					
		2960	—	0·26	34·67	27·85	8·06	2·49	—	—	—	4·69					
		3450	—	0·08	34·67	27·86	8·06	2·51	—	—	—	4·91					
		3940	3934	−0·03	34·67	27·86	8·12	2·57	—	0·00	—	4·79					
864	25	0	—	2·56	33·81	27·00	8·11	1·90	—	0·37	—	6·99					
		10	—	2·56	33·81	27·00	8·11	1·90	—	0·39							
		20	—	2·56	33·81	27·00	8·11	1·90	—	0·37	—	7·00					
		30	—	2·56	33·81	27·00	8·11	1·90	—	0·41							
		40	—	2·56	33·81	27·00	8·11	1·90	—	0·41?	—	7·02					
		50	—	2·56	33·81	27·00	8·11	1·90	—	0·38							
		60	—	2·56	33·81	27·00	8·12	1·90	—	0·36	—	6·99					
		80	—	2·56	33·81	27·00	8·12	1·90	—	0·36							
		100	—	2·51	33·86	27·03	8·12	1·90	—	0·37	—	7·02					
		150	—	1·78	33·99	27·21	8·08	2·11	—	0·44	—	6·72					
		200	—	0·78	34·19	27·44	8·01	2·36	—	0·38	—	6·03					
		300	—	0·91	34·43	27·62	7·95	2·36	—	0·00	—	4·86					
		400	—	1·42	34·59	27·71	7·92	2·36	—	—	—	4·36					
		600	—	1·85	34·69	27·75	7·96	2·36	—	—	—	4·14					
		800	—	1·78	34·75	27·82	7·98	2·19	—	—	—	4·22					
		1000	—	1·76	34·77	27·83	8·03	2·07	—	—	—	4·31					
		1490	—	1·41	34·76	27·84	8·03	2·15	—	—	—	4·45					
		1990	—	1·06	34·73	27·85	8·05	2·07	—	—	—	4·45					
		2490	—	0·69	34·70	27·85	8·04	2·20	—	—	—	4·59					
		2990	—	0·36	34·69	27·85	8·10	2·22	—	—	—	4·67					
		3480	—	0·20	34·68	27·86	8·05	2·24	—	—	—	4·79					
		3980	3973	0·05	34·68	27·87	8·15	2·26	—	0·00	—	4·75					
865	25	0	—	2·60	—	—	—	—	—	—	—	—	N 100 B	116–0	0620	0640	KT. Temperature from thermograph
													N 100 B	250–0	0620	0700	Depth estimated
													N 100 B	290–150	0711	0741	DGP. Closing depth estimated
866	26	0	—	3·60	33·83	26·92	8·13	2·09	—	0·34	—	6·89	N 70 V	1000–750	2015		
		10	—	3·60	33·83	26·92	8·13	2·09	—	0·34	—	—	,,	750–500			
		20	—	3·60	33·83	26·92	8·13	2·09	—	0·34	—	6·90	,,	500–250			
		30	—	3·60	33·83	26·92	8·13	2·09	—	0·36	—	—	,,	250–100			
		40	—	3·60	33·83	26·92	8·13	2·09	—	0·36	—	6·90	,,	100–50			
		50	—	3·60	33·83	26·92	8·13	2·09	—	0·35	—	—	,,	50–0			
		60	—	3·60	33·83	26·92	8·12	2·09	—	0·36	—	6·89	N 50 V	100–0	—	2349	
		80	—	3·55	33·84	26·93	8·12	2·09	—	0·35	—	—	N 70 B	98–0	0334	0354	KT. Tears in both nets
		100	—	3·55	33·84	26·93	8·12	2·09	—	0·34	—	6·88	N 100 B				
		150	—	3·55	33·92	27·00	8·08	2·17	—	0·26	—	6·67	N 70 B	284–110	0334	0404	DGP
		200	—	3·55	34·17	27·20	8·03	2·38	—	0·00	—	5·78	N 100 B				
		300	—	2·90	34·20	27·28	7·99	2·53	—	0·00	—	5·39					
		400	—	2·30	34·26	27·38	7·96	2·60	—	—	—	5·07					
		590	—	2·76	34·44	27·49	8·08	2·62	—	—	—	4·07					
		790	—	2·53	34·54	27·59	8·02	2·74	—	—	—	3·94					
		990	993	2·44	34·64	27·67	8·07	2·53	—	—	—	3·79					
		1390	—	2·17	34·75	27·78	8·04	2·41	—	—	—	4·24					
		1860	—	1·88	34·75	27·81	8·05	2·47	—	—	—	4·51					
		2320	—	1·39	34·74	27·83	8·05	2·51	—	—	—	4·61					
		2780	2782	1·04	34·73	27·85	8·10	2·59	—	0·00	—	4·47					
867	27	0	—	5·36	33·85	26·74	8·09	1·98	—	0·35	—	6·67	N 70 V	1000–750	2020		−7 hours
		10	—	5·36	33·85	26·74	8·09	1·98	—	0·38	—	—	,,	750–500			
		20	—	5·36	33·85	26·74	8·09	1·98	—	0·38	—	6·71	,,	500–250			
		30	—	5·36	33·85	26·74	8·09	1·98	—	0·36	—	—	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
867 *cont.*	49° 25·5′ S, 98° 21·8′ E	1932 2–3 v											
868	46° 55·4′ S, 100° 45·6′ E	3 v	2000	3686*	SSW	17	SSW	3	bc	1009·1	4·4	2·3	mod. conf. W and SW swell
869	43° 56·5′ S, 103° 24·3′ E	4 v	2000	3772*	WNW	25–35	WNW	6	orq	1004·9	8·8	7·7	heavy conf. WNW swell
			0000	—	WNW	26	WNW	6	opq	1004·5	8·9	8·3	heavy conf. WNW swell
870	41° 41·7′ S, 105° 16′ E	5 v	2000	4115*	NW×W	30	NW×W	6	orq	1009·1	11·8	11·1	heavy WNW swell
			0000	—	NW×W	22–27	NW×W	6	orq	—	11·8	11·6	heavy WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
867 *cont.*	27	40	—	5·36	33·85	26·74	8·09	1·98	—	0·36	—	6·69	**N 70 V**	100–50			
		50	—	5·36	33·85	26·74	8·09	1·98	—	0·36	—	—	,,	50–0			
		60	—	5·36	33·85	26·74	8·09	1·98	—	0·36	—	6·68	**N 50 V**	100–0	—	**2235**	
		80	—	5·33	33·85	26·75	8·09	1·98	—	0·37	—	—	**N 70 B**	139–0	**2313**	**2333**	KT. **N 70 B** torn
		100	—	5·32	33·85	26·75	8·09	1·98	—	0·39	—	6·66	**N 100 B**				
		150	—	4·18	33·86	26·88	8·10	2·11	—	0·33	—	6·69	**N 70 B**	330–150	**2313**	**2343**	DGP
		200	—	5·60	34·19	26·99	8·04	2·19	—	0·00	—	5·71	**N 100 B**				
		300	—	3·81	34·12	27·13	8·02	2·45	—	0·00	—	5·79	**N 70 B**	100–0	**2358**	**0018**	KT
		400	—	3·59	34·23	27·24	7·99	2·60	—	—	—	5·40					
		600	—	3·01	34·32	27·37	7·95	2·89	—	—	—	4·69					
		800	—	2·73	34·46	27·50	7·91	2·91	—	—	—	4·13					
		1000	—	2·48	34·55	27·60	7·92	2·91	—	—	—	3·97					
		1500	—	2·31	34·71	27·74	7·99	2·89	—	—	—	4·17					
		2000	—	2·01	34·74	27·79	8·03	2·68	—	—	—	4·33					
		2500	—	1·55	34·76	27·83	8·03	2·62	—	—	—	4·35					
		3000	—	1·04	34·73	27·85	8·08	2·68	—	0·00	—	4·46					
868	27	0	—	6·61	33·88	26·62	8·08	1·63	—	0·41	—	6·57	**N 70 V**	1000–750	**2008**		−8 hours
		10	—	6·61	33·88	26·62	8·08	1·65	—	0·41	—	—	,,	750–500			
		20	—	6·56	33·87	26·61	8·08	1·67	—	0·42	—	6·59	,,	500–250			
		30	—	6·43	33·86	26·61	8·08	1·73	—	0·41	—	—	,,	250–100			
		40	—	6·32	33·85	26·63	8·09	1·73	—	0·40	—	6·62	,,	100–50			
		50	—	6·21	33·85	26·64	8·09	1·77	—	0·40	—	—	,,	50–0			
		60	—	6·10	33·85	26·65	8·09	1·77	—	0·39	—	6·61	**N 50 V**	100–0	—	**2150**	
		80	—	5·91	33·85	26·68	8·10	1·77	—	0·38	—	—	**N 70 B**	98–0	**2237**	**2257**	KT
		100	—	5·91	33·85	26·68	8·10	1·77	—	0·37	—	6·62	**N 100 B**				
		150	—	5·93	34·01	26·80	8·09	1·77	—	0·19	—	6·25	**N 70 B**	240–100	**2237**	**2308**	DGP
		200	—	5·41	34·01	26·86	8·05	1·92	—	0·00	—	5·81	**N 100 B**				
		290	—	4·62	34·18	27·09	8·03	2·00	—	0·00	—	5·74					
		390	—	4·21	34·18	27·14	8·00	2·09	—	—	—	5·56					
		580	—	3·20	34·27	27·31	7·98	2·43	—	—	—	4·93					
		780	—	2·97	34·39	27·43	7·98	2·57	—	—	—	4·23					
		970	—	2·73	34·49	27·52	7·93	2·74	—	—	—	4·19					
		1460	—	2·39	34·68	27·71	7·97	2·66	—	—	—	3·98					
		1950	—	2·15	34·75	27·79	8·02	2·49	—	—	—	4·31					
		2430	—	1·65	34·75	27·83	8·04	2·43	—	—	—	4·42					
		2920	2919	1·32	34·73	27·83	8·08	2·43	—	0·00	—	4·44					
869	29	0	—	10·64	34·65	26·58	8·11	1·27	—	0·29	—	5·94	**N 70 V**	1000–740	**2010**		
		10	—	10·64	34·65	26·58	8·11	1·27	—	0·28	—	—	,,	750–510			
		20	—	10·64	34·65	26·58	8·11	1·27	—	0·29	—	5·96	,,	500–250			
		30	—	10·64	34·65	26·58	8·11	1·27	—	0·29	—	—	,,	250–100			
		40	—	10·64	34·65	26·58	8·11	1·27	—	0·28	—	5·95	,,	100–50			
		50	—	10·64	34·65	26·58	8·11	1·27	—	0·26	—	—	,,	50–0			
		60	—	10·64	34·65	26·58	8·11	1·27	—	0·26	—	5·95	**N 50 V**	100–0	—	**2150**	
		80	—	10·64	34·65	26·58	8·11	1·27	—	0·28	—	—	**N 70 B**	68–0	**0030**	**0050**	KT
		100	—	10·64	34·65	26·58	8·11	1·27	—	0·28	—	5·93	**N 100 B**				
		150	—	9·89	34·74	26·79	8·11	1·33	—	0·06	—	5·70					
		200	—	9·80	34·75	26·81	8·11	1·33	—	0·00	—	5·69	**N 70 B**	240–120	**0030**	**0100**	DGP. Deep nets fishing near surface for some time during repairs to wire
		290	—	9·73	34·81	26·87	8·12	1·33	—	0·00	—	5·72	**N 100 B**				
		390	—	9·30	34·73	26·88	8·12	1·33	—	—	—	5·82					
		490	—	9·30	34·73	26·88	8·13	1·37	—	—	—	5·67					
		590	—	9·19	34·73	26·90	8·12	1·54	—	—	—	5·52					
		780	—	7·71	34·52	26·96	8·09	1·98	—	—	—	4·86					
		970	—	5·47	34·37	27·14	8·02	2·40	—	—	—	4·64					
		1440	—	3·03	34·46	27·47	7·96	2·64	—	—	—	4·05					
		1950	1944	2·54	34·63	27·65	8·04	2·64	—	—	—	3·78					
		2480	—	2·21	34·73	27·76	8·05	2·51	—	—	—	4·20					
		2970	2971	1·73	34·75	27·82	8·10	2·53	—	—	—	4·21					
		3460	—	1·41	34·73	27·82	8·00	2·57	—	0·00	—	4·57					
870	0	0	—	10·64	34·50	26·47	8·12	1·37	—	0·31	—	5·92	**N 70 V**	1000–750	**2025**		
		10	—	10·64	34·50	26·47	8·12	1·37	—	0·30	—	—	,,	750–500			
		20	—	10·64	34·50	26·47	8·12	1·37	—	0·29	—	5·93	,,	500–250			
		30	—	10·64	34·50	26·47	8·12	1·37	—	0·29	—	—	,,	250–100			
		40	—	10·64	34·50	26·47	8·12	1·37	—	0·30	—	5·94	,,	100–50			
		50	—	10·64	34·50	26·47	8·12	1·37	—	0·30	—	—	,,	50–0			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
870 *cont.*	41° 41·7′ S, 105° 16′ E	1932 5–6 v											
871	39° 32·1′ S, 107° 06·4′ E	6 v	2000	4534*	NW × N	25	NW × N	5	bc	1017·3	14·2	13·3	heavy conf. NW swell
			0000	—	NW × N	24–28	NW × N	5	bc	1018·6	14·2	13·5	heavy conf. NW swell
872	37° 09·1′ S, 108° 47·2′ E	7 v	2000	4059*	NNW	4–6	NNW	3	bw	1025·5	16·2	16·0	low WSW swell
873	34° 19·1′ S, 110° 21·7′ E	8 v	2000	2097*	NE × E	10	NE × E	2	b	1023·1	20·3	19·2	mod. conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
870 *cont.*	0	60	—	10·64	34·50	26·47	8·12	1·37	—	0·30	—	5·93	**N 50 V**	100–0	—	**2320**	
		80	—	10·64	34·50	26·47	8·12	1·37	—	0·30	—	—	**N 70 B**	95–0	**0051**	**0111**	KT
		100	—	10·64	34·50	26·47	8·12	1·37	—	0·30	—	5·91	**N 100 B**				
		150	—	9·80	34·66	26·74	8·11	1·54	—	0·06	—	5·65	**N 70 B**	250–90	**0051**	**0123**	DGP
		200	—	9·33	34·66	26·82	8·11	1·54	—	0·00	—	5·71	**N 100 B**				
		300	—	9·10	34·66	26·85	8·11	1·54	—	0·00	—	5·66					
		400	—	8·90	34·65	26·88	8·12	1·54	—	—	—	5·68					
		500	—	8·66	34·61	26·89	8·19	1·56									
		590	—	8·44	34·61	26·93	8·10	1·77	—	—	—	5·21					
		790	—	6·65	34·50	27·09	8·08	2·15	—	—	—	4·56					
		990	993	4·23	34·34	27·26	8·09	2·36	—	—	—	4·52					
		1460	1457	2·83	34·52	27·54	8·01	2·38	—	—	—	3·80					
		1890	—	2·53	34·67	27·68	8·01	2·51	—	—	—	4·00					
		2360	2360	2·20	34·76	27·78	8·08	2·32	—	—	—	4·15					
		2830	—	1·64	34·75	27·83	8·03	2·38	—	—	—	4·36					
		3300	—	1·20	34·75	27·86	8·07	2·43	—	0·00	—	4·45					
871	1	0	—	12·55	34·91	26·44	8·17	0·91	—	0·26	—	5·67	**N 70 V**	1000–750	**2100**		
		10	—	12·58	34·91	26·43	8·17	0·91	—	0·28	—	—	,,	750–500			
		20	—	12·59	34·91	26·43	8·17	0·89	—	0·29	—	5·68	,,	500–230			
		30	—	12·58	34·91	26·43	8·17	0·89	—	0·27	—	—	,,	250–100			
		40	—	12·56	34·90	26·42	8·17	0·89	—	0·28	—	5·70	,,	100–50			
		50	—	12·58	34·91	26·43	8·17	0·89	—	0·28	—	—	,,	50–0			
		60	—	12·58	34·91	26·43	8·17	0·91	—	0·24	—	5·66	**N 50 V**	100–0	—	**0135**	
		80	—	12·60	34·94	26·44	8·16	0·91	—	0·26	—	—	**N 70 B**	91–0	**0152**	**0212**	KT
		100	—	12·41	34·96	26·49	8·16	0·91	—	0·44	—	5·59	**N 100 B**				
		150	—	10·77	34·96	26·80	8·13	1·16	—	0·00	—	6·12	**N 70 B**	240–100	**0152**	**0222**	DGP
		190	—	10·33	34·91	26·85	8·13	1·18	—	0·00	—	5·60	**N 100 B**				
		290	—	9·83	34·81	26·86	8·10	1·22	—	0·00	—	5·61					
		380	—	9·50	34·78	26·88	8·10	1·31	—	—	—	5·45					
		570	—	8·70	34·68	26·94	8·11	1·62	—	—	—	5·36					
		760	—	6·98	34·52	27·07	8·08	1·96	—	—	—	4·45					
		960	—	4·82	34·40	27·24	8·03	2·28	—	—	—	4·48					
		1430	—	2·99	34·51	27·52	7·96	2·66	—	—	—	3·75					
		1910	—	2·71	34·66	27·66	8·06	2·43	—	—	—	3·71					
		2390	—	2·25	34·73	27·76	8·10	2·36	—	—	—	3·91					
		2870	—	1·85	34·75	27·81	8·07	2·36	—	—	—	4·20					
		3340	—	1·33	34·75	27·85	8·22	2·15	—	—	—	4·07					
		3820	3822	0·96	34·75	27·87	8·24	2·26	—	0·00	—	3·98					
872	2	0	—	16·12	35·61	26·21	8·17	0·49	—	0·09	—	5·28	**N 70 V**	1000–765	**2010**		
		10	—	16·12	35·61	26·21	8·17	0·49	—	0·09	—	—	,,	750–515			
		20	—	16·02	35·60	26·22	8·17	0·49	—	0·09	—	5·29	,,	500–250			
		30	—	16·02	35·60	26·22	8·17	0·49	—	0·09	—	—	,,	250–100			
		40	—	15·64	35·54	26·27	8·18	0·49	—	0·14	—	5·29	,,	100–50			
		50	—	15·53	35·53	26·27	8·19	0·49	—	0·14	—	—	,,	50–0			
		60	—	15·33	35·48	26·28	8·19	0·49	—	0·14	—	5·30	**N 50 V**	100–0	—	**2200**	
		80	—	15·24	35·44	26·27	8·18	0·55	—	0·11	—	—	**N 70 B**	128–0	**2258**	**2318**	KT
		100	—	15·08	35·41	26·29	8·18	0·55	—	0·16	—	5·32	**N 100 B**				
		150	—	13·33	35·43	26·67	8·18	0·55	—	0·00	—	5·23	**N 70 B**	300–146	**2258**	**2328**	DGP
		200	—	12·23	35·20	26·72	8·16	1·05	—	0·00	—	5·37	**N 100 B**				
		300	—	10·83	35·00	26·83	8·14	1·20	—	0·00	—	5·45					
		400	—	10·12	34·85	26·83	8·13	1·24	—	—	—	5·52					
		600	—	9·11	34·75	26·93	8·15	1·46	—	—	—	5·27					
		800	—	7·95	34·59	26·98	8·11	1·82	—	—	—	4·90					
		990	—	5·13	34·37	27·18	8·04	2·22	—	—	—	4·35					
		1490	—	3·00	34·52	27·52	7·95	2·66	—	—	—	3·68					
		1990	—	2·54	34·69	27·69	8·01	2·62	—	—	—	3·73					
		2490	—	2·11	34·75	27·79	8·03	2·47	—	—	—	3·85					
		2980	—	1·75	34·75	27·82	8·08	2·47	—	—	—	3·95					
		3480	3479	1·42	34·75	27·84	8·09	2·47	—	0·00	—	4·05					
873	3	0	—	20·52	35·80	25·25	8·18	0·34	—	0·00	—	4·83	**N 70 V**	1000–775	**2015**		
		10	—	20·52	35·81	25·26	8·19	0·38	—	0·00	—	—	,,	750–515			
		20	—	20·33	35·82	25·32	8·19	0·36	—	0·00	—	4·83	,,	500–250			
		30	—	19·35	35·82	25·58	8·20	0·36	—	0·00	—	—	,,	250–90			
		40	—	18·73	35·83	25·74	8·21	0·38	—	0·00	—	4·90	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
873 *cont.*	34° 19·1′ S, 110° 21·7′ E	1932 8 v											
874	32° 15·2′ S, 112° 26·2′ E	9 v	1430	4975*	NNE	10	NNE	2–3	b	1018·4	22·1	20·0	mod. SSW swell
875	32° 12·8′ S, 113° 48′ E	10 v	0100	4237*	NE × N	11	NE × N	2	b	1018·9	22·2	18·9	low conf. swell
876	32° 02′ S, 115° 16′ E	10 v	1232	173	N	18	N	3	b	1016·5	24·4	16·2	low N swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P (Mg.—atom m.³)	Nitrate + Nitrite N₂ (Mg.—atom m.³)	Nitrite N₂ (Mg.—atom m.³)	Si (Mg.—atom m.³)	O₂ c.c. litre	Gear	Depth (metres)	Time From	Time To	Remarks
873 *cont.*	3	50	—	18·63	35·84	25·77	8·21	0·44	—	0·00	—	—	N 70 V	50–0			
		60	—	18·63	35·83	25·77	8·21	0·36	—	0·00	—	4·96	N 50 V	100–0	—	2145	
		80	—	18·43	35·84	25·82	8·18	0·36	—	0·04	—	—	N 70 B	86–0	2218	2238	KT
		100	—	16·50	35·66	26·16	8·18	0·51	—	0·00	—	5·09	N 100 B				
		150	—	13·22	35·34	26·63	8·14	0·61	—	0·00	—	5·28	N 70 B	220–100	2218	2248	DGP
		200	—	11·74	35·13	26·76	8·11	0·74	—	0·00	—	5·36	N 100 B				
		300	—	10·20	34·93	26·88	8·13	1·22	—	0·00	—	5·39					
		400	—	9·43	34·78	26·90	8·13	1·24	—	—	—	5·32					
		590	—	8·48	34·66	26·95	8·14	1·62	—	—	—	5·17					
		790	—	5·71	34·43	27·16	8·03	2·41	—	—	—	4·25					
		990	—	3·98	34·42	27·34	8·00	2·79	—	—	—	3·87					
		1480	—	2·74	34·63	27·64	8·01	2·83	—	—	—	3·67					
		1730	1725	2·53	34·69	27·70	8·01	2·98	—	0·00	—	3·55					
874	4	0	—	21·02	35·82	25·13	8·19	0·19	—	0·00	—	4·79	N 50 V	100–0	1432		
		10	—	20·86	35·82	25·17	8·19	0·19	—	0·00	—	—	N 70 V	1000–780			
		20	—	20·63	35·83	25·25	8·19	0·19	—	0·00	—	4·81	,,	750–500			
		30	—	20·55	35·86	25·29	8·19	0·19	—	0·00	—	—	,,	500–250			
		40	—	20·42	35·89	25·34	8·20	0·19	—	0·00	—	4·83	,,	250–100			
		50	—	20·23	35·91	25·41	8·20	0·19	—	0·00	—	—	,,	100–50			
		60	—	19·83	35·93	25·54	8·21	0·19	—	0·00	—	4·87	,,	50–0	—	1600	
		80	—	18·84	35·84	25·72	8·17	0·19	—	0·00	—	—	N 70 B	91–0	1724	1744	KT
		100	—	16·02	35·64	26·25	8·20	0·19	—	0·00	—	5·43	N 100 B				
		150	—	13·52	35·45	26·65	8·17	0·57	—	0·00	—	5·15	N 70 B	260–90	1724	1754	DGP
		200	—	12·32	35·22	26·72	8·15	0·67	—	0·00	—	5·31	N 100 B				
		300	—	10·81	35·00	26·83	8·11	0·86	—	0·00	—	5·38					
		400	—	9·70	34·81	26·88	8·12	1·05	—	—	—	5·31					
		500	—	9·07	34·74	26·93	8·12	1·33	—	—	—	5·13					
		600	—	8·56	34·67	26·95	8·14	1·48	—	—	—	5·17					
		800	—	5·47	34·41	27·17	8·03	2·36									
		1000	—	4·02	34·43	27·35	8·02	2·51	—	—	—	3·58					
		1500	—	2·90	34·59	27·59	8·00	2·76	—	—	—	3·32					
		2000	—	2·57	34·66	27·67	8·01	2·78	—	—	—	3·35					
		2500	—	2·00	34·73	27·78	8·01	2·60	—	—	—	3·66					
		3000	—	1·69	34·73	27·80	8·03	2·57	—	—	—	3·83					
		3500	—	1·40	34·72	27·81	8·08	2·55	—	—	—	3·95					
		4000	—	1·27	34·72	27·82	8·08	2·53									
		4500	4505	1·13	34·72	27·83	8·17	2·51	—	0·00	—	4·09					
875	4	0	—	22·03	35·57	24·66	8·19	0·19	—	0·14	—	4·60	N 70 V	1000–770	0110		
		10	—	22·03	35·57	24·66	8·19	0·19	—	0·00	—	—	,,	750–500			
		20	—	22·03	35·57	24·66	8·19	0·19	—	0·10	—	4·58	,,	500–250			
		30	—	22·03	35·57	24·66	8·19	0·19	—	0·06	—	—	,,	250–100			
		40	—	22·03	35·57	24·66	8·19	0·25	—	0·13	—	4·61	,,	100–50			
		50	—	22·03	35·57	24·66	8·19	0·44	—	0·04	—	—	,,	50–0			
		60	—	22·01	35·57	24·67	8·19	0·46	—	0·07	—	4·60	N 50 V	100–0	—	0310	
		80	—	21·98	35·57	24·68	8·19	0·48	—	0·05	—	—	N 70 B	91–0	0415	0435	KT
		90	—	21·96	35·57	24·68	8·19	0·51	—	0·05	—	4·63	N 100 B				
		140	—	21·92	35·57	24·69	8·19	0·53	—	0·00	—	4·62	N 70 B	225–95	0415	0445	DGP
		190	—	19·52	35·79	25·50	8·17	0·70	—	0·00	—	4·48	N 100 B				
		280	—	14·32	35·55	26·56	8·18	0·70	—	0·00	—	5·04					
		370	—	11·83	35·15	26·76	8·15	0·70	—	—	—	5·25					
		560	—	9·58	34·79	26·88	8·13	1·25	—	—	—	5·19					
		750	—	8·22	34·60	26·94	8·17	1·50	—	—	—	4·86					
		940	—	5·01	34·40	27·22	8·15	2·15	—	—	—	3·98					
		1400	—	3·31	34·50	27·48	8·05	2·66	—	—	—	3·50					
		1870	—	2·64	34·68	27·69	8·00	2·76	—	—	—	3·45					
		2340	—	2·22	34·70	27·74	8·02	2·76	—	—	—	3·44					
		2800	—	1·87	34·73	27·79	8·03	2·70	—	—	—	3·65					
		3270	3263	1·59	34·73	27·81	8·12	2·59	—	0·00	—	3·69					
876	4	0	—	22·44	35·48	24·47	8·17	0·25	—	0·00	—	4·57	N 70 V	100–50	1238		Sounding by plankton wire
		10	—	22·44	35·48	24·47	8·17	0·25	—	0·00	—	—	,,	50–0			
		20	—	22·43	35·48	24·48	8·17	0·25	—	0·00	—	4·59	N 50 V	100–0	—	1310	
		30	—	22·43	35·48	24·48	8·17	0·25	—	0·00	—	—	N 70 B	100–0	1317	1337	KT
		40	—	22·41	35·48	24·48	8·17	0·25	—	0·00	—	4·61	N 100 B				
		50	—	22·27	35·50	24·54	8·18	0·25	—	0·00							

12

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
876 *cont.*	32° 02′ S, 115° 16′ E	1932 10 v											
877	35° 12·5′ S, 114° 42·5′ E	17 v	2007 0000	2239* —	S × E SSE	18–20 18–20	S × E SSE	4 3	c bc	1022·9 1023·5	16·1 15·8	12·0 12·3	mod. SW swell mod. conf. swell
878	38° 01′ S, 115° 38·6′ E	18 v	2000 0000	4624* —	SE SE	4 4	SE SE	1 1	bc bc	1027·9 1027·5	11·6 11·6	8·5 8·8	mod. SW swell mod. SW swell
879	40° 56·7′ S, 116° 46·5′ E	19 v	2000 0000	4733* —	NW × W NW × W	16 20	NW × W NW × W	3 3	o o	1025·4 1023·8	11·6 11·8	9·1 9·1	mod. SW × W swell heavy SW × W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
876 *cont.*	4	60	—	22·23	35·52	24·56	8·18	0·25	—	0·00	—	4·58					
		80	—	22·23	35·52	24·56	8·17	0·25	—	0·00							
		100	—	22·15	35·53	24·60	8·19	0·30	—	0·00	—	4·51					
		150	—	22·05	35·58	24·67	8·18	0·34	—	0·32	—	4·35					
877	11	0	—	21·05	35·62	24·97	8·16	—	—	0·00	3·4	4·81	N 70 V	750–500	2010		
		10	—	21·05	35·62	24·97	8·16	—	—	0·00	3·4	—	,,	500–250			
		20	—	21·04	35·62	24·97	8·16	—	—	0·00	3·4	4·84	,,	250–100			
		30	—	20·83	35·64	25·04	8·16	—	—	0·00	3·4	—	,,	100–50			
		40	—	19·65	35·74	25·44	8·18	—	—	0·00	3·4	4·99	,,	50–0			
		50	—	19·07	35·77	25·61	8·18	—	—	0·00	3·4	—	N 50 V	100–0	—	2300	
		60	—	18·84	35·81	25·70	8·18	—	—	0·00	3·4	5·04	N 70 B	102–0	0001	0021	KT
		80	—	18·35	35·77	25·79	8·20	—	—	0·04	3·4	—	N 100 B				
		90	—	17·82	35·74	25·91	8·16	—	—	0·11	3·4	5·07	N 70 B	250–100	0001	0031	DGP
		140	—	16·40	35·57	26·11	8·17	—	—	0·31	3·4	5·15	N 100 B				
		180	—	13·31	35·40	26·66	8·16	—	—	0·00	3·4	5·30					
		280	—	10·88	34·99	26·81	8·14	—	—	0·00	3·4	5·35					
		370	—	9·22	34·79	26·94	8·11	—	—	—	6·9	5·36					
		550	—	7·70	34·54	26·98	8·12	—	—	—	12·7	4·82					
		740	—	5·04	34·41	27·22	8·06	—	—	—	27·0	4·13					
		920	—	4·22	34·41	27·31	8·11	—	—	—	36·7	3·98					
		1390	—	3·18	34·57	27·55	8·07	—	—	—	56·5	3·36					
		1850	1851	2·48	34·70	27·72	8·13	—	—	0·00	68·0	3·43					
878	13	0	—	18·73	35·82	25·73	8·18	—	—	0·05	2·6	5·01	N 70 V	1000–760	2008		
		10	—	18·73	35·82	25·73	8·18	—	—	0·06	2·4	—	,,	750–500			
		20	—	18·73	35·82	25·73	8·18	—	—	0·07	2·3	5·02	,,	500–250			
		30	—	18·73	35·82	25·73	8·18	—	—	0·07	2·1	—	,,	250–100			
		40	—	18·73	35·82	25·73	8·18	—	—	0·08	2·1	5·03	,,	100–50			
		50	—	18·73	35·82	25·73	8·18	—	—	0·08	2·1	—	,,	50–0			
		60	—	18·73	35·82	25·73	8·18	—	—	0·08	2·1	5·02	N 50 V	100–0	—	2240	
		80	—	18·34	35·78	25·81	8·18	—	—	0·26	2·1	—	N 70 B	125–0	2343	0003	KT
		100	—	17·73	35·74	25·93	8·18	—	—	0·23	2·1	5·01	N 100 B				
		150	—	16·32	35·57	26·13	8·16	—	—	0·34	2·1	5·19	N 70 B	294–80	2343	0013	DGP
		200	—	13·82	35·42	26·57	8·19	—	—	0·02	2·1	5·29	N 100 B				
		300	—	11·72	35·12	26·75	8·16	—	—	0·02	2·1	5·46					
		400	—	10·39	34·92	26·84	8·13	—	—	—	3·5	5·52					
		590	—	8·97	34·70	26·91	8·20	—	—	—	5·9	5·06					
		790	—	8·00	34·58	26·97	8·21	—	—	—	9·4	4·77					
		990	983	5·30	34·42	27·19	8·16	—	—	—	30·3	3·95					
		1460	—	2·93	34·52	27·53	8·00	—	—	—	59·6	3·72					
		1950	—	2·54	34·69	27·69	8·02	—	—	—	69·7	3·72					
		2440	—	2·17	34·70	27·74	8·17	—	—	—	75·4	3·78					
		2920	—	1·80	34·78	27·83	8·33	—	—	—	88·0	3·67					
		3410	—	1·36	34·75	27·85	8·23	—	—	—	90·1	3·95					
		3900	3893	1·01	34·74	27·86	8·31	—	—	0·00	90·1	3·82					
879	14	0	—	12·06	34·78	26·43	8·19	—	—	0·26	1·0	5·79	N 70 V	1000–780	2007		
		10	—	12·06	34·78	26·43	8·19	—	—	0·25	1·0	—	,,	750–500			
		20	—	12·06	34·78	26·43	8·19	—	—	0·25	1·0	5·79	,,	500–250			
		30	—	12·06	34·78	26·43	8·19	—	—	0·26	1·0	—	,,	250–100			
		40	—	12·06	34·78	26·43	8·19	—	—	0·26	1·0	5·80	,,	100–50			
		50	—	12·06	34·78	26·43	8·19	—	—	0·27	1·0	—	,,	50–0			
		60	—	12·06	34·78	26·43	8·19	—	—	0·26	1·0	5·80	N 50 V	100–0	—	2235	
		80	—	12·05	34·78	26·43	8·19	—	—	0·27	1·5	—	N 70 B	86–0	2353	0013	KT
		100	—	11·48	34·78	26·54	8·19	—	—	0·46	1·7	5·69	N 100 B				
		150	—	10·56	34·84	26·75	8·17	—	—	0·00	5·6	5·58	N 70 B	200–94	2353	0026	DGP
		190	—	9·86	34·78	26·82	8·14	—	—	0·00	4·6	5·60	N 100 B				
		290	—	9·30	34·76	26·90	8·14	—	—	0·00	6·7	5·50					
		390	—	8·94	34·70	26·91	8·13	—	—	0·00	6·7	5·34					
		580	—	8·45	34·62	26·94	8·19	—	—	0·00	8·3	5·34					
		770	—	7·26	34·50	27·01	8·17	—	—	0·00	14·2	4·59					
		970	—	5·24	34·42	27·20	8·13	—	—	0·00	25·0	4·22					
		1450	1450	2·96	34·51	27·52	8·17	—	—	0·00	49·2	3·54					
		1970	—	2·54	34·66	27·67	8·13	—	—	0·00	60·7	3·42					
		2460	—	2·19	34·71	27·75	8·04	—	—	0·00	67·5	3·97					
		2950	—	1·85	34·72	27·78	8·18	—	—	0·00	74·4	3·98					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
879 *cont.*	40° 56·7′ S, 116° 46·5′ E	1932 19–20 v											
880	43° 53·1′ S, 117° 50·8′ E	20 v	2000	4366*	WNW	15	WNW	4	bw	1019·5	10·3	9·5	heavy W swell
			0000	—	WNW	9	WNW	2	c	1020·1	9·2	8·9	mod. W swell
881	47° 00′ S, 119° 00·3′ E	21 v	2000	4134*	NW	26	NW	5	ome	1013·6	9·0	8·6	heavy conf. NW × W swell
882	49° 52·9′ S, 120° 28·6′ E	22 v	2000	4051*	SW × W	20	SW × W	4 conf.	bcq	1013·8	4·0	2·8	heavy conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
879 *cont.*	14	3440	—	1·53	34·71	27·80	8·21	—	—	0·00	81·0	4·00					
		3930	—	0·96	34·70	27·83	8·28	—	—	0·00	88·9	4·05					
		4420	4417	0·79	34·68	27·82	8·39	—	—	0·00	88·9	3·78					
880	15	0	—	9·75	34·41	26·55	8·17	—	—	0·35	3·2	6·08	**N 70 V**	1000–800	**2006**		
		10	—	9·75	34·41	26·55	8·17	—	—	0·35	3·2	—	,,	750–500			
		20	—	9·75	34·41	26·55	8·17	—	—	0·36	3·2	6·10	,,	500–250			
		30	—	9·76	34·41	26·55	8·17	—	—	0·35	3·2	—	,,	250–0			
		40	—	9·77	34·42	26·55	8·17	—	—	0·35	3·2	6·08	,,	250–100			
		50	—	9·77	34·42	26·55	8·17	—	—	0·34	3·2	—	,,	100–50			
		60	—	9·77	34·42	26·55	8·17	—	—	0·35	3·2	6·09	,,	50–0			
		80	—	9·72	34·42	26·56	8·17	—	—	0·36	3·2	—	**N 50 V**	100–0	—	**2220**	
		100	—	9·70	34·42	26·56	8·16	—	—	0·35	3·2	6·09	**N 70 B**	110–0	**0002**	**0022**	KT
		150	—	9·57	34·52	26·67	8·17	—	—	0·31	3·2	5·80	**N 100 B**				
		200	—	9·00	34·63	26·85	8·15	—	—	0·00	5·8	5·75	**N 70 B**	265–90	**0002**	**0032**	DGP
		300	—	8·98	34·64	26·86	8·13	—	—	0·00	7·1	5·80	**N 100 B**				
		400	—	8·73	34·61	26·88	8·13	—	—	—	7·5	5·71					
		600	—	8·39	34·61	26·93	8·23	—	—	—	10·1	5·15					
		800	—	6·96	34·45	27·01	8·16	—	—	—	17·7	4·49					
		1000	—	5·00	34·38	27·21	8·16	—	—	—	29·7	4·11					
		1490	—	2·93	34·51	27·52	8·09	—	—	—	56·3	3·71					
		1990	—	2·50	34·67	27·69	8·13	—	—	—	65·0	3·93					
		2490	—	2·21	34·71	27·75	8·19	—	—	—	67·3	3·98					
		2980	—	1·70	34·71	27·79	8·26	—	—	—	87·7	3·92					
		3480	—	—	34·70	—	8·17	—	—	—	92·0						
		3980	3976	1·00	34·70	27·83	8·31	—	—	0·00	92·0	3·95					
881	16	0	—	8·30	34·07	26·52	8·12	—	—	0·41	5·6	6·24	**N 70 V**	1000–750	**2005**		
		10	—	8·30	34·07	26·52	8·12	—	—	0·41	5·6	—	,,	750–500			
		20	—	8·30	34·07	26·52	8·12	—	—	0·41	5·6	6·29	,,	500–250			
		30	—	8·30	34·07	26·52	8·12	—	—	0·41	5·6	—	,,	250–100			
		40	—	8·30	34·07	26·52	8·12	—	—	0·41	5·6	6·29	,,	100–50			
		50	—	8·30	34·07	26·52	8·12	—	—	0·41	5·6	—	,,	50–0			
		60	—	8·30	34·07	26·52	8·12	—	—	0·40	5·6	6·25	**N 50 V**	100–0	—	**2150**	
		80	—	8·22	34·07	26·53	8·12	—	—	0·42	5·6	—	**N 70 B**	119–0	**2231**	**2251**	KT
		100	—	8·20	34·07	26·53	8·12	—	—	0·42	5·6	6·27	**N 100 B**				
		150	—	9·30	34·59	26·77	8·11	—	—	0·00	6·0	5·71	**N 70 B**	260–100	**2231**	**2301**	DGP
		200	—	8·99	34·56	26·79	8·11	—	—	0·00	7·5	5·69	**N 100 B**				
		300	—	8·90	34·61	26·86	8·10	—	—	0·00	7·5	5·72					
		400	—	8·50	34·61	26·91	8·11	—	—	—	8·4	5·54					
		600	—	6·99	34·49	27·03	8·12	—	—	—	17·3	4·68					
		800	—	4·78	34·34	27·20	8·11	—	—	—	26·0	4·62					
		1000	—	3·63	34·34	27·33	8·02	—	—	—	37·0	4·45					
		1490	—	2·64	34·56	27·59	8·02	—	—	—	55·5	3·90					
		1990	—	2·36	34·70	27·72	8·15	—	—	—	61·8	3·96					
		2490	—	2·01	34·74	27·79	8·19	—	—	—	71·1	3·97					
		2980	—	1·53	34·72	27·80	8·24	—	—	—	78·6	4·03					
		3480	3479	1·15	34·70	27·82	8·30	—	—	0·00	87·7	4·06					
882	17	0	—	5·05	33·89	26·81	8·10	—	—	0·35	4·1	6·73	**N 70 V**	1000–750	**2005**		−9 hours
		10	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	—	,,	750–480			
		20	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	6·73	,,	500–250			
		30	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	—	,,	250–100			
		40	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	6·75	,,	100–50			
		50	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	—	,,	50–0			
		60	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	6·77	**N 50 V**	100–0	—	**2203**	
		80	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	—	**N 70 B**	102–0	**2318**	**2338**	KT
		100	—	5·05	33·89	26·81	8·10	—	—	0·36	4·1	6·77	**N 100 B**				
		150	—	4·61	34·08	27·02	8·09	—	—	0·00	12·6	6·23	**N 70 B**	210–80	**2318**	**2349**	DGP
		200	—	4·05	34·04	27·04	8·09	—	—	0·00	14·0	6·27	**N 100 B**				
		300	—	3·61	34·06	27·10	8·06	—	—	0·00	21·3	6·06					
		400	—	3·56	34·19	27·21	8·03	—	—	—	26·2	5·34					
		600	—	2·91	34·24	27·32	8·06	—	—	—	40·4	4·57					
		800	—	2·78	34·43	27·47	7·95	—	—	—	50·3	4·15					
		1000	—	2·68	34·52	27·55	8·06	—	—	—	59·1	3·94					
		1500	—	2·41	34·70	27·72	7·97	—	—	—	64·1	4·08					
		2000	—	2·08	34·76	27·79	8·12	—	—	—	68·9	4·17					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
882 *cont.*	49° 52·9′ S, 120° 28·6′ E	1932 22 v											
883	52° 54′ S, 122° 03·8′ E	23 v	2000	4148*	NNE	22–27	NNE	5	bc	1014·6	3·3	1·8	heavy conf. SSW swell
884	56° 08·3′ S, 124° 04·8′ E	24 v	2000	4781*	NNE	20	NNE	4	orm	989·9	3·2	3·2	heavy conf. NW swell
			0000	—	NE × N	19	NE × N	4	orm	980·6	3·2	3·1	heavy conf. NW swell
885	58° 50·5′ S, 125° 54·9′ E	25–26 v	2000	4834*	W	25	W	5	c	972·0	−0·6	−1·1	mod. conf. N swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
882 *cont.*	17	2500	—	1·64	34·74	27·82	8·22	—	—	—	82·7	4·12					
		3000	—	1·17	34·71	27·83	8·19	—	—	—	90·7	4·06					
		3500	—	0·85	34·70	27·84	8·25	—	—	0·00	100·5	4·15					
883	18	0	—	3·72	33·86	26·92	8·10	—	—	0·42	7·6	6·99	N 70 V	1000–738	2008		
		10	—	3·72	33·86	26·92	8·10	—	—	0·42	7·6	—	,,	750–500			
		20	—	3·73	33·86	26·92	8·10	—	—	0·44	7·6	6·97	,,	500–250			
		30	—	3·74	33·86	26·92	8·10	—	—	0·43	7·6	—	,,	250–100			
		40	—	3·74	33·86	26·92	8·10	—	—	0·42	7·6	6·98	,,	100–50			
		50	—	3·74	33·86	26·92	8·10	—	—	0·42	7·6	—	,,	50–0			
		60	—	3·74	33·86	26·92	8·10	—	—	0·42	7·6	6·96	N 50 V	100–0	—	2140	
		80	—	3·74	33·86	26·92	8·10	—	—	0·42	7·6	—	N 70 B	89–0	2230	2250	KT
		100	—	3·72	33·86	26·92	8·10	—	—	0·41	7·6	6·96	N 100 B				
		150	—	2·29	34·00	27·17	8·05	—	—	0·00	23·4	6·45	N 70 B	210–90	2230	2302	DGP
		200	—	2·09	34·07	27·25	8·02	—	—	0·00	28·1	6·23	N 100 B				
		300	—	2·20	34·20	27·34	7·98	—	—	0·00	38·5	5·39					
		400	—	2·40	34·28	27·39	7·95	—	—	—	52·4	4·64					
		600	—	2·39	34·47	27·54	7·96	—	—	—	58·9	4·06					
		800	—	2·30	34·61	27·66	8·00	—	—	—	66·2	3·97					
		1000	1003	2·29	34·66	27·70	8·02	—	—	—	63·9	4·05					
		1480	—	2·06	34·73	27·77	8·02	—	—	—	68·6	4·36					
		1980	—	1·67	34·73	27·80	8·15	—	—	—	78·6	4·29					
		2470	—	1·19	34·70	27·82	8·27	—	—	—	87·7	4·25					
		2970	—	0·77	34·70	27·84	8·27	—	—	—	104·7	4·15					
		3460	3458	0·50	34·70	27·86	8·29	—	—	0·00	107·7	4·36					
884	19	0	—	1·92	33·90	27·12	8·11	—	—	0·46	13·7	7·29	N 70 V	1000–750	2012		
		10	—	1·92	33·90	27·12	8·11	—	—	0·46	13·7	—	,,	750–500			
		20	—	1·92	33·90	27·12	8·11	—	—	0·45	13·7	7·32	,,	500–250			
		30	—	1·92	33·90	27·12	8·11	—	—	0·45	13·7	—	,,	250–100			
		40	—	1·92	33·90	27·12	8·11	—	—	0·46	13·7	7·28	,,	100–50			
		50	—	1·92	33·90	27·12	8·11	—	—	0·46	13·7	—	,,	50–0			
		60	—	1·91	33·90	27·12	8·11	—	—	0·46	13·7	7·29	N 50 V	100–0	—	2145	
		80	—	1·90	33·90	27·12	8·11	—	—	0·45	13·7	—	N 70 B	122–0	0016	0036	KT
		100	—	1·90	33·90	27·12	8·11	—	—	0·44	13·7	7·30	N 100 B				
		150	—	1·69	33·92	27·16	8·10	—	—	0·39	16·5	7·23	N 70 B	270–90	0016	0046	DGP
		200	—	0·80	34·15	27·41	7·99	—	—	0·00	39·3	6·12	N 100 B				
		250	—	1·71	34·37	27·51	7·91	—	—	0·00	54·7	4·58					
		300	—	1·90	34·43	27·55	7·90	—	—	0·00	57·1	4·30					
		400	—	2·03	34·52	27·61	7·89	—	—	—	60·8	4·02					
		590	—	2·11	34·62	27·69	8·05	—	—	—	65·0	3·94					
		790	—	2·11	34·70	27·75	8·02	—	—	—	68·6	4·08					
		990	—	2·02	34·72	27·77	7·96	—	—	—	71·1	4·25					
		1490	—	1·70	34·73	27·80	8·07	—	—	—	77·0	4·39					
		1980	1978	1·26	34·73	27·83	8·04	—	—	—	82·0	4·49					
		2480	—	0·88	34·72	27·85	8·04	—	—	—	94·3	4·63					
		2970	—	0·47	34·71	27·87	8·13	—	—	—	104·7	4·61					
		3470	—	0·26	34·70	27·88	8·19	—	—	—	107·7	4·46					
		3960	—	0·09	34·70	27·88	8·25	—	—	—	104·7	4·54					
		4460	—	0·00	34·69	27·87	8·30	—	—	0·00	104·7	4·52					
885	20	0	—	1·01	33·94	27·21	8·10	—	—	0·45	21·6	7·41	N 70 V	1000–740	2003		– 10 hours
		10	—	1·01	33·94	27·21	8·10	—	—	0·44	21·6	—	,,	750–490			
		20	—	1·01	33·94	27·21	8·10	—	—	0·44	21·2	7·40	,,	500–240			
		30	—	1·01	33·94	27·21	8·10	—	—	0·44	21·2	—	,,	250–100			
		40	—	1·01	33·94	27·21	8·10	—	—	0·44	21·1	7·39	,,	100–50			
		50	—	1·01	33·94	27·21	8·10	—	—	0·44	20·7	—	,,	50–0			
		60	—	1·02	33·94	27·21	8·10	—	—	0·44	21·0	7·40	N 50 V	100–0	—	2150	
		80	—	1·02	33·94	27·21	8·10	—	—	0·44	20·9	—	N 70 B	116–0	2334	2354	KT
		100	—	1·03	33·94	27·21	8·10	—	—	0·44	21·3	7·39	N 100 B				
		150	—	0·87	34·14	27·38	8·00	—	—	0·00	42·4	6·21	N 70 B	280–120	2334	0004	DGP
		200	—	1·61	34·31	27·47	7·94	—	—	0·00	51·3	4·97	N 100 B				
		290	—	2·00	34·45	27·55	7·89	—	—	0·00	61·8	4·24					
		390	—	2·11	34·51	27·59	7·92	—	—	—	65·1	4·03					
		580	—	2·22	34·64	27·69	7·93	—	—	—	67·5	3·95					
		780	—	2·14	34·71	27·76	7·99	—	—	—	70·1	4·12					
		970	—	2·02	34·74	27·79	8·05	—	—	—	71·5	4·16					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
885 *cont.*	58° 50·5′ S, 125° 54·9′ E	1932 25–26 v											
886	61° 12·1′ S, 127° 52·9′ E	26 v	2000	4464*	WSW	25	WSW	5	c	984·8	−3·3	−5·0	heavy WSW swell
			0000	—	WSW	26	WSW	5	c	991·4	−2·2	−3·0	heavy conf. WSW swell
887	63° 41·4′ S, 130° 07′ E	27 v	1802	4000*	W × N	18	W × N	2	csp	1003·6	−1·6	−2·1	mod. NW × W swell
			2000	—	NW × W	14	NW × W	2	bcsp	1006·6	−1·6	−2·1	low NW swell
888	63° 23·2′ S, 130° 29·7′ E	28 v	0637	4098*	N	23	N	5	o	1011·0	−1·0	−1·5	mod. N swell
889	61° 44·6′ S, 131° 38·4′ E	28 v	2000	4645*	WNW	26	WNW	5	csp	1016·7	−0·6	−1·2	mod. NW swell
			0000	—	WNW	21–26	WNW	5	osprs	1016·0	−0·7	−1·3	heavy NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
885 *cont.*	20	1460	—	1·70	34·75	27·82	8·05	—	—	—	75·9	4·41					
		1940	1942	1·22	34·75	27·86	8·04	—	—	—	86·8	4·51					
		2460	—	0·89	34·73	27·86	8·01	—	—	—	98·5	4·73					
		2950	—	0·50	34·71	27·87	8·11	—	—	—	101·2	4·76					
		3450	—	0·23	34·70	27·88	8·22	—	—	—	104·1	4·53					
		3940	—	0·07	34·70	27·88	8·25	—	—	—	107·2	4·57					
		4430	4430	−0·07	34·69	27·87	8·27	—	—	0·00	107·2	4·53					
886	21	0	—	−0·42	33·97	27·32	8·09	—	—	0·41?	37·2	7·55	N 70 V	1000–750	2006		
		10	—	−0·42	33·97	27·32	8·09	—	—	0·41	37·2	—	,,	750–500			
		20	—	−0·42	33·97	27·32	8·09	—	—	0·41	37·2	7·58	,,	500–250			
		30	—	−0·41	33·97	27·32	8·09	—	—	0·41	37·2	—	,,	250–100			
		40	—	−0·41	33·97	27·32	8·09	—	—	0·41	37·2	7·56	,,	100–50			
		50	—	−0·41	33·97	27·32	8·09	—	—	0·41	37·2	—	,,	50–0			
		60	—	−0·42	33·97	27·32	8·09	—	—	0·40	37·2	7·55	N 50 V	100–0	—	2305	
		80	—	−0·42	33·97	27·32	8·09	—	—	0·40	37·6	—	N 70 B				
		100	—	−0·41	33·98	27·33	8·08	—	—	0·40	38·0	7·54	N 100 B	133–0	2353	0013	KT
		150	—	1·13	34·40	27·57	7·94	—	—	0·00	59·7	4·96	N 70 B				
		200	—	1·35	34·47	27·62	7·91	—	—	0·00	65·1	4·57	N 100 B	302–100	2353	0023	DGP
		300	—	1·80	34·64	27·72	7·90	—	—	0·00	70·1	4·09					
		400	—	1·80	34·68	27·75	7·92	—	—	—	71·5	4·17					
		590	—	1·83	34·70	27·77	7·98	—	—	—	72·9	4·16					
		790	—	1·73	34·76	27·82	8·12	—	—	—	74·4	4·07					
		990	—	1·63	34·76	27·83	8·12	—	—	—	74·4	4·11					
		1480	1483	1·23	34·75	27·86	8·09	—	—	—	88·9	4·39					
		1990	—	0·86	34·74	27·87	8·01	—	—	—	98·5	4·59					
		2490	—	0·48	34·72	27·87	8·15	—	—	—	101·2	4·54					
		2980	—	0·23	34·71	27·89	8·28	—	—	—	104·1	4·47					
		3480	—	0·08	34·70	27·89	8·26	—	—	—	104·1	4·65					
		3980	3976	−0·07	34·70	27·89	8·29	—	—	0·00	104·1	4·45					
887	22	0	—	−1·65	33·96	27·35	8·09	—	—	0·39	44·5	7·48	N 50 V	100–0	1813		Nets towed through streams of very light pack-ice and brash
		10	—	−1·65	33·96	27·35	8·09	—	—	0·39	44·5	—	N 70 V	1000–760			
		20	—	−1·64	33·96	27·35	8·10	—	—	0·39	44·5	7·51	,,	750–500			
		30	—	−1·61	33·96	27·35	8·10	—	—	0·39	44·5	—	,,	500–250			
		40	—	−1·60	33·97	27·36	8·10	—	—	0·39	45·1	7·52	,,	250–100			
		50	—	−1·52	33·97	27·36	8·09	—	—	0·39	45·1	—	,,	100–50			
		60	—	−1·19	34·04	27·40	8·09	—	—	0·38	42·5	7·29	,,	50–0	—	1952	
		80	—	0·61	34·47	27·67	7·94	—	—	0·00	59·6	—	N 70 B				
		100	—	1·20	34·58	27·72	7·93	—	—	0·00	62·6	4·47	N 100 B	86–0	2119	2139	KT
		150	—	1·58	34·63	27·73	7·91	—	—	0·00	66·0	4·24	N 70 B				
		200	—	1·50	34·67	27·77	7·92	—	—	0·00	68·4	4·33	N 100 B	235–115	2119	2149	DGP
		290	—	1·58	34·68	27·77	7·93	—	—	0·00	69·7	4·37	N 70 B				
		390	—	1·59	34·73	27·81	7·95	—	—	0·00	71·1	4·40	N 100 B	120–0	2202	2222	KT
		590	—	1·52	34·75	27·84	8·10	—	—	0·00	72·4	4·27	N 100 H	0–5	2213	2233	
		780	—	1·42	34·76	27·84	8·10	—	—	0·00	80·3	4·34					
		980	975	1·23	34·76	27·86	8·07	—	—	0·00	88·0	4·42					
		1460	—	0·82	34·73	27·86	8·07	—	—	0·00	90·1	4·56					
		1940	—	0·47	34·71	27·87	8·11	—	—	0·00	97·2	4·59					
		2430	—	0·18	34·70	27·87	8·12	—	—	0·00	102·6	4·69					
		2920	—	−0·03	34·68	27·87	8·16	—	—	0·00	102·6	4·77					
		3400	3395	−0·19	34·67	27·87	8·23	—	—	0·00	102·6	4·70					
888	22	0	—	−0·14	—	—	—	—	—	—	—	—	N 70 B				
													N 100 B	98–0	0655	0715	KT
													N 70 B				
													N 100 B	240–90	0655	0725	DGP
889	23	0	—	0·20	33·96	27·28	8·10	2·57	—	—	—	7·54	N 70 V	1000–750	2010		
		10	—	0·20	33·96	27·28	8·10	2·57	—	—	—	—	,,	750–500			
		20	—	0·20	33·96	27·28	8·10	2·57	—	—	—	7·51	,,	500–250			Stray on wire
		30	—	0·20	33·96	27·28	8·10	2·57	—	—	—	—	,,	250–100			,, ,, ,,
		40	—	0·20	33·96	27·28	8·10	2·49	—	—	—	7·52	,,	100–50			
		50	—	0·20	33·96	27·28	8·10	2·57	—	—	—	—	,,	50–0			
		60	—	0·20	33·96	27·28	8·10	2·34	—	—	—	7·50	N 50 V	100–0	—	2325	
		80	—	0·20	33·96	27·28	8·10	2·40	—	—	—	—	N 70 B				
		100	—	0·20	33·96	27·28	8·10	2·20	—	—	—	7·52	N 100 B	106–0	0037	0057	KT

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
889 *cont.*	61° 44·6′ S, 131° 38·4′ E	1932 28–29 v											
890	59° 04·5′ S, 133° 18·5′ E	29 v	2000	4771*	NNE	6	NNE	2	o	1013·5	−1·8	−2·2	low swell
891	56° 02·9′ S, 135° 10·5′ E	30 v	2000	4391*	S×E	4	S×E	1	ome	1009·3	2·0	1·7	mod. W×S and mod. conf. ENE swells
892	52° 48·5′ S, 137° 00·4′ E	31 v	2000	3069*	ESE	3–4	ESE	1	oe	1011·7	4·2	3·9	low conf. and mod. conf. swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
889 *cont.*	23	150	—	0·89	34·23	27·46	7·97	2·49	—	—	—	5·63	**N 70 B**	290–90	**0037**	**0107**	DGP
		200	—	1·70	34·41	27·54	7·89	2·60	—	—	—	4·49	**N 100 B**				
		300	—	2·00	34·52	27·61	7·89	2·64	—	—	—	4·01					
		400	—	2·11	34·60	27·66	7·93	2·72	—	—	—	4·01					
		590	—	2·03	34·68	27·74	8·03	2·72	—	—	—	4·00					
		790	—	1·99	34·70	27·76	8·09	2·72	—	—	—	3·99					
		990	—	1·92	34·76	27·80	8·09	2·60	—	—	—	4·21					
		1480	1480	1·53	34·76	27·83	8·09	2·49	—	—	—	4·33					
		1970	—	1·15	34·73	27·84	8·09	2·60	—	—	—	4·47					
		2470	—	0·73	34·71	27·86	8·14	2·60	—	—	—	4·39					
		2960	—	0·40	34·70	27·86	8·16	2·45	—	—	—	4·46					
		3450	—	0·17	34·69	27·86	8·26	2·47	—	—	—	4·38					
		3950	—	0·00	34·68	27·87	8·37	2·57	—	—	—	4·19					
890	24	0	—	0·70	33·90	27·20	8·11	2·28	—	—	—	7·47	**N 70 V**	1000–730	**2005**		
		10	—	0·70	33·90	27·20	8·11	2·28	—	—	—	—	,,	750–500			
		20	—	0·70	33·90	27·20	8·11	2·28	—	—	—	7·48	,,	500–250			
		30	—	0·70	33·90	27·20	8·11	2·28	—	—	—	—	,,	250–100			
		40	—	0·70	33·90	27·20	8·11	2·28	—	—	—	7·50	,,	100–50			
		50	—	0·70	33·90	27·20	8·10	2·24	—	—	—	—	,,	50–0			
		60	—	0·70	33·90	27·20	8·11	2·24	—	—	—	7·47	**N 50 V**	100–0	—	**2155**	
		80	—	0·64	33·90	27·21	8·10	2·24	—	—	—	—	**N 70 B**	98–0	**2312**	**2332**	KT
		100	—	0·60	33·90	27·21	8·10	2·15	—	—	—	7·51	**N 100 B**				
		150	—	0·24	34·15	27·44	8·02	2·45	—	—	—	6·76	**N 70 B**	240–110	**2312**	**2341**	DGP
		200	—	1·68	34·34	27·49	7·93	2·45	—	—	—	4·78	**N 100 B**				
		300	—	2·09	34·50	27·58	7·89	2·85	—	—	—	4·14					
		400	—	2·16	34·59	27·66	7·91	2·43	—	—	—	4·02					
		600	—	2·20	34·66	27·70	8·01	2·51	—	—	—	3·99					
		800	—	2·13	34·70	27·74	7·95	2·49	—	—	—	4·17					
		990	—	2·03	34·76	27·80	8·06	2·51	—	—	—	4·30					
		1490	—	1·73	34·76	27·82	8·06	2·45	—	—	—	4·50					
		1990	—	1·28	34·74	27·84	8·02	2·36	—	—	—	4·52					
		2490	—	0·70	34·72	27·86	8·02	2·47	—	—	—	4·67					
		2980	—	0·50	34·71	27·87	8·18	2·51	—	—	—	4·61					
		3480	—	0·23	34·70	27·88	8·23	2·49	—	—	—	4·43					
		3980	—	0·08													
		4470	4467	−0·11	34·69	27·88	8·31	2·49	—	—	—	4·60					
891	25	0	—	3·09	33·88	27·01	8·10	2·20	—	—	—	7·04	**N 70 V**	1000–710	**2008**		Stray on wire
		10	—	3·10	33·88	27·01	8·10	2·20	—	—	—	—	,,	1000–724			
		20	—	3·10	33·88	27·01	8·10	2·13	—	—	—	7·07	,,	750–500			
		30	—	3·10	33·88	27·01	8·10	2·55	—	—	—	—	,,	500–250			
		40	—	3·10	33·88	27·01	8·10	2·13	—	—	—	7·05	,,	250–100			
		50	—	3·10	33·88	27·01	8·10	2·09	—	—	—	—	,,	100–50			
		60	—	3·10	33·88	27·01	8·10	2·09	—	—	—	7·07	,,	50–0			
		80	—	3·07	33·88	27·01	8·11	2·07	—	—	—	—	**N 50 V**	100–0	—	**2245**	
		100	—	3·02	33·88	27·02	8·11	2·07	—	—	—	7·06	**N 70 B**	121–0	**2322**	**2342**	KT
		150	—	1·81	33·97	27·19	8·04	2·13	—	—	—	6·76	**N 100 B**				
		200	—	1·82	34·04	27·24	8·05	2·22	—	—	—	6·38	**N 70 B**	260–90	**2322**	**2352**	DGP
		290	—	2·32	34·22	27·34	7·96	2·24	—	—	—	5·27	**N 100 B**				
		390	—	2·26	34·31	27·42	7·96	2·30	—	—	—	4·72					
		590	—	2·49	34·49	27·54	8·04	2·34	—	—	—	3·76					
		780	—	2·41	34·59	27·64	8·09	2·36	—	—	—	3·75					
		980	979	2·30	34·66	27·69	8·10	2·30	—	—	—	3·75					
		1470	—	2·11	34·75	27·79	8·09	2·13	—	—	—	4·05					
		1930	—	1·81	34·77	27·82	8·01	2·11	—	—	—	4·39					
		2410	—	1·37	34·75	27·85	8·11	2·15	—	—	—	4·48					
		2900	—	0·95	34·72	27·84	8·17	2·28	—	—	—	4·27					
		3380	—	0·54	34·70	27·85	8·27	2·28	—	—	—	4·47					
		3860	3854	0·26	34·69	27·86	8·25	2·51	—	—	—	4·44					
892	26	0	—	5·00	33·89	26·82	8·12	1·92	—	—	—	6·80	**N 70 V**	1000–750	**2002**		
		10	—	5·01	33·89	26·81	8·12	1·92	—	—	—	—	,,	750–500			
		20	—	5·01	33·89	26·81	8·12	1·98	—	—	—	6·81	,,	500–260			
		30	—	5·01	33·89	26·81	8·12	1·88	—	—	—	—	,,	250–100			
		40	—	5·01	33·89	26·81	8·12	1·82	—	—	—	6·80	,,	100–50			
		50	—	5·01	33·89	26·81	8·11	1·90	—	—	—	—	,,	50–0			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
892 *cont.*	52° 48·5′ S, 137° 00·4′ E	1932 31 v											
893	49° 37·5′ S, 138° 35·3′ E	1–2 vi	2000	3244*	E × S	23–25	E × S	5	oe	1006·3	6·1	6·0	mod. E × S swell
894	46° 31·5′ S, 139° 50′ E	2 vi	2000	4448*	SSE	12	SSE	4	opd	1002·0	9·0	8·7	mod. conf. SE swell
895	43° 15·5′ S, 143° 38·4′ E	3 vi	2000	4740*	W × S	18	W × S	4	bcp	1009·0	10·0	9·0	mod. conf. SW swell
			0000	—	W × S	18	W × S	4	cp	1008·8	10·5	9·7	mod. conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
892 *cont.*	26	60	—	5·01	33·89	26·81	8·11	1·81	—	—	—	6·79	N 50 V	100–0	—	2230	
		80	—	5·00	33·89	26·82	8·11	1·81	—	—	—	—	N 70 B	93–0	2245	2305	KT
		100	—	4·89	33·89	26·83	8·11	1·75	—	—	—	6·81	N 100 B				
		150	—	4·58	34·05	26·99	8·08	1·69	—	—	—	6·42	N 70 B	220–100	2245	2320	DGP
		200	—	4·13	34·07	27·06	8·07	1·69	—	—	—	6·35	N 100 B				
		300	—	4·13	34·19	27·16	8·03	1·96	—	—	—	5·53					
		400	—	3·81	34·25	27·23	8·02	2·19	—	—	—	5·14					
		590	—	2·88	34·29	27·36	8·08	2·26	—	—	—	4·76					
		790	—	2·75	34·43	27·48	7·94	2·43	—	—	—	4·20					
		990	—	2·59	34·52	27·56	8·05	2·40	—	—	—	3·97					
		1480	—	2·37	34·68	27·71	8·10	2·32	—	—	—	3·83					
		1980	—	2·08	34·74	27·78	8·21	2·15	—	—	—	3·97					
		2470	2470	1·65	34·77	27·84	8·21	2·13	—	—	—	4·11					
893	27	0	—	7·91	34·15	26·65	8·12	1·31	—	—	—	6·34	N 70 V	1000–750	2010		
		10	—	7·91	34·15	26·65	8·12	1·27	—	—	—	—	,,	750–500			
		20	—	7·91	34·15	26·65	8·12	1·29	—	—	—	6·37	,,	500–250			
		30	—	7·85	34·14	26·65	8·11	1·20	—	—	—	—	,,	250–100			
		40	—	7·51	34·09	26·65	8·12	1·29	—	—	—	6·42	,,	100–50			
		50	—	7·40	34·08	26·66	8·11	1·35	—	—	—	—	,,	50–0			
		60	—	7·41	34·09	26·66	8·11	1·41	—	—	—	6·41	N 50 V	100–0	—	2215	
		80	—	7·22	34·06	26·67	8·10	1·41	—	—	—	—	N 70 B	100–0	2336	2356	KT
		100	—	7·35	34·07	26·66	8·10	1·31	—	—	—	6·42	N 100 B				
		150	—	8·09	34·37	26·79	8·09	1·29	—	—	—	5·96	N 70 B	260–100	2336	0006	DGP
		190	—	7·70	34·40	26·86	8·06	1·37	—	—	—	5·81	N 100 B				
		290	—	7·00	34·34	26·93	8·07	1·48	—	—	—	5·83					
		380	—	6·50	34·34	26·99	8·07	1·52	—	—	—	5·61					
		570	—	5·32	34·34	27·13	8·09	1·92	—	—	—	4·79					
		770	—	3·83	34·32	27·29	8·10	2·24	—	—	—	4·73					
		960	—	3·38	34·37	27·37	7·94	2·40	—	—	—	4·35					
		1440	—	2·56	34·58	27·61	8·05	2·41	—	—	—	3·97					
		1910	—	2·32	34·70	27·73	8·14	2·53	—	—	—	3·81					
		2390	—	2·02	34·76	27·80	8·15	2·30	—	—	—	3·99					
		2870	2872	1·46	34·76	27·84	8·18	2·38	—	—	—	3·92					
894	28	0	—	9·70	34·46	26·60	8·16	0·95	—	—	—	6·08	N 70 V	1000–730	2010		
		10	—	9·70	34·46	26·60	8·16	0·95	—	—	—	—	,,	750–500			
		20	—	9·70	34·46	26·60	8·16	0·95	—	—	—	6·06	,,	500–225			
		30	—	9·70	34·46	26·60	8·16	0·89	—	—	—	—	,,	250–0			
		40	—	9·70	34·46	26·60	8·16	0·93	—	—	—	6·07	,,	250–100			
		50	—	9·70	34·46	26·60	8·16	0·91	—	—	—	—	,,	100–50			
		60	—	9·70	34·46	26·60	8·15	0·89	—	—	—	6·05	,,	50–0			
		80	—	9·66	34·45	26·60	8·15	0·91	—	—	—	—	N 50 V	100–0	—	2210	
		100	—	9·50	34·44	26·62	8·15	0·89	—	—	—	6·06	N 70 B	91–0	2307	2327	KT
		150	—	8·52	34·57	26·88	8·11	1·12	—	—	—	5·81	N 100 B				
		200	—	8·29	34·53	26·88	8·11	1·16	—	—	—	5·89	N 70 B	235–105	2307	2345	DGP
		300	—	7·99	34·52	26·92	8·11	1·22	—	—	—	6·01	N 100 B				
		400	—	7·90	34·52	26·93	8·11	1·25	—	—	—	5·90					
		600	—	8·16	34·60	26·95	8·20	1·33	—	—	—	5·30					
		800	—	6·90	34·45	27·02	8·13	1·65	—	—	—	4·77					
		1000	—	5·16	34·40	27·20	8·09	2·13	—	—	—	4·36					
		1500	1500	2·87	34·47	27·50	8·01	2·45	—	—	—	3·93					
		1970	—	2·45	34·65	27·67	7·96	2·40	—	—	—	3·83					
		2460	—	2·17	34·71	27·75	8·12	2·40	—	—	—	3·68					
		2960	—	1·88	34·72	27·78	8·20	2·30	—	—	—	3·63					
		3450	3447	1·58	34·72	27·80	8·28	2·30	—	—	—	3·58					
		3940	—	1·34	34·71	27·82	8·28	2·26	—	—	—	3·80					
895	29	0	—	11·08	34·73	26·57	8·17	0·70	—	—	—	5·87	N 70 V	1000–735	2008		
		10	—	11·15	34·74	26·57	8·17	0·70	—	—	—	—	,,	750–500			
		20	—	11·16	34·74	26·57	8·17	0·68	—	—	—	5·88	,,	500–250			
		30	—	11·16	34·74	26·57	8·17	0·63	—	—	—	—	,,	250–100			
		40	—	11·10	34·74	26·58	8·17	0·68	—	—	—	5·85	,,	100–50			
		50	—	11·10	34·74	26·58	8·17	0·65	—	—	—	—	,,	50–0			
		60	—	11·11	34·75	26·58	8·17	0·68	—	—	—	5·85	N 50 V	100–0	—	2150	
		80	—	11·14	34·77	26·59	8·17	0·67	—	—	—	—	N 70 B	80–0	2329	2349	KT
		100	—	11·20	34·79	26·60	8·17	0·65	—	—	—	5·80	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
895 *cont.*	43° 15·5′ S, 143° 38·4′ E	1932 3–4 vi											
896	40° 15·5′ S, 143° 22·7′ E	4 vi	2005	102*	WSW	12–15	WSW	3	o	1017·1	11·1	8·2	mod. SW swell
897	41° 05·9′ S, 148° 56′ E	14–15 vi	2240	2037*	WNW	25–30	WNW	6	cpq	995·2	9·7	8·6	mod. NW swell
898	43° 55·5′ S, 149° 32·2′ E	15 vi	2012	3051*	NW	20–25	NW	4	bcp	982·2	10·8	8·9	mod. conf. NW swell
899	47° 18·2′ S, 150° 20·8′ E	16 vi	2000	4264*	E × S	10	E × S	2	bc	977·7	8·4	6·8	mod. conf. W × N and NE swells
			0000	—	SE × E	19	SE × E	3	bc	978·9	8·4	6·8	mod. conf. W × N and NE swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
895 *cont.*	29	150	—	10·54	34·83	26·74	8·13	0·80	—	—	—	5·42	N 70 B	200–0	2329	0000	DGP
		190	—	9·56	34·71	26·83	8·14	0·86	—	—	—	5·52	N 100 B				
		280	—	9·51	34·75	26·86	8·10	0·87	—	—	—	5·55	N 70 B	250–110	0022	0052	DGP
		370	—	8·43	34·61	26·92	8·09	1·12	—	—	—	5·46	N 100 B				
		560	—	8·16	34·60	26·95	8·11	1·29	—	—	—	5·31					
		750	—	7·19	34·50	27·02	8·11	1·67	—	—	—	4·47					
		930	—	5·17	34·45	27·24	8·08	2·13	—	—	—	4·16					
		1390	1389	2·96	34·53	27·54	7·97	2·43	—	—	—	3·72					
		1960	—	2·35	34·69	27·71	7·96	2·38	—	—	—	3·77					
		2450	—	2·06	34·75	27·79	8·09	2·40	—	—	—	3·69					
		2940	—	1·81	34·75	27·81	8·19	2·30	—	—	—	3·74					
		3430	—	1·49	34·75	27·84	8·18	2·30	—	—	—	3·70					
		3920	3917	1·30	34·74	27·84	8·25	2·43	—	—	—	3·63					
896	0	0	—	15·32	35·48	26·28	8·17	0·34	—	—	—	5·19	N 70 V	100–50	2007		
		10	—	15·33	35·48	26·28	8·18	0·34	—	—	—	—	,,	50–0			
		20	—	15·33	35·48	26·28	8·18	0·34	—	—	—	5·20	N 50 V	100–0	—	2025	
		30	—	15·33	35·48	26·28	8·19	0·34	—	—	—	—	N 70 B	84–0	2036	2051	KT
		40	—	15·33	35·48	26·28	8·19	0·34	—	—	—	5·20	N 100 B				
		50	—	15·32	35·48	26·28	8·19	0·34									
		60	—	15·30	35·48	26·29	8·19	0·32	—	—	—	5·18					
		80	—	15·19	35·46	26·30	8·19	0·34									
		100	—	15·06	35·46	26·33	8·19	0·30	—	—	—	5·10					
897	10	0	—	13·53	35·22	26·48	8·18	0·49	—	—	—	5·55	N 70 V	1000–750	2250		−11·5 hours
	41 5.15 148 22.7 E	10	—	13·53	35·22	26·48	8·18	0·49	—	—	—	—	,,	750–500			
		20	—	13·54	35·22	26·48	8·18	0·48	—	—	—	5·56	,,	500–250			
		30	—	13·54	35·22	26·48	8·18	0·48	—	—	—	—	,,	250–100			
		40	—	13·54	35·22	26·48	8·18	0·49	—	—	—	5·57	,,	100–50			
		50	—	13·54	35·22	26·48	8·18	0·87	—	—	—	—	,,	50–0			
		60	—	13·53	35·22	26·48	8·18	0·25	—	—	—	5·57	N 50 V	100–0	—	0050	
		80	—	13·53	35·22	26·48	8·18	0·44	—	—	—	—	N 70 B	117–0	0107	0127	KT
		100	—	13·53	35·22	26·48	8·18	0·44	—	—	—	5·57	N 100 B				
		150	—	12·91	35·17	26·57	8·13	0·70	—	—	—	4·98	N 70 B	315–120	0107	0137	DGP
		200	—	12·25	35·16	26·68	8·12	0·84	—	—	—	5·03	N 100 B				
		290	—	10·99	35·03	26·82	8·11	0·99	—	—	—	5·16					
		390	—	9·80	34·80	26·85	8·12	1·22	—	—	—	4·97					
		590	—	8·25	34·60	26·94	8·22	1·37	—	—	—	5·15					
		780	—	7·30	34·54	27·04	8·16	1·84	—	—	—	4·21					
		980	—	5·55	34·48	27·22	8·17	2·03	—	—	—	3·89					
		1470	1469	3·35	34·54	27·51	8·05	2·68	—	—	—	3·42					
898	11	0	—	13·28	35·17	26·49	8·16	0·63	—	0·36	—	5·52	N 70 V	1000–750	2010		
	43 55.5 S 149 32.7 E	10	—	13·29	35·17	26·49	8·16	0·63	—	0·33	—	—	,,	750–500			
		20	—	13·30	35·17	26·49	8·16	0·63	—	0·33	—	5·51	,,	500–250			
		30	—	13·30	35·17	26·49	8·16	0·63	—	0·33	—	—	,,	250–100			
		40	—	13·30	35·17	26·49	8·16	0·59	—	0·33	—	5·53	,,	100–50			
		50	—	13·30	35·17	26·49	8·16	0·59	—	0·31	—	—	,,	50–0			
		60	—	13·30	35·17	26·49	8·16	0·57	—	0·32	—	5·53	N 50 V	100–0	—	2150	
		80	—	13·29	35·17	26·49	8·16	0·57	—	0·32	—	—	N 70 B	128–0	2226	2246	KT
		100	—	13·28	35·17	26·49	8·16	0·57	—	0·33	—	5·52	N 100 B				
		150	—	12·78	35·25	26·64	8·13	0·89	—	0·00	—	4·85	N 70 B	310–120	2226	2256	DGP
		200	—	12·09	35·18	26·74	8·12	0·93	—	0·00	—	5·09	N 100 B				
		290	—	10·85	35·00	26·82	8·11	1·03	—	—	—	5·16					
		390	—	9·70	34·82	26·89	8·11	1·22	—	—	—	5·23					
		590	—	8·21	34·60	26·94	8·08	1·65	—	—	—	5·30					
		780	—	7·27	34·53	27·03	8·04	1·88	—	—	—	4·32					
		980	—	5·78	34·47	27·18	8·10	2·30	—	—	—	4·12					
		1470	—	3·17	34·55	27·54	8·15	2·45	—	0·00	—	3·43					
		1960	—	2·41	34·66	27·69	8·15	2·43	—	—	—	3·46					
		2450	2449	2·08	34·73	27·77	8·15	2·43	—	—	—	3·75					
899	12	0	—	10·52	34·73	26·67	8·17	0·82	—	0·48	—	5·97	N 70 V	1000–750	2006		
		10	—	10·52	34·73	26·67	8·17	0·86	—	0·48	—	—	,,	750–515			
		20	—	10·57	34·74	26·67	8·17	0·86	—	0·47	—	5·95	,,	500–260			
		30	—	10·58	34·74	26·67	8·17	0·89	—	0·48	—	—	,,	250–100			
		40	—	10·59	34·74	26·67	8·17	0·89	—	0·48	—	5·96	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
899 *cont.*	47° 18·2′ S, 150° 20·8′ E	1932 16–17 vi											
900	49° 26·7′ S, 150° 57·6′ E	17 vi	2000	2489*	SSW	26–34	SSW	6	bcq	994·7	2·9	1·7	heavy SSW swell
901	51° 27·8′ S, 151° 20·5′ E	18 vi	2002	4323*	SW	35–40	SW	6 very conf.	cq	990·5	2·9	2·3	heavy SW swell
902	52° 23·9′ S, 151° 11·4′ E	19 vi	0923	—	SW × S	25–28	SW × S	6	cq	995·2	0·0	−0·7	heavy SW swell
903	53° 32′ S, 151° 33·4′ E	19 vi	2000	4257*	SW × W	26	SW × W	5	bcqsp	989·6	0·0	−0·3	heavy SW swell
			0000	4329*	SW × W	16	SW × W	4	bcqsp	989·6	−1·1	−1·1	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
899 *cont.*	13	50	—	10.59	34.74	26.67	8.17	0.87	—	0.48	—	—	**N 70 V**	50–0			
		60	—	10.59	34.74	26.67	8.17	0.87	—	0.48	—	5.93	**N 50 V**	100–0	—	**2345**	
		80	—	10.60	34.74	26.67	8.17	0.86	—	0.41	—	—	**N 70 B**	117–0	**0000**	**0020**	KT
		100	—	10.60	34.74	26.67	8.17	0.84	—	0.34	—	5.94	**N 100 B**				
		150	—	10.58	34.84	26.75	8.14	0.89	—	0.00	—	5.54	**N 70 B**	330–0	**0000**	**0030**	DGP
		190	—	9.91	34.81	26.84	8.14	1.05	—	0.00	—	5.58	**N 100 B**				
		290	—	9.20	34.72	26.89	8.12	1.12	—	—	—	5.61					
		380	—	8.59	34.63	26.91	8.12	1.20	—	—	—	5.76					
		570	—	7.91	34.50	26.91	8.18	1.39	—	—	—	5.64					
		760	—	7.90	34.55	26.96	8.18	1.52	—	—	—	5.42					
		950	—	7.18	34.51	27.03	8.19	1.67	—	—	—	4.95					
		1430	—	4.77	34.39	27.24	8.04	2.22	—	—	—	4.38					
		1910	—	2.42	34.65	27.67	8.08	2.41	—	—	—	3.83					
		2380	—	2.03	34.74	27.79	8.02	2.34	—	—	—	4.15					
		2860	—	1.68	34.74	27.81	8.16	2.40	—	—	—	3.97					
		3330	—	1.24	34.72	27.82	8.24	2.34	—	—	—	3.97					
		3810	3806	0.99	34.71	27.84	8.25	2.22	—	—	—	4.06					
900	13	0	—	6.92	34.05	26.70	8.14	1.44	—	0.40	—	6.49	**N 70 V**	1000–735	**2003**		
		10	—	6.93	34.05	26.70	8.14	1.41	—	0.40	—	—	,,	750–500			
		20	—	6.94	34.05	26.70	8.14	1.43	—	0.40	—	6.48	,,	500–250			
		30	—	6.95	34.05	26.70	8.14	1.43	—	0.40	—	—	,,	250–100			
		40	—	6.94	34.05	26.70	8.14	1.44	—	0.41	—	6.49	,,	100–50			
		50	—	6.94	34.05	26.70	8.14	1.48	—	0.41	—	—	,,	50–0			
		60	—	6.94	34.05	26.70	8.14	1.50	—	0.41	—	6.48	**N 50 V**	100–0	—	**2213**	
		80	—	6.92	34.05	26.70	8.14	1.46	—	0.39	—	—	**N 100 B**	135–0	**2227**	**2247**	KT
		100	—	6.84	34.05	26.71	8.11	1.46	—	0.41	—	6.48	**N 100 B**	340–140	**2227**	**2257**	DGP
		150	—	7.41	34.33	26.85	8.10	1.44	—	0.01	—	6.06	**N 70 B**	96–0	**2321**	**2341**	KT
		200	—	7.21	34.39	26.93	8.09	1.54	—	0.00	—	5.96	**N 70 B**	280–150	**2321**	**2351**	DGP
		300	—	6.31	34.30	26.98	8.07	1.54	—	—	—	5.89					
		400	—	5.85	34.30	27.04	8.07	1.65	—	—	—	5.51					
		590	—	5.10	34.35	27.18	8.06	2.03	—	—	—	4.74					
		790	—	3.87	34.37	27.32	8.10	2.15	—	—	—	4.38					
		990	—	3.24	34.41	27.41	8.10	2.30	—	—	—	4.20					
		1480	—	2.51	34.61	27.65	8.10	2.26	—	—	—	3.66					
		1970	1967	2.32	34.72	27.74	8.15	2.26	—	—	—	3.78					
901	14	0	—	5.96	33.95	26.75	8.12	1.71	—	0.44	—	6.61					
		10	—	5.96	33.95	26.75	8.12	1.73	—	0.43							
		20	—	5.96	33.95	26.75	8.12	1.71	—	0.43	—	6.62					
		30	—	5.96	33.95	26.75	8.12	1.73	—	0.44							
		40	—	5.96	33.95	26.75	8.12	1.63	—	0.44	—	6.63					
		50	—	5.96	33.95	26.75	8.12	1.60	—	0.44							
		60	—	5.96	33.95	26.75	8.12	1.60	—	0.44	—	6.62					
		80	—	5.96	33.95	26.75	8.12	1.60	—	0.44							
		100	—	5.96	33.95	26.75	8.12	1.60	—	0.44	—	6.60					
		150	—	5.47	33.95	26.81	8.11	1.62	—	0.56	—	6.60					
		190	—	3.41	33.96	27.04	8.08	1.75	—	0.09	—	6.76					
		280	—	2.83	33.97	27.10	8.08	1.79	—	—	—	6.40					
		380	—	3.08	34.17	27.24	8.03	2.11	—	—	—	5.71					
		560	—	3.04	34.31	27.35	8.06	2.32	—	—	—	4.57					
		750	—	2.82	34.44	27.48	8.00	2.32	—	—	—	4.07					
		940	—	2.72	34.49	27.52	8.09	2.40	—	—	—	3.89					
		1400	—	2.44	34.64	27.67	8.09	2.36	—	—	—	3.80					
		1870	1870	2.18	34.73	27.76	8.15	2.28	—	—	—	3.88					
902	15	0	—	6.41	34.22	26.90	8.10	—	—	—	—	—	**N 100 B**	120–0	0940	1000	KT
													N 100 B	330–150	0940	1010	DGP
903	15	0	—	4.92	33.86	26.79	8.11	1.81	—	0.46	—	6.73	**N 70 V**	1000–750	**2015**		
		10	—	4.92	33.86	26.79	8.11	1.84	—	0.46	—	—	,,	750–500			
		20	—	4.93	33.86	26.79	8.11	1.84	—	0.46	—	6.72	,,	500–250			
		30	—	4.91	33.86	26.80	8.11	1.94	—	0.46	—	—	,,	250–100			
		40	—	4.91	33.86	26.80	8.11	1.96	—	0.46	—	6.75	,,	100–0			
		50	—	4.91	33.86	26.80	8.11	1.98	—	0.46	—	—	,,	100–50			
		60	—	4.91	33.86	26.80	8.11	1.98	—	0.46	—	6.73	,,	50–0			
		80	—	4.90	33.87	26.81	8.11	1.90	—	0.46	—	—	**N 50 V**	100–0	—	**2305**	

14

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
903 *cont.*	53° 32′ S, 151° 33·4′ E	1932 19–20 vi											
904	56° 13·1′ S, 152° 15·8′ E	20 vi	2000	3790*	E×N	9	E×N	2	c	984·2	−2·3	−2·7	mod. SW swell
905	59° 11·6′ S, 153° 11·4′ E	21 vi	2000	3702*	ESE	20–25	ESE	6	osp	990·7	−0·5	−0·7	heavy ESE swell
906	61° 24·7′ S, 154° 26·2′ E	22 vi	2000	3041*	E	12	—	0	o	1010·1	−6·0	−6·1	mod. ENE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
903 *cont.*	16	100	—	4·90	33·96	26·89	8·10	1·92	—	0·37	—	6·60	**N 100 B**	131–0	0037	0057	KT
		150	—	4·10	34·05	27·04	8·06	1·98	—	0·00	—	6·41	**N 100 B**	370–140	0037	0107	DGP
		200	—	4·11	34·12	27·10	8·05	2·05	—	0·00	—	6·09					
		290	—	4·26	34·23	27·17	8·02	2·13	—	0·00	—	5·41					
		390	—	3·70	34·30	27·28	7·97	2·36	—	0·00	—	5·06					
		580	—	3·00	34·35	27·40	8·04	2·51	—	—	—	4·36					
		780	—	2·79	34·46	27·49	8·00	2·51	—	—	—	3·94					
		970	—	2·57	34·52	27·56	8·04	2·47	—	—	—	3·82					
		1460	1460	2·29	34·70	27·73	8·10	2·32	—	—	—	3·89					
		1950	—	1·99	34·75	27·80	8·11	2·20	—	—	—	4·11					
		2440	—	1·65	34·76	27·83	8·07	2·22	—	—	—	4·39					
		2930	—	1·12	34·73	27·84	8·16	2·38	—	—	—	4·17					
		3410	—	0·85	34·71	27·85	8·16	2·38	—	—	—	4·20					
		3900	3901	0·73	34·71	27·86	8·23	2·38	—	—	—	4·16					
904	16	0	—	1·98	33·81	27·04	8·10	2·19	—	0·41	—	7·19	**N 70 V**	1000–780	2005		
		10	—	1·98	33·81	27·04	8·10	2·19	—	0·41	—	—	,,	750–500			
		20	—	2·00	33·81	27·04	8·10	2·11	—	0·41	—	7·18	,,	500–250			
		30	—	2·00	33·81	27·04	8·10	2·19	—	0·41	—	—	,,	250–100			
		40	—	2·00	33·81	27·04	8·10	2·55	—	0·41	—	7·18	,,	100–50			
		50	—	2·00	33·81	27·04	8·10	2·19	—	0·43	—	—	,,	50–0			
		60	—	2·00	33·81	27·04	8·10	1·92	—	0·43	—	7·17	**N 50 V**	100–0	—	2133	
		80	—	2·00	33·82	27·05	8·10	2·03	—	0·44	—	—	**N 70 B**	104–0	2222	2242	KT
		100	—	1·71	33·88	27·12	8·09	2·03	—	0·32	—	7·08	**N 100 B**				
		150	—	1·50	34·14	27·35	7·98	2·40	—	0·00	—	5·66	**N 70 B**	330–130	2222	2252	DGP
		200	—	2·01	34·32	27·45	7·92	2·43	—	0·00	—	4·66	**N 100 B**				
		290	—	2·41	34·48	27·55	7·89	2·47	—	—	—	4·04					
		390	—	2·34	34·52	27·58	7·90	2·49	—	—	—	3·97					
		590	—	2·19	34·66	27·70	7·88	2·47	—	—	—	3·89					
		780	774	2·15	34·69	27·73	8·00	2·36	—	—	—	4·04					
		980	—	2·07	34·69	27·73	8·00	2·36	—	—	—	4·23					
		1470	—	1·74	34·76	27·82	7·99	2·36	—	—	—	4·35					
		1960	—	1·30	34·74	27·84	8·06	2·34	—	—	—	4·38					
		2450	—	0·94	34·71	27·84	8·20	2·38	—	—	—	4·25					
		2940	—	0·64	34·70	27·85	8·16	2·51	—	—	—	4·30					
		3430	3427	0·50	34·68	27·84	8·15	2·51	—	—	—	4·25					
905	17	0	—	−0·81	33·88	27·27	8·06	2·38	—	0·30	—	7·50	**N 70 V**	1000–0	2038		
		10	—	−0·81	33·88	27·27	8·06	2·38	—	0·31	—	—	,,	1000–750			
		20	—	−0·82	33·88	27·27	8·06	2·51	—	0·31	—	7·51	,,	750–500			
		30	—	−0·82	33·88	27·27	8·06	2·43	—	0·31	—	—	,,	500–250			
		40	—	−0·82	33·88	27·27	8·06	2·28	—	0·31	—	7·51	,,	250–100			
		50	—	−0·81	33·88	27·27	8·06	2·28	—	0·33	—	—	,,	100–50			
		60	—	−0·81	33·89	27·27	8·06	2·38	—	0·33	—	7·49	,,	50–0			
		80	—	−0·39	33·97	27·32	8·05	2·45	—	0·27	—	—	**N 50 V**	100–0	—	2248	
		100	—	0·91	34·41	27·60	7·93	2·49	—	0·10	—	4·94	**N 70 B**	114–0	2323	2343	KT
		150	—	1·71	34·59	27·69	7·88	2·49	—	0·00	—	4·02	**N 100 B**				
		200	—	1·87	34·65	27·72	7·89	2·49	—	—	—	4·01	**N 70 B**	320–138	2323	2353	DGP
		300	—	1·89	34·68	27·75	7·89	2·49	—	—	—	4·06	**N 100 B**				
		390	—	1·90	34·68	27·75	7·97	2·59	—	—	—	4·16					
		590	—	1·84	34·72	27·78	7·99	2·59	—	—	—	4·21					
		790	—	1·71	34·71	27·79	8·08	2·55	—	—	—	4·17					
		980	—	1·52	34·70	27·80	8·09	2·34	—	—	—	4·34					
		1470	—	1·13	34·70	27·82	7·99	2·30	—	—	—	4·52					
		1970	—	0·70	34·69	27·83	8·09	2·36	—	—	—	4·48					
		2460	—	0·40	34·68	27·85	8·14	2·43	—	—	—	4·42					
		2950	—	0·29	34·68	27·85	8·20	2·38	—	—	—	4·50					
		3440	3443	0·26	34·67	27·85	8·20	2·45	—	—	—	4·49					
906	18	0	—	−1·80	34·14	27·51	8·03	2·47	—	0·22	—	6·89	**N 70 V**	1000–760	2010		Station worked in a sea of soft new ice
		10	—	−1·80	34·14	27·51	8·03	2·47	—	0·23	—	—	,,	750–500			
		20	—	−1·80	34·14	27·51	8·03	2·47	—	0·24	—	6·86	,,	500–250			
		30	—	−1·80	34·14	27·51	8·02	2·47	—	0·22	—	—	,,	250–100			
		40	—	−1·80	34·14	27·51	8·02	2·47	—	0·22	—	6·84	,,	100–50			
		50	—	−1·80	34·14	27·51	8·02	2·38	—	0·22	—	—	,,	50–0			
		60	—	−1·80	34·14	27·51	8·02	2·36	—	0·23	—	6·88	**N 50 V**	100–0	—	2200	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
906 *cont.*	61° 24·7′ S, 154° 26·2′ E	1932 22 vi											
907	61° 21·5′ S, 153° 59·3′ E	23 vi	0936	—	SSE	13	—	0	o	1012·0	−8·6	−8·7	mod. E × N swell
908	61° 33·3′ S, 154° 19·4′ E	23 vi	1234	—	SSE	10	—	0	c	1012·2	−10·0	−10·0	mod. ENE swell
909	61° 36·7′ S, 154° 31·8′ E	23 vi	1415	—	SSE	13	—	0	o	1011·5	−11·6	−11·6	mod. E × N swell
910	61° 35·8′ S, 154° 54·2′ E	23 vi	1600	—	SE	15	—	0	o	1011·1	−11·8	−11·8	mod. ESE swell
911	61° 18·2′ S, 155° 37·1′ E	23 vi	2000	—	SE × S	9	SE × S	2	o	1010·2	−9·8	−9·8	mod. ENE swell
912	61° 05′ S, 158° 24·5′ E to 61° 02′ S, 158° 26′ E	24 vi	1045	—	E × S	15	—	0	o	1006·5	−12·5	−13·5	low conf. NE and NW swells
			1200	991*	SE	11	—	0	cs	1005·5	−13·1	−13·1	mod. NE × E swell
			1600	—	SE	13	—	0	bcs	1005·0	−12·1	−12·1	mod. NE × E swell
913	60° 44·5′ S, 158° 37·3′ E	24 vi	2000	—	SE	14	SE	2	bc	1003·2	−11·7	−11·7	low NE swell
914	60° 20′ S, 158° 52·9′ E	25 vi	0000	—	SSE	10	SSE	2	bc	1002·6	−9·7	−10·0	low NE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
906 *cont.*	18	80	—	-1·57	34·14	27·50	8·02	2·49	—	0·22	—	—					KT. Nets closed just below surface to avoid ice. Depth estimated
		100	—	1·20	34·59	27·73	7·90	2·49	—	0·00	—	4·40	N 70 B	100–0	2324	2344	
		150	—	1·51	34·67	27·77	7·90	2·49	—	0·00	—	4·21	N 100 B				
		200	—	1·52	34·68	27·78	8·06	2·38	—	—	—	4·16	N 70 B	386–142	2324	2354	DGP
		300	—	1·58	34·69	27·77	8·16	2·43	—	—	—	4·07	N 100 B				
		400	—	1·39	34·72	27·81	8·20	2·28	—	—	—	4·03					
		600	597	1·38	34·73	27·83	8·15	2·28	—	—	—	4·18					
		770	—	1·33	34·74	27·84	7·96	2·40	—	—	—	4·44					
		960	—	1·16	34·72	27·83	8·07	2·43	—	—	—	4·39					
		1440	—	0·75	34·69	27·83	8·16	2·49	—	—	—	4·32					
		1920	—	0·37	34·68	27·85	8·15	2·51	—	—	—	4·36					
		2400	2396	0·08	34·67	27·86	8·18	2·55	—	—	—	4·44					
907	19	0	—	-1·72	34·16	27·51	8·02	—	—	—	—	—	N 70 B	102–0	0959	1019	KT. Nets closed just below surface to avoid ice
													N 100 B				
													N 70 B	290–110	0959	1029	DGP. Station worked in young pancake ice
													N 100 B				
908	19	0	—	-1·72	34·16	27·51	8·01	—	—	—	—	—	N 70 B	134–0	1244	1304	KT. Station worked in young pancake ice
													N 100 B				
													N 100 H	0–5	1244	1308	Net filled with ice
909	19	0	—	-1·73	33·97	27·36	8·01	—	—	—	—	—	N 70 B	165–0	1425	1445	KT. Station worked in young pancake ice
													N 100 B				
910	19	0	—	-1·74	33·96	27·35	8·01	—	—	—	—	—	N 70 B	146–0	1611	1631	KT. Station worked in young pancake ice
													N 100 B				
911	19	0	—	-0·78	34·06	27·41	8·06	—	—	—	—	—	N 70 B	106–0	2026	2046	KT
													N 100 B				
													N 70 B	300–110	2026	2057	DGP
													N 100 B				
912	20	0	—	-1·78	33·82	27·24	8·06	1·75	—	0·33	—	7·54	N 70 B	100–0	1105	1125	Depth estimated
		25	—	-1·74	33·90	27·30	8·06	1·79	—	0·33	—	7·57	N 100 B				
		50	—	-1·70	33·96	27·35	8·10	1·81	—	0·34	—	7·47	N 70 B	250–104	1105	1146	DGP. Nets towed for 11 minutes at 104 metres
		75	—	-0·41	33·97	27·32	8·08	1·90	—	0·26	—	6·37	N 100 B				
		100	—	1·57	34·48	27·61	8·06	1·96	—	0·00	—	3·93					
		150	—	1·72	34·58	27·68	7·88	2·13	—	0·00	—	3·89	N 70 H	0–10	1200	1230	Nets closed before heaving
		200	—	1·94	34·59	27·67	8·11	2·13	—	—	—	4·13	N 100 H	0–5			
		300	—	1·93	—	—	8·08?	—	—	—	—	—	N 70 H	0–10	1240	1310	Nets towed just below surface
		400	—	1·90	34·70	27·77	7·94	2·03	—	—	—	4·11	N 100 H	0–2			
		600	—	1·95	34·70	27·76	8·17	1·98	—	—	—	3·61	N 70 V	750–500	1350		Vertical nets worked in light ice composed of small circular floes packed close together
		800	—	1·85	34·70	27·77	8·14	2·03	—	—	—	4·59	,,	500–250			
													,,	250–100			
													,,	100–50			
													,,	50–0			
													N 50 V	100–0	—	1540	
													N 70 H	0–7	1653	1723	In young pancake ice getting thinner towards end of tow
													N 100 H	0–2			
913	20	0	—	-1·73	33·96	27·35	8·05	—	—	—	—	—	N 100 H	0–2	2026	2046	
													N 70 B	96–0	2029	2049	KT
													N 100 B				
													N 70 B	302–110	2029	2059	DGP
													N 100 B	280–100	2135	2205	DGP. Depth estimated
914	21	0	—	-0·40	33·88	27·25	8·05	—	—	—	—	—	N 100 H	0–2	0014	0034	
													N 70 B	95–0	0027	0047	KT
													N 100 B				
													N 70 B	288–150	0027	0057	DGP
													N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
915	59° 48·3′ S, 159° 12·1′ E	1932 25 vi	0400	—	S × W	9–10	S × W	2	c	1000·1	−8·6	−8·6	low E swell
916	59° 12·7′ S, 159° 33·4′ E	25 vi	0830	—	S × W	13	S × W	3	os	999·8	−7·0	−7·2	low E × S swell
917	58° 43·3′ S, 159° 51·2′ E	25 vi	1225	—	SE	12	SE	3	c	998·1	−5·7	−6·1	mod. SE × E swell
918	58° 17·3′ S, 160° 06·6′ E	25 vi	1600	—	SE	15	SE	3	osp	995·4	−2·8	−2·9	mod. SE swell
919	57° 50·4′ S, 160° 23·1′ E	25 vi	2000	3484*	NE × N	13	NE × N	3	cpr	991·0	0·6	0·0	mod. S × E swell
920	54° 41·1′ S, 162° 23·1′ E	26 vi	2000	4575*	Calms and Lt airs	0–2	—	0	c	1000·3	−0·3	−2·0	mod. conf. swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³				O_2 c.c. litre	Gear	Depth (metres)	TIME		
								P	Nitrate + Nitrite N_2	Nitrite N_2	Si				From	To	
915	21	0	—	−0·40	34·01	27·35	8·08	—	—	—	—	—	**N 100 H**	0–2	**0428**	**0458**	
													N 70 B **N 100 B**	130–0	**0431**	**0451**	Depth estimated
													N 70 B **N 100 B**	310–110	**0431**	**0503**	DGP
916	21	0	—	0·61	33·77	27·10	8·05	—	—	—	—	—	**N 70 B** **N 100 B**	146–0	0854	0914	KT
													N 70 B **N 100 B**	358–110	0854	0924	DGP
													N 100 H	0–2	0853	0955	
917	21	0	—	−0·62	33·82	27·21	8·02	—	—	—	—	—	**N 100 H**	0–2	1242	1302	
													N 70 B **N 100 B**	117–0	1246	1306	KT
													N 70 B **N 100 B**	300–110	1246	1316	DGP
918	21	0	—	0·91	33·82	27·13	8·06	—	—	—	—	—	**N 70 B** **N 100 B**	138–0	1620	1640	KT
													N 70 B **N 100 B**	350–120	1620	1650	DGP. Closing depth estimated
													N 100 H	0–2	1623	1643	
919	21	0	—	1·78	33·80	27·05	8·08	2·20	—	—	—	7·11	**N 70 V**	1000–745	**2006**		Stray on wire
		10	—	1·77	33·80	27·05	8·09	2·20	—	—	—	—	,,	750–490			,, ,, ,,
		20	—	1·76	33·80	27·05	8·09	2·20	—	—	—	7·11	,,	500–250			
		30	—	1·76	33·80	27·05	8·09	2·17	—	—	—	—	,,	250–100			
		40	—	1·75	33·80	27·05	8·09	2·03	—	—	—	7·10	,,	100–50			
		50	—	1·75	33·80	27·05	8·10	2·07	—	—	—	—	,,	50–0			
		60	—	1·75	33·80	27·05	8·10	2·11	—	—	—	7·08	**N 50 V**	100–0	—	**2211**	
		80	—	1·59	33·80	27·06	8·10	2·07	—	—	—	—	**N 70 B**	128–0	**2250**	**2310**	KT
		100	—	1·48	33·80	27·07	8·10	2·07	—	—	—	7·13	**N 100 B**				
		150	—	1·89	34·06	27·25	8·00	2·34	—	—	—	6·03	**N 100 H**	0–2	**2250**	**2315**	
		200	—	2·00	34·17	27·33	7·95	2·41	—	—	—	5·19	**N 70 B**	306–130	**2250**	**2320**	DGP
		300	—	1·95	34·32	27·45	7·92	2·60	—	—	—	4·52	**N 100 B**				
		400	—	2·10	34·45	27·54	7·92	2·60	—	—	—	4·03					
		590	—	2·22	34·57	27·63	7·93	2·60	—	—	—	3·82					
		790	—	2·19	34·66	27·70	8·02	2·47	—	—	—	3·78					
		990	—	2·10	34·68	27·73	7·95	2·41	—	—	—	4·04					
		1480	—	1·78	34·70	27·78	8·01	2·41	—	—	—	4·15					
		1970	—	1·34	34·70	27·81	8·12	2·43	—	—	—	4·10					
		2470	—	0·99	34·69	27·81	8·16	2·51	—	—	—	4·09					
		2960	2961	0·71	34·69	27·83	8·20	2·30	—	—	—	4·08					
920	22	0	—	2·91	33·83	26·99	8·10	2·01	—	—	—	6·97	**N 70 V**	1000–775	**2004**		
		10	—	2·95	33·83	26·99	8·10	2·01	—	—	—	—	,,	750–520			
		20	—	2·95	33·83	26·99	8·10	2·00	—	—	—	6·93	,,	500–250			
		30	—	2·95	33·83	26·99	8·10	2·07	—	—	—	—	,,	250–100			
		40	—	2·94	33·83	26·99	8·10	2·15	—	—	—	6·94	,,	100–50			
		50	—	2·94	33·83	26·99	8·10	2·13	—	—	—	—	,,	50–0			
		60	—	2·92	33·83	26·99	8·10	2·13	—	—	—	6·95	**N 50 V**	100–0	—	**2248**	
		80	—	2·92	33·83	26·99	8·09	2·15	—	—	—	—	**N 70 B**	123–0	**2316**	**2336**	KT
		100	—	2·93	33·83	26·99	8·09	2·15	—	—	—	6·90	**N 100 B**				
		150	—	2·93	33·83	26·99	8·09	2·19	—	—	—	6·90	**N 70 B**	320–100	**2316**	**2346**	DGP
		190	—	2·52	33·89	27·06	8·08	2·24	—	—	—	6·72	**N 100 B**				
		290	—	2·82	34·05	27·16	8·04	2·30	—	—	—	6·00					
		380	—	3·01	34·24	27·31	7·97	2·49	—	—	—	4·90					
		580	—	2·60	34·32	27·40	7·96	2·64	—	—	—	4·43					
		770	—	2·59	34·43	27·49	8·05	2·64	—	—	—	3·88					
		960	—	2·31	34·52	27·58	8·06	2·64	—	—	—	3·66					
		1440	1442	2·20	34·69	27·72	8·07	2·55	—	—	—	3·88					
		1920	—	1·99	34·71	27·77	7·99	2·43	—	—	—	4·14					
		2410	—	1·62	34·72	27·80	8·14	2·38	—	—	—	4·17					
		2890	—	1·29	34·70	27·81	8·21	2·47	—	—	—	4·00					
		3370	—	0·99	34·69	27·81	8·22	2·41	—	—	—	4·02					
		3850	—	0·86	34·68	27·82	8·26	2·09	—	—	—	3·99					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
921	51° 39·4′ S, 163° 52·2′ E	1932 27 vi	2000	4292*	S	25–45	S	6–7 conf.	bcq	1008·8	3·0	0·7	heavy conf. S swell
922	50° 19·6′ S, 163° 49·4′ E	28 vi	0700	2050*	S	23	S	5	c	1015·9	3·1	0·8	heavy conf. SW swell
923	47° 11·7′ S, 163° 41·4′ E	29 vi	0605	4574*	W	15	W	3	cp	1020·3	8·1	7·2	—
			1200	—	W×S	16	W×S	3	bcp	1019·6	8·0	7·9	mod. conf. W swell
924	44° 17·5′ S, 165° 46·2′ E	30 vi	0710	4447*	W	11	W	3	bc	1019·4	10·1	9·7	mod. conf. W swell
			1200	—	WSW	15	WSW	3	bc	1020·7	11·2	9·4	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
921	23	0	—	7·74	34·36	26·83	8·09	1·39	—	—	—	6·21	**N 70 V**	50–0	**2015**		Vertical hauls abandoned owing to weather
		10	—	7·74	34·36	26·83	8·09	1·46	—	—	—	—	,,	100–0	—	**2030**	
		20	—	7·74	34·36	26·83	8·09	1·48	—	—	—	6·20					
		30	—	7·75	34·36	26·83	8·10	1·56	—	—	—	—	**N 100 B**	114–0	**2145**	**2205**	Depth estimated
		40	—	7·74	34·36	26·83	8·10	1·35	—	—	—	6·21	**N 100 B**	250–100	**2145**	**2206**	Depth estimated
		50	—	7·74	34·36	26·83	8·10	1·33									
		60	—	7·74	34·36	26·83	8·10	1·35	—	—	—	6·19					
		80	—	7·74	34·36	26·83	8·10	1·41									
		100	—	7·74	34·36	26·83	8·10	1·41	—	—	—	6·19					
		150	—	7·79	34·37	26·83	8·09	1·41	—	—	—	6·21					
		200	—	8·08	34·44	26·85	8·09	1·46	—	—	—	6·04					
		300	—	7·74	34·50	26·94	8·09	1·48	—	—	—	5·90					
		400	—	7·75	34·50	26·94	8·09	1·54	—	—	—	5·77					
		500	—	7·65	34·50	26·95	8·21	1·56	—	—	—	5·24					
		1000	—	4·28	34·32	27·24	8·22	2·19	—	—	—	4·33					
922	24	0	—	8·24	34·45	26·82	8·08	1·24	—	—	—	6·05	**N 70 B**	121–0	**0727**	0747	KT
		10	—	8·24	34·45	26·82	8·08	1·24	—	—	—	—	**N 100 B**				
		20	—	8·24	34·45	26·82	8·08	1·24	—	—	—	6·06	**N 70 B**	338–192	**0727**	0757	DGP
		30	—	8·24	34·45	26·82	8·08	1·22	—	—	—	—	**N 100 B**				
		40	—	8·24	34·45	26·82	8·08	1·24	—	—	—	6·02	**N 70 V**	1000–780	0815		
		50	—	8·24	34·45	26·82	8·08	1·27	—	—	—	—	,,	750–500			
		60	—	8·23	34·45	26·82	8·08	1·31	—	—	—	6·02	,,	500–250			
		80	—	8·20	34·45	26·83	8·08	1·25	—	—	—	—	,,	250–100			
		100	—	8·20	34·45	26·83	8·09	1·29	—	—	—	6·04	,,	100–50			
		150	—	8·14	34·44	26·84	8·10	1·29	—	—	—	6·04	,,	50–0			
		200	—	8·09	34·44	26·85	8·10	1·31	—	—	—	6·05	**N 50 V**	100–0	—	1045	
		300	—	8·21	34·53	26·90	8·09	1·37	—	—	—	5·61					
		400	—	7·80	34·50	26·93	8·09	1·44	—	—	—	5·71					
		600	—	7·61	34·51	26·97	8·20	1·54	—	—	—	4·99					
		800	—	6·16	34·36	27·05	8·22	2·24	—	—	—	4·54					
		1000	—	4·53	34·34	27·23	8·17	2·24	—	—	—	4·38					
		1500	—	2·87	34·46	27·49	8·11	2·95	—	—	—	3·67					
923	25	0	—	8·88	34·44	26·72	8·15	1·18	—	—	—	6·06	**N 70 B**	100–0	**0618**	**0638**	KT
		10	—	8·88	34·44	26·72	8·15	1·20	—	—	—	—	**N 100 B**				
		20	—	8·88	34·44	26·72	8·15	1·20	—	—	—	6·08	**N 100 B**	240–138	**0618**	**0658**	DGP
		30	—	8·89	34·44	26·72	8·15	1·24	—	—	—	—	**N 70 B**	460–130	**0708**	0738	DGP
		40	—	8·89	34·44	26·72	8·15	1·20	—	—	—	6·07	**N 70 V**	1000–790	0748		
		50	—	8·89	34·44	26·72	8·15	1·20	—	—	—	—	,,	750–500			
		60	—	8·89	34·44	26·72	8·15	1·29	—	—	—	6·07	,,	500–250			
		80	—	8·88	34·44	26·72	8·15	1·27	—	—	—	—	,,	250–100			
		100	—	8·88	34·44	26·72	8·15	1·25	—	—	—	6·08	,,	100–50			
		150	—	8·88	34·44	26·72	8·14	1·24	—	—	—	6·06	,,	50–0			
		200	—	7·99	34·45	26·86	8·11	1·46	—	—	—	5·86	**N 50 V**	100–0	—	0918	
		300	—	7·80	34·46	26·90	8·10	1·52	—	—	—	5·87					
		390	—	7·91	34·53	26·94	8·09	1·58	—	—	—	5·57					
		490	—	7·84	34·54	26·96	8·26	1·73	—	—	—	5·08					
		590	—	7·60	34·52	26·98	8·17	1·71	—	—	—	5·38					
		790	—	6·07	34·43	27·11	8·02	2·13	—	—	—	4·64					
		980	—	4·75	34·35	27·22	8·20	2·32	—	—	—	4·05					
		1380	—	3·09	34·44	27·46	8·15	2·32	—	—	—	3·61					
		1470	—	2·93	34·47	27·49	8·02	2·38	—	—	—	3·95					
		1970	—	2·36	34·67	27·70	7·99	2·53	—	—	—	3·84					
		2460	—	1·93	34·72	27·77	8·15	2·60	—	—	—	3·74					
		2950	—	1·50	34·73	27·82	8·15	2·55	—	—	—	3·96					
		3440	—	1·32	34·72	27·82	8·19	2·51	—	—	—	3·88					
		3930	3925	1·29	34·72	27·82	8·14	2·41	—	—	—	3·89					
924	26	0	—	11·38	34·85	26·60	8·19	0·72	—	—	—	5·71	**N 70 B**	95–0	0720	0740	KT
		10	—	11·38	34·85	26·60	8·19	0·72	—	—	—	—	**N 100 B**				
		20	—	11·38	34·85	26·60	8·19	0·59	—	—	—	5·72	**N 70 B**	220–95	0720	0750	DGP
		30	—	11·38	34·85	26·60	8·19	0·76	—	—	—	—	**N 100 B**				
		40	—	11·33	34·85	26·61	8·19	0·72	—	—	—	5·65	**N 70 V**	1000–750	0805		
		50	—	11·33	34·85	26·61	8·19	0·65	—	—	—	—	,,	750–500			
		60	—	11·32	34·85	26·61	8·19	0·67	—	—	—	5·67	,,	500–250			
		80	—	11·32	34·85	26·61	8·19	0·74	—	—	—	—	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
924 *cont.*	44° 17·5′ S, 165° 46·2′ E	1932 30 vi											
925	41° 20·5′ S, 167° 55·5′ E	1 vii	0728	1170*	WSW	16	WSW	3	bc	1021·2	10·3	8·9	mod. WSW swell
926	38° 01·9′ S, 170° 12·8′ E	2 vii	0732	908*	WSW	19	WSW	3	bc	1020·0	12·2	10·0	mod. WSW swell
927	36° 12·2′ S, 171° 24·1′ E	2 vii	2210	—	SSW	14	SSW	3	—	1019·8	13·3	10·3	mod. SW swell
928	34° 39·2′ S, 172° 25·9′ E	3 vii	0830	152*	SW × S	15	SW × S	3	cp	1021·0	13·3	11·4	mod. SW swell
929	34° 21′ S, 172° 48′ E to	16 viii	1055	58	WNW	10	WNW	4	o	1009·4	13·0	11·9	mod. conf. W swell. Sounding by plankton wire
	34° 22′ S, 172° 49·8′ E	—	—	—	—	—	—	—	—	—	—	—	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
924 *cont.*	26	100	—	11·30	34·86	26·63	8·19	0·67	—	—	—	5·66	**N 70 V**	100–50			
		150	—	10·38	34·86	26·79	8·14	1·08	—	—	—	5·31	,,	50–0			
		200	—	9·98	34·82	26·84	8·10	1·14	—	—	—	5·19	**N 50 V**	100–0	—	0935	
		300	—	9·04	34·74	26·93	8·08	1·46	—	—	—	5·01					
		390	—	8·10	34·65	27·00	8·08	1·60	—	—	—	5·03					
		590	—	7·83	34·58	26·99	8·08	1·81	—	—	—	4·86					
		790	—	6·58	34·51	27·11	8·10	2·13	—	—	—	4·18					
		980	957	5·20	34·46	27·24	8·11	2·36	—	—	—	4·11					
		1470	—	3·03	34·56	27·55	8·03	2·79	—	—	—	3·53					
		1970	—	2·39	34·68	27·71	8·14	2·81	—	—	—	3·48					
		2460	—	1·95	34·74	27·79	8·04	2·74	—	—	—	3·94					
		2950	—	1·55	34·74	27·82	8·20	2·74	—	—	—	3·88					
		3440	—	1·28	34·74	27·84	8·20	2·62	—	—	—	3·95					
		3930	3926	1·16	34·74	27·85	8·21	2·62	—	—	—	3·91					
925	26	0	—	12·07	34·93	26·54	8·16	0·61	—	—	—	5·67	**N 70 B**	110–0	0743	0803	KT
		10	—	12·07	34·93	26·54	8·16	0·65	—	—	—	—	**N 100 B**				
		20	—	12·08	34·93	26·54	8·16	0·63	—	—	—	5·67	**N 70 B**	282–126	0743	0813	DGP
		30	—	12·08	34·93	26·54	8·16	0·61	—	—	—	—	**N 100 B**				
		40	—	12·08	34·93	26·54	8·16	0·59	—	—	—	5·67	**N 70 V**	1000–750	0830		
		50	—	12·08	34·93	26·54	8·16	0·67	—	—	—	—	,,	750–500			
		60	—	12·08	34·93	26·54	8·16	0·67	—	—	—	5·65	,,	500–250			
		80	—	12·08	34·93	26·54	8·16	0·65	—	—	—	—	,,	250–100			
		100	—	12·08	34·93	26·54	8·16	0·59	—	—	—	5·67	,,	100–50			
		150	—	11·55	35·08	26·75	8·14	0·91	—	—	—	5·21	,,	50–0			
		200	—	11·20	35·01	26·77	8·13	1·03	—	—	—	5·22	**N 50 V**	100–0	—	1012	
		300	—	10·40	34·92	26·84	8·09	1·25	—	—	—	4·83					
		400	—	9·33	34·77	26·90	8·07	1·48	—	—	—	4·75					
		590	—	8·33	34·63	26·95	8·12	1·73	—	—	—	4·83					
		790	—	7·04	34·55	27·09	8·08	2·07	—	—	—	4·27					
		990	991	5·34	34·43	27·21	8·06	2·38	—	—	—	4·02					
926	28	0	—	14·18	35·35	26·44	8·16	0·53	—	—	—	5·35	**N 70 B**	81–0	0744	0804	KT
		10	—	14·18	35·35	26·44	8·16	0·46	—	—	—	—	**N 100 B**				
		20	—	14·18	35·35	26·44	8·16	0·44	—	—	—	5·35	**N 100 B**	198–100	0744	0814	DGP
		30	—	14·16	35·35	26·44	8·16	0·44	—	—	—	—	**N 50 V**	100–0	0825		
		40	—	14·16	35·35	26·44	8·16	0·46	—	—	—	5·31	**N 70 V**	750–500			
		50	—	14·16	35·35	26·44	8·16	0·48	—	—	—	—	,,	500–140			
		60	—	14·16	35·35	26·44	8·16	0·51	—	—	—	5·31	,,	500–250			
		80	—	14·16	35·35	26·44	8·16	0·53	—	—	—	—	,,	250–100			
		100	—	14·17	35·35	26·44	8·16	0·51	—	—	—	5·31	,,	100–50			
		150	—	12·53	35·24	26·69	8·12	0·89	—	—	—	4·79	,,	50–0	—	1005	
		200	—	12·01	35·17	26·74	8·11	1·03	—	—	—	4·64	**N 70 B**	272–108	1014	1044	DGP
		300	—	11·00	35·02	26·82	8·07	1·37	—	—	—	4·28					
		400	—	10·13	34·91	26·88	8·06	1·50	—	—	—	4·21					
		600	—	8·00	34·61	27·00	8·09	1·81	—	—	—	4·46?					
		800	—	6·78	34·56	27·12	8·11	2·11	—	—	—	3·93					
927	29	0	—	15·00	—	—	—	—	—	—	—	—	**N 70 H**	0	**2210**	—	Wake of ship brightly luminescent. Temperature from thermograph
													N 50 H	0	**2215**	—	
928	0	0	—	14·92	35·39	26·31	8·16	0·61	—	—	—	5·10	**N 50 V**	100–0	0838		
		10	—	14·92	35·39	26·31	8·16	0·61	—	—	—	—	**N 70 V**	150–100			
		20	—	14·92	35·39	26·31	8·16	0·63	—	—	—	5·18	,,	100–50			
		30	—	14·91	35·39	26·31	8·16	0·65	—	—	—	—	,,	50–0	—	0907	
		40	—	14·90	35·39	26·31	8·16	0·59	—	—	—	5·14	**N 70 B**	119–0	0920	0940	KT
		50	—	14·84	35·39	26·32	8·16	0·57	—	—	—	—	**N 100 B**				
		60	—	14·82	35·38	26·33	8·16	0·57	—	—	—	5·11					
		80	—	14·41	35·32	26·36	8·15	0·72									
		100	—	14·03	35·28	26·41	8·14	0·82	—	—	—	4·72					
		150	—	13·52	35·22	26·48	8·14	0·97	—	—	—	4·48					
929	14	0	—	14·81	35·41	26·35	—	—	—	—	—	—	**DC**	58	1114	1115	
		50	—	14·73	35·41	26·37	—	—	—	—	—	—	**OTL**	58–55	1150	1250	
		0	—	14·91	35·42	26·34	—	—	—	—	—	—	**N 7–T**				
		50	—	14·76	35·41	26·36	—	—	—	—	—	—	**N 4–T**				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
930	Murimotu Light House bearing N 35° E distant 1·8 miles	1932 16 viii	1640	29*	NW × W	19	NW × W	3	bc	1008·7	14·0	11·5	mod. ENE swell
931	34° 14·8′ S, 172° 30′ E to 34° 15·3′ S, 172° 28·4′ E	17 viii	0720	95*	SW × W	33	SW × W	5	cpq	1013·3	11·8	10·2	heavy SSW swell
932	34° 13′ S, 172° 15·9′ E to 34° 12·2′ S, 172° 15′ E	17 viii	0945	185	SW × W	23	SW × W	4	bc	1014·2	14·3	10·0	mod. ENE swell. Sounding from chart
933	34° 13·3′ S, 172° 12′ E to 34° 13·2′ S, 172° 12·9′ E	17 viii	1051	260	SW × W	23	SW × W	5	bc	1014·7	—	—	mod. conf. E swell. Sounding by plankton wire
934	34° 11·6′ S, 172° 10·9′ E	17 viii	1152	97*	WSW	24	WSW	5	bcpq	1014·9	14·0	10·6	mod. conf. SW swell. Second sounding by plankton wire
	to 34° 11·4′ S, 172° 10·3′ E	—	1345	92–98	—	—	—	—	—	—	—	—	
935	34° 11·5′ S, 172° 08·5′ E to 34° 11·9′ S, 172° 08·5′ E	17 viii	1433	84*	SW	27–28	SW	4	bc	1015·8	12·8	10·6	mod. SW swell
936	35° 03·5′ S, 172° 58·2′ E	18 viii	0700	42–53	S × W	16	S × W	3	bc	1028·2	13·6	10·8	heavy WSW swell. First sounding from chart, second by plankton wire
	to 35° 05·4′ S, 172° 58·7′ E	—	—	50	—	—	—	—	—	—	—	—	
937	35° 18·7′ S, 173° 08·2′ E	18 viii	1100	48*	S × W	11	S × W	3	b	1027·8	13·4	10·7	Second sounding by plankton wire
			—	48	—	—	—	—	—	—	—	—	
938	35° 30·6′ S, 173° 19′ E	18 viii	1300	37	S × W	13	S × W	2	bcp	1027·8	13·3	11·0	heavy conf. SW swell. Sounding by plankton wire
939	35° 49·6′ S, 173° 27′ E to	18 viii	1545	87*	WSW	10	WSW	2	bc	1028·7	13·0	10·7	mod. SW swell. Second sounding by plankton wire
	35° 51·6′ S, 173° 28·9′ E	—	—	87	—	—	—	—	—	—	—	—	
940	38° 24·8′ S, 173° 41′ E	19 viii	1035	142*	WSW	11	WSW	3	c	1029·4	11·8	9·7	mod. SW × W swell
941	40° 51·4′ S, 174° 48·2′ E to 40° 55·8′ S, 174° 46·7′ E	20 viii	0330	122–128*	ENE	11	ENE	3	c	1025·0	9·7	8·6	mod. conf. swell
942	42° 46·3′ S, 176° 14·8′ E	31 viii	2000	660*	S	7–10	S	3	b	1009·2	11·2	9·0	mod. conf. NW swell
943	45° 28·4′ S, 179° 06·4′ E	1 ix	1955	2552*	N	23–25	N	5	b	1005·7	8·6	8·0	mod. conf. NE and WSW swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
930	14	0	—	14·50	—	—	—	—	—	—	—	—	**DC**	29	1640	**1730**	Ship at anchor, temperature from thermograph
931	15	0	—	14·64	35·39	26·37	—	—	—	—	—	—	**DC**	95	0759	0800	
		80	—	14·64	35·39	26·37											
932	15	0	—	14·64	35·37	26·36	—	—	—	—	—	—	**DC**	185	1007	1008	
		180	—	13·91	35·29	26·45											
933	15	0	—	14·62	35·37	26·36	—	—	—	—	—	—	**DC**	260	1125	1126	
		260	—	13·62	35·28	26·50											
934	15	0	—	14·37	35·35	26·40	—	—	—	—	—	—	**DC**	100	1205	1206	
		90	—	14·36	35·35	26·40	—	—	—	—	—	—	**OTL**	92–98	1232	1302	**OTL** badly torn
		0	—	14·12	35·37	26·47	—	—	—	—	—	—	**N 4–T**				
		98	—	14·20	35·39	26·46	—	—	—	—	—	—	**DRL**	98	1345		
935	15	—	—	—	—	—	—	—	—	—	—	—	**DRL**	84	1433	1445	
936	15	0	—	13·86	35·30	26·47	—	—	—	—	—	—	**DC**	50	0720	0730	
		45	—	13·72	35·29	26·49	—	—	—	—	—	—	**OTL**	50–57?	0800	0900	
		0	—	13·93	35·30	26·45	—	—	—	—	—	—	**N 7–T**				
		56	—	13·91	35·30	26·46	—	—	—	—	—	—	**N 4–T**				
937	16	0	—	13·72	35·20	26·42	—	—	—	—	—	—	**DC**	48	1115		
		48	—	13·62	35·29	26·51											
938	16	0	—	13·81	34·86	26·13	—	—	—	—	—	—	**DC**	37	1313		
		36	—	14·12	35·31	26·42											
939	16	0	—	14·61	35·33	26·33	—	—	—	—	—	—	**DC**	87	1558	1604	
		87	—	13·91	35·32	26·47	—	—	—	—	—	—	**OTL**	87	1623	1723	
		0	—	14·24	35·34	26·42	—	—	—	—	—	—	**N 7–T**				
		85	—	13·85	35·29	26·46	—	—	—	—	—	—	**N 4–T**				
940	17	0	—	13·53	35·37	26·59	—	—	—	—	—	—	**N 50 V**	100–0	1038	1042	
													N 70 B	122–0	1055	1115	KT
													N 100 B				
941	18	0	—	11·03	34·89	26·70	—	—	—	—	—	—	**N 50 V**	100–0	**0341**	**0350**	
		150	—	11·03	35·05	26·82	—	—	—	—	—	—	**N 70 B**	128–0	**0401**	**0421**	KT
													N 100 B				
													DC	128	**0434**		
													DRL	128	—	**0505**	
942	28	0	—	9·12	34·61	26·82	—	0·97	—	0·17	5·1	5·95	**N 70 V**	620–500	**2010**		+ 12 hours
		10	—	9·17	34·61	26·81	—	0·97	—	0·16	5·1	—	,,	500–250			
		20	—	9·17	34·61	26·81	—	0·97	—	0·17	5·1	5·94	,,	250–100			
		30	—	9·17	34·61	26·81	—	0·97	—	0·16	5·1	—	,,	100–50			
		40	—	9·17	34·61	26·81	—	0·97	—	0·16	5·1	5·93	,,	50–0			
		50	—	9·17	34·61	26·81	—	0·97	—	0·16	5·1	—	**N 50 V**	100–0	—	**2127**	
		60	—	9·17	34·61	26·81	—	0·97	—	0·16	5·1	5·95	**N 70 B**	132–0	**2149**	**2209**	KT
		80	—	9·06	34·60	26·81	—	0·95	—	0·17	5·1	—	**N 100 B**				
		100	—	9·01	34·59	26·82	—	0·93	—	0·17	5·1	5·90	**N 70 B**	350–110	**2149**	**2219**	DGP
		150	—	8·86	34·56	26·81	—	0·93	—	0·04	5·1	5·73	**N 100 B**				
		200	—	8·39	34·49	26·83	—	1·01	—	0·00	5·1	5·70					
		300	—	8·50	34·55	26·87	—	1·24	—	0·00	5·1	5·25					
		400	—	8·29	34·57	26·91	—	1·43	—	0·00	7·3	5·09					
		500	—	8·11	34·52	26·90	—	1·41	—	0·00	8·3	4·86					
943	1	0	—	7·37	34·42	26·92	—	1·24	—	0·24	4·9	6·34	**N 70 V**	1000–750	**2005**		
		10	—	7·39	34·43	26·94	—	1·24	—	0·23	4·9	—	,,	750–500			
		20	—	7·40	34·43	26·94	—	1·22	—	0·23	4·8	6·35	,,	500–0			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
943 *cont.*	45° 28·4′ S, 179° 06·4′ E	1932 1 ix											
944	47° 41·6′ S, 178° 16′ W	2 ix	2000	4783*	SW	30–40	SW	6	bcpq	1002·1	5·9	5·3	heavy conf. SW swell
945	48° 25·6′ S, 177° 24·5′ W	3 ix	0932	5038*	S × W	26	S × W	5	c	1007·3	6·0	5·2	heavy conf. SW and W swells
946	49° 24·6′ S, 176° 21·3′ W	3 ix	2000	2441*	SW × W	20	SW × W	4	bc	1010·4	6·6	6·4	heavy conf. SW swell
947	51° 59·2′ S, 173° 26·9′ W	4 ix	2000	5044*	NW	34	NW	6	c	1002·5	7·5	6·2	heavy conf. NW swell
			0000	—	NW × W	34	NW × W	6	o	998·8	7·1	6·7	heavy conf. NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
943 *cont.*	1	30	—	7·40	34·43	26·94	—	1·22	—	0·23	5·0	—	**N 70 V**	250–100			
		40	—	7·40	34·43	26·94	—	1·22	—	0·24	5·4	6·33	,,	100–50			
		50	—	7·40	34·43	26·94	—	1·22	—	0·23	6·2	—	,,	50–0			
		60	—	7·40	34·43	26·94	—	1·24	—	0·24	5·6	6·32	**N 50 V**	100–0	—	**2230**	
		80	—	7·38	34·43	26·94	—	1·22	—	0·24	5·4	—	**N 70 B**	128–0	**2322**	**2342**	KT
		100	—	7·39	34·43	26·94	—	1·22	—	0·22	5·4	6·22	**N 100 B**				
		150	—	7·30	34·45	26·96	—	1·29	—	0·06	5·9	6·08	**N 70 B**	356–130	**2322**	**2352**	DGP
		200	—	6·61	34·36	26·99	—	1·41	—	0·14	5·9	6·20	**N 100 B**				
		300	—	6·38	34·36	27·02	—	1·62	—	0·00	7·1	5·98					
		400	—	6·08	34·34	27·05	—	1·69	—	—	7·1	6·08					
		600	—	5·76	34·30	27·05	—	1·82	—	—	11·2	5·55					
		800	—	4·86	34·34	27·19	—	2·17	—	—	19·0	4·80					
		1000	—	3·80	34·34	27·31	—	2·22	—	—	25·7	4·44					
		1500	—	2·60	34·55	27·59	—	2·45	—	—	42·3	3·73					
		2000	—	2·30	34·67	27·70	—	2·34	—	—	52·8	3·65					
944	2	0	—	6·54	34·34	26·98	—	1·60	—	0·11	6·5	6·26	**N 70 V**	1000–750?	**2011**		Bad stray on wire
		10	—	6·60	34·34	26·98	—	1·62	—	0·11	6·4	—	,,	750–500			
		20	—	6·60	34·34	26·98	—	1·65	—	0·11	6·4	6·26	,,	500–250			
		30	—	6·61	34·34	26·98	—	1·79	—	0·11	6·3	—	,,	250–100			
		40	—	6·61	34·34	26·98	—	1·62	—	0·11	6·3	6·27	,,	100–50			
		50	—	6·61	34·34	26·98	—	1·62	—	0·11	6·3	—	,,	50–0			
		60	—	6·58	34·34	26·98	—	1·46	—	0·10	5·6	6·23	**N 50 V**	100–0	—	**2202**	
		80	—	6·51	34·36	27·00	—	1·63	—	0·08	7·6						
		100	—	6·51	34·36	27·00	—	1·63	—	0·09	6·6	6·40					
		150	—	6·50	34·37	27·01	—	1·65	—	0·09	6·6	6·42					
		190	—	6·41	34·37	27·03	—	1·73	—	0·04	6·9	6·29					
		280	—	5·90	34·31	27·04	—	1·71	—	0·05	7·6	6·24					
		380	—	5·41	34·22	27·02	—	1·92	—	0·00	9·0	6·16					
		570	—	4·81	34·31	27·17	—	2·28	—	—	18·2	5·05					
		750	—	3·68	34·31	27·29	—	2·34	—	—	23·4	4·80					
		940	—	3·10	34·38	27·41	—	2·53	—	—	34·1	4·38					
		1400	—	2·64	34·58	27·61	—	2·59	—	—	53·6	3·49					
		1880	—	2·25	34·72	27·75	—	2·53	—	—	50·6	3·77					
		2350	2344	1·94	34·75	27·80	—	2·34	—	—	52·1	3·80					
		2910	—	1·57	34·74	27·82	—	2·40	—	—	57·8	4·26					
		3390	—	1·23	34·73	27·84	—	2·34	—	—	59·7	4·03					
		3880	—	1·00	34·73	27·85	—	2·34	—	—	66·3	4·12					
		4360	4358	0·89	34·73	27·86	—	1·75	—	—	72·9	4·06					
945	3	0	—	6·00	—	—	—	—	—	—	—	—	**N 100 B**	102–0	0947	1007	KT
													N 100 B	255–80	0947	1018	DGP
946	4	0	—	6·90	34·33	26·92	—	1·43	—	0·21	4·9	6·43	**N 70 V**	1000–750	**2010**		
		10	—	6·90	34·33	26·92	—	1·39	—	0·21	4·8	—	,,	750–500			
		20	—	6·90	34·33	26·92	—	1·41	—	0·20	5·2	6·44	,,	500–250			
		30	—	6·87	34·32	26·92	—	1·48	—	0·20	5·2	—	,,	250–100			
		40	—	6·84	34·31	26·92	—	1·41	—	0·20	5·2	6·45	,,	100–50			
		50	—	6·80	34·30	26·91	—	1·48	—	0·21	5·2	—	,,	50–0			
		60	—	6·81	34·30	26·91	—	1·46	—	0·21	5·2	6·40	**N 50 V**	100–0	—	**2150**	
		80	—	6·81	34·30	26·91	—	1·54	—	0·21	5·4	—	**N 70 B**	128–0	**2237**	**2257**	KT
		100	—	6·53	34·30	26·95	—	1·50	—	0·66	6·7	6·41	**N 100 B**				
		150	—	6·53	34·30	26·95	—	1·52	—	0·28	7·0	6·35	**N 70 B**	270–120	**2237**	**2307**	DGP
		190	—	6·24	34·29	26·98	—	1·60	—	0·14	7·0	6·36	**N 100 B**				
		280	—	5·93	34·27	27·01	—	1·67	—	0·06	7·1	6·25					
		380	—	5·93	34·29	27·02	—	1·86	—	0·00	10·8	5·64					
		560	—	5·10	34·34	27·17	—	2·15	—	—	18·4	4·91					
		750	—	3·93	34·35	27·31	—	2·41	—	—	25·8	4·51					
		940	—	3·28	34·38	27·39	—	2·34	—	—	25·8	4·59					
		1400	—	2·58	34·56	27·59	—	2·64	—	—	47·5	3·66					
		1870	1869	2·35	34·64	27·68	—	2·53	—	—	53·5	3·66					
947	5	0	—	6·93	34·35	26·94	—	1·56	—	0·24	6·1	6·40	**N 70 V**	1000–785	**2032**		Closing depth estimated
		10	—	6·94	34·35	26·94	—	1·46	—	0·24	6·1	—	,,	750–500			
		20	—	6·94	34·35	26·94	—	1·46	—	0·24	6·1	6·40	,,	500–250			
		30	—	6·94	34·35	26·94	—	1·46	—	0·24	6·1	—	,,	250–100			
		40	—	6·94	34·35	26·94	—	1·48	—	0·24	6·0	6·43	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
		1932											
947 *cont.*	51° 59·2′ S, 173° 26·9′ W	4–5 ix											
948	54° 24·9′ S, 170° 13′ W	5 ix	2000	5083*	W×S	22–25	W×S	5	bc	1005·4	4·0	3·4	heavy W×S swell
			0000	—	WNW	20	WNW	4	ope	1007·4	4·3	4·3	mod. W×S swell
949	56° 49·6′ S, 166° 55·9′ W	6 ix	2000	5067*	WNW	30–35	WNW	6	opd	1007·9	4·5	4·5	heavy W×N swell
			0000	—	NW×W	31	NW×W	6	opdq	1007·4	4·7	4·6	heavy W×N swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
947 *cont.*	5	50	—	6·94	34·35	26·94	—	1·43	—	0·24	5·7	—	**N 70 V**	50–0			
		60	—	6·94	34·35	26·94	—	1·44	—	0·25	5·5	6·38	**N 50 V**	100–0	—	**2232**	
		80	—	6·93	34·35	26·94	—	1·48	—	0·26	5·4	—	**N 100 B**	117–0	**2345**	**0005**	KT
		100	—	6·91	34·35	26·95	—	1·63	—	0·26	5·5	6·39	**N 100 B**	310–130	**2345**	**0015**	DGP
		150	—	6·86	34·34	26·94	—	1·58	—	0·24	5·5	6·36					
		200	—	6·45	34·29	26·95	—	1·65	—	0·04	5·9	6·19					
		300	—	6·40	34·32	26·99	—	1·65	—	0·00	7·1	6·15					
		390	—	6·13	34·30	27·00	—	1·81	—	0·00	8·6	6·19					
		590	—	5·59	34·33	27·09	—	2·07	—	—	15·2	5·05					
		780	—	4·37	34·32	27·23	—	2·34	—	—	24·8	4·65					
		980	—	3·56	34·37	27·35	—	2·55	—	—	31·9	4·21					
		1470	1471	2·69	34·51	27·54	—	2·55	—	—	47·0	3·60					
		1930	—	2·35	34·63	27·67	—	2·51	—	—	47·7	3·73					
		2410	—	2·17	34·73	27·76	—	2·30	—	—	51·7	4·01					
		2890	—	1·87	34·75	27·81	—	2·32	—	—	64·4	4·16					
		3370	—	1·51	34·74	27·83	—	2·38	—	—	66·7	4·07					
		3850	—	1·19													
		4330	4330	0·95	34·73	27·85	—	1·50	—	—	69·2	3·99					
948	5	0	—	4·74	34·19	27·09	—	1·98	—	0·04	8·5	6·60	**N 70 V**	1000–750	**2007**		
		10	—	4·76	34·19	27·09	—	1·98	—	0·04	8·5	—	,,	750–500			
		20	—	4·77	34·19	27·09	—	1·90	—	0·04	8·3	6·63	,,	500–250			
		30	—	4·78	34·19	27·09	—	1·92	—	0·04	8·3	—	,,	250–100			
		40	—	4·78	34·19	27·09	—	1·86	—	0·04	8·3	6·63	,,	100–50			
		50	—	4·73	34·18	27·08	—	1·86	—	0·07	8·3	—	,,	50–0			
		60	—	4·72	34·18	27·08	—	1·86	—	0·07	8·4	6·63	**N 50 V**	100–0	—	**2144**	
		80	—	4·65	34·17	27·08	—	1·92	—	0·06	8·8	—	**N 70 B**	115–0	**0008**	**0028**	KT
		100	—	4·63	34·17	27·08	—	1·86	—	0·06	8·9	6·69	**N 100 B**				
		150	—	4·93	34·24	27·11	—	2·22	—	0·00	13·6	5·61	**N 70 B**	310–132	**0008**	**0038**	DGP
		200	—	4·01	34·14	27·12	—	2·07	—	0·02	9·2	6·73	**N 100 B**				
		300	—	3·52	34·14	27·18	—	2·11	—	0·01	8·9	6·80					
		400	—	3·92	34·21	27·19	—	2·24	—	0·00	17·0	5·59					
		600	—	3·39	34·13	27·17	—	2·41	—	—	28·0	4·80					
		800	—	3·39	34·41	27·40	—	2·66	—	—	—	4·15					
		1000	—	2·60	34·49	27·53	—	2·78	—	—	45·6	3·98					
		1490	—	2·39	34·66	27·69	—	2·64	—	—	56·1	3·84					
		1990	1987	2·07	34·75	27·79	—	2·51	—	—	60·7	4·10					
		2480	—	1·76	34·75	27·82	—	2·51	—	—	62·8	4·21					
		2970	—	1·39	34·75	27·84	—	2·40	—	—	70·1	4·28					
		3470	—	1·12	34·74	27·85	—	2·24	—	—	75·9	4·13					
		3960	—	0·96	34·73	27·85	—	2·51	—	—	79·2	4·08					
		4460	4460	0·87	34·72	27·85	—	1·35	—	—	79·2	4·04					
949	7	0	—	3·41	34·06	27·12	—	2·01	—	0·03	9·6	6·89	**N 70 V**	1000–750	**2010**		
		10	—	3·32	34·06	27·13	—	2·01	—	0·03	9·6	—	,,	750–500			
		20	—	3·33	34·06	27·13	—	2·01	—	0·03	11·4	6·87	,,	500–250			
		30	—	3·33	34·06	27·13	—	2·01	—	0·03	11·4	—	,,	250–100			
		40	—	3·15	34·05	27·14	—	2·01	—	0·01	13·3	6·91	,,	100–50			
		50	—	3·14	34·05	27·14	—	2·03	—	0·01	12·0	—	,,	50–0			
		60	—	3·09	34·05	27·14	—	2·03	—	0·01	10·7	6·91	**N 50 V**	100–0	—	**2320**	
		80	—	2·90	34·03	27·15	—	2·01	—	0·02	10·8	—	**N 70 B**	117–0	**2334**	**2354**	KT
		100	—	2·77	34·01	27·14	—	2·22	—	0·01	10·9	6·95	**N 100 B**				
		150	—	2·73	34·01	27·14	—	2·05	—	0·01	11·8	6·91	**N 70 B**	320–120	**2334**	**0004**	DGP
		200	—	2·72	34·01	27·14	—	2·05	—	0·01	11·7	6·88	**N 100 B**				
		290	—	2·84	34·04	27·15	—	2·13	—	0·01	13·9	6·63					
		390	—	3·64	34·23	27·23	—	2·49	—	0·01	23·6	5·14					
		590	—	2·94	34·34	27·39	—	2·51	—	—	30·2	4·51					
		780	—	2·66	34·44	27·50	—	2·62	—	—	40·8	4·05					
		980	—	2·48	34·52	27·57	—	2·74	—	—	41·8	3·73					
		1470	1465	2·26	34·70	27·73	—	2·30	—	—	47·3	3·67					
		1990	—	1·96	34·73	27·78	—	2·45	—	—	56·2	4·01					
		2480	—	1·60	34·73	27·81	—	2·40	—	—	57·0	4·30					
		2980	—	1·28	34·74	27·84	—	2·57	—	—	58·9	4·30					
		3480	—	1·06	34·73	27·85	—	2·57	—	—	64·2	4·16					
		3970	—	0·88	34·71	27·85	—	2·57	—	—	67·8	4·29					
		4470	4467	0·87	34·71	27·85	—	2·34	—	—	70·5	4·07					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
		1932											
950	59° 05·3′ S, 163° 46·5′ W	7 ix	2000	4844*	NW	18	NW	4	or	1002·6	2·1	1·9	heavy W × N swell
			0000	—	NW	18	NW	5	or	996·6	1·7	1·7	heavy NW swell
951	61° 26·3′ S, 160° 02·9′ W	8 ix	2000	3490*	NW × N	15–22	NW × N	4	osp	1003·0	−4·2	−4·6	mod. conf. WNW swell
952	62° 20·2′ S, 158° 22·1′ W	9 ix	0837	—	WSW	19	WSW	1	osp	1008·5	−10·0	−10·2	mod. NW × W swell
953	62° 19·5′ S, 158° 19·6′ W	9 ix	0952	—	WSW	19	—	0	osp	1008·0	−9·2	−9·3	mod. WNW swell
954	62° 18·2′ S, 158° 16·2′ W	9 ix	1053	—	WSW	16	—	0	o	1007·4	−8·4	−8·5	mod. WNW swell
955	62° 17·2′ S, 158° 13·2′ W	9 ix	1205	—	WNW	13	—	0	o	1005·5	−7·0	−7·3	mod. NW × W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
950	8	0	—	0·74	33·92	27·22	—	2·40	—	0·22	13·3	7·38	**N 70 V**	1000–750	**2015**		+11 hours
		10	—	0·61	33·92	27·23	—	2·34	—	0·22	13·3	—	,,	750–500			
		20	—	0·60	33·92	27·23	—	2·40	—	0·22	14·5	7·37	,,	500–250			
		30	—	0·58	33·92	27·23	—	2·38	—	0·22	15·2	—	,,	250–100			
		40	—	0·57	33·92	27·23	—	2·38	—	0·22	15·2	7·39	,,	100–50			
		50	—	0·56	33·92	27·33	—	2·38	—	0·22	15·3	—	,,	50–0			
		60	—	0·58	33·92	27·23	—	2·38	—	0·22	15·3	7·36	**N 50 V**	100–0	—	**2200**	
		80	—	0·61	33·92	27·23	—	2·36	—	0·22	15·3	—	**N 70 B**	102–0	**2330**	**2350**	KT
		100	—	0·56	33·92	27·23	—	2·32	—	0·23	14·9	7·36	**N 100 B**				
		150	—	0·54	33·92	27·23	—	2·28	—	0·23	13·8	7·36	**N 70 B**	300–130	**2330**	**0000**	DGP
		200	—	0·54	33·92	27·23	—	2·38	—	0·15	14·3	7·29	**N 100 B**				
		250	—	1·83	34·06	27·25	—	2·51	—	0·00	21·5	6·06					
		300	—	2·22	34·19	27·33	—	2·51	—	0·00	30·4	5·34					
		390	—	2·49	34·31	27·40	—	2·60	—	0·00	35·6	4·68					
		590	—	2·38	34·43	27·50	—	2·66	—	—	44·2	4·01					
		790	—	2·35	34·57	27·62	—	2·68	—	—	53·7	3·90					
		990	—	2·27	34·66	27·70	—	2·68	—	—	56·3	3·89					
		1480	—	2·04	34·72	27·77	—	2·57	—	—	56·3	4·06					
		1970	1971	1·70	34·73	27·80	—	2·49	—	—	57·3	4·26					
		2490	—	1·34	34·73	27·83	—	2·49	—	—	65·9	4·33					
		2990	—	1·09	34·72	27·83	—	2·66	—	—	72·8	4·37					
		3480	—	0·91	34·71	27·85	—	2·57	—	—	74·3	4·20					
		3980	—	0·87	34·70	27·84	—	2·62	—	—	77·6	4·06					
		4480	4478	0·88	34·70	27·84	—	2·34	—	—	77·6	4·00					
951	8	0	—	−1·64	33·78	27·21	—	2·49	—	0·29	23·5	7·52	**N 70 V**	1000–780	**2007**		
		10	—	−1·64	33·78	27·21	—	2·49	—	0·29	23·5	—	,,	750–500			
		20	—	−1·63	33·78	27·21	—	2·43	—	0·29	23·5	7·53	,,	500–250			
		30	—	−1·62	33·78	27·21	—	2·49	—	0·29	23·5	—	,,	250–100			
		40	—	−1·62	33·78	27·21	—	2·49	—	0·29	23·5	7·52	,,	100–50			
		50	—	−1·61	33·78	27·21	—	2·57	—	0·28	23·5	—	,,	50–0			
		60	—	−1·61	33·78	27·21	—	2·57	—	0·28	24·4	7·52	**N 50 V**	100–0	—	**2137**	
		80	—	−1·61	33·78	27·21	—	2·53	—	0·28	25·0	—	**N 70 B**	117–0	**2219**	**2239**	KT
		100	—	−1·50	33·81	27·23	—	2·68	—	0·28	26·2	7·34	**N 100 B**				
		150	—	0·17	34·01	27·32	—	2·74	—	0·04	26·9	6·33	**N 70 B**	340–130	**2219**	**2249**	DGP
		200	—	1·92	34·26	27·41	—	2·97	—	0·00	40·0	4·84	**N 100 B**				
		290	—	2·02	34·42	27·52	—	3·06	—	0·00	46·3	4·25					
		390	—	2·24	34·49	27·56	—	3·27	—	0·00	52·7	3·95					
		590	—	2·24	34·60	27·65	—	3·23	—	—	57·5	3·82					
		780	—	2·16	34·61	27·67	—	3·12	—	—	59·3	4·02					
		980	—	2·07	34·68	27·73	—	2·97	—	—	61·2	3·93					
		1470	—	1·71	34·73	27·80	—	2·89	—	—	71·6	4·18					
		1950	—	1·30	34·72	27·82	—	2·97	—	—	77·5	4·03					
		2440	—	1·00	34·70	27·83	—	2·97	—	—	82·5	4·19					
		2930	2933	0·80	34·70	27·84	—	3·06	—	—	84·4	4·08					
952	8	0	—	−1·66	34·10	27·46	—	—	—	—	—	—	**N 70 B**	146–0	0855	0915	KT. +10 hours. Nets closed just below surface
													N 100 B				
													N 70 B	340–110	0855	0925	DGP. In fairly open patch among light, loose pack-ice
													N 100 B				
													N 100 H	0–2	0857	0927	
953	9	0	—	−1·68	34·08	27·45	—	—	—	—	—	—	**N 70 H**	5–10	0957	1037	In light loose pack-ice
													N 100 H	0–5			
954	9	0	—	−1·60	34·06	27·43	—	—	—	—	—	—	**N 70 H**	0–7	1115	1145	In light loose pack-ice dotted with heavy floes
													N 100 H	0–2			
955	9	0	—	−1·50	33·98	27·37	—	—	—	—	—	—	**N 70 H**	0–7	1210	1240	In light loose pack-ice dotted with heavy floes. Temperature from thermograph
													N 100 H	0–2			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
956	62° 12·8′ S, 158° 11′ W	1932 9 ix	1340	2974*	W	24	W	2	oq	1003·6	−5·0?	−4·7	heavy NW×W swell
957	61° 56·3′ S, 155° 49·6′ W	10 ix	1045	—	WNW	12	WNW	4	osq	965·2	−3·9	−4·1	heavy WNW swell
958	61° 53·9′ S, 155° 42·4′ W	10 ix	1145	—	S	22	S	4	o	964·8	−5·2	−5·5	heavy WNW swell
959	61° 07′ S, 153° 57·2′ W	10 ix	2010	2968*	SW	25	SW	4	bcs	968·4	−3·3	−4·6	heavy WNW swell
			0000	—	SSE	28	SSE	4	os	971·9	−9·0	−9·3	heavy W swell
960	58° 31·4′ S, 150° 02·9′ W	11–12 ix	2000	2939*	SW×W	22	SW×W	5–6	csp	987·3	−11·5	−11·9	heavy conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
956	9	0	—	−1·76	33·97	27·37	—	2·41	—	0·26	33·4	7·17	N 70 B	97–0	1351	1411	KT. Near edge of light pack-ice
		10	—	−1·76	33·98	27·38	—	2·38	—	0·26	33·4	—	N 100 B				
		20	—	−1·77	33·99	27·39	—	2·30	—	0·26	33·4	7·14	N 70 B	280–100	1351	1421	DGP
		30	—	−1·79	34·00	27·39	—	2·30	—	0·26	33·4	—	N 100 B				
		40	—	−1·79	34·00	27·39	—	2·38	—	0·26	33·4	7·03	N 70 V	1000–760	1440		
		50	—	−1·79	34·00	27·39	—	2·45	—	0·26	33·4	—	,,	750–480			Stray on wire
		60	—	−1·79	34·00	27·39	—	2·30	—	0·26	33·4	7·03	,,	500–238			
		80	—	−1·79	34·00	27·39	—	2·38	—	0·26	33·4	—	,,	250–96			
		100	—	−1·73	34·01	27·39	—	2·45	—	0·26	33·7	7·03	,,	250–100			
		150	—	0·11	34·25	27·51	—	2·64	—	0·11	36·7	5·53	,,	100–50			
		200	—	1·52	34·49	27·62	—	2·66	—	0·00	47·7	4·14	,,	50–0			
		290	—	1·94	34·61	27·69	—	2·66	—	0·00	52·4	3·85	N 50 V	100–0	—	1725	
		390	—	2·02	34·63	27·70	—	2·60	—	0·00	52·4	3·86					
		590	—	1·99	34·70	27·76	—	2·55	—	—	54·0	3·89					
		780	—	1·88	34·71	27·78	—	2·43	—	—	55·6	4·00					
		980	—	1·75	34·72	27·79	—	2·34	—	—	57·3	4·16					
		1470	—	1·34	34·72	27·82	—	2·45	—	—	60·2	4·15					
		1960	—	0·99	34·71	27·84	—	2·59	—	—	65·5	4·17					
		2450	2451	0·74	34·70	27·85	—	2·66	—	—	76·5	4·23					
957	10	0	—	−1·60	34·05	27·42	—	—	—	—	—	—	N 70 H	0–7	1046	1116	In loose pack-ice
													N 100 H	0–2			
													N 100 H	0–5	1046	1116	
958	10	0	—	−1·64	34·11	27·47	—	—	—	—	—	—	N 70 H	0–7	1145	1215	Among scattered floes
													N 100 H	0–2			
													N 70 B	100–0	1241	1301	KT
													N 100 B				
													N 70 B	260–114	1241	1315	DGP
													N 100 B				
													N 100 H	0–5	1250	1325	
959	10	0	—	−1·76	34·11	27·48	—	2·68	—	0·26	41·7	7·07	N 70 V	1000–770	2017		Remainder of vertical hauls abandoned
		10	—	−1·75	34·11	27·48	—	2·74	—	0·26	41·2	—	,,	250–100			
		20	—	−1·71	34·10	27·46	—	2·68	—	0·26	40·3	7·07	,,	250–0			
		30	—	−1·71	34·10	27·46	—	2·68	—	0·27	39·5	—	,,	100–50			
		40	—	−1·71	34·10	27·46	—	2·72	—	0·26	41·7	7·05	,,	50–0			
		50	—	−1·71	34·10	27·46	—	2·72	—	0·26	41·7	—	N 50 V	100–0	—	2350	
		60	—	−1·71	34·10	27·46	—	2·72	—	0·26	41·7	7·09	N 70 B	91–0	0012	0032	KT
		80	—	−1·69	34·10	27·46	—	2·74	—	0·25	41·7	—	N 100 B				
		100	—	−1·59	34·12	27·48	—	2·74	—	0·24	42·7	6·91	N 70 B	240–110	0012	0042	DGP
		150	—	0·15	34·38	27·62	—	2·81	—	0·11	47·7	5·30	N 100 B				
		200	—	1·80	34·57	27·66	—	2·85	—	0·00	60·2	3·96					
		290	—	1·94	34·68	27·74	—	2·95	—	0·00	61·2	3·91					
		390	—	2·04	34·70	27·76	—	2·72	—	0·00	64·4	3·98					
		590	—	1·84	34·70	27·77	—	2·79	—	—	72·0	4·03					
		780	—	1·75	34·72	27·79	—	2·72	—	—	72·0	4·10					
		980	—	1·55	34·72	27·80	—	2·78	—	—	74·9	4·21					
		1460	—	1·14	34·72	27·83	—	2·81	—	—	83·4	4·23					
		1950	—	0·77	34·71	27·85	—	2·79	—	—	91·7	4·24					
		2440	2438	0·63	34·70	27·85	—	2·59	—	—	91·7	4·03					
960	11	0	—	−1·44	34·09	27·45	—	2·83	—	0·25	36·7	7·36	N 70 V	1000–750	2020		
		10	—	−1·42	34·09	27·45	—	2·89	—	0·25	36·3	—	,,	750–500			Depth of 10 m. bottle estimated
		20	—	−1·42	34·09	27·45	—	2·89	—	0·26	36·7	7·38	,,	500–250			
		30	—	−1·42	34·09	27·45	—	2·89	—	0·26	36·7	—	,,	350–180			Depth estimated, gear frozen
		40	—	−1·42	34·09	27·45	—	2·85	—	0·26	36·7	7·38	,,	250–100			
		50	—	−1·42	34·09	27·45	—	2·89	—	0·26	36·7	—	,,	200–0			
		60	—	−1·41	34·09	27·45	—	2·85	—	0·26	36·7	7·39	,,	100–50			
		80	—	−1·41	34·09	27·45	—	2·83	—	0·26	37·4	—	,,	50–0			
		100	—	−1·39	34·09	27·45	—	2·81	—	0·25	38·6	7·35	N 50 V	100–0	—	0015	Depth estimated, gear frozen
		150	—	0·51	34·34	27·57	—	2·97	—	0·06	48·9	5·22					
		200	—	1·32	34·42	27·57	—	2·97	—	0·00	51·7	4·42	N 70 B	137–0	0037	0057	KT
		300	—	1·92	34·59	27·68	—	2·97	—	0·00	54·0	3·86	N 100 B				
		390	—	2·02	34·64	27·71	—	2·97	—	0·00	55·6	3·89	N 100 H	0–2	0035	0105	
		590	—	2·00	34·70	27·75	—	2·68	—	—	58·2	3·84	N 70 B	290–134	0037	0107	DGP
		790	—	1·88	34·73	27·79	—	2·68	—	—	60·2	4·08	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
960 *cont.*	58° 31·4′ S, 150° 02·9′ W	1932 11–12 ix											
961	56° 16·4′ S, 146° 22·3′ W	12 ix	2000	2968*	WSW	15–17	WSW	4 conf.	o	999·4	−6·6	−7·3	heavy conf. WSW swell
			0000	—	SW × W	22	SW × W	5	osp	985·7	−9·4	−9·7	heavy conf. SW swell
962	54° 02·8′ S, 142° 25·4′ W	13 ix	2000	3655*	SSW	19	SSW	4	bc	1001·8	2·8	1·4	heavy conf. SW swell
			0000	—	SW × S	18	SW × S	4	c	1006·8	1·0	−0·8	heavy conf. SW × S swell
963	52° 01·1′ S, 139° 13·2′ W	14 ix	2000	4341*	W	18	W	4	bc	1019·4	5·6	4·1	mod. conf. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
960 *cont.*	11	980	—	1·73	34·74	27·81	—	2·70	—	—	62·2	4·15					
		1480	—	1·27	34·73	27·83	—	2·68	—	—	72·0	4·09					
		1970	—	0·86	34·71	27·85	—	2·68	—	—	83·4	3·92					
		2460	2463	0·72	34·70	27·85	—	2·01	—	—	87·4	3·92					
961	12	0	—	0·42	33·99	27·30	—	2·72	—	0·19	23·5	7·03	**N 70 V**	1000–750	**2015**		
		10	—	0·48	33·99	27·29	—	2·81	—	0·19	23·5	—	,,	750–500			
		20	—	0·48	33·99	27·29	—	2·79	—	0·19	23·3	7·02	,,	500–250			
		30	—	0·48	33·99	27·29	—	2·79	—	0·19	23·4	—	,,	250–100			
		40	—	0·48	33·99	27·29	—	2·79	—	0·19	23·4	7·03	,,	100–50			
		50	—	0·48	33·99	27·29	—	2·72	—	0·19	23·3	—	,,	50–0			
		60	—	0·50	33·99	27·29	—	2·91	—	0·19	23·4	7·00	**N 50 V**	100–0	—	**2146**	
		80	—	0·47	33·99	27·30	—	2·72	—	0·20	23·3	—	**N 70 B**	109–0	**2216**	**2236**	KT
		100	—	1·33	34·12	27·34	—	2·85	—	0·03	28·6	5·84	**N 100 B**				
		150	—	−0·35	34·07	27·40	—	2·81	—	0·27	31·1	6·96	**N 70 B**	290–0	**2216**	**2246**	DGP
		200	—	−0·35	34·09	27·41	—	2·74	—	0·23	33·1	6·82	**N 100 B**				
		300	—	2·23	34·43	27·52	—	3·00	—	0·00	38·1	4·11	**N 70 B**	325–144	**2307**	**2337**	DGP
		390	—	2·30	34·50	27·57	—	3·08	—	0·00	49·2	3·91	**N 100 B**				
		590	—	2·25	34·61	27·66	—	3·04	—	—	52·9	3·74					
		790	—	2·16	34·70	27·74	—	2·79	—	—	55·4	3·91					
		980	—	2·07	34·71	27·76	—	2·81	—	—	55·4	3·93					
		1480	—	1·68	34·74	27·81	—	2·79	—	—	62·2	4·07					
		1970	—	1·23													
		2460	2455	0·98	34·71	27·84	—	2·79	—	—	72·3	4·03					
962	13	0	—	5·03	34·18	27·05	—	2·17	—	0·11	7·5	6·50	**N 70 V**	1000–765	**2015**		
		10	—	5·03	34·18	27·05	—	2·34	—	0·13	6·5	—	,,	750–500			
		20	—	5·03	34·18	27·05	—	2·13	—	0·14	6·2	6·49	,,	500–250			
		30	—	5·03	34·18	27·05	—	2·13	—	0·14	8·3	—	,,	250–100			
		40	—	5·03	34·18	27·05	—	2·11	—	0·14	7·4	6·49	,,	100–50			
		50	—	5·03	34·18	27·05	—	2·13	—	0·13	7·2	—	,,	50–5			
		60	—	5·03	34·18	27·05	—	2·13	—	0·14	7·2	6·49	**N 50 V**	100–0	—	**2224**	
		80	—	5·03	34·18	27·05	—	2·00	—	0·14	7·4	—	**N 70 B**	124–0	**0027**	**0047**	KT. **N 70 B** split
		100	—	5·02	34·18	27·05	—	2·00	—	0·12	7·5	6·49	**N 100 B**				
		150	—	5·02	34·18	27·05	—	1·98	—	0·12	7·4	6·50	**N 70 B**	320–100	**0027**	**0057**	DGP
		200	—	5·02	34·18	27·05	—	1·92	—	0·12	7·4	6·50	**N 100 B**				
		300	—	4·99	34·18	27·05	—	1·94	—	0·16	7·6	6·46	**N 70 B**	100–0	**0111**	**0131**	Depth estimated
		400	—	3·87	34·05	27·07	—	2·17	—	0·19	8·0	6·55					
		500	—	3·71	34·27	27·26	—	2·41	—	—	17·4	4·68					
		590	—	4·13	34·27	27·22	—	2·66	—	—	19·8	4·79					
		790	788	3·36	34·36	27·36	—	2·91	—	—	30·2	4·29					
		980	—	2·81													
		1470	1458	2·38	34·62	27·67	—	2·97	—	—	41·2	3·39					
		1980	—	2·14	34·71	27·76	—	2·74	—	—	52·8	4·01					
		2480	—	1·75	34·73	27·80	—	2·72	—	—	60·4	4·07					
		2970	—	1·36	34·72	27·82	—	2·74	—	—	70·7	4·24					
		3470	3470	1·18	34·71	27·83	—	2·74	—	—	70·7	4·24					
963	14	0	—	6·48	34·37	27·02	—	1·81	—	0·07	6·5	6·24	**N 70 V**	1000–770	**2010**		+9 hours
		10	—	6·48	34·37	27·02	—	1·90	—	0·09	6·5	—	,,	750–500			
		20	—	6·48	34·37	27·02	—	1·96	—	0·18	6·6	6·25	,,	500–250			
		30	—	6·48	34·37	27·02	—	2·03	—	0·09	6·6	—	,,	250–100			
		40	—	6·48	34·37	27·02	—	2·03	—	0·09	6·7	6·25	,,	100–50			
		50	—	6·48	34·37	27·02	—	2·00	—	0·09	6·7	—	,,	50–0			
		60	—	6·48	34·37	27·02	—	2·03	—	0·09	6·6	6·24	**N 50 V**	100–0	—	**2145**	
		80	—	6·47	34·37	27·02	—	2·05	—	0·09	6·4	—	**N 70 B**	117–0	**2242**	**2302**	KT
		100	—	6·46	34·37	27·02	—	2·03	—	0·09	6·4	6·25	**N 100 B**				
		150	—	6·46	34·37	27·02	—	2·00	—	0·09	6·4	6·24	**N 70 B**	320–128	**2242**	**2312**	DGP
		200	—	6·47	34·37	27·02	—	1·84	—	0·09	6·4	6·26	**N 100 B**				
		300	—	6·43	34·37	27·02	—	1·92	—	0·06	6·5	6·15					
		400	—	6·34	34·36	27·02	—	2·00	—	0·01	6·9	5·92					
		600	—	6·03	34·34	27·05	—	2·09	—	—	11·2	5·37					
		800	—	5·21	34·33	27·13	—	2·36	—	—	16·9	4·94					
		1000	—	4·26	34·34	27·26	—	2·51	—	—	24·6	4·49					
		1500	1501	2·81	34·46	27·49	—	2·95	—	—	42·7	3·93					
		1970	—	2·41	34·62	27·67	—	2·64	—	—	50·6	3·67					
		2460	—	2·11	34·72	27·76	—	2·60	—	—	62·2	3·76					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
963 *cont.*	52° 01·1′ S, 139° 13·2′ W	1932 14 ix											
964	49° 42·1′ S, 135° 33·2′ W	15 ix	2000	4734*	WNW	27	WNW	5	bcp	1017·1	6·6	5·7	mod. conf. W swell
			0000	—	WNW	28	WNW	5	opd	1014·3	6·8	5·9	heavy conf. W swell
965	47° 16·9′ S, 132° 25·1′ W	16 ix	2000	4678*	SW	25–30	SW	6	bc	1018·3	6·7	6·4	heavy conf. WSW swell
966	44° 40·3′ S, 129° 27·9′ W	17–18 ix	2000	5015*	W × S	18–22	WSW	4	bcp	1022·2	7·2	5·7	heavy WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
963 *cont.*	14	2950	—	1·85	34·72	27·78	—	2·64	—	—	66·6	3·88					
		3450	—	1·38	34·71	27·82	—	2·66	—	—	73·0	3·87					
		3940	3942	1·32	34·71	27·82	—	2·66	—	—	71·6	3·51					
964	15	0	—	6·86	34·42	26·99	—	1·52	—	0·21	7·3	6·29	N 70 V	1000–750	2015		
		10	—	6·85	34·42	26·99	—	1·52	—	0·19	7·3	—	,,	750–500			
		20	—	6·83	34·42	27·00	—	1·39	—	0·19	7·5	6·32	,,	500–250			
		30	—	6·83	34·42	27·00	—	1·41	—	0·19	7·4	—	,,	250–100			
		40	—	6·83	34·42	27·00	—	1·41	—	0·20	7·4	6·30	,,	100–50			
		50	—	6·83	34·42	27·00	—	1·43	—	0·19	7·0	—	,,	50–0			
		60	—	6·83	34·42	27·00	—	1·58	—	0·19	6·9	6·29	N 50 V	100–0	—	2205	
		80	—	6·82	34·42	27·00	—	1·41	—	0·19	7·0	—	N 70 B	110–0	2326	2346	KT
		100	—	6·82	34·42	27·00	—	1·46	—	0·19	7·0	6·29	N 100 B				
		150	—	6·81	34·42	27·00	—	1·43	—	0·18	6·9	6·29	N 70 B	250–100	2326	2356	DGP. Depth estimated
		200	—	6·81	34·42	27·00	—	1·44	—	0·09	6·9	6·19	N 100 B				
		300	—	6·83	34·43	27·01	—	1·52	—	0·03	7·0	6·06					
		400	—	6·83	34·43	27·01	—	1·73	—	0·00	7·1	5·79					
		600	—	6·36	34·36	27·02	—	1·84	—	—	9·0	5·67					
		800	—	5·50	34·33	27·10	—	2·20	—	—	13·2	5·11					
		1000	—	4·64	34·33	27·20	—	2·41	—	—	21·1	4·59					
		1500	—	2·93	34·45	27·47	—	2·70	—	—	40·8	3·93					
		2000	2003	2·43	34·61	27·65	—	2·79	—	—	48·9	3·67					
		2460	—	2·21	34·66	27·70	—	2·78	—	—	52·4	3·78					
		2950	—	1·86	34·70	27·77	—	2·72	—	—	58·2	3·95					
		3440	—	1·52	34·71	27·81	—	2·74	—	—	64·4	3·82					
		3930	—	1·34	34·70	27·81	—	2·72	—	—	66·7	3·90					
		4420	4414	1·33	34·70	27·81	—	2·72	—	—	62·2	3·74					
965	16	0	—	7·10	34·38	26·94	—	1·35	—	0·27	3·4	6·36	N 70 V	1000–780	2008		
		10	—	7·10	34·38	26·94	—	1·69	—	0·31	3·4	—	,,	750–500			
		20	—	7·10	34·38	26·94	—	1·31	—	0·31	3·5	6·37	,,	500–250			
		30	—	7·10	34·38	26·94	—	1·46	—	0·28	3·9	—	,,	250–100			
		40	—	7·10	34·38	26·94	—	1·50	—	0·27	4·1	6·39	,,	100–50			
		50	—	7·10	34·38	26·94	—	1·46	—	0·26	4·1	—	,,	50–0			
		60	—	7·10	34·38	26·94	—	1·41	—	0·26	4·2	6·37	N 50 V	100–0	—	2136	
		80	—	7·10	34·38	26·94	—	1·35	—	0·29	4·3	—	N 70 B	121–0	2242	2302	KT
		100	—	6·94	34·39	26·97	—	1·50	—	0·31	4·3	6·36	N 100 B				
		150	—	6·90	34·40	26·98	—	1·67	—	0·32	5·0	6·32	N 70 B	310–132	2242	2312	DGP
		200	—	6·83	34·41	27·00	—	1·44	—	0·36	5·1	6·30	N 100 B				
		300	—	6·73	34·42	27·01	—	1·62	—	0·00	5·7	5·90					
		400	—	6·58	34·41	27·03	—	1·67	—	0·00	6·9	5·94					
		600	—	6·18	34·35	27·05	—	1·67	—	0·10	8·4	5·82					
		800	—	5·41	34·31	27·10	—	1·86	—	—	10·4	5·44					
		1000	—	4·53	34·33	27·21	—	2·24	—	—	21·6	4·62					
		1500	—	2·84	34·49	27·51	—	2·76	—	—	43·5	4·00					
		1990	1992	2·35	34·61	27·66	—	2·76	—	—	58·7	3·55					
		2450	—	2·05	34·67	27·72	—	2·72	—	—	66·0	3·35					
		2930	—	1·79	34·68	27·75	—	2·72	—	—	72·4	3·44					
		3420	—	1·64	34·70	27·79	—	2·72	—	—	73·9	3·46					
		3910	—	1·43	34·71	27·81	—	2·72	—	—	73·9	3·67					
		4400	4395	1·32	34·71	27·82	—	2·72	—	—	72·4	3·74					
966	17	0	—	8·50	34·24	26·63	—	1·14	—	0·27	4·8	6·22	N 70 V	1000–790	2010		
		10	—	8·51	34·24	26·63	—	1·12	—	0·27	5·1	—	,,	750–520			
		20	—	8·51	34·24	26·63	—	1·16	—	0·26	5·2	6·24	,,	500–250			
		30	—	8·51	34·24	26·63	—	1·10	—	0·23	5·3	—	,,	250–100			
		40	—	8·51	34·24	26·63	—	1·03	—	0·26	5·1	6·25	,,	100–50			
		50	—	8·51	34·24	26·63	—	1·06	—	0·26	5·2	—	,,	50–0			
		60	—	8·51	34·24	26·63	—	1·03	—	0·24	5·1	6·23	N 50 V	100–0	—	2255	
		80	—	8·31	34·26	26·67	—	1·06	—	0·29	5·3	—	N 70 B	102–0	2332	2352	KT
		100	—	8·19	34·28	26·70	—	1·10	—	0·34	5·3	6·18	N 100 B				
		150	—	7·89	34·31	26·77	—	1·16	—	0·34	5·3	6·12	N 70 B	250–100	2332	0002	Depth estimated
		200	—	7·52	34·31	26·82	—	1·24	—	0·34	5·4	6·22	N 100 B				
		300	—	6·92	34·39	26·97	—	1·56	—	0·00	6·6	5·78					
		390	—	6·70	34·39	27·00	—	1·67	—	0·02	8·4	5·68					
		590	—	6·45	34·37	27·02	—	1·79	—	—	8·6	5·68					
		790	—	5·69	34·31	27·07	—	1·96	—	—	9·2	5·44					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
966 *cont.*	44° 40·3′ S, 129° 27·9′ W	1932 17–18 ix											
967	41° 03·1′ S, 126° 03·9′ W	19 ix	0503	4568*	WNW	20–22	WNW	4	c	1017·3	8·4	5·3	heavy conf. W × N swell
968	42° 30′ S, 124° 51·7′ W	19 ix	2000	—	W	23	W	5	b	1016·9	8·6	6·1	heavy conf. W swell
969	45° 36·1′ S, 122° 09·5′ W	20 ix	2000	3940*	W	22–40	W	6 conf.	bcpq	1004·3	8·1	6·3	heavy conf. WSW swell
970	55° 26·7′ S, 115° 00·8′ W	25 ix	0915	3543*	Lt airs	2	—	0	o	1004·1	0·6	0·5	mod. SW × W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
966 *cont.*	17	990	—	4·86	34·30	27·16	—	2·28	—	—	18·9	4·76					
		1480	—	2·87	34·48	27·51	—	2·57	—	—	43·9	3·87					
		1970	1972	2·36	34·61	27·66	—	2·74	—	—	—	3·46					
		2460	—	1·95	34·68	27·74	—	2·83	—	—	67·5	3·31					
		2950	—	1·78	34·68	27·76	—	2·79	—	—	71·5	3·43					
		3450	—	1·63	34·68	27·77	—	2·78	—	—	68·8	3·33					
		3940	—	1·45	34·69	27·78	—	2·78	—	—	70·1	3·77					
		4430	—	1·30	34·71	27·82	—	2·47	—	—	71·5	3·68					
967	19	0	—	9·70	34·14	26·36	—	0·72	—	0·31	3·4	6·13	**N 70 V**	1000–750	**0510**		+8 hours
		10	—	9·70	34·14	26·36	—	0·72	—	0·31	3·4	—	,,	750–500			
		20	—	9·70	34·14	26·36	—	0·74	—	0·32	3·4	6·14	,,	500–250			
		30	—	9·70	34·14	26·36	—	0·68	—	0·32	3·4	—	,,	250–100			
		40	—	9·70	34·14	26·36	—	0·80	—	0·31	3·4	6·14	,,	100–50			
		50	—	9·70	34·14	26·36	—	0·80	—	0·31	3·4	—	,,	50–0			
		60	—	9·69	34·14	26·36	—	0·84	—	0·32	3·4	6·11	**N 50 V**	100–0	—	0642	
		80	—	9·62	34·14	26·37	—	0·86	—	0·33	3·4	—	**N 70 B**	110–0	0743	0803	KT
		100	—	9·50	34·14	26·39	—	0·86	—	0·33	3·4	6·07	**N 100 B**				
		150	—	8·58	34·25	26·62	—	1·20	—	0·16	3·4	5·58	**N 70 B**	306–145	0743	0813	DGP
		190	—	7·72	34·34	26·82	—	1·48	—	0·02	3·4	5·36	**N 100 B**				
		290	—	6·90	34·39	26·98	—	1·65	—	0·00	8·2	5·42					
		390	—	6·60	34·41	27·03	—	1·58	—	0·00	8·3	5·57					
		580	—	6·17	34·34	27·03	—	1·84	—	0·00	8·8	5·43					
		770	—	5·32	34·32	27·12	—	2·01	—	0·00	13·5	5·15					
		970	—	4·38	34·31	27·22	—	2·36	—	0·00	20·1	4·60					
		1450	1446	2·80	34·45	27·48	—	2·64	—	—	45·6	3·84					
		1950	—	2·20	34·65	27·69	—	2·72	—	—	60·7	3·50					
		2440	—	1·86	34·68	27·75	—	2·72	—	—	65·1	3·40					
		2940	—	1·71	34·68	27·76	—	2·81	—	—	66·3	3·32					
		3430	—	1·53	34·68	27·77	—	2·68	—	—	70·1	3·56					
		3930	3930	1·42	34·69	27·78	—	2·47	—	—	71·5	3·64					
968	19	0	—	9·30	34·21	26·47	—	—	—	—	—	—	**N 70 B**	86–0	**2016**	**2036**	KT
													N 100 B				
													N 70 B	250–106	**2016**	**2046**	DGP
													N 100 B				
969	20	0	—	7·81	34·23	26·72	—	1·24	—	0·31	5·4	6·28	**N 100 B**	89–0	**2247**	**2307**	KT
		10	—	7·85	34·23	26·72	—	1·29	—	0·30	5·5	—	**N 100 B**	250–100	**2247**	**2317**	Depth estimated
		20	—	7·85	34·23	26·72	—	1·29	—	0·29	5·5	6·30					
		30	—	7·84	34·23	26·72	—	1·18	—	0·29	5·4						
		40	—	7·84	34·23	26·72	—	1·20	—	0·29	5·2	6·29					
		50	—	7·83	34·23	26·72	—	1·18	—	0·29	5·2						
		60	—	7·83	34·24	26·73	—	1·20	—	0·29	5·2	6·30					
		80	—	7·80	34·26	27·74	—	1·20	—	0·29	5·2						
		100	—	7·58	34·28	27·79	—	1·31	—	0·32	5·2	6·17					
		150	—	7·32	34·30	27·84	—	1·35	—	0·26	5·3	6·07					
		200	—	7·00	34·33	27·91	—	1·56	—	0·22	5·6	6·05					
		290	—	6·71	34·40	27·00	—	1·65	—	0·33	7·4	5·72					
		390	—	6·58	34·40	27·02	—	1·63	—	0·00	7·5	5·76					
		590	—	6·13	34·34	27·04	—	1·88	—	0·00	8·5	5·70					
		780	—	5·36	34·30	27·10	—	2·17	—	0·00	15·4	5·07					
		980	—	4·43	34·31	27·21	—	2·38	—	0·02	23·1	4·57					
		1470	—	2·84	34·46	27·49	—	2·91	—	0·00	47·3	3·86					
		1950	—	2·29	34·61	27·66	—	2·89	—	0·00	64·2	3·60					
		2440	—	1·90	34·63	27·71	—	2·95	—	—	78·1	3·37					
		2930	—	1·69	34·66	27·74	—	2·95	—	—	87·7	3·37					
		3420	3419	1·57	34·67	27·76	—	2·95	—	—	92·1	3·29					
970	25	0	—	3·70	34·06	27·09	—	1·75	—	0·20	7·7	6·79	**N 70 V**	1000–750	1000		+7 hours
		10	—	3·71	34·06	27·09	—	1·82	—	0·20	7·8	—	,,	750–500			
		20	—	3·71	34·06	27·09	—	1·75	—	0·19	8·0	6·81	,,	500–250			
		30	—	3·71	34·06	27·09	—	1·77	—	0·19	8·0	—	,,	250–100			
		40	—	3·71	34·06	27·09	—	1·75	—	0·19	7·9	6·81	,,	100–50			
		50	—	3·70	34·06	27·09	—	1·79	—	0·19	7·9	—	,,	50–0			
		60	—	3·70	34·06	27·09	—	1·82	—	0·19	7·9	6·79	**N 50 V**	100–0	—	1140	
		80	—	3·70	34·06	27·09	—	1·77	—	0·20	8·0	—	**N 70 B**	141–0	1210	1230	KT
		100	—	3·70	34·06	27·09	—	1·79	—	0·20	8·0	6·80	**N 100 B**				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
970 *cont.*	55° 26·7′ S, 115° 00·8′ W	1932 25 ix											
971	56° 22·9′ S, 113° 58·5′ W	25 ix	2000	—	SE	8	Conf.	2	o	1000·4	0·6	−0·5	mod. conf. SW swell
972	59° 21·8′ S, 109° 59·5′ W	26 ix	2000	5349*	W	15–18	W	4	csp	994·8	0·4	−0·1	mod. SW swell
973	61° 47·8′ S, 105° 37·1′ W	27 ix	2000	—	W×S	15	W×S	3	c	1000·4	0·6	−0·2	mod. WSW swell
974	63° 57′ S, 101° 16′ W	28 ix	1400	5126*	WNW	23–24	WNW	4	c	993·2	0·5	0·0	mod. conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
970 *cont.*	25	150	—	3·70	34·06	27·09	—	1·82	—	0·20	8·1	6·78	N 70 B	380–110	1210	1240	DGP
		190	—	3·70	34·06	27·09	—	1·96	—	0·20	8·2	6·79	N 100 B				
		290	—	3·47	34·13	27·16	—	2·09	—	0·00	14·1	6·03					
		390	—	3·28	34·15	27·21	—	2·22	—	0·00	18·5	5·55					
		580	—	3·13	34·32	27·35	—	2·47	—	0·00	26·6	4·68					
		770	—	2·57	34·38	27·45	—	2·62	—	0·00	39·2	4·41					
		970	—	2·53	34·49	27·54	—	2·62	—	0·00	44·6	4·07					
		1450	—	2·27	34·65	27·69	—	2·62	—	0·00	53·3	3·85					
		1930	—	1·99	34·73	27·78	—	2·45	—	0·00	67·3	3·88					
		2420	—	1·59	34·73	27·81	—	2·47	—	—	67·3	4·00					
		2900	2900	1·36	34·73	27·83	—	2·55	—	—	67·3	3·92					
971	25	0	—	4·61	34·23	27·13	—	—	—	—	—	—	N 70 B	117–0	2018	2038	KT
													N 100 B				
													N 70 B	340–120	2018	2048	DGP
													N 100 B				
972	26	0	—	1·61	34·03	27·25	—	2·26	—	0·09	14·1	7·06	N 70 V	1000–750	2005		
		10	—	1·61	34·03	27·25	—	2·26	—	0·08	14·1	—	,,	750–500			
		20	—	1·61	34·03	27·25	—	2·26	—	0·08	14·0	7·07	,,	500–250			
		30	—	1·61	34·03	27·25	—	2·26	—	0·07	13·9	—	,,	250–100			
		40	—	1·61	34·03	27·25	—	2·26	—	0·08	14·0	7·05	,,	100–50			
		50	—	1·61	34·03	27·25	—	2·32	—	0·07	13·9	—	,,	50–0			
		60	—	1·61	34·03	27·25	—	2·24	—	0·07	14·0	7·06	N 50 V	100–0	—	2143	
		80	—	1·61	34·03	27·25	—	2·07	—	0·07	14·0	—	N 70 B	128–0	2308	2328	KT
		100	—	1·60	34·03	27·25	—	2·11	—	0·07	13·9	7·07	N 100 B				
		150	—	1·59	34·03	27·25	—	2·07	—	0·07	13·9	7·07	N 70 B	300–128	2308	2338	DGP. Lower depth estimated
		200	—	1·59	34·03	27·25	—	2·07	—	0·06	13·9	7·06	N 100 B				
		290	—	1·98	34·11	27·28	—	2·34	—	0·00	20·1	6·24					
		390	—	2·49	34·24	27·35	—	2·62	—	0·00	20·6	5·12					
		590	—	2·29	34·30	27·41	—	2·64	—	0·00	37·7	4·48					
		780	—	2·22	34·50	27·57	—	2·78	—	0·00	44·0	4·04					
		970	—	2·20	34·59	27·65	—	2·85	—	0·00	52·8	3·92					
		1460	—	2·13	34·70	27·75	—	2·64	—	0·00	59·6	4·15					
		1950	—	1·69	34·72	27·79	—	2·62	—	0·00	62·6	4·12					
		2440	—	1·34	34·73	27·83	—	2·62	—	—	67·2	4·30					
		2940	—	1·10	34·73	27·84	—	2·55	—	—	80·3	4·16					
		3430	—	0·79	34·72	27·85	—	2·60	—	—	80·3	4·45					
		3930	—	0·57	34·70	27·86	—	2·62	—	—	82·1	4·16					
		4420	—	0·42	34·70	27·87	—	2·64	—	—	84·0	4·21					
		4920	4921	0·38	34·70	27·87	—	2·64	—	—	84·0	4·21					
973	27	0	—	1·59	34·05	27·26	—	—	—	—	—	—	N 70 B	100–0	2016	2036	KT
													N 100 B				
													N 70 B	270–120	2016	2046	DGP
													N 100 B				
974	28	0	—	−0·88	33·89	27·27	—	2·24	—	0·34	16·6	7·54	N 70 V	1000–800	1406		
		10	—	−0·88	33·89	27·27	—	2·24	—	0·34	13·2	—	,,	750–510			
		20	—	−0·89	33·89	27·27	—	2·24	—	0·34	16·5	7·58	,,	500–250			
		30	—	−0·89	33·89	27·27	—	2·19	—	0·34	16·6	—	,,	250–100			
		40	—	−0·89	33·89	27·27	—	2·20	—	0·34	16·5	7·56	,,	100–50			
		50	—	−0·89	33·89	27·27	—	2·15	—	0·34	16·6	—	,,	50–0			
		60	—	−0·89	33·89	27·27	—	2·17	—	0·34	16·5	7·53	N 50 V	100–0	—	1550	
		80	—	−0·89	33·89	27·27	—	2·24	—	0·34	16·6	—	N 70 B	115–0	1717	1737	KT
		100	—	−0·89	33·89	27·27	—	2·22	—	0·34	16·6	7·56	N 100 B				
		150	—	−0·89	33·89	27·27	—	2·20	—	0·34	16·5	7·53	N 70 B	314–114	1717	1745	DGP
		200	—	0·50	34·07	27·35	—	2·40	—	0·00	27·8	6·52	N 100 B				
		300	—	1·54	34·26	27·44	—	2·60	—	0·00	38·2	5·04	N 100 H	0–2	1729	1749	
		400	—	1·86	34·42	27·53	—	2·72	—	0·00	45·3	4·41					
		590	—	2·06	34·55	27·63	—	2·74	—	—	51·0	3·95					
		790	—	2·12	34·60	27·66	—	2·72	—	—	54·8	3·80					
		990	—	2·07	34·66	27·71	—	2·68	—	—	56·5	3·98					
		1480	—	1·80	34·73	27·79	—	2·49	—	—	76·5	4·18					
		1980	—	1·41	34·73	27·82	—	2·55	—	—	76·5	4·25					
		2470	2467	1·12	34·71	27·83	—	2·55	—	—	76·5	4·36					
		2960	—	0·92	34·71	27·85	—	2·57	—	—	76·5	4·30					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
974 *cont.*	63° 57′ S, 101° 16′ W	1932 28 ix											
975	61° 29·9′ S, 94° 06·7′ W	29 ix	2000	5064*	W × S	18–22	W × S	5	c	1008·9	−0·9	−2·2	heavy W × S swell
976	59° 22′ S, 89° 03·9′ W	30 ix	2000	5211*	WNW	20–24	WNW	4	o	1018·3	2·1	0·6	heavy W × S swell
977	57° 18·2′ S, 84° 29·5′ W	1 x	2000	4802*	WNW	16	WNW	4	o	1015·5	4·4	2·9	mod. WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
974 *cont.*	28	3450	—	0·64	34·70	27·85	—	2·47	—	—	79·8	4·51					
		3950	—	0·44	34·70	27·86	—	2·57	—	—	79·8	4·35					
		4440	—	0·38	34·69	27·85	—	2·57	—	—	81·5	4·29					
		4930	4927	0·31	34·69	27·85	—	2·59	—	—	81·5	4·28					
975	29	0	—	0·43	33·98	27·29	—	2·07	—	0·14	16·6	7·27	**N 70 V**	1000–750	**2008**		Closing depth estimated. +6 hours
		10	—	0·41	33·98	27·29	—	2·28	—	0·14	16·5	—	,,	750–515			
		20	—	0·41	33·98	27·29	—	2·11	—	0·14	16·5	7·25	,,	500–250			
		30	—	0·41	33·98	27·29	—	2·20	—	0·14	16·5	—	,,	250–100			
		40	—	0·41	33·98	27·29	—	2·20	—	0·13	16·6	7·25	,,	100–50			
		50	—	0·41	33·98	27·29	—	2·20	—	0·14	16·5	—	,,	50–0			
		60	—	0·41	33·98	27·29	—	2·15	—	0·14	16·4	7·26	**N 50 V**	100–0	—	**2203**	
		80	—	0·41	33·98	27·29	—	2·11	—	0·14	16·1	—	**N 70 B**	117–0	**2321**	**2341**	KT
		100	—	0·41	33·98	27·29	—	2·22	—	0·14	16·1	7·27	**N 100 B**				
		150	—	0·41	33·98	27·29	—	2·07	—	0·14	15·9	7·25	**N 70 B**	290–104	**2321**	**2352**	DGP
		200	—	0·41	33·98	27·29	—	2·07	—	0·14	15·6	7·27	**N 100 B**				
		300	—	1·53	34·17	27·37	—	2·28	—	0·00	29·2	5·71					
		400	—	2·18	34·32	27·44	—	2·43	—	0·00	35·8	4·74					
		600	—	2·21	34·42	27·50	—	2·43	—	—	39·5	4·15					
		800	—	2·22	34·52	27·59	—	2·43	—	—	47·5	3·93					
		1000	—	2·21	34·61	27·66	—	2·40	—	—	52·7	3·94					
		1490	—	1·97	34·72	27·77	—	2·30	—	—	59·3	4·08					
		1990	1987	1·62	34·71	27·80	—	2·11	—	—	62·2	4·20					
		2490	—	1·35	34·70	27·81	—	2·15	—	—	67·8	4·25					
		2990	—	1·03	34·70	27·83	—	2·24	—	—	73·0	4·38					
		3480	—	0·80	34·70	27·84	—	2·28	—	—	75·9	4·21					
		3980	—	0·51	34·69	27·84	—	2·28	—	—	77·5	4·32					
		4480	—	0·40	34·69	27·85	—	2·28	—	—	79·1	4·16					
976	1	0	—	2·69	34·09	27·21	—	1·98	—	0·09	12·0	6·84	**N 70 V**	1000–750	**2005**		
		10	—	2·70	34·09	27·21	—	2·03	—	0·09	11·8	—	,,	750–500			
		20	—	2·70	34·09	27·21	—	1·98	—	0·09	11·8	6·84	,,	500–250			
		30	—	2·70	34·09	27·21	—	1·98	—	0·09	11·7	—	,,	250–100			
		40	—	2·69	34·09	27·21	—	1·98	—	0·09	12·0	6·83	,,	100–50			
		50	—	2·60	34·09	27·21	—	1·98	—	0·09	11·2	—	,,	50–0			
		60	—	2·60	34·09	27·21	—	2·00	—	0·09	11·3	6·76	**N 50 V**	100–0	—	**2143**	
		80	—	2·53	34·09	27·22	—	2·01	—	0·10	11·3	—	**N 70 B**	73–0	**2304**	**2324**	KT
		100	—	2·32	34·06	27·22	—	2·07	—	0·11	11·6	6·91	**N 100 B**				
		150	—	2·10	34·05	27·22	—	2·07	—	0·12	11·8	6·98	**N 70 B**	190–84	**2304**	**2334**	DGP
		200	—	2·10	34·05	27·22	—	2·07	—	0·12	11·9	7·02	**N 100 B**				
		300	—	2·01	34·05	27·23	—	2·07	—	0·00	12·9	6·90					
		400	—	2·90	34·24	27·32	—	2·24	—	0·00	22·7	5·24					
		600	—	2·70	34·32	27·39	—	2·40	—	0·00	35·9	4·64					
		800	—	2·50	34·43	27·50	—	2·51	—	0·00	41·1	4·04					
		1000	—	2·39	34·52	27·58	—	2·53	—	0·00	51·3	3·93					
		1500	—	2·18	34·68	27·72	—	2·53	—	0·00	56·0	3·89					
		2000	—	1·86	34·73	27·79	—	2·28	—	0·00	59·6	4·01					
		2500	2502	1·52	34·72	27·81	—	2·24	—	—	66·0	4·15					
		3000	—	1·25	34·71	27·82	—	2·30	—	—	67·2	4·27					
		3500	—	0·98	34·70	27·83	—	2·30	—	—	72·4	4·36					
		4000	—	0·66	34·70	27·85	—	2·30	—	—	80·3	4·24					
		4500	—	0·48	34·70	27·86	—	2·38	—	—	80·3	4·27					
		5000	5033	0·47	34·70	27·86	—	2·32	—	—	80·3	4·28					
977	2	0	—	4·61	34·23	27·13	—	1·79	—	0·09	9·1	6·55	**N 70 V**	1000–730	**2010**		
		10	—	4·61	34·23	27·13	—	1·86	—	0·11	9·2	—	,,	750–500			
		20	—	4·62	34·23	27·13	—	1·81	—	0·09	9·2	6·57	,,	500–250			
		30	—	4·62	34·23	27·13	—	1·77	—	0·09	9·1	—	,,	250–100			
		40	—	4·62	34·23	27·13	—	1·77	—	0·10	9·1	6·56	,,	100–50			
		50	—	4·62	34·23	27·13	—	1·77	—	0·09	9·1	—	,,	50–0			
		60	—	4·62	34·23	27·13	—	1·73	—	0·09	9·2	6·56	**N 50 V**	100–0	—	**2140**	
		80	—	4·62	34·23	27·13	—	1·71	—	0·09	9·2	—	**N 70 B**	119–0	**2249**	**2309**	KT
		100	—	4·59	34·23	27·14	—	1·73	—	0·09	9·3	6·54	**N 100 B**				
		150	—	4·46	34·23	27·14	—	1·73	—	0·09	10·2	6·48	**N 70 B**	318–140	**2249**	**2319**	DGP
		200	—	4·39	34·23	27·15	—	1·77	—	0·06	11·1	6·38	**N 100 B**				
		300	—	4·13	34·23	27·18	—	1·69	—	0·08	10·9	6·59					
		400	—	4·01	34·22	27·18	—	1·71	—	0·08	10·4	6·66					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
977 *cont.*	57° 18·2′ S, 84° 29·5′ W	1932 1 x											
978	55° 18·4′ S, 80° 08·1′ W	2 x	2000	4803*	N×E	15–20	N	3	c	1014·2	3·9	2·4	mod. conf. S and WNW swells
979	51° 00′ S, 62° 36·3′ W	15 x	1030	171* 175	NW×N	19	NW×N	4	c	997·0	7·3	5·8	mod. NW swell. Second sounding taken with plankton wire
980	51° 00·6′ S, 64° 44·1′ W	15 x	2130	135*	WSW	10	WSW	2	o	1003·3	5·8	4·7	mod. NNW swell
981	51° 01·1′ S, 66° 58·2′ W	16 x	0840	106*	WSW	22–27	WSW	4	bc	1012·7	9·0	5·8	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
977 *cont.*	2	600	—	3·68	34·19	27·20	—	1·82	—	0·00	13·0	6·10					
		800	—	3·33	34·25	27·28	—	2·26	—	0·00	23·2	4·97					
		1000	—	3·11	34·29	27·33	—	2·45	—	0·00	33·7	4·34					
		1500	—	2·45	34·56	27·60	—	2·47	—	0·00	47·1	3·87					
		2000	1995	2·17	34·67	27·71	—	2·32	—	0·00	54·7	3·84					
		2480	—	1·87	34·74	27·80	—	2·36	—	—	60·8	4·05					
		2970	—	1·54	34·74	27·82	—	2·30	—	—	75·4	4·16					
		3450	—	1·26	34·72	27·82	—	2·57	—	—	75·4	4·07					
		3940	—	0·84	34·71	27·85	—	2·41	—	—	80·2	4·13					
		4420	4419	0·58	34·71	27·87	—	2·41	—	—	82·0	4·20					
978	3	0	—	4·97	34·16	27·03	—	1·71	—	0·14	7·8	6·69	**N 70 V**	1000–750	**2005**		+ 5 hours
		10	—	4·97	34·16	27·03	—	1·69	—	0·14	7·8	—	,,	750–500			
		20	—	4·97	34·16	27·03	—	1·65	—	0·14	7·7	6·71	,,	500–250			
		30	—	4·97	34·16	27·03	—	1·63	—	0·11	7·9	—	,,	250–100			
		40	—	4·97	34·16	27·03	—	1·69	—	0·12	7·9	6·67	,,	100–50			
		50	—	4·97	34·16	27·03	—	1·62	—	0·14	8·0	—	,,	50–0			
		60	—	4·97	34·16	27·03	—	1·60	—	0·14	8·0	6·66	**N 50 V**	100–0	—	**2139**	
		80	—	4·97	34·16	27·03	—	1·62	—	0·18	7·9	—	**N 70 B**	117–0	**2243**	**2303**	KT
		100	—	4·96	34·19	27·07	—	1·62	—	0·16	7·0	6·54	**N 100 B**				
		150	—	4·95	34·23	27·09	—	1·65	—	0·07	7·1	6·44	**N 70 B**	298–108	**2243**	**2313**	DGP
		200	—	4·93	34·23	27·09	—	1·73	—	0·04	7·8	6·36	**N 100 B**				
		300	—	4·90	34·23	27·10	—	1·65	—	0·04	8·0	6·45	**CPR**	—	**2324**		
		400	—	4·88	34·23	27·10	—	1·62	—	0·02	8·0	6·39					
		600	—	4·58	34·23	27·14	—	1·96	—	0·04	10·5	5·91					
		800	—	4·12	34·23	27·19	—	2·20	—	0·00	14·8	5·46					
		1000	—	3·68	34·32	27·30	—	2·41	—	0·00	29·1	4·71					
		1500	—	2·62	34·51	27·55	—	2·47	—	0·00	47·7	3·78					
		2000	1999	2·21	34·67	27·71	—	2·74	—	0·00	59·1	3·35					
		2490	—	1·96	34·70	27·76	—	2·70	—	—	67·6	3·55					
		2970	—	1·80	34·74	27·80	—	2·59	—	—	67·6	3·91					
		3460	—	1·47	34·75	27·84	—	2·59	—	—	68·9	3·86					
		3940	—	0·99	34·74	27·86	—	2·59	—	—	80·9	4·07					
		4430	4432	0·71	34·72	27·86	—	2·59	—	—	82·7	4·16					
979	15	0	—	5·58	33·65	26·56	—	—	—	—	—	7·04	**N 70 V**	160–100	1035		+ 3 hours
		10	—	5·58	33·65	26·56	—	—	—	—	—	—	,,	100–50			
		20	—	5·56	33·65	26·56	—	—	—	—	—	7·08	,,	50–0			
		30	—	5·54	33·65	26·57	—	—	—	—	—	—	**N 50 V**	100–0	—	1105	
		40	—	5·52	33·65	26·57	—	—	—	—	—	7·06	**N 70 B**	117–0	1109	1129	KT
		50	—	5·50	33·65	26·57	—	—	—	—	—	—	**N 100 B**				
		60	—	5·40	33·65	26·58	—	—	—	—	—	7·04					
		80	—	5·18	33·65	26·61											
		100	—	5·14	33·66	26·61	—	—	—	—	—	6·72					
		135	—	5·02	33·69	26·66	—	—	—	—	—	6·33					
		170	—	5·02	33·69	26·66	—	—	—	—	—	6·32					
980	16	0	—	5·10	33·27	26·31	—	—	—	—	—	7·29	**N 70 V**	100–50	**2135**		
		10	—	5·10	33·27	26·31	—	—	—	—	—	—	,,	50–0			
		20	—	5·09	33·28	26·32	—	—	—	—	—	7·20	**N 50 V**	100–0	—	**2200**	
		30	—	5·04	33·28	26·33	—	—	—	—	—	—	**N 70 B**	104–0	**2206**	**2223**	KT
		40	—	5·08	33·28	26·33	—	—	—	—	—	7·20	**N 100 B**				
		50	—	5·08	33·28	26·33											
		60	—	4·80	33·28	26·36	—	—	—	—	—	6·82					
		80	—	4·81	33·29	26·37											
		100	—	4·80	33·30	26·37	—	—	—	—	—	6·77					
		138	—	4·80	33·30	26·37	—	—	—	—	—	6·77					
981	16	0	—	5·80	33·28	26·24	—	—	—	—	—	6·66	**N 70 V**	100–50	0843		
		10	—	5·80	33·28	26·24	—	—	—	—	—	—	,,	50–0			
		20	—	5·80	33·28	26·24	—	—	—	—	—	6·67	**N 50 V**	100–0	—	0900	
		30	—	5·80	33·28	26·24	—	—	—	—	—	—	**N 70 B**	80–0	0916	0936	KT
		40	—	5·80	33·28	26·24	—	—	—	—	—	6·66	**N 100 B**				
		50	—	5·80	33·28	26·24											
		60	—	5·80	33·28	26·24	—	—	—	—	—	6·66					
		80	—	5·80	33·28	26·24											
		100	—	5·80	33·28	26·24	—	—	—	—	—	6·63					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
982	Isla Capitana Aracena (Sholl Bay and Port Soffia) Cockburn Channel	1932 18–21 x	Var.	—	—	—	—	—	—	—	—	—	
983	55° 10′ S, 76° 04·7′ W	23 x	2000	4134*	W	36	W	6	bcq	1002·4	3·9	2·9	heavy conf. W swell
984	55° 14·4′ S, 77° 48·6′ W	24 x	0830	4387*	WSW	16	WSW	4	bcq	1010·3	3·6	1·7	heavy W × S swell
985	55° 20·2′ S, 79° 24·5′ W	24 x	2000	3952*	W	30	W	5	c	1011·3	4·4	2·9	heavy conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
982	—	0	—	7·5–6·5	—	—	—	—	—	—	—	—	**NS Sh. coll.**	—	1700	—	18. x. 1932 Shore collecting, Sholl Bay and Port Soffia
983	24	0	—	5·91	33·97	26·78	—	—	—	—	—	6·67	**N 100 B**	121–0	**2250**	**2310**	KT
		10	—	5·91	33·97	26·78	—	—	—	—	—	—	**N 100 B**	300–80	**2250**	**2320**	DGP
		20	—	5·92	33·97	26·77	—	—	—	—	—	6·68					
		30	—	5·92	33·97	26·77											
		40	—	5·92	33·97	26·77	—	—	—	—	—	6·70					
		50	—	5·92	33·97	26·77											
		60	—	5·92	33·97	26·77	—	—	—	—	—	6·67					
		80	—	5·81	33·96	26·78											
		100	—	5·24	34·07	26·93	—	—	—	—	—	6·57					
		150	—	5·12	34·13	26·99	—	—	—	—	—	6·53					
		200	—	5·00	34·20	27·06	—	—	—	—	—	6·33					
		300	—	4·90	34·23	27·10	—	—	—	—	—	6·29					
		400	—	4·80	34·23	27·11	—	—	—	—	—	6·24					
		600	—	4·62	34·23	27·13	—	—	—	—	—	6·14					
		790	—	4·08	34·22	27·17	—	—	—	—	—	5·59					
		990	—	3·31	34·36	27·37	—	—	—	—	—	4·38					
		1490	1490	2·56	34·53	27·57	—	—	—	—	—	3·47					
		1980	—	2·19	34·65	27·69	—	—	—	—	—	3·30					
		2470	—	1·94	34·66	27·72	—	—	—	—	—	3·46					
		2950	—	1·79	34·72	27·78	—	—	—	—	—	3·57					
		3440	—	1·45	34·74	27·83	—	—	—	—	—	4·03					
		3930	3929	0·94	34·73	27·85	—	—	—	—	—	4·14					
984	24	0	—	5·00	34·20	27·06	—	—	—	—	—	6·72	**N 70 V**	1000–750	0837		
		10	—	5·00	34·20	27·06	—	—	—	—	—	—	,,	750–500			
		20	—	5·00	34·20	27·06	—	—	—	—	—	6·70	,,	500–250			
		30	—	5·00	34·20	27·06	—	—	—	—	—	—	,,	250–100			
		40	—	5·00	34·20	27·06	—	—	—	—	—	6·71	,,	100–50			
		50	—	5·00	34·20	27·06	—	—	—	—	—	—	,,	50–0			
		60	—	5·00	34·20	27·06	—	—	—	—	—	6·70	**N 50 V**	100–0	—	1040	
		80	—	5·00	34·20	27·06	—	—	—	—	—	—	**N 70 B**	99–0	1105	1125	KT
		100	—	5·00	34·20	27·06	—	—	—	—	—	6·68	**N 100 B**				
		150	—	4·87	34·20	27·08	—	—	—	—	—	6·45	**N 70 B**	240–100	1105	1135	DGP. Closing depth estimated
		200	—	4·80	34·20	27·08	—	—	—	—	—	6·39	**N 100 B**				
		300	—	4·75	34·20	27·09	—	—	—	—	—	6·42					
		390	—	4·74	34·21	27·10	—	—	—	—	—	6·45					
		590	—	4·58	34·21	27·12	—	—	—	—	—	6·21					
		790	—	4·11	34·21	27·17	—	—	—	—	—	5·80					
		980	—	3·67	34·30	27·28	—	—	—	—	—	4·66					
		1480	—	2·71	34·52	27·55	—	—	—	—	—	3·54					
		1970	—	2·27	34·65	27·69	—	—	—	—	—	3·31					
		2460	—	1·99	34·66	27·72	—	—	—	—	—	3·34					
		2950	2947	1·85	34·72	27·78	—	—	—	—	—	3·69					
985	25	0	—	4·96	34·20	27·07	—	—	—	—	—	—	**N 50 V**	100–0	2015	2023	
		10	—	4·96	34·20	27·07	—	—	—	—	—	—	**N 70 B**	113–0	**2209**	**2229**	KT. Small tear near **N 70 B** bucket
		20	—	4·97	34·20	27·06	—	—	—	—	—	6·69	**N 100 B**				
		30	—	4·97	34·20	27·06	—	—	—	—	—	—	**N 70 B**	290–110	**2209**	**2239**	DGP
		40	—	4·96	34·20	27·07	—	—	—	—	—	6·69	**N 100 B**				
		50	—	4·96	34·20	27·07											
		60	—	4·96	34·20	27·07	—	—	—	—	—	6·67					
		80	—	4·96	34·20	27·07											
		100	—	4·96	34·20	27·07	—	—	—	—	—	6·69					
		150	—	4·94	34·20	27·07	—	—	—	—	—	6·67					
		200	—	4·93	34·22	27·08	—	—	—	—	—	6·48					
		300	—	4·93	34·23	27·10	—	—	—	—	—	6·49					
		400	—	4·92	34·25	27·11	—	—	—	—	—	6·47					
		600	—	4·73	34·23	27·12	—	—	—	—	—	6·49					
		800	—	4·40	34·22	27·14	—	—	—	—	—	5·71					
		990	988	3·66	34·28	27·27	—	—	—	—	—	4·74					
		1480	—	3·81													
		1960	—	2·32	34·64	27·68	—	—	—	—	—	3·67					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
985 *cont.*	55° 20·2′ S, 79° 24·5′ W	1932 24 x											
986	56° 28·9′ S, 79° 28·2′ W	25 x	0830	4837*	WNW	30–40	WNW	6 conf.	oq	1001·4	4·5	4·3	heavy conf. W swell
987	58° 23·8′ S, 79° 28·9′ W	26 x	0845	4937*	WSW	23	WSW	5	o	996·2	1·7	0·5	heavy SW swell
988	59° 19′ S, 79° 39·8′ W	26 x	2000	5087*	NW	3	NW	1	c	991·3	2·4	1·6	heavy conf. SW swell
989	60° 38·6′ S, 79° 50·1′ W	27 x	0830	5036*	NW × W	14	NW × W	3	orm	984·1	3·9	3·9	mod. conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
985 *cont.*	25	2450	—	2·04	34·71	27·77	—	—	—	—	—	3·80					
		2940	—	1·74	34·73	27·80	—	—	—	—	—	3·89					
		3430	3433	1·35	34·73	27·83	—	—	—	—	—	3·98					
986	25	0	—	4·89	34·23	27·10	—	—	—	—	—	6·51	**N 70 V**	1000–750	0840		Closing depth
		10	—	4·90	34·23	27·10	—	—	—	—	—	—	,,	750–500			doubtful
		20	—	4·91	34·23	27·10	—	—	—	—	—	6·53	,,	500–250			
		30	—	4·91	34·23	27·10	—	—	—	—	—	—	,,	250–100			
		40	—	4·91	34·23	27·10	—	—	—	—	—	6·52	,,	100–50			
		50	—	4·91	34·23	27·10	—	—	—	—	—	—	,,	50–0			
		60	—	4·91	34·23	27·10	—	—	—	—	—	6·53	**N 50 V**	100–0	—	1040	
		80	—	4·91	34·23	27·10	—	—	—	—	—	—	**N 100 B**	102–0	1100	1120	KT. Net torn in
		100	—	4·89	34·23	27·10	—	—	—	—	—	6·52					coarse mesh near
		150	—	4·85	34·23	27·10	—	—	—	—	—	6·49					throttling band
		190	—	4·81	34·23	27·11	—	—	—	—	—	6·55	**N 100 B**	244–114	1100	1130	DGP
		290	—	4·73	34·23	27·12	—	—	—	—	—	6·29					
		390	—	4·50	34·22	27·13	—	—	—	—	—	6·44					
		580	—	4·15	34·21	27·16	—	—	—	—	—	6·31					
		770	—	3·73	34·24	27·24	—	—	—	—	—	5·21					
		970	—	3·32	34·30	27·32	—	—	—	—	—	4·62					
		1450	—	2·61	34·53	27·57	—	—	—	—	—	3·74					
		1930	—	2·25	34·64	27·69	—	—	—	—	—	3·60					
		2420	—	1·97	34·72	27·77	—	—	—	—	—	3·98					
		2900	2900	1·63	34·73	27·81	—	—	—	—	—	3·89					
987	26	0	—	3·90	34·21	27·19	—	—	—	—	—	6·78	**N 70 V**	1000–750	0847		
		10	—	3·90	34·21	27·19	—	—	—	—	—	—	,,	750–500			
		20	—	3·90	34·21	27·19	—	—	—	—	—	6·78	,,	500–250			
		30	—	3·90	34·21	27·19	—	—	—	—	—	—	,,	250–100			
		40	—	3·90	34·21	27·19	—	—	—	—	—	6·77	,,	100–50			
		50	—	3·90	34·21	27·19	—	—	—	—	—	—	,,	50–0			
		60	—	3·90	34·21	27·19	—	—	—	—	—	6·76	**N 50 V**	100–0	—	1035	
		80	—	3·90	34·21	27·19	—	—	—	—	—	—	**N 100 B**	108–0	1130	1150	KT
		100	—	3·90	34·21	27·19	—	—	—	—	—	6·77	**N 100 B**	296–96	1130	1200	DGP
		150	—	3·90	34·21	27·19	—	—	—	—	—	6·77					
		200	—	3·90	34·21	27·19	—	—	—	—	—	6·71					
		300	—	3·34	34·19	27·24	—	—	—	—	—	6·38					
		400	—	3·11	34·18	27·25	—	—	—	—	—	6·35					
		590	—	3·16	34·28	27·32	—	—	—	—	—	4·89					
		790	—	2·70	34·36	27·42	—	—	—	—	—	4·46					
		990	986	2·59	34·46	27·51	—	—	—	—	—	4·06					
988	27	0	—	3·89	34·21	27·19	—	—	—	—	—	6·78	**N 50 V**	100–0	2103	2109	
		10	—	3·89	34·21	27·19	—	—	—	—	—	—	**N 70 B**	88–0	**2240**	**2300**	KT
		20	—	3·89	34·21	27·19	—	—	—	—	—	6·78	**N 100 B**				
		30	—	3·86	34·21	27·19	—	—	—	—	—	—	**N 70 B**	224–74	**2240**	**2310**	DGP
		40	—	3·87	34·21	27·19	—	—	—	—	—	6·78	**N 100 B**				
		50	—	3·87	34·21	27·19											
		60	—	3·87	34·21	27·19	—	—	—	—	—	6·79					
		80	—	3·84	34·20	27·19											
		100	—	3·82	34·20	27·19	—	—	—	—	—	6·77					
		150	—	3·82	34·20	27·19	—	—	—	—	—	6·78					
		200	—	3·82	34·20	27·19	—	—	—	—	—	6·71					
		290	—	3·42	34·19	27·23	—	—	—	—	—	6·53					
		390	—	3·10	34·17	27·24	—	—	—	—	—	6·31					
		590	—	3·03	34·20	27·26	—	—	—	—	—	5·44					
		780	—	3·00	34·35	27·40	—	—	—	—	—	4·35					
		980	—	2·66	34·43	27·48	—	—	—	—	—	4·16					
		1470	—	2·33	34·56	27·61	—	—	—	—	—	3·75					
		2450	—	1·76	34·72	27·79	—	—	—	—	—	3·79					
		2940	—	1·38	34·73	27·83	—	—	—	—	—	4·26					
		3430	—	1·05	34·72	27·84	—	—	—	—	—	4·35					
		3920	—	0·75	34·72	27·86	—	—	—	—	—	4·45					
		4410	4410	0·55	34·72	27·87	—	—	—	—	—	4·45					
989	27	0	—	3·43	34·17	27·21	—	—	—	—	—	6·63	**N 70 V**	1000–790	0840		
		10	—	3·43	34·17	27·21	—	—	—	—	—	—	,,	750–520			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
989 *cont.*	60° 38·6′ S, 79° 50·1′ W	1932 27 x											
990	61° 56·3′ S, 79° 57′ W	27 x	2000	4857*	NW × N	21	NW × N	4	od	974·6	3·3	3·3	mod. NW swell
991	63° 12·8′ S, 80° 02·7′ W	28 x	0836	4745*	W	30–40	W	5 conf.	cq	960·2	−0·9	−1·6	heavy W × N swell
992	64° 19·2′ S, 80° 06′ W	28 x	2002	4410	WNW	30–38	WNW	6	bceq	966·7	−0·4	−0·5	heavy conf. W × N swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
989 *cont.*	27	20	—	3·41	34·17	27·21	—	—	—	—	—	6·62	N 70 V	500–250			
		30	—	3·41	34·17	27·21	—	—	—	—	—	—	,,	250–100			
		40	—	3·42	34·17	27·21	—	—	—	—	—	6·61	,,	100–50			
		50	—	3·40	34·17	27·21	—	—	—	—	—	—	,,	50–0			
		60	—	3·33	34·16	27·21	—	—	—	—	—	6·63	N 50 V	100–0	—	1010	
		80	—	3·33	34·16	27·21	—	—	—	—	—	—	N 70 B				
		100	—	3·32	34·16	27·21	—	—	—	—	—	6·64	N 100 B	100–0	1059	1119	KT
		150	—	3·31	34·16	27·21	—	—	—	—	—	6·64	N 70 B				
		200	—	3·31	34·16	27·21	—	—	—	—	—	6·63	N 100 B	270–98	1059	1129	DGP
		300	—	3·30	34·16	27·21	—	—	—	—	—	6·40					
		390	—	2·47	34·11	27·24	—	—	—	—	—	6·55					
		490	—	2·93	34·21	27·28	—	—	—	—	—	5·34					
		590	—	2·53	34·21	27·32	—	—	—	—	—	5·31					
		790	—	2·75	34·40	27·45	—	—	—	—	—	4·23					
		980	—	2·54	34·47	27·52	—	—	—	—	—	3·96					
		1480	—	2·25	34·64	27·69	—	—	—	—	—	3·90					
		1970	—	1·96	34·72	27·77	—	—	—	—	—	4·04					
		2460	2460	1·62	34·72	27·80	—	—	—	—	—	4·14					
990	28	0	—	3·06	34·12	27·20	—	—	—	—	—	7·15	N 50 V	100–0	2105	2115	
		10	—	3·08	34·12	27·20	—	—	—	—	—	—	N 70 B				
		20	—	3·08	34·12	27·20	—	—	—	—	—	6·80	N 100 B	96–0	2229	2249	KT
		30	—	3·08	34·12	27·20	—	—	—	—	—	—	N 70 B				
		40	—	3·08	34·12	27·20	—	—	—	—	—	6·83	N 100 B	276–100	2229	2259	DGP. Closing depth estimated
		50	—	3·08	34·12	27·20											
		60	—	3·08	34·12	27·20	—	—	—	—	—	6·81					
		80	—	3·08	34·12	27·20											
		100	—	3·08	34·12	27·20	—	—	—	—	—	6·82					
		150	—	3·08	34·12	27·20	—	—	—	—	—	6·81					
		200	—	2·91	34·12	27·22	—	—	—	—	—	6·59					
		300	—	2·51	34·13	27·25	—	—	—	—	—	6·46					
		400	—	2·81	34·20	27·28	—	—	—	—	—	5·51					
		600	—	2·77	34·29	27·36	—	—	—	—	—	4·54					
		800	—	2·58	34·43	27·49	—	—	—	—	—	4·14					
		1000	—	2·43	34·52	27·57	—	—	—	—	—	3·85					
		1490	—	2·22	34·59	27·65	—	—	—	—	—	3·81					
		2490	—	1·53	34·72	27·80	—	—	—	—	—	3·88					
		2990	—	1·16	34·73	27·84	—	—	—	—	—	4·36					
		3480	—	0·88	34·73	27·86	—	—	—	—	—	4·40					
		3980	—	0·59	34·73	27·88	—	—	—	—	—	4·48					
		4480	4479	0·51	34·72	27·87	—	—	—	—	—	4·52					
991	28	0	—	−0·39	33·84	27·21	—	—	—	—	—	7·56	N 50 V	100–0	0843		
		10	—	−0·39	33·84	27·21	—	—	—	—	—	—	N 70 V	1000–750			
		20	—	−0·39	33·84	27·21	—	—	—	—	—	7·57	,,	750–500			
		30	—	−0·39	33·84	27·21	—	—	—	—	—	—	,,	500–250			
		40	—	−0·39	33·84	27·21	—	—	—	—	—	7·58	,,	250–100			
		50	—	−0·39	33·84	27·21	—	—	—	—	—	—	,,	100–50			
		60	—	−0·39	33·84	27·21	—	—	—	—	—	7·59	,,	50–0	—	1013	
		80	—	−0·39	33·84	27·21	—	—	—	—	—	—	N 70 B				
		100	—	−0·39	33·84	27·21	—	—	—	—	—	7·57	N 100 B	149–0	1130	1150	KT
		150	—	0·21	33·93	27·25	—	—	—	—	—	7·36	N 100 B	304–104	1130	1200	DGP
		200	—	0·91	34·05	27·31	—	—	—	—	—	6·63					
		300	—	1·36	34·18	27·39	—	—	—	—	—	5·71					
		390	—	1·94	34·31	27·44	—	—	—	—	—	4·69					
		590	—	2·17	34·47	27·56	—	—	—	—	—	4·08					
		790	—	2·18	34·57	27·63											
		980	—	2·12	34·65	27·70	—	—	—	—	—	3·79					
		1480	—	1·86	34·70	27·77	—	—	—	—	—	4·59					
		1970	—	1·53	34·72	27·80	—	—	—	—	—	4·10					
		2460	2460	1·20	34·72	27·83	—	—	—	—	—	4·20					
992	29	0	—	−1·52	33·85	27·26	—	—	—	—	—	7·73	N 100 B	99–0	2159	2219	KT
		10	—	−1·52	33·85	27·26	—	—	—	—	—	—	N 100 B	270–110	2159	2229	DGP
		20	—	−1·52	33·85	27·26	—	—	—	—	—	7·76					
		30	—	−1·52	33·85	27·26											
		40	—	−1·52	33·85	27·26	—	—	—	—	—	7·76					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
992 *cont.*	64° 19·2′ S, 80° 06′ W	1932 28 x											
993	65° 38·7′ S, 80° 18·6′ W	29 x	0830	4820*	WNW	8	WNW	1–2	csp	959·8	−1·7	−1·8	heavy conf. W swell
994	66° 45·7′ S, 80° 19·8′ W	29 x	2000	4133*	ENE	19	ENE	4	os	940·2	−1·6	−1·7	heavy W × N swell
995	67° 06·2′ S, 79° 55·8′ W	30 x	0320	—	N	6	—	—	o	927·7	−2·2	−2·8	mod. NW swell
			—	—	W × S	48	—	—	blizzard	—	—	—	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
992 *cont.*	29	50	—	−1·57	33·85	27·26											
		60	—	−1·56	33·85	27·26	—	—	—	—	—	7·77					
		80	—	−1·56	33·85	27·26											
		100	—	−1·56	33·85	27·26	—	—	—	—	—	7·75					
		150	—	−1·12	33·96	27·34	—	—	—	—	—	7·31					
		200	—	1·09	34·22	27·43	—	—	—	—	—	5·51					
		290	—	1·78	34·39	27·53	—	—	—	—	—	4·45					
		390	—	1·98	34·47	27·57	—	—	—	—	—	4·08					
		580	—	2·13	34·57	27·64	—	—	—	—	—	3·84					
		780	—	2·07	34·65	27·70	—	—	—	—	—	3·86					
		970	—	2·02	34·69	27·74	—	—	—	—	—	3·87					
		1460	1459	1·72	34·71	27·79	—	—	—	—	—	4·22					
		1930	—	1·34	34·73	27·83	—	—	—	—	—	4·29					
		2400	—	1·06	34·71	27·84	—	—	—	—	—	4·35					
		2870	2870	0·80	34·70	27·84	—	—	—	—	—	4·41					
993	29	0	—	−1·86	33·89	27·30	—	—	—	—	—	7·68	**N 70 V**	1000–780	0834		
		10	—	−1·86	33·89	27·30	—	—	—	—	—	—	,,	750–500			
		20	—	−1·86	33·89	27·30	—	—	—	—	—	7·66	,,	500–250			
		30	—	−1·87	33·89	27·30	—	—	—	—	—	—	,,	250–100			
		40	—	−1·87	33·89	27·30	—	—	—	—	—	7·67	,,	100–50			
		50	—	−1·86	33·89	27·30	—	—	—	—	—	—	,,	50–0			
		60	—	−1·86	33·89	27·30	—	—	—	—	—	7·62	**N 50 V**	100–0	—	1105	
		80	—	−1·86	33·89	27·30	—	—	—	—	—	—	**N 70 B** }	76–0	1123	1143	KT
		100	—	−1·85	33·89	27·30	—	—	—	—	—	7·64	**N 100 B** }				
		150	—	0·45	34·18	27·45	—	—	—	—	—	5·79	**N 70 B** }	196–76	1123	1153	DGP
		200	—	1·21	34·31	27·50	—	—	—	—	—	4·93	**N 100 B** }				
		300	—	1·78	34·46	27·58	—	—	—	—	—	4·17					
		390	—	2·00	34·56	27·64	—	—	—	—	—	3·91					
		590	—	2·06	34·65	27·70	—	—	—	—	—	3·88					
		790	—	1·97	34·71	27·77	—	—	—	—	—	3·98					
		980	—	1·85	34·71	27·78	—	—	—	—	—	4·08					
		1480	—	1·50	34·73	27·82	—	—	—	—	—	4·17					
		1970	—	1·16	34·71	27·83	—	—	—	—	—	4·29					
		2460	2455	0·91	34·70	27·84	—	—	—	—	—	4·32					
994	0	0	—	−1·69	33·97	27·36	—	—	—	—	—	7·37	**N 50 V**	100–0	2110	2120	
		10	—	−1·69	33·97	27·36	—	—	—	—	—	—	**N 70 B** }	113–0	2159	2219	KT
		20	—	−1·70	33·97	27·36	—	—	—	—	—	7·40	**N 100 B** }				
		30	—	−1·70	33·97	27·36	—	—	—	—	—	—	**N 70 B** }	270–90	2159	2229	DGP
		40	—	−1·70	33·97	27·36	—	—	—	—	—	7·38	**N 100 B** }				
		50	—	−1·70	33·97	27·36	—	—	—	—	—	—	**N 100 H**	0–5	2155	2225	
		60	—	−1·70	33·97	27·36	—	—	—	—	—	7·40					
		80	—	−1·70	33·97	27·36											
		100	—	−1·69	33·98	27·37	—	—	—	—	—	7·33					
		150	—	0·95	34·25	27·47	—	—	—	—	—	5·34					
		200	—	1·54	34·39	27·54	—	—	—	—	—	4·55					
		290	—	1·91	34·48	27·59	—	—	—	—	—	4·04					
		390	—	1·94	34·57	27·65	—	—	—	—	—	3·93					
		590	—	2·05	34·66	27·72	—	—	—	—	—	3·81					
		790	—	1·95	34·70	27·76	—	—	—	—	—	3·99					
		980	—	1·83	34·72	27·78	—	—	—	—	—	3·94					
		1470	1474	1·51	34·73	27·82	—	—	—	—	—	4·12					
		2000	—	1·13	34·73	27·84	—	—	—	—	—	4·25					
		2500	—	0·88	34·70	27·84	—	—	—	—	—	4·31					
		3000	—	0·60	34·70	27·85	—	—	—	—	—	4·56					
		3500	—	0·42	34·69	27·85	—	—	—	—	—	4·54					
		4000	4012	0·38	34·69	27·85	—	—	—	—	—	4·51					
995	1	0	—	−1·80	33·96	27·36	—	—	—	—	—	—	**N 70 B**	125–0	0342	0402	KT. Net full of ice and badly torn
													N 70 B	320–120	0342	0412	DGP. Station worked in close, light pack-ice. Floes up to 10 yards or more in diameter. Temperature taken from thermograph

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
996	66° 53·8′ S, 78° 52·6′ W	1932 30 x	1630	3923*	W × S	25	W × S	3	bc	962·0	−7·8	−8·2	mod. NW swell
997	66° 37·4′ S, 78° 23·6′ W	30 x	2018	—	Lt airs	0–1	—	0	c	962·2	−5·3	−6·1	heavy NW swell
998	66° 40·7′ S, 75° 13·7′ W	31 x	0830	3282*	S × W	10	—	0	o	957·6	−8·0	−8·2	heavy NNW swell
999	65° 55·8′ S, 73° 51·5′ W	31 x	2200	—	W × S	15	S × W	1	o	966·9	−7·8	−8·3	mod. NW swell
1000	65° 06·6′ S, 71° 39·7′ W	1 xi	0845	3441*	WSW	19	WSW	4	c	972·9	−5·9	−6·7	mod. W × N swell
1001	64° 53·8′ S, 68° 43·9′ W	1 xi	2000	2672*	NE	20	NE	4	c	971·4	−3·6	−4·4	mod. NE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
996	1	0	—	−1·70	34·04	27·41	—	—	—	—	—	—	**N 70 B**	100–0	1646	1706	Depth estimated
													N 100 B				
													N 70 B	350–90	1646	1716	DGP
													N 100 B				
													N 100 H	0–5	1645	1720	
													N 100 H	0–5	1735	1755	
997	1	0	—	−1·72	34·04	27·41	—	—	—	—	—	—	**N 100 H**	0–5	2025	2055	
													N 100 H	0–10	2025	2055	
998	2	0	—	−1·82	33·99	27·39	—	—	—	—	—	6·64	**N 70 V**	1000–750	0841		Station worked in sludge-ice
		10	—	−1·80	33·99	27·39	—	—	—	—	—	—	,,	750–500			
		20	—	−1·79	33·99	27·39	—	—	—	—	—	6·61	,,	500–250			
		30	—	−1·79	33·99	27·39	—	—	—	—	—	—	,,	250–93			
		40	—	−1·79	33·99	27·39	—	—	—	—	—	6·61	,,	135–60			
		50	—	−1·79	33·99	27·39	—	—	—	—	—	—	,,	50–0			
		60	—	−1·79	33·99	27·39	—	—	—	—	—	6·64	**N 50 V**	100–0	—	1135	
		80	—	−1·78	33·99	27·39	—	—	—	—	—	—	**N 70 B**	100–0	1157	1217	Depth estimated
		100	—	−1·74	34·00	27·38	—	—	—	—	—	6·54	**N 100 B**				
		150	—	−0·99	34·14	27·48	—	—	—	—	—	6·01	**N 70 B**	300–78	1157	1227	DGP
		190	—	0·90	34·48	27·66	—	—	—	—	—	4·55	**N 100 B**				
		290	—	1·45	34·61	27·73	—	—	—	—	—	4·11	**N 100 H**	3–4	1158	1230	
		390	—	1·68	34·66	27·74	—	—	—	—	—	4·00					
		580	—	1·67	34·72	27·79	—	—	—	—	—	4·09					
		780	—	1·47	34·72	27·81	—	—	—	—	—	4·03					
		970	—	1·38	34·71	27·82	—	—	—	—	—	4·23					
		1450	—	1·00	34·71	27·84	—	—	—	—	—	4·32					
		1940	—	0·73	34·71	27·86	—	—	—	—	—	4·32					
		2420	2424	0·50	34·71	27·87	—	—	—	—	—	4·36					
999	2	0	—	−1·73	34·00	27·38	—	—	—	—	—	—	**N 70 B**	151–0	**2207**	**2227**	KT. Station worked among light pack-ice
													N 100 B				
													N 100 H	0–5	**2207**	**2237**	
1000	3	0	—	−1·72	33·95	27·34	—	—	—	—	—	7·21	**N 70 V**	1000–750	0850		
		10	—	−1·72	33·95	27·34	—	—	—	—	—	—	,,	750–500			
		20	—	−1·72	33·95	27·34	—	—	—	—	—	7·22	,,	500–250			
		30	—	−1·72	33·95	27·34	—	—	—	—	—	—	,,	250–100			
		40	—	−1·72	33·95	27·34	—	—	—	—	—	7·21	,,	100–50			
		50	—	−1·73	33·95	27·34	—	—	—	—	—	—	,,	50–0			
		60	—	−1·73	33·95	27·34	—	—	—	—	—	7·22	**N 50 V**	100–0	—	1028	
		80	—	−1·73	33·95	27·34	—	—	—	—	—	—	**N 70 B**	128–0	1108	1128	KT
		100	—	−0·80	33·96	27·33	—	—	—	—	—	6·06	**N 100 B**				
		150	—	1·20	34·43	27·60	—	—	—	—	—	4·51	**N 70 B**	300–110	1108	1138	DGP
		200	—	1·81	34·56	27·65	—	—	—	—	—	3·99	**N 100 B**				
		300	—	1·90	34·61	27·70	—	—	—	—	—	3·92					
		400	—	1·91	34·66	27·73	—	—	—	—	—	3·92					
		590	—	1·89	34·70	27·77	—	—	—	—	—	3·99					
		790	—	1·81	34·73	27·79	—	—	—	—	—	3·99					
		990	—	1·64	34·74	27·82	—	—	—	—	—	4·16					
		1480	—	1·25	34·73	27·83	—	—	—	—	—	4·30					
		1980	—	0·92	34·72	27·85	—	—	—	—	—	4·26					
		2470	2468	0·67	34·71	27·86	—	—	—	—	—	4·40					
1001	3	0	—	−1·70	33·94	27·33	—	—	—	—	—	7·41	**N 50 V**	100–0	2112	2121	
		10	—	−1·71	33·94	27·33	—	—	—	—	—	—	**N 70 B**	95–0	2143	**2203**	KT
		20	—	−1·73	33·94	27·33	—	—	—	—	—	7·40	**N 100 B**				
		30	—	−1·70	33·94	27·33	—	—	—	—	—	—	**N 70 B**	230–66	2143	**2213**	DGP. Closing depth estimated
		40	—	−1·70	33·94	27·33	—	—	—	—	—	7·39	**N 100 B**				
		50	—	−1·70	33·94	27·33	—	—	—	—	—	—	**N 100 H**	0–5	**2147**	**2207**	
		60	—	−1·62	33·94	27·33	—	—	—	—	—	7·39					
		80	—	−1·58	33·95	27·34											
		100	—	−0·89	34·14	27·48	—	—	—	—	—	6·32					
		150	—	1·21	34·54	27·69	—	—	—	—	—	4·31					
		200	—	1·72	34·64	27·73	—	—	—	—	—	3·93					
		300	—	1·81	34·67	27·74	—	—	—	—	—	3·94					
		400	—	1·74	34·70	27·78	—	—	—	—	—	4·02					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1001 *cont.*	64° 53·8′ S, 68° 43·9′ W	1932 1 xi											
1002	64° 23·4′ S, 65° 44·5′ W	2 xi	0830	355*	NE–NW	7–20	Conf.	3	bcsp	959·2	−1·8	−2·0	mod. conf. NE swell
1003	63° 40·7′ S, 63° 07·7′ W	2 xi	2000	304*	NNW	6	NNW	2	o	964·1	−1·4	−1·8	heavy conf. NW swell
1004	63° 02·2′ S, 60° 25·5′ W (3·48 miles S 47½° E of Ravn Rock, Neptune's Bellows, Deception I)	5 xi	1145	523*	WSW	24	WSW	4	bv	985·6	−2·9	−4·9	mod. WSW swell
1005	63° 09′ S, 60° 11′ W	5 xi	1450	629*	WSW	25–30	WSW	4	bc	985·2	−2·8	−4·1	mod. WSW swell
1006	63° 16·7′ S, 60° 06·5′ W	5 xi	1800	832*	WSW	23	WSW	4	bc	985·3	−2·7	−3·8	mod. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1001 *cont.*	3	600	—	1·62	34·73	27·81	—	—	—	—	—	4·15					
		790	—	1·42	34·74	27·83	—	—	—	—	—	4·21					
		990	—	1·26	34·74	27·84	—	—	—	—	—	4·18					
		1490	—	0·81	34·71	27·85	—	—	—	—	—	4·46					
		1980	—	0·50	34·70	27·86	—	—	—	—	—	4·50					
		2480	2475	0·39	34·69	27·85	—	—	—	—	—	4·51					
1002	4	0	—	−1·68	34·03	27·41	—	—	—	—	—	7·29	**N 70 V**	340–250	0840		
		10	—	−1·69	34·03	27·41	—	—	—	—	—	—	,,	250–100			
		20	—	−1·69	34·03	27·41	—	—	—	—	—	7·31	,,	100–50			
		30	—	−1·69	34·03	27·41	—	—	—	—	—	—	,,	50–0			
		40	—	−1·69	34·03	27·41	—	—	—	—	—	7·30	**N 50 V**	100–0	—	0925	
		50	—	−1·69	34·03	27·41	—	—	—	—	—	—	**N 70 B**	86–0	0952	1012	KT
		60	—	−1·69	34·03	27·41	—	—	—	—	—	7·31	**N 100 B**				
		80	—	−1·68	34·03	27·41	—	—	—	—	—	—	**N 70 B**	230–94	0952	1022	DGP
		100	—	−1·19	34·14	27·49	—	—	—	—	—	6·28	**N 100 B**				
		150	—	−0·39	34·34	27·62	—	—	—	—	—	5·54	**N 100 H**	0–5	0952	1025	
		200	—	0·42	34·48	27·69	—	—	—	—	—	4·72					
		300	—	1·01	34·66	27·79	—	—	—	—	—	4·30					
		350	—	1·04	34·66	27·79	—	—	—	—	—	4·28					
1003	4	0	—	−1·40	34·14	27·50	—	—	—	—	—	7·32	**N 50 V**	100–0	2008	2013	
		10	—	−1·40	34·14	27·50	—	—	—	—	—	—	**N 70 B**	115–0	2050	2110	KT
		20	—	−1·40	34·14	27·50	—	—	—	—	—	7·31	**N 100 B**				
		30	—	−1·39	34·14	27·50											
		40	—	−1·38	34·14	27·50	—	—	—	—	—	7·29					
		50	—	−1·38	34·14	27·50											
		60	—	−1·33	34·14	27·49	—	—	—	—	—	7·25					
		80	—	−1·17	34·20	27·53											
		100	—	−0·83	34·29	27·59	—	—	—	—	—	6·37					
		150	—	−0·29	34·42	27·67	—	—	—	—	—	5·67					
		200	—	0·57	34·55	27·74	—	—	—	—	—	4·86					
		300	—	1·15	34·66	27·78	—	—	—	—	—	4·46					
1004	7	0	—	−0·21	34·32	27·59	—	—	—	—	—	6·97	**N 70 V**	450–250	1135		
		10	—	−0·39	34·32	27·60	—	—	—	—	—	—	,,	250–0			
		20	—	−0·53	34·32	27·61	—	—	—	—	—	6·97	,,	250–100			
		30	—	−0·68	34·32	27·61	—	—	—	—	—	—	,,	100–50			
		40	—	−0·75	34·31	27·61	—	—	—	—	—	6·97	,,	50–0			
		50	—	−0·81	34·31	27·61	—	—	—	—	—	—	**N 50 V**	100–0	—	1240	
		60	—	−0·88	34·31	27·61	—	—	—	—	—	6·97	**N 70 B**	123–0	1259	1319	KT
		80	—	−0·90	34·31	27·61	—	—	—	—	—	—	**N 100 B**				
		100	—	−0·90	34·31	27·61	—	—	—	—	—	6·97	**N 70 B**	320–120	1259	1329	DGP
		150	—	−0·51	34·39	27·67	—	—	—	—	—	5·99	**N 100 B**				
		200	—	−0·08	34·49	27·71	—	—	—	—	—	5·34					
		300	—	0·29	34·57	27·76	—	—	—	—	—	4·97					
		400	—	0·39	34·61	27·80	—	—	—	—	—	4·88					
		500	—	0·45	34·61	27·80	—	—	—	—	—	4·92					
1005	7	0	—	−0·81	34·32	27·62	—	—	—	—	—	7·31	**N 70 V**	500–250	1503		
		10	—	−0·92	34·32	27·62	—	—	—	—	—	—	,,	250–100			
		20	—	−1·07	34·32	27·63	—	—	—	—	—	7·34	,,	100–50			
		30	—	−1·17	34·32	27·63	—	—	—	—	—	—	,,	50–0			
		40	—	−1·21	34·32	27·63	—	—	—	—	—	7·33	**N 50 V**	100–0	—	1545	
		50	—	−1·28	34·32	27·63	—	—	—	—	—	—	**N 70 B**	109–0	1615	1635	KT
		60	—	−1·31	34·32	27·63	—	—	—	—	—	7·29	**N 100 B**				
		80	—	−1·31	34·33	27·63	—	—	—	—	—	—	**N 70 B**	300–100	1615	1645	DGP
		100	—	−1·25	34·36	27·66	—	—	—	—	—	7·07	**N 100 B**				
		150	—	−1·11	34·42	27·70	—	—	—	—	—	6·74					
		200	—	−1·11	34·45	27·73	—	—	—	—	—	6·39					
		300	—	−1·21	34·52	27·79	—	—	—	—	—	6·19					
		400	—	−1·28	34·54	27·81	—	—	—	—	—	6·17					
		500	—	−1·31	34·57	27·84	—	—	—	—	—	6·15					
1006	7	0	—	−0·35	34·39	27·66	—	—	—	—	—	6·91	**N 70 V**	750–500	1806		
		10	—	−0·54	34·39	27·67	—	—	—	—	—	—	,,	500–270			
		20	—	−0·72	34·39	27·67	—	—	—	—	—	6·88	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1006 *cont.*	63° 16·7′ S, 60° 06·5′ W	1932 5 xi											
1007	63° 25′ S, 59° 57′ W	5 xi	2125	152*	W×N	18	W×N	4	o	983·8	−2·3	−3·3	mod. conf. W swell
1008	63° 06·5′ S, 59° 05·8′ W	6 xi	0140	256*	WNW	15	WNW	3	o	983·3	−2·1	−2·5	low W swell
1009	62° 55·9′ S, 58° 00·3′ W	6 xi	0530	702*	NW×W	15	NW×W	3	o	983·7	−2·1	−2·7	low NW×W swell
1010	62° 46·6′ S, 56° 58·1′ W	6 xi	0924	240*	N×W	19	N×W	4	os	981·4	−2·1	−2·4	mod. conf. swell
1011	62° 40·4′ S, 56° 19·5′ W	6 xi	1200	196*	NW×W	20	NW×W	4	os	977·6	−1·8	−2·0	low NNW swell
1012	62° 20·4′ S, 56° 19·5′ W	6 xi	1530	670*	W	12	W	4	c	977·9	−0·7	−1·8	low W swell
1013	61° 57·5′ S, 56° 20·1′ W	6 xi	2000	1960*	WNW	14	WNW	3	bc	979·2	−1·0	−1·4	low conf. NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
1006 *cont.*	7	30	—	−0·91	34·39	27·68	—	—	—	—	—	—	N 70 V	100–50			
		40	—	−1·01	34·39	27·68	—	—	—	—	—	6·84	,,	50–0			
		50	—	−1·01	34·39	27·68	—	—	—	—	—	—	N 50 V	100–0	—	1913	
		60	—	−1·05	34·39	27·69	—	—	—	—	—	6·84	N 70 B	115–0	1940	2000	KT
		80	—	−1·11	34·39	27·69	—	—	—	—	—	—	N 100 B				
		100	—	−1·11	34·42	27·70	—	—	—	—	—	6·79	N 70 B	320–152	1940	2010	DGP
		150	—	−1·11	34·47	27·75	—	—	—	—	—	6·43	N 100 B				
		200	—	−1·11	34·49	27·76	—	—	—	—	—	6·33	N 100 H	0–5	1934	2004	
		300	—	−1·14	34·51	27·78	—	—	—	—	—	6·17					
		400	—	−1·20	34·52	27·78	—	—	—	—	—	6·11					
		500	—	−1·17	34·57	27·83	—	—	—	—	—	6·02					
		700	—	−1·27	34·58	27·84	—	—	—	—	—	6·08					
1007	7	0	—	−1·08	34·41	27·70	—	—	—	—	—	6·88	N 50 V	100–0	2130		
		10	—	−1·09	34·41	27·70	—	—	—	—	—	—	N 70 V	100–50			
		20	—	−1·09	34·41	27·70	—	—	—	—	—	6·87	,,	50–0	—	2147	
		30	—	−1·09	34·41	27·70	—	—	—	—	—	—	N 100 H	0–5	2200	2230	
		40	—	−1·09	34·41	27·70	—	—	—	—	—	6·87					KT. Both nets fished for some minutes at 30 m. on the way out
		50	—	−1·09	34·41	27·70	—	—	—	—	—	—	N 70 B	90–0	2212	2232	
		60	—	−1·09	34·41	27·70	—	—	—	—	—	6·84	N 100 B				
		80	—	−1·09	34·41	27·70											
		100	—	−1·09	34·41	27·70	—	—	—	—	—	6·81					
		150	—	−1·11	34·41	27·70	—	—	—	—	—	6·63					
1008	7	0	—	−1·35	—	—	—	—	—	—	—	—	N 70 B	110–0	0155	0215	KT. Temperature from thermograph
													N 100 B				
													N 100 H	0–5	0156	0226	
1009	8	0	—	−0·85	34·52	27·78	—	—	—	—	—	—	N 70 B	155–0	0545	0605	KT
													N 100 B				
													N 70 B	300–120	0545	0615	DGP. Depths estimated
													N 100 B				
													N 100 H	0–2	0540	0625	
1010	8	0	—	−1·32	34·53	27·81	—	—	—	—	—	—	N 70 B	126–0	0935	0955	KT
													N 100 B				
													N 100 H	0–5	0933	1000	
1011	8	0	—	−1·44	34·52	27·80	—	—	—	—	—	7·11	N 100 H	0–5	1212	1242	
		10	—	−1·47	34·52	27·80	—	—	—	—	—	—	N 70 B	100–0	1214	1234	Depth estimated
		20	—	−1·49	34·52	27·80	—	—	—	—	—	7·12	N 100 B				
		30	—	−1·49	34·52	27·80	—	—	—	—	—	—	N 70 V	150–100	1250		
		40	—	−1·48	34·52	27·80	—	—	—	—	—	7·10	,,	100–50			
		50	—	−1·48	34·52	27·80	—	—	—	—	—	—	,,	50–0			
		60	—	−1·48	34·52	27·80	—	—	—	—	—	7·09	N 50 V	100–0	—	1315	
		80	—	−1·48	34·52	27·80											
		100	—	−1·48	34·52	27·80	—	—	—	—	—	7·06					
		150	—	−1·47	34·52	27·80	—	—	—	—	—	7·03					
1012	8	0	—	−0·90	34·41	27·69	—	—	—	—	—	6·92	N 70 V	500–250	1533		
		10	—	−0·90	34·41	27·69	—	—	—	—	—	—	,,	250–100			
		20	—	−0·90	34·41	27·69	—	—	—	—	—	6·89	,,	100–50			
		30	—	−0·89	34·42	27·69	—	—	—	—	—	—	,,	50–0			
		40	—	−0·86	34·43	27·71	—	—	—	—	—	6·62	N 50 V	100–0	—	1620	
		50	—	−0·70	34·45	27·71	—	—	—	—	—	—	N 100 H	0–5	1646	1716	
		60	—	−0·59	34·49	27·74	—	—	—	—	—	5·88	N 70 B	104–0	1648	1718	KT
		80	—	−0·97	34·49	27·75	—	—	—	—	—	—	N 100 B				
		100	—	−0·90	34·50	27·76	—	—	—	—	—	6·09	N 70 B	316–150	1648	1728	DGP
		150	—	−1·09	34·50	27·77	—	—	—	—	—	6·19	N 100 B				
		200	—	−1·09	34·52	27·79	—	—	—	—	—	6·12					
		300	—	−1·05	34·58	27·84	—	—	—	—	—	5·99					
		400	—	−1·06	34·58	27·84	—	—	—	—	—	5·93					
		600	—	−1·01	34·58	27·84	—	—	—	—	—	5·95					
1013	8	0	—	−1·08	34·32	27·63	—	—	—	—	—	7·18	N 70 V	1000–750	2001		
		10	—	−1·08	34·32	27·63	—	—	—	—	—	—	,,	750–500			
		20	—	−1·08	34·32	27·63	—	—	—	—	—	7·16	,,	500–250			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
1013 *cont.*	61° 57·5′ S, 56° 20·1′ W	1932 6 xi											
1014	61° 26·8′ S, 56° 19·7′ W	7 xi	0200	543*	SE	12	SE	2	0	980·1	−2·4	−3·3	mod. NW swell
1015	58° 53·2′ S, 56° 18·6′ W	7 xi	2000	3864*	SE	15–20	SE	4 conf.	0	983·9	−1·1	−1·6	mod. conf. swell
1016	57° 19′ S, 56° 19·9′ W	8 xi	0835	4124*	S	11	S	4	0	996·1	−1·5	−2·5	mod. conf. S swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	TIME To	Remarks
		HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				
1013 *cont.*	8	30	—	−1·09	34·32	27·63	—	—	—	—	—	—	**N 70 V**	250–0			
		40	—	−1·09	34·32	27·63	—	—	—	—	—	7·18	,,	250–100			
		50	—	−1·09	34·32	27·63	—	—	—	—	—	—	,,	100–50			
		60	—	−1·10	34·32	27·63	—	—	—	—	—	7·16	,,	50–0			
		80	—	−1·15	34·33	27·63	—	—	—	—	—	—	**N 50 V**	100–0	—	**2155**	
		100	—	−1·18	34·35	27·66	—	—	—	—	—	7·17	**N 70 B**	93–0	**2210**	**2230**	KT
		150	—	−0·62	34·43	27·70	—	—	—	—	—	6·01	**N 100 B**				
		200	—	−0·74	34·48	27·75	—	—	—	—	—	6·02	**N 70 B**	314–140	**2210**	**2240**	DGP
		290	—	−0·72	34·49	27·74	—	—	—	—	—	5·90	**N 100 B**				
		390	—	−0·78	34·52	27·78	—	—	—	—	—	5·82	**N 100 H**	0–5	**2219**	**2249**	
		580	—	−0·92	34·56	27·81	—	—	—	—	—	5·85					
		780	—	−1·03	34·58	27·84	—	—	—	—	—	5·88					
		970	—	−1·04	34·58	27·84	—	—	—	—	—	5·73					
		1460	—	−1·15	34·58	27·84	—	—	—	—	—	5·65					
		1800	1799	−1·24	34·58	27·84	—	—	—	—	—	5·81					
1014	8	0	—	−1·06	34·32	27·63	—	—	—	—	—	7·11	**N 70 V**	500–250	**0205**		
		10	—	−1·06	34·32	27·63	—	—	—	—	—	—	,,	250–100			
		20	—	−1·05	34·32	27·63	—	—	—	—	—	7·10	,,	100–50			
		30	—	−1·05	34·32	27·63	—	—	—	—	—	—	,,	50–0			
		40	—	−1·06	34·32	27·63	—	—	—	—	—	7·09	**N 50 V**	100–0	—	**0243**	
		50	—	−1·02	34·32	27·63	—	—	—	—	—	—	**N 70 B**	144–0	**0320**	0340	KT
		60	—	−0·99	34·32	27·62	—	—	—	—	—	7·06	**N 100 B**				
		80	—	−0·95	34·34	27·64	—	—	—	—	—	—	**N 100 H**	0–5	**0318**	0348	
		100	—	−0·94	34·34	27·64	—	—	—	—	—	6·99					
		150	—	−0·82	34·37	27·66	—	—	—	—	—	6·79					
		200	—	−0·54	34·43	27·70	—	—	—	—	—	6·13					
		300	—	−0·23	34·52	27·75	—	—	—	—	—	5·59					
		400	—	−0·14	34·53	27·76	—	—	—	—	—	5·46					
		500	—	−0·04	34·57	27·78	—	—	—	—	—	5·42					
1015	9	0	—	−0·41	33·96	27·31	—	—	—	—	—	7·65	**N 50 V**	100–0	2003	2010	
		10	—	−0·41	33·96	27·31	—	—	—	—	—	—	**N 70 B**	128–0	**2210**	**2230**	KT
		20	—	−0·41	33·96	27·31	—	—	—	—	—	7·67	**N 100 B**				
		30	—	−0·41	33·96	27·31	—	—	—	—	—	—	**N 70 B**	350–120	**2210**	**2240**	DGP
		40	—	−0·49	33·96	27·31	—	—	—	—	—	7·65	**N 100 B**				
		50	—	−0·49	33·96	27·31	—	—	—	—	—	—	**N 100 H**	0–5	**2212**	**2244**	
		60	—	−0·55	33·96	27·32	—	—	—	—	—	7·65					
		80	—	−0·59	33·96	27·32											
		100	—	−0·51	34·05	27·38	—	—	—	—	—	6·87					
		150	—	0·34	34·23	27·49	—	—	—	—	—	5·73					
		200	—	1·48	34·41	27·56	—	—	—	—	—	4·53					
		300	—	1·91	34·52	27·62	—	—	—	—	—	4·02					
		390	—	2·01	34·60	27·67	—	—	—	—	—	3·88					
		590	—	2·01	34·67	27·73	—	—	—	—	—	3·85					
		780	—	1·89	34·70	27·77	—	—	—	—	—	3·93					
		980	—	1·71	34·73	27·80	—	—	—	—	—	4·04					
		1470	1487	1·31	34·74	27·84	—	—	—	—	—	4·21					
		1950	—	0·99	34·73	27·85	—	—	—	—	—	4·28					
		2440	—	0·67	34·71	27·86	—	—	—	—	—	4·06					
		2930	—	0·31	34·70	27·87	—	—	—	—	—	4·25					
		3420	3421	0·09	34·69	27·87	—	—	—	—	—	4·51					
1016	10	0	—	−0·20	33·84	27·20	—	—	—	—	—	7·78	**N 70 V**	1000–750	0835		
		10	—	−0·23	33·84	27·20	—	—	—	—	—	—	,,	750–500			
		20	—	−0·26	33·84	27·20	—	—	—	—	—	7·81	,,	500–250			
		30	—	−0·27	33·84	27·20	—	—	—	—	—	—	,,	250–100			
		40	—	−0·27	33·84	27·20	—	—	—	—	—	7·79	,,	100–50			
		50	—	−0·28	33·84	27·20	—	—	—	—	—	—	,,	50–0			
		60	—	−0·29	33·84	27·20	—	—	—	—	—	7·80	**N 50 V**	100–0	—	1023	
		80	—	−0·38	33·84	27·21	—	—	—	—	—	—	**N 70 B**	113–0	1111	1131	KT
		100	—	−0·39	33·93	27·28	—	—	—	—	—	7·27	**N 100 B**				
		150	—	0·57	34·07	27·35	—	—	—	—	—	6·36	**N 70 B**	360–130	1111	1141	DGP. Closing depth estimated
		200	—	1·54	34·24	27·43	—	—	—	—	—	5·14	**N 100 B**				
		300	—	1·91	34·37	27·50	—	—	—	—	—	4·56	**N 100 H**	0–5	1112	1142	
		390	—	2·11	34·48	27·57	—	—	—	—	—	4·07					
		590	—	2·24	34·60	27·65	—	—	—	—	—	3·69					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1016 *cont.*	57° 19′ S, 56° 19·9′ W	1932 8 xi											
1017	56° 00·2′ S, 56° 07·6′ W	8 xi	2000	4326*	N	10	N	3	os	999·3	−0·2	−1·2	mod. conf. S swell
1018	54° 43·9′ S, 55° 55·7′ W	9 xi	0830	756*	NNW	17	NNW	3	oe	988·1	5·8	5·3	mod. conf. WNW swell
1019	53° 22·6′ S, 56° 02′ W	9 xi	2003	2796*	NW×W	9	NW×W	2	csp	986·0	6·7	6·1	mod. conf. NW swell
1020	52° 03·8′ S, 57° 15·6′ W	10 xi	0833	392*	W	22	W	4	bc	1000·3	6·9	6·5	mod. conf. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1016 *cont.*	10	780	—	2·14	34·67	27·72	—	—	—	—	—	3·66					
		980	—	2·06	34·69	27·73	—	—	—	—	—	3·63					
		1470	—	1·69	34·74	27·81	—	—	—	—	—	4·02					
		1960	—	1·30	34·73	27·83	—	—	—	—	—	3·88					
		2450	—	0·90	34·72	27·85	—	—	—	—	—	3·95					
		2940	2935	0·62	34·71	27·87	—	—	—	—	—	4·15					
1017	10	0	—	0·70	33·79	27·12	—	—	—	—	—	7·62	**N 50 V**	100–0	**2132**	**2140**	
		10	—	0·69	33·79	27·12	—	—	—	—	—	—	**N 70 B**	110–0	**2216**	**2236**	KT
		20	—	0·60	33·79	27·13	—	—	—	—	—	7·61	**N 100 B**				
		30	—	0·54	33·79	27·13	—	—	—	—	—	—	**N 70 B**	330–150	**2216**	**2246**	DGP
		40	—	0·50	33·79	27·13	—	—	—	—	—	7·61	**N 100 B**				
		50	—	0·50	33·79	27·13	—	—	—	—	—	—	**N 100 H**	0–5	**2226**	**2256**	
		60	—	0·41	33·79	27·14	—	—	—	—	—	7·61					
		80	—	0·19	33·79	27·15											
		100	—	0·10	33·79	27·15	—	—	—	—	—	7·60					
		150	—	0·00	33·88	27·23	—	—	—	—	—	7·36					
		200	—	1·12	34·09	27·32	—	—	—	—	—	6·34					
		300	—	1·81	34·23	27·40	—	—	—	—	—	5·32					
		390	—	1·81	34·32	27·46	—	—	—	—	—	4·90					
		590	—	2·21	34·43	27·52	—	—	—	—	—	4·17					
		780	—	2·33	34·57	27·62	—	—	—	—	—	3·78					
		980	—	2·24	34·66	27·70	—	—	—	—	—	3·77					
		1470	1470	1·96	34·74	27·79	—	—	—	—	—	3·82					
		1920	—	1·70	34·73	27·80	—	—	—	—	—	3·93					
		2400	—	1·38	34·73	27·83	—	—	—	—	—	3·83					
		2880	—	1·00	34·71	27·84	—	—	—	—	—	4·07					
		3360	—	0·79	34·70	27·84	—	—	—	—	—	4·02					
		3840	3839	0·49	34·69	27·84	—	—	—	—	—	4·16					
1018	11	0	—	4·97	34·16	27·03	—	—	—	—	—	6·80	**N 70 V**	700–500	0837		
		10	—	4·97	34·16	27·03	—	—	—	—	—	—	,,	500–250			
		20	—	4·97	34·16	27·03	—	—	—	—	—	6·79	,,	250–100			
		30	—	4·97	34·16	27·03	—	—	—	—	—	—	,,	100–50			
		40	—	4·97	34·16	27·03	—	—	—	—	—	6·79	,,	50–0			
		50	—	4·97	34·16	27·03	—	—	—	—	—	—	**N 50 V**	100–0	—	0945	
		60	—	4·95	34·16	27·04	—	—	—	—	—	6·78	**N 70 B**	119–0	1001	1021	KT
		80	—	4·81	34·16	27·05	—	—	—	—	—	—	**N 100 B**				
		100	—	4·60	34·16	27·08	—	—	—	—	—	6·58	**N 70 B**	322–156	1001	1031	DGP
		150	—	4·54	34·22	27·12	—	—	—	—	—	6·46	**N 100 B**				
		200	—	4·52	34·22	27·12	—	—	—	—	—	6·43	**N 100 H**	0–5	1006	1036	
		300	—	4·41	34·23	27·16	—	—	—	—	—	6·40					
		400	—	4·24	34·23	27·17	—	—	—	—	—	6·33					
		600	—	4·08	34·22	27·17	—	—	—	—	—	6·04					
1019	11	0	—	5·11	34·16	27·02	—	—	—	—	—	6·95	**N 50 V**	100–0	2007	2014	
		10	—	5·13	34·16	27·02	—	—	—	—	—	—	**N 70 B**	119–0	**2143**	**2203**	KT
		20	—	5·05	34·19	27·05	—	—	—	—	—	6·94	**N 100 B**				
		30	—	5·00	34·20	27·06	—	—	—	—	—	—	**N 70 B**	320–110	**2143**	**2213**	DGP
		40	—	5·00	34·20	27·06	—	—	—	—	—	6·86	**N 100 B**				
		50	—	4·99	34·20	27·06	—	—	—	—	—	—	**N 100 H**	0–5	**2144**	**2214**	
		60	—	4·92	34·20	27·07	—	—	—	—	—	6·89					
		80	—	4·90	34·20	27·07											
		100	—	4·71	34·23	27·12	—	—	—	—	—	6·81					
		150	—	4·19	34·22	27·16	—	—	—	—	—	6·55					
		200	—	4·02	34·21	27·18	—	—	—	—	—	6·43					
		300	—	3·78	34·21	27·20	—	—	—	—	—	6·43					
		400	—	3·31	34·21	27·25	—	—	—	—	—	6·35					
		600	—	3·00	34·21	27·28	—	—	—	—	—	5·78					
		800	—	2·50	34·20	27·31	—	—	—	—	—	5·81					
		1000	—	2·76	34·32	27·39	—	—	—	—	—	4·48					
		1500	—	2·47	34·54	27·59	—	—	—	—	—	3·63					
		2000	—	2·20	34·67	27·71	—	—	—	—	—	3·68					
		2500	—	1·96	34·75	27·80	—	—	—	—	—	3·58					
1020	12	0	—	6·43	33·80	26·57	—	—	—	—	—	6·92	**N 70 V**	250–100	0840		
		10	—	6·42	33·80	26·57	—	—	—	—	—	—	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1020 *cont.*	52° 03·8′ S, 57° 15·6′ W	1932 10 xi											
1021	51° 20·1′ S, 55° 20·1′ W	13 xi	2000	1299*	WNW	25	WNW	5	b	990·8	7·0	6·3	heavy WNW swell
1022	50° 59·1′ S, 52° 47′ W	14 xi	0830	2068*	WNW	15	WNW	3	b	995·3	6·4	5·7	heavy conf. W swell
1023	50° 48·9′ S, 51° 32·9′ W	16 xi	2000	2102*	W×N	19	W×N	4	b	1001·5	6·0	4·7	heavy WSW swell
1024	50° 32·9′ S, 49° 08·9′ W	17 xi	0830	2840	NNE	10–18	NNE	4	bc	1002·0	5·4	4·6	mod. conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. C.	S ‰	σt	pH	Mg.—atom m.³				O_2 c.c. litre	Gear	Depth (metres)	TIME		
								P	Nitrate + Nitrite N_2	Nitrite N_2	Si				From	To	
1020 *cont.*	12	20	—	6·40	33·80	26·58	—	—	—	—	—	6·91	N 70 V	50–0			
		30	—	6·01	33·79	26·63	—	—	—	—	—	—	N 50 V	100–0	—	0907	
		40	—	5·61	33·85	26·71	—	—	—	—	—	6·51	N 70 B	143–0	0929	0949	KT
		50	—	5·53	33·86	26·72	—	—	—	—	—	—	N 100 B				
		60	—	5·30	33·87	26·77	—	—	—	—	—	6·40	N 100 H	0–5	0927	0957	
		80	—	5·31	33·94	26·82											
		100	—	5·22	33·96	26·85	—	—	—	—	—	6·59					
		150	—	5·01	34·04	26·93	—	—	—	—	—	6·54					
		200	—	4·69	34·11	27·03	—	—	—	—	—	6·29					
		300	—	4·50	34·14	27·08	—	—	—	—	—	6·21					
1021	15	0	—	5·80	34·15	26·94	—	—	—	—	—	6·89	N 50 V	100–0	2005	2013	
		10	—	5·79	34·15	26·94	—	—	—	—	—	—	N 70 B	120–0	2119	2139	KT
		20	—	5·78	34·15	26·94	—	—	—	—	—	6·90	N 100 B				
		30	—	5·80	34·15	26·94	—	—	—	—	—	—	N 70 B	315–150	2119	2149	DGP
		40	—	5·51	34·15	26·97	—	—	—	—	—	6·92	N 100 B				
		50	—	5·32	34·15	26·99	—	—	—	—	—	—	N 100 H	0–5	2125	2155	
		60	—	5·02	34·15	27·03	—	—	—	—	—	6·86					
		80	—	4·62	34·15	27·07											
		100	—	4·38	34·17	27·11	—	—	—	—	—	6·55					
		150	—	4·31	34·19	27·14	—	—	—	—	—	6·54					
		200	—	4·29	34·22	27·15	—	—	—	—	—	6·39					
		300	—	4·02	34·21	27·18	—	—	—	—	—	6·25					
		400	—	3·91	34·21	27·19	—	—	—	—	—	6·20					
		600	—	3·18	34·19	27·25	—	—	—	—	—	6·03					
		800	—	2·77	34·23	27·32	—	—	—	—	—	5·41					
		1000	—	2·78	34·33	27·39	—	—	—	—	—	4·56					
1022	16	0	—	5·82	34·23	26·99	—	—	—	—	—	6·91	N 70 V	1000–720	0835		
		10	—	5·74	34·23	27·00	—	—	—	—	—	—	,,	750–500			
		20	—	5·60	34·22	27·00	—	—	—	—	—	6·93	,,	500–250			
		30	—	5·50	34·21	27·01	—	—	—	—	—	—	,,	250–100			
		40	—	5·42	34·20	27·01	—	—	—	—	—	6·91	,,	100–0			
		50	—	5·39	34·20	27·01	—	—	—	—	—	—	,,	100–50			
		60	—	5·17	34·20	27·04	—	—	—	—	—	6·91	,,	50–0			
		80	—	4·19	34·20	27·15	—	—	—	—	—	—	N 50 V	100–0	—	1020	
		100	—	3·94	34·20	27·18	—	—	—	—	—	6·68	N 70 B	98–0	1034	1054	KT
		150	—	3·64	34·20	27·21	—	—	—	—	—	6·56	N 100 B				
		200	—	3·43	34·20	27·23	—	—	—	—	—	6·47	N 100 B	300–126	1034	1104	DGP
		300	—	3·12	34·18	27·25	—	—	—	—	—	6·37	N 100 H	0–5	1036	1106	
		400	—	2·99	34·20	27·27	—	—	—	—	—	5·81					
		600	—	2·65	34·28	27·37	—	—	—	—	—	5·00					
		800	—	2·63	34·42	27·47	—	—	—	—	—	4·13					
		1000	—	2·43	34·51	27·56	—	—	—	—	—	3·73					
		1500	—	2·14	34·67	27·72	—	—	—	—	—	3·61					
1023	18	0	—	5·31	34·15	27·00	—	—	—	—	—	6·91	N 50 V	100–0	2005	2020	
		10	—	5·34	34·17	27·00	—	—	—	—	—	—	N 70 B	112–0	2152	2213	KT
		20	—	5·38	34·17	27·00	—	—	—	—	—	6·93	N 100 B				
		30	—	5·38	34·17	27·00	—	—	—	—	—	—	N 70 B	318–130	2152	2223	DGP
		40	—	5·22	34·17	27·02	—	—	—	—	—	6·92	N 100 B				
		50	—	5·14	34·16	27·02	—	—	—	—	—	—	N 100 H	0–5	2157	2227	
		60	—	5·02	34·15	27·03	—	—	—	—	—	6·89					
		80	—	4·26	34·14	27·10											
		100	—	4·10	34·15	27·13	—	—	—	—	—	6·81					
		150	—	3·55	34·15	27·19	—	—	—	—	—	6·74					
		200	—	3·22	34·15	27·22	—	—	—	—	—	6·56					
		300	—	2·92	34·14	27·24	—	—	—	—	—	6·43					
		400	—	2·94	34·14	27·23	—	—	—	—	—	6·01					
		600	—	2·55	34·25	27·35	—	—	—	—	—	5·05					
		800	—	2·59	34·42	27·47	—	—	—	—	—	4·24					
		1000	—	2·45	34·49	27·54	—	—	—	—	—	3·71					
		1500	—	2·18	34·65	27·69	—	—	—	—	—	3·60					
		2000	—	1·86	34·70	27·77	—	—	—	—	—	3·77					
1024	19	0	—	4·80	34·17	27·06	—	—	—	—	—	6·87	N 70 V	1000–750	0834		
		10	—	4·80	34·17	27·06	—	—	—	—	—	—	,,	750–500			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
1024 *cont.*	50° 32·9′ S, 49° 08·9′ W	1932 17 xi											
1025	50° 18·3′ S, 47° 12·4′ W	17 xi	2000	2803*	NNW	16	NNW	4	fe	992·8	7·3	7·2	mod. conf. SSW and NW swells
1026	49° 59·6′ S, 44° 41·3′ W	18 xi	0830	2759*	W×N	12	W×N	3	bc	997·0	5·7	5·0	mod. conf. swell
1027	51° 19·8′ S, 44° 40·8′ W	18 xi	2000	2709*	N×W	8	N×W	4	c	988·9	4·3	4·1	mod. conf. N×W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
1024 *cont.*	19	20	—	4·80	34·17	27·06	—	—	—	—	—	6·90	**N 70 V**	500–250			
		30	—	4·79	34·17	27·06	—	—	—	—	—	—	,,	250–100			
		40	—	4·79	34·17	27·06	—	—	—	—	—	6·87	,,	100–50			
		50	—	4·73	34·17	27·07	—	—	—	—	—	—	,,	50–0			
		60	—	4·60	34·16	27·08	—	—	—	—	—	6·89	**N 50 V**	100–0	—	1025	
		80	—	4·33	34·14	27·10	—	—	—	—	—	—	**N 70 B**	89–0	1044	1104	KT
		100	—	3·64	34·14	27·17	—	—	—	—	—	6·81	**N 100 B**				
		150	—	2·86	34·13	27·22	—	—	—	—	—	6·72	**N 70 B**	246–120	1044	1114	DGP
		200	—	2·71	34·13	27·23	—	—	—	—	—	6·59	**N 100 B**				
		300	—	2·31	34·12	27·27	—	—	—	—	—	6·18					
		400	—	2·04	34·15	27·32	—	—	—	—	—	5·99					
		600	—	2·40	34·30	27·40	—	—	—	—	—	4·68					
		800	—	2·35	34·43	27·51	—	—	—	—	—	4·01					
		1000	—	2·35	34·56	27·61	—	—	—	—	—	3·81					
		1500	—	2·13	34·66	27·71	—	—	—	—	—	3·57					
		2000	—	1·84	34·72	27·78	—	—	—	—	—	3·75					
		2500	—	1·36	34·74	27·84	—	—	—	—	—	3·96					
1025	19	0	—	5·02	34·08	26·97	—	—	—	—	—	7·00	**N 50 V**	100–0	**2008**	**2015**	
		10	—	5·12	34·10	26·97	—	—	—	—	—	—	**N 70 B**	140–0	**2137**	**2157**	KT
		20	—	5·12	34·10	26·97	—	—	—	—	—	7·03	**N 100 B**				
		30	—	4·95	34·10	26·99	—	—	—	—	—	—	**N 70 B**	400–160	**2137**	**2207**	DGP
		40	—	4·02	34·11	27·10	—	—	—	—	—	7·02	**N 100 B**				
		50	—	3·38	34·10	27·15							**N 100 H**	0–5	**2137**	**2207**	
		60	—	2·94	34·10	27·19	—	—	—	—	—	7·00					
		80	—	2·66	34·10	27·22											
		100	—	2·38	34·08	27·23	—	—	—	—	—	7·00					
		150	—	1·97	34·07	27·25	—	—	—	—	—	6·95					
		200	—	1·70	34·07	27·27	—	—	—	—	—	6·87					
		300	—	1·73	34·12	27·31	—	—	—	—	—	6·10					
		400	—	2·30	34·22	27·34	—	—	—	—	—	5·36					
		600	—	2·47	34·44	27·51	—	—	—	—	—	4·18					
		800	—	2·37	34·54	27·60	—	—	—	—	—	3·88					
		1000	—	2·24	34·59	27·65	—	—	—	—	—	3·79					
		1500	—	1·98	34·72	27·77	—	—	—	—	—	3·60					
		2000	—	1·75	34·74	27·81	—	—	—	—	—	3·95					
		2500	—	1·18	34·74	27·85	—	—	—	—	—	4·03					
1026	20	0	—	4·60	34·04	26·98	—	—	—	—	—	7·17	**N 70 V**	1000–710	0834		
		10	—	4·62	34·04	26·98	—	—	—	—	—	—	,,	750–0			
		20	—	4·62	34·04	26·98	—	—	—	—	—	7·18	,,	750–500			
		30	—	4·62	34·04	26·98	—	—	—	—	—	—	,,	500–230			
		40	—	4·62	34·05	26·99	—	—	—	—	—	7·14	,,	250–100			
		50	—	4·64	34·05	26·98	—	—	—	—	—	—	,,	100–50			
		60	—	4·29	34·09	27·05	—	—	—	—	—	6·95	,,	50–0			
		80	—	3·10	34·13	27·20	—	—	—	—	—	—	**N 50 V**	100–0	—	1030	
		100	—	3·01	34·13	27·21	—	—	—	—	—	6·72	**N 70 B**	98–0	1047	1107	KT
		150	—	2·68	34·13	27·24	—	—	—	—	—	6·65	**N 100 B**				
		200	—	2·45	34·13	27·26	—	—	—	—	—	6·46	**N 70 B**	285–130	1047	1117	DGP
		300	—	1·86	34·13	27·30	—	—	—	—	—	6·24	**N 100 B**				
		400	—	2·40	34·23	27·35	—	—	—	—	—	5·26	**N 100 H**	0–5	1049	1119	
		600	—	2·46	34·41	27·48	—	—	—	—	—	4·21					
		800	—	2·30	34·51	27·58	—	—	—	—	—	3·88					
		1000	—	2·26	34·61	27·67	—	—	—	—	—	3·66					
		1500	—	2·07	34·72	27·76	—	—	—	—	—	3·93					
		2000	—	2·19	34·74	27·77	—	—	—	—	—	4·32					
		2500	—	1·43	34·73	27·82	—	—	—	—	—	4·05					
1027	20	0	—	3·63	33·95	27·01	—	—	—	—	—	7·31	**N 50 V**	100–0	**2005**	**2013**	
		10	—	3·70	33·96	27·01	—	—	—	—	—	—	**N 70 B**	100–0	**2139**	**2159**	Depth estimated
		20	—	3·71	33·96	27·01	—	—	—	—	—	7·31	**N 100 B**				
		30	—	3·46	33·96	27·04	—	—	—	—	—	—	**N 70 B**	300–125	**2139**	**2209**	DGP
		40	—	3·40	33·96	27·04	—	—	—	—	—	7·35	**N 100 B**				
		50	—	3·11	33·96	27·07	—	—	—	—	—	—	**N 100 H**	0–5	**2140**	**2210**	
		60	—	2·20	33·96	27·15	—	—	—	—	—	7·40	**CPR**	—	**2220**		
		80	—	1·10	33·96	27·23											
		100	—	0·69	33·94	27·23	—	—	—	—	—	7·45					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1027 *cont.*	51° 19·8′ S, 44° 40·8′ W	1932 18 xi											
1028	52° 55·2′ S, 44° 38·2′ W	19 xi	0830	2423*	WNW	16	WNW	4	o	982·9	3·3	2·9	mod. W swell
1029	54° 20·7′ S, 44° 35·8′ W	19 xi	2000	3599*	W × N	6	W × N	2	od	980·2	2·4	2·3	mod. conf. W swell
1030	55° 43·4′ S, 44° 31·4′ W	20 xi	0830	3740*	S × W	20	S × W	4	o	991·4	0·6	−0·5	mod. conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1027 *cont.*	20	150	—	0·69	34·04	27·31	—	—	—	—	—	7·39					
		200	—	0·65	34·05	27·32	—	—	—	—	—	6·74					
		300	—	1·60	34·24	27·42	—	—	—	—	—	5·38					
		400	—	2·05	34·36	27·48	—	—	—	—	—	4·65					
		600	—	2·19	34·50	27·57	—	—	—	—	—	3·96					
		800	—	2·14	34·62	27·69	—	—	—	—	—	3·79					
		1000	—	2·09	34·64	27·70	—	—	—	—	—	3·79					
		1500	—	2·10	34·65	27·70	—	—	—	—	—	3·44					
		2000	—	1·48	34·74	27·83	—	—	—	—	—	3·81					
		2500	—	0·97	34·73	27·85	—	—	—	—	—	4·06					
1028	21	0	—	2·40	33·99	27·16	—	—	—	—	—	7·31	**N 70 V**	1000–735	0835		
		10	—	2·40	33·99	27·16	—	—	—	—	—	—	,,	750–490			
		20	—	2·38	33·99	27·16	—	—	—	—	—	7·30	,,	500–250			
		30	—	2·33	33·99	27·17	—	—	—	—	—	—	,,	250–100			
		40	—	2·29	33·99	27·17	—	—	—	—	—	7·33	,,	100–50			
		50	—	2·20	33·99	27·18	—	—	—	—	—	—	,,	50–0			
		60	—	2·10	33·99	27·18	—	—	—	—	—	7·30	**N 50 V**	100–0	—	0953	
		80	—	1·70	34·03	27·24	—	—	—	—	—	—	**N 70 B**	119–0	1015	1035	KT
		100	—	1·39	34·03	27·27	—	—	—	—	—	7·05	**N 100 B**				
		150	—	1·59	34·08	27·29	—	—	—	—	—	6·59	**N 70 B**	330–135	1015	1045	DGP
		200	—	1·43	34·09	27·30	—	—	—	—	—	6·20	**N 100 B**				
		290	—	1·95	34·27	27·41	—	—	—	—	—	5·06	**N 100 H**	0–5	1020	1050	
		390	—	2·51	34·39	27·47	—	—	—	—	—	4·34					
		580	—	2·21	34·52	27·59	—	—	—	—	—	3·83					
		780	—	2·15	34·60	27·66	—	—	—	—	—	3·65					
		970	—	2·05	34·66	27·72	—	—	—	—	—	3·74					
		1460	—	1·61	34·73	27·81	—	—	—	—	—	3·83					
		1950	1952	1·16	34·73	27·84	—	—	—	—	—	4·06					
1029	21	0	—	1·44	33·91	27·16	—	—	—	—	—	7·55	**N 50 V**	100–0	**2007**	**2014**	
		10	—	1·40	33·92	27·18	—	—	—	—	—	—	**N 70 B**	100–0	**2158**	**2218**	KT
		20	—	1·30	33·93	27·18	—	—	—	—	—	7·60	**N 100 B**				
		30	—	1·22	33·93	27·19	—	—	—	—	—	—	**N 70 B**	300–150	**2158**	**2228**	DGP
		40	—	1·20	33·93	27·19	—	—	—	—	—	7·54	**N 100 B**				
		50	—	1·10	33·93	27·20	—	—	—	—	—	—	**N 100 H**	0–5	**2158**	**2228**	
		60	—	0·90	33·93	27·21	—	—	—	—	—	7·53					
		80	—	0·41	33·94	27·25											
		100	—	0·09	33·94	27·27	—	—	—	—	—	7·37					
		150	—	1·19	34·09	27·32	—	—	—	—	—	6·11					
		200	—	1·55	34·20	27·38	—	—	—	—	—	5·41					
		300	—	1·90	34·37	27·50	—	—	—	—	—	4·58					
		400	—	2·00	34·43	27·54	—	—	—	—	—	4·20					
		590	—	2·12	34·56	27·63	—	—	—	—	—	3·85					
		790	—	2·03	34·65	27·71	—	—	—	—	—	3·87					
		990	—	1·89	34·70	27·77	—	—	—	—	—	3·89					
		1480	—	1·61	34·73	27·81	—	—	—	—	—	3·99					
		1880	—	1·20	34·73	27·84	—	—	—	—	—	4·02					
		2350	—	0·86	34·72	27·85	—	—	—	—	—	4·30					
		2820	2822	0·63	34·71	27·86	—	—	—	—	—	4·26					
1030	22	0	—	1·74	33·94	27·16	—	—	—	—	—	7·34	**N 70 V**	1000–720	0830		
		10	—	1·70	33·96	27·18	—	—	—	—	—	—	,,	750–500			
		20	—	1·70	33·96	27·18	—	—	—	—	—	7·35	,,	500–250			
		30	—	1·68	33·96	27·19	—	—	—	—	—	—	,,	250–100			
		40	—	1·63	33·96	27·19	—	—	—	—	—	7·35	,,	100–50			
		50	—	1·60	33·97	27·20	—	—	—	—	—	—	,,	50–0			
		60	—	1·59	33·97	27·20	—	—	—	—	—	7·28	**N 50 V**	100–0	—	1005	
		80	—	1·59	34·01	27·23	—	—	—	—	—	—	**N 70 B**	126–0	1025	1045	KT
		100	—	1·36	34·02	27·26	—	—	—	—	—	7·20	**N 100 B**				
		150	—	0·36	34·06	27·35	—	—	—	—	—	6·68	**N 70 B**	340–135	1025	1056	DGP
		200	—	1·54	34·22	27·40	—	—	—	—	—	5·47	**N 100 B**				
		300	—	2·00	34·34	27·47	—	—	—	—	—	4·56					
		400	—	2·20	34·43	27·52	—	—	—	—	—	4·30					
		590	—	2·20	34·56	27·62	—	—	—	—	—	3·69					
		790	—	2·07	34·65	27·70	—	—	—	—	—	3·81					
		990	—	1·94	34·70	27·76	—	—	—	—	—	3·82					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1030 *cont.*	55° 43·4′ S, 44° 31·4′ W	1932 20 xi											
1031	56° 56·4′ S, 44° 32·3′ W	20 xi	2010	3548*	WSW	15	WSW	4	o	995·0	−0·2	−0·9	mod. WSW swell
1032	58° 29′ S, 44° 34·4′ W	21 xi	0830	2890*	NW	10	NW	2	o	989·2	0·3	−0·1	mod. conf. W swell
1033	59° 38·2′ S, 44° 30·8′ W	21 xi	2005	3062*	N×E	20	N×E	4	os	980·3	−0·6	−0·6	low conf. W swell
1034	60° 57·6′ S, 44° 39·8′ W	24 xi	1138	232*	ESE	17	ESE	4	og	967·5	−0·8	−1·1	mod. conf. S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1030 *cont.*	22	1480	—	1·60	34·73	27·81	—	—	—	—	—	4·01					
		1970	—	1·15	34·73	27·84	—	—	—	—	—	4·24					
		2460	—	0·76	34·71	27·86	—	—	—	—	—	4·34					
		2960	2958	0·46	34·70	27·86	—	—	—	—	—	4·47					
1031	22	0	—	0·22	34·05	27·35	—	—	—	—	—	7·81	**N 50 V**	100–0	**2010**	**2017**	
		10	—	0·21	34·05	27·35	—	—	—	—	—	—	**N 70 B**	149–0	**2153**	**2213**	KT
		20	—	0·19	34·05	27·35	—	—	—	—	—	7·82	**N 100 B**				
		30	—	0·16	34·05	27·35	—	—	—	—	—	—	**N 70 B**	370–104	**2153**	**2223**	DGP
		40	—	0·11	34·05	27·35	—	—	—	—	—	7·79	**N 100 B**				
		50	—	0·01	34·05	27·36	—	—	—	—	—	—	**N 100 H**	0–5	**2154**	**2244**	
		60	—	−0·03	34·05	27·36	—	—	—	—	—	7·66					
		80	—	−0·07	34·05	27·36											
		100	—	−0·09	34·05	27·37	—	—	—	—	—	7·60					
		150	—	−0·39	34·14	27·46	—	—	—	—	—	7·03					
		200	—	0·07	34·29	27·55	—	—	—	—	—	6·16					
		300	—	0·91	34·47	27·65	—	—	—	—	—	4·73					
		400	—	0·46	34·48	27·69	—	—	—	—	—	5·18					
		600	—	1·22	34·65	27·77	—	—	—	—	—	4·40					
		800	—	1·51	34·72	27·81	—	—	—	—	—	4·21					
		1000	—	1·47	34·73	27·82	—	—	—	—	—	4·19					
		1500	—	0·95	34·71	27·84	—	—	—	—	—	4·20					
		2000	—	0·56	34·70	27·86	—	—	—	—	—	4·53					
		2500	—	0·33	34·69	27·85	—	—	—	—	—	4·54					
		3000	—	0·11	34·68	27·86	—	—	—	—	—	4·51					
1032	23	0	—	0·20	34·11	27·40	—	—	—	—	—	7·63	**N 70 V**	1000–750	0840		
		10	—	0·19	34·11	27·40	—	—	—	—	—	—	,,	750–500			
		20	—	0·11	34·11	27·40	—	—	—	—	—	7·67	,,	500–250			
		30	—	0·07	34·11	27·41	—	—	—	—	—	—	,,	250–100			
		40	—	−0·01	34·11	27·41	—	—	—	—	—	7·60	,,	100–50			
		50	—	−0·01	34·11	27·41	—	—	—	—	—	—	,,	50–0			
		60	—	−0·11	34·13	27·43	—	—	—	—	—	7·52	**N 50 V**	100–0	—	1115	
		80	—	−0·31	34·16	27·47	—	—	—	—	—	—	**N 70 B**	107–0	1158	1218	KT
		100	—	−0·38	34·22	27·51	—	—	—	—	—	6·90	**N 100 B**				
		150	—	−0·38	34·37	27·64	—	—	—	—	—	6·11	**N 70 B**	284–96	1158	1228	DGP
		200	—	0·08	34·46	27·69	—	—	—	—	—	5·44	**N 100 B**				
		300	—	0·60	34·56	27·74	—	—	—	—	—	4·86	**N 100 H**	0–5	1158	1229	
		400	—	1·10	34·65	27·77	—	—	—	—	—	4·61					
		600	—	1·04	34·70	27·83	—	—	—	—	—	4·45					
		800	—	1·21	34·74	27·85	—	—	—	—	—	4·18					
		1000	—	1·00	34·73	27·85	—	—	—	—	—	4·13					
		1500	—	0·54	34·71	27·87	—	—	—	—	—	4·51					
		2000	—	0·18	34·69	27·86	—	—	—	—	—	4·52					
		2500	—	−0·01	34·68	27·87	—	—	—	—	—	4·66					
1033	23	0	—	0·19	34·09	27·38	—	—	—	—	—	7·71	**N 50 V**	100–0	2007	**2015**	
		10	—	0·11	34·10	27·39	—	—	—	—	—	—	**N 70 B**	113–0	**2318**	**2338**	KT
		20	—	0·09	34·10	27·40	—	—	—	—	—	7·70	**N 100 B**				
		30	—	0·07	34·11	27·41	—	—	—	—	—	—	**N 70 B**	270–100	**2318**	**2348**	DGP. Lower depth estimated
		40	—	−0·11	34·11	27·42	—	—	—	—	—	7·37	**N 100 B**				
		50	—	−0·23	34·14	27·45	—	—	—	—	—	—	**N 100 H**	0–5	**2319**	**2349**	
		60	—	−0·29	34·16	27·46	—	—	—	—	—	7·12					
		80	—	−0·31	34·18	27·49											
		100	—	0·08	34·22	27·49	—	—	—	—	—	7·03					
		150	—	1·66	34·49	27·61	—	—	—	—	—	4·25					
		200	—	1·77	34·56	27·66	—	—	—	—	—	4·02					
		300	—	1·50	34·62	27·74	—	—	—	—	—	4·19					
		400	—	1·80	34·64	27·72	—	—	—	—	—	4·13					
		600	—	1·46	34·70	27·80	—	—	—	—	—	4·19					
		800	—	1·15	34·74	27·85	—	—	—	—	—	4·21					
		1500	—	0·52	34·69	27·84	—	—	—	—	—	4·36					
		2000	—	0·27	34·68	27·86	—	—	—	—	—	4·50					
		2500	—	0·04	34·67	27·86	—	—	—	—	—	4·54					
1034	26	0	—	−1·19	34·28	27·60	—	—	—	—	—	7·61	**N 70 V**	200–100	1140		
		10	—	−1·19	34·23	27·56	—	—	—	—	—	—	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1034 *cont.*	60° 57·6′ S, 44° 39·8′ W	1932 24 xi											
1035	61° 56·2′ S, 44° 44·2′ W	24 xi	2030	429*	ESE	18–20	ESE	3	o	979·3	−1·6	−2·1	mod. conf. E×N swell
1036	61° 52·3′ S, 42° 23·1′ W	25 xi	0820	779*	SE×S	18	SE×S	2	c	987·8	−3·2	−4·0	mod. conf. NE swell
1037	61° 32·5′ S, 40° 49·8′ W	25 xi	1600	—	S	12	S	2	c	990·2	−3·0	−3·9	low NE swell
1038	61° 39·4′ S, 40° 00·3′ W	25 xi	2044	3410*	Lt airs	2	—	1	o	992·1	−5·0	−5·1	low conf. E swell

		HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				
								Mg.—atom m.³							TIME		
Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	Remarks
1034	26	20	—	−1·21	34·28	27·60	—	—	—	—	—	7·59	**N 70 V**	50–0			
cont.		30	—	−1·21	34·28	27·60	—	—	—	—	—	—	**N 50 V**	100–0	—	1214	
		40	—	−1·27	34·28	27·60	—	—	—	—	—	7·53	**N 70 B**				
		50	—	−1·25	34·28	27·60	—	—	—	—	—	—	**N 100 B**	165–0	1220	1240	KT
		60	—	−1·30	34·30	27·61	—	—	—	—	—	7·46					
		80	—	−1·31	34·30	27·61											
		100	—	−1·32	34·30	27·61											
		150	—	−1·25	34·31	27·62	—	—	—	—	—	7·11					
		200	—	−0·72	34·44	27·71	—	—	—	—	—	6·05					
1035	26	0	—	−1·21	34·31	27·62	—	—	—	—	—	7·46	**N 50 V**	100–0	**2120**	**2127**	Among drift ice
		10	—	−1·21	34·31	27·62	—	—	—	—	—	—	**N 70 B**				
		20	—	−1·21	34·31	27·62	—	—	—	—	—	7·47	**N 100 B**	100–0	**2219**	**2239**	KT
		30	—	−1·21	34·31	27·62	—	—	—	—	—	—	**N 70 B**				
		40	—	−1·21	34·31	27·62	—	—	—	—	—	7·45	**N 100 B**	274–116	**2219**	**2249**	DGP
		50	—	−1·21	34·31	27·62	—	—	—	—	—	—	**N 100 H**	0–5	**2220**	**2250**	
		60	—	−1·21	34·31	27·62	—	—	—	—	—	7·45					
		80	—	−1·37	34·37	27·68											
		100	—	−1·43	34·39	27·70	—	—	—	—	—	7·05					
		150	—	−1·51	34·39	27·70	—	—	—	—	—	6·98					
		200	—	−1·11	34·47	27·75	—	—	—	—	—	6·07					
		300	—	−0·51	34·58	27·82	—	—	—	—	—	5·22					
		400	—	−0·21	34·65	27·85	—	—	—	—	—	4·86					
1036	27	0	—	−1·41	34·29	27·61	—	—	—	—	—	7·74	**N 70 V**	700–500	0830		Among drift ice.
		10	—	−1·44	34·30	27·62	—	—	—	—	—	—	,,	500–250			Ship shifted during
		20	—	−1·48	34·30	27·62	—	—	—	—	—	7·66	,,	250–100			station to avoid ice
		30	—	−1·49	34·30	27·62	—	—	—	—	—	—	,,	100–50			
		40	—	−1·50	34·30	27·62	—	—	—	—	—	7·60	,,	50–0			
		50	—	−1·50	34·30	27·62	—	—	—	—	—	—	**N 50 V**	100–0	—	0955	
		60	—	−1·58	34·30	27·62	—	—	—	—	—	7·26	**N 70 B**				
		80	—	−1·53	34·35	27·67	—	—	—	—	—	—	**N 100 B**	99–0	1012	1032	KT
		100	—	−1·56	34·37	27·68	—	—	—	—	—	6·82	**N 70 B**				
		150	—	−1·24	34·44	27·73	—	—	—	—	—	6·23	**N 100 B**	258–120	1012	1042	DGP
		200	—	−0·80	34·54	27·80	—	—	—	—	—	5·46	**N 100 H**	0–5	1014	1044	
		300	—	−0·34	34·62	27·85	—	—	—	—	—	5·10					
		400	—	−0·01	34·65	27·84	—	—	—	—	—	4·95					
		600	—	−0·18	34·65	27·85	—	—	—	—	—	4·83					
		700	—	−0·19	34·65	27·85	—	—	—	—	—	4·78					
1037	27	0	—	−1·18	34·42	27·70	—	—	—	—	—	—	**N 50 V**	100–0	1605	1613	
													N 70 B				
													N 100 B	148–0	1623	1643	KT
													N 100 H	0–5	1620	1650	
1038	27	0	—	−1·31	34·29	27·60	—	—	—	—	—	7·54	**N 50 V**	100–0	**2050**	**2100**	
		10	—	−1·21	34·33	27·63	—	—	—	—	—	—	**N 70 B**				
		20	—	−1·21	34·38	27·68	—	—	—	—	—	7·61	**N 100 B**	151–0	**2227**	**2247**	KT
		30	—	−1·23	34·38	27·68	—	—	—	—	—	—	**N 70 B**				
		40	—	−1·22	34·38	27·68	—	—	—	—	—	7·47	**N 100 B**	375–110	**2227**	**2257**	DGP
		50	—	−1·21	34·38	27·68	—	—	—	—	—	—	**N 100 H**	0–5	**2228**	**2258**	Station worked in
		60	—	−1·21	34·38	27·68	—	—	—	—	—	7·45					light brash near
		80	—	−1·21	34·39	27·69											edge of heavy pack-
		100	—	−1·41	34·39	27·70	—	—	—	—	—	6·90					ice
		150	—	−0·82	34·53	27·79	—	—	—	—	—	5·65					
		200	—	−0·24	34·64	27·85	—	—	—	—	—	4·90					
		300	—	0·09	34·65	27·84	—	—	—	—	—	4·64					
		400	—	0·25	34·66	27·84	—	—	—	—	—	4·55					
		600	—	0·40	34·68	27·85	—	—	—	—	—	4·37					
		800	—	0·33	34·68	27·85	—	—	—	—	—	4·43					
		1000	—	0·23	34·67	27·85	—	—	—	—	—	4·39					
		1500	—	0·01	34·67	27·86	—	—	—	—	—	4·66					
		2000	—	−0·19	34·66	27·86	—	—	—	—	—	4·70					
		2500	—	−0·39	34·66	27·87	—	—	—	—	—	4·91					
		3000	—	−0·54	34·66	27·88	—	—	—	—	—	5·10					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
1039	61° 29·9′ S, 37° 14·5′ W	1932 26 xi	0817	3692*	SW	4	SW	1	o	993·9	−3·6	−4·7	mod. NNW swell
1040	60° 50·4′ S, 37° 06·3′ W	26 xi	1600	—	WNW	9	WNW	1	o	996·8	−3·1	−3·6	low NW swell
1041	60° 31·3′ S, 36° 19·5′ W	26 xi	2000	1737*	W × N	9	W × N	1	csp	997·8	−2·7	−3·2	low NW swell
1042	60° 07·9′ S, 34° 19′ W	27 xi	0830	2055*	Lt W airs	1–3	W	2	bcz	998·7	−0·6	−1·4	low NW swell
1043	60° 13·8′ S, 33° 06·1′ W	27 xi	1600	—	N	20	N	3	o	992·2	−0·8	−1·4	low NNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1039	28	0	—	−0·99	34·23	27·55	—	—	—	—	—	7·53	**N 70 V**	1000–760	0820		Near edge of a stream
		10	—	−1·00	34·23	27·55	—	—	—	—	—	—	,,	750–500			of light ice
		20	—	−1·01	34·23	27·55	—	—	—	—	—	7·52	,,	500–250			
		30	—	−1·01	34·23	27·55	—	—	—	—	—	—	,,	250–100			
		40	—	−1·04	34·23	27·56	—	—	—	—	—	7·47	,,	100–50			
		50	—	−1·30	34·29	27·60	—	—	—	—	—	—	,,	50–0			
		60	—	−1·31	34·33	27·63	—	—	—	—	—	6·97	**N 50 V**	100–0	—	0955	
		80	—	−1·41	34·37	27·68	—	—	—	—	—	—	**N 70 B**				
		100	—	−1·30	34·38	27·68	—	—	—	—	—	6·63	**N 100 B**	128–0	1027	1047	KT
		150	—	−0·52	34·48	27·74	—	—	—	—	—	5·67	**N 70 B**				
		200	—	−0·90	34·49	27·75	—	—	—	—	—	5·47	**N 100 B**	348–96	1027	1057	DGP
		300	—	−0·11	34·63	27·84	—	—	—	—	—	4·78	**N 100 H**	0–5	1028	1058	
		400	—	0·26	34·65	27·83	—	—	—	—	—	4·52					
		600	—	0·44	34·69	27·85	—	—	—	—	—	4·36					
		800	—	0·42	34·69	27·85	—	—	—	—	—	4·32					
		1000	—	0·31	34·68	27·85	—	—	—	—	—	4·30					
		1500	—	0·12	34·67	27·85	—	—	—	—	—	4·53					
		2000	—	−0·09	34·66	27·86	—	—	—	—	—	4·59					
		2500	—	−0·28	34·66	27·87	—	—	—	—	—	4·85					
		3000	—	−0·49	34·66	27·87	—	—	—	—	—	5·05					
1040	28	0	—	−1·18	34·17	27·51	—	—	—	—	—	—	**N 50 V**	100–0	1604	1611	
													N 70 B / **N 100 B**	137–0	1617	1637	KT. Infrequent streams of light ice to be seen
													N 100 H	0–5	1614	1644	
1041	28	0	—	−1·05	34·11	27·46	—	—	—	—	—	7·31	**N 50 V**	100–0	**2003**	**2010**	
		10	—	−1·16	34·11	27·46	—	—	—	—	—	—	**N 70 B**				
		20	—	−1·22	34·12	27·47	—	—	—	—	—	7·24	**N 100 B**	84–0	**2110**	**2130**	KT
		30	—	−1·28	34·13	27·47	—	—	—	—	—	—	**N 70 B**				
		40	—	−1·31	34·14	27·49	—	—	—	—	—	7·23	**N 100 B**	250–100	**2110**	**2140**	DGP
		50	—	−1·33	34·16	27·50	—	—	—	—	—	—	**N 100 H**	0–5	**2111**	**2141**	
		60	—	−1·40	34·19	27·54	—	—	—	—	—	7·12					
		80	—	−1·41	34·30	27·62											
		100	—	−0·91	34·40	27·68	—	—	—	—	—	6·01					
		150	—	−0·19	34·54	27·77	—	—	—	—	—	5·30					
		200	—	0·15	34·61	27·81	—	—	—	—	—	4·93					
		300	—	0·22	34·66	27·84	—	—	—	—	—	4·79					
		400	—	0·50	34·66	27·82	—	—	—	—	—	4·72					
		600	—	0·27	34·66	27·84	—	—	—	—	—	4·59					
		800	—	0·27	34·67	27·85	—	—	—	—	—	4·57					
		1000	—	0·27	34·67	27·85	—	—	—	—	—	4·42					
		1500	—	0·22	34·67	27·85	—	—	—	—	—	4·45					
1042	29	0	—	−1·28	34·20	27·53	—	—	—	—	—	7·15	**N 70 V**	1000–750	0837		About ½ mile from
		10	—	−1·41	34·21	27·55	—	—	—	—	—	—	,,	750–500			edge of pack-ice
		20	—	−1·42	34·21	27·55	—	—	—	—	—	7·11	,,	500–250			with numbers of
		30	—	−1·44	34·21	27·55	—	—	—	—	—	—	,,	250–100			included bergs
		40	—	−1·49	34·21	27·55	—	—	—	—	—	7·10	,,	100–50			
		50	—	−1·51	34·22	27·55	—	—	—	—	—	—	,,	50–0			
		60	—	−1·52	34·27	27·60	—	—	—	—	—	6·85	**N 50 V**	100–0	—	1015	
		80	—	−1·46	34·34	27·66	—	—	—	—	—	—	**N 70 B**				
		100	—	−1·22	34·39	27·69	—	—	—	—	—	6·23	**N 100 B**	82–0	1030	1050	KT
		150	—	−0·41	34·54	27·78	—	—	—	—	—	5·43	**N 70 B**				
		200	—	0·06	34·64	27·84	—	—	—	—	—	4·96	**N 100 B**	250–100	1030	1100	DGP
		300	—	0·17	34·66	27·84	—	—	—	—	—	4·76					
		400	—	0·29	34·66	27·83	—	—	—	—	—	4·65					
		600	—	0·27	34·66	27·84	—	—	—	—	—	4·52					
		800	—	0·28	34·67	27·84	—	—	—	—	—	4·48					
		1000	—	0·26	34·67	27·85	—	—	—	—	—	4·42					
		1500	—	0·10	34·67	27·85	—	—	—	—	—	4·57					
1043	29	0	—	−1·30	34·09	27·44	—	—	—	—	—	—	**N 50 V**	100–0	1607	1612	
													N 70 B / **N 100 B**	157–0	1617	1637	KT
													N 100 H	0–5	1615	1645	

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1044	60° 00·6′ S, 32° 21·6′ W	1932 27 xi	2000	763*	N × W	24	N × W	5	os	984·8	−0·6	−0·8	mod. NNW swell
1045	58° 33′ S, 27° 04·9′ W	29 xi	0835	2827*	WNW	5	WNW	1	c	991·7	0·1	−1·1	mod. conf. NW × W swell
1046	58° 08·6′ S, 26° 52·1′ W	29 xi	1600	2879*	NW × W	12	NW × W	3	ome	988·1	−0·6	−0·6	mod. NW swell
1047	57° 26·9′ S, 26° 09·3′ W	30 xi	0230	2313*	WNW	18	WNW	4	or	985·4	0·0	0·0	mod. WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
1044	29	0	—	−1·21	34·05	27·41	—	—	—	—	—	7·82	**N 50 V**	100–0	**2011**	**2018**	
		10	—	−1·21	34·05	27·41	—	—	—	—	—	—	**N 70 B**	117–0	**2108**	**2128**	KT
		20	—	−1·21	34·05	27·41	—	—	—	—	—	7·84	**N 100 B**				
		30	—	−1·22	34·05	27·41	—	—	—	—	—	—	**N 70 B**	296–0	**2108**	**2138**	DGP
		40	—	−1·34	34·05	27·41	—	—	—	—	—	7·82	**N 100 B**	296–100			
		50	—	−1·48	34·09	27·45	—	—	—	—	—	—	**N 100 H**	0–5	**2110**	**2140**	
		60	—	−1·59	34·17	27·52	—	—	—	—	—	7·03	**N 70 B**	225–96	**2157**	**2227**	DGP
		80	—	−1·57	34·22	27·55											
		100	—	−1·46	34·28	27·61	—	—	—	—	—	6·53					
		150	—	−0·82	34·45	27·72	—	—	—	—	—	5·74					
		200	—	−0·31	34·56	27·79	—	—	—	—	—	5·15					
		300	—	0·08	34·64	27·84	—	—	—	—	—	4·80					
		400	—	0·31	34·66	27·83	—	—	—	—	—	4·72					
		600	—	0·18	34·66	27·84	—	—	—	—	—	4·64					
		700	700	0·19	34·66	27·84	—	—	—	—	—	4·72					
1045	1	0	—	−1·44	34·06	27·43	—	—	—	—	—	7·10	**N 70 V**	1000–750	0835		
		10	—	−1·54	34·08	27·45	—	—	—	—	—	—	,,	750–500			
		20	—	−1·61	34·08	27·45	—	—	—	—	—	7·08	,,	500–250			
		30	—	−1·66	34·08	27·45	—	—	—	—	—	—	,,	250–100			
		40	—	−1·68	34·08	27·45	—	—	—	—	—	7·08	,,	100–50			
		50	—	−1·71	34·08	27·45	—	—	—	—	—	—	,,	50–0			
		60	—	−1·71	34·08	27·45	—	—	—	—	—	7·04	**N 50 V**	100–0	—	1020	
		80	—	−1·66	34·13	27·48	—	—	—	—	—	—	**N 70 B**	100–0	1036	1056	KT
		100	—	−1·62	34·31	27·63	—	—	—	—	—	6·34	**N 100 B**				
		150	—	−0·64	34·48	27·74	—	—	—	—	—	5·44	**N 70 B**	256–110	1036	1106	DGP
		200	—	−0·04	34·61	27·82	—	—	—	—	—	4·94	**N 100 B**				
		300	—	0·38	34·65	27·82	—	—	—	—	—	4·66	**N 100 H**	0–5	1037	1107	
		400	—	0·76	34·69	27·83	—	—	—	—	—	4·63					
		600	—	0·41	34·69	27·85	—	—	—	—	—	4·46					
		800	—	0·34	34·69	27·85	—	—	—	—	—	4·46					
		1000	—	0·29	34·69	27·85	—	—	—	—	—	4·44					
		1500	—	0·09	34·68	27·87	—	—	—	—	—	4·50					
		2000	—	−0·06	34·67	27·86	—	—	—	—	—	4·63					
		2500	—	−0·20	34·67	27·87	—	—	—	—	—	4·76					
1046	2	0	—	−1·01	34·00	27·36	—	—	—	—	—	7·57	**N 50 V**	100–0	1609	1616	
		10	—	−1·20	34·02	27·39	—	—	—	—	—	—	**N 70 B**	119–0	1736	1756	KT
		20	—	−1·23	34·02	27·39	—	—	—	—	—	7·59	**N 100 B**				
		30	—	−1·31	34·03	27·40	—	—	—	—	—	—	**N 70 B**	330–90	1736	1806	DGP
		40	—	−1·34	34·03	27·40	—	—	—	—	—	7·53	**N 100 B**				
		50	—	−1·41	34·04	27·41	—	—	—	—	—	—	**N 100 H**	0–5	1736	1806	
		60	—	−1·61	34·21	27·55	—	—	—	—	—	6·78					
		80	—	−1·41	34·31	27·63											
		100	—	−0·91	34·40	27·68	—	—	—	—	—	5·84					
		150	—	0·03	34·56	27·77	—	—	—	—	—	5·05					
		200	—	0·59	34·65	27·81	—	—	—	—	—	4·68					
		300	—	0·66	34·66	27·81	—	—	—	—	—	4·59					
		400	—	0·78	34·67	27·82	—	—	—	—	—	4·61					
		600	—	0·39	34·68	27·85	—	—	—	—	—	4·54					
		800	—	0·40	34·69	27·85	—	—	—	—	—	4·53					
		1000	—	0·32	34·69	27·85	—	—	—	—	—	4·48					
		1500	—	0·10	34·68	27·86	—	—	—	—	—	4·56					
		2000	—	−0·09	34·67	27·87	—	—	—	—	—	4·75					
		2500	—	−0·19	34·67	27·87	—	—	—	—	—	4·76					
1047	2	0	—	−0·93	34·07	27·42	—	—	—	—	—	7·55	**N 50 V**	100–0	**0242**		
		10	—	−1·07	34·10	27·45	—	—	—	—	—	—	**N 70 V**	1000–770			
		20	—	−1·11	34·10	27·45	—	—	—	—	—	7·55	,,	750–500			
		30	—	−1·15	34·10	27·45	—	—	—	—	—	—	,,	500–250			
		40	—	−1·21	34·12	27·47	—	—	—	—	—	7·50	,,	250–100			
		50	—	−1·38	34·15	27·51	—	—	—	—	—	—	,,	100–50			
		60	—	−1·51	34·19	27·54	—	—	—	—	—	6·95	,,	50–0	—	**0425**	
		80	—	−1·61	34·26	27·59	—	—	—	—	—	—	**N 70 B**	84–0	**0438**	**0458**	KT
		100	—	−1·59	34·26	27·59	—	—	—	—	—	6·60	**N 100 B**				
		150	—	−0·79	34·42	27·69	—	—	—	—	—	5·69	**N 70 B**	230–86	**0438**	**0510**	DGP
		200	—	−0·41	34·55	27·79	—	—	—	—	—	5·15	**N 100 B**				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1047 *cont.*	57° 26·9′ S, 26° 09·3′ W	1932 30 xi											
1048	56° 32·2′ S, 27° 21·9′ W	30 xi	1600	1515*	WSW	10–15	WSW	4	c	994·9	−0·1	−0·8	mod. conf. swell
1049	54° 49·7′ S, 29° 35·4′ W	1 xii	0830	7105*	ESE	8	ESE	2	o	991·4	0·3	−0·6	mod. conf. W swell
1050	53° 46·6′ S, 31° 09·2′ W	1 xii	2000	4070*	SSE	20	SSE	5 conf.	osp	987·9	−0·6	−1·0	heavy conf. NNW and ESE swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1047 *cont.*	2	300	—	0·12	34·64	27·83	—	—	—	—	—	4·72	**N 100 H**	0–5	0439	0511	
		400	—	0·49	34·66	27·82	—	—	—	—	—	4·62					
		600	—	0·37	34·66	27·83	—	—	—	—	—	4·48					
		800	—	0·31	34·66	27·83	—	—	—	—	—	4·34					
		1000	—	0·21	34·67	27·85											
		1500	—	0·10	34·67	27·85	—	—	—	—	—	4·69					
		2000	—	−0·12	34·66	27·86	—	—	—	—	—	4·75					
1048	3	0	—	−0·65	34·04	27·38	—	—	—	—	—	7·71	**N 70 V**	1000–770	1605		
		10	—	−0·69	34·04	27·38	—	—	—	—	—	—	,,	750–500			
		20	—	−0·71	34·04	27·38	—	—	—	—	—	7·71	,,	500–250			
		30	—	−0·77	34·04	27·39	—	—	—	—	—	—	,,	250–100			
		40	—	−0·81	34·04	27·39	—	—	—	—	—	7·68	,,	100–50			
		50	—	−0·82	34·04	27·39	—	—	—	—	—	—	,,	50–0			
		60	—	−0·88	34·09	27·43	—	—	—	—	—	7·51	**N 50 V**	100–0	—	1735	
		80	—	−0·91	34·15	27·49	—	—	—	—	—	—	**N 70 B**	119–0	1547	1607	KT
		100	—	−0·86	34·23	27·55	—	—	—	—	—	6·60	**N 100 B**				
		150	—	−0·57	34·37	27·65	—	—	—	—	—	6·08	**N 70 B**	340–140	1547	1617	DGP
		200	—	0·09	34·53	27·75	—	—	—	—	—	5·12	**N 100 B**				
		300	—	0·70	34·65	27·80	—	—	—	—	—	4·63	**N 100 H**	0–5	1547	1617	
		400	—	0·69	34·65	27·80	—	—	—	—	—	4·57					
		600	—	0·57	34·66	27·82	—	—	—	—	—	4·51					
		800	—	0·49	34·68	27·84	—	—	—	—	—	4·46					
		1000	—	0·40	34·69	27·85	—	—	—	—	—	4·42					
		1400	—	0·21	34·68	27·86	—	—	—	—	—	4·41					
1049	3	0	—	0·09	34·05	27·36	—	—	—	—	—	7·94	**N 70 V**	1000–730	0835		
		10	—	0·04	34·05	27·36	—	—	—	—	—	—	,,	750–500			
		20	—	−0·11	34·05	27·37	—	—	—	—	—	7·95	,,	500–250			
		30	—	−0·17	34·05	27·37	—	—	—	—	—	—	,,	250–100			
		40	—	−0·22	34·05	27·37	—	—	—	—	—	7·93	,,	100–50			
		50	—	−0·29	34·06	27·38	—	—	—	—	—	—	,,	50–0			
		60	—	−0·34	34·06	27·39	—	—	—	—	—	7·88	**N 50 V**	100–0	—	1020	
		80	—	−0·69	34·05	27·39	—	—	—	—	—	—	**N 70 B**	100–0	1042	1102	KT
		100	—	−0·99	34·09	27·43	—	—	—	—	—	7·58	**N 100 B**				
		150	—	−0·71	34·11	27·44	—	—	—	—	—	6·29	**N 70 B**	268–110	1042	1112	DGP
		200	—	0·00	34·48	27·71	—	—	—	—	—	5·28	**N 100 B**				
		300	—	0·62	34·65	27·81	—	—	—	—	—	4·62	**N 100 H**	0–5	1043	1113	
		400	—	0·67	34·67	27·82	—	—	—	—	—	4·55					
		600	—	0·79	34·70	27·84	—	—	—	—	—	4·47					
		800	—	0·55	34·70	27·86	—	—	—	—	—	4·44					
		1000	—	0·42	34·70	27·86	—	—	—	—	—	4·52					
		1500	—	0·22	34·69	27·86	—	—	—	—	—	4·58					
		2000	—	0·05	34·68	27·87	—	—	—	—	—	4·53					
		2500	—	−0·09	34·67	27·87	—	—	—	—	—	4·77					
		3000	—	−0·20	34·66	27·86	—	—	—	—	—	4·83					
1050	4	0	—	0·01	34·04	27·35	—	—	—	—	—	7·96	**N 50 V**	100–0	2008	2020	
		10	—	−0·14	34·04	27·36	—	—	—	—	—	—	**N 100 B**	103–0	2212	2232	KT
		20	—	−0·21	34·04	27·36	—	—	—	—	—	7·95	**N 70 B**	295–104	2212	2242	DGP
		30	—	−0·21	34·04	27·36	—	—	—	—	—	—	**N 100 B**				
		40	—	−0·22	34·04	27·36	—	—	—	—	—	7·97	**N 100 H**	0–5	2213	2243	
		50	—	−0·24	34·04	27·36	—	—	—	—	—	—	**N 70 B**	110–0	2251	2311	DGP
		60	—	−0·60	34·05	27·39	—	—	—	—	—	7·82	**CPR**	—	2320		
		80	—	−1·18	34·12	27·47											
		100	—	−1·15	34·20	27·53	—	—	—	—	—	6·91					
		150	—	0·22	34·46	27·68	—	—	—	—	—	5·35					
		200	—	0·91	34·59	27·75	—	—	—	—	—	4·69					
		300	—	1·20	34·67	27·79	—	—	—	—	—	4·38					
		400	—	1·53	34·72	27·80	—	—	—	—	—	4·28					
		600	—	1·04	34·72	27·84	—	—	—	—	—	4·37					
		800	—	0·84	34·70	27·84	—	—	—	—	—	4·49					
		1000	1016	0·61	34·70	27·85	—	—	—	—	—	4·52					
		1480	1478	0·37	34·69	27·85	—	—	—	—	—	4·36					
		1970	—	0·18	34·68	27·86	—	—	—	—	—	4·45					
		2470	—	−0·01	34·67	27·86	—	—	—	—	—	4·73					
		2960	—	−0·10	34·66	27·86	—	—	—	—	—	4·72					
		3450	—	−0·33	34·66	27·87	—	—	—	—	—	5·10					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1051	52° 49·7′ S, 32° 35·6′ W	1932 2 xii	0835	2825*	NW × W	24	NW × W	4	or	996·7	1·7	1·6	mod. conf. WNW swell
1052	52° 10·1′ S, 33° 22·2′ W	2 xii	2000	1771*	NW	20	NW	4	od	994·1	2·3	2·1	heavy WNW swell
1053	51° 09·4′ S, 34° 35·3′ W	3 xii	0800	5088*	W	5	W	2	od	992·2	2·5	2·3	mod. conf. WNW swell
1054	50° 07·8′ S, 35° 48·6′ W	3 xii	1957	4908*	SSE	16	SSE	4	bc	996·1	2·2	0·6	heavy conf. W × N and SSE swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
								Mg.—atom m.³							TIME		
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1051	4	0	—	0·06	34·04	27·35	—	—	—	—	—	7·84	**N 70 V**	1000–750	0833		
		10	—	−0·04	34·04	27·35	—	—	—	—	—	—	,,	750–500			
		20	—	−0·10	34·04	27·36	—	—	—	—	—	7·88	,,	500–250			
		30	—	−0·11	34·04	27·36	—	—	—	—	—	—	,,	250–100			
		40	—	−0·13	34·04	27·36	—	—	—	—	—	7·85	,,	100–50			
		50	—	−0·21	34·05	27·37	—	—	—	—	—	—	,,	50–0			
		60	—	−0·22	34·05	27·37	—	—	—	—	—	7·81	**N 50 V**	100–0	—	1030	
		80	—	−0·53	34·11	27·44	—	—	—	—	—	—	**N 100 B**	84–0	1046	1106	KT
		100	—	−0·50	34·19	27·50	—	—	—	—	—	6·42	**N 100 B**	330–110	1136	1206	DGP
		150	—	−0·21	34·34	27·61	—	—	—	—	—	5·87					
		200	—	0·88	34·48	27·66	—	—	—	—	—	4·78					
		290	—	1·46	34·57	27·69	—	—	—	—	—	4·31					
		390	—	1·70	34·65	27·73	—	—	—	—	—	4·24					
		590	—	1·40	34·70	27·80	—	—	—	—	—	4·16					
		780	—	1·15	34·70	27·82	—	—	—	—	—	4·29					
		1470	—	0·87	34·70	27·84	—	—	—	—	—	4·15					
		1960	—	0·27	34·69	27·86	—	—	—	—	—	4·46					
		2450	2447	0·10	34·69	27·86	—	—	—	—	—	4·46					
1052	5	0	—	1·00	33·95	27·22	—	—	—	—	—	7·64	**N 50 V**	100–0	**2025**	**2035**	
		10	—	1·00	33·95	27·22	—	—	—	—	—	—	**N 70 B** }	133–0	**2104**	**2124**	KT
		20	—	0·99	33·95	27·22	—	—	—	—	—	7·66	**N 100 B** }				
		30	—	0·98	33·95	27·22	—	—	—	—	—	—	**N 70 B**	338–130	**2104**	**2134**	DGP
		40	—	0·90	33·95	27·23	—	—	—	—	—	7·68	**N 100 H**	0–5	**2105**	**2135**	
		50	—	0·90	33·95	27·23	—	—	—	—	—	—	**N 100 B**	340–100	**2152**	**2222**	DGP
		60	—	0·89	33·95	27·23	—	—	—	—	—	7·66					
		80	—	0·86	33·95	27·23											
		100	—	0·29	34·04	27·33	—	—	—	—	—	7·09					
		150	—	1·15	34·25	27·45	—	—	—	—	—	5·33					
		200	—	1·72	34·41	27·54	—	—	—	—	—	4·46					
		300	—	2·00	34·53	27·62	—	—	—	—	—	3·99					
		400	—	2·20	34·62	27·68	—	—	—	—	—	3·89					
		590	—	2·06	34·70	27·75	—	—	—	—	—	3·94					
		790	—	1·96	34·72	27·77	—	—	—	—	—	3·95					
		990	—	1·84	34·73	27·79	—	—	—	—	—	3·93					
		1480	1482	1·27	34·73	27·83	—	—	—	—	—	4·06					
1053	5	0	—	2·15	33·93	27·12	—	—	—	—	—	7·46	**N 70 V**	1000–785	0834		
		10	—	2·10	33·93	27·13	—	—	—	—	—	—	,,	750–520			
		20	—	2·10	33·93	27·13	—	—	—	—	—	7·48	,,	500–250			
		30	—	2·09	33·93	27·13	—	—	—	—	—	—	,,	250–100			
		40	—	2·07	33·94	27·14	—	—	—	—	—	7·46	,,	100–50			
		50	—	2·03	33·94	27·14	—	—	—	—	—	—	,,	50–0			
		60	—	2·00	33·94	27·14	—	—	—	—	—	7·42	**N 50 V**	100–0	—	1009	
		80	—	1·35	33·95	27·20	—	—	—	—	—	—	**N 70 B** }	100–0	1100	1120	Depth estimated
		100	—	0·78	33·99	27·28	—	—	—	—	—	7·21	**N 100 B** }				
		150	—	0·73	34·11	27·37	—	—	—	—	—	6·34	**N 70 B** }	360–90	1100	1130	DGP
		200	—	1·09	34·21	27·43	—	—	—	—	—	5·58	**N 100 B** }				
		300	—	1·77	34·40	27·53	—	—	—	—	—	4·47	**N 100 H**	0–5	1101	1131	
		400	—	1·90	34·51	27·61	—	—	—	—	—	4·02					
		590	—	1·99	34·64	27·71	—	—	—	—	—	3·90					
		790	—	2·01	34·70	27·76	—	—	—	—	—	3·96					
		990	—	2·01	34·73	27·78	—	—	—	—	—	4·17					
		1480	—	1·49	34·73	27·82	—	—	—	—	—	4·23					
		1980	—	0·96	34·70	27·83	—	—	—	—	—	4·11					
		2470	2468	0·58	34·68	27·84	—	—	—	—	—	4·26					
		2960	—	0·24	34·67	27·85	—	—	—	—	—	4·51					
1054	6	0	—	2·91	33·92	27·06	—	—	—	—	—	7·43	**N 50 V**	100–0	**2006**	**2015**	
		10	—	2·91	33·92	27·06	—	—	—	—	—	—	**N 70 B** }	98–0	**2226**	**2246**	KT
		20	—	2·91	33·92	27·06	—	—	—	—	—	7·44	**N 100 B** }				
		30	—	2·91	33·92	27·06	—	—	—	—	—	—	**N 70 B** }	250–90	**2226**	**2256**	DGP
		40	—	2·88	33·92	27·06	—	—	—	—	—	7·37	**N 100 B** }				
		50	—	2·85	33·92	27·06	—	—	—	—	—	—	**N 100 H**	0–5	**2227**	**2257**	
		60	—	2·80	33·93	27·07	—	—	—	—	—	7·35					
		80	—	2·00	33·95	27·15											
		100	—	0·68	34·01	27·29	—	—	—	—	—	7·13					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1054 *cont.*	50° 07·8′ S, 35° 48·6′ W	1932 3 xii											
1055	49° 03·2′ S, 37° 16·7′ W	4 xii	0827	5376*	W × N	5	W × N	2	b	1010·0	3·9	1·6	mod. conf. WSW swell
1056	50° 18′ S, 37° 04·5′ W	4 xii	2000	5153*	NW	15–20	NW	4	or	1008·2	5·0	4·0	mod. NW swell
1057	51° 55′ S, 36° 51·6′ W	5 xii	0830	3914*	NW	16	NW	3	b	1010·5	4·0	3·7	mod. conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1054 *cont.*	6	150	—	0·79	34·10	27·36	—	—	—	—	—	6·49					
		200	—	1·19	34·19	27·41	—	—	—	—	—	5·73					
		300	—	1·50	34·37	27·53	—	—	—	—	—	4·69					
		400	—	2·18	34·53	27·60	—	—	—	—	—	4·04					
		590	—	2·08	34·64	27·70	—	—	—	—	—	3·89					
		790	—	2·00	34·66	27·72	—	—	—	—	—	3·95					
		990	—	1·89	34·71	27·78	—	—	—	—	—	3·96					
		1480	—	1·77	34·76	27·82	—	—	—	—	—	4·32					
		1980	1982	1·20	34·73	27·84	—	—	—	—	—	4·36					
		2440	2443	0·82	34·72	27·85	—	—	—	—	—	4·21					
		2930	—	0·47	34·70	27·86	—	—	—	—	—	4·34					
		3420	—	0·19	34·69	27·86	—	—	—	—	—	4·34					
		3900	—	0·06	34·68	27·87	—	—	—	—	—	4·63					
		4390	—	0·07	34·68	27·87	—	—	—	—	—	4·52					
1055	6	0	—	4·89	34·05	26·96	—	—	—	—	—	7·00	**N 70 V**	1000–750	0835		
		10	—	4·81	34·05	26·96	—	—	—	—	—	—	,,	750–500			
		20	—	4·79	34·05	26·97	—	—	—	—	—	7·03	,,	500–250			
		30	—	4·77	34·05	26·97	—	—	—	—	—	—	,,	250–100			
		40	—	4·75	34·05	26·97	—	—	—	—	—	7·01	,,	100–80			
		50	—	4·74	34·05	26·97	—	—	—	—	—	—	,,	100–50			
		60	—	4·73	34·05	26·97	—	—	—	—	—	7·00	,,	50–0			
		80	—	4·22	34·08	27·06	—	—	—	—	—	—	**N 50 V**	100–0	—	1015	
		100	—	3·33	34·09	27·15	—	—	—	—	—	6·99	**N 70 B**	121–0	1141	1201	KT
		150	—	2·25	34·08	27·24	—	—	—	—	—	6·98	**N 100 B**				
		200	—	1·80	34·06	27·26	—	—	—	—	—	6·84	**N 70 B**	298–134	1141	1211	DGP
		300	—	1·75	34·10	27·29	—	—	—	—	—	6·22	**N 100 B**				
		400	—	2·58	34·20	27·30	—	—	—	—	—	5·16	**N 100 H**	0–5	1142	1212	
		600	—	2·28	34·38	27·48	—	—	—	—	—	4·09					
		800	—	2·26	34·54	27·61	—	—	—	—	—	3·81					
		1000	—	2·18	34·63	27·68	—	—	—	—	—	3·75					
		1500	—	2·04	34·71	27·77	—	—	—	—	—	4·07					
		2000	2026	2·07	34·79	27·82	—	—	—	—	—	4·61					
		2480	2480	1·43	34·75	27·84	—	—	—	—	—	4·07					
		2980	—	0·83	34·71	27·85	—	—	—	—	—	4·30					
		3470	—	0·44	34·69	27·85	—	—	—	—	—	4·16					
		3970	—	0·21	34·68	27·86	—	—	—	—	—	4·43					
		4460	—	0·14	34·68	27·86	—	—	—	—	—	4·65					
1056	7	0	—	4·31	34·03	27·01	—	—	—	—	—	7·15	**N 50 V**	100–0	**2008**	**2017**	
		10	—	4·41	34·03	27·00	—	—	—	—	—	—	**N 70 B**	100–0	**2139**	**2159**	Depth estimated
		20	—	4·41	34·03	27·00	—	—	—	—	—	7·17	**N 100 B**				
		30	—	4·33	34·03	27·01	—	—	—	—	—	—	**N 70 B**	340–150	**2139**	**2209**	DGP
		40	—	4·10	34·04	27·03	—	—	—	—	—	7·09	**N 100 B**				
		50	—	3·59	34·05	27·09	—	—	—	—	—	—	**N 100 H**	0–5	**2140**	**2210**	
		60	—	3·02	34·05	27·15	—	—	—	—	—	7·08					
		80	—	2·02	34·07	27·25											
		100	—	1·69	34·06	27·26	—	—	—	—	—	6·96					
		150	—	1·52	34·06	27·28	—	—	—	—	—	6·77					
		190	—	1·59	34·12	27·32	—	—	—	—	—	6·22					
		290	—	2·29	34·30	27·41	—	—	—	—	—	4·96					
		380	—	2·51	34·38	27·46	—	—	—	—	—	4·43					
		570	—	2·16	34·53	27·61	—	—	—	—	—	4·00					
		760	—	2·25	34·63	27·68	—	—	—	—	—	3·89					
		950	—	2·06	34·67	27·72	—	—	—	—	—	3·75					
		1420	—	1·99	34·76	27·80	—	—	—	—	—	4·21					
		1900	—	1·72	34·79	27·85	—	—	—	—	—	4·32					
		2370	2366	1·10	34·74	27·85	—	—	—	—	—	4·26					
		2840	—	0·67	34·71	27·86	—	—	—	—	—	4·24					
1057	7	0	—	1·08	33·96	27·23	—	—	—	—	—	7·78	**N 70 V**	1000–780	0835		
		10	—	0·92	33·96	27·24	—	—	—	—	—	—	,,	750–530			
		20	—	0·80	33·96	27·24	—	—	—	—	—	7·77	,,	500–250			
		30	—	0·73	33·96	27·25	—	—	—	—	—	—	,,	250–100			
		40	—	0·70	33·96	27·25	—	—	—	—	—	7·73	,,	100–50			
		50	—	0·60	33·96	27·26	—	—	—	—	—	—	,,	50–0			
		60	—	0·51	33·96	27·26	—	—	—	—	—	7·67	**N 50 V**	100–0	—	1005	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
1057 *cont.*	51° 55′ S, 36° 51·6′ W	1932 5 xii											
1058	3·0 miles S 60° E of Jason I, South Georgia	10 xii	1019	—	Lt airs	0–2	—	0	b	983·2	2·5	1·6	mod. conf. NNW swell
1059	53° 41·2′ S, 37° 06·9′ W	10 xii	1500	144*	SW	20	SW	3	bc	991·2	2·2	0·7	mod. conf. W swell
1060	53° 23·4′ S, 37° 12′ W	10 xii	1850	1262*	SW × W	20	SW	3	bc	995·4	1·2	−0·1	mod. SW swell
1061	53° 01·5′ S, 37° 15·7′ W	10–11 xii	2352	2776*	WSW	19	WSW	4	c	999·0	0·8	−0·6	mod. conf. WSW swell
1062	52° 41·3′ S, 37° 23·1′ W	11 xii	0505	1984*	W × S	5	W × S	2	bc	999·4	0·6	−0·6	mod. conf. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1057 *cont.*	7	80	—	0·30	33·97	27·28	—	—	—	—	—	—	N 70 B	91–0	1049	1109	KT
		100	—	−0·24	34·05	27·37	—	—	—	—	—	7·19	N 100 B				
		150	—	−0·03	34·24	27·52	—	—	—	—	—	5·97	N 70 B	300–148	1049	1119	DGP
		200	—	0·52	34·36	27·58	—	—	—	—	—	5·30	N 100 B				
		300	—	1·52	34·56	27·68	—	—	—	—	—	4·18	N 100 H	0–5	1051	1121	
		400	—	2·10	34·64	27·70	—	—	—	—	—	3·93					
		600	—	1·84	34·69	27·75	—	—	—	—	—	3·89					
		800	—	1·56	34·70	27·79	—	—	—	—	—	4·03					
		990	992	1·40	34·73	27·82	—	—	—	—	—	4·11					
		1490	—	1·00	34·73	27·85	—	—	—	—	—	4·26					
		1980	—	0·58	34·70	27·86	—	—	—	—	—	4·50					
		2480	2481	0·35	34·70	27·87	—	—	—	—	—	4·35					
		2980	—	0·15	34·69	27·86	—	—	—	—	—	4·49					
		3470	—	−0·03	34·68	27·87	—	—	—	—	—	4·59					
1058	12	0	—	1·40	33·77	27·05	—	—	—	—	—	—	N 50 V	100–0	1013	1027	+1 hour
1059	13	0	—	1·12	33·90	27·17	—	—	—	—	15·4	7·78	N 50 V	100–0	1507		Stray on wire
		10	—	1·12	33·90	27·17	—	—	—	—	15·5	—	N 70 V	100–50			
		20	—	1·10	33·90	27·18	—	—	—	—	15·4	7·74	,,	50–0	—	1545	
		30	—	1·01	33·90	27·18	—	—	—	—	14·9	—	N 70 B	135–0	1608	1625	KT
		40	—	1·00	33·90	27·18	—	—	—	—	14·9	7·62	N 100 B				
		50	—	0·73	33·92	27·22	—	—	—	—	14·8	—	N 100 H	0–5	1604	1634	
		60	—	0·41	33·95	27·26	—	—	—	—	15·9	7·44					
		80	—	−0·11	33·98	27·32	—	—	—	—	20·3						
		100	—	0·39	34·05	27·34	—	—	—	—	22·1	6·98					
1060	13	0	—	1·15	33·95	27·21	—	—	—	—	10·1	7·80	N 70 V	1000–750	1855		
		10	—	1·10	33·95	27·22	—	—	—	—	10·1	—	,,	750–500			
		20	—	1·10	33·95	27·22	—	—	—	—	10·1	7·84	,,	500–260			
		30	—	1·10	33·95	27·22	—	—	—	—	9·1	—	,,	250–100			
		40	—	1·10	33·95	27·22	—	—	—	—	8·0	7·81	,,	100–50			
		50	—	1·09	33·95	27·22	—	—	—	—	8·7	—	,,	50–0			
		60	—	1·08	33·95	27·22	—	—	—	—	8·8	7·75	N 50 V	100–0	—	2035	
		80	—	0·98	33·95	27·22	—	—	—	—	8·8	—	N 70 B	100–0	2100	2120	KT
		90	—	0·19	33·97	27·29	—	—	—	—	16·7	7·31	N 100 B				
		140	—	1·00	34·30	27·50	—	—	—	—	32·8	5·18	N 70 B	286–100	2100	2130	DGP
		180	—	1·41	34·36	27·52	—	—	—	—	34·9	4·67	N 100 B				
		270	—	1·68	34·47	27·59	—	—	—	—	42·9	4·30	N 100 H	0–5	2101	2131	
		360	—	1·89	34·51	27·61	—	—	—	—	47·1	4·07					
		540	—	1·95	34·64	27·71	—	—	—	—	50·3	3·74					
		720	—	1·89	34·70	27·77	—	—	—	—	58·0	3·76					
		900	899	1·79	34·73	27·79	—	—	—	—	58·0	3·85					
1061	13	0	—	1·42	33·95	27·19	—	—	—	—	7·5	7·67	N 70 V	1000–750	2358		
		10	—	1·40	33·95	27·20	—	—	—	—	5·9	—	,,	750–500			
		20	—	1·40	33·95	27·20	—	—	—	—	6·1	7·64	,,	500–250			
		30	—	1·40	33·95	27·20	—	—	—	—	6·4	—	,,	250–100			
		40	—	1·39	33·95	27·20	—	—	—	—	5·2	7·63	,,	100–50			
		50	—	1·33	33·95	27·20	—	—	—	—	5·4	—	,,	50–0			
		60	—	1·01	33·94	27·21	—	—	—	—	5·6	7·70	N 50 V	100–0	—	0150	
		80	—	0·39	33·94	27·25	—	—	—	—	11·0	—	N 70 B	103–0	0207	0227	KT
		100	—	−0·01	33·99	27·32	—	—	—	—	19·7	7·04	N 100 B				
		150	—	0·39	34·21	27·47	—	—	—	—	32·5	5·88	N 70 B	250–100	0207	0237	Depth estimated
		200	—	0·90	34·31	27·52	—	—	—	—	35·2	5·14	N 100 B				
		290	—	1·61	34·47	27·60	—	—	—	—	41·9	4·27	N 100 H	0–5	0208	0238	
		390	—	1·83	34·57	27·66	—	—	—	—	47·7	3·96					
		580	—	1·91	34·65	27·72	—	—	—	—	55·5	3·89					
		780	—	1·81	34·66	27·73	—	—	—	—	52·4	3·91					
		970	—	1·68	34·72	27·79	—	—	—	—	54·7	3·97					
		1460	—	1·38	34·71	27·82	—	—	—	—	61·8	4·16					
		1940	—	0·94	34·70	27·83	—	—	—	—	71·1	4·29					
		2430	2432	0·66	34·70	27·85	—	—	—	—	67·3	4·41					
1062	13	0	—	1·21	33·94	27·20	—	—	—	—	8·6	7·58	N 70 B	93–0	0525	0545	KT
		10	—	1·21	33·94	27·20	—	—	—	—	8·5	—	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1062 *cont.*	52° 41·3′ S, 37° 23·1′ W	1932 11 xii											
1063	53° 04·7′ S, 38° 08·8′ W	11 xii	1200	—	SW × W	15	SW × W	3	b	1001·5	1·3	0·1	mod. conf. swell
1064	53° 28·5′ S, 38° 57·6′ W	11 xii	1700	—	SW	22	SW	4	c	1002·4	1·0	−0·5	mod. conf. swell
1065	53° 40·5′ S, 39° 41·7′ W	11 xii	2130	—	SW	20	SW	4	osp	1003·9	0·7	−0·1	mod. conf. WSW swell
1066	53° 53·6′ S, 40° 30·5′ W	12 xii	0150	—	SW	25	SW	4	osp	1004·3	0·2	−0·4	mod. conf. WSW swell
1067	53° 53·6′ S, 40° 05·3′ W	12 xii	0525	2082*	SW	26–30	SW	4	csp	1004·6	−0·7	−0·8	mod. SW swell
1068	53° 53·6′ S, 39° 33·4′ W	12 xii	0916	427* 350	SW × W	20	SW × W	4	csp	1004·5	−0·1	−0·8	mod. SW swell. Second sounding by plankton wire

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	Mg.—atom m.³				O_2 c.c. litre	Gear	Depth (metres)	TIME		
								P	Nitrate + Nitrite N_2	Nitrite N_2	Si				From	To	
1062 *cont.*	13	20	—	1·21	33·94	27·20	—	—	—	—	8·1	7·39	N 70 B	240–100	0525	0555	DGP
		30	—	1·20	33·94	27·20	—	—	—	—	7·9	—	N 100 B				
		40	—	1·20	33·94	27·20	—	—	—	—	7·8	7·57	N 100 H	0–5	0526	0556	
		50	—	1·20	33·94	27·20	—	—	—	—	7·9	—	N 50 V	100–0	0613		
		60	—	1·17	33·95	27·21	—	—	—	—	8·3	7·56	N 70 V	1000–790			
		80	—	0·49	33·96	27·26	—	—	—	—	14·9	—	,,	750–500			
		100	—	0·05	33·97	27·30	—	—	—	—	19·7	7·24	,,	500–250			
		150	—	0·59	34·22	27·46	—	—	—	—	33·1	5·67	,,	250–100			
		200	—	1·48	34·38	27·54	—	—	—	—	35·2	4·65	,,	100–50			
		290	—	1·88	34·55	27·65	—	—	—	—	42·9	3·99	,,	50–0	—	0810	
		390	—	1·89	34·58	27·67	—	—	—	—	55·5	3·88					
		580	—	1·89	34·68	27·75	—	—	—	—	53·1	3·85					
		780	—	1·78	34·72	27·79	—	—	—	—	54·7	3·82					
		970	—	1·62	34·73	27·81	—	—	—	—	59·9	3·93					
		1460	1459	1·24	34·73	27·83	—	—	—	—	63·9	4·15					
1063	14	0	—	1·90	34·04	27·23	—	—	—	—	—	—	N 50 V	100–0	1208	1215	
													N 70 B	128–0	1231	1251	KT
													N 100 B				
													N 70 B	334–114	1231	1301	DGP
													N 100 B				
													N 100 H	0–5	1232	1302	
1064	14	0	—	1·67	34·05	27·26	—	—	—	—	—	—	N 50 V	100–0	1710	1720	
													N 70 B	91–0	1733	1753	KT
													N 100 B				
													N 70 B	250–0	1733	1803	DGP
													N 100 B	250–92			
													N 100 H	0–5	1734	1804	
1065	14	0	—	1·40	34·05	27·28	—	—	—	—	—	—	N 50 V	100–0	2135	2140	
													N 70 B	106–0	2156	2216	KT
													N 100 B				
													N 70 B	290–80	2156	2226	DGP
													N 100 B				
													N 100 H	0–5	2156	2226	
1066	14	0	—	2·20	—	—	—	—	—	—	—	—	N 70 B	94–0	0228	0248	KT. Temperature from thermograph
		300	—	1·90	34·30	27·44	—	—	—	—	28·7	5·07	N 100 B				
		400	—	2·12	34·40	27·50	—	—	—	—	39·2	4·42	N 70 B	276–105	0228	0258	DGP
													N 100 B				
													N 100 H	0–5	0229	0259	
													N 70 V	?	0309		Net touched bottom, bottom sample preserved
													N 50 V	100–0	—	0350	
1067	14	0	—	1·80	33·95	27·17	—	—	—	—	10·7	7·36	N 70 V	1000–770	0530		
		10	—	1·80	33·95	27·17	—	—	—	—	10·4	—	,,	750–500			
		20	—	1·80	33·95	27·17	—	—	—	—	10·4	7·33	,,	500–250			
		30	—	1·80	33·95	27·17	—	—	—	—	10·4	—	,,	250–100			
		40	—	1·80	33·95	27·17	—	—	—	—	10·5	7·33	,,	100–50			
		50	—	1·80	33·95	27·17	—	—	—	—	10·4	—	,,	50–0			
		60	—	1·70	33·95	27·17	—	—	—	—	10·5	7·36	N 50 V	100–0	—	0708	
		80	—	1·64	33·95	27·18	—	—	—	—	10·6						
		100	—	1·50	33·96	27·20	—	—	—	—	12·1	7·24					
		150	—	0·80	34·05	27·32	—	—	—	—	16·7	6·77					
		190	—	1·10	34·13	27·36	—	—	—	—	21·4	6·11					
		290	—	1·90	34·32	27·46	—	—	—	—	33·6	4·67					
		380	—	2·00	34·42	27·52	—	—	—	—	41·3	4·25					
		570	—	2·09	34·57	27·64	—	—	—	—	52·7	3·66					
		770	—	2·06	34·66	27·71	—	—	—	—	56·7	3·56					
		960	—	1·90	34·69	27·75	—	—	—	—	62·2	3·83					
		1440	1437	1·48	34·72	27·81	—	—	—	—	62·2	3·98					
1068	14	0	—	1·32	33·94	27·19	—	—	—	—	8·7	7·48	N 50 V	100–0	0930		
		10	—	1·32	33·94	27·19	—	—	—	—	8·7	—	N 70 V	250–100			
		20	—	1·31	33·94	27·19	—	—	—	—	8·7	7·49	,,	100–50			
		30	—	1·30	33·94	27·19	—	—	—	—	8·7	—	,,	50–0	—	1010	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1068 *cont.*	53° 53·6′ S, 39° 33·4′ W	1932 12 xii											
1069	53° 56·9′ S, 39° 06·8′ W	12 xii	1319	195*	SW × W	16	SW × W	4	bcsp	1004·3	1·7	0·0	mod. SW swell
1070	53° 59·3′ S, 38° 34·2′ W	12 xii	1635	155*	SW × S	20	SW × S	4	csp	1004·6	0·8	0·3	heavy SW swell
1071	54° 17·8′ S, 37° 56·9′ W	12 xii	2150	—	SW × S	20	SW × S	4	csp	1005·6	1·1	0·1	mod. SW swell
1072	54° 37·6′ S, 37° 20·5′ W	13 xii	0150	—	SW	20	SW	4	bc	1006·5	0·2	−0·8	mod. SW swell
1073	54° 59·6′ S, 36° 38·9′ W	13 xii	0605	—	WSW	22	WSW	5	osp	1006·0	0·6	0·0	mod. conf. SW swell
1074	55° 01·1′ S, 35° 45′ W	13 xii	0959	—	WSW	26	WSW	5	c	1006·7	0·9	−0·3	mod. SW swell
1075	54° 41·1′ S, 34° 58·1′ W	13 xii	1415	232*	SW × W	16–20	SW × W	4	bc	1007·4	1·1	0·1	mod. SW swell
1076	54° 24′ S, 34° 07·1′ W	13 xii	1858	4238*	SW	11	SW	3	b	1008·0	1·4	0·0	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1068 *cont.*	14	40	—	1·30	33·94	27·19	—	—	—	—	9·3	7·49	N 70 B	97–0	1038	1058	KT
		50	—	1·29	33·94	27·19	—	—	—	—	9·7	—	N 100 B				
		60	—	1·23	33·94	27·20	—	—	—	—	8·9	7·47	N 70 B	250–120	1038	1108	DGP
		80	—	0·99	33·94	27·21	—	—	—	—	12·2	—	N 100 B				
		100	—	0·50	33·96	27·26	—	—	—	—	14·7	7·22	N 100 H	0–5	1039	1109	
		150	—	0·57	34·11	27·38	—	—	—	—	25·6	6·18					
		200	—	0·41	34·17	27·44	—	—	—	—	31·6	5·94					
		300	—	1·49	34·42	27·56	—	—	—	—	38·0	4·61					
		350	—	1·87	34·44	27·56	—	—	—	—	38·7	4·21					
1069	15	0	—	1·41	33·93	27·18	—	—	—	—	7·2	7·64	N 70 V	100–50	1320		
		10	—	1·42	33·93	27·17	—	—	—	—	7·2	—	,,	50–0			
		20	—	1·38	33·93	27·18	—	—	—	—	7·4	7·63	N 50 V	100–0	—	1343	
		30	—	1·40	33·93	27·18	—	—	—	—	7·6	—	N 70 B	135–0	1410	1430	KT
		40	—	1·38	33·93	27·18	—	—	—	—	7·6	7·61	N 100 B				
		50	—	1·37	33·93	27·18	—	—	—	—	7·6	—	N 100 H	0–5	1406	1436	
		60	—	1·32	33·93	27·18	—	—	—	—	8·5	7·56					
		80	—	1·12	33·95	27·21	—	—	—	—	9·2						
		100	—	1·23	33·94	27·20	—	—	—	—	8·7	7·54					
		150	—	0·07	34·07	27·38	—	—	—	—	28·7	6·50					
		200	—	0·46	34·21	27·47	—	—	—	—	33·1	5·84					
1070	15	0	—	1·60	33·95	27·18	—	—	—	—	6·0	7·71	N 50 V	100–0	1640		
		10	—	1·59	33·95	27·18	—	—	—	—	7·3	—	N 70 V	100–50			
		20	—	1·59	33·95	27·18	—	—	—	—	7·3	7·71	,,	50–0	—	1655	
		30	—	1·56	33·95	27·18	—	—	—	—	5·6	—	N 70 B	123–0	1807	1827	KT
		40	—	1·52	33·95	27·19	—	—	—	—	5·5	7·67	N 100 B				
		50	—	1·20	33·95	27·21	—	—	—	—	9·0	—	N 100 H	0–5	1803	1833	
		60	—	1·15	33·96	27·22	—	—	—	—	9·3	7·64					
		80	—	0·80	33·96	27·25	—	—	—	—	13·4						
		100	—	0·38	33·96	27·27	—	—	—	—	20·4	7·06					
		150	—	0·09	34·05	27·36	—	—	—	—	27·6	6·71					
1071	15	0	—	1·55	33·95	27·19	—	—	—	—	—	—	N 50 V	100–0	2150	2200	
													N 70 B	106–0	2210	2230	KT
													N 100 B				
													N 100 H	0–5	2207	2237	
1072	15	0	—	1·40	33·96	27·21	—	—	—	—	—	—	N 50 V	100–0	0200	0209	
													N 70 B	120–0	0217	0237	KT
													N 100 B				
													N 100 H	0–5	0215	0245	
1073	15	0	—	1·23	33·95	27·21	—	—	—	—	—	—	N 50 V	100–0	0610	0620	
													N 70 B	117–0	0628	0648	KT
													N 100 B				
													N 100 H	0–5	0625	0655	
1074	15	0	—	1·31	33·87	27·14	—	—	—	—	—	—	N 50 V	100–0	1003	1013	Great stray on wire
													N 70 B	112–0	1021	1041	KT
													N 100 B				
													N 100 H	0–5	1018	1048	
1075	16	0	—	1·12	33·95	27·21	—	—	—	—	—	—	N 50 V	100–0	1415	1427	
													N 70 B	113–0	1435	1455	KT
													N 100 B				
													N 100 H	0–5	1433	1503	
1076	16	0	—	1·10	33·95	27·22	—	—	—	—	8·4	7·65	N 70 V	1000–750	1907		
		10	—	1·01	33·95	27·22	—	—	—	—	8·3	—	,,	750–500			
		20	—	0·94	33·95	27·23	—	—	—	—	7·2	7·68	,,	500–250			
		30	—	0·91	33·95	27·23	—	—	—	—	7·8	—	,,	250–100			
		40	—	0·90	33·95	27·23	—	—	—	—	8·4	7·67	,,	100–50			
		50	—	0·88	33·95	27·23	—	—	—	—	7·4	—	N 70 V	50–0			
		60	—	0·83	33·95	27·23	—	—	—	—	8·6	7·66	N 50 V	100–0	—	2035	
		80	—	0·18	33·95	27·27	—	—	—	—	16·2	—	N 70 B	110–0	2134	2154	KT
		100	—	−0·24	34·04	27·34	—	—	—	—	21·9	7·05	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1076 *cont.*	54° 24′ S, 34° 07·1′ W	1932 13 xii											
1077	54° 24′ S, 34° 44·3′ W	14 xii	0013	2663*	SW	8	—	1	c	1008·9	0·5	−0·6	mod. SSW swell
1078	54° 24′ S, 35° 22·9′ W	14 xii	0449	315*	NE	10	NE	1	o	1007·4	0·6	0·0	mod. conf. S swell
1079	54° 24′ S, 35° 54·5′ W	14 xii	0835	112*	N × W	10	N × W	2	bc	1007·6	1·9	0·1	low conf. swell
1080	3 miles S 60° E of Jason I, South Georgia	14 xii	1140	—	Lt airs	0–2	—	0	o	1007·4	1·4	0·6	low conf. swell
1081	3 miles S 60° E of Jason I, South Georgia	27 xii	1200	—	NW × W	21	NW × W	4	bc	977·9	1·7	0·0	mod. conf. W swell
1082	53° 44′ S, 38° 30·9′ W	29 xii	2000	—	NW	23	NW	5	oe	985·5	3·6	3·4	heavy conf. WSW and mod. conf. NW swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1076 *cont.*	16	150	—	0·66	34·21	27·45	—	—	—	—	32·4	5·60	**N 70 B**	270–100	2134	**2204**	DGP
		200	—	1·43	34·35	27·52	—	—	—	—	38·0	4·67	**N 100 B**				
		300	—	1·86	34·48	27·59	—	—	—	—	48·7	4·10	**N 100 H**	0–5	2135	**2205**	
		390	—	2·20	34·56	27·62	—	—	—	—	52·0	3·97					
		590	—	1·88	34·65	27·72	—	—	—	—	54·2	3·95					
		790	—	1·71	34·69	27·76	—	—	—	—	55·8	4·01					
		980	—	1·68	34·71	27·79	—	—	—	—	57·5	3·99					
		1475	1475	1·23	34·73	27·84	—	—	—	—	67·8	4·27					
		1970	—	0·82	34·72	27·85	—	—	—	—	73·0	4·38					
		2460	—	0·61	34·71	27·87	—	—	—	—	79·1	4·33					
		2950	—	0·38	34·70	27·87	—	—	—	—	80·8	4·56					
		3440	—	0·23	34·69	27·86	—	—	—	—	84·4	4·55					
		3930	—	−0·39	34·67	27·88	—	—	—	—	77·5	5·11					
1077	16	0	—	1·10	33·93	27·20	—	—	—	—	4·9	7·64	**N 70 V**	1000–790	**0025**		
		10	—	1·05	33·93	27·20	—	—	—	—	4·7	—	,,	750–500			
		20	—	1·02	33·93	27·20	—	—	—	—	4·8	7·66	,,	500–250			
		30	—	1·00	33·93	27·20	—	—	—	—	4·6	—	,,	250–100			
		40	—	0·96	33·93	27·21	—	—	—	—	5·2	7·63	,,	100–50			
		50	—	0·92	33·93	27·21	—	—	—	—	5·7	—	,,	50–0			
		60	—	0·91	33·93	27·21	—	—	—	—	5·7	7·64	**N 50 V**	100–0	—	**0200**	
		80	—	0·70	33·94	27·23	—	—	—	—	7·7	—	**N 70 B**	82–0	**0212**	0232	KT
		100	—	0·47	33·95	27·26	—	—	—	—	11·3	7·45	**N 100 B**				
		150	—	0·38	34·08	27·37	—	—	—	—	23·6	6·43	**N 70 B**	244–100	**0212**	0242	DGP
		190	—	1·48	34·29	27·46	—	—	—	—	38·7	4·95	**N 100 B**				
		290	—	1·97	34·46	27·56	—	—	—	—	42·2	4·17	**N 100 H**	0–5	**0213**	0243	
		390	—	1·91	34·51	27·61	—	—	—	—	47·5	3·98					
		590	—	2·02	34·65	27·71	—	—	—	—	52·7	3·76					
		790	—	1·93	34·68	27·74	—	—	—	—	55·8	3·75					
		980	—	1·78	34·71	27·79	—	—	—	—	58·4	3·89					
		1480	—	1·39	34·73	27·82	—	—	—	—	66·6	4·05					
		1970	1967	1·00	34·72	27·84	—	—	—	—	73·0	4·25					
1078	16	0	—	1·47	33·94	27·18	—	—	—	—	4·1	7·99	**N 70 B**	157–0	0500	0520	KT. Nansen Pettersson water bottle touched bottom at 250 m.
		10	—	1·37	33·94	27·19	—	—	—	—	4·1	—	**N 100 B**				
		20	—	1·35	33·94	27·19	—	—	—	—	4·1	7·89					
		30	—	1·24	33·94	27·20	—	—	—	—	4·3	—	**N 100 H**	0–5	0458	0528	
		40	—	1·12	33·94	27·20	—	—	—	—	3·2	7·95	**N 70 V**	100–50	0554		
		50	—	1·04	33·94	27·21	—	—	—	—	3·8	—	,,	50–0			
		60	—	0·87	33·94	27·22	—	—	—	—	6·5	7·66	**N 50 V**	100–0	—	0602	
		80	—	0·58	33·95	27·25	—	—	—	—	10·2						
		100	—	0·37	33·96	27·27	—	—	—	—	11·7	7·28					
		150	—	0·36	34·12	27·40	—	—	—	—	23·4	6·32					
		200	—	0·63	34·20	27·45	—	—	—	—	33·0	5·74					
		250	—	1·08	34·31	27·51	—	—	—	—	33·0	5·10					
1079	16	0	—	1·63	33·69	26·97	—	—	—	—	5·9	7·85	**N 70 V**	100–50	0840		
		10	—	1·50	33·69	26·98	—	—	—	—	5·7	—	,,	50–0			
		20	—	1·42	33·73	27·02	—	—	—	—	5·5	7·79	**N 50 V**	100–0	—	0900	
		30	—	1·38	33·77	27·05	—	—	—	—	5·3	—	**N 70 B**	111–0	0910	0925	KT
		40	—	1·32	33·77	27·05	—	—	—	—	5·3	7·77	**N 100 B**				
		50	—	1·33	33·80	27·08	—	—	—	—	5·3						
		60	—	1·34	33·83	27·11	—	—	—	—	6·3	7·69					
		80	—	1·23	33·83	27·12	—	—	—	—	7·0						
		100	—	0·70	33·93	27·22	—	—	—	—	9·7	7·32					
1080	17	0	—	2·12	33·86	27·06	—	—	—	—	—	—	**N 50 V**	100–0	1140	1147	
1081	0	0	—	2·95	33·34	26·59	—	—	—	—	—	—	**N 50 V**	100–0	1205	1213	
1082	2	0	—	2·41	33·86	27·04	—	—	—	—	—	—	**N 70 B**	113–0	2056	2116	KT. +3 hours
													N 100 B				
													N 70 B	290–120	2056	2126	DGP
													N 100 B				
													N 100 H	0–5	2104	2134	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
1083	54° 37·5′ S, 40° 35·9′ W	1932 30 xii	0900	—	W × N	24	W × N	5	o	964·1	3·8	2·7	heavy W × N swell
1084	55° 49·3′ S, 41° 22·4′ W	30 xii	2000	3449*	W × S	20	W × S	5	o	964·4	2·2	1·7	heavy conf. WSW and W swells
1085	57° 00′ S, 41° 53·9′ W	31 xii	0900	—	SW × W	22–27	SW × W	6	oqp	964·4	1·0	−0·7	heavy conf. SW swell
1086	57° 58·3′ S, 42° 25·6′ W	31 xii	2000	3181*	W × S	33	W × S	6	osq	965·1	0·5	−0·6	heavy conf. SW swell
1087	59° 05·6′ S, 43° 02·8′ W	1933 1 i	0900	—	WSW	26	WSW	5	osp	963·0	0·5	−0·3	heavy conf. WSW swell
1088	60° 12·1′ S, 44° 29·9′ W	1 i	2000	5476*	SE	16	SE	3	o	967·2	0·3	0·0	heavy conf. W swell
1089	Crutchley I and Powell I, South Orkney Is	3 i	—	—	—	—	—	—	—	—	—	—	—
1090	Fredriksen I and Holmen Gras (rocky islet south of Crutchley I), South Orkney Is	4 i	—	—	—	—	—	—	—	—	—	—	—

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1083	3	0	—	3·18	34·05	27·13	—	—	—	—	—	—	**N 70 B**	125–0	0919	0939	KT
													N 100 B				
													N 70 B	250–100	0919	0949	Depth estimated
													N 100 B				
													N 100 H	0–5	0917	0947	
1084	3	0	—	1·93	33·95	27·16	—	—	—	—	—	7·41	**N 50 V**	100–0	2008	**2018**	
		10	—	1·90	33·95	27·16	—	—	—	—	—	—	**N 70 B**	119–0	**2154**	**2214**	KT
		20	—	1·90	33·95	27·16	—	—	—	—	—	7·43	**N 100 B**				
		30	—	1·90	33·95	27·16	—	—	—	—	—	—	**N 70 B**	280–100	**2154**	**2224**	DGP
		40	—	1·80	33·95	27·17	—	—	—	—	—	7·43	**N 100 B**				
		50	—	1·51	33·95	27·19	—	—	—	—	—	—	**N 100 H**	0–5	**2156**	**2226**	
		60	—	0·31	33·96	27·27	—	—	—	—	—	7·42					
		80	—	0·10	34·04	27·34											
		100	—	0·50	34·11	27·38	—	—	—	—	—	6·32					
		150	—	1·19	34·24	27·45	—	—	—	—	—	5·49					
		200	—	1·61	34·32	27·48	—	—	—	—	—	4·80					
		290	—	1·96	34·48	27·58	—	—	—	—	—	4·17					
		390	—	2·15	34·53	27·61	—	—	—	—	—	4·11					
		590	—	2·05	34·65	27·71	—	—	—	—	—	3·93					
		780	—	1·95	34·66	27·72	—	—	—	—	—	3·97					
		980	—	1·79	34·72	27·78	—	—	—	—	—	4·09					
		1470	—	1·31	34·74	27·84	—	—	—	—	—	4·23					
		1970	—	0·82	34·70	27·84	—	—	—	—	—	4·45					
		2460	—	0·49	34·70	27·86	—	—	—	—	—	4·53					
		2960	2957	0·29	34·69	27·85	—	—	—	—	—	4·70					
1085	4	0	—	2·26	33·96	27·14	—	—	—	—	—	—	**N 100 B**	146–0	0918	0938	KT
													N 100 B	250–125	0918	0948	DGP. Lower depth estimated
1086	4	0	—	0·93	34·23	27·46	—	—	—	—	—	—	**N 100 B**	128–0	**2040**	**2100**	KT
													N 100 B	320–100	**2040**	**2110**	DGP
1087	5	0	—	0·75	34·32	27·54	—	—	—	—	—	—	**N 70 B**	134–0	0924	0944	KT
													N 100 B				
													N 70 B	350–110	0924	0954	DGP
													N 100 B				
1088	5	0	—	0·40	34·24	27·50	—	—	—	—	—	7·58	**N 50 V**	100–0	2007	2016	
		10	—	0·36	34·25	27·50	—	—	—	—	—	—	**N 70 B**	100–0	**2149**	**2209**	KT
		20	—	0·20	34·30	27·55	—	—	—	—	—	7·62	**N 100 B**				
		30	—	0·19	34·30	27·55	—	—	—	—	—	—	**N 70 B**	260–120	**2149**	**2219**	DGP
		40	—	0·18	34·30	27·55	—	—	—	—	—	7·61	**N 100 B**				
		50	—	0·17	34·30	27·55	—	—	—	—	—	—	**N 100 H**	0–5	**2149**	**2219**	
		60	—	0·15	34·30	27·55	—	—	—	—	—	7·60					
		80	—	−0·58	34·34	27·63											
		100	—	−0·73	34·36	27·64	—	—	—	—	—	6·80					
		150	—	−0·71	34·43	27·70	—	—	—	—	—	6·35					
		200	—	−0·39	34·47	27·72	—	—	—	—	—	5·74					
		300	—	0·10	34·55	27·76	—	—	—	—	—	5·23					
		400	—	0·73	34·63	27·79	—	—	—	—	—	4·88					
		590	—	0·58	34·67	27·83	—	—	—	—	—	4·75					
		790	—	0·29	34·66	27·83	—	—	—	—	—	4·66					
		990	—	0·38	34·67	27·84	—	—	—	—	—	4·64					
		1480	—	0·18	34·68	27·86	—	—	—	—	—	4·72					
		1980	—	0·03	34·66	27·85	—	—	—	—	—	4·81					
		2470	—	−0·09	34·66	27·86	—	—	—	—	—	4·84					
		2970	2969	−0·20	34·65	27·85	—	—	—	—	—	5·07					
1089	—	—	—	—	—	—	—	—	—	—	—	—	**Sh. coll.**				
1090	—	—	—	—	—	—	—	—	—	—	—	—	**Sh. coll.**				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1091	Governen I, Sandifjord Bay, South Orkney Is	1933 9 i	—	—	—	—	—	—	—	—	—	—	—
1092	Signy I, South Orkney Is	18 i	—	—	—	—	—	—	—	—	—	—	—
1093	South coast of Coronation I opposite Borge Bay, Signy I, South Orkney Is	19 i	—	—	—	—	—	—	—	—	—	—	—
1094	Inaccessible Is, South Orkney Is	25 i	—	—	—	—	—	—	—	—	—	—	—
1095	Whitton Bay, Laurie I, South Orkney Is	26–28 i	—	—	—	—	—	—	—	—	—	—	—
1096	61° 02·2′ S, 48° 27·1′ W	30 i	2000	2833*	Var. NW–SW	3	NW × W	3	o Lt snow	973·3	−1·3	−1·5	mod. NW × W swell
1097	61° 39·9′ S, 50° 27·8′ W	31 i	0900	—	S	20	S	3	o	983·4	−5·8	−6·8	mod. WSW swell
1098	61° 42·8′ S, 53° 41·3′ W	1 ii	0000	324*	S	?	S	2	bv	990·0	−4·1	−4·6	low conf. swell
1099	62° 15·5′ S, 53° 41·4′ W	1 ii	0800	872*	SSW	7	SSW	1	c	991·1	−2·5	−3·1	no swell

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Biological observations: Gear	Depth (metres)	Time: From	To	Remarks
1091	—	—	—	—	—	—	—	—	—	—	—	—	**Sh. coll.**				
1092	—	—	—	—	—	—	—	—	—	—	—	—	**Sh. coll.**				
1093	—	—	—	—	—	—	—	—	—	—	—	—	**Sh. coll.**				
1094	—	—	—	—	—	—	—	—	—	—	—	—	**Sh. coll.**				
1095	—	—	—	—	—	—	—	—	—	—	—	—	**Sh. coll.**				
1096	5	0	—	0·59	34·19	27·45	—	—	—	—	—	7·69	**N 70 V**	1000–740	2005		
		10	—	0·59	34·19	27·45	—	—	—	—	—	—	,,	750–500			Bad stray on wire
		20	—	0·61	34·19	27·45	—	—	—	—	—	7·70	,,	500–250			
		30	—	0·61	34·19	27·45	—	—	—	—	—	—	,,	250–100			Bad stray on wire
		40	—	0·55	34·19	27·45	—	—	—	—	—	7·71	,,	100–50			,, ,, ,, ,,
		50	—	0·46	34·21	27·47	—	—	—	—	—	—	,,	50–0			
		60	—	0·43	34·36	27·59	—	—	—	—	—	7·72	**N 50 V**	100–0	—	**2205**	Bad stray on wire
		80	—	0·10	34·41	27·64	—	—	—	—	—	—	**N 70 B**	98–0	**2243**	**2303**	KT
		100	—	−0·62	34·44	27·71	—	—	—	—	—	7·31	**N 100 B**				
		150	—	−1·01	34·48	27·76	—	—	—	—	—	6·92	**N 70 B**	250–140	**2243**	**2313**	DGP. Lower depth estimated
		200	—	−0·94	34·50	27·76	—	—	—	—	—	6·46	**N 100 B**				
		300	—	−0·21	34·63	27·84	—	—	—	—	—	5·11	**N 100 H**	0–5	**2244**	**2314**	
		400	—	0·13	34·66	27·84	—	—	—	—	—	4·76					
		600	—	0·31	34·67	27·84	—	—	—	—	—	4·67					
		790	—	0·22	34·67	27·85	—	—	—	—	—	4·65					
		990	—	0·12	34·67	27·85	—	—	—	—	—	4·76					
		1490	—	−0·18	34·66	27·86	—	—	—	—	—	5·01					
		1980	—	−0·33	34·66	27·87	—	—	—	—	—	5·10					
		2480	2480	−0·50	34·66	27·88	—	—	—	—	—	5·33					
1097	5	0	—	−1·11	33·69	27·12	—	—	—	—	—	—	**N 50 V**	100–0	0905	0912	At edge of loose pack-ice
													N 70 B	119–0	0931	0951	KT
													N 100 B				
													N 70 B	280–124	0931	1001	DGP
													N 100 B				
													N 100 H	0–5	0932	1002	
1098	6	0	—	−0·46	34·23	27·53	—	—	—	—	—	7·01	**N 50 V**	100–0	**0015**		Close to a very large iceberg
		10	—	−0·42	34·23	27·53	—	—	—	—	—	—	**N 70 V**	250–100			
		20	—	−0·41	34·23	27·53	—	—	—	—	—	6·94	,,	100–50			
		30	—	−0·38	34·23	27·53	—	—	—	—	—	—	,,	50–0	—	**0045**	
		40	—	−0·41	34·23	27·53	—	—	—	—	—	6·95	**N 70 B**	98–0	**0125**	**0145**	KT
		50	—	−0·41	34·23	27·53	—	—	—	—	—	—	**N 100 B**				
		60	—	−0·31	34·23	27·53	—	—	—	—	—	6·99	**N 70 B**	250–100	**0125**	**0155**	Depth estimated
		80	—	−0·51	34·22	27·51	—	—	—	—	—	—	**N 100 B**				
		100	—	−0·71	34·28	27·58	—	—	—	—	—	6·63	**N 100 H**	0–5	**0126**	**0156**	
		150	—	−0·26	34·27	27·55	—	—	—	—	—	6·65					
		200	—	−0·73	34·30	27·59	—	—	—	—	—	6·41					
		300	—	−0·41	34·39	27·66	—	—	—	—	—	6·22					
1099	6	0	—	−0·77	34·21	27·53	—	—	—	—	—	7·36	**N 70 B**	119–0	0815	0835	KT
		10	—	−1·00	34·27	27·58	—	—	—	—	—	—	**N 100 B**				
		20	—	−1·07	34·27	27·59	—	—	—	—	—	7·19	**N 70 B**	250–100	0815	0845	Depth estimated
		30	—	−1·23	34·32	27·63	—	—	—	—	—	—	**N 100 B**				
		40	—	−1·31	34·34	27·65	—	—	—	—	—	6·80	**N 70 V**	750–500	0900		
		50	—	−1·37	34·36	27·67	—	—	—	—	—	—	,,	500–0			
		60	—	−1·41	34·36	27·67	—	—	—	—	—	6·76	,,	500–250			
		80	—	−1·31	34·42	27·70	—	—	—	—	—	—	,,	250–100			
		100	—	−1·30	34·43	27·72	—	—	—	—	—	6·08	,,	100–50			
		150	—	−1·19	34·48	27·76	—	—	—	—	—	5·91	,,	50–0			
		200	—	−1·00	34·55	27·82	—	—	—	—	—	5·73	**N 50 V**	100–0	—	1034	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1099 *cont.*	62° 15·5′ S, 53° 41·4′ W	1933 1 ii											
1100	62° 07·1′ S, 54° 49·2′ W	1 ii	1655	728*	W × N	9–10	W × N	1	c	988·9	0·3	−0·6	low W swell
1101	61° 50·8′ S, 54° 42·9′ W	1 ii	2118	688*	NW × N	10	NW × N	3	om	985·7	0·6	0·0	no swell
1102	61° 33·6′ S, 54° 39·8′ W	2 ii	0258	1257*	W	20	W	3	odrs	985·3	1·1	0·8	low W swell
1103	61° 09·9′ S, 54° 31·8′ W	2 ii	1020	688*	W × S	15	W × S	3	or	988·0	1·8	1·1	mod. conf. SW × W swell

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Depth by thermometer	Temp. °C.	S °/₀₀	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Biological observations: Gear	Depth (metres)	Time: From	To	Remarks
1099	6	300	—	−0·28	34·63	27·85	—	—	—	—	—	5·03					
cont.		400	—	0·00	34·66	27·85	—	—	—	—	—	4·80					
		600	—	−0·13	34·66	27·86	—	—	—	—	—	4·99					
		800	—	−0·33	34·66	27·87	—	—	—	—	—	5·14					
1100	7	0	—	0·04	34·03	27·35	—	—	—	—	—	7·46	**N 70 B**	100–0	1710	1730	KT
		10	—	0·17	34·06	27·36	—	—	—	—	—	—	**N 100 B**				
		20	—	0·49	34·23	27·48	—	—	—	—	—	7·35	**N 70 B**	250–100	1710	1740	Depth estimated
		30	—	0·42	34·28	27·53	—	—	—	—	—	—	**N 100 B**				
		40	—	0·34	34·30	27·54	—	—	—	—	—	7·10	**N 50 V**	100–0	1755		
		50	—	0·19	34·30	27·55	—	—	—	—	—	—	**N 70 V**	650–500			
		60	—	0·16	34·32	27·57	—	—	—	—	—	6·98	,,	500–250			
		80	—	−0·20	34·38	27·64	—	—	—	—	—	—	,,	250–100			
		100	—	−0·81	34·39	27·68	—	—	—	—	—	6·60	,,	100–50			
		150	—	−0·58	34·47	27·73	—	—	—	—	—	6·29	,,	50–0	—	1910	
		200	—	−1·43	34·45	27·74	—	—	—	—	—	6·37					
		300	—	−1·36	34·50	27·78	—	—	—	—	—	6·21					
		400	—	−0·89	34·56	27·81	—	—	—	—	—	5·72					
		600	—	−0·40	34·64	27·86	—	—	—	—	—	5·22					
		700	—	−0·43	34·64	27·86	—	—	—	—	—	5·23					
1101	7	0	—	−0·41	34·21	27·51	—	—	—	—	—	6·94	**N 70 V**	650–500	**2125**		
		10	—	−0·32	34·21	27·51	—	—	—	—	—	—	,,	500–250			
		20	—	−0·33	34·21	27·51	—	—	—	—	—	6·94	,,	250–100			
		30	—	−0·34	34·21	27·51	—	—	—	—	—	—	,,	100–50			
		40	—	−0·34	34·21	27·51	—	—	—	—	—	6·94	,,	50–0			
		50	—	−0·37	34·21	27·51	—	—	—	—	—	—	**N 50 V**	100–0	—	**2235**	
		60	—	−0·40	34·22	27·51	—	—	—	—	—	6·86	**N 70 B**	153–0	**2301**	**2321**	KT
		80	—	−0·50	34·23	27·53	—	—	—	—	—	—	**N 100 B**				
		100	—	−0·51	34·23	27·53	—	—	—	—	—	6·68	**N 70 B**	250–100	**2301**	**2331**	Depth estimated
		150	—	−0·54	34·29	27·58	—	—	—	—	—	6·48	**N 100 B**				
		200	—	−0·47	34·33	27·60	—	—	—	—	—	6·48	**N 100 H**	0–5	**2302**	**2332**	
		300	—	−0·69	34·45	27·71	—	—	—	—	—	6·07					
		400	—	−0·58	34·48	27·74	—	—	—	—	—	5·90					
		600	—	−0·55	34·55	27·80	—	—	—	—	—	5·69					
1102	7	0	—	0·53	34·15	27·42	—	—	—	—	—	7·42	**N 70 V**	1000–0	0302		
		10	—	0·53	34·16	27·42	—	—	—	—	—	—	,,	1000–0			
		20	—	0·53	34·17	27·43	—	—	—	—	—	7·40	,,	1000–750			
		30	—	0·53	34·18	27·44	—	—	—	—	—	—	,,	750–500			
		40	—	0·49	34·20	27·45	—	—	—	—	—	7·26	,,	500–250			
		50	—	0·44	34·23	27·49	—	—	—	—	—	—	,,	250–0			
		60	—	0·39	34·25	27·50	—	—	—	—	—	7·10	,,	250–100			
		80	—	0·32	34·27	27·52	—	—	—	—	—	—	,,	100–50			
		100	—	0·07	34·31	27·57	—	—	—	—	—	6·77	,,	50–0			
		150	—	−0·15	34·38	27·64	—	—	—	—	—	6·45	**N 50 V**	100–0	—	0600	
		200	—	−0·29	34·46	27·71	—	—	—	—	—	6·28	**N 70 B**	103–0	0620	0640	KT
		300	—	−0·54	34·46	27·72	—	—	—	—	—	6·24	**N 100 B**				
		400	—	−0·41	34·54	27·78	—	—	—	—	—	5·94	**N 70 B**	250–100	0620	0650	Depth estimated
		600	—	−0·63	34·57	27·81	—	—	—	—	—	5·73	**N 100 B**				
		800	—	−0·81	34·57	27·82	—	—	—	—	—	5·85					
		1000	—	−1·02	34·56	27·82	—	—	—	—	—	6·10					
1103	7	0	—	0·62	34·15	27·42	—	—	—	—	—	7·44	**N 70 V**	500–250	1020		
		10	—	0·59	34·15	27·42	—	—	—	—	—	—	,,	250–100			
		20	—	0·56	34·15	27·42	—	—	—	—	—	7·43	,,	100–50			
		30	—	0·55	34·15	27·42	—	—	—	—	—	—	,,	50–0			
		40	—	0·52	34·15	27·42	—	—	—	—	—	7·34	**N 50 V**	100–0	—	1105	
		50	—	0·48	34·20	27·45	—	—	—	—	—	—	**N 70 B**	108–0	1136	1156	KT
		60	—	0·39	34·20	27·46	—	—	—	—	—	7·08	**N 100 B**				
		80	—	0·35	34·22	27·47	—	—	—	—	—	—	**N 70 B**	250–100	1136	1206	Depth estimated
		100	—	0·15	34·31	27·56	—	—	—	—	—	6·78	**N 100 B**				
		150	—	0·01	34·32	27·58	—	—	—	—	—	6·64					
		200	—	0·00	34·39	27·64	—	—	—	—	—	6·31					
		300	—	−0·10	34·46	27·70	—	—	—	—	—	5·97					
		400	—	−0·18	34·46	27·70	—	—	—	—	—	5·91					
		600	—	−0·43	34·55	27·79	—	—	—	—	—	5·60					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1104	61° 19′ S, 55° 05·8′ W	1933 2 ii	1413	858*	WNW	10	WNW	4	om	989·1	2·1	1·8	mod. conf. W swell
1105	1 mile N 10° W of East Point, Gibbs I	2 ii	2015	113*	NW × N	17	NW × N	4	omr	990·5	1·5	1·5	mod. WNW swell
		3 ii	0505	—	W × N	20	W × N	4	o	988·8	3·3	3·0	mod. W × N swell
1106	61° 38·3′ S, 56° 03·6′ W	3 ii	0855	612*	NW	18–24	NW	4	cq	986·6	2·4	2·2	mod. WNW swell
1107	61° 49·9′ S, 56° 44·9′ W	3 ii	1400	431*	W	25	W	4	b	989·3	2·0	1·4	mod. conf. W swell
1108	62° 22·3′ S, 58° 30·5′ W	4 ii	1130	1333*	W × N	24	W × N	4	bc	988·7	2·1	1·0	mod. SSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	To	
1104	8	0	—	0·75	34·09	27·35	—	—	—	—	—	7·36	N 50 V	100–0	1417		
		10	—	0·70	34·14	27·40	—	—	—	—	—	—	N 70 V	750–500			
		20	—	0·69	34·14	27·40	—	—	—	—	—	7·35	,,	500–250			
		30	—	0·65	34·15	27·41	—	—	—	—	—	—	,,	250–100			
		40	—	0·60	34·16	27·42	—	—	—	—	—	7·28	,,	100–50			
		50	—	0·48	34·18	27·44	—	—	—	—	—	—	,,	50–0	—	1545	
		60	—	0·40	34·18	27·45	—	—	—	—	—	7·12	N 70 B	128–0	1601	1621	KT
		80	—	0·12	34·25	27·51	—	—	—	—	—	—	N 100 B				
		100	—	0·06	34·26	27·53	—	—	—	—	—	6·67	N 70 B	250–100	1601	1631	Depth estimated
		150	—	−0·01	34·32	27·58	—	—	—	—	—	6·56	N 100 B				
		200	—	−0·03	34·40	27·64	—	—	—	—	—	6·15					
		300	—	0·09	34·49	27·71	—	—	—	—	—	5·70					
		400	—	0·00	34·52	27·74	—	—	—	—	—	5·66					
		600	—	0·06	34·53	27·75	—	—	—	—	—	5·37					
		800	—	−0·60	34·52	27·77	—	—	—	—	—	5·89					
1105	8	0	—	0·59	34·22	27·46	—	—	—	—	—	7·14	N 70 V	100–50	2018		Ship at anchor for
		10	—	0·58	34·22	27·46	—	—	—	—	—	—	,,	50–0			vertical nets and
		20	—	0·42	34·23	27·49	—	—	—	—	—	6·97	N 50 V	100–0	—	2036	hydrological hauls
		30	—	0·38	34·25	27·50	—	—	—	—	—	—	N 70 B	100–0	0508	0523	KT. Nets towed on
		40	—	0·29	34·27	27·52	—	—	—	—	—	6·76	N 100 B				leaving anchorage
		50	—	0·29	34·31	27·55											
		60	—	0·28	34·31	27·56	—	—	—	—	—	6·69					
		80	—	0·27	34·31	27·56											
		100	—	0·29	34·31	27·55	—	—	—	—	—	6·53					
1106	8	0	—	0·70	33·97	27·26	—	—	—	—	—	7·59	N 70 V	500–250	0852		Bad stray on wire
		10	—	0·70	33·98	27·27	—	—	—	—	—	—	,,	250–100			,, ,,
		20	—	0·69	33·99	27·28	—	—	—	—	—	7·59	,,	100–50			,, ,,
		30	—	0·69	33·99	27·28	—	—	—	—	—	—	,,	50–0			
		40	—	0·55	34·08	27·36	—	—	—	—	—	7·31	N 50 V	100–0	—	0943	
		50	—	0·39	34·15	27·43	—	—	—	—	—	—	N 70 B	119–0	1025	1045	KT
		60	—	0·11	34·18	27·46	—	—	—	—	—	7·06	N 100 B				
		80	—	−0·07	34·26	27·53	—	—	—	—	—	—	N 70 B	250–100	1025	1055	Depth estimated
		100	—	−0·08	34·34	27·60	—	—	—	—	—	6·31	N 100 B				
		150	—	0·01	34·43	27·67	—	—	—	—	—	5·92					
		200	—	0·00	34·45	27·68	—	—	—	—	—	5·72					
		300	—	−0·41	34·51	27·75	—	—	—	—	—	5·97					
		400	—	−0·45	34·52	27·76	—	—	—	—	—	5·95					
		550	—	−0·97	34·54	27·80	—	—	—	—	—	6·06					
1107	9	0	—	0·98	34·06	27·31	—	—	—	—	—	7·50	N 70 V	400–250	1402		
		10	—	0·95	34·07	27·33	—	—	—	—	—	—	,,	250–100			
		20	—	0·90	34·08	27·34	—	—	—	—	—	7·48	,,	100–50			
		30	—	0·90	34·08	27·34	—	—	—	—	—	—	,,	50–0			
		40	—	0·70	34·15	27·41	—	—	—	—	—	7·28	N 50 V	100–0	—	1445	
		50	—	0·61	34·17	27·43	—	—	—	—	—	—	N 70 B	109–0	1510	1530	KT
		60	—	0·55	34·20	27·45	—	—	—	—	—	7·07	N 100 B				
		80	—	0·39	34·23	27·49	—	—	—	—	—	—	N 70 B	250–100	1510	1540	Depth estimated
		100	—	0·31	34·26	27·51	—	—	—	—	—	6·73	N 100 B				
		150	—	0·22	34·31	27·56	—	—	—	—	—	6·58					
		200	—	0·17	34·33	27·57	—	—	—	—	—	6·43					
		300	—	0·00	34·41	27·65	—	—	—	—	—	6·08					
		400	—	−0·12	34·51	27·74	—	—	—	—	—	5·81					
1108	10	0	—	0·41	33·79	27·14	—	—	—	—	—	7·70	N 70 V	1000–750	1135		
		10	—	0·39	33·79	27·14	—	—	—	—	—	—	,,	750–500			
		20	—	0·39	33·92	27·24	—	—	—	—	—	7·50	,,	500–250			
		30	—	0·39	34·14	27·42	—	—	—	—	—	—	,,	250–100			
		40	—	0·01	34·16	27·45	—	—	—	—	—	7·14	,,	100–50			
		50	—	−0·14	34·18	27·48	—	—	—	—	—	—	,,	50–0			
		60	—	−0·31	34·24	27·54	—	—	—	—	—	7·09	N 50 V	100–0	—	1305	
		80	—	−0·14	34·27	27·55	—	—	—	—	—	—	N 70 B	134–0	1321	1341	KT
		100	—	−0·33	34·34	27·62	—	—	—	—	—	6·69	N 100 B				
		150	—	−0·64	34·37	27·65	—	—	—	—	—	6·82	N 70 B	290–100	1321	1351	DGP
		200	—	−0·92	34·42	27·69	—	—	—	—	—	6·70	N 100 B				
		300	—	−1·01	34·52	27·79	—	—	—	—	—	6·27					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1108 *cont.*	62° 22·3′ S, 58° 30·5′ W	1933 4 ii											
1109	62° 40·7′ S, 58° 03·5′ W	4 ii	1613	811*	W	15–18	W	3	bc	987·2	1·9	1·1	mod. conf. W swell
1110	62° 57·5′ S, 57° 38·6′ W	4 ii	2045	222*	WNW	8	WNW	2	o Lt snow	984·2	1·2	0·9	low conf. swell
1111	63° 49·2′ S, 61° 30′ W	5 ii	1215	828*	SSE	19	SSE	3–4 conf.	oq	964·9	1·0	0·7	heavy conf. W×N swell
1112	63° 27′ S, 61° 59·5′ W	5 ii	1730	147*	NE×E	12	NE×E	4	os	971·2	0·3	0·1	heavy WNW swell
1113	63° 04·5′ S, 62° 15′ W	5 ii	2145	371*	SW×W SE	10–14	SW×W	2 conf.	oesp	973·7	0·7	0·6	heavy conf. WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1108 *cont.*	10	400	—	−0·95	34·52	27·78	—	—	—	—	—	6·12					
		600	—	−1·00	34·55	27·82	—	—	—	—	—	5·95					
		800	—	−0·98	34·57	27·82	—	—	—	—	—	5·81					
		990	989	−1·17	34·56	27·82	—	—	—	—	—	6·02					
1109	10	0	—	1·01	34·15	27·39	—	—	—	—	—	7·50	N 70 V	750–500	1620		Bad stray on wire
		10	—	1·00	34·16	27·39	—	—	—	—	—	—	,,	500–250			,, ,, ,, ,,
		20	—	1·00	34·16	27·39	—	—	—	—	—	7·51	,,	250–100			
		30	—	0·90	34·17	27·41	—	—	—	—	—	—	,,	100–50			
		40	—	0·52	34·19	27·45	—	—	—	—	—	7·38	,,	50–0			
		50	—	0·09	34·26	27·53	—	—	—	—	—	—	N 50 V	100–0	—	1725	
		60	—	−0·42	34·34	27·62	—	—	—	—	—	7·09	N 70 B	116–0	1802	1822	KT
		80	—	−0·74	34·40	27·68	—	—	—	—	—	—	N 100 B				
		100	—	−0·82	34·43	27·71	—	—	—	—	—	6·67	N 70 B	310–120	1802	1832	DGP
		150	—	−0·82	34·49	27·75	—	—	—	—	—	6·35	N 100 B				
		200	—	−0·84	34·52	27·78	—	—	—	—	—	6·13					
		290	—	−0·71	34·57	27·81	—	—	—	—	—	5·93					
		390	—	−0·98	34·55	27·81	—	—	—	—	—	6·11					
		580	—	−1·02	34·55	27·82	—	—	—	—	—	5·92					
		730	726	−1·10	34·59	27·85	—	—	—	—	—	5·98					
1110	10	0	—	−0·71	34·40	27·67	—	—	—	—	—	6·85	N 50 V	100–0	2047		
		10	—	−0·78	34·41	27·69	—	—	—	—	—	—	N 70 V	200–100			
		20	—	−0·81	34·41	27·69	—	—	—	—	—	6·83	,,	100–50			
		30	—	−0·81	34·41	27·69	—	—	—	—	—	—	,,	50–0	—	2120	
		40	—	−0·82	34·41	27·69	—	—	—	—	—	6·82	N 70 B	135–0	**2133**	**2153**	KT
		50	—	−0·83	34·42	27·69	—	—	—	—	—	—	N 100 B				
		60	—	−0·87	34·42	27·69	—	—	—	—	—	6·77	N 100 H	0–5	2126	**2156**	
		80	—	−0·91	34·42	27·69											
		100	—	−0·94	34·42	27·69	—	—	—	—	—	6·65					
		150	—	−1·09	34·43	27·72	—	—	—	—	—	6·55					
		200	—	−1·20	34·47	27·75	—	—	—	—	—	6·34					
1111	11	0	—	1·28	33·95	27·20	—	—	—	—	—	7·11	N 70 B	104–0	1233	1253	KT. Hole in **N 70 B** near bucket
		10	—	1·28	33·96	27·21	—	—	—	—	—	—	N 100 B				
		20	—	1·29	34·00	27·24	—	—	—	—	—	7·06	N 70 B	310–100	1233	1303	DGP. Closing depth estimated
		30	—	1·29	34·00	27·24	—	—	—	—	—	—	N 100 B				
		40	—	1·22	34·00	27·25	—	—	—	—	—	7·08	N 70 V	750–500	1315		
		50	—	1·10	34·05	27·30	—	—	—	—	—	—	,,	500–250			
		60	—	0·84	34·08	27·34	—	—	—	—	—	6·71	,,	250–100			
		80	—	0·30	34·21	27·47	—	—	—	—	—	—	,,	100–50			
		100	—	0·08	34·27	27·54	—	—	—	—	—	6·06	,,	50–0			
		150	—	−0·44	34·36	27·63	—	—	—	—	—	6·43	N 50 V	100–0	—	1415	
		200	—	−0·64	34·41	27·68	—	—	—	—	—	6·21					
		300	—	−0·81	34·43	27·71	—	—	—	—	—	6·46					
		390	—	−0·81	34·52	27·78	—	—	—	—	—	6·21					
		590	—	−0·66	34·53	27·78	—	—	—	—	—	5·95					
		740	735	−0·62	34·55	27·80	—	—	—	—	—	5·83					
1112	11	0	—	1·27	34·00	27·24	—	—	—	—	—	7·26	N 50 V	100–0	1732		
		10	—	1·29	34·00	27·24	—	—	—	—	—	—	N 70 V	100–50			
		20	—	1·29	34·00	27·24	—	—	—	—	—	7·27	,,	50–0	—	1753	
		30	—	1·29	34·00	27·24	—	—	—	—	—	—	N 70 B	123–0	1827	1842	KT
		40	—	1·29	34·00	27·24	—	—	—	—	—	7·25	N 100 B				
		50	—	1·29	34·00	27·24											
		60	—	1·29	34·00	27·24	—	—	—	—	—	7·27					
		80	—	0·95	34·08	27·34											
		100	—	−0·68	34·26	27·56	—	—	—	—	—	6·19					
		150	—	0·21	34·39	27·63	—	—	—	—	—	5·65					
1113	11	0	—	1·00	34·07	27·32	—	—	—	—	—	7·13	N 70 V	250–100	**2145**		
		10	—	1·01	34·07	27·32	—	—	—	—	—	—	,,	100–50			
		20	—	1·01	34·07	27·32	—	—	—	—	—	7·12	,,	50–0			
		30	—	1·00	34·08	27·33	—	—	—	—	—	—	N 50 V	100–0	—	**2211**	
		40	—	0·93	34·11	27·36	—	—	—	—	—	7·02	N 70 B	80–0	**2248**	**2303**	KT
		50	—	0·91	34·14	27·39	—	—	—	—	—	—	N 100 B				
		60	—	0·87	34·16	27·40	—	—	—	—	—	6·92	N 70 B	275–130	**2248**	**2313**	DGP
		80	—	0·81	34·17	27·41	—	—	—	—	—	—	N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1113 *cont.*	63° 04·5′ S, 62° 15′ W	1933 5 ii											
1114	62° 51·1′ S, 62° 05·4′ W	6 ii	0100	706*	SSW	14	SSW	4	os	983·7	−0·3	−0·6	heavy WNW swell
1115	60° 39·2′ S, 61° 31·9′ W	6 ii	2000	3638*	W	24	W	4	or	980·3	3·2	3·2	heavy W swell
1116	59° 17·2′ S, 61° 04·4′ W	7 ii	0900	—	NW	24	NW	4	o	988·5	4·4	4·3	heavy WNW swell
1117	57° 46·1′ S, 60° 30·9′ W	7 ii	2000	3404*	Var. SW	6–40	SW	2–5	or	977·2	4·5	4·4	heavy SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
1113 *cont.*	11	100	—	0·75	34·18	27·43	—	—	—	—	—	6·75					
		150	—	0·38	34·34	27·58	—	—	—	—	—	6·02					
		200	—	0·30	34·41	27·63	—	—	—	—	—	5·67					
		300	—	0·39	34·59	27·78	—	—	—	—	—	5·03					
		375	—	−0·01	34·61	27·82	—	—	—	—	—	5·27					
1114	11	0	—	1·23	33·97	27·23	—	—	—	—	—	7·32	N 50 V	100–0	0115		
		10	—	1·17	34·00	27·25	—	—	—	—	—	—	N 70 V	500–0			
		20	—	0·90	34·02	27·29	—	—	—	—	—	7·19	,,	500–0			
		30	—	0·90	34·07	27·33	—	—	—	—	—	—	,,	500–250			
		40	—	0·85	34·07	27·33	—	—	—	—	—	7·11	,,	250–100			
		50	—	0·84	34·07	27·33	—	—	—	—	—	—	,,	100–50			
		60	—	0·80	34·07	27·34	—	—	—	—	—	7·06	,,	50–0	—	0237	
		80	—	0·80	34·07	27·34	—	—	—	—	—	—	N 70 B	102–0	0320	0340	KT
		100	—	0·71	34·14	27·40	—	—	—	—	—	6·88	N 100 B				
		150	—	0·40	34·24	27·50	—	—	—	—	—	6·24	N 70 B	290–90	0320	0350	DGP
		200	—	0·26	34·41	27·64	—	—	—	—	—	5·50	N 100 B				
		300	—	0·45	34·50	27·70	—	—	—	—	—	5·10					
		400	—	0·65	34·61	27·78	—	—	—	—	—	4·77					
		600	—	0·37	34·61	27·80	—	—	—	—	—	4·94					
1115	12	0	—	1·70	33·81	27·07	—	—	—	—	—	7·31	N 70 V	1000–750	2005		
		10	—	1·70	33·81	27·07	—	—	—	—	—	—	,,	750–500			
		20	—	1·70	33·81	27·07	—	—	—	—	—	7·32	,,	500–250			
		30	—	1·68	33·81	27·07	—	—	—	—	—	—	,,	250–100			
		40	—	1·62	33·81	27·07	—	—	—	—	—	7·32	,,	100–50			
		50	—	1·60	33·81	27·07	—	—	—	—	—	—	,,	50–0			
		60	—	−0·39	33·90	27·26	—	—	—	—	—	7·46	N 50 V	100–0	—	**2155**	
		80	—	−1·13	33·91	27·30	—	—	—	—	—	—	N 70 B	119–0	**2215**	**2235**	KT
		100	—	−0·51	34·00	27·34	—	—	—	—	—	6·99	N 100 B				
		150	—	0·69	34·19	27·44	—	—	—	—	—	5·71	N 70 B	315–130	**2215**	**2245**	DGP
		200	—	1·57	34·34	27·50	—	—	—	—	—	4·69	N 100 B				
		290	—	1·88	34·44	27·56	—	—	—	—	—	4·16	N 100 H	0–5	**2215**	**2245**	
		390	—	2·20	34·58	27·64	—	—	—	—	—	3·92					
		580	—	2·01	34·63	27·70	—	—	—	—	—	3·98					
		780	—	2·00	34·70	27·76	—	—	—	—	—	4·08					
		970	—	1·89	34·71	27·78	—	—	—	—	—	4·10					
		1460	—	1·50	34·71	27·81	—	—	—	—	—	4·21					
		1950	1947	1·19	34·70	27·82	—	—	—	—	—	4·32					
		2430	—	0·82	34·70	27·84	—	—	—	—	—	4·44					
		2920	—	0·56	34·70	27·86	—	—	—	—	—	4·56					
1116	12	0	—	2·76	33·75	26·93	—	—	—	—	—	—	N 50 V	100–0	0905	0912	
													N 70 B	110–0	0926	0946	KT
													N 100 B				
													N 70 B	270–115	0926	0956	DGP
													N 100 B				
1117	13	0	—	4·37	33·91	26·90	—	—	—	—	—	6·89	N 70 V	1000–750	2008		
		10	—	4·39	33·96	26·94	—	—	—	—	—	—	,,	750–500			
		20	—	4·37	33·97	26·95	—	—	—	—	—	6·90	,,	500–0			
		30	—	4·34	33·98	26·97	—	—	—	—	—	—	,,	500–250			
		40	—	4·31	33·98	26·97	—	—	—	—	—	6·89	,,	250–100			
		50	—	4·31	33·98	26·97	—	—	—	—	—	—	,,	100–50			
		60	—	4·22	33·99	26·99	—	—	—	—	—	6·89	,,	50–0			
		80	—	3·71	34·15	27·17	—	—	—	—	—	—	N 50 V	100–0	—	**2219**	
		100	—	3·45	34·14	27·19	—	—	—	—	—	6·61	N 70 B	119–0	**2245**	**2305**	KT
		150	—	3·27	34·14	27·20	—	—	—	—	—	6·56	N 100 B				
		200	—	2·91	34·09	27·19	—	—	—	—	—	6·64	N 70 B	320–120	**2245**	**2315**	DGP
		290	—	2·69	34·10	27·22	—	—	—	—	—	6·38	N 100 B				
		390	—	2·65	34·16	27·27	—	—	—	—	—	5·80					
		590	—	3·00	34·33	27·37	—	—	—	—	—	4·50					
		780	—	2·57	34·43	27·49	—	—	—	—	—	4·14					
		980	—	2·44	34·52	27·57	—	—	—	—	—	3·85					
		1470	—	2·16	34·63	27·69	—	—	—	—	—	3·79					
		1950	—	1·86	34·70	27·77	—	—	—	—	—	4·05					
		2440	—	1·51	34·70	27·80	—	—	—	—	—	4·16					
		2930	2932	1·20	34·70	27·82	—	—	—	—	—	4·34					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
1118	56° 22·2′ S, 60° 02·9′ W	1933 8 ii	0900	—	NW × N	23	NW × N	5–4	o	986·5	7·1	6·5	heavy W swell
1119	55° 07·9′ S, 59° 18·5′ W	8 ii	2000	3072	WSW	35–42	WSW	5	cq	983·7	8·3	6·6	mod. conf. W swell
			2045	3109*	WSW	17–21	WSW	5	—	—	—	—	—
1120	53° 48·7′ S, 58° 35′ W	9 ii	0900	681*	WNW	20	WNW	4	b	995·8	9·1	7·4	mod. conf. WNW swell
1121	51° 59·7′ S, 53° 24·2′ W	19 ii	2000	2078*	W × S	20–23	W × S	5	b	978·8	6·7	3·9	heavy conf. WNW swell
1122	52° 04·6′ S, 50° 54·5′ W	20 ii	0900	—	NW	23–34	NW	5	oq	989·1	8·0	6·8	heavy WNW swell
1123	52° 12·6′ S, 48° 25·3′ W	20 ii	2000	2448*	NW × W	23	NW × W	5	b	993·5	6·6	5·5	heavy conf. WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1118	13	0	—	6·33	34·05	26·78	—	—	—	—	—	—	N 50 V	100–0	0901	0908	
													N 70 B	119–0	0928	0948	KT
													N 100 B				
													N 70 B	410–100	0928	0958	DGP
													N 100 B				
1119	14	0	—	6·63	34·16	26·83	—	—	—	—	—	6·54	N 70 V	1000–780	2013		
		10	—	6·63	34·16	26·83	—	—	—	—	—	—	,,	760–500			Closing depth
		20	—	6·55	34·16	26·84	—	—	—	—	—	6·57	,,	700–525			doubtful
		30	—	6·43	34·16	26·86	—	—	—	—	—	—	,,	500–260			
		40	—	6·36	34·16	26·86	—	—	—	—	—	6·56	,,	250–100			
		50	—	6·25	34·16	26·88	—	—	—	—	—	—	,,	100–50			
		60	—	6·11	34·16	26·90	—	—	—	—	—	6·53	,,	50–0			
		80	—	5·52	34·17	26·98	—	—	—	—	—	—	N 50 V	100–0	—	2213	
		100	—	5·23	34·17	27·01	—	—	—	—	—	6·46	N 70 B	100–0	2247	2307	KT
		150	—	4·85	34·17	27·06	—	—	—	—	—	6·30	N 100 B				
		200	—	4·72	34·23	27·12	—	—	—	—	—	6·41	N 70 B	330–100	2247	2317	DGP
		300	—	4·30	34·20	27·14	—	—	—	—	—	6·42	N 100 B				
		390	—	4·21	34·19	27·15	—	—	—	—	—	6·39	N 100 H	0–5	2247	2317	
		590	—	3·73	34·21	27·21	—	—	—	—	—	5·97					
		790	—	3·48	34·21	27·23	—	—	—	—	—	5·64					
		980	980	3·22	34·25	27·29	—	—	—	—	—	5·08					
		1480	—	2·54	34·52	27·57	—	—	—	—	—	3·86					
		1970	—	2·26	34·65	27·69	—	—	—	—	—	3·69					
		2460	2468	1·99	34·70	27·76	—	—	—	—	—	3·91					
1120	15	0	—	7·10	34·16	26·77	—	—	—	—	—	—	N 50 V	100–0	0903	0913	
													N 100 B	110–0	0928	0948	KT
													N 70 B	300–110	0928	0958	DGP
													N 100 B				
1121	25	0	—	6·26	34·08	26·82	—	—	—	—	—	6·55	N 70 V	1000–750	2005		
		10	—	6·26	34·08	26·82	—	—	—	—	—	—	,,	750–500			
		20	—	6·26	34·08	26·82	—	—	—	—	—	6·58	,,	500–250			
		30	—	6·26	34·08	26·82	—	—	—	—	—	—	,,	250–100			
		40	—	6·26	34·08	26·82	—	—	—	—	—	6·58	,,	100–50			
		50	—	6·21	34·08	26·83	—	—	—	—	—	—	,,	50–0	—	2155	
		60	—	5·72	34·08	26·89	—	—	—	—	—	6·65	N 70 B	106–0	2220	2240	KT
		80	—	3·91	34·10	27·10	—	—	—	—	—	—	N 100 B				
		100	—	3·28	34·13	27·18	—	—	—	—	—	6·60	N 70 B	290–110	2220	2250	DGP
		150	—	3·10	34·15	27·23	—	—	—	—	—	6·51	N 100 B				
		200	—	2·88	34·16	27·25	—	—	—	—	—	6·44	N 100 H	0–5	2221	2241	
		300	—	2·38	34·16	27·29	—	—	—	—	—	6·36					
		390	—	1·97	34·15	27·32	—	—	—	—	—	6·14					
		590	—	2·59	34·26	27·35	—	—	—	—	—	5·01					
		790	—	2·64	34·41	27·47	—	—	—	—	—	4·20					
		980	—	2·45	34·51	27·56	—	—	—	—	—	3·96					
		1470	—	2·17	34·64	27·70	—	—	—	—	—	3·77					
		1960	1963	1·83	34·71	27·78	—	—	—	—	—	3·98					
1122	25	0	—	6·71	34·14	26·81	—	—	—	—	—	—	N 100 B	70–0	0928	0948	KT
													N 70 B	190–115	0928	0958	DGP
													N 100 B				
1123	26	0	—	5·10	34·09	26·96	—	—	—	—	—	6·68	N 70 V	1000–750	2010		Closing depth
		10	—	5·20	34·09	26·95	—	—	—	—	—	—	,,	750–500			doubtful
		20	—	5·20	34·09	26·95	—	—	—	—	—	6·69	,,	500–150			
		30	—	5·20	34·09	26·95	—	—	—	—	—	—	,,	500–250			
		40	—	5·20	34·09	26·95	—	—	—	—	—	6·67	,,	250–100			
		50	—	5·20	34·09	26·95	—	—	—	—	—	—	,,	100–50			
		60	—	5·11	34·09	26·96	—	—	—	—	—	6·70	,,	50–0			
		80	—	3·83	34·10	27·11	—	—	—	—	—	—	N 50 V	100–0	—	2258	
		100	—	3·58	34·17	27·19	—	—	—	—	—	6·56	N 100 B	102–0	2312	2332	KT
		150	—	3·27	34·19	27·24	—	—	—	—	—	6·49	N 70 B	250–100	2312	2342	DGP
		200	—	2·79	34·17	27·27	—	—	—	—	—	6·48	N 100 B				
		300	—	2·31	34·15	27·30	—	—	—	—	—	6·33	N 100 H	0–5	2313	2343	
		400	—	2·12	34·16	27·31	—	—	—	—	—	6·00					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1123 *cont.*	52° 12·6′ S, 48° 25·3′ W	1933 20 ii											
1124	52° 15·3′ S, 46° 13·4′ W	21 ii	0900	—	WNW	18	WNW	4	bc	1003·4	6·3	5·6	heavy conf. WNW swell
1125	52° 21·5′ S, 43° 34·5′ W	21 ii	2000	3340*	NW	10	NW	3	b	1005·8	5·3	4·9	heavy conf. NW and SW swells
1126	52° 27·2′ S, 40° 55′ W	22 ii	0900	—	N × W	12	N × W	3	bc	1003·3	5·0	4·4	heavy conf. SW and NW swells
1127	52° 43·7′ S, 37° 12·5′ W	23 ii	0405	1861*	N	4	N	1	fe	996·2	0·6	0·6	mod. W swell
1128	53° 04·4′ S, 37° 12·8′ W	23 ii	0926	2939*	ENE	10	ENE	2	of	995·4	1·9	1·9	mod. conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S °/₀₀	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1123 *cont.*	26	600	—	2·47	34·17	27·29	—	—	—	—	—	5·96					
		800	—	2·45	34·41	27·48	—	—	—	—	—	4·34					
		1000	—	2·37	34·52	27·58	—	—	—	—	—	3·95					
		1500	—	2·09	34·69	27·73	—	—	—	—	—	3·82					
1124	26	0	—	5·44	34·03	26·88	—	—	—	—	—	—	N 50 V	100–0	0904	0914	
													N 70 B, N 100 B	97–0	0928	0948	KT
													N 70 B, N 100 B	260–94	0928	0958	DGP
1125	27	0	—	4·38	33·82	26·83	—	—	—	—	—	6·96	N 70 V	1000–800	**2004**		
		10	—	4·39	33·82	26·83	—	—	—	—	—	—	,,	750–540			
		20	—	4·39	33·82	26·83	—	—	—	—	—	6·98	,,	500–265			
		30	—	4·28	33·83	26·86	—	—	—	—	—	—	,,	250–100			
		40	—	4·20	33·84	26·86	—	—	—	—	—	6·98	,,	100–50			
		50	—	3·97	33·85	26·90	—	—	—	—	—	—	,,	50–0			
		60	—	3·80	33·86	26·91	—	—	—	—	—	7·00	N 50 V	100–0	—	**2205**	
		80	—	1·01	33·92	27·20	—	—	—	—	—	—	N 70 B, N 100 B	97–0	**2222**	**2242**	KT
		100	—	0·82	33·94	27·22	—	—	—	—	—	7·18					
		150	—	0·71	34·05	27·32	—	—	—	—	—	6·61	N 70 B, N 100 B	290–100	**2222**	**2252**	DGP
		200	—	0·90	34·11	27·36	—	—	—	—	—	6·12					
		300	—	1·32	34·25	27·44	—	—	—	—	—	5·23	N 100 H	0–5	**2223**	**2253**	
		390	—	1·42	34·36	27·52	—	—	—	—	—	4·60					
		590	—	2·29	34·52	27·59	—	—	—	—	—	3·96					
		780	783	2·16	34·61	27·68	—	—	—	—	—	3·89					
		980	—	2·08	34·65	27·70	—	—	—	—	—	3·85					
		1470	—	1·77	34·70	27·78	—	—	—	—	—	4·07					
		1960	—	1·34	34·70	27·81	—	—	—	—	—	4·27					
		2450	2445	0·87	34·70	27·84	—	—	—	—	—	4·43					
		2940	—	0·51	34·69	27·84	—	—	—	—	—	4·62					
1126	27	0	—	3·97	33·91	26·95	—	—	—	—	—	—	N 50 V	100–0	0909	0916	
													N 70 B, N 100 B	138–0	0932	0952	KT
													N 70 B, N 100 B	370–110	0932	1002	DGP
1127	28	0	—	2·90	33·89	27·03	—	—	—	—	—	7·23	N 70 V	1000–750	**0410**		
		10	—	2·90	33·89	27·03	—	—	—	—	—	—	,,	750–500			
		20	—	2·88	33·89	27·03	—	—	—	—	—	7·22	,,	500–250			
		30	—	2·80	33·88	27·04	—	—	—	—	—	—	,,	250–100			
		40	—	2·80	33·88	27·04	—	—	—	—	—	7·20	,,	100–50			
		50	—	2·75	33·88	27·04	—	—	—	—	—	—	,,	50–0			
		60	—	2·50	33·91	27·08	—	—	—	—	—	7·10	N 50 V	100–0	—	0550	
		80	—	0·61	34·00	27·29	—	—	—	—	—	—	N 70 B, N 100 B	100–0	0604	0624	KT
		100	—	0·24	34·07	27·37	—	—	—	—	—	6·33					
		150	—	0·74	34·23	27·47	—	—	—	—	—	5·34	N 70 B, N 100 B	260–90	0604	0634	DGP
		200	—	1·09	34·32	27·52	—	—	—	—	—	4·85					
		300	—	1·30	34·43	27·59	—	—	—	—	—	4·31					
		400	—	1·49	34·53	27·66	—	—	—	—	—	4·01					
		590	—	2·00	34·61	27·69	—	—	—	—	—	3·90					
		790	—	1·89	34·68	27·75	—	—	—	—	—	3·95					
		990	—	1·70	34·71	27·79	—	—	—	—	—	4·06					
		1480	1484	1·28	34·72	27·82	—	—	—	—	—	4·27					
1128	28	0	—	2·95	33·91	27·04	—	—	—	—	4·9	7·17	N 70 V	1000–0	0927		
		10	—	2·92	33·91	27·05	—	—	—	—	4·9	—	,,	1000–750			
		20	—	2·84	33·90	27·04	—	—	—	—	4·6	7·21	,,	750–500			
		30	—	2·82	33·90	27·05	—	—	—	—	4·5	—	,,	500–250			
		40	—	2·81	33·90	27·05	—	—	—	—	4·5	7·18	,,	250–100			
		50	—	2·78	33·90	27·05	—	—	—	—	4·5	—	,,	100–50			
		60	—	2·70	33·90	27·06	—	—	—	—	4·5	7·09	,,	50–0			
		70	—	0·99	—	—	—	—	—	—	—	—	N 50 V	100–0	—	1115	
		80	—	0·57	33·99	27·29	—	—	—	—	13·7	—	N 70 B, N 100 B	96–0	1127	1147	KT
		100	—	0·14	34·01	27·32	—	—	—	—	19·2	6·69					
		150	—	0·11	34·14	27·43	—	—	—	—	29·2	5·95	N 70 B, N 100 B	280–100	1127	1157	DGP
		200	—	0·67	34·28	27·51	—	—	—	—	34·5	5·15					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1128 *cont.*	53° 04·4′ S, 37° 12·8′ W	1933 23 ii											
1129	53° 25·1′ S, 37° 13·1′ W	23 ii	1400	948*	NNE	2	NNE	2	of	995·2	3·0	2·8	mod. W swell
1130	53° 45′ S, 37° 09·8′ W	23 ii	1811	142*	ESE	5	ESE	1	fe	995·4	0·5	0·5	mod. conf. NW swell
1131	54° 22·6′ S, 34° 08·4′ W	24 ii	1324	4625*	Lt airs	0–4	—	0	o	999·8	1·1	0·3	low E swell
1132	54° 24·4′ S, 34° 43′ W	24 ii	1843	2020*	WNW	15	WNW	3	om	1000·1	1·1	1·0	low conf. E swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1128 *cont.*	28	300	—	1·31	34·44	27·60	—	—	—	—	37·2	4·28					
		390	—	1·43	34·53	27·66	—	—	—	—	48·7	4·02					
		590	—	1·98	34·63	27·70	—	—	—	—	55·8	3·91					
		790	—	1·89	34·70	27·77	—	—	—	—	59·3	3·92					
		990	—	1·80	34·70	27·77	—	—	—	—	61·2	4·03					
		1490	—	1·45	34·71	27·81	—	—	—	—	63·3	4·26					
		1980	—	1·06	34·71	27·84	—	—	—	—	65·5	4·40					
		2480	2476	0·87	34·71	27·85	—	—	—	—	74·4	4·45					
1129	29	0	—	3·39	33·83	26·95	—	—	—	—	—	7·64	N 70 V	750–500	1402		
		10	—	3·10	33·82	26·96	—	—	—	—	—	—	,,	500–250			
		20	—	3·00	33·82	26·97	—	—	—	—	—	7·43	,,	250–100			
		30	—	2·98	33·82	26·97	—	—	—	—	—	—	,,	100–50			
		40	—	2·91	33·82	26·98	—	—	—	—	—	7·39	,,	50–0			
		50	—	2·90	33·82	26·98	—	—	—	—	—	—	N 50 V	100–0	—	1458	
		60	—	2·72	33·82	27·00	—	—	—	—	—	7·37	N 70 B	88–0	1508	1528	KT
		80	—	1·21	33·92	27·19	—	—	—	—	—	—	N 100 B				
		100	—	1·02	33·94	27·21	—	—	—	—	—	7·01	N 70 B	240–100	1508	1538	DGP
		150	—	−0·11	34·06	27·38	—	—	—	—	—	6·43	N 100 B				
		200	—	0·61	34·24	27·49	—	—	—	—	—	5·34	N 100 H	0–5	1509	1539	
		290	—	1·32	34·43	27·59	—	—	—	—	—	4·26					
		390	—	1·51	34·53	27·66	—	—	—	—	—	3·98					
		590	—	2·03	34·56	27·64	—	—	—	—	—	3·88					
		780	783	1·92	34·67	27·73	—	—	—	—	—	3·90					
1130	29	0	—	2·99	33·74	26·90	—	—	—	—	7·4	7·19	N 70 V	100–50	1814		
		10	—	2·83	33·74	26·92	—	—	—	—	6·9	—	,,	50–0			
		20	—	2·41	33·74	26·95	—	—	—	—	7·0	7·21	N 50 V	100–0	—	1825	
		30	—	2·32	33·76	26·98	—	—	—	—	6·6	—	N 70 B	110–0	1839	1859	KT
		40	—	2·31	33·77	26·98	—	—	—	—	6·8	7·10	N 100 B				
		50	—	2·31	33·77	26·98	—	—	—	—	6·9	—	N 100 H	0–5	1835	1905	
		60	—	2·14	33·83	27·05	—	—	—	—	7·8	7·08					
		80	—	0·78	33·96	27·25	—	—	—	—	17·4						
		100	—	0·51	34·00	27·29	—	—	—	—	19·5	6·50					
1131	0	0	—	1·72	33·96	27·18	—	—	—	—	—	7·35	N 70 V	1000–800	1330		
		10	—	1·72	33·96	27·18	—	—	—	—	—	—	,,	750–500			
		20	—	1·63	33·96	27·19	—	—	—	—	—	7·38	,,	500–250			
		30	—	1·55	33·97	27·21	—	—	—	—	—	—	,,	250–100			
		40	—	1·47	33·98	27·22	—	—	—	—	—	7·32	,,	100–50			
		50	—	1·34	33·99	27·24	—	—	—	—	—	—	,,	50–0			
		60	—	1·20	33·99	27·25	—	—	—	—	—	7·16	N 50 V	100–0	—	1509	
		80	—	0·81	34·03	27·30	—	—	—	—	—	—	N 70 B	100–0	1619	1639	KT
		100	—	0·19	34·08	27·38	—	—	—	—	—	6·83	N 100 B				
		150	—	0·00	34·25	27·52	—	—	—	—	—	5·62	N 70 B	250–106	1619	1649	DGP
		200	—	0·64	34·40	27·60	—	—	—	—	—	4·77	N 100 B				
		300	—	1·30	34·56	27·69	—	—	—	—	—	4·09					
		400	—	1·31	34·61	27·74	—	—	—	—	—	4·04					
		600	—	1·90	34·68	27·75	—	—	—	—	—	3·93					
		800	—	1·74	34·70	27·78	—	—	—	—	—	4·06					
		1000	992	1·58	34·70	27·79	—	—	—	—	—	4·10					
		1500	—	1·08	34·70	27·83	—	—	—	—	—	4·35					
		2000	—	0·57	34·70	27·86	—	—	—	—	—	4·55					
		2500	—	0·37	34·69	27·85	—	—	—	—	—	4·73					
		3000	—	0·20	34·68	27·86	—	—	—	—	—	4·82					
		3500	—	0·01	34·67	27·86	—	—	—	—	—	4·92					
		4000	—	−0·25	34·66	27·86	—	—	—	—	—	5·17					
1132	0	0	—	2·50	33·91	27·08	—	—	—	—	8·6	7·35	N 70 B	110–0	1855	1915	KT
		10	—	2·50	33·91	27·08	—	—	—	—	8·8	—	N 100 B				
		20	—	2·23	33·91	27·10	—	—	—	—	8·6	7·31	N 70 B	275–110	1855	1925	DGP
		30	—	2·23	33·91	27·10	—	—	—	—	8·7	—	N 100 B				
		40	—	2·24	33·91	27·10	—	—	—	—	8·8	7·33	N 100 H	0–5	1856	1926	
		50	—	2·21	33·91	27·11	—	—	—	—	9·1	—	N 70 V	1000–750	1941		
		60	—	2·21	33·91	27·11	—	—	—	—	9·2	7·19	,,	750–500			
		80	—	1·61	33·95	27·18	—	—	—	—	13·0	—	,,	500–250			
		100	—	0·51	34·07	27·35	—	—	—	—	19·2	6·51	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1132 *cont.*	54° 24·4′ S, 34° 43′ W	1933 24 ii											
1133	54° 26·2′ S, 35° 16·6′ W	24–25 ii	2353	279*	NW	16	NW	3	oe	998·7	2·8	2·4	low conf. E swell
1134	54° 28′ S, 35° 51·6′ W	25 ii	0325	186*	S	8	S	1	bc	997·5	1·9	1·5	low ESE swell
1135	3 miles S 60° E of Jason I, South Georgia	1 iii	1408	—	SE × E	22	SE × E	4	osp	988·0	−0·1	−0·5	mod. conf. SE swell
1136	54° 31·2′ S, 35° 08·5′ W	1 iii	2100	1069*	SE × S	19	SE × S	3	osp	989·4	−0·9	−1·0	mod. conf. NE swell
1137	55° 08·8′ S, 33° 23·6′ W	2 iii	0830	—	SSE	25	SSE	4	c	989·8	−0·6	−1·7	mod. conf. E swell
1138	55° 55·5′ S, 31° 15·6′ W	2 iii	2005	3905*	S	15	S × E	4 conf.	bcsp	987·6	−1·0	−1·7	mod. conf. SSE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
1132 *cont.*	0	150	—	1·21	34·18	27·40	—	—	—	—	27·7	5·54	**N 70 V**	100–50			
		190	—	1·60	34·29	27·45	—	—	—	—	33·9	4·94	,,	50–0			
		290	—	1·73	34·43	27·56	—	—	—	—	42·2	4·35	**N 50 V**	100–0	—	**2108**	
		380	—	1·92	34·52	27·62	—	—	—	—	48·7	4·04					
		570	—	1·75	34·61	27·71	—	—	—	—	50·6	4·09					
		760	—	1·89	34·70	27·77	—	—	—	—	60·3	3·90					
		950	—	1·71	34·70	27·78	—	—	—	—	52·0	4·13					
		1430	1433	1·19	34·71	27·83	—	—	—	—	67·8	4·45					
1133	1	0	—	2·90	33·85	27·00	—	—	—	—	—	7·24	**N 70 V**	250–100	**2355**		
		10	—	2·88	33·85	27·00	—	—	—	—	—	—	,,	100–50			
		20	—	2·80	33·86	27·01	—	—	—	—	—	7·26	,,	50–0			
		30	—	2·53	33·89	27·06	—	—	—	—	—	—	**N 50 V**	100–0	—	**0025**	
		40	—	2·50	33·89	27·06	—	—	—	—	—	7·26	**N 70 B**	135–0	**0053**	**0113**	KT
		50	—	2·47	33·89	27·07	—	—	—	—	—	—	**N 100 B**				
		60	—	2·41	33·90	27·08	—	—	—	—	—	7·10	**N 100 H**	0–5	**0049**	**0119**	
		80	—	2·31	33·92	27·11											
		100	—	1·91	33·93	27·14	—	—	—	—	—	6·96					
		150	—	0·71	34·01	27·29	—	—	—	—	—	6·64					
		200	—	1·31	34·24	27·44	—	—	—	—	—	5·34					
		250	—	1·61	34·34	27·50	—	—	—	—	—	4·77					
1134	1	0	—	2·92	33·65	26·84	—	—	—	—	7·7	7·07	**N 70 V**	100–50	**0328**		
		10	—	2·90	33·66	26·84	—	—	—	—	7·7	—	,,	50–0			
		20	—	2·80	33·73	26·91	—	—	—	—	7·7	7·03	**N 50 V**	100–0	—	**0353**	
		30	—	2·82	33·74	26·92	—	—	—	—	7·7	—	**N 70 B**	117–0	**0416**	**0436**	KT
		40	—	2·83	33·74	26·92	—	—	—	—	7·9	6·98	**N 100 B**				
		50	—	2·83	33·75	26·93	—	—	—	—	7·8	—	**N 100 H**	0–5	**0414**	**0444**	
		60	—	2·84	33·75	26·93	—	—	—	—	8·1	6·94					
		80	—	2·68	33·78	26·97	—	—	—	—	8·7						
		100	—	2·60	33·79	26·99	—	—	—	—	8·9	6·83					
		150	—	1·91	33·89	27·11	—	—	—	—	13·5	6·69					
1135	5	0	—	2·96	33·69	26·87	—	—	—	—	—	—	**N 50 V**	100–0	1410	1420	+1 hour
1136	5	0	—	2·38	33·90	27·08	—	—	—	—	—	7·16	**N 50 V**	100–0	**2105**		
		10	—	2·39	33·90	27·08	—	—	—	—	—	—	**N 70 V**	1000–800			
		20	—	2·40	33·90	27·08	—	—	—	—	—	7·16	,,	750–500			
		30	—	2·40	33·90	27·08	—	—	—	—	—	—	,,	500–250			
		40	—	2·40	33·90	27·08	—	—	—	—	—	7·14	,,	250–100			
		50	—	2·40	33·90	27·08	—	—	—	—	—	—	,,	100–50			
		60	—	2·41	33·90	27·08	—	—	—	—	—	7·16	,,	50–0	—	**2238**	
		80	—	2·41	33·90	27·08	—	—	—	—	—	—	**N 70 B**	102–0	**2253**	**2313**	KT
		100	—	2·41	33·90	27·08	—	—	—	—	—	7·14	**N 100 B**				
		150	—	0·93	34·05	27·31	—	—	—	—	—	6·54	**N 70 B**	290–120	**2253**	**2323**	DGP
		200	—	1·22	34·22	27·42	—	—	—	—	—	5·48	**N 100 B**				
		300	—	1·81	34·42	27·53	—	—	—	—	—	4·46	**N 100 H**	0–5	**2254**	**2324**	
		400	—	2·00	33·48	27·58	—	—	—	—	—	4·11					
		600	—	1·90	33·65	27·72	—	—	—	—	—	4·05					
		800	—	1·87	33·69	27·75	—	—	—	—	—	4·12					
		1000	—	1·67	33·72	27·79	—	—	—	—	—	4·12					
1137	6	0	—	1·66	34·04	27·25	—	—	—	—	—	—	**N 50 V**	100–0	0834	0841	
													N 70 B	110–0	0858	0918	KT
													N 100 B				
													N 70 B	310–90	0858	0928	DGP
													N 100 B				
1138	6	0	—	1·13	34·07	27·31	—	—	—	—	—	7·38	**N 70 V**	1000–750	**2008**		
		10	—	1·13	34·07	27·31	—	—	—	—	—	—	,,	750–500			
		20	—	1·13	34·07	27·31	—	—	—	—	—	7·39	,,	500–250			
		30	—	1·13	34·07	27·31	—	—	—	—	—	—	,,	250–100			
		40	—	1·13	34·07	27·31	—	—	—	—	—	7·39	,,	100–50			
		50	—	1·11	34·08	27·32	—	—	—	—	—	—	,,	50–0			
		60	—	1·11	34·08	27·32	—	—	—	—	—	7·38	**N 50 V**	100–0	—	**2145**	
		80	—	0·22	34·14	27·43	—	—	—	—	—	—	**N 70 B**	132–0	**2237**	**2257**	KT
		100	—	−0·43	34·23	27·53	—	—	—	—	—	6·74	**N 100 B**				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1138 *cont.*	55° 55·5′ S, 31° 15·6′ W	1933 2 iii											
1139	56° 37·9′ S, 29° 19′ W	3 iii	0900	—	S×W	15	S×W	3	bc	986·5	−1·0	−2·1	mod. conf. SE swell
1140	57° 21·1′ S, 27° 09·9′ W	3 iii	2000	3047*	SSW	16	SSW	4	bc	985·1	−1·2	−2·8	mod. conf. S swell
1141	57° 59·8′ S, 24° 43·7′ W	4 iii	0900	—	SW×W	25	SW×W	4	o	984·0	−0·9	−1·8	mod. conf. swell
1142	58° 44·3′ S, 22° 30·9′ W	4 iii	2002	4237*	SW	19	SW	4	csp	984·4	−0·6	−1·2	heavy conf. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O c.c. litre	Gear	Depth (metres)	From	To	
1138 *cont.*	6	150	—	−0·51	34·34	27·62	—	—	—	—	—	6·06	**N 70 B**	335–100	**2237**	**2307**	DGP
		200	—	−0·09	34·48	27·72	—	—	—	—	—	5·43	**N 100 B**				
		300	—	0·54	34·58	27·76	—	—	—	—	—	4·90	**N 100 H**	0–5	**2238**	**2308**	
		400	—	0·76	34·67	27·82	—	—	—	—	—	4·69					
		600	—	0·73	34·68	27·83	—	—	—	—	—	4·65					
		790	—	0·67	34·68	27·83	—	—	—	—	—	4·65					
		990	993	0·50	34·68	27·84	—	—	—	—	—	4·62					
		1480	—	0·29	34·68	27·85	—	—	—	—	—	4·67					
		1970	—	0·13	34·68	27·86	—	—	—	—	—	4·81					
		2460	—	−0·01	34·68	27·87	—	—	—	—	—	4·90					
		2950	2952	−0·10	34·67	27·87	—	—	—	—	—	4·96					
		3440	—	−0·13	34·67	27·87	—	—	—	—	—	5·09					
1139	7	0	—	0·92	34·06	27·32	—	—	—	—	—	—	**N 50 V**	100–0	0902	0912	
													N 70 B / **N 100 B**	108–0	0925	0945	KT
													N 70 B / **N 100 B**	270–120	0925	0955	DGP
1140	7	0	—	0·32	34·05	27·34	—	—	—	—	—	7·47	**N 70 V**	1000–750	**2005**		
		10	—	0·31	34·05	27·34	—	—	—	—	—	—	,,	750–500			
		20	—	0·31	34·05	27·34	—	—	—	—	—	7·48	,,	500–250			
		30	—	0·31	34·05	27·34	—	—	—	—	—	—	,,	250–100			
		40	—	0·31	34·05	27·34	—	—	—	—	—	7·47	,,	100–50			
		50	—	0·31	34·05	27·34	—	—	—	—	—	—	,,	50–0			
		60	—	0·31	34·05	27·34	—	—	—	—	—	7·48	**N 50 V**	100–0	—	**2145**	
		80	—	0·29	34·05	27·34	—	—	—	—	—	—	**N 70 B**	104–0	**2202**	**2222**	KT
		100	—	−0·49	34·23	27·53	—	—	—	—	—	6·58	**N 100 B**				
		150	—	−0·19	34·48	27·72	—	—	—	—	—	5·38	**N 70 B**	310–110	**2202**	**2232**	DGP
		200	—	0·31	34·58	27·77	—	—	—	—	—	4·96	**N 100 B**				
		300	—	0·79	34·67	27·81	—	—	—	—	—	4·67	**N 100 H**	0–5	**2204**	**2234**	
		400	—	0·72	34·68	27·83	—	—	—	—	—	4·64					
		590	—	0·59	34·69	27·84	—	—	—	—	—	4·66					
		790	—	0·44	34·68	27·85	—	—	—	—	—	4·58					
		990	—	0·37	34·68	27·85	—	—	—	—	—	4·62					
		1480	—	0·18	34·68	27·86	—	—	—	—	—	4·78					
		1980	—	−0·03	34·67	27·86	—	—	—	—	—	4·91					
		2470	2465	−0·17	34·67	27·87	—	—	—	—	—	5·03					
1141	8	0	—	0·40	33·98	27·29	—	—	—	—	—	—	**N 50 V**	100–0	0903	0915	
													N 70 B / **N 100 B**	94–0	0921	0941	KT
													N 70 B / **N 100 B**	260–100	0921	0951	DGP
1142	8	0	—	0·71	33·69	27·03	—	—	—	—	—	7·45	**N 70 V**	1000–800	**2004**		
		10	—	0·71	33·69	27·03	—	—	—	—	—	—	,,	750–510			
		20	—	0·71	33·69	27·03	—	—	—	—	—	7·45	,,	500–250			
		30	—	1·01	33·86	27·14	—	—	—	—	—	—	,,	250–100			
		40	—	1·19	33·90	27·17	—	—	—	—	—	7·39	,,	100–50			Heavy stray on wire
		50	—	1·12	33·96	27·22	—	—	—	—	—	—	,,	50–0			
		60	—	1·15	33·97	27·23	—	—	—	—	—	7·36	**N 50 V**	100–0	—	**2149**	
		80	—	1·16	34·02	27·27	—	—	—	—	—	—	**N 70 B**	93–0	**2315**	**2335**	KT
		100	—	1·09	34·00	27·26	—	—	—	—	—	7·33	**N 100 B**				
		150	—	−0·79	34·23	27·54	—	—	—	—	—	6·53	**N 100 H**	0–5	**2314**	**2344**	
		200	—	−0·25	34·38	27·64	—	—	—	—	—	5·66	**N 70 B**	260–110	**2315**	**2345**	DGP
		300	—	0·72	34·57	27·74	—	—	—	—	—	4·77	**N 100 B**				
		400	—	1·01	34·64	27·78	—	—	—	—	—	4·57					
		600	—	0·80	34·66	27·80	—	—	—	—	—	4·59					
		800	—	0·50	34·67	27·83	—	—	—	—	—	4·65					
		1000	—	0·50	34·67	27·83	—	—	—	—	—	4·54					
		1500	1507	0·32	34·67	27·84	—	—	—	—	—	4·61					
		1980	—	0·20	34·68	27·86	—	—	—	—	—	4·74					
		2480	—	−0·02	34·67	27·86	—	—	—	—	—	4·91					
		2970	2970	−0·13	34·67	27·87	—	—	—	—	—	4·96					
		3460	—	−0·33	34·67	27·88	—	—	—	—	—	5·24					
		3960	—	−0·38	34·66	27·87	—	—	—	—	—	5·27					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1143	59° 12·9′ S, 20° 10·1′ W	1933 5 iii	0900	—	WSW	26	WSW	5	oq	987·6	−0·6	−1·7	heavy conf. swell
1144	59° 44·5′ S, 17° 30·8′ W	5 iii	2000	2938*	W × S	25	W × S	5	bcq	989·3	−0·6	−1·9	heavy conf. SW swell
1145	60° 22·1′ S, 14° 43·9′ W	6 iii	0900	—	W × N	17	W × N	5	o	995·5	0·0	−1·4	heavy WSW swell
1146	61° 00·2′ S, 12° 03·8′ W	6 iii	2000	4984*	E × N	20	E × N	4	oqs	990·8	−1·0	−1·0	heavy conf. W × S swell
		7 iii	0000	—	E × N	16	E × N	4	oqs	984·9	−0·5	−0·5	heavy W × S swell
1147	61° 49·7′ S, 08° 09·9′ W	7 iii	2004	5258*	N × E	16	N × E	3	oe	973·8	0·3	0·3	heavy conf. NNW swell

Station	Age of moon (days)	Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	Time From	Time To	Remarks
		HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS				
1143	9	0	—	0·62	33·72	27·07	—	—	—	—	—	—	**N 50 V**	100–0	0903	0914	
													N 70 B	121–0	0928	0948	KT
													N 100 B				
													N 70 B	330–120	0928	0958	DGP
													N 100 B				
1144	10	0	—	0·36	33·63	27·01	—	—	—	—	—	7·46	**N 70 V**	1000–790	**2005**		
		10	—	0·37	33·63	27·01	—	—	—	—	—	—	,,	750–500			
		20	—	0·37	33·63	27·01	—	—	—	—	—	7·47	,,	500–250			
		30	—	0·37	33·63	27·01	—	—	—	—	—	—	,,	250–100			
		40	—	0·35	33·63	27·01	—	—	—	—	—	7·45	,,	100–50			
		50	—	–0·59	33·98	27·34	—	—	—	—	—	—	,,	50–0			
		60	—	–0·99	34·13	27·46	—	—	—	—	—	7·00	**N 50 V**	100–0	—	**2145**	
		80	—	–1·09	34·16	27·50	—	—	—	—	—	—	**N 100 B**	119–0	**2221**	**2241**	KT
		100	—	–1·09	34·23	27·56	—	—	—	—	—	6·56	**N 100 B**	340–100	**2221**	**2251**	DGP
		150	—	–0·24	34·43	27·68	—	—	—	—	—	5·54					
		200	—	0·49	34·56	27·74	—	—	—	—	—	4·92					
		300	—	0·81	34·66	27·80	—	—	—	—	—	4·61					
		400	—	0·90	34·68	27·82	—	—	—	—	—	4·61					
		590	—	0·53	34·68	27·84	—	—	—	—	—	4·57					
		790	765	0·49	34·68	27·84	—	—	—	—	—	4·52					
		990	—	0·39	34·68	27·85	—	—	—	—	—	4·55					
		1480	—	0·20	34·68	27·86	—	—	—	—	—	4·62					
		1980	—	–0·02	34·67	27·86	—	—	—	—	—	4·89					
		2470	2466	–0·10	34·67	27·87	—	—	—	—	—	4·95					
1145	10	0	—	0·08	34·23	27·51	—	—	—	—	—	—	**N 50 V**	100–0	0905	0915	
													N 100 B	104–0	0930	0950	KT
													N 70 B	280–100	0930	1000	DGP
													N 100 B				
1146	10	0	—	–0·09	34·23	27·51	—	—	—	—	—	7·43	**N 70 V**	1000–750	**2015**		
		10	—	–0·09	34·23	27·51	—	—	—	—	—	—	,,	750–500			
		20	—	–0·09	34·23	27·51	—	—	—	—	—	7·45	,,	500–250			
		30	—	–0·09	34·23	27·51	—	—	—	—	—	—	,,	250–100			
		40	—	–0·09	34·23	27·51	—	—	—	—	—	7·43	,,	100–50			
		50	—	–0·10	34·23	27·51	—	—	—	—	—	—	,,	50–0			
		60	—	–0·46	34·30	27·58	—	—	—	—	—	7·27	**N 50 V**	100–0	—	**2205**	
		80	—	–1·58	34·48	27·77	—	—	—	—	—	—	**N 70 B**	104–0	**2344**	**0004**	KT
		100	—	–1·48	34·49	27·77	—	—	—	—	—	6·23	**N 100 B**				
		150	—	–0·38	34·63	27·85	—	—	—	—	—	5·03	**N 70 B**	290–110	**2344**	**0014**	DGP
		200	—	0·21	34·65	27·83	—	—	—	—	—	4·42	**N 100 B**				
		290	—	0·32	34·67	27·84	—	—	—	—	—	4·29	**N 100 H**	0–5	**2345**	**0015**	
		390	—	0·38	34·67	27·84	—	—	—	—	—	4·28					
		580	—	0·34	34·67	27·84	—	—	—	—	—	4·29					
		780	—	0·27	34·67	27·85	—	—	—	—	—	4·39					
		970	—	0·18	34·67	27·85	—	—	—	—	—	4·47					
		1460	—	0·00	34·67	27·86	—	—	—	—	—	4·72					
		1950	1947	–0·19	34·67	27·87	—	—	—	—	—	4·94					
		2390	—	–0·27	34·67	27·87	—	—	—	—	—	5·02					
		2860	2855	–0·33	34·67	27·88	—	—	—	—	—	5·15					
		3340	—	–0·42	34·67	27·88	—	—	—	—	—	5·27					
		3810	—	–0·51	34·66	27·88	—	—	—	—	—	5·38					
		4290	—	–0·55	34·66	27·88	—	—	—	—	—	5·53					
1147	11	0	—	–0·09	34·05	27·37	—	—	—	—	—	7·51	**N 70 V**	1000–750	**2010**	—	GMT. Small hole in **N 70 V** near bucket discovered after completion of last haul
		10	—	–0·09	34·05	27·37	—	—	—	—	—	—	,,	750–500			
		20	—	–0·09	34·05	27·37	—	—	—	—	—	7·53	,,	500–250			
		30	—	–0·09	34·05	27·37	—	—	—	—	—	—	,,	250–100			
		40	—	–0·09	34·05	27·37	—	—	—	—	—	7·51	,,	100–50			
		50	—	–0·09	34·05	27·37	—	—	—	—	—	—	,,	50–0			
		60	—	–0·89	34·23	27·55	—	—	—	—	—	7·21	**N 50 V**	100–0	—	**2140**	
		80	—	–1·72	34·43	27·73	—	—	—	—	—	—	**N 70 B**	113–0	**2310**	**2330**	KT
		100	—	–1·28	34·43	27·72	—	—	—	—	—	6·26	**N 100 B**				
		150	—	0·90	34·68	27·82	—	—	—	—	—	4·31	**N 70 B**	280–120	**2310**	**2340**	DGP
		200	—	0·90	34·69	27·82	—	—	—	—	—	4·32	**N 100 B**				
		300	—	0·73	34·68	27·83	—	—	—	—	—	4·37	**N 100 H**	0–5	**2312**	**2342**	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
1147 *cont.*	61° 49·7′ S, 08° 09·9′ W	1933 7 iii											
1148	63° 52′ S, 00° 54·9′ W	9 iii	2000	5332*	WNW	6	WNW	2	csp	980·5	−0·7	−1·0	mod. conf S and NNE swells
1149	64° 34·4′ S, 01° 42·6′ E	10 iii	0900	—	N × E	16	N × E	3	c	991·6	0·7	0·0	heavy NNE swell
1150	65° 21·6′ S, 04° 33·7′ E	10 iii	2002	3673*	NNE	15	NNE	3	osp	997·3	0·0	0·0	mod. NNE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	TIME From	To	
1147 *cont.*	11	400	—	0·53	34·68	27·84	—	—	—	—	—	4·37					
		600	—	0·44	34·68	27·85	—	—	—	—	—	4·23					
		800	—	0·40	34·68	27·85	—	—	—	—	—	4·33					
		1000	—	0·30	34·67	27·84	—	—	—	—	—	4·43					
		1490	—	0·08	34·67	27·86	—	—	—	—	—	4·71					
		1990	—	−0·11	34·67	27·87	—	—	—	—	—	4·77					
		2490	2492	−0·24	34·67	27·87	—	—	—	—	—	4·98					
		2980	2977	−0·30	34·66	27·87	—	—	—	—	—	5·08					
		3480	—	−0·38	34·66	27·87	—	—	—	—	—	5·10					
		3970	—	−0·42	34·66	27·87	—	—	—	—	—	5·33					
		4470	—	−0·47	34·66	27·87	—	—	—	—	—	5·36					
		4970	—	−0·50	34·66	27·88	—	—	—	—	—	5·41					
1148	13	0	—	0·22	34·02	27·33	—	—	—	—	—	7·54	**N 70 V**	1000–760	**2011**		
		10	—	0·22	34·02	27·33	—	—	—	—	—	—	,,	750–500			
		20	—	0·22	34·02	27·33	—	—	—	—	—	7·56	,,	500–250			
		30	—	0·23	34·02	27·33	—	—	—	—	—	—	,,	250–100			
		40	—	0·25	34·04	27·34	—	—	—	—	—	7·55	,,	100–50			
		50	—	−0·40	34·12	27·44	—	—	—	—	—	—	,,	50–0			
		60	—	−1·79	34·29	27·62	—	—	—	—	—	7·22	**N 50 V**	100–0	—	2140	
		80	—	−1·80	34·31	27·64	—	—	—	—	—	—	**N 70 B**	117–0	**2324**	**2344**	KT
		100	—	−1·79	34·33	27·65	—	—	—	—	—	7·01	**N 100 B**				
		150	—	−0·39	34·52	27·76	—	—	—	—	—	5·35	**N 70 B**	330–100	**2324**	**2354**	DGP
		200	—	0·40	34·66	27·83	—	—	—	—	—	4·53	**N 100 B**				
		300	—	0·41	34·68	27·85	—	—	—	—	—	4·38	**N 100 H**	0–5	**2325**	**2355**	
		400	—	0·41	34·69	27·85	—	—	—	—	—	4·28					
		600	—	0·40	34·69	27·85	—	—	—	—	—	4·24					
		800	—	0·35	34·69	27·85	—	—	—	—	—	4·35					
		1000	—	0·26	34·69	27·86	—	—	—	—	—	4·47					
		1490	—	0·08	34·68	27·87	—	—	—	—	—	4·69					
		1990	—	−0·11	34·67	27·87	—	—	—	—	—	4·93					
		2490	2487	−0·22	34·66	27·86	—	—	—	—	—	5·05					
		2970	2968	−0·30	34·66	27·87	—	—	—	—	—	5·10					
		3460	—	−0·34	34·66	27·87	—	—	—	—	—	5·10					
		3960	—	−0·39	34·66	27·87	—	—	—	—	—	5·18					
		4450	—	−0·46	34·66	27·87	—	—	—	—	—	5·36					
		4950	—	−0·48	34·66	27·87	—	—	—	—	—	5·37					
1149	14	0	—	0·40	34·14	27·42	—	—	—	—	—	—	**N 50 V**	100–0	0907	0915	
													N 70 B	97–0	0928	0948	KT
													N 100 B				
													N 70 B	270–100	0928	0958	DGP
													N 100 B				
1150	14	0	—	0·11	34·06	27·36	—	—	—	—	—	7·47	**N 70 V**	1000–750	**2006**		
		10	—	0·11	34·06	27·36	—	—	—	—	—	—	,,	750–500			
		20	—	0·11	34·07	27·37	—	—	—	—	—	7·46	,,	500–250			
		30	—	0·11	34·07	27·37	—	—	—	—	—	—	,,	250–100			
		40	—	0·11	34·08	27·38	—	—	—	—	—	7·45	,,	100–50			
		50	—	0·01	34·10	27·40	—	—	—	—	—	—	,,	50–0			
		60	—	−1·09	34·35	27·66	—	—	—	—	—	6·36	**N 50 V**	100–0	—	**2132**	
		70	—	−0·71	—	—	—	—	—	—	—	—	**N 70 B**	91–0	**2219**	**2239**	KT
		80	—	0·59	34·65	27·81	—	—	—	—	—	—	**N 100 B**				
		100	—	0·92	34·67	27·81	—	—	—	—	—	4·33	**N 70 B**	270–100	**2219**	**2249**	DGP
		150	—	0·67	34·68	27·83	—	—	—	—	—	4·58	**N 100 B**				
		200	—	0·62	34·68	27·84	—	—	—	—	—	4·63	**N 100 H**	0–5	**2220**	**2250**	
		300	—	0·51	34·68	27·84	—	—	—	—	—	4·63					
		400	—	0·55	34·69	27·84	—	—	—	—	—	4·57					
		600	—	0·56	34·69	27·84	—	—	—	—	—	4·47					
		800	795	0·50	34·69	27·84	—	—	—	—	—	4·51					
		1000	—	0·40	34·69	27·85	—	—	—	—	—	4·44					
		1490	—	0·19	34·68	27·86	—	—	—	—	—	4·68					
		1980	—	0·02	34·67	27·86	—	—	—	—	—	4·76					
		2480	—	−0·16	34·67	27·87	—	—	—	—	—	4·95					
		2970	2969	−0·21	34·67	27·87	—	—	—	—	—	5·06					
		3460	—	−0·29	34·67	27·88	—	—	—	—	—	5·14					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1151	66° 35·5′ S, 06° 30·3′ E	1933 11 iii	0900	—	Lt airs	0–1	—	0	o Lt snow	1001·7	0·0	−0·1	low NNE swell
1152	68° 03′ S, 08° 03′ E	11 iii	2004	3968*	SW × S	7–10	SW × S	3	o	1005·6	−1·1	−1·1	low conf. NE swell
1153	69° 22′ S, 09° 37·5′ E	12 iii	0906	—	SSE	16	SSE	3	b	1009·7	−7·4	−7·7	mod. conf. NE swell
1154	69° 20·8′ S, 09° 33·8′ E	12 iii	1035	3038*	S × E	10	S × E	2	bc	1009·0	−7·4	−7·4	mod. NNE swell
	69° 19·6′ S, 09° 34·1′ E		1200	—	SSE	12	SSE	3	bc	1008·7	−7·0	−7·8	mod. NE swell
	69° 16·1′ S, 09° 29·4′ E		1600	—	S × E	8	S × E	1	bc	1009·9	−5·1	−5·6	low N × E swell
	69° 15·8′ S, 09° 30·2′ E		2000	—	S × E	2	S × E	0–1	o	1008·8	−4·9	−5·7	low N × E swell
	69° 14·8′ S, 09° 37·3′ E		2335	—	Lt airs	1–3	—	0	bc	1007·9	−4·3	−5·0	mod. N × E swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1151	15	0	—	0·03	34·17	27·46	—	—	—	—	—	—	**N 50 V**	100–0	0902	0912	− 1 hour
													N 70 B	100–0	0922	0942	KT
													N 100 B				
													N 70 B	295–110	0922	0952	DGP
													N 100 B				
													N 100 H	0–5	0923	0953	
1152	15	0	—	−0·76	34·28	27·59	—	—	—	—	—	7·62	**N 70 V**	1000–300	**2005**		
		10	—	−0·79	34·29	27·59	—	—	—	—	—	—	,,	1000–750			
		20	—	−0·81	34·29	27·59	—	—	—	—	—	7·63	,,	750–500			
		30	—	−0·81	34·29	27·59	—	—	—	—	—	—	,,	500–250			
		40	—	−0·85	34·30	27·60	—	—	—	—	—	7·59	,,	250–100			
		50	—	−0·89	34·31	27·61	—	—	—	—	—	—	,,	100–50			
		60	—	−0·89	34·31	27·61	—	—	—	—	—	7·55	,,	50–0			
		80	—	−0·99	34·32	27·62	—	—	—	—	—	—	**N 50 V**	100–0	—	**2250**	
		100	—	−1·29	34·36	27·66	—	—	—	—	—	6·81	**N 70 B**	115–0	**2304**	**2324**	KT
		150	—	−0·87	34·50	27·76	—	—	—	—	—	5·72	**N 100 B**				
		200	—	0·41	34·61	27·80	—	—	—	—	—	4·78	**N 70 B**	340–120	**2304**	**2334**	DGP
		300	—	0·81	34·68	27·82	—	—	—	—	—	4·38	**N 100 B**				
		400	—	1·05	34·70	27·82	—	—	—	—	—	4·30	**N 100 H**	0–5	**2308**	**2338**	
		600	—	0·88	34·70	27·83	—	—	—	—	—	4·41					
		800	—	0·68	34·69	27·83	—	—	—	—	—	4·50					
		990	991	0·51	34·68	27·84	—	—	—	—	—	4·50					
		1490	—	0·20	34·68	27·86	—	—	—	—	—	4·67					
		1980	—	0·01	34·68	27·87	—	—	—	—	—	4·74					
		2480	—	−0·12	34·68	27·88	—	—	—	—	—	5·01					
		2970	2968	−0·19	34·67	27·87	—	—	—	—	—	5·04					
		3460	—	−0·20	34·67	27·87	—	—	—	—	—	5·09					
1153	16	—	—	—	—	—	—	—	—	—	—	—	**N 70 B**	117–0	0925	0945	KT. Station worked in streams of pancake ice and fragments of light floes
													N 100 B				
													N 70 B	365–140	0925	0955	DGP
													N 100 B				
													N 100 H	0–5	0923	0956	
1154	16	0	—	−1·57	34·14	27·50	—	1·98	21·42	0·24	44·7	7·66	**TYFV**	250–0	1200		Station worked in thin streams of pancake ice and occasional fragments of light floes
		10	—	−1·53	34·14	27·50	—	1·98	—	0·25	45·7	—	,,	500–250			
		20	—	−1·50	34·14	27·50	—	1·96	23·92	0·25	46·9	7·60	,,	750–500			
		30	—	−1·40	34·16	27·51	—	1·96	—	0·25	44·7	—	,,	1000–750			
		40	—	−1·37	34·21	27·55	—	1·92	25·70	0·24	42·2	7·51	,,	1500–1000			
		50	—	−1·23	34·23	27·56	—	1·92	—	0·24	44·7	—	,,	2000–0			
		60	—	−1·10	34·24	27·57	—	1·94	27·13	0·24	42·7	7·33	,,	2000–1500			
		80	—	−1·19	34·29	27·60	—	1·98	29·27	0·24	47·5	—	,,	2800–2000	—	**1930**	
		100	—	−1·39	34·32	27·64	—	2·01	28·20	0·21	50·0	6·86	**N 50 V**	100–0	1350	1400	
		150	—	−1·43	34·48	27·77	—	2·07	31·41	0·19	55·0	6·16	**N 70 V**	50–0	1625		
		200	—	0·81	34·57	27·73	—	2·15	33·91	0·00	61·2	5·17	,,	100–50			
		300	—	0·61	34·67	27·83	—	2·15	—	0·00	64·3	4·58	,,	250–100			
		400	—	0·82	34·68	27·82	—	2·15	35·70	0·00	65·5	4·44	,,	500–260			
		600	—	0·80	34·70	27·84	—	2·07	—	—	65·5	4·46	,,	750–520			
		800	—	0·59	34·70	27·85	—	2·05	34·62	—	67·8	4·54	,,	1000–770	—	1820	
		1000	—	0·41	34·69	27·85	—	2·05	—	—	84·4	4·60	**N 100 H**	0–5	**1949**	**2019**	
		1500	—	0·21	34·68	27·86	—	2·05	30·34	—	86·3	4·74	**TYFB**	240–0	**1949**	**2039**	DGP
		2000	—	−0·01	34·68	27·87	—	2·05	—	—	88·3	4·94	**N 70 B**				
		2500	—	−0·09	34·67	27·87	—	2·05	30·70	—	88·3	4·96	**N 70 H**	20–30	**2100**	**2130**	KT
		3000	—	−0·14	34·67	27·87	—	2·01	30·34	—	88·3	5·07	**N 100 H**				
													N 70 H	10	**2138**	**2208**	
													N 100 H	5			
													N 100 H	0–5	**2140**	**2210**	
													N 70 H	10	**2219**	**2249**	
													N 100 H	5			
													N 100 H	0–5	**2220**	**2250**	
													N 70 H	10	**2258**	**2328**	
													N 100 H	5			
													N 100 H	0–5	**2259**	**2329**	

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
		1933											
1155	67° 02·6′ S, 12° 13·9′ E	13 iii	1500	—	SW × S	16	SW × S	4	bc	1001·6	−0·7	−1·7	low NNW swell
1156	64° 43·3′ S, 14° 41·4′ E	14 iii	0830	4808*	SW × S	10–17	SW × S	3	c	996·7	0·0	−0·6	—
	64° 42·9′ S, 14° 41·9′ E		1200	—	SW × W	15	SW	3	o	996·3	0·0	−0·6	low S × W swell
	64° 41·5′ S, 14° 42·3′ E		1600	—	SW × W	14	SW × W	3	o	994·5	−0·8	−1·5	mod. conf. S and SE swells
1157	61° 51·5′ S, 14° 31·3′ E	15 iii	1100	—	N	5	—	0	o	990·7	−0·7	−1·2	mod. conf. W swell
1158	58° 37·5′ S, 14° 42·7′ E	16 iii	0830	5127*	SSW	18	SSW	3–4	csp	997·5	0·3	0·0	heavy WSW swell
	58° 35·2′ S, 14° 42·9′ E		1200	—	S × W	18	S × W	4	csp	999·3	0·6	−0·1	heavy WSW swell
	58° 35·8′ S, 14° 42·9′ E		1600	—	SSW	24	SSW	4	o	1000·3	0·0	−1·0	mod. WSW swell
1159	55° 48·7′ S, 14° 45·2′ E	17 iii	1106	—	WSW	23	WSW	5	osp	997·1	0·6	0·1	mod. WSW swell
1160	52° 41·5′ S, 14° 30·4′ E	18 iii	0830	2633*	SW × W	24	SW × W	6	o	1001·3	1·1	0·0	heavy SW swell
	52° 43·1′ S, 14° 29·1′ E		1200	—	SW × W	24	SW × W	5	c	1002·0	1·1	0·0	heavy SW swell
	52° 45·2′ S, 14° 27′ E		1600	—	WSW	17	WSW	5	o	998·1	0·6	0·1	heavy SW swell
	52° 45·6′ S, 14° 24·7′ E		2000	—	W × N	24	W × N	5	ope	998·1	1·3	1·2	heavy SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m^3: P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
1155	17	0	—	−0·23	34·14	27·45	—	—	—	—	—	—	**N 100 H**	0–5	1525	1555	
													TYFB / **N 70 B**	300–0	1525	1615	DGP
													N 50 V	100–0	1629	1635	
1156	18	0	—	0·69	33·96	27·25	—	1·41	26·77	0·30	26·9	7·53	**TYFV**	3100–2000	0851		
		10	—	0·69	33·96	27·25	—	1·39	—	0·30	27·1	—	,,	2000–1500			
		20	—	0·67	33·96	27·25	—	1·35	26·77	0·29	28·5	7·51	,,	1500–1000			
		30	—	0·49	34·01	27·30	—	1·43	—	0·28	28·5	—	,,	1000–760			
		40	—	0·31	34·05	27·34	—	1·44	24·99	0·27	29·4	7·42	,,	750–500			
		50	—	−1·36	34·28	27·61	—	1·88	—	0·25	44·1	—	,,	500–250			
		60	—	−1·50	34·33	27·64	—	1·81	31·77	0·28	48·1	6·76	,,	250–0	—	1515	
		80	—	−0·92	34·42	27·69	—	2·03	36·41	0·34	52·0	—	**N 50 V**	100–0	1215	1222	
		100	—	0·29	34·58	27·77	—	2·03	38·91	0·10	56·7	4·77	**N 100 H**	0–5	1545	1615	
		150	—	1·01	34·67	27·80	—	2·17	36·77	0·00	59·3	4·30	**TYFB** / **N 70 B**	280–0	1545	1635	DGP
		200	—	1·13	34·68	27·80	—	2·15	37·48	0·00	61·2	4·26					
		300	—	1·11	34·68	27·80	—	2·17	—	0·00	63·3	4·30					
		400	—	1·11	34·70	27·82	—	2·01	36·41	0·00	67·8	4·35					
		600	—	0·95	34·70	27·83	—	2·03	—	—	70·3	4·47					Reversing bottles at 770, 960, 1440, 1910 and 2872 metres were on same haul, whilst reversing bottles at 2480, 3470, 3960 and 4454 metres were on another haul
		770	—	0·79	34·70	27·84	—	2·03	38·55	—	73·0	4·37					
		960	—	0·61	34·69	27·84	—	2·03	—	—	79·1	4·56					
		1440	—	0·33	34·68	27·85	—	1·96	34·62	—	82·5	4·45					
		1910	—	0·08	34·68	27·87	—	1·96	—	—	82·5	4·77					
		2480	—	−0·12	34·67	27·87	—	1·96	34·27	—	80·8	4·60					
		2870	2872	−0·20	34·67	27·87	—	1·92	—	—	82·5	4·99					
		3470	—	−0·21	34·67	27·87	—	1·88	34·27	—	88·3	4·99					
		3960	—	−0·29	34·66	27·87	—	1·84	—	—	88·3	5·25					
		4460	4454	−0·31	34·66	27·87	—	1·84	35·34	—	86·3	5·19					
1157	19	0	—	0·89	33·96	27·24	—	—	—	—	—	—	**N 50 V**	100–0	1115	1122	
													TYFB / **N 70 B**	240–0	1128	1218	DGP
1158	20	0	—	0·61	33·78	27·12	—	1·67	25·70	0·36	33·6	7·47	**TYFB** / **N 70 B**	260–0	0841	0931	DGP
		10	—	0·61	33·78	27·12	—	1·67	—	0·36	36·2	—					
		20	—	0·61	33·78	27·12	—	1·56	26·77	0·36	36·2	7·48	**N 50 V**	100–0	1000	1010	
		30	—	0·61	33·78	27·12	—	1·54	—	0·36	38·3	—	**TYFV**	3000–2000	0955		
		40	—	0·60	33·79	27·13	—	1·56	27·84	0·36	40·0	7·46	,,	2000–1500			
		50	—	−1·69	34·16	27·51	—	2·05	—	0·41	50·0	—	,,	1500–1000			
		60	—	−1·78	34·19	27·55	—	2·05	32·13	0·44	52·7	7·26	,,	1000–730			
		80	—	−1·78	34·22	27·56	—	2·07	31·05	0·45	53·5	—	,,	750–500			
		100	—	−1·69	34·25	27·58	—	1·92	32·84	0·38	57·5	6·99	,,	500–250			
		150	—	−0·39	34·55	27·79	—	2·15	34·98	0·00	66·6	5·08	,,	250–0	—	1635	
		200	—	0·21	34·66	27·84	—	2·24	36·41	0·00	73·0	4·47					
		300	—	0·39	34·67	27·84	—	2·24	—	0·00	82·5	4·29					
		390	—	0·35	34·67	27·84	—	2·11	36·77	0·00	80·8	4·26					
		490	—	0·36	34·68	27·85	—	2·17	—	—	82·5	4·09					
		580	—	0·35	34·68	27·85	—	2·17	—	—	84·4	4·19					
		780	—	0·25	34·67	27·85	—	2·15	36·77	—	88·3	4·41					
		970	—	0·14	34·67	27·85	—	2·05	—	—	88·3	4·52					
		1460	1464	−0·04	34·67	27·86	—	1·96	36·41	—	86·3	4·76					
		1940	—	−0·19	34·67	27·87	—	1·94	—	—	84·4	4·95					
		2430	2426	−0·30	34·66	27·87	—	1·86	34·98	—	88·3	5·03					
		2970	—	−0·36	34·66	27·87	—	1·92	—	—	86·3	5·12					
		3470	—	−0·41	34·66	27·87	—	2·00	34·62	—	86·3	5·02					
		3970	—	−0·45	34·66	27·87	—	1·92	—	—	86·3	5·31					
		4460	4460	−0·49	34·66	27·87	—	1·90	34·98	—	79·1	5·27					
		4960	—	−0·45	34·66	27·87	—	1·92	34·98	—	78·3	5·33					
1159	21	0	—	0·52	33·99	27·29	—	—	—	—	—	—	**N 50 V**	100–0	1125	1136	
													TYFB / **N 70 B**	230–0	1152	1238	DGP. **N 70 B** split
1160	22	0	—	1·01	33·96	27·23	—	1·88	27·84	0·36	33·3	7·35	**TYFB**	270–0	0852	0942	DGP
		10	—	1·01	33·96	27·23	—	1·88	—	0·36	40·0	—	**TYFV**	250–0	1000		
		20	—	1·01	33·96	27·23	—	1·86	28·20	0·36	40·0	7·37	,,	500–250			
		30	—	1·01	33·96	27·23	—	1·81	—	0·36	40·4	—	,,	750–500			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
		1933											
1160	52° 41·5′ S, 14° 30·4′ E	18 iii	0830										
cont.	52° 43·1′ S, 14° 29·1′ E		1200										
	52° 45·2′ S, 14° 27′ E		1600										
	52° 45·6′ S, 14° 24·7′ E		2000										
1161	50° 23·1′ S, 13° 55·2′ E	19 iii	1606	—	W	22	W	6	ome	991·6	3·1	2·9	heavy conf. WSW swell
1162	46° 47·2′ S, 12° 39·4′ E	21 iii	0621	4522*	W	24	W	5	bc	990·0	5·7	4·1	heavy conf. WNW swell
	46° 47·9′ S, 12° 37·5′ E		1200	—	W	24	W	5	bcpq	991·2	6·1	4·0	heavy conf. W swell
1163	44° 35·9′ S, 11° 35·5′ E	22 iii	1130	—	W × N	38	W × N	7	bcq	1001·9	8·4	6·6	heavy conf. W swell
1164	41° 45′ S, 10° 07·6′ E	23 iii	1630	4556	SW × S	30	SW × S	6	bcq	1010·6	7·9	5·5	heavy conf. W swell
1165	41° 01′ S, 09° 34·3′ E	24 iii	0607	4641*	WSW	18	WSW	4	c	1018·8	9·4	7·4	heavy conf. WSW swell
	40° 58·6′ S, 09° 32·8′ E		0800	—	W × N	15	W × N	4	c	1019·1	9·9	7·1	heavy conf. SW swell
	40° 57·3′ S, 09° 30·1′ E		1200	—	NW × W	21	NW × W	4	opr	1018·2	10·0	9·8	heavy conf. SW swell
	40° 54·7′ S, 09° 25·5′ E		1600	—	NW	21–22	NW	5	op	1016·3	12·3	11·8	heavy conf. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³: P	Nitrate + Nitrite N_3	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
1160 *cont.*	22	40	—	1·01	33·96	27·23	—	1·81	28·56	0·36	43·6	7·36	**TYFV**	1000–750			
		50	—	1·01	33·96	27·23	—	1·81	—	0·36	43·6	—	,,	1500–1000	—	**2135**	
		60	—	1·01	33·96	27·23	—	1·81	28·56	0·36	43·6	7·39	**N 50 V**	100–0	1640	1651	
		80	—	0·96	33·96	27·24	—	1·71	32·48	0·36	43·6						
		100	—	0·10	34·05	27·35	—	2·01	34·62	0·36	48·7	6·54					
		150	—	0·12	34·30	27·55	—	2·13	36·05	0·19	60·3	5·47					
		200	—	1·01	34·47	27·64	—	2·15	41·41	0·00	62·2	4·58					
		300	—	1·62	34·61	27·72	—	2·19	—	0·00	65·5	4·14					
		400	—	1·63	34·66	27·75	—	2·15	34·98	0·00	67·8	4·18					
		590	—	1·50	34·68	27·78	—	2·01	—	—	73·0	4·23					
		790	—	1·40	34·72	27·81	—	2·01	35·70	—	75·9	4·34					
		990	—	1·09	34·70	27·82	—	2·01	—	—	79·1	4·41					
		1480	—	0·67	34·70	27·85	—	1·90	34·98	—	86·3	4·52					
		1980	—	0·46	34·69	27·84	—	2·17	—	—	88·3	4·59					
		2470	2472	0·29	34·68	27·85	—	2·17	34·27	—	88·3	4·65					
1161	23	0	—	2·76	33·98	27·12	—	—	—	—	—	—	**N 100 B**	91–0	1621	1641	KT
													N 100 B	340–150	1621	1651	DGP
1162	24	0	—	6·00	33·96	26·75	—	1·39	14·99	0·50	6·0	6·66	**TYFB**	} 280–0	0635	0725	DGP. **N 70 B** net damaged
		10	—	6·00	33·96	26·75	—	1·27	—	0·50	5·5	—	**N 70 B**				
		20	—	6·00	33·96	26·75	—	1·37	15·71	0·51	5·5	6·68	**TYFSV**	250–0	0830		
		30	—	6·00	33·96	26·75	—	1·44	—	0·51	5·5	—	,,	500–250			
		40	—	6·00	33·96	26·75	—	1·25	15·71	0·52	7·4	6·65	,,	750–500	—	1420	
		50	—	6·00	33·96	26·75	—	1·25	—	0·51	4·9	—	**N 50 V**	100–0	1435	1444	
		60	—	6·00	33·96	26·75	—	1·22	15·71	0·51	5·0	6·66					
		80	—	6·00	33·96	26·75	—	1·18	15·71	0·51	5·1						
		100	—	5·61	33·96	26·80	—	1·29	16·42	0·80	6·4	6·64					
		150	—	4·58	34·14	27·06	—	1·35	26·41	0·00	7·6	6·59					
		190	—	4·18	34·14	27·11	—	1·41	25·70	0·00	9·0	6·50					
		290	—	3·70	34·15	27·17	—	1·63	—	0·00	10·7	5·95					
		390	—	3·24	34·18	27·24	—	1·63	27·13	0·00	13·3	5·84					
		580	—	2·70	34·23	27·32	—	1·82	—	—	22·3	5·34					
		770	—	2·55	34·32	27·41	—	2·11	36·41	—	38·3	4·74					
		970	—	2·52	34·46	27·52	—	2·19	—	—	40·4	4·14					
		1450	1451	2·53	34·68	27·69	—	2·09	35·70	—	44·1	3·97					
		1970	—	2·39	34·77	27·78	—	1·88	—	—	46·9	4·39					
		2460	—	2·01	34·77	27·81	—	1·60	29·63	—	52·7	4·32					
		2960	—	1·55	34·76	27·83	—	1·84	—	—	70·3	4·45					
		3450	—	1·07	34·72	27·84	—	1·92	33·20	—	75·9	4·55					
		3940	3939	0·83	34·70	27·84	—	1·96	33·91	—	79·1	4·44					
1163	26	0	—	7·60	34·13	26·67	—	—	—	—	—	—					Weather conditions too bad for nets and further observations
		200	—	5·80	34·23	26·99	—	—	—	—	—	5·62					
		400	—	4·72	34·23	27·12	—	—	—	—	—	6·41					
		590	—	3·60	34·20	27·21	—	—	—	—	—	5·57					
		790	786	2·94	34·24	27·31	—	—	—	—	—	5·09					
1164	27	0	—	10·71	34·40	26·38	—	—	—	—	—	—					Weather conditions too bad for nets
		400	—	5·59	34·31	27·08	—	—	—	—	—	5·42					
		600	—	4·23	34·22	27·16	—	—	—	—	—	5·34					
		790	—	3·51	34·28	27·29	—	—	—	—	—	5·03					
		990	—	2·96	34·36	27·40	—	—	—	—	—	4·51					
		1190	1186	2·81	34·47	27·50	—	—	—	—	—	3·98					
1165	28	0	—	15·50	35·23	26·05	—	0·36	1·43	0·24	3·1	5·31	**TYFB**	} 250–0	0618	0708	DGP
		10	—	15·50	35·23	26·05	—	0·36	—	0·24	4·0	—	**N 70 B**				
		20	—	15·50	35·23	26·05	—	0·36	1·43	0·25	4·0	5·31	**TYFSV**	250–0	0735		
		30	—	15·50	35·23	26·05	—	0·36	—	0·25	3·9	—	,,	500–250			
		40	—	15·50	35·23	26·05	—	0·29	1·78	0·26	3·6	5·31	,,	750–500			
		50	—	15·50	35·23	26·05	—	0·25	—	0·25	3·2	—	,,	1000–750			
		60	—	15·50	35·23	26·05	—	0·25	1·43	0·26	3·1	5·31	,,	1500–1000			
		80	—	15·50	35·23	26·05	—	0·27	1·43	0·26	3·0	—	,,	2000–1470	—	1520	
		100	—	15·49	35·23	26·06	—	0·25	1·43	0·24	2·7	5·30	**N 50 V**	100–0	1535	1545	
		150	—	15·43	35·23	26·07	—	0·29	3·21	0·25	2·6	5·30					
		200	—	9·71	34·47	26·61	—	0·89	15·71	1·14	9·8	5·85					
		290	—	9·29	34·81	26·95	—	1·60	—	0·06	11·7	4·23					
		390	—	7·31	34·65	27·12	—	1·58	27·13	0·14	18·6	4·05					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
		1933											
1165	41° 01′ S, 09° 34·3′ E	24 iii	0607										
cont.	40° 58·6′ S, 09° 32·8′ E		0800										
	40° 57·3′ S, 09° 30·1′ E		1200										
	40° 54·7′ S, 09° 25·5′ E		1600										
1166	38° 32·7′ S, 07° 48·3′ E	25 iii	1300	5288*	W × S	10	W × S	2	ce	1026·9	14·2	13·6	mod. conf. W × S swell
1167	36° 01·3′ S, 06° 31·5′ E	26 iii	0834	5290*	W × N	6	W × N	1	c	1028·0	18·3	15·6	low SW × S swell
	36° 00·5′ S, 06° 34·2′ E		1200	—	Lt airs	2–3	—	0	c	1027·5	20·2	16·8	low SW × S swell
	36° 00′ S, 06° 31·4′ E		1600	—	SSW	2	SSW	1	c	1024·9	19·5	16·6	low conf. SSE and SW swells
1168	34° 08·2′ S, 15° 34·2′ E	4 iv	0900	4128*	S × E	20–23	S × E	5	bc	1019·0	17·1	14·6	SSE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1165 *cont.*	28	580	—	4·85	34·48	27·30	—	2·76	—	0·00	26·2	4·12					
		780	—	3·74	34·47	27·41	—	2·83	33·55	0·00	32·4	3·99					
		970	—	2·90	34·47	27·49	—	2·98	—	0·00	37·6	4·03					
		1460	—	2·63	34·67	27·68	—	2·83	32·48	0·00	43·6	4·00					
		1940	—	2·67	34·81	27·79	—	2·22	—	—	40·4	4·50					
		2430	2432	2·47	34·84	27·83	—	2·30	27·13	0·00	36·9	4·80					
		2930	—	2·32	34·84	27·84	—	2·01	—	0·00	39·1	4·89					
		3420	—	2·02	34·82	27·86	—	2·13	23·56	0·00	45·7	4·87					
		3910	—	1·37	34·77	27·86	—	2·41	—	0·00	61·2	4·41					
		4400	4395	1·07	34·75	27·87	—	2·59	28·56	0·00	63·3	4·52					
		Bottom	—	1·03	34·73	27·85											
1166	29	0	—	14·12	34·59	25·87	—	—	—	—	—	—	**N 50 V**	100–0	1456	1508	
		390	—	6·54	34·40	27·03	—	—		—	12·2	5·63	**TYFB**	} 306–0	1523	1613	DGP
		580	—	4·79	34·30	27·16	—	—	—	—	7·6	5·31	**N 70 B**				
		770	—	3·48	—	—	—	—	—	—	—	5·30					
		970	—	3·06	34·27	27·32	—	—	—	—	11·8	4·99					
		1160	—	2·85	34·40	27·44	—	—	—	—	18·9	4·51					
		1360	—	2·74	34·49	27·52	—	—	—	—	24·6	4·18					
		1550	1543	2·69	34·58	27·60	—	—	—	—	29·4	3·96					
1167	0	0	—	19·56	35·63	25·38	—	0·15	0·00	0·00	2·5	5·02	**TYFB**	} 280–0	0849	0939	DGP
		10	—	19·59	35·63	25·37	—	0·15	—	0·00	2·0	—	**N 70 B**				
		20	—	19·53	35·63	25·39	—	0·15	0·00	0·00	2·1	5·06	**TYFSV**	250–0	1010		
		30	—	19·52	35·63	25·39	—	0·13	—	0·00	2·8	—	,,	500–250			
		40	—	19·52	35·63	25·39	—	0·13	0·00	0·00	2·5	5·04	,,	750–500			
		50	—	19·40	35·62	25·41	—	0·13	—	0·00	2·3	—	,,	1000–750			
		60	—	19·22	35·62	25·46	—	0·13	0·00	0·00	2·7	5·06	,,	1500–0			
		80	—	16·72	35·44	25·93	—	0·17	0·00	0·05	1·9	—	,,	1500–1000			
		100	—	15·91	35·39	26·08	—	0·25	0·00	0·04	1·8	5·47	,,	2000–1500			
		150	—	14·42	35·26	26·31	—	0·40	3·28	0·04	2·8	5·10	,,	3000–2000	—	1710	
		200	—	13·02	35·03	26·43	—	0·55	7·14	0·00	2·5	5·11	**N 50 V**	100–0	1527	1534	
		300	—	11·90	34·98	26·62	—	0·67	—	0·00	2·9	4·80					
		390	—	10·99	34·97	26·77	—	1·03	13·56	0·00	3·7	4·88					
		590	—	7·14	34·51	27·03	—	1·79	—	—	11·0	4·60					
		790	—	4·41	34·31	27·21	—	1·96	27·13	—	13·5	5·03					
		990	—	3·63	34·33	27·31	—	2·19	—	—	23·3	4·57					
		1480	—	2·78	34·58	27·59	—	2·40	29·27	—	35·8	3·95					
		1970	—	2·77	34·80	27·77	—	1·98	—	—	29·9	4·47					
		2470	—	2·63	34·85	27·82	—	1·94	23·56	—	28·8	4·78					
		2960	—	2·43	34·86	27·84	—	1·62	—	—	29·9	4·70					
		3450	—	2·27	34·85	27·85	—	1·65	24·99	—	33·3	4·95					
		3950	—	1·67	34·80	27·86	—	1·81	—	—	46·3	4·75					
		4440	4443	1·19	34·75	27·86	—	2·15	28·20	—	52·7	4·56					
		4930	—	1·12	34·74	27·85	—	2·03	—	—	61·2	4·44					
1168	9	0	—	17·86	35·43	25·65	—	—	—	—	—	5·20	**TYFB**	} 272–0	0920	1010	DGP. −2 hours
		10	—	17·89	35·43	25·64	—	—	—	—	—	—	**N 70 B**				
		20	—	17·89	35·43	25·64	—	—	—	—	—	5·23	**N 50 V**	100–0	1020	1027	
		30	—	17·89	35·43	25·64											
		40	—	17·89	35·43	25·64	—	—	—	—	—	5·20					
		50	—	17·83	35·43	25·66											
		60	—	17·03	35·44	25·86	—	—	—	—	—	4·64					
		80	—	16·53	35·44	25·98											
		100	—	16·62	35·46	25·98	—	—	—	—	—	4·60					
		150	—	14·20	35·23	26·34	—	—	—	—	—	4·90					
		200	—	13·16	35·13	26·48	—	—	—	—	—	4·83					
		300	—	11·43	35·01	26·73	—	—	—	—	—	4·82					
		390	—	9·94	34·84	26·86	—	—	—	—	—	4·85					
		590	—	5·84	34·43	27·15	—	—	—	—	—	4·99					
		790	—	4·15	34·30	27·23	—	—	—	—	—	5·02					
		990	—	3·37	34·38	27·38	—	—	—	—	—	4·48					
		1480	1478	2·73	34·70	27·70	—	—	—	—	—	4·08					
		1980	—	2·73	34·88	27·84	—	—	—	—	—	4·63					
		2470	2468	2·48	34·88	27·86	—	—	—	—	—	4·85					
		2940	—	2·29	34·87	27·86	—	—	—	—	—	5·01					
		3450	—	1·99	34·85	27·87	—	—	—	—	—	4·74					
		3950	—	1·11	34·76	27·86	—	—	—	—	—	4·71					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
1169	33° 59·7′ S, 11° 36·8′ E	1933 5 iv	0903	4967*	S	20	S	3	cp	1017·1	17·2	15·7	mod. conf. S×W swell
			1200	—	S	20	S	4	bcp	1020·2	17·3	14·2	mod. conf. S×W swell
1170	33° 57·9′ S, 08° 10·6′ E	6 iv	0900	5130*	SE×E	16	SE×E	3	bc	1024·4	15·4	11·8	heavy SSW swell
1171	33° 29·6′ S, 05° 29·9′ E	7 iv	0300	5060*	E	12	E	2	bc	1021·6	17·2	15·0	heavy SSE swell
1172	33° 02·4′ S, 05° 15′ E	7 iv	0837	5163*	ENE	5–7	ENE	2	cp	1021·3	17·8	14·5	mod. SSE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	Mg.—atom m.³ P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
1169	10	0	—	18·23	35·54	25·65	—	—	—	—	—	5·07	**TYFB**				
		10	—	18·33	35·55	25·63	—	—	—	—	—	—	**N 70 B**	298–0	0921	1011	DGP
		20	—	18·33	35·55	25·63	—	—	—	—	—	5·07	**N 50 V**	100–0	1030	1038	
		30	—	18·33	35·55	25·63											
		40	—	18·33	35·55	25·63	—	—	—	—	—	5·06					
		50	—	18·33	35·55	25·63											
		60	—	18·33	35·55	25·63	—	—	—	—	—	5·07					
		80	—	18·23	35·54	25·65											
		100	—	17·53	35·53	25·82	—	—	—	—	—	4·60					
		150	—	16·32	35·46	26·05	—	—	—	—	—	4·55					
		200	—	14·89	35·35	26·29	—	—	—	—	—	4·57					
		300	—	12·89	35·11	26·52	—	—	—	—	—	4·80					
		400	—	11·64	35·02	26·70	—	—	—	—	—	4·90					
		600	—	9·00	34·71	26·92	—	—	—	—	—	4·76					Large stray on hydrological wire between 600 and 2000 metres
		800	—	5·70	34·50	27·21	—	—	—	—	—	4·60					
		1000	—	3·96	34·35	27·30	—	—	—	—	—	4·57					
		1500	—	2·83	34·66	27·65	—	—	—	—	—	4·03					
		2000	—	2·84	34·81	27·78	—	—	—	—	—	4·61					
		2500	—	2·75	34·86	27·81	—	—	—	—	—	4·77					Very large stray on hydrological wire between 2500 and 4500 metres
		3000	—	2·55	34·86	27·83	—	—	—	—	—	4·99					
		3500	—	2·38	34·87	27·86	—	—	—	—	—	5·00					
		4000	—	2·09	34·84	27·86	—	—	—	—	—	4·90					
		4500	—	1·29	34·77	27·86	—	—	—	—	—	4·64					
1170	11	0	—	19·27	35·66	25·47	—	—	—	—	—	5·05	**TYFB**	310–0	0915	1005	DGP
		10	—	19·17	35·65	25·49	—	—	—	—	—	—	**N 50 V**	100–0	1020	1031	
		20	—	18·95	35·65	25·55	—	—	—	—	—	5·11					
		30	—	18·94	35·65	25·55											
		40	—	18·86	35·64	25·56	—	—	—	—	—	5·09					
		50	—	18·85	35·64	25·56											
		60	—	18·83	35·64	25·57	—	—	—	—	—	5·09					
		80	—	18·58	35·60	25·60											
		100	—	17·23	35·51	25·87	—	—	—	—	—	4·64					
		150	—	15·72	35·44	26·17	—	—	—	—	—	4·75					
		200	—	14·51	35·28	26·31	—	—	—	—	—	4·86					
		300	—	12·58	35·14	26·60	—	—	—	—	—	4·84					
		400	—	11·17	34·98	26·76	—	—	—	—	—	4·89					
		600	—	7·64	34·59	27·03	—	—	—	—	—	4·50					
		800	—	4·52	34·29	27·18	—	—	—	—	—	5·12					
		990	—	3·55	34·41	27·38	—	—	—	—	—	4·60					
		1490	—	2·76	34·64	27·65	—	—	—	—	—	3·90					
		1990	1989	2·71	34·81	27·79	—	—	—	—	—	4·55					
		2490	—	2·57	34·86	27·83	—	—	—	—	—	4·87					
		2980	—	2·39	34·87	27·86	—	—	—	—	—	4·92					
		3480	—	2·20	34·86	27·86	—	—	—	—	—	4·81					
		3980	—	1·53	34·80	27·87	—	—	—	—	—	4·76					
		4480	—	1·12	34·77	27·87	—	—	—	—	—	4·71					
1171	12	0	—	19·90	35·66	25·31	—	—	—	—	—	5·00	**TYFB**	320–0	0314	0354	DGP. Large stray on hydrological wire, station abandoned
		400	—	11·42	35·01	26·73	—	—	—	—	—	4·82	**N 70 B**				
													N 50 V	100–0	0430	0445	
1172	12	0	—	19·61	35·69	25·40	—	—	—	—	—	5·01					
		10	—	19·73	35·70	25·38											
		20	—	19·73	35·70	25·38	—	—	—	—	—	4·99					
		30	—	19·73	35·70	25·38											
		40	—	19·73	35·70	25·38	—	—	—	—	—	4·99					
		50	—	19·73	35·70	25·38											
		60	—	19·73	35·70	25·38	—	—	—	—	—	4·99					
		80	—	18·43	35·55	25·60											
		100	—	17·85	35·53	25·74	—	—	—	—	—	4·58					
		150	—	16·61	35·46	25·98	—	—	—	—	—	4·42					
		190	—	14·91	35·35	26·28	—	—	—	—	—	4·56					
		290	—	13·10	35·18	26·54	—	—	—	—	—	4·67					
		380	—	11·20	34·96	26·72	—	—	—	—	—	4·80					
		580	—	8·10	34·61	26·97	—	—	—	—	—	4·24					
		770	—	4·68	34·34	27·21	—	—	—	—	—	4·78					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
1172 *cont.*	33° 02·4′ S, 05° 15′ E	1933 7 iv											
1173	29° 39′ S, 03° 37′ E	8 iv	0839	4880*	NE	15	NE	3	o	1014·1	19·6	15·9	mod. conf. E swell
	29° 37·1′ S, 03° 35·5′ E		1200	—	NE	11–14	NE	3 conf.	c	1014·3	20·4	15·8	mod. ESE swell
	29° 37·1′ S, 03° 35·5′ E		1600	—	N × E	10–12	N × E	3	bc	1010·2	20·8	16·7	mod. E swell
1174	25° 59·4′ S, 02° 11·8′ E	9 iv	1700	4949*	W	12	W	3	bc	1012·2	22·0	18·9	low SW × W swell
1175	23° 33·4′ S, 01° 14′ E	10 iv	1110	5216*	S × W	14	S × W	2	bc	1019·1	22·2	18·9	low S × W swell
	23° 36·4′ S, 01° 12′ E		1600	—	S × E	17–20	S × E	4 conf.	cqp	1017·5	21·2	18·4	low conf. SW swell
1176	20° 15·3′ S, 00° 15·2′ W	11 iv	1700	5526*	SE × E	25	SE × E	5	c	1017·9	21·6	17·8	heavy conf. SE × E and SW swells

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1172 *cont.*	12	960	—	3·65	34·38	27·35	—	—	—	—	—	4·47					
		1440	—	2·84	34·65	27·64	—	—	—	—	—	3·90					
		1920	1917	2·91	34·86	27·80	—	—	—	—	—	4·72					
		2400	—	2·67	34·86	27·82	—	—	—	—	—	4·88					
		2880	—	2·43	34·88	27·86	—	—	—	—	—	4·68					
		3360	—	2·34	34·88	27·87	—	—	—	—	—	4·80					
		3840	—	2·23	34·86	27·86	—	—	—	—	—	4·81					
		4320	—	1·75	34·84	27·89	—	—	—	—	—	4·83					
1173	13	0	—	21·04	35·62	24·97	—	0·13	0·00	0·00	3·7	4·90	**TYFB**	} 290–0	0853	0943	DGP. – 1 hour
		10	—	21·11	35·62	24·95	—	0·13	—	0·00	3·2	—	**N 70 B**				
		20	—	21·11	35·62	24·95	—	0·13	0·00	0·00	2·9	4·92	**TYFSV**	250–0	0955		
		30	—	21·11	35·62	24·95	—	0·11	—	0·00	2·7	—	,,	500–250			
		40	—	21·11	35·62	24·95	—	0·11	0·00	0·00	2·8	4·90	,,	750–500			
		50	—	21·11	35·62	24·95	—	0·10	—	0·00	3·2	—	,,	1000–750			
		60	—	21·11	35·62	24·95	—	0·11	0·00	0·00	2·9	4·93	,,	1500–1000			
		80	—	17·63	35·44	25·72	—	0·11	0·00	0·15	2·9	—	,,	2000–1500			
		100	—	16·01	35·40	26·07	—	0·17	2·64	0·28	3·6	5·01	,,	3000–2000	—	1700	
		150	—	14·63	35·29	26·29	—	0·19	3·43	0·00	4·3	5·05	**N 50 V**	100–0	1520	1528	
		200	—	13·22	35·10	26·45	—	0·27	7·14	0·00	4·2	5·09					
		290	—	11·81	35·01	26·66	—	0·32	—	0·00	5·5	4·81					
		390	—	10·08	34·82	26·82	—	0·44	17·13	0·00	6·5	4·77					
		590	—	6·37	34·47	27·11	—	1·31	—	—	10·4	4·56					
		780	—	4·07	34·50	27·40	—	1·41	28·20	—	13·2	4·72					
		980	—	3·55	34·43	27·40	—	1·88	—	—	23·8	4·00					
		1460	—	2·96	34·71	27·69	—	1·79	31·77	—	29·9	4·17					
		1950	—	3·03	34·87	27·80	—	1·39	—	—	25·8	4·73					
		2440	2440	2·67	34·91	27·87	—	1·33	27·49	—	24·0	5·00					
		2930	2926	2·44	34·90	27·88	—	1·31	—	—	27·1	5·02					
		3420	—	2·33	34·88	27·87	—	1·35	28·20	—	29·4	4·92					
		3910	—	1·83	34·83	27·87	—	1·52	—	—	36·5	4·80					
		4390	—	1·15	34·76	27·86	—	1·67	32·84	—	50·6	4·48					
1174	15	0	—	22·41	35·83	24·75	—	—	—	—	—	—	**N 50 V**	100–0	1740	1747	GMT
		390	—	9·20	34·75	26·92	—	—	—	—	7·4	4·19	**TYFB**	} 310–0	1804	1854	DGP
		580	—	5·84	34·43	27·15	—	—	—	—	12·3	4·13	**N 70 B**				
		970	—	3·35	34·48	27·46	—	—	—	—	25·3	3·88					
		1170	—	3·35	34·66	27·60	—	—	—	—	25·3	4·01					
		1360	1358	3·23	34·75	27·69	—	—	—	—	23·0	4·37					
1175	15	0	—	22·62	35·97	24·80	—	0·19	0·00	0·00	3·2	4·78	**TYFSV**	3000–1985	1115		
		10	—	22·52	35·97	24·83	—	0·17	—	0·00	3·7	—	,,	2000–1500			
		20	—	22·44	35·97	24·85	—	0·17	0·00	0·00	4·7	4·79	,,	1500–1000			
		30	—	22·44	35·99	24·86	—	0·17	—	0·00	5·1	—	,,	1000–750			
		40	—	22·44	36·00	24·88	—	0·17	0·00	0·00	3·7	4·82	,,	750–500			
		50	—	21·52	35·88	25·03	—	0·17	—	0·00	7·2	—	,,	500–250			
		60	—	20·36	35·72	25·24	—	0·23	0·00	0·00	3·7	5·35	,,	250–0	—	1708	
		80	—	17·57	35·63	25·88	—	0·30	0·00	0·00	3·5	—	**N 50 V**	100–0	1605	1612	Very small trace of nitrite present at 80 and 100 metres, amount too small to be determined
		100	—	16·53	35·54	26·06	—	0·30	0·00	0·00	3·5	5·19					
		150	—	14·82	35·32	26·27	—	0·36	3·64	0·00	3·6	4·95					
		190	—	12·91	35·08	26·49	—	0·67	14·28	0·00	4·6	4·61					
		290	—	11·51	35·01	26·71	—	0·82	—	0·00	5·1	4·59					
		390	—	9·29	34·75	26·90	—	1·33	20·35	0·00	7·6	4·33	**TYFB**	350–0	1740	1830	DGP
		580	—	5·08	34·41	27·22	—	1·01	—	—	13·7	4·22					
		780	—	4·05	34·42	27·33	—	2·22	33·91	—	17·7	3·89					
		970	—	3·41	34·49	27·46	—	2·20	—	—	23·4	3·79					
		1460	—	3·32	34·80	27·72	—	1·65	29·27	—	20·8	4·47					
		1940	—	3·02	34·88	27·81	—	1·24	—	—	19·1	4·79					
		2430	2423	2·63	34·91	27·87	—	1·43	25·70	—	23·2	5·12					
		2930	2927	2·44	34·91	27·89	—	1·29	—	—	23·5	5·10					
		3420	—	2·42	34·91	27·89	—	1·06	24·99	—	18·0	4·78					
		3910	—	2·43	34·90	27·88	—	1·37	—	—	24·6	4·89					
		4390	—	2·43	34·90	27·88	—	1·31	25·70	—	25·0	4·70					
		4880	—	2·53	34·90	27·87	—	1·22	—	—	25·0	4·89					
1176	17	0	—	22·82	35·98	24·75	—	—	—	—	—	—	**N 50 V**	100–0	1738	1745	
		200	—	13·32	35·13	26·44	—	—	—	—	4·2	4·29	**TYFB**	} 308–0	1804	1854	DGP
		400	—	8·56	34·70	26·98	—	—	—	—	10·0	3·15	**N 70 B**				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
		1933											
1176 *cont.*	20° 15·3′ S, 00° 15·2′ W	11 iv											
1177	17° 54·1′ S, 01° 18·8′ W	12 iv	1115	4947*	ESE	18–20	ESE	5	c	1016·4	22·8	19·2	heavy conf. SE swell
	17° 54·2′ S, 01° 17·9′ W		1600	—	ESE	20	ESE	5	bc	1014·1	22·8	19·2	heavy conf. SE swell
			2000	—	ESE	16	ESE	5	bc	1017·5	22·8	19·1	heavy conf. SE swell
1178	14° 25·9′ S, 02° 51·5′ W	13 iv	2000	5278*	SE×E	21	SE×E	4	cp	1013·6	23·1	20·9	mod. conf. SE swell
1179	12° 29·8′ S, 03° 41·8′ W	14 iv	1135	4199*	SE×E	18	SE×E	4	c	1012·5	23·9	21·2	mod. conf. SE×E swell
			1600	—	SE×E	19	SE×E	4	o	—	24·0	21·4	mod. conf. SE×E swell
1180	10° 30·8′ S, 04° 41·6′ W	15 iv	1100	3899*	SE	16	SE	4	bc	1021·3	25·4	21·2	mod. SE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS						Mg.—atom m.³					BIOLOGICAL OBSERVATIONS		TIME		Remarks
		Depth (metres)	Depth by thermometer	Temp. ° C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1176 *cont.*	17	600	—	5·77	34·50	27·20	—	—	—	—	14·7	2·64					
		800	—	4·42	34·48	27·35	—	—	—	—	18·8	3·05					
		1000	—	3·79	34·53	27·46	—	—	—	—	19·2	3·57					
		1200	—	3·56	34·66	27·58	—	—	—	—	20·2	3·93					
1177	17	0	—	23·33	36·40	24·92	—	0·11	0·00	0·00	2·9	4·67	**TYFSV**	250–0	1125		
		10	—	23·33	36·40	24·92	—	0·11	—	0·00	2·9	—	,,	500–250			
		20	—	23·33	36·40	24·92	—	0·11	0·00	0·00	3·1	4·67	,,	750–500			
		30	—	23·33	36·40	24·92	—	0·11	—	0·00	3·4	—	,,	1000–750			
		40	—	23·05	36·34	24·96	—	0·11	0·00	0·00	10·0	4·72	,,	1500–1000			
		50	—	19·11	35·82	25·64	—	0·21	—	0·00	3·4	—	,,	2000–1500	—	2015	
		60	—	18·43	35·81	25·80	—	0·23	0·00	0·00	3·7	5·27	**N 50 V**	100–0	1750	1800	
		80	—	17·73	35·78	25·96	—	0·30	1·57	0·82	3·8						
		100	—	17·10	35·65	26·00	—	0·42	3·78	0·42	3·6	4·71					
		150	—	15·12	35·45	26·31	—	0·51	7·50	0·00	4·3	4·42					
		200	—	13·62	35·23	26·46	—	0·76	15·35	0·00	5·6	3·96					
		290	—	10·22	34·88	26·84	—	1·46	—	0·00	7·1	3·49					
		390	—	7·93	34·66	27·04	—	1·96	30·70	0·00	11·3	2·79					
		590	—	5·23	34·49	27·26	—	2·32	—	—	16·2	2·96					
		780	—	4·22	34·49	27·37	—	2·24	39·98	—	20·5	3·23					
		980	—	3·78	34·59	27·51	—	2·20	—	—	22·0	3·46					
		1460	—	3·49	34·95	27·82	—	1·43	27·13	—	16·5	4·00					
		1950	—	3·19	34·95	27·85	—	1·44	—	—	17·3	4·93					
		2440	2436	2·84	34·93	27·87	—	1·33	23·92	—	21·3	5·01					
		2930	—	2·60	34·91	27·88	—	1·37	—	—	23·9	4·91					
		3420	—	2·51	34·91	27·88	—	1·31	23·92	—	24·8	4·81					
		3900	—	2·43	34·91	27·89	—	1·18	—	—	21·3	4·47					
		4390	—	2·43	34·91	27·89	—	1·31	24·99	—	24·5	4·68					
		4680	—	2·50	34·91	27·89	—	1·20	—	—	25·6	4·87					
1178	19	0	—	24·30	36·64	24·81	—	—	—	—	—	—	**N 50 V**	100–0	2020	2030	
		190	—	11·69	35·09	26·74	—	—	—	—	7·0	1·85	**TYFB**	} 310–0	2100	2150	DGP
		390	—	8·00	34·76	27·10	—	—	—	—	10·5	1·42	**N 70 B**				
		580	—	5·58	34·55	27·28	—	—	—	—	15·0	1·96					
		770	—	4·66	34·49	27·33	—	—	—	—	16·4	2·60					
		970	—	4·07	34·56	27·45	—	—	—	—	17·6	3·17					
		1160	1162	3·77	34·72	27·61	—	—	—	—	18·6	3·68					
1179	19	0	—	25·19	36·53	24·46	—	0·11	0·29	0·00	3·6	4·43	**TYFSV**	250–0	1145		
		10	—	25·15	36·53	24·47	—	0·11	—	0·00	3·4	—	,,	500–250			
		20	—	25·15	36·53	24·47	—	0·11	0·00	0·00	3·1	4·43	,,	750–500			
		30	—	25·13	36·53	24·48	—	0·11	—	0·00	3·1	—	,,	1000–750			
		40	—	24·52	36·59	24·71	—	0·11	0·14	0·00	3·2	4·59	,,	1500–1000			Small hole in net
		50	—	22·45	36·46	25·22	—	0·15	—	0·00	3·8	—	,,	2000–1500	—	1800	above bucket
		60	—	20·53	36·31	25·63	—	0·17	0·29	0·00	3·8	5·12	**N 50 V**	100–0	1605	1615	
		80	—	16·63	35·88	26·29	—	0·78	15·35	0·93	5·9						
		100	—	14·68	35·61	26·53	—	1·29	23·92	2·14	7·4	2·26					
		150	—	11·74	35·17	26·80	—	2·05	31·77	0·00	7·9	1·38					
		190	—	10·67	35·03	26·88	—	2·05	32·13	0·00	8·9	1·38					
		290	—	9·19	34·87	27·00	—	2·49	—	0·00	11·0	1·27					
		390	—	8·10	34·75	27·09	—	2·49	39·26	0·00	10·7	1·39					
		580	—	6·22	34·57	27·20	—	2·03	39·62	—	14·0	1·65					
		770	—	4·69	34·63	27·44	—	2·01	38·55	—	17·5	2·46					
		970	—	4·09	34·56	27·45	—	2·43	—	—	19·0	3·08					
		1450	1448	3·61	34·88	27·75	—	1·65	27·49	—	16·5	4·37					
		1950	—	3·22	34·92	27·82	—	1·20	—	—	17·6	4·69					
		2430	—	2·88	34·92	27·85	—	1·24	24·63	—	21·2	4·93					
		2920	2917	2·61	34·91	27·88	—	1·29	—	—	21·2	4·98					
		3410	—	2·49	34·91	27·89	—	1·41	23·20	—	22·6	4·96					
		3890	—	2·41	34·91	27·89	—	0·93	—	—	24·8	4·78					
1180	20	0	—	26·41	36·33	23·93	—	0·30	0·21	0·00	3·2						
		40	—	23·84	36·41	24·78	—	0·32	0·00	0·00	8·7	4·74					
		60	—	20·73	36·26	25·54	—	0·32	0·36	0·00	5·9	4·73					
		80	—	19·87	36·12	25·67	—	0·46	7·14	0·51	5·7						
		100	—	17·19	35·88	26·15	—	0·97	14·99	1·00	6·5	3·21					
		200	—	10·91	35·00	26·81	—	2·03	36·77	0·00	10·1	1·42					

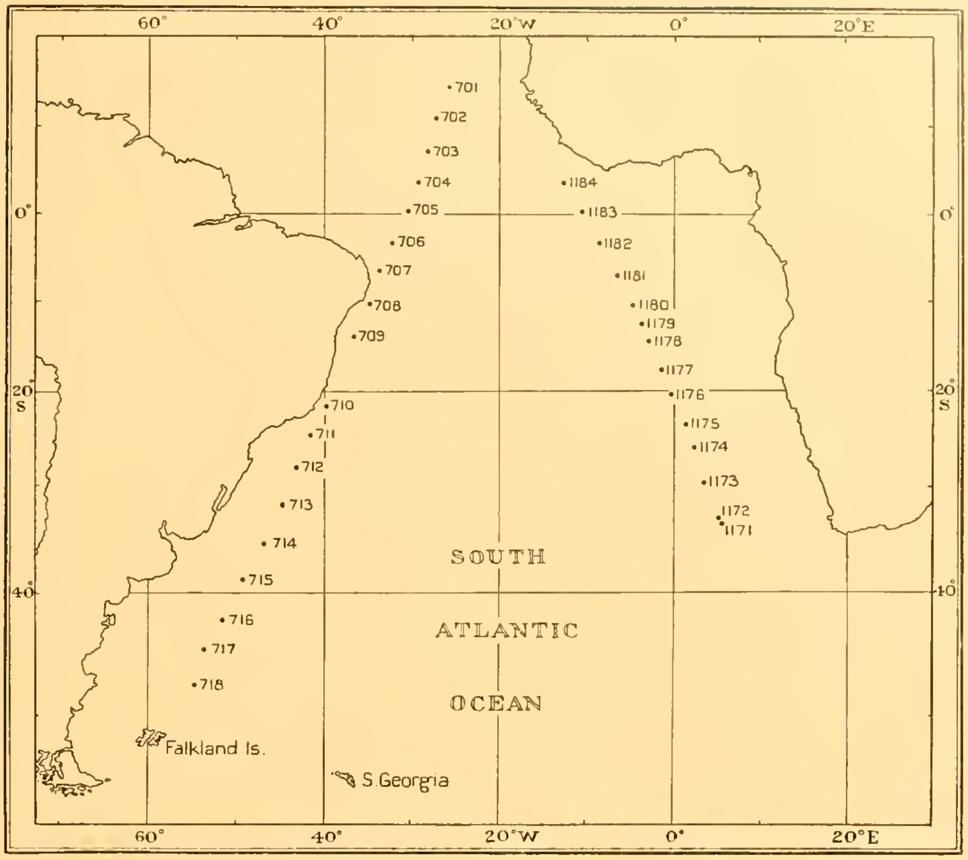
Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
1180 *cont.*	10° 30·8′ S, 04° 41·6′ W	1933 15 iv											
1181	06° 59·3′ S, 06° 30·8′ W	16 iv	1100	4565*	SE × S	17	SE × S	4	c	1011·8	27·4	23·2	mod. SE swell
1182	03° 20·8′ S, 08° 37·2′ W	17 iv	1100	4312*	E × S to SE × S	8–17	Conf.	3	c	1009·4	27·2	25·2	mod. SE swell
1183	00° 07′ N, 10° 35·7′ W	18 iv	1100	4294*	SE × E	10	SE × E	3	bc	1009·0	28·6	25·0	mod. SE swell
1184	03° 46·2′ N, 12° 55·1′ W	19 iv	1100	4552*	Calms and Lt airs	0–1	—	0	cp	1011·7	28·8	25·7	mod. SE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS											BIOLOGICAL OBSERVATIONS				Remarks
								Mg.—atom m.³							TIME		
		Depth (metres)	Depth by thermometer	Temp. °C.	S ‰	σt	pH	P	Nitrate + Nitrite N_2	Nitrite N_2	Si	O_2 c.c. litre	Gear	Depth (metres)	From	To	
1180 *cont.*	20	390	—	7·83	34·70	27·09	—	2·43	37·84	0·00	11·3	1·49					
		590	—	6·04	34·62	27·28	—	1·98	37·84	—	12·9	1·95					
		780	—	4·80	34·50	27·32	—	2·43	37·84	—	15·8	2·49					
		980	—	4·06	34·58	27·47	—	2·13	34·62	—	17·8	3·25					
		1170	1166	3·90	34·73	27·60	—	1·88	32·13	—	17·0	3·64					
1181	21	0	—	27·41	36·11	23·44	—	0·10	0·00	0·00	5·1	4·26					
		40	—	26·19	36·17	23·88	—	0·11	0·00	0·00	5·0	4·49					
		60	—	18·12	35·74	25·83	—	1·08	18·92	0·55	6·6	2·78					
		80	—	15·10	35·51	26·36	—	1·46	27·13	0·00	6·9						
		100	—	13·51	35·35	26·58	—	1·48	27·84	0·00	7·4	2·35					
		190	—	10·62	35·01	26·88	—	2·01	32·48	0·00	10·3	1·75					
		290	—	9·49	34·88	26·96	—	2·17	33·91	0·00	10·8	1·60					
		380	—	8·50	34·79	27·06	—	2·53	38·91	0·00	11·0	1·38					
		570	—	6·04	34·57	27·23	—	2·32	38·91	—	14·0	1·81					
		770	—	4·57	34·49	27·34	—	1·81	36·41	—	17·1	2·94					
		960	—	4·12	34·58	27·46	—	2·20	29·98	—	17·8	3·23					
		1150	—	4·06	34·75	27·61	—	1·20	33·20	—	15·3	3·62					
		1340	1341	3·99	34·88	27·71	—	1·43	27·84	—	13·8	4·33					
1182	22	0	—	28·44	35·17	22·41	—	0·00	—	0·00	7·4	4·26					+1 hour
		40	—	27·51	35·35	22·84	—	0·06	—	0·00	4·7	4·39					
		60	—	17·63	35·62	25·86	—	1·14	—	0·56	9·1	3·05					
		80	—	15·22	35·59	26·39	—	1·24	—	0·00	8·5						
		100	—	14·62	35·53	26·49	—	1·31	—	0·00	8·6	2·89					
		190	—	13·11	35·28	26·60	—	1·73	—	0·00	12·2	1·74					
		290	—	10·70	35·02	26·87	—	1·88	—	0·00	9·9	2·08					
		390	—	8·61	34·81	27·06	—	2·28	—	0·00	12·1	1·59					
		580	—	5·77	34·55	27·25	—	2·28	—	—	15·1	2·88					
		780	—	4·66	34·57	27·39	—	2·07	—	—	16·5	2·79					
		970	—	4·18	34·64	27·51	—	2·07	—	—	18·9	3·27					
		1170	—	4·22	34·82	27·65	—	1·90	—	—	15·9	3·86					
		1360	1357	4·04	34·92	27·74	—	1·54	—	—	14·0	4·42					
1183	23	0	—	28·62	34·57	21·89	—	0·00	0·00	0·00	3·8	4·21					
		40	—	25·74	36·07	23·94	—	0·10	0·00	0·00	3·5	4·26					
		60	—	22·21	36·26	25·13	—	0·15	2·14	0·81	3·5	3·87					
		80	—	19·04	36·09	25·87	—	0·29	5·71	0·02	4·9						
		100	—	16·52	35·75	26·22	—	0·78	11·07	0·01	4·9	3·65					
		190	—	13·07	35·28	26·61	—	1·20	18·56	0·00	7·2	3·19					
		290	—	9·72	34·91	26·95	—	2·07	33·20	0·00	10·0	1·69					
		390	—	7·70	34·70	27·11	—	2·22	33·91	0·00	11·0	2·35					
		580	—	6·56	34·52	27·12	—	2·15	35·70	—	15·0	2·95					
		780	—	4·53	34·56	27·40	—	1·79	34·62	—	15·4	3·29					
		970	—	4·33	34·63	27·48	—	2·19	35·70	—	16·2	3·28					
		1170	—	4·35	34·78	27·60	—	1·54	32·48	—	15·1	3·74					
		1360	1357	4·21	34·92	27·72	—	1·29	27·49	—	11·7	4·52					
1184	24	0	—	29·52	34·82	21·78	—	0·00	—	0·00	1·6	4·26					
		40	—	29·35	35·34	22·22	—	0·00	—	0·00	1·6	4·35					
		60	—	26·42	35·71	23·46	—	0·00	—	0·00	2·1	4·25					
		80	—	16·32	35·57	26·13	—	1·52	—	0·13	6·0						
		100	—	15·60	35·53	26·27	—	1·39	—	0·01	4·9	2·19					
		190	—	13·47	35·34	26·58	—	1·37	—	0·00	6·7	2·83					
		290	—	11·11	35·08	26·83	—	2·05	—	0·00	9·1	1·44					
		390	—	8·60	34·75	27·01	—	2·22	—	0·00	11·8	2·00					
		580	—	6·20	34·65	27·27	—	1·90	—	—	14·6	2·32					
		780	—	4·90	34·56	27·36	—	2·30	—	—	17·2	2·80					
		970	—	4·46	34·65	27·48	—	1·98	—	—	16·1	3·15					
		1170	—	4·35	34·79	27·60	—	1·81	—	—	15·0	3·61					
		1360	1353	4·13	34·92	27·73	—	1·37	—	—	14·0	4·30					

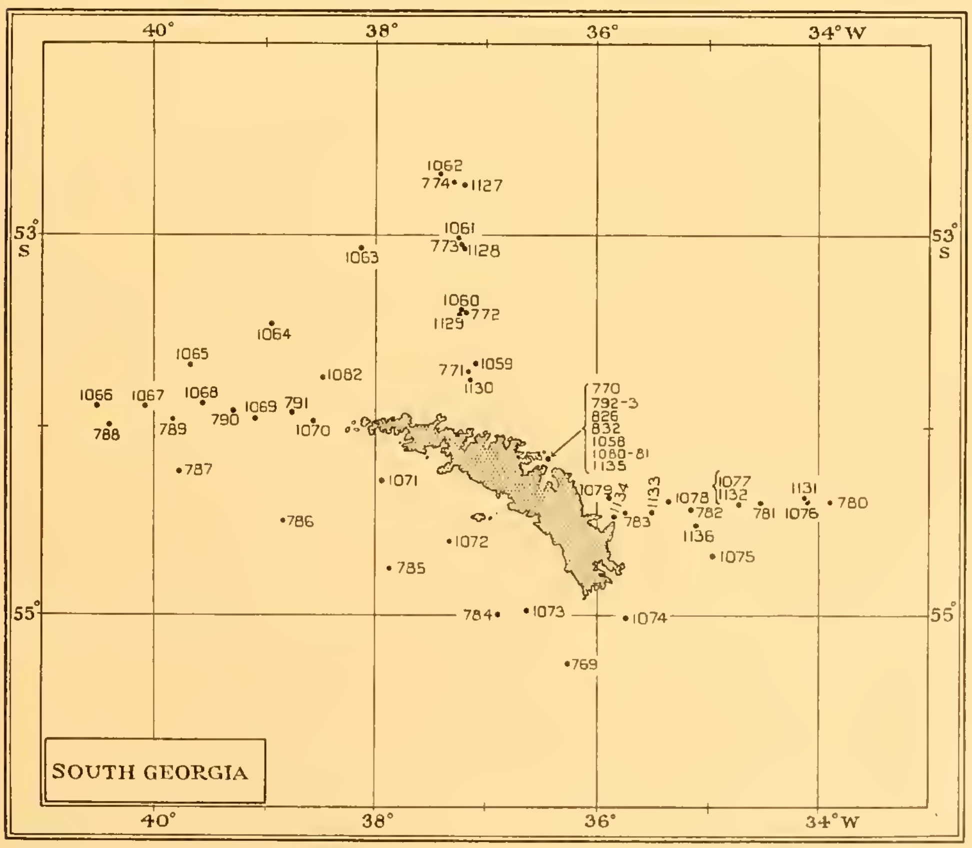
SUMMARIZED LIST OF STATIONS

The positions of all stations made by the R.R.S. 'Discovery II' between October 1931 and April 1933 are shown on the charts reproduced in Plates I–IV. The following list indicates on which chart each of the stations is to be found.

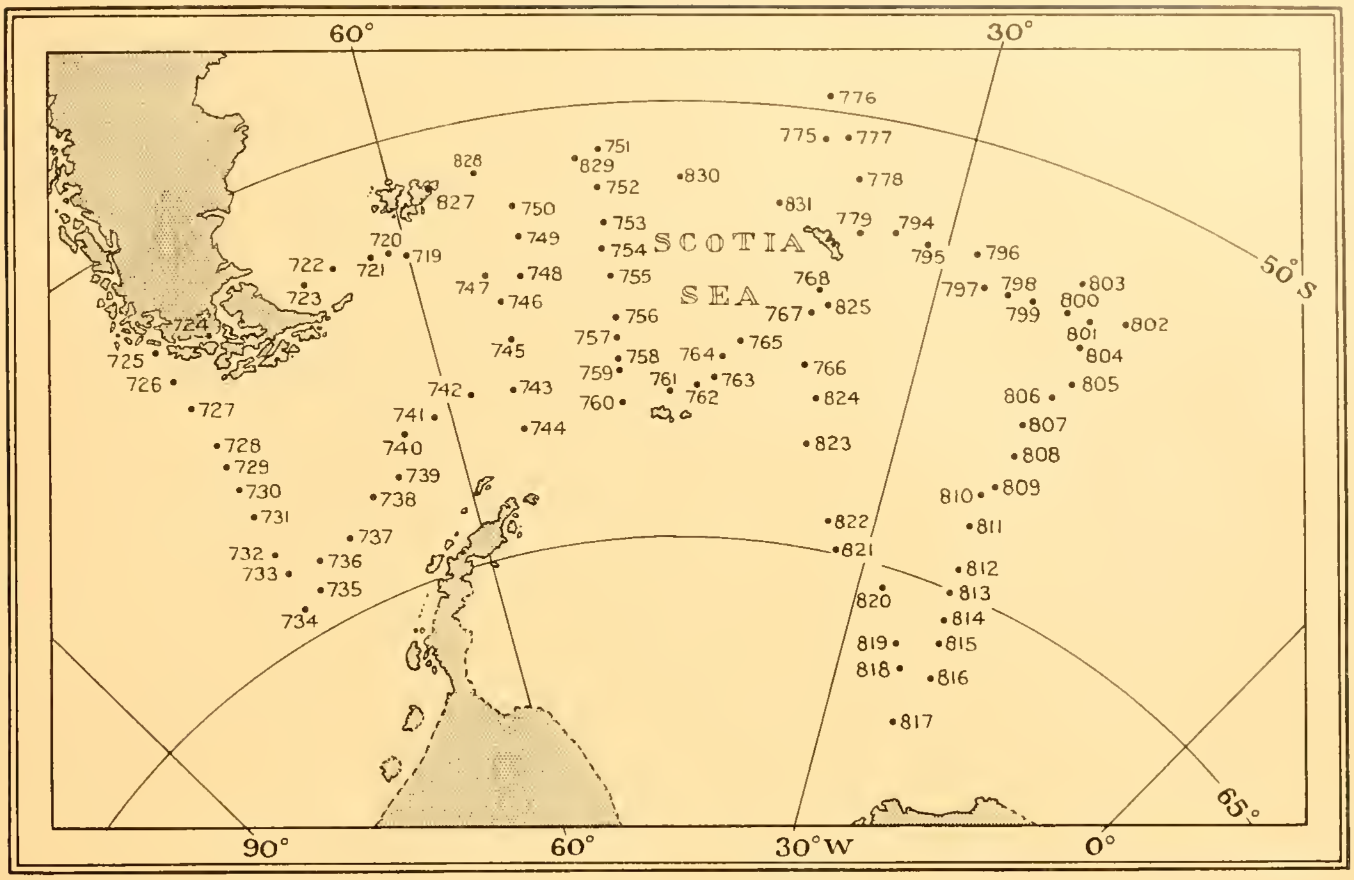
Station	Date	Place	Plate
701–718	16. x.–3. xi. 31	Cape Verde Islands—Falkland Islands	I A
719–723	13. xi.–14. xi. 31	Falkland Islands—Magellan Strait	II A
724	16. xi. 31	Magellan Strait	II A
725–734	17. xi.–22. xi. 31	Western end of Magellan Strait southwards down 75° W	II A
735–768	22. xi.–11. xii. 31	Scotia Sea	II A
769–774	12. xii.–16. xii. 31	South Georgia	I B
775–779	16. xii.–19. xii. 31	North of South Georgia	II A
780–793	19. xii. 31–5. i. 32	South Georgia	I B
794–825	6. i.–28. i. 32	South Georgia—Weddell Sea—South Georgia	II A
826	8. ii. 32	South Georgia	I B
827–831	17. ii.–20. ii. 32	Falkland Islands to South Georgia	II A
832	22. ii. 32	South Georgia	I B
833–843	22. ii.–4. iii. 32	South Georgia to Cape Town	III
844–855	8. iv.–20. iv. 32	Cape Town to ice-edge north of Enderby Land	III
855–876	20. iv.–10. v. 32	Ice-edge north of Enderby Land to Fremantle, Western Australia	III
877–887	17. v.–27. v. 32	Fremantle, Western Australia to ice-edge north of Wilkes Land	III
887–896	27. v.–4. vi. 32	Ice-edge north of Wilkes Land to Melbourne, Australia	III
897–911	14. vi.–23. vi. 32	Tasmania to ice-edge north-west of Balleny Islands	III
911–928	23. vi.–3. vii. 32	Ice-edge north-west of Balleny Islands to North Cape, New Zealand	III
929–941	16. viii.–20. viii. 32	New Zealand	III (inset)
942–978	31. viii.–2. x. 32	W-shaped cruise across the Pacific sector	III
979–981	15. x.–16. x. 32	Falkland Islands to Magellan Strait	II B
982	18–21. x. 32	Magellan Strait	II B
983–995	23. x.–30. x. 32	Western exit of Magellan Strait southwards to the ice-edge in Bellingshausen Sea	II B
995–1003	30. x.–2. xi. 32	Ice-edge in Bellingshausen Sea to South Shetland Islands	II B
1004–1014	5. xi.–7. xi. 32	Bransfield Strait	IV
1015–1034	7. xi.–24. xi. 32	Scotia Sea	II B
1035–1057	24. xi.–5. xii. 32	South Orkney Islands—South Sandwich Islands—South Georgia	II B
1058–1082	10. xii.–29. xii. 32	South Georgia	I B
1083–1088	30. xii. 32–1. i. 33	South Georgia to South Orkney Islands	II B
1089–1095	3. i.–26/28. i. 33	South Orkney Islands	IV (inset)
1096–1098	30. i.–1. ii. 33	South Orkney Islands to South Shetland Islands	II B
1099–1114	1. ii.–6. ii. 33	Bransfield Strait	IV
1115–1120	6. ii.–9. ii. 33	South Shetland Islands to Falkland Islands	II B
1121–1126	19. ii.–22. ii. 33	Falkland Islands to South Georgia	II B
1127–1136	23. ii.–1. iii. 33	South Georgia	I B
1137–1154	2. iii.–12. iii. 33	South Georgia to ice-edge near 10° E	III
1154–1168	12. iii.–4. iv. 33	Ice-edge near 10° E to Cape Town	III
1168–1170	4. iv.–6. iv. 33	Cape Town westward	III
1171–1184	7. iv.–19. iv. 33	Eastern South Atlantic	I A


60°
40°
20°W
0°
20°E
0°
20° S
40°
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
1184
1183
1182
1181
1180
1179
1178
1177
1176
1175
1174
1173
1172
1171
SOUTH
ATLANTIC
OCEAN
Falkland Is.
S. Georgia

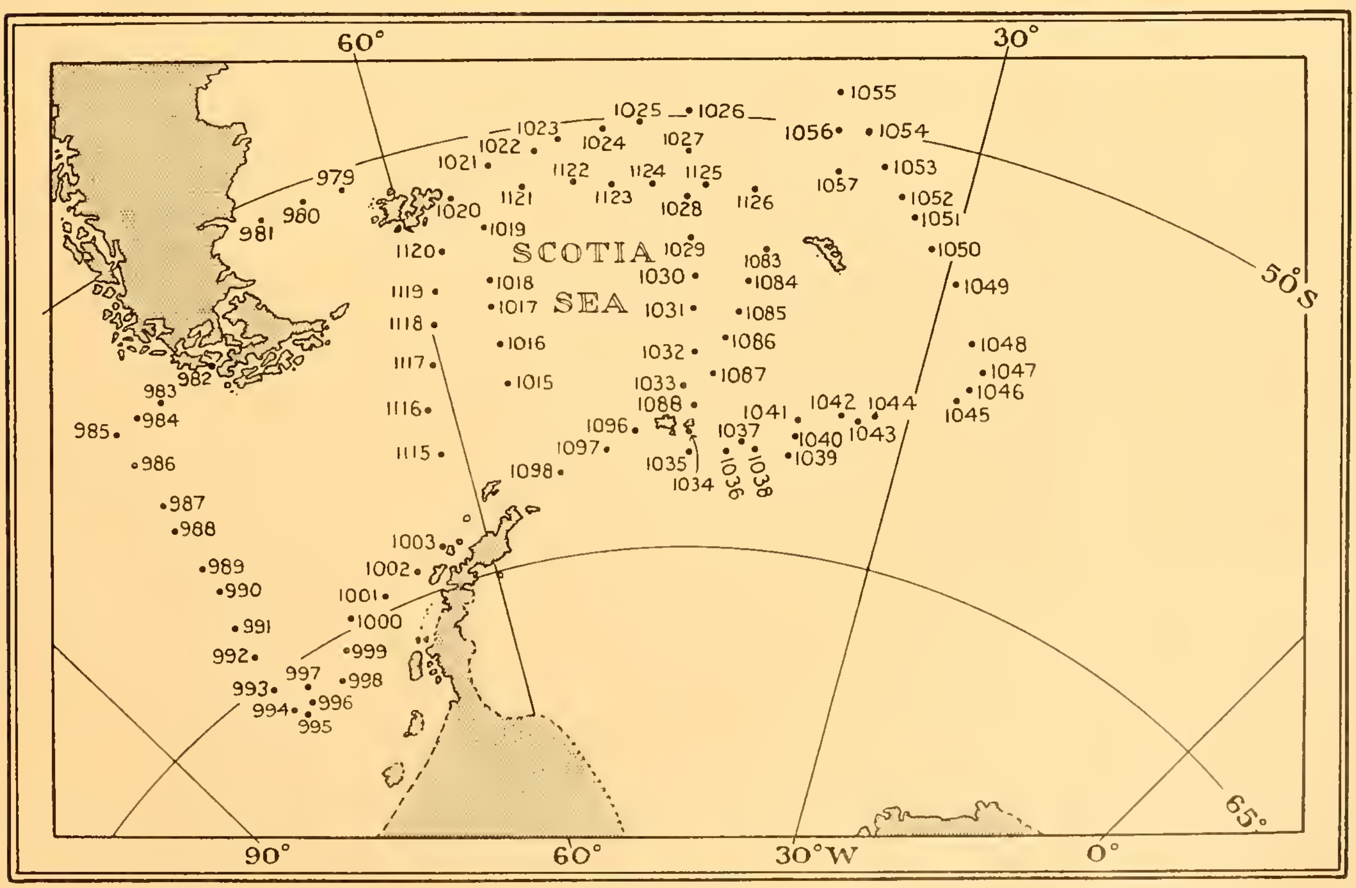
A


40°
38°
36°
34°W
53° S
55°
1062
774
1127
1061
773
1128
1063
1060
772
1129
1064
1065
771
1059
1130
1082
1066
1067
1068
1069
791
790
1070
788
789
787
786
1071
770
792-3
826
832
1058
1060-81
1135
1079
1134
1133
1078
1077
1132
1131
781
1076
780
782
783
1136
1075
1072
785
784
1073
1074
769
SOUTH GEORGIA

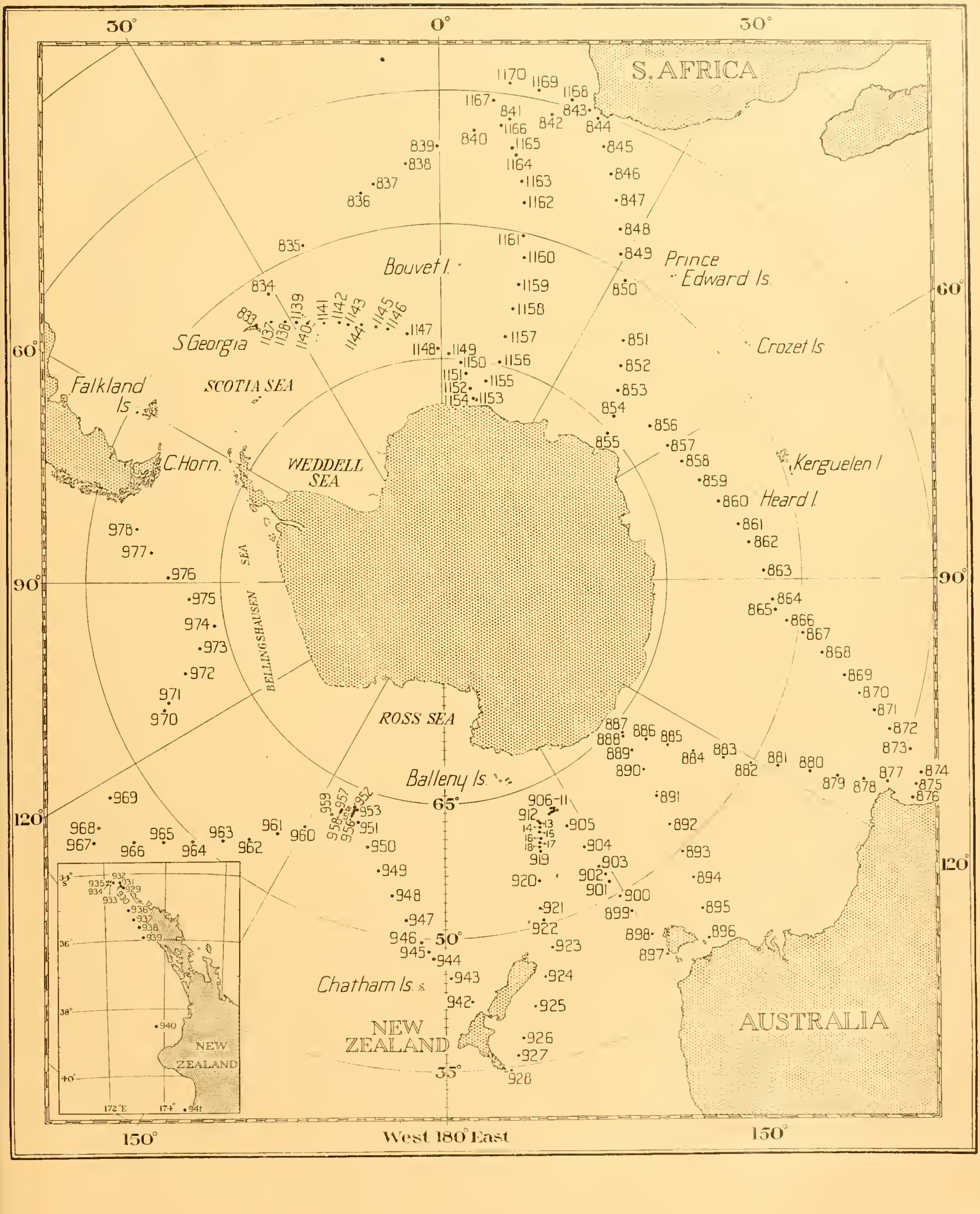
B

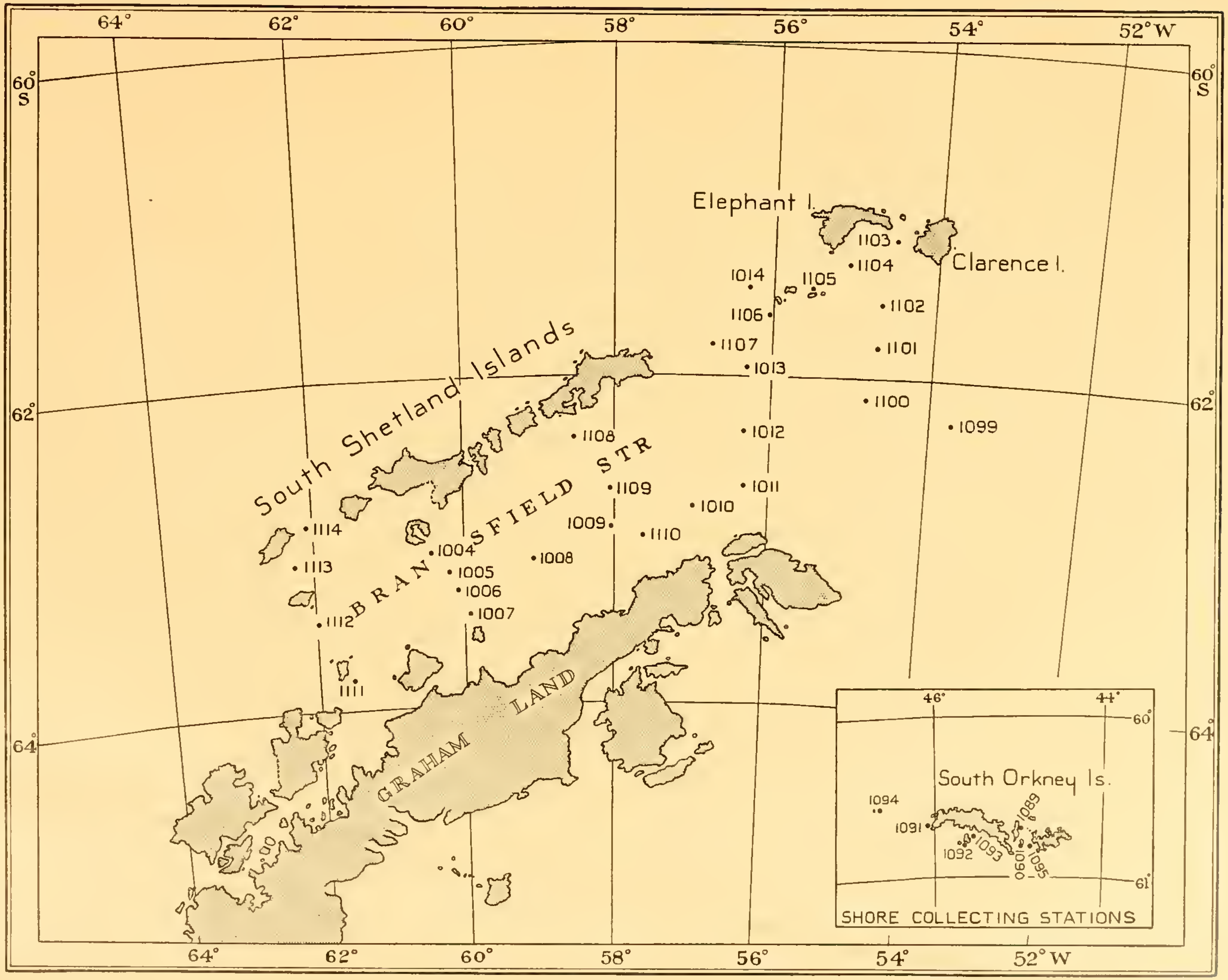

60°
30°
776
775
777
751
828
829
830
752
778
827
750
831
779
794
753
749
720
719
722
721
754
SCOTIA
795
796
748
755
768
797
798
803
747
746
723
SEA
825
767
800
799
756
724
802
757
765
801
745
758
764
804
725
759
761
763
766
805
742
743
806
726
760
762
824
727
741
744
807
740
823
728
808
729
739
809
730
738
810
731
822
811
737
821
732
736
812
733
735
820
813
734
814
819
815
818
816
817
50° S
65°
90°
60°
30° W
0°

A


60°
30°
1055
1025
1026
1023
1056
1054
1022
1024
1027
1021
979
1122
1124
1125
1053
1057
1121
1123
1126
1052
980
1020
1028
981
1051
1019
1120
SCOTIA
1029
1083
1050
1018
1030
1084
1119
1049
SEA
1017
1031
1085
1118
1016
1086
1048
1032
1117
1087
1047
1015
1033
1046
983
982
1088
1042
1044
1045
984
1116
1041
985
1096
1037
1043
1040
1097
986
1115
1039
1035
1098
1036
1038
1034
987
988
1003
1002
989
990
1001
1000
991
999
992
997
998
993
996
994
995
50° S
65°
90°
60°
30° W
0°

B


S. AFRICA
AUSTRALIA
NEW ZEALAND
Bouvet I.
Prince Edward Is.
Crozet Is
Kerguelen I
Heard I.
S Georgia
SCOTIA SEA
Falkland Is.
C. Horn.
WEDDELL SEA
BELLINGSHAUSEN SEA
ROSS SEA
Balleny Is.
Chatham Is.
30°
0°
30°
60°
60°
90°
90°
120°
120°
150°
West 180° East
150°
65°
50°
35°


Elephant I.
Clarence I.
South Shetland Islands
BRANSFIELD STR
GRAHAM LAND
South Orkney Is.
SHORE COLLECTING STATIONS
1099
1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
1114
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1089
1090
1091
1092
1093
1094
1095
64°
62°
60°
58°
56°
54°
52° W
60° S
62°
64°
46°
44°
61°

[*Discovery Reports. Vol. XXI, pp. 227–234, Plates V, VI, February 1941*]

A RARE PORPOISE OF THE SOUTH ATLANTIC, *PHOCAENA DIOPTRICA* (LAHILLE, 1912)

By

J. E. HAMILTON, D.Sc.

CONTENTS

A RARE PORPOISE OF THE SOUTH ATLANTIC, *PHOCAENA DIOPTRICA* (LAHILLE, 1912)

By J. E. Hamilton, D.Sc.

Records have been published of three specimens of *Phocaena dioptrica*, all from the South Atlantic region.

The type was described by Lahille (1912) and was a pregnant and therefore adult female caught near Quilmes on the River Plate. A second female was captured in the Rio Santiago, and the third, a male, was taken at the same place about a year later.

Two more may now be added to the list of known specimens; one, secured by Sir Hubert Wilkins at South Georgia in 1923 during the Quest expedition and the other from the Falkland Islands. The latter was brought to me by a shepherd, G. Butler, who found it on the beach in a practically skeletonized condition. The sex could not be determined and the lower jaw and flippers were missing. The length from the tip of the snout to the notch of the flukes was 185·5 cm. Wilkins's animal was only 135·9 cm.

EXTERNAL APPEARANCE

Lahille describes, with photographs, his female and the foetus which it contained. Bruch's paper is illustrated with photographs of both of his animals and there are detailed notes on the Quest specimen to which I have had access by courtesy of Dr Fraser of the British Museum (Natural History).

The colouring of *P. dioptrica* is striking and distinctive. In the adult the back, except for a broad band on each side of the upper jaw, is bright black. On the dorsal keel of the caudal region this colour disappears but reappears on the flukes where it extends over the entire dorsal surface. The remainder of the animal is clear white except that the ventral surface of the flukes has a grey border, and a few dark lines radiate from the caudal notch. A series of fine almost imperceptible grey lines form a faint wavy band extending from the lower jaw to the pectoral fin which is white, with pale grey edges.

A black patch surrounds the eye, and in the type the latter was nearly surrounded by a narrow white line. From this white mark arose the comparison with a spectacled condition which suggested the specific name.

In Bruch's male there seems to have been no spectacle mark and in Wilkins's also, an immature female, it appears to have been absent. My specimen was not in a condition to allow any observations.

The well-grown foetus from Lahille's animal shows colour markings identical with those of the adult except that the dark colour is carried along the dorsal keel of the tail, the mandibulo-pectoral band is very distinct, the white mark over the eye is reduced, and there is an unpigmented band extending from the blow-hole to the rostrum, a feature absent in the larger animals. There is also a good deal of colour on the ventral surface of the flukes.

Wilkins's specimen is described as having been blue-black above and dirty white below. In it the mandibulo-pectoral band showed clearly, and apparently the tail is as dark or nearly as dark below as above. This animal shows a coloration resembling that of the foetus, and it is reasonable to assert that the pale or uncoloured areas become more extensive with age and that the colours become brighter. It may well be that similar transitions are to be found in other dolphins. This specimen is noted by the collector as "? juv."

The skull of Wilkins's specimen is clearly that of an immature animal. There is a general lack of development and the teeth have scarcely if at all erupted. The Falkland skull is much developed and the teeth stand well up from the gum.

SKELETON

There is, unfortunately, no description of the skeleton of any of the three Argentine specimens, so that the following notes are based on Wilkins's immature and my adult specimens. Comparisons have been made with *P. phocaena*, the best known species of the genus, and *P. spinipinnis* as described and figured by Allen (1925).

Vertebral column. Cervical vertebrae, 7. Of these the first five are fused and the sixth and seventh are free, whereas in *P. phocaena* only the seventh is free. The whole series is extremely compressed antero-posteriorly and possesses marked bilateral asymmetry.

The neural arch is incomplete in the fifth and seventh vertebrae but complete in the sixth. The neural spine of the atlas is deeply cleft, so that the fifth, sixth and seventh vertebrae are visible in dorsal aspect and it only partly embraces the seventh neural spine. In *P. phocaena* this spine covers the remaining cervical vertebrae to a much greater extent (Plate VI, figs. 1, 2, 3, 4).

Vertebrarterial canals are present in the fifth vertebra, complete on the right side and incomplete on the left.

Dorsal vertebrae, 13. The height of the neural spines increases until the seventh is reached and therefore decreases towards the tail. The first and second spines have sharp ends, whereas those of *P. phocaena* are rounded. The transverse process of the first dorsal vertebra exhibits a slight ridge on the antero-dorsal aspect, and if examination is made of the corresponding region in successive vertebrae this ridge is found to assume a more and more central position until on the twelfth vertebra it forms a well-marked prezygapophysis herein agreeing with *P. phocaena* (but not with *P. spinipinnis*). All the neural spines slope backwards, the greatest inclination being attained by the sixth.

Lumbar vertebrae, 16. The neural spines attain their greatest development at the fifth and sixth lumbar which are about the same size. These spines become more and more erect towards the tail, but there is never the slightest indication of the forward curvature characteristic of *P. phocaena*. In this *P. dioptrica* agrees with *P. spinipinnis*.

The transverse processes have an anterior inclination from the sixth (Plate VI, figs. 7, 8).

Caudal vertebrae, 32. The neural arch ceases to exist after the sixteenth, but the seventeenth has a groove between two small lateral tubercles, a last trace of the arch. The transverse processes are gradually reduced until on the eleventh vertebra there are the merest traces, and even they are absent after this.

Table I. *Body measurements*

	Measurements of the known specimens of *P. dioptrica* in centimetres					
	Lahille ♀	Bruch ♀	Bruch ♂	Wilkins imm. ♀	Hamilton	Lahille foetus
1. Snout to notch of flukes	186	186	204	135·9	185·5	48·4
2. Snout to spiracle	21	—	—	15·24	—	7·1
3. Spiracle to anterior insertion of dorsal fin	60	60	64	49·53	—	17·4
4. Height of dorsal fin	16	15	25·5	10·16	—	2·9
5. Length of dorsal fin	36	36	44·5	22·86	—	7·1
6. Posterior insertion of dorsal fin to caudal notch	79	79	83	48·26	—	18·8
7. Width of flukes	—	—	47	31·75	30*	8·7
8. Anus to caudal notch	54·5	54·5	59	41·9	—	14
9. Depth of body at anterior insertion of dorsal fin	43	43	35	30·48	—	9·7
10. Snout to anterior insertion of flipper	35	—	—	25·4	—	11·3
	Measurements as percentages of total length					
	Lahille ♀	Bruch ♀	Bruch ♂	Wilkins imm. ♀	Hamilton	Lahille foetus
1. Snout to notch of flukes	100	100	100	100	100	100
2. Snout to spiracle	11·29	—	—	11·21	—	15
3. Spiracle to anterior insertion of dorsal fin	32·26	32·26	31·4	36·5	—	36
4. Height of dorsal fin	8·6	8·1	12·5	7·5	—	6
5. Length of dorsal fin	19·35	19·35	21·8	16·8	—	15
6. Posterior insertion of dorsal fin to caudal notch	42·47	42·47	40·7	35·5	—	39
7. Width of flukes	—	—	23·0	23·4	16·2	18
8. Anus to caudal notch	29·3	29·3	28·9	30·8	—	28·9
9. Depth of body at anterior insertion of dorsal fin	23·1	23·1	17·2	22·4	—	20
10. Snout to anterior insertion of flipper	18·8	—	—	18·7	—	23

* Approximate.

Ribs. Thirteen pairs, all remarkable for their stoutness in comparison with *P. phocaena*. Nine of them are double-headed. The four pairs of floating ribs are progressively and markedly flattened in a manner reminiscent of *Neobalaena* (Plate VI, figs. 5, 6).

Sternum. This bone is completely fused, an indication of maturity. It is broad anteriorly, having a width of 85·5 mm. but narrows rapidly to 31 mm. and increases again to 35 mm. The posterior margin is abruptly truncated. There are eight pairs of sternal ribs, of which the first three are attached directly to the sternum itself and the fourth to the cartilagenous xiphisternal plate. The remaining four sternal ribs have only a tendinous connexion with the sternum; the last of them is attached to a single-headed rib as in *Lagenorhynchus*.

Chevron bones, 15. There is, however, a slight doubt as to whether more may not have been present, since loss is easy in more or less decomposed specimens such as mine.

Teeth. Many of these are missing from the Falkland skull, there have probably been seventeen on the right and nineteen on the left of the upper jaw, but some of the posterior alveoli are partly obliterated and others may be completely so. In Wilkins's skull the teeth are $\frac{21}{17}$ on each side. There is a distinct neck at the line of the gum and the tips are rounded and slightly rough. In the adult teeth there are signs of wear and almost every one is curved sharply.

The epiphyses can be easily discerned in the cervical vertebrae and are quite free in the anterior dorsal region. From the tail, fusion has not advanced beyond the posterior side of the nineteenth vertebra.

It is therefore at least possible that this animal could have attained a greater length.

SKULL

The general character of the skull is that of the genus, but compared with *P. phocaena* there is a greater width across the preorbital region and the rostrum is more acute. The profile of the supra-occipital rises almost at right angles to the foramen magnum and curves forward rapidly until in the region of the interparietal it forms a triangular and almost flat area on the top of the skull. In the young specimen the rise from the foramen is rather less abrupt, but the flattening at the top is quite obvious. In *P. phocaena* the profile of the supra-occipital rises at about the same angle as that of the immature *P. dioptrica*, but it curves steadily and gently to the interparietal region which is marked by a small bony eminence. This eminence has indeed a flat top, but in the *P. phocaena* examined it was only $3 \times 2{\cdot}5$ cm., whereas in the larger specimen of *P. dioptrica* it is $9{\cdot}5 \times 4{\cdot}25$ cm. These measurements are made as accurately as possible, having regard to the somewhat vague limits of the areas in question (Plate V, figs. 5, 6).

The descent from the top of the skull to the level of the nasal orifices is very steep in *P. dioptrica*, even in the immature specimen, and in the adult it is practically vertical until the nasal bones are reached, a distance of about 2 cm. The prenasal protruberances of the premaxillae are rather flatter in *P. dioptrica* than in *P. phocaena*.

The dorsal surface of the rostrum of *P. dioptrica* is much more flattened than in *P. phocaena*, so that in the former the rostral parts of the premaxillae are not visible in lateral view as they are in *P. phocaena*. The upper surface of the rostrum is rather abruptly rounded off in the last two centimetres in *P. dioptrica* (Plate V, figs. 1, 2).

In the ventral aspect the vomer of the adult *P. dioptrica* where applied to the presphenoid has broad lateral and posterior wings with a wide V-shaped depression between them posteriorly. The vomer also takes part in the formation of the posterior edge of the palate in *P. dioptrica* but does not in *P. phocaena* (Plate V, figs. 3, 4). The palato-maxillary suture of the former is deeply concave towards the front instead of

Table II. *Skull measurements*

	Actual in cm.		As percentages of condylobasal length	
	Wilkins	Hamilton	Wilkins	Hamilton
1. Condylobasal length	24·4	28·8	100	100
2. Rostrum, length	9·8	12·1	40·2	42
3. Rostrum, width at base	6·6	8·8	27	30·6
4. Preorbital width	11·1	15·5	45·5	53·8
5. Postorbital width	13·1	17·0	53·7	59
6. Zygomatic width	13·1	16·8	53·7	58·3
7. Parietal width	12·5	14·3	51·2	49·7
8. Prenarial width of premaxillae	3·8	4·5	15·6	15·6
9. Premaxillar width, at middle point	2·2	3·2	9	11·1
10. Palate, median length	—	16·45	—	57·1

The posterior part of the palate of Wilkins's specimen is damaged.

being very shallow as in *P. phocaena*, and in the latter it is much more serrated. The posterior part of the palate is damaged in the immature *P. dioptrica* and the curvature of the maxillo-palatine suture is shallow. In both examples of *P. dioptrica* the maxillary part of the palate is quite definitely convex from side to side and the condition is even more pronounced in the immature specimen. In *P. phocaena* the corresponding part is flattened or even somewhat excavated.

In *P. dioptrica* the zygomatic arches are almost entirely concealed by the frontals, but in *P. phocaena* they are so arched horizontally as to be easily visible from above.

REFERENCES

Allen, G. M., 1925. *Burmeister's porpoise* (Phocaena spinipinnis). Bull. Mus. Comp. Zool. Harvard, LXVII, no. 5, p. 25.

Bruch, C., 1916. *El macho de* Phocaena dioptrica *Lah.* Physis, Buenos Aires, II, no. 12.

Lahille, F., 1912. *Nota preliminar sobre una neuva espece de marsopa del rio de la Plata.* Ann. Mus. Nac., Buenos Aires, XXIII, p. 269.

Wilkins, G. H., 1922. *Shackleton-Rowett Expedition, Mammalogical Report.* MS. in British Museum (Natural History).

PLATE V

The skull of *P. dioptrica* compared with that of *P. phocaena*.

Figs. 1, 3, 5. *P. phocaena*. Dorsal, ventral and lateral views.

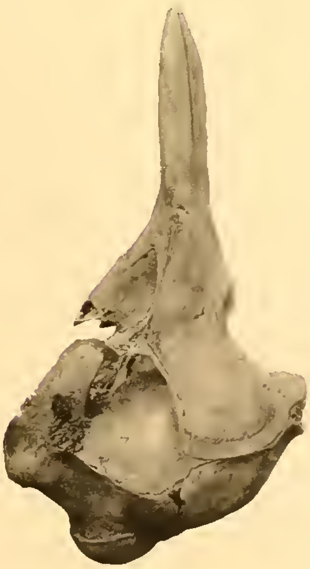
Figs. 2, 4, 6. *P. dioptrica*. Dorsal, ventral and lateral views.


1


2


3


4


5


6

0 5cm

PLATE VI

Figs. 1, 3. *P. dioptrica.* Lateral and dorsal view of cervical vertebrae.

Figs. 2, 4. *P. phocaena.* Lateral and dorsal view of cervical vertebrae.

Fig. 5. *P. dioptrica.* Lateral view of rib of last pair.

Fig. 6. *P. phocaena.* Lateral view of rib of last pair.

Fig. 7. *P. phocaena.* Lateral view of lumbar vertebra (about XII).

Fig. 8. *P. dioptrica.* Lateral view of lumbar vertebra (about ? VI).


5
6
SW 1934/43
8
7
5 cm
2
4
1
3

[*Discovery Reports*. *Vol. XXI*, *pp.* 235–260, *Plates VII*, *VIII*, *October* 1941.]

THE ECHIURIDAE, SIPUNCULIDAE AND PRIAPULIDAE COLLECTED BY THE SHIPS OF THE DISCOVERY COMMITTEE DURING THE YEARS 1926 TO 1937

By

A. C. STEPHEN, D.Sc.

The Royal Scottish Museum, Edinburgh

CONTENTS

THE ECHIURIDAE, SIPUNCULIDAE AND PRIAPULIDAE COLLECTED BY THE SHIPS OF THE DISCOVERY COMMITTEE DURING THE YEARS 1926 TO 1937

By A. C. Stephen, D.Sc.
The Royal Scottish Museum, Edinburgh

INTRODUCTION

The extensive voyages of the Discovery Committee's ships in southern waters during the years 1926–37 have resulted in a considerable and interesting collection of Echiurids, Sipunculids and Priapulids being brought back. In all, sixteen species have been identified in the collections. Of these one is new to science and one is now recognized as being a larval form. The material has come mainly from the Antarctic area, but some of the Sipunculids were secured in the Atlantic on the outward and homeward runs.

The collection possesses several points of interest. Although only one new species is described, several are recorded from the Antarctic, Tristan da Cunha and Ascension for the first time. In other cases the known range of distribution has been considerably extended, thanks to the wide area over which the investigations were conducted.

The Echiurids have supplied the most important records. Until the present collections were made, the known representatives of this group in the Antarctic belonged to three species—namely, *Urechis chilensis* from the coasts of Chile, *Echiurus antarcticus* from South Georgia and *Thalassema verrucosum* from Kerguelen. While the first two species have again been taken in the original localities, there are now three other species to be added. Two of these, *Hamingia arctica* and *Thalassema faex*, are well-known species which have not so far been found in other than northern seas, and the third is *T. antarcticum*, the only new species described.

Most of the species of Sipunculids already recorded from the Antarctic have occurred in the collections, some from new localities. The collections of *Phascolosoma margaritaceum* have shown a considerably greater degree of variation than hitherto described, and the variety *trybomi*, previously recorded only once from the Antarctic, has been taken again. *Physcosoma nigrescens* is now recorded from the islands of Ascension and Tristan da Cunha, as is also *P. scolops* from the first-named island.

The Priapulids are represented by *Priapulus caudatus* var. *tuberculato-spinosus* only; this is rather surprising, since both *P. bicaudatus* and *P. horridus* have previously been taken within the area of the investigations and might have been expected to appear in the collections.

The comparative scarcity of many of these animals, or the inability of the standard collecting gear to secure them, is again brought out. In spite of the lengthy period of the Discovery investigations, several species are represented by only a single specimen.

ACKNOWLEDGEMENTS

I am indebted to the Discovery Committee and to Mr C. C. A. Monro of the British Museum of Natural History for the opportunity of studying the material.

To Professor Dr Sixten Boch I am indebted for the loan of several specimens, named by Théel, for purposes of comparison.

To Mr R. J. Fant, Zoology Department, the University, Edinburgh, I am indebted for the photographs to illustrate this paper.

The collection is deposited in the British Museum (Natural History).

LIST OF THE SPECIES TAKEN

The following is the list of the species taken:

ECHIURIDAE.

1. *Echiurus antarcticus* Spengel.
2. *Urechis chilensis* Müller.
3. *Thalassema faex* Selenka.
4. *Thalassema antarcticum* sp.nov.
5. *Hamingia arctica* Koren and Danielssen.

SIPUNCULIDAE.

(*a*) Antarctic.

6. *Phascolosoma anderssoni* Théel.
7. *Phascolosoma margaritaceum* Sars.
8. *Phascolosoma nordenskjöldi* Théel.
9. *Phascolosoma ohlini* Théel.
10. *Phascolion strombi* (Montagu).

(*b*) Eastern Atlantic, etc.

11. *Pelagosphaera aloysii* Mingazzini. Larval form.
12. *Sipunculus nudus* Linnaeus.
13. *Physcosoma nigrescens* Keferstein.
14. *Physcosoma scolops* Selenka and de Man.
15. *Aspidosiphon mülleri* Diesing.

PRIAPULIDAE.

16. *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

LIST OF STATIONS WITH THE NAMES OF SPECIES COLLECTED AT EACH

R.R.S. 'DISCOVERY'

St. 1. 16. xi. 25. Clarence Bay, Ascension Island, 7° 55′ 15″ S, 14° 25′ 00″ W. Medium rectangular net, 16–27 m., coralline sand and shells.

Physcosoma nigrescens Keferstein; *P. scolops* Selenka and de Man.

St. 2. 17. xi. 25. Clarence Bay, Ascension Island, Catherine's Point and Collyer Point, shore collecting.

Physcosoma nigrescens Keferstein.

St. 4. 30. i. 26. Tristan da Cunha, 36° 55′ 00″ S, 12° 12′ 00″ W. Large dredge, stones, 40–46 m.

Physcosoma nigrescens Keferstein.

St. 6. 1. ii. 26. Tristan da Cunha, 3 miles N 30° E of Settlement. Large dredge, rock, 80–140 m.

Physcosoma nigrescens Keferstein.

St. 27. 15. iii. 26. West Cumberland Bay, South Georgia, 3·3 miles S 44° E of Jason Light. Large dredge, rock, 110 m.

Phascolosoma margaritaceum Sars; *Phascolion strombi* (Montagu).

St. 28. 16. iii. 26. West Cumberland Bay, South Georgia, 3·3 miles S 45° W of Jason Light. Conical dredge, 168 m.

Echiurus antarcticus Spengel.

St. 39. 25. iii. 26. East Cumberland Bay, South Georgia, from 8 cables S 81° W of Merton Rock to 1·3 miles N 7° E of Macmahon Rock. Otter trawl, grey mud, 179–235 m.

Phascolosoma ohlini Théel.

St. 42. 1. iv. 26. Off the mouth of Cumberland Bay, South Georgia, from 6·3 miles N 89° E of Jason Light to 4 miles N 39° E of Jason Light. Otter trawl, 120–204 m.

Phascolosoma anderssoni Théel; *P. ohlini* Théel; *Phascolion strombi* (Montagu).

St. 45. 6. iv. 26. 2·7 miles S 85° E of Jason Light, South Georgia. Grey mud, 238–270 m.

Echiurus antarcticus Spengel; *Phascolosoma anderssoni* Théel; *P. margaritaceum* Sars.

St. 90. 10. vii. 26. Off Simon's Town, False Bay, South Africa. Basin H.M. Dockyard. 1–2 m.

Physcosoma scolops Selenka and de Man.

St. 123. 15. xii. 26. Off the mouth of Cumberland Bay, South Georgia. From 4·1 miles N 54° E of Larsen Point to 1·2 miles S 62° W of Merton Rock. Otter trawl, grey mud, 230–250 m.

Phascolosoma anderssoni Théel; *P. ohlini* Théel.

St. 140. 23. xii. 26. Stromness Harbour to Larsen Point, South Georgia. 54° 02′ 00″ S, 36° 38′ 00″ W to 54° 11′ 30″ S, 36° 29′ 00″ W. Otter trawl, green mud and stones, 122–136 m.

Echiurus antarcticus Spengel; *Phascolion strombi* (Montagu).

St. 141. 29. xii. 26. East Cumberland Bay, South Georgia, 200 yards from shore under Mount Duse. Small beam trawl, 17–27 m.

Phascolosoma margaritaceum Sars; *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

St. 142. 30. xii. 26. East Cumberland Bay, South Georgia. From 54° 11′ 30″ S, 36° 35′ 00″ W to 54° 12′ 00″ S, 36° 29′ 30″ W. 88–273 m.

Echiurus antarcticus Spengel.

St. 144. 5. i. 27. Off the mouth of Stromness Harbour, South Georgia. From 54° 04′ 00″ S, 36° 27′ 00″ W to 53° 58′ 00″ S, 36° 26′ 00″ W. Coarse silk tow-net touched bottom, green mud and sand, 155–178 m.

Phascolion strombi (Montagu); *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

St. 148. 9. i. 27. Off Cape Saunders, South Georgia. From 54° 03′ 00″ S, 36° 39′ 00″ W to 54° 05′ 00″ S, 36° 36′ 00″ W. Grey mud and stones, 132–148 m.

Echiurus antarcticus Spengel.

St. 149. 10. i. 27. Mouth of East Cumberland Bay, South Georgia, from 1·15 miles N 76½° W to 2·62 miles S 11° W of Merton Rock. Otter trawl, mud, 200–234 m.

Phascolosoma ohlini Théel.

St. 159. 21. i. 27. South Georgia, 53° 52′ 30″ S, 36° 08′ 00″ W. Large dredge, rock, 160 m.
Phascolosoma ohlini Théel; *Phascolion strombi* (Montagu).

St. 160. 7. ii. 27. Near Shag Rocks, 53° 43′ 40″ S, 40° 57′ 00″ W. Large dredge, grey mud, stones and rock, 177 m.
Phascolion strombi (Montagu).

St. 167. 20. ii. 27. Off Signy Island, South Orkneys, 60° 50′ 30″ S, 46° 15′ 00″ W. Green mud, 244–344 m.
Echiurus antarcticus Spengel; *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

St. 170. 23. ii. 27. Off Cape Bowles, Clarence Island, 61° 25′ 30″ S, 53° 46′ 00″ W. Large dredge, rock, 342 m.
Phascolion strombi (Montagu).

St. 172. 26. ii. 27. Off Deception Island, South Shetlands, 62° 59′ 00″ S, 60° 28′ 00″ W. Large dredge, rock, 525 m.
Thalassema faex Selenka.

St. 175. 2. iii. 27. Bransfield Strait, South Shetlands, 63° 17′ 20″ S, 59° 48′ 15″ W. Mud, stones and gravel, 200 m.
Phascolosoma anderssoni Théel; *Phascolion strombi* (Montagu).

St. 182. 14. iii. 27. Schollaert Channel, Palmer Archipelago, 64° 21′ 00″ S, 62° 58′ 00″ W. Otter trawl, 278–500 m.
Thalassema antarcticum sp.nov.

St. 187. 18. iii. 27. Neumayer Channel, Palmer Archipelago, 64° 48′ 30″ S, 63° 31′ 30″ W. Large dredge, mud, 259 m.
Phascolion strombi (Montagu).

St. 190. 24. iii. 27. Bismarck Strait, Palmer Archipelago, 64° 56′ 00″ S, 65° 35′ 00″ W. Rock or stones and mud, 90–130 m.
Echiurus antarcticus Spengel.

St. 195. 30. iii. 27. Admiralty Bay, King George Island, South Shetlands, 62° 07′ 00″ S, 58° 28′ 30″ W. Large dredge, mud and stones, 391 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

St. 196. 3. iv. 27. Bransfield Strait, South Shetlands, 62° 17′ 30″ S, 58° 21′ 00″ W. Tow-net on bottom, mud, diatom ooze, 720 m.
Phascolosoma ohlini Théel.

St. 279. 10. viii. 27. Off Cape Lopez, French Congo, from 8·5 miles N 71° E to 15 miles N 24° E of Cape Lopez Light. Net attached to trawl, mud and fine sand, 58–67 m.
Aspidosiphon mülleri Diesing.

St. 283. 14. viii. 27. Off Annobon, Gulf of Guinea, 0·75–1 mile N 12° E of Pyramid Rock, Annobon. Large dredge, 18–30 m.
Physcosoma nigrescens Keferstein; *Aspidosiphon mülleri* Diesing.

R.R.S. 'DISCOVERY II'

St. 1569. 12. iv. 35. Off South-East Africa, 31° 50·3′ S, 32° 20·5′ E. Young fish trawl, 1200–1300 m.
Larval Sipunculid (*Pelagosphaera aloysii* Mingazzini).

St. 1645. 17. i. 36. Ross Sea, 77° 43·3′ S, 166° 18·2′ W. Conical dredge, 475 m.
Phascolosoma anderssoni Théel; *P. margaritaceum* Sars.

St. 1647. 18. i. 36. Ross Sea, 77° 43·8′ S, 171° 31·1′ W. Conical dredge, 420 m.
Phascolosoma margaritaceum Sars.

St. 1651. 22. i. 36. Ross Sea, 77° 04·3′ S, 176° 26·1′ W. Conical dredge, 594 m.
Phascolosoma anderssoni Théel; *P. margaritaceum* Sars.

St. 1653. 23. i. 36. Ross Sea, 74° 55′ S, 179° 49·1′ E. Conical dredge, 485 m.
Phascolosoma anderssoni Théel; *P. margaritaceum* Sars.

St. 1659. 26. i. 36. Ross Sea, 75° 43·9′ S, 173° 10·6′ E. Conical dredge, 512 m.
Phascolosoma anderssoni Théel.

St. 1660. 27. i. 36. Ross Sea, 74° 46·4′ S, 178° 23·4′ E. Otter trawl, 351 m.
Phascolosoma margaritaceum Sars.

St. 1873. 13. ii. 36. 61° 20·8′ S, 54° 04·2′ W. Dredge, 210–180 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

St. 1909. 30. xi. 36. Burdwood Bank, 53° 53·2′ S, 60° 29·9′ W. Conical dredge, 132 m.
Thalassema antarcticum sp.nov.

St. 1952. 11. i. 37. Admiralty Bay, King George Island, South Shetlands. Dredge, 367–383 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

St. 1958. 5. ii. 37. South Shetlands, 61° 17·9′ S, 52° 50·8′ W. Large dredge, 740 m.
Hamingia arctica Koren and Danielssen.

St. 1961. 12. ii. 37. South Orkneys, 60° 49·5′ S, 45° 27·5′ W. Dredge, green mud, 340–360 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

R.S.S. 'WILLIAM SCORESBY'

St. WS 33. 21. xii. 26. South Georgia, 54° 59′ 00″ S, 35° 24′ 00″ W. Tow-net on bottom, grey mud and stones, 130 m.
Phascolosoma ohlini Théel.

St. WS 62. 19. i. 27. Wilson Harbour, South Georgia, 15–90 m.
Echiurus antarcticus Spengel.

St. WS 73. 6. iii. 27. Falkland Islands, 51° 01′ 00″ S, 58° 54′ 00″ W. Otter trawl, fine dark sand, 121 m.
Phascolosoma margaritaceum Sars.

St. WS 80. 14. iii. 27. Falkland Islands, 50° 57′ 00″ S, 63° 37′ 30″ W. Otter trawl, fine dark sand, 152–156 m.
Phascolosoma margaritaceum Sars.

St. WS 84. 24. iii. 27. 7½ miles S 9° W of Sea Lion Island, East Falkland Islands. Otter trawl, coarse sand, shells and stones, 74–75 m.
Phascolosoma margaritaceum Sars.

St WS 85. 25. iii. 27. 8 miles S 66° E of Lively Island, East Falkland Islands, 52° 09′ 00″ S, 58° 14′ 00″ W to 52° 08′ 00″ S, 58° 09′ 00″ W. Otter trawl, sand and shells, 79 m.
Phascolosoma margaritaceum Sars.

St. WS 89. 7. iv. 27. 9 miles N 21° E of Arenas Point light, Tierra del Fuego. Otter trawl, mud, gravel and stones, 21–23 m.
Phascolosoma margaritaceum Sars.

St. WS 128. 10. vi. 27. West side of Gough Island, inshore, 40° 19′ 00″ S, 10° 04′ 00″ W. Large dredge, 90–120 m.
Sipunculus nudus Linnaeus.

St. WS 179. 7. iii. 28. South Georgia, 55° 08′ 00″ S, 35° 20′ 00″ W. Mud, stones and shells, 125 m.
Phascolion strombi (Montagu).

St. WS 212. 30. v. 28. Falkland Islands, 49° 22′ 00″ S, 60° 10′ 00″ W. Tow-net on bottom, green sand, mud and pebbles, 242–249 m.

Phascolosoma nordenskjöldi Théel.

St. WS 225. 9. vi. 28. Falkland Islands, 50° 20′ 00″ S, 62° 30′ 00″ W. Net attached to trawl, green sand, shells and pebbles, 161–162 m.

Phascolosoma nordenskjöldi Théel; *P. margaritaceum* Sars.

St. WS 236. 6. vii. 28. Falkland Islands, 45° 55′ 00″ S, 60° 40′ 00″ W. Net attached to trawl, dark green sand and mud, 272–300 m.

Phascolosoma nordenskjöldi Théel.

St. WS 237. 7. vii. 28. North of the Falkland Islands, 45° 00′ 00″ S, 60° 05′ 00″ W. Net attached to trawl, coarse brown sand and shells, 150–256 m.

Phascolosoma nordenskjöldi Théel.

St. WS 244. 18. vii. 28. Falkland Islands, 52° 00′ 00″ S, 62° 40′ 00″ W. Net attached to trawl, fine dark sand and mud, 247–253 m.

Phascolosoma anderssoni Théel.

St. WS 246. 19. vii. 28. Falkland Islands, 52° 25′ 00″ S, 61° 00′ 00″ W. Net attached to trawl, coarse green sand and pebbles, 208–267 m.

Phascolosoma nordenskjöldi Théel.

St. WS 248. 20. vii. 28. Falkland Islands, 52° 40′ 00″ S, 58° 30′ 00″ W. Otter trawl, fine green sand, pebbles and shells, 210–242 m.

Phascolosoma margaritaceum Sars.

St. WS 250. 20. vii. 28. Falkland Islands, 51° 45′ 00″ S, 57° 00′ 00″ W. Otter trawl, fine green sand, 251–313 m.

Phascolosoma margaritaceum Sars.

St WS 777. 3. xi. 31. Off Patagonia, 45° 56′ 00″ S, 66° 24′ 00″ W. Otter trawl, green mud and sand, 98–99 m.

Urechis chilensis Müller.

St. WS 783. 5. xii. 31. Falkland Islands, 50° 03′ 30″ S, 60° 08′ 00″ W. Conical dredge, rock, mud and sand, 155 m.

Phascolosoma anderssoni Théel.

St WS 788. 13. xii. 31. Off Patagonia, 45° 05′ 00″ S, 65° 00′ 00″ W. Otter trawl, grey mud and sand, 82–88 m.

Phascolosoma margaritaceum Sars. ? var. *hanseni* Koren and Danielssen.

St WS 840. 6. xi. 32. Falkland Islands, 53° 52′ 00″ S, 61° 49′ 15″ W. Otter trawl, green-grey sand, 368–463 m.

Phascolosoma ohlini Théel.

MARINE BIOLOGICAL STATION

St. MS 27. 29. iv. 25. 1¼ miles SW by W of Merton Rock, East Cumberland Bay, South Georgia. Small dredge, 200 m.

Phascolosoma margaritaceum Sars.

St. MS 68. 2. iii. 26. East Cumberland Bay, South Georgia, 1·7 miles S ½ E to 8½ cables SE by E of Sappho Point. Large rectangular net, 220–247 m.

Phascolosoma nordenskjöldi Théel.

St. MS 74. 17. iii. 26. East Cumberland Bay, South Georgia, 1 cable SE by E of Hope Point to 3·1 miles SW of Merton Rock. Small beam trawl, 22–40 m.

Phascolosoma margaritaceum Sars.

MISCELLANEOUS COLLECTIONS

18. ii. 27. Port Stanley Harbour, Falkland Islands. Shore collection amongst mussels.
Phascolosoma margaritaceum Sars. var. *trybomi* Théel.

22. ix. 27. Port Stanley Harbour, Falkland Islands.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

22. xii. 28. South Georgia. Fish trap, stomach of *Notothenia rossi*, 4–5 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

1926. Saldanha Bay beach, Cape Province.
Physcosoma scolops Selenka and de Man.

22. ii. 31. Larsen Harbour, South Georgia.
Echiurus antarcticus Spengel. Hand line, stomach of *Notothenia rossi*, 10–20 m.

BIPOLAR DISTRIBUTION

The close similarity, amounting in many cases to specific identity, between Arctic and Antarctic species belonging to the Echiuridae, Sipunculidae and Priapulidae is further exemplified in the Discovery collections.

For convenience, the northern limit of the Antarctic and sub-Antarctic fauna may be taken as 40° S as has already been done by Fischer (1920, p. 414), with certain exceptions. For example, at Kerguelen and to the south of New Zealand we find some species appearing south of 40° S which obviously belong to the warmer waters to the north, and these are not included in the table. In the following list, which includes the species which come strictly under the above heading, localities are added only for those species which have not been mentioned in the text.

The species may be divided into three groups:

(*a*) Those which are identical with, or regarded as varieties of, Arctic species.

(*b*) Those which are very closely related to Arctic forms but which are still regarded as specifically distinct.

(*c*) Those which are not closely related to Arctic species.

Grouped in this way the recorded species are as follows:

ECHIURIDAE.

(*a*) *Thalassema faex* Selenka.

(*a*) *Hamingia arctica* Koren and Danielssen.

(*b*) *Echiurus antarcticus* Spengel.

(*c*) *Urechis chilensis* Müller.

(*c*) *Thalassema verrucosum* Studer.
Kerguelen. Collin (1901, p. 306), Fischer (1916, p. 17).

(*c*) *Thalassema antarcticum* sp.nov.

SIPUNCULIDAE.

(*a*) *Phascolosoma margaritaceum* Sars.

(*a*) *Phascolosoma muricaudatum* Southern.
Bouvet Island. Fischer (1916, p. 15).

(*a*) *Phascolosoma minutum* Keferstein.
Falkland Islands. Théel (1911, p. 31).

(*a*) *Phascolosoma eremita* Sars var. *australe* Benham.
Commonwealth Bay. Benham (1922, p. 17).

(*a*) *Phascolosoma intermedium* Southern.
Commonwealth Bay. Stephen, B.A.N.Z.A.R.E.[1] Rep. (in the Press).

(*a*) *Phascolion strombi* (Montagu).

(*b*) *Phascolosoma benhami* Stephen.
Off Kemp Island; off Adélie Land. Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

(*c*) *Phascolosoma anderssoni* Théel.

(*c*) *Phascolosoma charcoti* Hérubel.
Port Charcot. Hérubel (1908, p. 2).

(*c*) *Phascolosoma nordenskjöldi* Théel.

(*c*) *Phascolosoma ohlini* Théel.

(*c*) *Phascolosoma pudicum* Selenka.
Kerguelen. Selenka (1885, p. 11); Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

(*c*) *Phascolosoma mawsoni* Benham.
Commonwealth Bay. Benham (1922, p. 13).
Off Enderby Land: off Kemp Land. Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

(*c*) *Phascolion lutense* Selenka.
Southern Indian Ocean. 53° 55′ S, 108° 35′ E; 62° 26′ S, 95° 44′ E. Selenka (1885, p. 16).

PRIAPULIDAE.

(*a*) *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

(*a*) *Priapulus bicaudatus* Koren and Danielssen var. *australis* de Guerne.
Patagonia; South Shetlands. De Guerne (1888, p. 13).

(*c*) *Priapulus horridus* Théel.
Coast of Uruguay. Théel (1911, p. 24).

Thus of the twenty-three species listed, ten come under category (*a*) and two under (*b*); that is, half are either northern species or very closely related to them. While this phenomenon of bipolarity is well known and is seen in other groups of animals, it would appear, when all the records are examined, to be as well shown in these groups as any.

The question of bipolarity has been discussed by several authors and more than one theory put forward to account for the facts. It seems too early as yet to try to theorize, especially in view of the considerable additions made by the B.A.N.Z.A.R.E. and Discovery Expeditions. Also, in spite of the considerable surveys made, several species are represented by only one or two specimens. Intensive work would almost certainly secure many more records which might show a very different picture. One fact, however, seems to stand out and may represent a real condition, namely, that in the Antarctic most of these bipolar species seem to be confined to the South American quadrant.

[1] British, Australian and New Zealand Antarctic Research Expedition.

ECHIURIDAE

Genus Echiurus Pallas

1. **Echiurus antarcticus** Spengel. Plate VII, fig. 1.

Echiurus antarcticus Spengel, 1912, p. 200.

Distribution. South Georgia; Grytviken, Cumberland Bay: Spengel, loc. cit.

Occurrence. South Georgia: St. WS 62. 15–90 m.
Larsen Harbour, 10–20 m.
St. 28. 168 m.
St. 45. 238–270 m.
St. 140. 122–136 m.
St. 142. 88–273 m.
St. 148. 132–148 m.
St. 167. 244–344 m.
South Shetlands: St 190. 90–130 m.

Our knowledge of this species rests on the specimens described by Spengel from South Georgia. In the collections there are examples from nine stations, but these, with one exception, are still in close proximity to the original place of capture. The new record comes from St. 190 in the Bismarck Strait, South Shetlands, and this marks a considerable extension in the known range of the species, this station being nearly a thousand miles from South Georgia. It should be stated, however, that this record rests on the presence of a single introvert in the collection, no other portions of the animal being found. This introvert is very similar to that contained in the same tube as the specimen of *Echiurus antarcticus* at St. 167 which, I presume, belonged to this species.

In all, fourteen specimens were taken and these came from nine stations. At seven of these stations only a single specimen was found, but at Wilson Harbour five animals were brought up by the grapnel, and off Signy Island two specimens were secured with net N 4-T.

The species is a fairly deep water one, the range in depth at which it was taken by the Discovery Committee's ships varied from 88 to 344 m., with the single exception of the shallow-water station in Larsen Harbour where the depth was under 20 m.

Spengel, in his description of the species, gives as distinctions between this species and the northern *Echiurus echiurus* Pall.: (1) the arrangement of the papillae on the skin, (2) the shape of the introvert, (3) the number of nephridia.

In *E. echiurus* the small papillae lying between the well-marked rows of large papillae are also arranged in rows. In *E. antarcticus* Spengel states that the small papillae are not arranged in this manner but are scattered. In most of the Discovery specimens the small papillae are not very distinct, but an examination of the animals shows that the small papillae, which at first sight appear to be scattered at random, are really arranged in rows. The rows, however, are very incomplete and gaps of varying width occur.

The second distinction between the two species lies in the form of the introvert. In *E. echiurus* this takes the form of a short stout truncate cylinder, with longitudinal ribbing on the inner surface. As has already been stated, two introverts were found in the collection, one of which was included in the same tube as a specimen of *E. antarcticus* and the other was in a tube alone. Spengel (1912, p. 200) also found a similar unattached introvert which he assumed belonged to this species. The two introverts in the Discovery collections were very similar. The one from St. 167 measured about 65 mm. in length and about 18 mm. at its broadest part. At the posterior end where it had been attached to the body it was rolled into a small tube for a distance of about 5 mm., thereafter broadening out into a more or less uniform wide flap. At the anterior end it was slightly T-shaped. The colour throughout was cream, except along the edges where it was light brown. The inner surface was practically smooth throughout, except for a slight ribbing along the edges. The introvert found at St. 190 was in all respects similar. It was about 50 mm. in length and about 11 mm. at its greatest breadth.

The third distinction lies in the number of nephridia. In *E. echiurus* there are two pairs and in *E. antarcticus* Spengel suggests that there may be three pairs. The nephridia are evidently easily destroyed and seem to macerate first, and in most cases I was unable to come to a definite decision as to the number of nephridia in the Discovery specimens except in the case of three of the specimens where there seemed definitely to be only two pairs.

Thus, of the three suggested distinctions between the two species given by Spengel only the difference in the shape and structure of the introvert seems to be valid, judging by the Discovery specimens. Spengel had doubts as to whether the two species were really distinct. They are without any doubt very closely related, but the very different structure of the introvert would seem to suggest that in the meantime the two should be kept apart.

In most of the specimens the setae in the two posterior rows were too damaged to make it possible to count them, but fortunately in several of the specimens the rows appeared to be complete, and the counts were as follows: In the five specimens from Larsen Harbour two had seven setae in each row, while the remaining three had seven setae in the inner row and eight in the outer row. In the animals from West Cumberland Bay there were nine setae in the inner row but the outer row was too damaged for counting. In the specimen from East Cumberland Bay there were eight setae in each row. Taking the collection as a whole, there would seem to be, on the average, seven to nine setae in the inner row and seven to eight in the outer row. There would seem to be a good deal of variation, since Spengel (1912, p. 201) gives for his specimens ten setae as the number in the outer row and five in the inner row.

Genus Urechis Seitz

2. Urechis chilensis (Müller).

Echiurus chilensis Müller, 1852, p. 21.
E. farcimen Baird, 1873, p. 97.
E. chilensis Müller, Fischer, 1896, p. 6.
Urechis chilensis (Müller), Seitz, 1907, p. 323.

DISTRIBUTION. Chile: Müller, loc. cit.
Chile: Punta Arenas, Magellan Straits: Baird, Fischer, loc. cit.
Chile: coast near Tumbes (I presume this is the town about 20 miles north of Conception), Seitz, loc. cit.

OCCURRENCE. Off Patagonia: St. WS 777. 98–99 m.

One specimen approximately 140 mm. in length was taken off Patagonia. While the species has been recorded on several occasions from the eastern side of the Continent, this is the first record from the Atlantic coast.

The animal had the body wall damaged in places. The papillae on approximately the last 2 cm. of the body were higher than those in the middle. The same was true of the area just behind the introvert. There for a depth of about 1·5 cm. the papillae were higher than in the middle of the body and gave the skin a scaly appearance. There were ten anal bristles, irregularly spaced. The three pairs of segmental organs were all very long and reached to within about 2 cm. of the posterior end of the body. The first two pairs were very much swollen, the largest having a maximum diameter of about 8 mm. The third pair were merely long thin tubes.

Genus Thalassema Lamarck

The only species belonging to this group so far reported from the Antarctic is *Thalassema verrucosum* described by Studer (1879, p. 124) from Kerguelen. So far as the family itself is concerned, it is mainly a tropical one and few species have been found in the colder seas. The collections of these animals brought back by the 'Discovery' is therefore of special interest, since six individuals belonging to two species hitherto unrecorded in the Antarctic were secured. A further point of interest is that one of these species is a well-known Arctic form. Both the stations at which they were found were from fairly deep water.

3. Thalassema faex Selenka. Plate VII, fig. 2.

DISTRIBUTION. Arctic seas off Norway, etc.

OCCURRENCE. South Shetlands: St. 172. 525 m.

Three specimens were secured. Two were complete and the third was fragmentary. All were strongly contracted.

The introvert was small in comparison with the length of the body. In the two complete specimens the bodies were 45 and 20 mm. and the respective introverts 5 and 4 mm. When fully expanded the introvert may be longer. The skin was white with only a few indistinct papillae. The digestive tract was filled with black rock fragments of all sizes from fine grains to fragments about 2 mm. in length. This dark mass showed distinctly through the skin. The longitudinal muscles were continuous. There was only a single pair of nephridia, white in colour, and containing a few large round ova. The specimens seem to correspond closely to the northern species and to be identified with it.

4. Thalassema antarcticum sp.nov. Plate VII, figs. 3, 4.

OCCURRENCE. Falkland Islands: St. 1909. 132 m.
Palmer Archipelago, Schollaert Channel: St. 182. 278–500 m.

HOLOTYPE. The introvert seemed to be fully expanded and was much longer than the body, which was short and cylindrical. The body measured 27 mm. and the introvert 52 mm. In preservative the introvert was straw-coloured with a darkened thickened edge all round, while the body was grey-brown. In life, however, the colour was more vivid, as the colour note made at the time of capture indicates: 'found embedded in the heart of a dark green clayish rock, only the ribbon-like introvert protruding through a chink in the surface of the rock and waving gently to and fro. Body pale yellow-white, translucent, the viscera showing through. The introvert pale milk-white, translucent, edged with opaque porcelain-white.'

The surface of the introvert was smooth and the thickened edge had indentations at intervals. The tip was not divided but had an indentation similar to those along the sides.

The body was smooth in appearance, and only under magnification were the very small papillae visible. These papillae were very small, elongated, white bodies and were seen only in the middle of the body. The skin at the extremities of the body was somewhat corrugated.

The longitudinal muscles were continuous. There were two yellow ventral setae. These were rectangular in shape in the end portion when seen in full and are only slightly bent at the tip when seen in profile.

There was only one pair of segmental organs and they had no spiral appendages. They were thin white tubes and narrowed at the lower end into a still thinner tube which bore the funnel at its lower end.

Holotype taken at St. 1909. Deposited at the British Museum (Nat. Hist.).

At St. 1909 an introvert similar to that possessed by the type was also taken, and a similar colour note attached to it.

At St. 182 a much larger animal was taken, which seemed to belong to this species. The body measured 67 mm. The introvert measured only 33 mm., this comparative shortness compared with those at St. 1909 being due to contraction. Such a difference due to the state of the animal when preserved has been illustrated by Shipley (1899, pl. xxxiii, figs. 5, 6, p. 338) in the case of *Thalassema neptuni*. The introvert was similar in appearance to the others mentioned. The ventral setae had been lost. The two segmental organs were long thickish tubes, almost three-quarters the length of the body and filled with small ova.

This species differs from others of its genus possessing continuous longitudinal muscles and a single pair of segmental organs, in the lack of papillae on the body and in the long ribbon-like introvert.

Genus Hamingia Koren and Danielssen

5. Hamingia arctica Koren and Danielssen. Plate VIII, fig. 1.

DISTRIBUTION. Arctic seas.

OCCURRENCE. St. 1958, South Shetlands. 740 m.

One contracted specimen only was secured. The body measured 28 mm. and the introvert 20 mm. The diameter of the body at the widest part was 13 mm. In alcohol the colour was a uniform dull grey-green, and the body wall in the posterior half was sufficiently thin for the rod-like pellets filling the digestive tract to be seen. In the living state, however, the animal was highly coloured as the colour note made at the time of capture indicates: 'body an extraordinarily vivid grass green, introvert very pale weak-milk white.'

The skin was very tough. The whole animal was contracted and the body was filled with a mass of elongated cylindrical clay pellets of varying size, rounded at the extremities. Owing to the tough nature of the skin and the closely packed mass of clay pellets in the digestive tract, considerable maceration had taken place and the walls of the gut had completely disappeared, as well as some of the other structures. Any comparison of the course and shape of the digestive tract was out of the question.

Two accounts of the appearance and anatomy of this species have been given: the original one by Koren and Danielssen (1881, p. 20) and a later one by Wesenberg-Lund (1934, p. 7).

With regard to the Discovery specimen, the body was smooth as described by Koren and Danielssen, not warty at the extremities as in the specimen described by Wesenberg-Lund. The two prominent cylindrical papillae described by Koren and Danielssen were not seen in the Discovery specimen, as was also the case in Wesenberg-Lund's specimens. Two low hemispherical bulges of the body wall appeared on the anterior ventral side some distance apart on the Discovery specimen about 3 mm. from the base of the introvert. They seemed, however, to be accidental bulges rather than related to the papillae in question. They were at some considerable lateral distance from the openings of the nephridia.

The introvert formed an almost closed tube for most of its length. It was somewhat macerated. The tip was T-shaped and folded. When the tip was unfolded as in the figure, it was seen to be bifid but the arms were comparatively short, much shorter than those figured by Wesenberg-Lund (1934, fig. 1), but this may not be significant since the Antarctic specimen was somewhat macerated and further was more contracted than the specimen figured.

As previously indicated, the digestive tract was completely macerated. The anal trees were also incomplete but seemed quite in keeping with previous descriptions. Two small nephridia were present, opening to the exterior close behind the introvert.

In spite of the great difference in distance between the known areas of distribution, the Arctic and Antarctic specimens seem sufficiently similar for them to be linked under the same species.

SIPUNCULIDAE

Considerable collections of these animals were secured both in the Antarctic and on the outward and homeward voyages. Since these latter stations are incidental to the Antarctic survey proper and the species secured are tropical ones, the two sets of species are listed separately.

(*a*) SPECIES TAKEN IN ANTARCTIC WATERS

Genus **Phascolosoma** F. S. Leuckart

6. **Phascolosoma anderssoni** Théel. Plate VIII, fig. 2.

Phascolosoma anderssoni Théel, 1911, p. 28.

DISTRIBUTION. South Georgia, Graham Land Region: Théel, loc. cit.
65° 48′ S, 53° 16′ E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).
66° S, 140° E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).
66° 45′ S, 62° 03′ E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).
67° 03′ S, 74° 29′ E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

OCCURRENCE.

Falkland Islands:	St. WS 244.	247–253 m.
	St. WS 783.	155 m.
South Georgia:	St. 42.	120–204 m.
	St. 45.	238–270 m.
	St. 123.	230–250 m.
South Shetlands:	St. 175.	200 m.
Ross Sea:	St. 1645.	475 m.
	St. 1651.	594 m.
	St. 1653.	485 m.
	St. 1659.	512 m.

This species has been recorded by Théel from South Georgia and the Graham Land region. It was also taken by the B.A.N.Z.A.R.E. on the edge of the Antarctic Continent off Adélie Land, etc. The Discovery collections show that it occurs over a much wider area of the Antarctic. In these collections it was not taken in the Graham Land region, although already recorded from there, but was taken at South Georgia. It is now recorded from the Falklands and, more interestingly, from four stations in the Ross Sea.

There is not a great deal to add to Théel's excellent description, but the number of specimens in the Discovery collections enables the description to be elaborated at one or two points. In Théel's specimens the skin was thin, shining and semi-transparent. While this was true of the small specimens in the collection and a number of the large ones taken by the 'Discovery', other large specimens had the skin over the introvert or over the whole body dull and opaque. In some the introvert was stained with brown or black.

Théel has also described the papillae in his specimens as being cylindrical over the body except at the girdle of vesicles, but in all these Discovery specimens as the girdle of vesicles was approached from the anterior end the papillae tended to be more or less swollen at the base and had the general appearance of a narrow cone. In some of the specimens one or two of the papillae were set on isolated vesicles.

The portion of the body carrying the girdle of vesicles varied greatly in shape. In some specimens it was of the same diameter as the body but in others was swollen to varying degrees, in the extreme case being almost like a ball, with the viscera showing through the wall. Where this portion was greatly expanded the 'tail' was usually prominent, but in two of the smaller specimens the tail was very inconspicuous and the area with vesicles narrow so that the end of the body looked rounded with the girdle like a cap at the end.

Most of the specimens were not fully expanded but, allowing for this, a comparison of the lengths of the animals is interesting. Most of Théel's specimens from South Georgia were small, but his specimens from Graham Land region he called 'large'; the largest was, however, only 100 mm. in length. While the three specimens taken at the Falklands and South Georgia were small, measuring some 15–45 mm. in length, the specimens from the Ross Sea were almost all large, in most cases greatly exceeding 100 mm. For example, at St. 1645 the largest specimen, fully expanded, measured 250 mm., while two others, not fully expanded, measured 190 and 140 mm. respectively. At Sts. 1651 and 1653 specimens equally large were taken. At St. 1659 the specimens tended to be smaller, being only some 130–140 mm. in length.

The species seems to live in moderately deep water. Théel gave a record from South Georgia of only 75 m. but the Discovery specimens ranged from 120 to 594 m.

7. Phascolosoma margaritaceum Sars. Plate VIII, figs. 3, 4.

Sipunculus margaritaceus Sars (1851, p. 196).
Phascolosoma capsiforme Baird (1868, p. 83).
P. antarcticum Michaelsen (1889, p. 3).
P. fuscum Michaelsen (1889, p. 3).
P. georgianum Michaelsen (1889, p. 3).
P. margaritaceum Sars var. *capsiforme* Baird, Fischer (1896, p. 3).
P. margaritaceum Sars ?, Théel (1911, p. 26).
P. margaritaceum Sars, Fischer (1920, p. 409).
P. socium Lanchester (1908, p. 1).
P. antarcticum Hérubel (1908, p. 1).
P. margaritaceum var. *capsiforme* Baird, Benham (1922, p. 7).
P. capsiforme Baird, Pratt (1898, p. 16); Shipley (1902, p. 285).

DISTRIBUTION. Falkland Islands: Baird, Théel, Pratt.
South Georgia: Michaelsen, Théel.
Tierra del Fuego: Théel.
Graham Region: Théel, Fischer.
Cape Adare: Shipley.
Port Charcot: Hérubel.
Commonwealth Bay: Benham.
Ross Sea: Lanchester.

OCCURRENCE. Off Patagonia: St. WS 89. 21–23 m. One small specimen.
St. WS 788. 82–88 m. Five medium-sized and small specimens.
Falkland Islands: St. WS 73. 121 m. Six small and three very small specimens.
St. WS 80. 152–156 m. One medium-sized specimen.
St. WS 84. 74–75 m. Three medium-sized, two small specimens.

Falkland Islands:	St. WS 85. 79 m. One medium-sized specimen.
	St. WS 225. 161–162 m. One medium-sized specimen.
	St. WS 248. 210–242 m. One medium-sized specimen.
	St. WS 250. 251–313 m. One medium-sized specimen.
South Georgia:	St. MS 27. 200 m. Two medium-sized specimens.
	St. MS 74. 22–40 m. One small specimen.
	St. 27. 110 m. One very small specimen.
	St. 45. 238–270 m. One medium-sized specimen, one small.
	St. 141. 17–27 m. Three medium-sized specimens.
Ross Sea:	St. 1645. 475 m. Four large specimens.
	St. 1647. 420 m. One medium-sized specimen.
	St. 1651. 594 m. One small specimen.
	St. 1653. 485 m. One large specimen.
	St. 1660. 351 m. One medium-sized specimen.

This species is one of the commonest and best known Antarctic forms. It appears to be subject to very considerable variation. As the synonymy shows, several varieties and even species have been described which later have been rejected and linked with this species. Variation seems greatest in the very large and, presumably, old individuals and seems to follow the same general trend in both hemispheres. Varieties *hanseni* and *trybomi*, previously described from Arctic waters, have now been taken in the Antarctic and, conversely, the variety *antarcticum*, described from South Georgia, has been recorded by Sato (1939, p. 409) from Japanese waters. The large animals from Sts. 1647, 1653 and 1660 from the Ross Sea do not, at first sight, suggest this species. On the balance of characters, however, it has been considered right to regard them as old individuals of this species, possibly considerably affected by the nature of the habitat.

The specimens from the Ross Sea were mostly very large animals and showed a good deal of variation in the thickness and appearance of the body wall. The animals from Sts. 1647 and 1660 were most alike in appearance. That from St. 1660 was contracted into a short cylinder and the body measured 24 mm. The body wall was thin and transparent so that the closely coiled gut showed through. The specimen from St. 1647 was expanded and measured 125 mm. overall and had the usual pearl grey colour.

The specimen from St. 1653 was peculiar in appearance. It was contracted and measured 150 mm. overall. The anterior part of the body was yellow in colour and very firm in texture. The rest of the animal was dirty grey in colour and the skin was very thin so that the gut was quite visible. The animal had the appearance of having been living in a tube or in very dense clay soil. The animal from St. 1651 was of medium size. As in the preceding specimen, it was yellow anteriorly but the body was firm and uniform throughout. The four specimens from St. 1645 were dissimilar in appearance. Two were pearly grey in appearance and resembled those from St. 1647. The two other animals were dirty grey in colour with a good deal of black deposit on them. The skin was very rough and corky in appearance. All specimens were damaged so that measurements could not be given, but they were all very large. Although so very different in appearance, the specimens seemed all to belong to this species. In most specimens the typical criss-cross markings of the skin were seen. The chief difference noted was that the gut seemed much larger in proportion. In most specimens the body was filled with a large mass of gut filled with fine mud, and the retractors occupied only a very small area in the anterior third, very similar to the proportions of the variety *trybomi*.

? var. hanseni Koren and Danielssen.

The specimens from St. WS 788 were four in number and ranged from 29 to 64 mm. in length, overall. They seemed to approach this variety. The smallest two specimens were fairly typical, but even in them the skin at the two extremities of the body was assuming a corky appearance, and in the second smallest specimen just below the introvert was a small area where the skin was becoming corky in appearance and pitted with pores, like little rounded pits. In the largest specimen a considerable area at each end of the body had a rough corky appearance, and the whole intermediate area of the body had these small pits scattered over it. Internally, however, the specimens differed from the variety in that the bases of the retractors were not divided.

var. trybomi Théel.

Phascolosoma trybomi Théel, 1905, p. 69.
P. margaritaceum Sars var. *trybomi* Théel, Fischer, 1924, p. 69; 1925, p. 19.
P. trybomi Théel, Stephen, 1936, p. 166.
P. margaritaceum Sars var. *trybomi* Théel, Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

DISTRIBUTION. Arctic seas: Théel, loc. cit.; Stephen, loc. cit.
Antarctic, off Sabrina Land, 64° 28′ S, 114° 59′ E: Stephen, loc. cit.

OCCURRENCE. Falkland Islands, Port Stanley Harbour, on the shore amongst mussels. 18. ii. 27. One specimen, about 115 mm. in length, was secured.

It was undamaged externally, but was somewhat macerated internally. The gut was in part destroyed so that the coils could not be counted. The specimen corresponded closely to that figured by Théel and also with a specimen in my possession taken in the northern North Sea, but with a small difference in colour. The animal from the Falkland Islands was dirty grey both externally and internally and lacked the mother-of-pearl lustre on the inside of the body well seen in the northern specimens. The Scottish specimen was rose pink both externally and internally. This form has only been recorded on a very few occasions in northern waters, usually from fairly deep water. It is interesting to find it in the Antarctic, although it has already been recorded in the collections made by the B.A.N.Z.A.R.E.

8. Phascolosoma nordenskjöldi Théel.

Phascolosoma nordenskjöldi Théel, 1911, p. 30.

DISTRIBUTION. Falkland Islands and South Georgia: Théel, loc. cit.
Kerguelen: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

OCCURRENCE. South Georgia: St. MS 68. 220–247 m. 'From root of giant sponge.'
Falkland Islands: St. WS 212. 242–249 m.
St. WS 225. 161–162 m.
St. WS 236. 272–300 m.
St. WS 237. 150–256 m.
St. WS 246. 208–267 m.

This is a small species. The largest specimen described by Théel measured only 9 mm. in length, and the Discovery specimens were mostly about this size. It was first taken at South Georgia and the Falkland Islands and the Discovery specimens came from much the same area, namely, from South Georgia and from an extensive patch lying to the north of the Falkland Islands along the edge of the continental shelf. It has also been found at Kerguelen, having been taken there by the B.A.N.Z.A.R.E. in 1930.

The depths in which it was taken were also considerably in excess of these previously recorded. At the Falkland Islands it was taken in 12 m., at South Georgia in depths ranging from 64 to 195 m., and at Kerguelen in 91 m. The range in depth of the Discovery specimens was 150–300 m.

One of the animals from St. WS 212 had the body full of ova.

9. **Phascolosoma ohlini** Théel.

Phascolosoma ohlini Théel, 1911, p. 29.
P. ohlini Théel, Fischer, 1920, p. 413.

DISTRIBUTION. South Georgia: Théel, loc. cit.
North of Astrolabe Island, 63° 9′ S, 58° 17′ W: Théel, loc. cit.
Kaiser Wilhelm Land, 66° 2′ S, 89° 38′ E: Fischer, loc. cit.

OCCURRENCE. Falkland Islands: St. WS 840. 368–463 m. One specimen 'from large rock'.
South Georgia: St. WS 33. 130 m. One specimen.
St. 39. 179–235 m. Three very large specimens, one small.
St. 42. 120–204 m. Two medium-sized specimens.
St. 123. 230–250 m. One medium-sized specimen, six small.
St. 149. 200–234 m. Five small to medium specimens.
St. 159. 160 m. One very small specimen.
South Shetlands: St. 196. 720 m. Three small specimens, one with the body full of ova.

These animals agreed well with Théel's description and no comment need be made except that the tentacles may be more numerous than the original description stated. The species is evidently a fairly widespread one from south of the Falklands to the South Shetlands. The Discovery stations are from considerably deeper water than the previous records.

Genus **Phascolion** Théel

10. **Phascolion strombi** (Mont.)

Phascolion strombi (Mont.) ?, Théel, 1911, p. 31.

DISTRIBUTION. This species is widely distributed in Arctic and northern waters. In the Antarctic it has been recorded from one station, namely, Shag Rocks Bank (between South Georgia and the Falkland Islands), 53° 34′ S, 43° 23′ W. 160 m. Théel, loc. cit.

OCCURRENCE. South Georgia: St. WS 179. 125 m.
St. 27. 110 m.
St. 42. 120–204 m.
St. 140. 122–136 m.
St. 144. 155–178 m.
St. 159. 160 m.

Near Shag Rocks: St. 160. 177 m.
South Shetlands: St. 175. 200 m.
St. 187. 259 m.
Clarence Island: St. 170. 342 m.

Previously this species was known from only one station in the Antarctic at Shag Rocks Bank as recorded by Théel. In his record he put a question mark after the identification but stated that he could not differentiate his animals from northern ones. Fischer (1920, p. 417) quotes the record without the query, being satisfied that the southern animals were the same as the northern ones. The present specimens agreed with Théel's figures and description, and are regarded as belonging to the species.

Although previously recorded from only one locality it has a much wider area of distribution, since the Discovery specimens came from over a wide area from South Georgia to the South Shetlands. At few points was it common, two or three specimens at each station being the usual catch.

The species usually lives in old shells of gastropods or *Dentalium*, but is often found living free. In these Antarctic collections it was found living free and in shells in about equal proportions, as the following table shows:

St. 27. One large and one small specimen, both living in the same gastropod shell.
St. 42. One large and one small specimen, living in the same gastropod shell.
St 140. Two specimens, living free.
St. 144. Three specimens, living free.
St. 159. Eleven specimens, living free.
St. 160. Three specimens in gastropod shells.
St. 170. One specimen in gastropod shell.
St. 175. Three specimens in gastropod shells, two living free.
St. 187. One specimen, living free.
St. 199. One specimen, living free.

(*b*) SPECIES TAKEN IN SOUTH AFRICAN WATERS AND IN THE EASTERN ATLANTIC

11. Larval sipunculid.

OCCURRENCE. Off South-East Africa: St. 1569. 31° 50·3′ S, 32° 20·5′ E. 12. iv. 35. 1200–300 m. T.Y.F.B.

Only one specimen, about 5 mm. in diameter, was taken. There were numerous very small indistinct papillae scattered over the skin, and there were thirty-six radiating longitudinal muscle bands. On a dark field the animal, preserved in formol, had a bluish appearance and the skin appeared iridescent.

This form was originally considered to be a distinct, but pelagic aberrant, species of sipunculid and was given the name of *Pelagosphaera aloysii* by Mingazzini (1905, p. 713). More recent investigations by Dawydoff (1930, p. 88) have shown that it is an unidentified larva of some sipunculid. Dawydoff was fortunate in securing over thirty live specimens and was able to follow the metamorphosis until the animals had ceased to be pelagic and were developing an elongated body and an opaque skin.

These latter specimens were taken off the coast of Annam. Other localities in which it has been found are the southern Pacific (between Norfolk Island and new Caledonia), the Gulf of Senegal and the seas around Java and the Moluccas.

Genus Sipunculus Linnaeus

12. Sipunculus nudus L.

DISTRIBUTION. This species is widely distributed in the oceans of the world, being recorded from many parts of the Atlantic, Indian and Pacific oceans.

OCCURRENCE. St. WS 128, west side Gough Island, inshore, 40° 19′ 00″ S, 10° 04′ 00″ W. 10. iv. 27. 90–120 m.

Only one specimen was secured. This consisted of the lustrous, translucent and highly iridescent anterior portion of a medium-sized animal. The internal organs were much damaged. There were thirty-two longitudinal muscle bands. The ventral retractors were attached to the second, third and fourth longitudinal muscle bands, while the dorsal retractors were attached to the ninth, tenth and eleventh muscle bands.

Genus Physcosoma Selenka

13. Physcosoma nigrescens Keferstein.

DISTRIBUTION. A widely distributed species occurring in the Indian Ocean, Pacific Ocean and in the Atlantic. In this latter area it has been recorded from the east coast of South America and from the west coast of Africa as far north as the Gulf of Guinea. In the Gulf of Guinea it has been recorded from the Gold Coast, Ilha das Rolas bei Ilha de São Thomé and the Isle of Annobon. It is now recorded for the first time from Ascension and Tristan da Cunha.

OCCURRENCE.	Ascension: Clarence Bay:	St. 1. 16–27 m.
		St. 2. Shore collection 'found in Lithothamnion'.
	Tristan da Cunha:	St. 4. 40–46 m.
		St. 6. 80–140 m.
	Gulf of Guinea: Off Annobon.	St. 283. 18–30 m.

At St. 1 the animals were mostly large, the largest, which was not fully expanded, measuring about 55 mm. overall. All were distinctly coloured. In each animal the dorsal side of the introvert was red-brown. In some, single red-brown papillae were scattered over the body showing up in marked contrast to the whitish papillae covering the body. In other specimens the red-brown papillae were gathered into small groups giving the animals the appearance of being spotted. Twenty-five specimens were taken.

At St. 2 the ten specimens were considerably smaller than those at St. 1, the largest measuring only some 20 mm. overall. These animals had also red-brown papillae scattered over the body.

At St. 4 some fifty specimens were taken. All were comparatively small, the largest which was more or less fully expanded, measuring only some 30 mm. overall. At this station the animals were all a dirty grey-white and showed no colouring at all.

At St. 6, from fairly deep water, only one small specimen was secured. It also showed no pigmentation.

At St. 283 seven small, three intermediate and four large specimens were taken. The large animals were fully expanded, the largest measuring about 125 mm. overall. Some of them resembled those taken at Ascension in having red-brown papillae scattered over the body.

14. **Physcosoma scolops** Selenka and de Man.

DISTRIBUTION. A cosmopolitan species occurring in many parts of the Indian Ocean, Pacific Ocean and on the southern and western coasts of Africa. Along the coasts of Natal and Cape Province it is one of the commonest intertidal sipunculids, and has been secured at a number of places along these coasts during the recent surveys carried out by the Zoology Department of the University of Cape Town. On the west coast of Africa it has been recorded as far north as the Gulf of Guinea. In this latter area it has been recorded from the Gold Coast, Ilha das Rolas bei Ilha de São Thomé, the Isle of Annobon and the Belgian Congo. The Discovery collections have not greatly extended the known range of distribution on the African coast, but the species is recorded for the first time from Ascension.

OCCURRENCE. Cape Province: Saldanha Bay beach. 1926.
False Bay off Simon's Town: St. 90. 1–2 m.
Ascension: Clarence Bay: St. 1. 16–27 m.

The specimens were quite typical and need no description. The species was not found in any abundance, the numbers at the stations being two, two and one respectively.

Genus **Aspidosiphon** Diesing

15. **Aspidosiphon mülleri** Diesing.

DISTRIBUTION. This species occurs along the Atlantic coasts of Norway, Britain and France. It is also found in the northern North Sea and in the Mediterranean. On the west coast of Africa it is recorded south to the French Congo. On the east coast of Africa it is known from Suez and Jibouti. Sluiter has also recorded it from the Malay region. In the Gulf of Guinea and neighbourhood it is recorded from Dahomey, southern Nigeria and Kinsembo.

OCCURRENCE. Gulf of Guinea: Off Annobon: St. 283. 18–30 m.
French Congo: Off Cape Lopez: St. 279. 58–67 m.

At St. 283 thirteen specimens were taken, the largest being about 20 mm. overall, while the rest were small.

At St. 279 four small specimens were secured.

PRIAPULIDAE

The family is a small one, only three species being recognized. Of these, two occur in northern seas, and three in southern and Antarctic waters. Of these latter, two are now considered to be only varieties of the northern species. The southern records are as follows:

Priapulus horridus Théel (1911, p. 24).
Uruguay: 33° S, 51° 10′ W. 80 m.

Priapulus bicaudatus Danielssen var. *australis* de Guerne. De Guerne (1888, p. 13).

Patagonia: 44° 47′ S, 65° 56′ W. 90 m.

South Shetlands: Sound of Navarin. 200 m.

Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

From many parts of the Antarctic.

Only the last named appeared in the Discovery collections. In addition, Benham (1916) reports that a single specimen was found in the collections made by F.I.S. 'Endeavour', but there was no note of the locality in which it was taken. Although already recorded from the Antarctic seas, no specimen had been found so far north in the southern hemisphere, since the 'Endeavour' did not enter the Antarctic.

Genus Priapulus Lamarck

16. Priapulus caudatus Lamarck var. tuberculato-spinosus Baird.

P. tuberculato-spinosus Baird, 1868, p. 106; de Guerne, 1888, p. 9.
P. humanus Lamarck var. *antarcticus* Michaelsen, 1889, p. 10.
P. caudatus Lamarck var. *antarcticus* Michaelsen, Fischer, 1896, p. 10.
P. humanus (Lamarck) var. *antarcticus* Michaelsen, Collin, 1901, p. 299.
P. caudatus Lamarck, Shipley, 1902, p. 284.
P. caudatus Lamarck forma *tuberculato-spinosus* Baird, Théel, 1911, p. 18.
P. caudatus Lamarck var. *antarcticus* Michaelsen, Fischer, 1920, p. 419.
P. caudatus var. *tuberculato-spinosus* Baird, Benham, 1922, p. 6.
P. caudatus Benham, 1932, p. 890.

DISTRIBUTION. Commonwealth Bay, Macquarie Island: Benham (1922).
Falkland Islands: Baird; de Guerne; Théel.
Graham Land Region: Théel.
Island of Navarin, Puerto Toro: Fischer; Michaelsen.
Kerguelen: Collin; Fischer.
New Zealand: Benham (1932).
Orange Bay: de Guerne.
Patagonia: Théel.
South Georgia: Fischer; Michaelsen; Théel.
Straits of Magellan: de Guerne.
Tierra del Fuego: Fischer.
Victoria Land, Cape Adare: Shipley.

OCCURRENCE. South Georgia. St. 141. 17–27 m. Two specimens.
St. 144. 155–178 m. One specimen.
Fish trap, stomach of *Notothenia rossi*. 4–5 m. 22. xii. 28. One specimen.
Falkland Islands: Port Stanley, shore collection. One specimen.
South Orkneys: St. 167. 244–344 m. Two specimens.
St. 1961. 340–360 m. Three specimens.
South Shetlands: St. 195. 391 m. One specimen.
St. 1873. 210–180 m. One specimen.
St. 1952. 367–383 m. One specimen.

This species has been very fully described by Théel (1911, p. 18), and there is nothing to add to his description. The varietal name of the species has been subject to a good deal of alteration, some authors preferring to use Michaelsen's name of *antarcticus*, while others have preferred Baird's name of *tuberculato-spinosus*. While the atter is clumsy, I see no reason why Baird's name should not stand, as it is now recognized that Baird's specimen belongs to this variety, in spite of trivial discrepancies in his description.

This form is widely distributed in the Antarctic seas. It was taken at nine of the Discovery stations, thirteen specimens in all being secured. Of the nine stations only four were in areas from which the species had been previously recorded, and the remaining five, namely, the South Orkneys, South Shetlands, and the area lying between these two groups of islands, are new localities.

The range in depth of the stations was considerable. At Port Stanley it was taken on the shore; at South Georgia from 4 to 178 m., while in the South Shetlands the records all come from depths ranging from 210 to 391 m. The specimens varied considerably in size, but in most cases they were too contorted to allow of any accurate measurements being made. The smallest, only some 5 mm. overall and taken in the beginning of January, came from St. 144, South Georgia. The next smallest specimen, taken in February, was about 11 mm. in length, and came from St. 167, off Signy Island, South Orkneys. The other specimens in order of size were considerably larger and this would suggest that breeding takes place in late summer.

The largest specimens came from the South Shetlands, the body and introvert being between 90 and 100 mm. overall.

As it is usual to see these animals with the natural colours lost in the course of preservation, the following notes made of the colours for five of the specimens when collected may be of interest.

St. 1873. 'Pale in colour, except the introvert, which is brown.'

St. 1952. 'Colour generally a pale dirty yellow-brown; caudal vesicles a dull, but deeper, yellow-brown: teeth dark brown.'

St. 1961. (*a*) 'Colour throughout a pale dull dirty cream.' (*b*) 'Colour throughout a pale dirty cream.' (*c*) 'Colour pale cream.'

In the two last specimens the full colour may not have been developed, since the specimens were comparatively small and may have been fairly young.

LITERATURE CITED

Baird, W., 1868. *Monograph of the species of worms belonging to the subclass Gephyrea.* Proc. Zool. Soc. Lond.

—— 1873. *Description of some new species of Annelida and Gephyrea in the collection of the British Museum.* J. Linn. Soc. (Zool.), xi.

Benham, W. B., 1916. *Report on the Polychaeta obtained by F.I.S. 'Endeavour' on the coasts of New South Wales, Victoria, Tasmania and South Australia.* III. *Report on the Gephyrean* Priapulus *obtained by F.I.S. 'Endeavour' in Australian waters.* Fish. Commonw. Australia, iv.

—— 1922. *Gephyrea inermia.* Sci. Rep. Aust. Antarctic Exp. 1911–14. Series C, vi, pt. 5.

—— 1932. Priapulus caudatus *in New Zealand waters.* Nature, Lond., cxxx.

Collin, A., 1901. *Die Gephyreen der Deutschen Expedition S.M.S. 'Gazelle'.* Arch. Naturgesch., 67. Jahrgang, Beiheft.

DAWYDOFF, C. N., 1930. *Quelques observations sur Pelagosphaera, larve de Sipunculide des côtes d'Annam.* Bull. Soc. Zool. Fr. LV.

FISCHER, W., 1896. Gephyrea, *in Hamburger Magalhaensische Sammelreise*, Lief. I.

—— 1916. *Die Gephyreenausbeute der Deutschen Tiefsee-Expedition*, 1898–9. Vorläuf. Mitt., im Zool. Anz. XLVIII, no. I.

—— 1920. *Gephyreen der antarktischen und sub-antarktischen Meere.* Deutsche Süd-Polar Expedition, XVI. Zoologie, VIII.

—— 1924. *Beitrag zur Kenntnis der Sipunculiden. Ueber die verwandtschaftlichen Beziehungen der Arten* Phascolosoma margaritaceum *Sars*, Phasc. hanseni *Dan. und Kor.*, Phasc. trybomi *Théel.* Zool. Anz. LVIII.

—— 1925. *Echiuridae, Sipunculidae, Priapulidae. Tierwelt N.- u. Ostsee.* Lief. I, Teil VI*d*. Leipzig.

DE GUERNE, J., 1888. *Priapulides.* Mission scientifique du Cap Horn, 1882–3, VI, Zoologie. Paris.

HÉRUBEL, M. A., 1908. *Géphyriens.* Expédition Antarctique Français, 1903–5.

KOREN, J. and DANIELSSEN, D. C., 1881. *Norwegian North Atlantic Expedition*, 1876–8, pt. iii.

LANCHESTER, W. F., 1908. *Sipunculoidea.* National Antarctic Expedition, 1901–4, IV.

MICHAELSEN, W., 1889. *Die Gephyreen von Süd-Georgien nach der Ausbeute der Deutschen Station von* 1882–3. Jb. hamburg. wiss. Anst. VI, Hamburg.

MINGAZZINI, P., 1905. *Un Gefireo pelagico*: Pelagosphaera aloysii. Atti Accad. Lincei, Ser. 5, XIV.

MÜLLER, M., 1852. *Observationes de vermibus quibusdam maritimis.* Diss. Berlin.

PRATT, E. M., 1898. *Contribution to our knowledge of the marine fauna of the Falkland Islands.* Mem. Manchr Lit. Phil. Soc. XLII, no. 13.

SARS, M., 1851. Nyt Mag. Natur. VI. Bed.

SATO, H., 1939. *Studies on the Echiuroidea, Sipunculoidea and Priapuloidea of Japan.* Sci. Rep. Tôhoku Univ. XIV, no. 4.

SEITZ, PH., 1907. *Der Bau von* Echiurus chilensis (*Urechis n.g.*). Zool. Jb. XXIV, Heft 2, Abt. für Anat. u. Ontogenie.

SELENKA, E., 1885. *Report on the Gephyrea collected by H.M.S. 'Challenger' during the years* 1873–76. Rep. Sci. Results of the Voyage of H.M.S. 'Challenger'. Zool., XIII, no. 2.

SHIPLEY, A. E., 1899. *Willey's Zoological Results*, III.

—— 1902. *Natural History Collections of the 'Southern Cross'.* London.

SPENGEL, J. W., 1912. *Beiträge zur Kenntnis der Gephyreen.* IV. *Revision der Gattung* Echiurus. Zool. Jb. XXXIII, Abt. für Systematik.

STEPHEN, A. C., 1936. *The Echiuridae, Sipunculidae and Priapulidae of Scottish and adjacent waters.* Proc. R. Phys. Soc. Edinb. XXII, pt. 4.

—— *Report on the Sipunculids collected by the B.A.N.Z.A.R. Expedition*, 1929–31. (In the Press.)

STUDER, TH., 1879. Vide Collin, 1901.

—— 1879. Thalassema verrucosa *sp.nov.* Arch. Naturgesch. XLV.

THÉEL, H., 1905. *Northern and Arctic invertebrates in the collection of the Swedish State Museum.* I. *Sipunculids.* K. svenska Vetensk. Akad. Handl. XXXIX, no. I.

—— 1911. *Priapulids and Sipunculids dredged by the Swedish Antarctic Expedition*, 1901–3. K. svenska Vetensk. Akad. Handl. XLVII. Uppsala and Stockholm.

WESENBERG-LUND, 1934. *Gephyreans and Annelids. The Scoresby Sound Committee's second East Greenland Expedition in* 1932 *to King Christian IX's Land.* Medd. Gronland, CIV, no. 14.


PLATE VII

Fig. 1. *Echiurus antarcticus* Spengel. Introvert. St. 190. ×1·5 nat. size.
Fig. 2. *Thalassema faex* Selenka. St. 172. ×2 nat. size.
Fig. 3. *Thalassema antarcticum* sp.nov. St. 1909. ×1·5 nat. size.
Fig. 4. *Thalassema antarcticum* sp.nov. St. 182. ×1·5 nat. size.

1

2

3

4

PLATE VIII

Fig. 1. *Hamingia arctica* Koren and Danielssen. St. 1958. $\times 1\cdot5$ nat. size.

Fig. 2. *Phascolosoma anderssoni* Théel. Varying appearance of the posterior end of the body according to degree of inflation.

Fig. 3. *Phascolosoma margaritaceum* Sars. St. 1653. $\times 1\cdot5$ nat. size.

Fig. 4. *Phascolosoma margaritaceum* Sars. St. 1647. $\times 1\cdot5$ nat. size.

1

2

3

4

[*Discovery Reports. Vol. XXI, pp.* 261–356, *October*, 1942.]

PHYTOPLANKTON PERIODICITY IN ANTARCTIC SURFACE WATERS

By

T. JOHN HART, D.Sc.

CONTENTS

PHYTOPLANKTON PERIODICITY IN ANTARCTIC SURFACE WATERS

By T. John Hart, D.Sc.

(Text-figs. 1–19)

INTRODUCTION

AIMS, METHODS AND TERMINOLOGY

Our main object in planning the phytoplankton work carried out during the last three commissions of the R.R.S. 'Discovery II' was to gain some knowledge of the broader variations in plant population over the whole of the Antarctic zone of the southern ocean. This great enlargement on the scope of our work during earlier commissions became very necessary with the enormous expansion of modern pelagic whaling during 1928–31, which has since been maintained.

In dealing with such a vast sea area it was obviously essential to adopt methods which could be used at as many stations as possible. Although our general knowledge of Antarctic seas made it certain that relatively uniform conditions for plant growth would be found over great distances, it must be remembered that our previous work had been mainly confined to the complicated areas round South Georgia and in the Falkland sector. Further, our detailed knowledge of the hydrological background (Herdman, 1932; Deacon, 1933, 1937; Clowes, 1934, 1938) was being obtained concurrently with the phytoplankton observations. It was therefore impossible to judge beforehand where a series of observations typical of conditions over a wide area could be obtained. It was only in the last stages of these investigations that such series of repeated observations in one area could be undertaken, and the earlier more widespread work interpreted in the light of the results so obtained. The general plan of campaign, therefore, resolved itself into an attempt to obtain as many observations as possible over the whole zone and to compare these subsequently with repeated series of similar observations in what seemed the most typical oceanic area. This is necessary in order to determine how far the broader differences in quantity and quality of the phytoplankton are to be ascribed to seasonal changes, rather than inherent differences in the conditions from place to place.

In this way I have tried to draw a picture of the main sequence of events in broad outline, for an 'average' year, for several distinct biogeographical regions or areas within the Antarctic zone, and to present it in a form suitable for comparison with other lines of research, such as work on the variations in nutrient materials in the water, and on the zooplankton. It is hoped that this broad survey may serve as a useful basis for more detailed phytoplankton work in the future. In the present circumstances it is very uncertain when such work will again be possible, so that it seems the more desirable that the data, and a possible interpretation of them, should be published without delay.

The methods we adopted were: vertical hauls with the Gran International Net from 100 to 0 m.; vertical hauls with a modified form of Harvey's apparatus (Harvey, 1934*a*) and centrifuging of water samples.

The routine hauls with the Gran Net (N 50 V) of 50 cm. diameter at the mouth, and made of the finest grade of bolting silk, had been fished throughout the previous work of the Discovery investigations. By analysing the catches by the well-known Hensen's methods it was possible to gain some idea of the grosser quantitative changes. The method is very useful for qualitative purposes, as it provides a large amount of material in good condition in a short space of time without the necessity for having a phytoplankton specialist on board to deal with the samples immediately. It was therefore particularly valuable during the pioneer stages of the investigations when we had little knowledge of the general distribution of the phytoplankton, and had a limited staff distributed over two ships and a shore station. It was realized from the first, however, that such hauls can only provide a very rough idea of even the grossest quantitative changes (Hardy, in Hardy and Gunther, 1935, pp. 26, 27, 40; Hart, 1934, pp. 15–17). Therefore, as soon as it became possible to adopt better methods, we fished the Gran Net mainly to ensure an abundant supply of material for subsequent taxonomic work. It may still provide the best means of studying the general distribution of some of the larger and rarer diatoms (Hart, 1937), but apart from such special studies the analytical work has been concentrated on the other two methods.

Harvey's method consists essentially in applying the assimilatory pigment extract colour match, first introduced into marine plankton work by Kreps (Kreps and Verjbinskaya, 1930), to the catch obtained from a measuring net. Harvey (1934*a*, p. 762) tells us that Nansen was the first to suggest the use of a measuring net for plankton studies. The co-ordination of the two ideas and the elaboration of a successful working technique are, however, quite new. We found certain structural modifications necessary to suit our own special conditions, but the dimensions, working parts, and silk nets were identical with those of Harvey's own model. Our subsequent treatment of the catches by digestion with 80 % acetone and direct visual comparison of the coloured extract with the nickel sulphate mixture were carried out exactly as described in Harvey's first account of the method (1934*a*, pp. 770–1). Quantitative counting was not attempted, but during the third and fourth commissions all the catches were examined microscopically at sea and the dominant species noted. During the fifth commission all the catches were subjected to a more thorough microscopic examination, usually when fresh. A 'qualitative count' was made from a large wet mount prepared from the well-mixed sample, which usually involved the examination of some thirty fields of the microscope, but varied considerably according to the size of the catch. The numbers of the leading forms were then reduced to percentages.

Our modifications of Harvey's original design and method of fishing the apparatus were introduced to increase its strength and reliability, even at the cost of some loss of accuracy, so that numerous observations could be taken in spite of the bad weather normally prevalent in the southern ocean. We had also to consider the fact that the greater working height above water on the larger ship would tend to increase the surging strain on the gear during heavy rolling. We therefore decided to have the apparatus assembled for vertical upward hauling only, in conjunction with one of our well-tried single-type release gears. This enabled us to substitute a metal upper cone with rigid bridles for the upper canvas cone with throttling band of Harvey's original model (Harvey, 1934*a*, p. 762). The circular body carrying the meter we also had made of heavy brass tube, nickel-plated. The weight of the attachment ring and bucket was taken off the silk net by three wire bridles shackled to lugs on the upper cone, and to a 10 lb. lead below the bucket. Fig. 1 shows the apparatus rigged in this way.

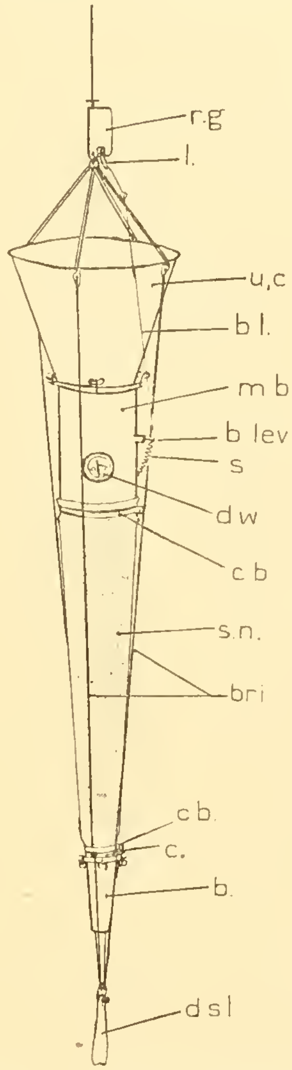


Fig. 1. Semi-diagrammatic sketch of Harvey apparatus rigged ready for use. *b.* bucket, *b.l.* brake-line, *b.lev.* brake lever, *bri.* bridles, *c.* collar, *c.b.* clamping bands, *d.s.l.* deep sea lead, *d.w.* dial window, *l.* link, *m.b.* main body carrying the meter, *r.g.* release gear, *s.* spring, *s.n.* silk net, *u.c.* upper cone.

The additional error introduced by the meter spinning during the interval between the net breaking surface and the brake being again applied was found not to exceed $\pm 3\%$ by trials against stop-watch under the most adverse conditions. This is avoided by Harvey's method of the double release gear and allowing the balanced apparatus to fish both while being lowered and while being hauled up. It was felt, however, that the risk of fouling would be so great in all but the calmest weather that this procedure would prove unsuitable for continuous work in the open sea. With the apparatus rigged in the fashion we finally adopted, we were repeatedly able to make routine observations in winds up to gale force, and rarely obtained markedly discrepant meter readings unless there was a bad stray on the wire, when we found, as Harvey had done before us, that an unexpectedly larger volume of water appeared to pass through the net.

Our meters were made by Messrs R. W. Munro, Ltd., and calibrated by the National Physical Laboratory. Colour standards from Harvey's formula made up in sealed tubes by British Drug Houses were sent out each season, and checked against freshly prepared solutions in shore laboratories when occasion offered. No signs of fading or darkening were observed over the periods for which the standards were in use. It was sometimes found that small southern samples gave a slightly yellower tint than the original Harvey standards, but medium and larger catches always gave a good match.

Phaeocystis brucei sometimes gave trouble by clogging the filter, until Mr Marr hit on the expedient of filtering the catch through a no. 2 Whatman paper instead of the usual silk disk. Where it is very abundant this organism causes serious clogging of all fine-meshed nets, which may appear almost as if they had been treated with 'aeroplane dope' after being used in such water. Fortunately such conditions are rare, and are almost entirely confined to what I have termed the intermediate region of the Antarctic zone, for a short period after the rapid recession of the ice-edge about mid-season. The pigment extract from catches where this organism predominated gave a good match with the colour standards. At those few stations where it was really abundant, however, our results are obviously vitiated by the clogging of the net. I believe that under such conditions *P. brucei*, with its disintegrating gelatinous colonies, would defeat all methods of quantitative estimation, except perhaps some modification of that recently introduced by Riley (1938).

Large Dinoflagellates, which spoil the colour match by the browner colour of their pigments, are fortunately very rare within the Antarctic zone (Hart, 1934, p. 181). It became very evident, however, that there were considerable differences in the quality of the pigments in some of the diatoms themselves though this did not interfere with the colour matches. *Thalassiosira* spp. were found to need much longer digestion with acetone before all their pigments were dissolved, just as Harvey had found with members of the same genus in the northern hemisphere (1934*a*, p. 770). This might be due to the physical characters of the living frustules or of the protoplasts rather than any difference of the pigments themselves, but *Biddulphia striata*, a neritic species, yielded a vast amount of rich green pigment in proportion to its bulk. The extracts sometimes appeared dark 'hookers green' or almost black on the rare occasions when this species predominated in the catches. This peculiarly rich pigment in *B. striata* was first noted by our assistant, Mr W. F. Fry, who carried out the estimations under the direction of Mr J. W. S. Marr during the fourth commission. I was subsequently able to confirm it on two occasions during the fifth commission; off the Balleney Islands in summer and near South Georgia in the autumn. On suitable dilution, however, these rich extracts gave a very exact match with the tint of the standards.

At many stations during the winter months colour matches could not be obtained, owing to extreme poverty of the phytoplankton and at times to the high proportion of animals in the minute catches. It is extremely unlikely that our picture of the main sequence of events is affected by this, for lack of light alone is almost certainly sufficient to preclude the possibility of any considerable production during this period, by organisms which might be missed by the net.

In general, it may be said that the colour match obtained from mixed catches within the Antarctic zone was very good, and the direct visual comparison probably ample for determining the broader differences in quantity of the standing crop which we desired to study (cf. Harvey, 1934*a*, pp. 771–3).

Our centrifuge counts were made during the third commission by a modification of the methods employed by Gran (1929, p. 6) and Marshall (1933, p. 112). It took some time to evolve a method that could be used successfully aboard ship, where so much depends upon the actual manipulation, and many of the earlier counts have had to be discarded. The method finally adopted, and which gave what seemed to be fairly consistent results, was as follows: A small electric centrifuge carrying four 12·5 c.c. tubes was employed and the samples centrifuged for 5 min. at 2000 r.p.m., the highest speed at which the machine could be run at sea without excessive straining. Longer periods of centrifuging did not lead to appreciable increase in the number of organisms deposited. The supernatant liquid was very carefully drawn off with a special pipette with a recurved tip, similar to the arrangement employed by Marshall (1933, p. 112). We found that this gave very much more consistent results than pouring, as recommended by Nielsen (1933). The liquid remaining in the tip of the tube (about 0·3 c.c.) was then cautiously agitated with a straight pipette to remove the crust of organisms adhering to the glass, and transferred to a cell on a large squared slide. Here it was trapped under a no. 1 cover-glass of the largest rectangular size, and the organisms counted under an ordinary microscope in the usual way, with the aid of a large mechanical stage.

Recentrifuging of the supernatant liquid usually gave about 10% of the original count for most species, so to allow for this and loss in manipulation 12 c.c. were reckoned as 10 c.c. in working out the results (cf. Gran, 1929, p. 6).

Series of counts from 0, 5, 10, 20, 50 and 100 m. were obtained from 119 stations, apart from the earlier experimental efforts which had to be discarded. While the work was in progress Nielsen's (1933) severe criticism of the method appeared, from which it seemed that centrifuge results could not even be considered as roughly comparable at different stations. It had long been known, of course, that the method did not approach the ideal of an 'absolute' estimation (Allen, 1919), and in view of the new unfavourable evidence it seemed useless to persevere with it. Unfortunately, the alternative sedimentation method advocated by Nielsen did not lend itself to our immediate purpose, for reasons discussed in the next section of this paper. It is felt, however, that these counts still provide a valuable clue to the probable type of depth distribution of the phytoplankton as a whole, and some evidence regarding organisms which may be missed by the nets. They have accordingly been considered briefly from these points of view, though it is now evident that the full data are not worth publishing.

These centrifuge counts strongly supported the impression gained from the experimental work of Marshall and Orr (1928) that within the Antarctic zone production would be limited to the upper 50 m. or so by the minimum light requirements of the organisms. We had further evidence of this from experimental net hauls, which prompted us to use the 50–0 m. Harvey net haul as our best indication of the relative order of production throughout, though on rare occasions large quantities of diatoms are to be found at lower levels.

The presentation of the results is based on arithmetical means of the observations at mean dates, in several regions or areas within the Antarctic zone. The areas have been chosen according to the degree of uniformity of the conditions, both physical and biological, observed within them, as described on pp. 278–80. It will be realized that no hard and fast lines can be drawn in nature—some gradual merging of conditions is always evident—but in practice it is essential to draw boundaries somewhere in order to reduce the problems to manageable proportions. It will be realized also that the averages in themselves have no 'absolute' value owing to the observational errors, and the varying numbers of observations available at different times and places. They represent a convenient figure summarizing the existing data, and provided that due note is taken of the number of observations upon which they are based, should not prove liable to misinterpretation. The full data from individual stations have been tabulated in the Appendix.

Results obtained in different seasons have had to be considered together, in most of the areas, and this can obviously lead to serious discrepancies, but the whole region is so vast that it is impossible to make any headway with our main problem without doing so. I believe that our previous work, and our last big series of repeated observations in one area, go far towards enabling us to detect any serious distortion due to this cause.

A few series of hydrological data, derived from the work of our hydrologists, Messrs Herdman, Clowes and Deacon, with their assistant, Mr Saunders, have been considered here. These were selected as fairly illustrative of the type of interrelations that have been suspected from our previous work, and which should be demonstrable on a larger scale when the full hydrological data are published. Incidentally, they provide strong independent proof of the adequacy of our methods for following the grosser changes in phytoplankton population.

In describing hydrological features I have used the terms introduced mainly by Deacon (1933, 1937) and retained the conception of the 'age' of the surface water, previously found so useful in describing changes within the Antarctic zone (Hart, 1934, p. 10), and which has subsequently proved helpful in the consideration of observations in northern waters also (Nielsen, 1937, p. 151).

Differences in phytoplankton population have been expressed so far as possible in the terms advocated by Gran and Braarud (1935, p. 332). I have eschewed the use of the words 'association' and 'succession' as applied in my earlier work on account of their specialized connotation in terrestrial plant ecology. One must agree with these authors on this point, but I venture to suggest that with the rapid increase of specialization in all branches of ecology, there is grave danger that any language will soon be bereft of suitable descriptive terms that one can use in a general sense, without trespassing upon the jargon of this or that branch. The difficulty of describing new phenomena, or known phenomena taking place on a hitherto unrecognized scale, is thereby enormously increased.

The phrases 'main phytoplankton increase' or 'main increase', to describe the period of maximum production, have been used in preference to the 'spring diatom growth', 'diatom flowering' or 'spring increase' of workers in the northern hemisphere. This has been found more convenient because in the southern hemisphere, with its very much lower temperatures in corresponding latitudes, the increase takes place later in the year, so that one would need to speak of an 'early summer' or 'summer increase' in describing the phenomenon in terms of the seasons. As it is obviously completely analogous to the spring increase of the northern hemisphere, I have endeavoured to avoid all possibility of confusion by the use of the expression 'main phytoplankton increase'. The secondary (and usually much lesser) autumnal increase is common to both hemispheres also, but has a corresponding time distribution in both, so that no alteration in terminology is needed. The reversal of the seasons in the southern hemisphere is represented by starting all time scales on 1 July, so that 1 January is to be regarded as midsummer or 'mid-season'.

Owing to the peculiar conditions found within the Antarctic zone, the terms 'oceanic', 'neritic', 'holoplanktonic', etc. are difficult to apply with the precision originally intended by Haeckel (1890), and it has been found necessary to adopt a special grouping system for the ecological characterization of the important species. This is described in detail on pp. 281–5. It will be seen that while a binary system, similar to the classical one evolved by Gran (1902) for the northern hemisphere, could not be applied, his concepts have been followed as closely as possible. The system proposed by Hendey (1937, pp. 226–7) is not very helpful, for he did not attempt to take into consideration the differences in hydrological conditions within the Antarctic zone. With regard to individual species many of his descriptions prove sound, but there are important exceptions due to the limited amount of material he examined. This was doubtless ample for taxonomic purposes, but inadequate for ecological description. A few of my own earlier conclusions (Hart, 1934, pp. 153–74) are subject to the same criticism now that more extensive observations have been obtained. Hendey's taxonomic work, on the other hand, is of the highest value, and I have endeavoured to bring all our results into line with his revised classification of the Bacillariophyceae.

PREVIOUS WORK

Before the Discovery investigations were begun, our knowledge of the Antarctic phytoplankton was derived from accounts of the material brought back by various expeditions which had geographical exploration as their main object, or were engaged upon large-scale oceanographical programmes of which the more southerly cruises formed but a small part. These were: the voyage of H.M.S. 'Challenger', 1873–6 (Castracane, 1886), the 'Belgica' Expedition, 1897–9 (Van Heurck, 1909), the German Deep Sea Expedition, 1898–9 (Karsten, 1905–7), the German South Polar Expedition, 1901–3 (Heiden and Kolbe, 1928), the Scottish National Antarctic Expedition, 1902–4 (Mangin, 1922) and the second French Antarctic Expedition, 1908–10 (Mangin, 1915). All these accounts are mainly concerned with systematic descriptions of the organisms obtained, though Mangin made a noteworthy attempt to determine the relative importance of the various species, and Karsten's included several observations of general biological interest, including numerous abstracts from Schimper's field-notes. More recent and very much more extensive observations have only served to show that this body of work provides ample foundation for our knowledge of the systematics of the species involved. Bearing in mind the scattered and isolated distribution of most of the earlier observations, this fact in itself provides striking evidence of the completely circumpolar distribution of the more important species.

More recent work in the Antarctic zone has been directed mainly at the elucidation of the ecological problems presented by the phytoplankton. Hendey's valuable systematic revision of the Bacillariophyceae is most conveniently considered here, however, on account of its close relation to other observations based on Discovery material and its recent date.

From observations carried out on the Whale Factory 'Vikingen' in the summer season of 1929–30, Gran (1932, pp. 351, 352) concluded that the stabilization of the surface layers was the most important factor favouring the onset of the main phytoplankton increase. It was extremely encouraging to find such close agreement with our own observations from so distinguished an investigator (cf. Hart, 1934, p. 191). On this occasion Gran's observations were not sufficiently numerous to permit of much further discussion in relation to the seasonal cycle.

In considering the observations obtained during the Antarctic part of the Meteor's programme, Hentschel has divided them into west Antarctic and east Antarctic sections. The first of these coincides roughly with the area to which Norwegian whaling investigators give the same name, and which has also been called the Falkland sector. The second refers to the region east of the Scotia arc to the longitude of Cape Town, and south of 50° S lat. Summing up the conditions he observed in the west Antarctic, Hentschel (1936, p. 229) points out that the absolute means for both microplankton and Metazoa were the highest of all the regions investigated during the whole voyage. He also comments on the richness of the region in Antarctic mammals and birds, including large numbers of species dependent on land. Diatoms and Protozoa were the dominant groups of microplankton, Coccosphaeriales falling entirely into the background. An inverse relationship between diatoms and Protozoa, in respect of their local abundance and regional distribution, was observed. This is not readily apparent from our more numerous observations obtained at all seasons of the year. It is, however, perhaps significantly related to our observation of a very distinct inverse relationship in relative (*not* absolute) abundance between these two groups at different seasons, Protozoa being more important in the scanty winter microplankton. In all other respects Hentschel's generalizations tally perfectly with our observations.

In the 'east Antarctic', where the Meteor's observations were comparatively few, Hentschel (1936, p. 301) points out its strong resemblance to his west Antarctic region, though total plankton and diatoms were poorer, and the vertebrate fauna shows few species dependent on land. Again the agreement with our findings is complete.

The principal importance of the Meteor results in relation to the present work lies in the evidence they provide concerning nanno-forms which may be missed by our methods. Before embarking on a further consideration of this aspect, it is important to realize that Hentschel has included some stations as Antarctic which we, with more recent hydrological evidence, would regard as sub-Antarctic. He apparently took the

6·0° C. isotherm as the northern limit of his Antarctic zone, whereas we now know that the highest surface temperatures reached by truly Antarctic surface waters (in the hydrological sense) are of the order of 3·5° C.

It is also important to remember that several of the small number of Antarctic observations obtained by the Meteor were closer in to the land than the majority of our own, and that the time was just after mid-season. This is just after the diatom maximum in the northern part of the Antarctic zone, at a time when such dinoflagellates as are to be found there will be at their maximum for the year. It may here be mentioned that all available evidence goes to show that the dinoflagellates are essentially a warm-water group of organisms, and that their maximum occurrence in higher latitudes, where the seasonal changes in temperature are considerable, almost invariably coincides with the period of maximum temperature for the region in question.

Considering the Meteor results in respect of those groups for which our sampling methods were known to be inadequate—the Coccosphaeriales and the small dinoflagellates—we must now turn to the detailed figures published in Hentschel's earlier work (1932, pp. 114–23). Taking only those stations which fall within the Antarctic zone as defined in the light of more recent hydrological work, it becomes necessary to omit five stations now considered as sub-Antarctic. From the remaining twenty-seven observations at 0 or 50 m. Coccosphaeriales were recorded at nine only, five in the west Antarctic and four in the 'east Antarctic' regions. At only two of these stations, one at South Georgia and one near the northern limits of the Antarctic zone in the open South Atlantic, was the group of any real importance numerically. It is interesting to note that the species *Pontosphaera huxleyi*, long known to be the most important member of the group in northern waters, was alone responsible for these figures. No Coccosphaeriales were recorded at any of the more southerly stations in open water. When the excessively small size of these organisms is taken into account, we may therefore safely say that the Meteor results support our contention that our picture of the main phytoplankton cycle in the Antarctic zone is unlikely to be affected by the inadequacy of our methods for dealing with the members of this group.

All writers on Antarctic phytoplankton have testified to the scarcity of Dinoflagellata in those seas, but the Meteor was the first expedition to use methods capturing the smallest ones in our area. Considered numerically therefore it is not surprising to find the proportion of Dinoflagellata much higher than one was previously inclined to suppose, particularly in view of the time of year at which the observations were obtained. They averaged 15% of the total phytoplankton. Further examination of the Meteor results reveals, however, that more than half (56·7%) of these were Gymnodinians without chromatophores, and therefore presumably heterotrophic. Moreover, those stations at which the numerical proportion of dinoflagellates to diatoms was high were again very close in to the land. Another point to be borne in mind is that so far as is known the division rate of dinoflagellates is considerably lower than that of diatoms. We may say, therefore, that while minute dinoflagellates missed by our nets may be of slight importance as producers during the post-maximal period for diatoms, it is unlikely that they are ever sufficiently important to invalidate the broad picture presented by our study based mainly upon those larger autotrophic organisms.

Before leaving the work of the 'Meteor', mention should be made of the work of Peters (1934) on the Ceratia. The agreement between his observations upon *Ceratium fusus* (p. 37, fig. 12) and *C. pentagonum* (pp. 27, 32, fig. 10) and my own (Hart, 1934, pp. 23, 173 etc.; 1937, p. 441) is very close, and I think it may be considered as well established that the latter is the only member of the genus whose normal distribution extends so far south as the Antarctic zone.

The pioneer work on the study of the phytoplankton undertaken as part of the Discovery investigations was carried out by Professor A. C. Hardy. The results, mostly relating to the complicated region of the South Georgia whaling grounds during the season 1926–7, have been described by him in Part II of the very detailed work on the plankton observed in that region published in collaboration with Mr E. R. Gunther (1935). As the observations were mainly confined to one protracted survey, they yielded little direct evidence with regard to the seasonal cycle of the phytoplankton, but the first attack on many important related problems was made on the basis of these results. Hardy's most important findings in relation to the present work are as follows:

On p. 40 he gives strong evidence of the overwhelming predominance of diatoms and the negligible quantity of the larger dinoflagellates in the Antarctic zone. *Halosphaera viridis* (Protococcoideae) was the only autotrophic organism, apart from diatoms, observed in large numbers, and this had an extremely limited distribution (p. 64). A detailed picture of phytoplankton conditions in the South Georgia area at mid-season, when the diatom maximum was probably just beginning to wane, is given; which agrees well with subsequent observations (Hart, 1934, pp. 66, 67). Hardy has also shown very clearly that while the phosphate content of the surface water was never reduced to such an extent that it could be considered as a limiting factor for phytoplankton, there was good general agreement between production and phosphate reduction (pp. 76–87, 285). Further, he found some slight evidence of a small secondary autumnal diatom maximum.

In Part V of the same work Hardy enters into a prolonged and valuable discussion of the relations between zooplankton and phytoplankton, mainly concerned with the development of the hypothesis of animal exclusion. The most important point in relation to the present work lies in Hardy's acknowledgement that the exclusion hypothesis may not hold good for all species of zooplankton, and that the converse of 'exclusion', limitation of the phytoplankton by the grazing of herbivores, is also probably important far south (pp. 310–11). The most important of Antarctic 'key-industry' animals, *Euphausia superba*, is mentioned as probably being an important grazer. The probable importance of the 'grazing down' factor in limiting populations of marine phytoplankton was first clearly recognized in Harvey's (1934*b*) work in the English Channel. Hardy records Harvey's agreement that the two effects are not necessarily incompatible, each may operate at different times and places.

My own earlier work (Hart, 1934) was mainly confined to a discussion of the phytoplankton conditions round South Georgia, in the Scotia and Bellingshausen Seas, and adjacent coastal areas—the most complicated region in the Antarctic zone. It was shown that here the main diatom increase began in late spring or early summer, the time of incidence falling later in the year as one proceeded pole-wards (p. 183). Stress was laid on the important fact that throughout the whole of the region studied polar influences extend very much farther towards the equator than in the northern hemisphere. An attempt was made to group the species according to their seasonal abundance and to distinguish the phytoplankton communities[1] ('floras') in Antarctic surface waters of differing past history. These findings still hold good for the most part but stand in need of some modification in the light of our more numerous and widespread observations obtained subsequently.

Areas with exceptionally rich phytoplankton were observed off South Georgia, other more or less coastal waters round the southern half of the Scotia Arc and in the channels of the Palmer Archipelago; also, to a lesser extent, in Bransfield Strait.

It was shown that the phosphate content of the surface waters was never reduced to such as extent that one could regard it as a factor limiting phytoplankton production (Hart, 1934, p. 184). The hypothesis that silica might prove to be limiting to some extent was put forward on the suggestion of Professor W. H. Pearsall, though at that time no direct observations on silica content were available (p. 185). The major importance of various interrelated physical factors in determining the extent of phytoplankton production was emphasized. Chief among these were the influence of light, the degree of stability of the surface layers, and the effects of pack-ice (pp. 186–93).

Observations in Cumberland Bay, South Georgia (Hart, 1934, Appendix I) showed the phytoplankton to be very scanty, in striking contrast to the rich catches obtained 20–100 miles offshore round that island. The adverse factors responsible for this appeared to be extreme turbulence of the surface layers due to the strong and variable winds, combined with the vast amount of very finely divided inorganic detritus brought down by land drainage (mostly morainic mud). This last must have greatly hindered the penetration of light. The same unfavourable factors have since been found to be responsible for a similar unexpected scarcity of phytoplankton in some regions of the northern hemisphere (Bay of Fundy, Gran and Braarud, 1935, p. 322; coastal waters round Iceland, Nielsen, 1935, pp. 42–8).

The great value of Hendey's work (1937) lies in his thorough revision of the systematics of the plankton diatoms. He has cleared up many vexed questions concerning nomenclature and priority with a thoroughness only possible to one with long acquaintance with the extraordinarily voluminous and contradictory literature on the subject. The most helpful features to the plankton worker are his decisions to 'lump'

[1] In some sense the idea of this grouping approximates more closely to that of Gran and Braarud's 'phytoplankton societies' (1935, p. 332). Since the groups varied mainly in the proportions of the same species present, not in specific constitution, and the water masses concerned gradually lose their individuality as they move to the east and north, it seems safer to use the wider term. It is just such differences as these due to the much greater rate of change in the aqueous as distinct from the terrestrial environment, that makes it so hard for the plankton worker to describe his observations in terms with rigidly conventionalized meanings.

certain 'species' together (e.g. all previously described species of *Corethron* as 'phases' of *C. criophilum* Castracane, which is called the 'type phase'). This use of the more general term 'phase' to describe subspecific rankings, previously labelled 'varieties' and 'forms' in rather indiscriminate fashion, wherever a clear sequence of intermediate stages can be shown to exist, seems logical and is very useful in practice. As the first clear acknowledgement by a recognized taxonomic expert of the extreme variability of plankton diatoms, it is particularly encouraging to the unfortunate plankton worker who is continually grappling with problems presented by this exasperating property.

In his notes on the divisions of the flora, Hendey is upon less certain ground, owing mainly to the limited amount of material he examined (1937, pp. 163–99). Two hundred and twenty odd stations distributed over all the regions visited by the Discovery investigations from 1927 to 1935 may well have been ample for systematic revision, but quite obviously preclude the possibility of considering the seasonal variation in any one area, and it is well known that the quality of the phytoplankton varies very considerably with the seasons, except in some tropical seas.

The broad division of the flora into cold- and warm-water species, with a dividing line mainly coincident with the subtropical convergence but otherwise based on unspecified thermal considerations, is too wide to be of any assistance in considering conditions within the Antarctic zone, and ignores the cosmopolitan distribution of some important species. It is chiefly for these reasons that Hendey's table (1937, pp. 226–7) of 'species typical of the cold-water flora' shows some marked differences from my own findings, though the disagreement is far less marked when one considers his distributional notes on individual species.

It is very interesting to note that Hendey has experienced the same difficulty in the precise application of the Haeckellian terms 'oceanic', 'meroplanktonic', etc. (p. 220) that I have already had occasion to mention. This again may cause apparent rather than real differences between our findings. The difficulty arises because we have only circumstantial evidence as to whether the majority of plankton diatoms are meroplanktonic or holoplanktonic, using the words in the strict sense. In the northern hemisphere work on the phytoplankton has been going on so much longer and more intensively that we may safely regard the accumulation of this evidence as sufficient to be conclusive for most species. In the far south it is still necessary to proceed with caution. Conditions are further complicated by pack-ice maintaining a small proportion of meroplanktonic forms in the open ocean at the greatest possible distances from land, which may flourish for a time among the truly oceanic species after the ice has dispersed. Yet again many forms that appear to be truly oceanic still reach their maximum abundance in neritic areas. Hence Hendey's tabulation of some species as both holo- and meroplanktonic, oceanic and neritic, is not so paradoxical as it appears at first sight.

My object in pointing out the following important differences between my findings and those expressed in Hendey's table (pp. 226–7) of 'species typical of the cold-water flora' is to avoid possible misunderstanding in the future. It must be realized that I have the advantage of much more numerous observations, many on material obtained subsequently to that available to Hendey, and that limitations of material in my own earlier work have led me into some similar errors.

Nitzschia seriata should not, I believe, be regarded as neritic only; many observations of this widespread species from all parts of the ocean in considerable abundance were already available.

Corethron criophilum should surely be included among the species typical of Bransfield Strait, where I had already shown it to be a dominant (over 90% of the (net) plankton throughout the year; Hart, 1934, p. 159).

The omission of *Thalassiothrix antarctica* from the table of typical forms is unfortunate, for it is often one of the most important of the larger species in the northern part of the Antarctic zone, and, more rarely, farther south (Hart, 1934, p. 40; Hardy in Hardy and Gunther, 1935, p. 66).

The two most important southern species of *Thalassiosira*—*Th. antarctica* and *Th. subtilis*—are tabulated by Hendey as oceanic, holoplanktonic. We should now regard them as definitely neritic (and ice-edge), as seems true for most members of the genus throughout the world. The probability that they are meroplanktonic is strong. My own earlier remarks on *Th. antarctica* ('widely distributed...', Hart, 1934, p. 157) were intended to apply to a more restricted area, but may have led Hendey astray here. A similar remark of mine concerning *Biddulphia striata* (p. 165) may also have been misleading. Hendey tabulates it as holoplanktonic, oceanic and neritic. We should now regard it as meroplanktonic and very definitely neritic, being rare even along the ice-edge in the open ocean which some neritic species seem to find an adequate substitute for a coast. Such mistakes as these are due entirely to the localization of most of our earlier work in the complicated Falkland sector. Until even longer oceanographical cruises were undertaken, it was impossible for us to realize how the vast scale of biophysical relationships in the southern ocean leads to neritic influences being felt at much greater distances from land than in the better known waters of the northern hemisphere.

Chaetoceros atlanticum is omitted from Hendey's table and is said in his notes to be unimportant far south. It is quite true that it is rare in the extreme south, but in the more northerly parts of the Antarctic zone it is one of the most numerous medium-sized chaetocerids, and, since his 'cold-water flora' apparently includes most of the sub-Antarctic zone as well, it should certainly be included in any table of typical forms.

There are minor points concerning less important species of *Chaetoceros* on which we differ. Thus Hendey tabulated *Ch. castracanei*, *Ch. chunii* and *Ch. schimperianum* as neritic while we now tend to regard them as oceanic. The evidence is not yet conclusive, particularly with regard to the last named.

Finally, Hendey has tabulated all the *Actinocyclus* spp. he examined as neritic, no doubt correctly, but has not considered the smaller members of the genus we have found in our more recent work to be very constant constituents of the oceanic plankton. Though never occurring in great numbers, these are important and certainly 'typical' in winter.

In a note on the effect of environment on form, Hendey (pp. 224–5) records his general impression that conditions in warm seas favour the development of a flora of relatively thin-walled diatoms of small surface : volume ratio, while diatoms in colder waters have stronger frustules and a larger proportion of surface to volume. Such scanty concrete observations as are available (Wimpenny, 1936; Hart, 1937, p. 444) certainly favour the view that this difference in form must be ultimately correlated with environmental influences. The idea raises several problems of the first importance in connexion with the physiology of plankton diatoms.

DISCUSSION OF THE METHODS EMPLOYED IN RELATION TO RECENT ADVANCES IN PHYTOPLANKTON TECHNIQUE

In recent years the main pioneer methods of studying the phytoplankton, examination of routine vertical hauls with fine silk nets and of centrifuged water samples, have been severely criticized by Nielsen (1933, 1938). Their probable shortcomings had long been realized by their principal protagonists, and had indeed been clearly demonstrated by the classic dilution experiment of E. J. Allen (1919). Nielsen apparently considers them so unreliable that even observations on the broad distributional changes, involving quantitative variations of many hundreds per cent, to which they have previously been regarded as an adequate guide, may prove misleading. The present work has been accomplished by these older methods, or modifications of them, for Nielsen's improvements have little application in long-range work of this type, and we have some evidence that conditions in the Antarctic zone are such that the errors are at a minimum. In view of Nielsen's recent work, however, it is felt that the limitations of our methods should be fully considered.

The whole problem of methods in marine phytoplankton investigations is an exceedingly difficult one. Both Gran (1932, p. 346) and W. E. Allen (1934) point out that it is very necessary that methods be adapted to the scope and aims of the particular investigation. Allen says that while it is important to strive for as high a degree of uniformity of method as possible, a certain degree of elasticity will nearly always prove to be essential. This statement aptly defines in abstract terms the difficulties confronting us in planning our programme. Antarctic surface waters occupy over twelve million square miles. This is over 6% of the total surface of the earth, and some $8\frac{1}{2}$% of the total sea surface. For this reason alone it was essential to obtain the very largest number of observations possible in order to make out even the grosser differences in the distribution, in time and space, of the phytoplankton. Our cruises involve absence from shore laboratories for long periods, and for this reason also it seemed necessary to use methods that could be completed at sea. Hence the attempt to achieve the most useful working compromise between the strongly conflicting desiderata of magnitude and exactitude, resolved itself into the observation of the phytoplankton by the methods already described.

The modified Harvey method has been our main standby for the study of the wider variations in quantity. Its disadvantages are obviously those inseparable from the use of any form of tow-net—loss of nannoplankton forms and small solitary diatoms through the mesh, and a certain degree of clogging where the phytoplankton is very dense. Thus the values obtained will always be minimal. There is considerable evidence that nannoplankton forms and dinoflagellates are never present in such numbers as to be important producers (as compared with the diatoms) in the Antarctic zone. The Meteor results and my own centrifuge counts may be useless for comparative purposes as Nielsen maintains, but would certainly have shown up the presence of a large proportion of nannoplankton forms if it was in any sense a general occurrence. Moreover, the colonial habit is strongly developed in most of the small Antarctic diatoms, though this is not always readily apparent in preserved samples. Even the difficulty due to clogging rarely arises, for the design and dimensions of the Harvey net are such that the proportion of filtering surface to effective aperture is more than three times as great as in an ordinary tow-net (cf. Hardy, 1939, p. 47). During the three commissions some 800 observations within the Antarctic zone have been obtained by this method. When these are grouped regionally and in time sequence as in this paper, the general picture they present agrees so well with the changes in the physical and chemical factors of the environment, studied by entirely independent methods, that it seems certain that they must be roughly comparable to the true value of the standing crop. I should be the first to admit that in warmer seas where nannoplankton forms may predominate, and dinoflagellates are important, the method would be inadequate.

The advantages of Harvey's method for our particular purpose are more readily appreciated if one considers the weak points of other methods available. If one had obtained sedimentation counts from some eight hundred stations (none too many considering the size of the area concerned) the time spent in the actual collecting at sea, which extended, in conjunction with our other work, over more than five years, would have been considerably increased. All the counting would have had to be done in a shore laboratory and, owing to the uneven distribution of phytoplankton with depth, at least six counts from each station would have been needed to give a true picture. Each count takes from two to three hours according to Nielsen (1933), so that the working up of such a volume of material would occupy the whole time of an experienced worker for at least a further five years. From this practical consideration alone it is evident that such refined methods can only be employed to advantage after the general conditions have been made known in broad outline, so that the detailed work can be limited to manageable series of observations where conditions are probably typical of larger areas. A minor drawback of the sedimentation method (Nielsen, 1933, 1935, p. 5), that certain small naked forms must always be lost or become unrecognizable when working with preserved material, need not concern us; but the difficulties he experienced when *Chaetoceros* spp. were numerous would prove a serious handicap in polar waters.

While census-taking will always remain an essential part of the study of the phytoplankton, it is subject to some general objections inseparable from all purely numerical estimations, especially if it is desired to correlate phytoplankton data with that obtained from other lines of research. The numbers of different forms convey very little unless the reader has some knowledge of their shapes and sizes. Counts might well prove misleading to a chemist or zoologist who would perhaps be able to show significant correlation between his observations and those on the phytoplankton, if the quantity of the latter were expressed in a different way. This point is the more important when we bear in mind the tremendously wide range of variation in size and shape which can take place within the limits of many single phytoplankton species.

An ideal method should provide comparable figures bearing a direct relation to the total amount of organic matter present as phytoplankton. The concept of the biomass, introduced into marine plankton investigations by Russian workers, almost, but not quite, epitomizes this ideal. Zenkevitch (1931) defines the biomass as 'the quantity of substance in living organisms per unit of surface or volume'. Thus if it were possible to determine this property of the phytoplankton organisms in a unit volume of water, the quantity of inorganic matter in the organisms would be included. This would indeed be necessary and desirable in considering the relation of the phytoplankton to the physical and chemical characteristics of the medium. When we come to consider the possible value of the phytoplankton as food for animals, however, the inclusion of large quantities of an inert substance like silica might well prove misleading. The biomass constitutes the ideal basis for the study of the relation between organism and the physico-chemical factors of the environment, but is not so well suited to the study of biological interrelationships. Moreover, it seems only too obvious that no good routine method of determining this property of the phytoplankton could ever be devised.

Harvey's method, on the other hand, gives figures that may reasonably be supposed to bear some relation to the total organic content of the phytoplankton captured. It is at least probable that there is a relation between total organic matter and the total amount of assimilatory pigments responsible for the production of that matter, and the arbitrary colour units are a measure of total quantity of pigments. Foremost among the advantages of the method, therefore, we may place this approach to the ideal of comparable figures related to the total quantity of organic matter present as phytoplankton. These can easily be appreciated by workers in other fields without detailed knowledge of the constituent species, and are therefore less liable to misinterpretation than figures derived from census-taking methods. The great advance on Krep's method of utilizing the pigment extract from a net haul as a measure of phytoplankton intensity lies in the knowledge of the approximate volume of water from which the catch is filtered.

I would insist that in the detailed study of the phytoplankton itself census-taking is still very necessary, and likely to remain so; but that Harvey's method has given us a powerful new line of approach, the more valuable when other methods can be used to check and supplement the data.

The next advance may be expected from simultaneous use of Nielsen's sedimentation methods, and modifications of Harvey's method such as Riley (1938) and Krey (1939) have recently employed. For such work to be of value in considering the conditions in large sea areas, it must be preceded by a large-scale survey by cruder methods such as those employed by us. Without this it will be quite impossible to say whether any series of more detailed observations, such as could be carried out within a reasonable period of time, will be typical of conditions over a wider area or not. In the north Atlantic and adjacent waters previous work may already provide a sufficient background; in other regions where the economic significance of the phytoplankton begins to be realized, such as the Antarctic zone and the north Pacific, it does not. Moreover, the precision methods now being elaborated do not lend themselves to the study of fluctuations over wide areas, and it is just such differences as these that one desires to study in attempting to link up plankton ecology with human economy. Gran has said that a single 'absolute' determination of phytoplankton would be about as valuable as a single temperature determination carried to the third decimal place. The new methods have got beyond the stage of being open to this kind of criticism, but still demand an expenditure of time that precludes their use in our attempts to solve some of the most important phytoplankton problems. The sea is wide and man has but a little time to live.

DIVISION OF THE ANTARCTIC ZONE INTO BIOGEOGRAPHICAL REGIONS AND AREAS

The Antarctic zone may be defined as the sea area covered by Antarctic surface waters, as shown by the work of our hydrologists. Its northern limit may be taken from Deacon's (1937) presentation of the probable average position of the Antarctic convergence—where the Antarctic surface waters sink below the more saline but warmer sub-Antarctic waters to the north. The mean latitude of the Antarctic convergence is 53° S. Thus polar conditions of climate and hydrological environment extend very much farther towards the equator than they do in most parts of the northern hemisphere, and their distribution bears little relation to such purely mathematical entities as the Antarctic circle. In general, the Antarctic surface waters extend some thousand miles to the north of the coast line of the Antarctic continent.

The area covered by Antarctic surface waters is very large—at least 12 million square miles. In considering the conditions of existence of phytoplankton organisms in an area of this size, it is obviously essential to adopt some scheme of subdivision, in order to keep both the descriptions of observations, and discussion of their significance, within reasonable proportions. Ideally, such a scheme should be based on the principal changes in the conditions of existence, in practice a degree of arbitrariness will obviously be unavoidable. In nature conditions will always merge more or less gradually, but in practice boundaries must be drawn somewhere. This difficulty is very apparent in the Antarctic zone where the gradient in water temperature, for example, is very slight.

In the areas south of the three great oceans the latitude of the Antarctic convergence approaches its mean fairly closely. Here a satisfactory division may be made by considering the interaction of two important factors known to exert a profound influence upon phytoplankton production: light, and the distribution of pack-ice. The duration and intensity of the light will vary more or less directly with the distance one proceeds to the south, so long as the latitude of the convergence remains fairly constant, since it is of extra-terrestrial origin. The distribution of the pack-ice, on the other hand, can be extremely erratic as climatic conditions fluctuate. Our knowledge of it is now sufficient, however, to make the following subdivision, based on the gradient of these two factors, reasonably satisfactory in the open oceans.[1] We divide these parts of the Antarctic zone into Northern, Intermediate and Southern Regions.

The *Northern Region* extends 330 sea miles south of the Antarctic convergence, all the way round the world, with the exclusion of the special areas to be described later. It is never covered by continuous pack-ice and only invaded by loose pack- and drift-ice in spring on rare occasions.

The *Intermediate Region* extends from the southern boundary of the Northern Region to the Antarctic circle—an unavoidably arbitrary boundary. It is largely covered by pack-ice in winter and spring, and mainly free during summer and early autumn. Here again it is necessary to exclude the 'special areas'.

The *Southern Region* lies between the Antarctic circle and the Antarctic continent, excluding the immediate coastal areas. It is largely covered by pack-ice throughout the year and free only in summer. New ice frequently forms in March.

To the south-west of South America and south of New Zealand the Antarctic convergence lies far to the south of its mean latitude, and the gradient in the conditions of existence is consequently 'telescoped' so that three clearly defined regions can no longer be distinguished. Hence the need for separate treatment of these 'special areas', *north of the Ross Sea* and the *eastern south Pacific*. These are oceanic, but cannot be divided into Northern and Intermediate Regions on the same basis as those previously described. To the south of them, however, it appears that no serious anomaly is introduced by regarding the Ross Sea and Bellingshausen Sea as comparable with the Southern Region.

To the south and south-east of South America conditions are extremely complicated. These are the only localities where considerable land masses and a sharp rise in the sea floor—the Graham Land Peninsula, the Scotia arc with island groups—intrude upon the northern part of the Antarctic zone. The complications clearly exert a profound influence upon the phytoplankton development. For present purposes they may be somewhat loosely summarized as neritic influences, and in the light of our observations it is possible to distinguish further 'special areas' based partly on latitude but mainly on 'degree of neritic influences'. Chief among them are the *South Georgia area* and the *Scotia Sea*. To make the scheme of subdivision complete, one would need to consider as special areas the Bransfield Strait, the central portion of the Weddell Sea, and other areas around isolated islands with local neritic conditions. Little of the work considered here falls in these regions however, so that they may be treated under the general heading of 'other special areas'. It may be noted that conditions around

[1] See Mackintosh and Herdman, *Distribution of the Pack-ice in the Southern Ocean*, Discovery Repts., XIX, pp. 285–96, plates LXIX–XCV, published since the above was written.

Kerguelen Island and over the ridge connecting it with Heard Island may be expected to resemble those observed in the South Georgia area on a smaller scale, but we have no observations there.

The subdivisions described are shown in Fig. 2, and may be tabulated as follows:

Main Regions (oceanic)

The Northern Region: between the Antarctic convergence and a line 330 miles south of it, all round the world, excepting the special areas between 30 and 110° W, and between 150° W and 170° E.

The Intermediate Region: between the southern limit of the above and the Antarctic circle all the way round the world with the exception of the same complicated areas.

The Southern Region: all seas south of the Antarctic circle, excluding immediate coastal areas.

Special areas

The South Georgia area: between 52 and 55° S; 33 and 41° W. Neritic influence very strong.

The Scotia Sea: between the Antarctic convergence and 62° S: 30 and 70° W, excluding the South Georgia area. Neritic influence considerable but less marked.

Other Special areas: where our observations are too few for detailed consideration, namely: (1) The eastern south Pacific between the Antarctic convergence and the Antarctic circle: 70–110° W. This is essentially oceanic and is best known. (2) The area north of the Ross Sea between the Antarctic convergence and the Antarctic circle: 150° W–170° E, oceanic. (3) Central Weddell Sea between the southern limits of the Scotia Sea and the Antarctic circle, oceanic. (4) Bransfield Strait and coastal waters of the Palmer Archipelago, neritic. (5) Other essentially neritic areas, e.g. coastal waters of the Balleney Islands, which could be ranged according to latitude if necessary.

It will be seen that the main idea of this scheme of subdivision is essentially similar to that which I had already suggested to Clowes (1938, p. 8), but with three times as much data it has been possible to improve the original zonation. The definition of the southern region (or zone) in terms of distance from the ice-edge has been abandoned for the arbitrary one, placing its northern limit at the Antarctic circle. This is an improvement in one way because of the difficulty of establishing an 'average summer position' of the ice-edge in the less known sectors, but it is certainly true that the actual extent of the pack-ice is a most important environmental factor in this region. It has also been possible to define the special areas whose existence had indeed been recognized though it was not possible at that time to express that recognition in concrete terms. In all other respects it will be seen that the scheme remains essentially the same as that which Clowes found helpful in considering the distribution of phosphate and silicate in the water. This in itself provides evidence that it has real significance despite the unavoidably arbitrary nature of some of the boundaries.

ECOLOGICAL GROUPING OF THE IMPORTANT PHYTOPLANKTON SPECIES

In considering the phytoplankton population in such a vast region as the Antarctic zone, it is obviously desirable to adopt some scheme of ecological characterization of the important species. By such means only can the bulk of observational data be clarified and reduced to manageable proportions. Ideally, such a classification should result in an accurate reflexion of the space/time distribution of various groups of species in response to environmental changes. In practice, it has been recognized from the first that a degree of arbitrary distinction is unavoidable—the degree to which some important species can adapt themselves to environmental change is so enormously varied.

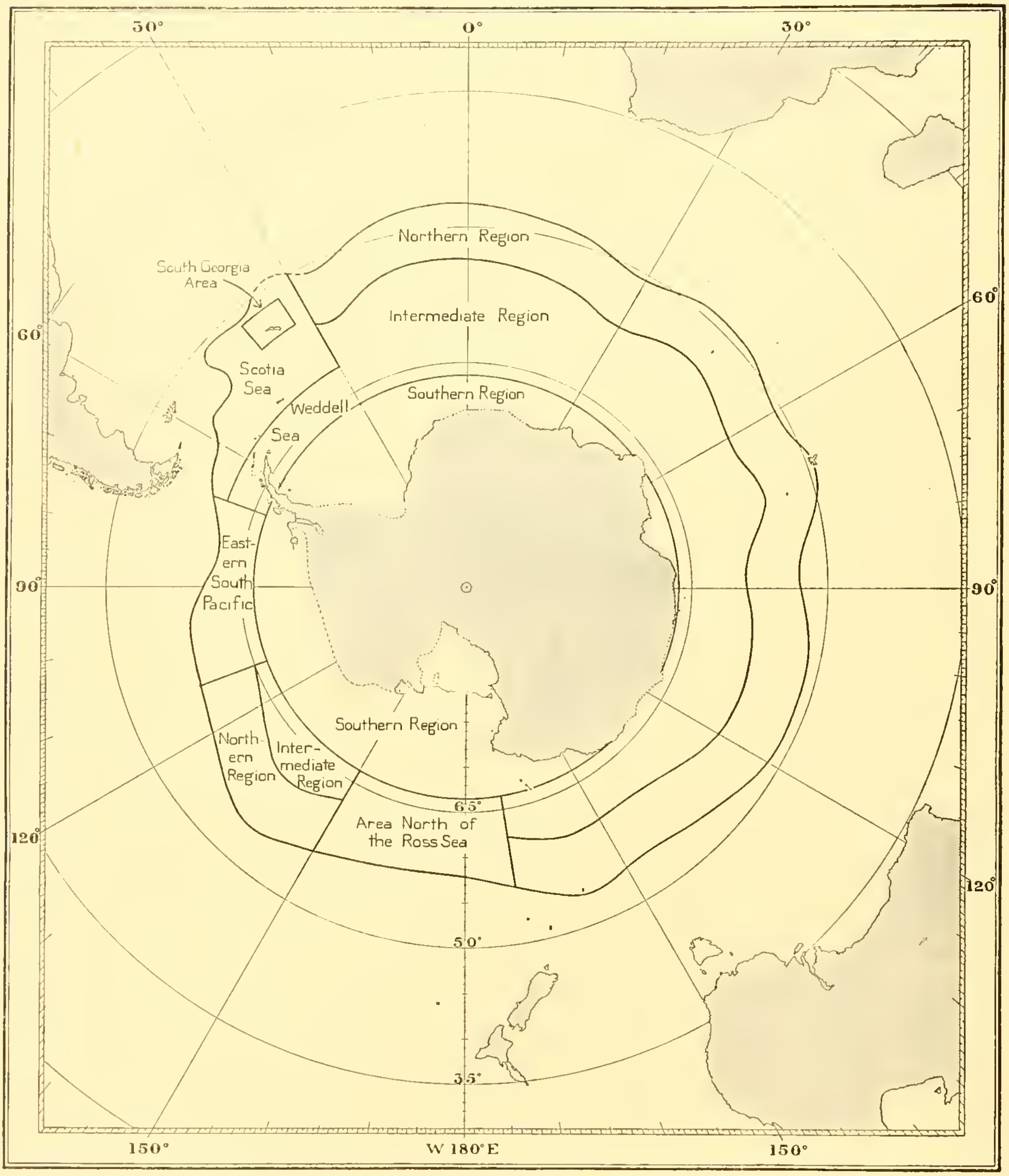


Fig. 2. Division of the Antarctic zone into biogeographical regions and areas.

The classic foundation for such a subdivision of the phytoplankton into mainly ecological, part arbitrary, 'plankton elements' is the binary system introduced by Gran (1902) for the description of conditions observed in the north Atlantic. Using the terms introduced by Haeckel (1890), he divides the phytoplankton species into three main groups:

Oceanic species—entirely holoplanktonic.

Neritic species—mainly meroplanktonic.

Tychopelagic species—essentially bottom forms of littoral waters.

Each of these groups he again divides into *arctic*, *boreal* and *temperate elements*, according to their temperature requirements. It is here that some arbitrary distinctions have to be drawn, owing to the overlapping caused by the variation of temperature with the seasons and the existence of cosmopolitan and other more or less eurythermal species.

In an attempt to arrive at a satisfactory 'division of the flora', Hendey (1937) has attempted to apply essentially similar concepts. His system, however, which is intended to include all southern seas, is not of much help in considering conditions within the Antarctic zone, where the temperature gradient is very slight and the annual range does not normally exceed 5° C.

As already noted (p. 269), Hendey experienced difficulty in applying the terms 'oceanic', 'neritic', 'holoplanktonic', etc. in the strict connotation originally intended by Haeckel, which we also have found. It is especially pronounced within the Antarctic zone. The reason is not far to seek. Our evidence as to whether the vast majority of marine plankton diatoms are holoplanktonic or meroplanktonic is entirely circumstantial, and based mainly upon the general distributional data available. The occurrence of resting spores which tend to sink may be regarded as strong evidence that a species should be regarded as neritic, meroplanktonic. The resting spores of comparatively few species are known, however, and it is by no means certain that all must inevitably sink to the bottom. It is conceivable that some might be of such a density that they could be returned to the surface layers in the normal course of the water movements of the regions they inhabit without sinking to the bottom.

In the northern hemisphere, where much intensive plankton work has been carried out for some seventy years, it is probable that the circumstantial evidence as to whether a given diatom species is holo- or mero-planktonic is usually sufficient to be conclusive. In the Antarctic zone it is not so, and there are two peculiar features of phytoplankton communities in the far south which add to the difficulty of arriving at a clear-cut decision in the matter. First, many undoubtedly holoplanktonic species, to be found at all seasons at the greatest possible distance from land, reach their greatest abundance in regions subject to neritic influence. Secondly, some of the almost certainly meroplanktonic species are able to use pack-ice when they require a solid substratum, and so are able to flourish for a short period in the open ocean at the greatest possible distances from land, for a short period after the pack-ice reaches its northern limit and disperses. The situation is still further complicated by the presence of living diatoms in the pack-ice, which from their general space/time distribution would be classified as holoplanktonic, oceanic species without hesitation, for they are to be found in the open ocean at all seasons. With these considerations in view, it is clear that the Haeckellian terms cannot be applied rigidly.

The term 'oceanic' has accordingly been used to describe all species whose time distribution at great distances from land makes it improbable that they are *necessarily* dependent on the ice in this way. Most are truly holoplanktonic though some have been seen alive in pack-ice.

Instead of 'neritic' one is constrained to use the expression 'neritic/ice-edge', to include with the forms that are not found far from land those almost certainly meroplanktonic ones that seem able to use the ice-edge as a coast, and to flourish in the open ocean for a short time after the dispersal of the pack. There are still a few important species which future work may show to have been wrongly grouped here. Where any doubt still exists full notes are given in the exposition of the scheme which follows. It will be noted that as a general rule it is advisable to use the terms holoplanktonic and meroplanktonic only with some such prefix as 'probably'.

In the attempt to evolve a useful ecological scheme of subdivision, the concept of 'types of planktonic vegetation' as used by Gran and Braarud (1935, p. 332), but applied in a rather more restricted way, has proved helpful. These authors define 'types of planktonic vegetation' as 'phytoplankton populations which have their main occurrence quantitatively during the same season and whose dominant species all belong to one group—diatoms, dinoflagellates....' Since the Antarctic phytoplankton is almost entirely diatomaceous, it is necessary to consider smaller taxonomic units than those implied in Gran and Braarud's definition. Some genera and families lend themselves to this, but some important species when classified on their time distribution will only fall into taxonomically heterogeneous groups. Size distinctions are helpful here, and have an obvious bearing on the food value of the phytoplankton for different zooplankton herbivores. In all it will be seen that a much higher degree of arbitrary distinction than is necessary in northern waters has been found unavoidable. Since our system is only intended to facilitate discussion of the qualitative data described here, the point is of small moment, provided that its basis is clearly understood by the reader. It is hoped, however, that the system will provide useful groundwork if future work renders a more 'natural' regrouping possible.

Group I

Fragilariopsis antarctica *Nitzschia seriata* (? +*N. delicatissima*) *Distephanus speculum*	Small oceanic pennate diatoms with *Distephanus*. Numerically the most important group at all seasons, except autumn. Most abundant at peak of main increase in areas subject to neritic influence. Greatest relative importance before and just after the maximum.

Group II

Chaetoceros boreale *Ch. criophilum* *Rhizosolenia* spp. *Dactyliosolen antarcticus* *Corethron criophilum* *Synedra pelagica* *Thalassiothrix antarctica*	'Large diatom species'—the solenoids, large Chaetocerids, and two exceptionally elongated pennate forms. A very heterogeneous, essentially oceanic, group with strong tendency to occur in local concentration of from one to four of the categories mentioned. Abundance doubtless greatest at peak of main increase, and in neritic areas, but relative importance greatest during the post-maximal decrease, and more especially in autumn, in the Northern and Intermediate Regions.

Group III

Thalassiosira spp. *Asteromphalus parvulus* *Biddulphia striata* *Eucampia balaustium* *Chaetoceros flexuosum* *Ch. neglectum* *Ch. sociale* *Ch. tortissimum* *Fragilaria* spp. etc. *Nitzschia closterium*	*Neritic and ice-edge forms*, the majority almost certainly meroplanktonic. Relative importance greatest from *beginning to peak of main increase*, which is also period of greatest abundance. Decline more rapidly than other groups after main increase. Almost absent from oceanic waters at other seasons. Autumnal increase seen in few spp. but only in truly neritic areas.

Group IV

Chaetoceros atlanticum *Ch. castracanei* *Ch. chunii* *Ch. curvatum* *Ch. dichaeta* type *Ch. dichaeta tenuicornis* phase *Ch. pendulum* *Ch. radiculum* *Ch. schimperianum*	*Oceanic Chaetocerids* of *medium size*. Greatest relative importance from *peak of main increase* through *summer* and *autumn*. Probably most abundant at period of maximum, and in regions subject to neritic influence. Considerable variation in relative importance with latitude on the part of individual members but time distribution very characteristic.

Group V

Coscinodiscus spp. (oceanic) *Actinocyclus* spp. (oceanic) *Asteromphalus* spp. (other than *A. parvulus*)	*Oceanic Discoidae*, mostly *small*. Of considerable importance in the scanty *winter* phytoplankton. Almost negligible at other seasons, but doubtless more abundant during main increase.

Other categories of microplankton were considered in the qualitative counts but were quite unimportant except in winter. Dinoflagellates were counted but not tabulated, since they were of no numerical importance at a vast majority of the stations studied. *Phaeocystis brucei*, the only Antarctic phytoplankton organism that seems important apart from diatoms, could not be counted and must be considered separately. The holozoic constituents of the net hauls have been tabulated as shown below. As one would expect, they form a negligible proportion of the catches except in winter, when the phytoplankton is so very scanty.

Holozoic Protozoa	Metazoa
Foraminifera	Copepoda
Cymatocyclis spp.	Nauplii
Other Tintinnidae	Other Crustacea
Acanthometridae	*Limacina* juv.
Challengeridae	Ova
Other Radiolaria	
Sticholonche	

NOTES ON THE SPECIES

The following notes on the species and categories included in the grouping system are intended to facilitate comparison of the data presented here with previous work. They are arranged in order of the ecological groupings, not taxonomically. Only the most important synonymy is given, and the generic and specific names adopted are those used by Hendey (1937).

GROUP I

Fragilariopsis antarctica (Castracane) Hustedt in Schmidt (Hendey, 1937, p. 332) = *Fragilaria antarctica* Castracane (1886); Hardy in Hardy and Gunther, 1935; Hart, 1934.

The most numerous diatom in Antarctic seas, taking the year as a whole, and certainly one of the most important producers despite its small size. Very long curved chains are developed when growth is rapid, which break up in preserved samples. Its abundance in all parts of the Antarctic zone throughout the year makes it seem certain that *F. antarctica* is not necessarily dependent upon a solid substratum at any stage and may therefore be considered as 'oceanic'. It is, however, one of the species most commonly found alive in the pack-ice and hence provides a good illustration of a species which confounds rigid application of the Haeckellian terminology (cf. Hendey, 1937, p. 227, where it is tabulated as both oceanic and neritic, holoplanktonic and meroplanktonic). The strongly silicified frustules are very resistant, and are the most plentiful recognizable remains in the stomachs of herbivorous zooplankton, in diatomaceous oozes and muds, and in the guano of carcinophagous birds.

Nitzschia seriata Cleve (?+*N. delicatissima* Cleve).

Among those who have studied Antarctic material in recent years, Hendey, Hardy and myself have not been convinced that *N. delicatissima* occurs there. Very thin forms are to be found, especially far south among pack-ice, but there appears to me to be a continuous but somewhat irregular gradation in width of the cells from north to south, ranging from typical *N. seriata* of the largest size downwards. Workers in the northern hemisphere record both species as reaching their greatest abundance near the junction of Atlantic and polar waters, with a tendency for *N. seriata* to be the more polar of the two (Braarud, 1935, p. 97, and others). I believe that we are almost certainly dealing with phases of one species *N. seriata* in the far south, but prefer to use the indefinite heading so long as any doubt exists. Since the organisms so described have the same time distribution, the possibility of confusion is unimportant in broad considerations of the phytoplankton population as a whole such as are attempted here. Hendey (1937, p. 352) is probably wrong in regarding this species as neritic. We find it in the open ocean at all seasons, though it is certainly most abundant in neritic areas. It is much more of a summer form than *Fragilariopsis*, but has been found alive in pack-ice. I would certainly regard it as oceanic in the sense the word is used in this paper. Where it is abundant, the chains of *Nitzschia seriata* are often very long, but break up in preserved samples. A very cosmopolitan species.

Distephanus speculum (Ehrenberg) Haeckel.

This widely distributed silicoflagellate is very common in the Antarctic zone, whereas *Dictyocha* is scarcely ever found south of the convergence. *Distephanus* was abundant at the same times and places as Group I diatoms with perhaps a stronger tendency to increase in relative importance near the ice-edge. Great variation in form and in size were to be seen where it was abundant. It has been found in pack-ice, but it is not certain that the individuals were alive.

Group II

Chaetoceros boreale Baily.

Comparatively rare in this material but sometimes occurred in considerable quantity along with *Ch. criophilum*, with which it may sometimes have been confused in counting the contorted chains in rich mixed samples—oceanic.

Chaetoceros criophilum Castracane.

This oceanic species often occurs in dense local concentrations, sometimes in company with other large forms such as *Corethron criophilum*. It tends to increase in importance as one proceeds southwards. The long strong bristles contain chloroplastids and are triturated and swallowed by some of the common Calanoids and Euphausians in spite of their formidable spinose armature. There have been occasions late in the season when observations suggested that this species was dying off. The endochrome turned brown and appeared to degenerate, and the water was full of broken spine fragments, apparently sinking. A chemical analysis of some material dried at about 120° F., carried out by Mr W. J. Copenhagen, showed that the fragments contained an extremely small amount of organic matter. Since it is certain that the spines, which may be up to a millimetre in length, must be bitten off before plankton animals can swallow this species, it may be that rapid break-up of faeces after heavy grazing, rather than death from senescence, was responsible for this state of affairs.

Rhizosolenia spp. (see Hendey, 1937, pp. 309–20 for synonymy).

These are all essentially oceanic forms within the Antarctic zone. *Rh. hebetata* Baily, *semispina* phase, and *Rh. alata* Brightwell, usually in the *gracillima* phase, are important in local concentrations, mainly in the Intermediate and Southern Regions. In early work stouter individuals of the first named were confused with *Rh. styliformis* Brightwell. Among the smaller forms, *Rh. antarctica* Karsten (not treated by Hendey) and *Rh. chunii* Karsten have been seen in extremely long chains when fresh material was examined—up to twenty-eight and forty-one frustules respectively. Some of the larger and rarer species seem very characteristic of the older and warmer Antarctic surface waters. *Rh. bidens* Karsten and *Rh. simplex* Karsten, in particular, seem confined to the Northern Region and northern half of the Intermediate Region. Except for the local concentrations mentioned above, however, the genus is unimportant numerically. Auxospore formation is more often to be seen among the solenoids than in any other group, and good examples of this phenomenon in *Rh. alata* are particularly common.

Dactyliosolen antarcticus Castracane (Hendey, 1937, pp. 323–4) = *D. antarcticus* Castracane + *D. laevis* Karsten + *D. flexuosus* Mangin in Hart (1934) and Hardy, in Hardy and Gunther (1935).

The forms described as separate species are treated by Hendey as phases of the 'type', an opinion which I had come to as a result of the work in the field during the third commission. In some one or more of these phases, *D. antarcticus* is to be found throughout the Antarctic zone. It is most abundant in the South Georgia (neritic) area at the time of the main increase, but is more important, relative to the total phytoplankton present, in oceanic areas in autumn and winter. It should therefore probably be regarded as an oceanic species. The less strongly silicified *laevis* phase has a more southerly distribution than the type, which is the reverse of what one would expect from the silica content of the water.

Corethron criophilum Castracane (Hendey, 1937, pp. 325–9, shows how all previously recorded species appear to be but phases of the type) = *C. valdiviae* Karsten, 1905; Hardy in Hardy and Gunther, 1935; Hart, 1934.

The most important solenoid diatom of Antarctic surface waters, to be found, mainly in the *hystrix*, type and *inerme* phases described by Hendey, throughout the whole of the Antarctic zone at all seasons in varying numbers. It is most important in neritic areas, where it sometimes forms almost the whole of the phytoplankton (Hart, 1934, pp. 40, 135), but from the wide distribution of most phases it must be regarded as an essentially oceanic species. Living examples have been seen in pack-ice. Like some other members of Group II this species is locally more abundant as one proceeds southwards, in the open ocean.

There is no doubt that Hendey is correct in applying Castracane's name to the species, but it happens that the taxonomic type phase (that first described) does not correspond to the phases most frequently encountered in nature. For this reason I find some parts of Hendey's descriptions, relating to the other phases, somewhat misleading. In my experience the 'average' *Corethron* of the Antarctic zone is intermediate, as regards size and strength of frustule, between Hendey's *hystrix* and type phases. Auxospores developed from the type phase always approximate more to the *hystrix* phase in these respects, and I find the convexity of the valves too variable within each phase to help in drawing even these elastic distinctions. Karsten's 'species' *C. valdiviae* is certainly nearer the 'average' *Corethron* of Antarctic surface waters than the small fragile *C. criophilum* Castracane that constitutes the type. *C. valdiviae* becomes part of the *hystrix* phase in Hendey's system.

Hendey describes the *inerme* phase, which I had previously referred to as the 'spineless chains' of *C. valdiviae*, as having 'robust cells, usually strongly siliceous'. This is true enough in comparison with the type, but the minute, fragile, extremely weakly siliceous type phase populations are certainly a summer form of the far south, where no wholesale change-over to the spineless chains takes place. In general the spineless chains are very much less robust and less strongly siliceous than the *hystrix*/type intermediates from which they appear to develop in late summer farther north. Hendey's statement (p. 329) '...In *some* specimens the bristles are entirely absent' should I think be altered to 'In *most* specimens...' to bring his description of the *inerme* phase into line with our observations.

I had already put forward the view that the change over to spineless chains might be correlated with temporary shortage of silica, which would account for its complete dominance over the *hystrix*/type intermediates in some localities in late summer (Hart, 1934, p. 185). Analyses for silica were not then available, but subsequent work strongly supports the suggestion, though it is possible that the seasonal change in temperature may also be involved. The latter, however, is very slight in the regions with which we are concerned, less than 3° C. between the peak of the main increase and the time of maximum development of the *inerme* phase. It may be mentioned that in fresh material the chains are often extremely long—up to 2 mm.

I have never seen gelatinous colonies of *Corethron* such as Hendey (1937, p. 327) describes, but the exceptionally small and weak far southern type of *Corethron* is often associated with *Phaeocystis* in pack-ice and develops with that organism in adjacent waters. From Hendey's description of the pale-staining mucilaginous groundwork, with deeply staining granules in addition to the *Corethron* cells, it seems probable that he was looking at a mixture of the two distinct organisms. Where it is abundant, *Phaeocystis* jelly always tends to entangle everything else in the samples. That the granules could be microspores appears very doubtful. Gross (1937, p. 39) doubts whether microspores really exist among centricate diatoms. I have seen inclusion bodies similar to those described by Karsten (1905, pp. 108–9, Taf. XIV) as microspores of *Corethron*, and mentioned by Hendey, but always in individuals considerably larger than the small weak ice-edge phase. These bodies might indeed give rise to the latter—they are often nearly as big while still within the mother-cell—but are they really microspores?

It is noteworthy that in a large population of the small weak ice-edge *Corethron* one may at first find no large individuals, but if the stations are closely spaced one soon finds a small proportion of large individuals produced by recent auxospore formation. On occasions the proportion of large individuals was clearly increasing with time, and the auxospore formation could be seen in progress.

It appears to me, therefore, so far as we can say at present, that the real order of events is something like this: Far south minute ('type phase') *Corethron* and *Phaeocystis* subsist together in the pack-ice. Both forms multiply rapidly when liberated in summer, but the *Phaeocystis* soon decreases. Some of the *Corethron* cells, already near the lower size limit for the species, soon begin to form auxospores. From the large cells so developed the small-celled population is maintained—perhaps merely by the well-known progressive diminution through continued division, but quite probably by production of microspores, for the proportion of large individuals in these far southern populations is never very high. The large individuals would be described as *hystrix* phase, with slighter cell walls than usual, in Hendey's terminology.

A thorough biometric survey of our abundant material of this species would be extremely interesting, but would be far too big a study in itself for inclusion in work upon the phytoplankton as a whole.

Synedra pelagica Hendey (1937, p. 335) = *S. spathulata* Schimper; Karsten, 1905; Hardy (Hardy and Gunther, 1935); Hart, 1934; *non S. spathulata* O'Meara.

Never so abundant as *Thalassiothrix antarctica*, it is of very similar habit but more usually solitary, rarely forming rafts. It is more widely distributed and more definitely oceanic than that species, with which it is easily confused. In general its range is more southerly and it is not found in dense local concentrations.

Thalassiothrix antarctica Karsten (Hendey, 1937, p. 335) = *Th. antarctica* Schimper; Karsten, 1905; Hardy (Hardy and Gunther, 1935); Hart, 1934.

The larger individuals of this robust oceanic species are among the longest diatoms known—up to 5 mm. It is particularly abundant at the time of the main increase in the rich mixed plankton of the South Georgia area, but is also to be found throughout the whole of the Antarctic zone. It is commoner in the Northern and Intermediate Regions than farther south and fills even large-meshed plankton nets when abundant. It is frequently colonial, the cells being joined by their truncated ends in rafts, usually in multiples of two up to twenty-four individuals; 'eights' are the most common. Strongly silicified, but the recognizable remains in bottom deposits are mostly fragmentary. Uniformly small and less robust individuals, mostly solitary, have been seen when changes in the *Corethron* population also suggested shortage of silica. Possibly confused with *Thalassiothrix longissima* Cleve and Grunow, at some stations near the northern limit of its range.

Group III

Thalassiosira spp.

Most of the Antarctic members of this genus may be referred to *Thalassiosira antarctica* Comber and *Th. subtilis* (Ostenfeld) Gran, but *Th. gravida* Cleve also has been recorded from the South Georgia area by Hendey. *Th. antarctica* is very variable and certainly at times confused with the much rarer neritic species *Coscinosira antarctica* Mangin. For descriptions and synonymy of the species of *Thalassiosira* the reader is referred to Hendey (1937, pp. 237–40). In general the genus is strongly neritic but occurs in smaller quantities in the open oceans immediately after the break-up of the pack-ice. The time distribution is very well marked, occurrence of the genus in any quantity being rigidly confined to the early part of the main increase up to the maximum. A majority of the northern members of the genus appear to have a similar time distribution, being referred to by several writers as markedly spring forms. In the far south *Thalassiosira* is most important round South Georgia and in other neritic areas.

Asteromphalus parvulus Karsten.

A small species that might perhaps be better placed in Group I, for it may well be oceanic as Hendey maintains. It is frequently found living in pack-ice, however, and from its time distribution in the plankton fits in well with the neritic/ice-edge group. I have included extremely minute individuals, common along the ice-edge, with this species in the qualitative counts. Some day these may prove to be distinct. This form and the undoubtedly oceanic *A. hookerii* have a much more southerly distribution than other members of the genus.

Biddulphia striata Karsten.

A strongly neritic species, very rare along the ice-edge in oceanic regions. It is present in enormous numbers in the rich mixed plankton of neritic areas during the main increase and has twice been seen to form very dense local concentrations during the sporadic secondary autumnal increase. The formation of resting spores, more heavily silicified and with punctate valves, was observed during a double crossing of the Scotia Arc near the South Orkney Islands at the end of March 1938, and at South Georgia a week later. These were very irregular in shape, and I think it probable that some of the forms described by Van Heurck, which Mangin united under the name *B. polymorpha* but which Hendey (1937, p. 277) has shown should be referred to as *B. anthropomorpha* Van Heurck, will eventually turn out to be nothing more than resting spores, or 'winter phases', of *B. striata* Karsten.

Eucampia balaustium Castracane, Hendey, 1937, pp. 285–6 = *E. balaustium* and *Moelleria antarctica* Castracane (1886, pp. 97–8) = *E. antarctica* Mangin (1915); Hardy (Hardy and Gunther, 1935); Hart, 1934.

A typical neritic/ice-edge species with the characteristic time distribution of the group, but in neritic areas it persists in some quantity later in the season. Like the others, it is very abundant round South Georgia, in the channels of the Palmer Archipelago, and, still farther south, around the Balleney Islands. The winter (*balaustium* or type) phase is rarely found in chains of more than four frustules, but when the summer (*moelleria*) phase is propagating rapidly extremely long spiral chains are formed which coil up like corkscrews. These soon break up in preserved samples. Intermediates between the two distinct phases are common in short chains of varying lengths and isolated pairs of frustules.

Chaetoceros flexuosum Mangin.

A strictly neritic species mainly confined to the more southerly ice-fringed coasts, and encountered at the open ice-edge only late in the year, when it lies far south near the Antarctic continent.

Chaetoceros neglectum Karsten.

A typical neritic/ice-edge species in its distribution both in time and space. This form has probably been confused with the smallest phases of *Ch. dichaeta* in the past, and is therefore not so important as was previously supposed. Most of the South Georgia material I examined was correctly identified as belonging to this species, but I now believe that some of the Bellingshausen and Weddell Sea material should have been referred to minute phases of *Ch. dichaeta* (cf. Hart, 1934, p. 164).

Chaetoceros sociale Lauder.

Very typical of the group in its space/time distribution, this species is one of the most important ice-edge invaders of truly oceanic habitats. There, however, it never reaches anything like the extraordinary abundance common in truly neritic areas. It was once observed in almost 'pure culture' in Deception Island harbour, to the number of about 25 million cells per litre, estimated by the drop method. The surface waters were visibly discoloured by it on this occasion.

Chaetoceros tortissimum Gran.

Truly neritic and very local. Abundant at the Palmer Archipelago and at Adelaide Island. Rarely along the ice-edge and only where the ice has receded a long way south.

Fragilaria spp. etc.

Under this heading I have included those tychopelagic species one normally encounters only in the immediate vicinity of dispersing pack-ice, among which various species of *Fragilaria* usually predominate, but many other genera are included—rarely, and always in small numbers. If much of our work had been done in littoral waters it would of course have been necessary to give separate heads for such genera as *Leptocylindrus* also, but this is unnecessary with the material dealt with here. Most important of the ice forms are: *Fragilaria curta* Van Heurck, *F. linearis* Castracane and *Fragilariopsis sublinearis* (Van Heurck) Heiden and Kolbe. Rarer littoral and ice forms that have been included here when necessary are: *Cocconeis*, *Licmophora*, *Amphiprora*, *Amphora* spp. etc. Round South Georgia *Thalassionema nitzschioides* Hustedt, a neritic species characteristic of warmer seas, has also been observed since the earlier work was published, and would require separate treatment if we had more inshore samples to consider. It should also be realized that in the material treated here the larger neritic species of *Coscinodiscus* and other discoid genera were almost absent. Where important they would also demand separate treatment as constituents of Group III.

Nitzschia closterium (Ehrenberg) Wm. Smith.

This is the most ubiquitous and variable of all neritic diatoms. In the Antarctic zone it is commonest far south, in a very minute phase which in fresh samples can often be seen to form chains of from three to twelve frustules. In the ice itself larger solitary phases are usually to be found. We found *N. closterium* frequently in company with *Phaeocystis* immediately after the ice melted, though it is apparently almost absent from oceanic waters at other times. Lucas has recently described a similar apparent relation with *Phaeocystis* in the North Sea (1940, p. 128). It is partly due, no doubt, to clogging of the filtering apparatus by the *Phaeocystis* jelly, which increases the chances of the minute *Nitzschia closterium* being retained. Our centrifuge samples, however, showed that although present elsewhere when not captured in nets, *N. closterium* was definitely abundant in the same areas as *Phaeocystis*. This cannot be ascribed to more complete sedimentation in the centrifuge tubes due to presence of *Phaeocystis*, because the plankton was rich enough to enable us to work with volumes of water so small that *Phaeocystis* colonies were quite often not included. It seems likely, therefore, that the association is a real one, as Lucas is inclined to believe. Such quantities of *Nitzschia closterium* as have been captured by our net methods, which admittedly are not adequate for such a small frequently solitary species, shows a time distribution typical of our neritic/ice-edge grouping.

Group IV

Chaetoceros atlanticum Cleve.

The most important member of the group in the northern region of the Antarctic zone, this cosmopolitan oceanic species shows its greatest absolute abundance in areas subject to neritic influence at the time of the main increase. Its importance relative to the other phytoplankton present, however, is typical of the group, being greatest during the post-maximal decrease and in autumn, in oceanic regions. *Ch. atlanticum* diminishes in importance as one proceeds southwards, but even in the southern region small numbers are to be found from time to time.

Chaetoceros castracanei Karsten.

To be found in all parts of the Antarctic zone, and its time of maximum relative importance is the same as that of the other oceanic chaetocerids—post-maximal, not earlier as with all the members of the neritic/ice-edge group. *Ch. castracanei* increases in importance as one proceeds southwards.

Chaetoceros chunii Karsten.

The time distribution of this species shows it to be most important during the post-maximal period in all parts of the Antarctic zone, i.e. long after the ice has receded in the oceanic regions. No doubt its absolute abundance may be greater in neritic areas earlier in the year, but almost all Antarctic plankton diatoms reach their greatest abundance in neritic areas at the time of the main increase, and I am sure no one would proceed to describe them all as neritic species for that reason alone. *Ch. chunii* is widely distributed, rather more important in the northern regions and areas than farther south.

Chaetoceros curvatum Castracane.

This oceanic, usually solitary species, seems to find its optimum in sub-Antarctic and perhaps sub-tropical waters. It was found, however, in small numbers throughout the year in the Northern and Intermediate Regions of the Antarctic zone. Very rare farther south.

Chaetoceros dichaeta Ehrenberg.

An oceanic, cosmopolitan species showing great variation in size and form. One of the most important members of the group, especially in autumn, in all parts of the Antarctic zone. It is much more common in the extreme south than *Ch. atlanticum* and tends to alternate with that species in its space/time distribution elsewhere.

Chaetoceros dichaeta tenuicornis phase.

I use this term to describe the minute form of *Ch. dichaeta* which is perhaps the most numerous oceanic chaetocerid of the Antarctic zone. The characteristic flexure of the bristles that led Mangin (1915, p. 43) to describe it as *Ch. dichaeta* forma *tenuicornis* is a variable character, however, and is not shown by all individuals. The phase usually occurs in short chains of three to six frustules, but longer ones are quite common. It has certainly been confused with *Ch. neglectum* in some previous work, including my own (Hart, 1934) (see note on the latter species in this paper). *Ch. dichaeta tenuicornis* phase shows a marked increase in relative importance as one proceeds southwards, and is the most important member of the group in the southern region. It is abundant from the time of the main increase onwards, with maximum relative importance much later than the Group III forms.

Chaetoceros pendulum Karsten.

Widely distributed in the Antarctic zone but in very small numbers relative to the rest of the phytoplankton present. I have here treated it as oceanic rather than neritic as Hendey has done, but it reaches its maximum relative importance earlier than other Chaetocerids so that his opinion may be the sounder. If so it should be transferred to Group III, but it occurred in such small proportions in our catches that such a change would not affect the general picture presented.

Chaetoceros radiculum Castracane.

An oceanic species found in all parts of the Antarctic zone in relatively small numbers. The bulbous swollen bristles of the solitary cells, and of the terminal cells of the short chains, are sometimes recognizable in bottom deposits. A peculiar phase, at first suspected of being a new species, was sometimes seen far south. The cells were broad, very weakly silicified, having a very hyaline appearance and strongly accentuated octagonal outline in girdle view; the bristles short and degenerate, often almost invisible. This phase was only seen in rather long chains which evidently broke up easily, but at length some were found with the swollen terminal bristles so characteristic of the species. *Ch. radiculum* is never a major constituent of the phytoplankton as a whole, but reaches its greatest relative importance in autumn in the Northern and Intermediate Regions.

Chaetoceros schimperianum Karsten.

Hendey is possibly right in regarding this species as neritic rather than oceanic—its time distribution in the open oceans is nearer to that of Group III than that of the majority of our Group IV species, but it was so widely distributed that we have regarded it as oceanic. It decreases in relative importance as one proceeds southwards.

Group V

Coscinodiscus spp. (oceanic).

Small numbers of this genus occur in minor quantities in the open oceans throughout the year and are important in the scanty winter phytoplankton of the northern region. The same remarks apply to:

Actinocyclus spp. (oceanic).

Asteromphalus spp. (other than *A. parvulus*).

These are most abundant at the time of the main increase in the Northern Region, but most important in winter. *A. hookerii* Ehrenberg is numerous much farther south than the others—*A. regularis* Karsten, *A. roperianus* Ralfs ex Pritchard, *A. brookei* Bailey, and other still indeterminate forms.

ITINERARIES OF THE PHYTOPLANKTON OBSERVATIONS DURING THE THIRD, FOURTH AND FIFTH COMMISSIONS OF THE R.R.S. 'DISCOVERY II'

The positions of the stations at which phytoplankton observations were obtained within the Antarctic zone, during the third commission of the R.R.S. 'Discovery II', are shown in Figs. 3 and 4. On Fig. 3 the boundaries of the biogeographical regions and areas previously described are also shown. The first experiments with the Harvey net were made in sub-Antarctic water on the outward voyage from Tristan da Cunha to South Georgia, so that we were proficient in the use of the new methods by the time the Antarctic convergence was reached a little to the north and east of the South Georgia area. Here we found the main diatom increase near its peak and twelve hauls obtained during 27 November–4 December 1933 yielded very high values. Proceeding south-westwards across the Scotia Sea, and through the western end of Bransfield Strait to 67° 45·3′ S in approximately 80° W, much less phytoplankton was encountered. One station off the Palmer Archipelago yielded a fairly rich haul, but on working up the 80° W meridian the comparative poverty of the phytoplankton in the eastern South Pacific area, in the middle of December, was very apparent.

We next crossed the convergence about the time of the New Year and proceeded westwards on a zigzag course along the Pacific ice-edge into the area north of the Ross Sea, and up to New Zealand at the end of January 1934. This cruise yielded more evidence of the poverty of the eastern South Pacific, and showed uniformly moderate quantities of phytoplankton in the Southern Region increasing as we proceeded westwards.

On the voyage southward from New Zealand, station work was precluded because of the necessity for speed in making the rendezvous with Admiral Byrd's supply ship, the 'Bear of Oakland', to whom we were transporting an additional medical officer and stores. Observations began again in the last week of February in 72° S in the Ross

Fig. 3. Positions of observations obtained within the Antarctic zone during the third commission of R.R.S. 'Discovery II', excluding those from the South Georgia area which are plotted separately in Fig. 4.

Sea. From there we worked eastwards across the Pacific in a rather higher southern latitude than before, most of the observations being made south of the Antarctic circle. This cruise showed larger quantities of phytoplankton than had been encountered in the Southern Region in January, until the end of the first week of March. In the second week of March there was a distinct falling off, but by that time we were working into the eastern South Pacific area, which subsequent work has shown to be consistently

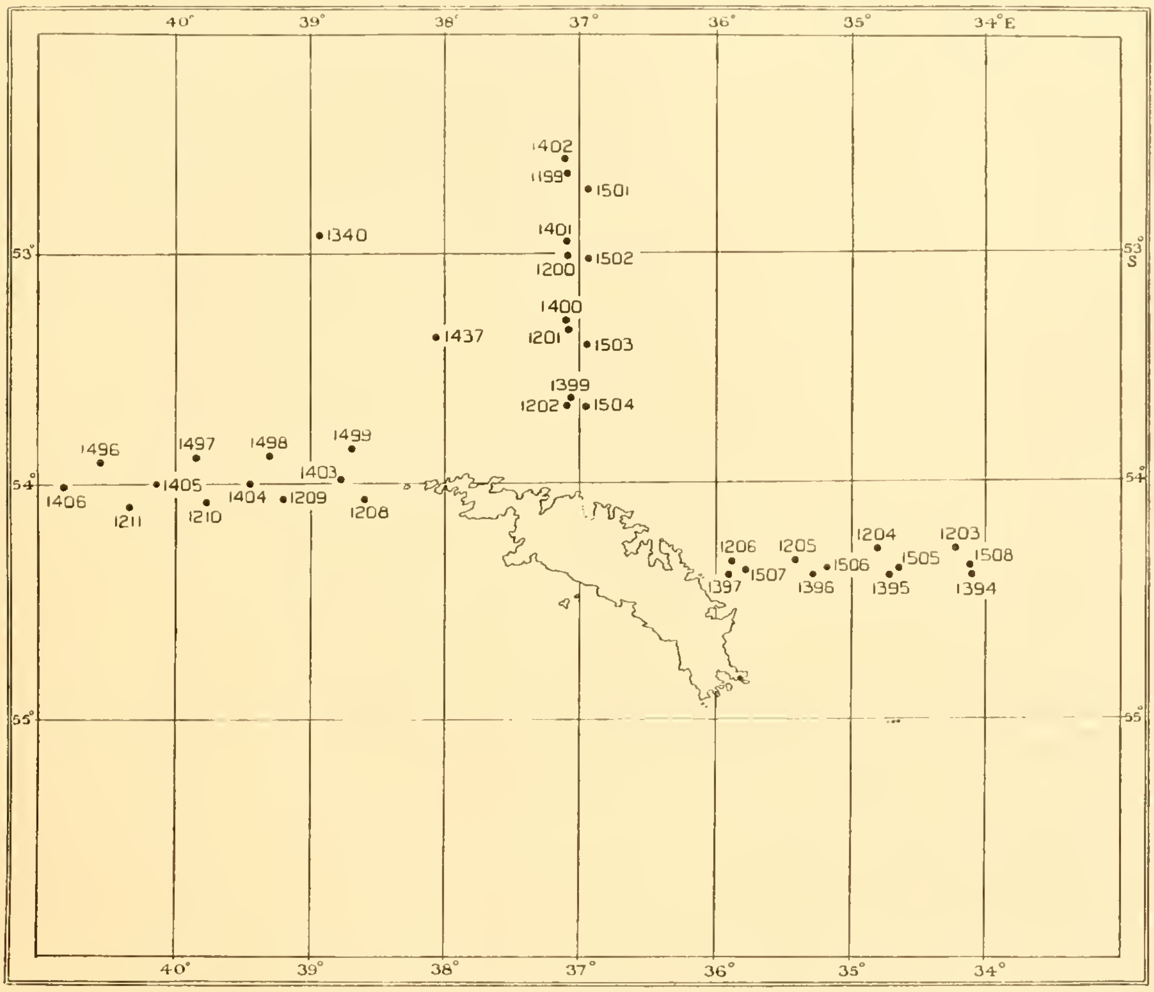


Fig. 4. Positions of the observations obtained in the South Georgia area during the third commission of R.R.S. 'Discovery II'.

poorer in phytoplankton than others. Fig. 5 indicates the order of the quantitative differences observed during this cruise.

Two lines of stations worked in the Scotia Sea early in April showed scanty phytoplankton, though there was a hint of slight secondary autumnal increase at two of them. The long cruise eastwards in the autumn was carried out mainly in the Intermediate Region. At first the phytoplankton was very scanty, but during the first week of May distinct indications of autumnal secondary increase were observed. Thereafter the ship was working in more northerly waters until refitted at Simonstown (South Africa).

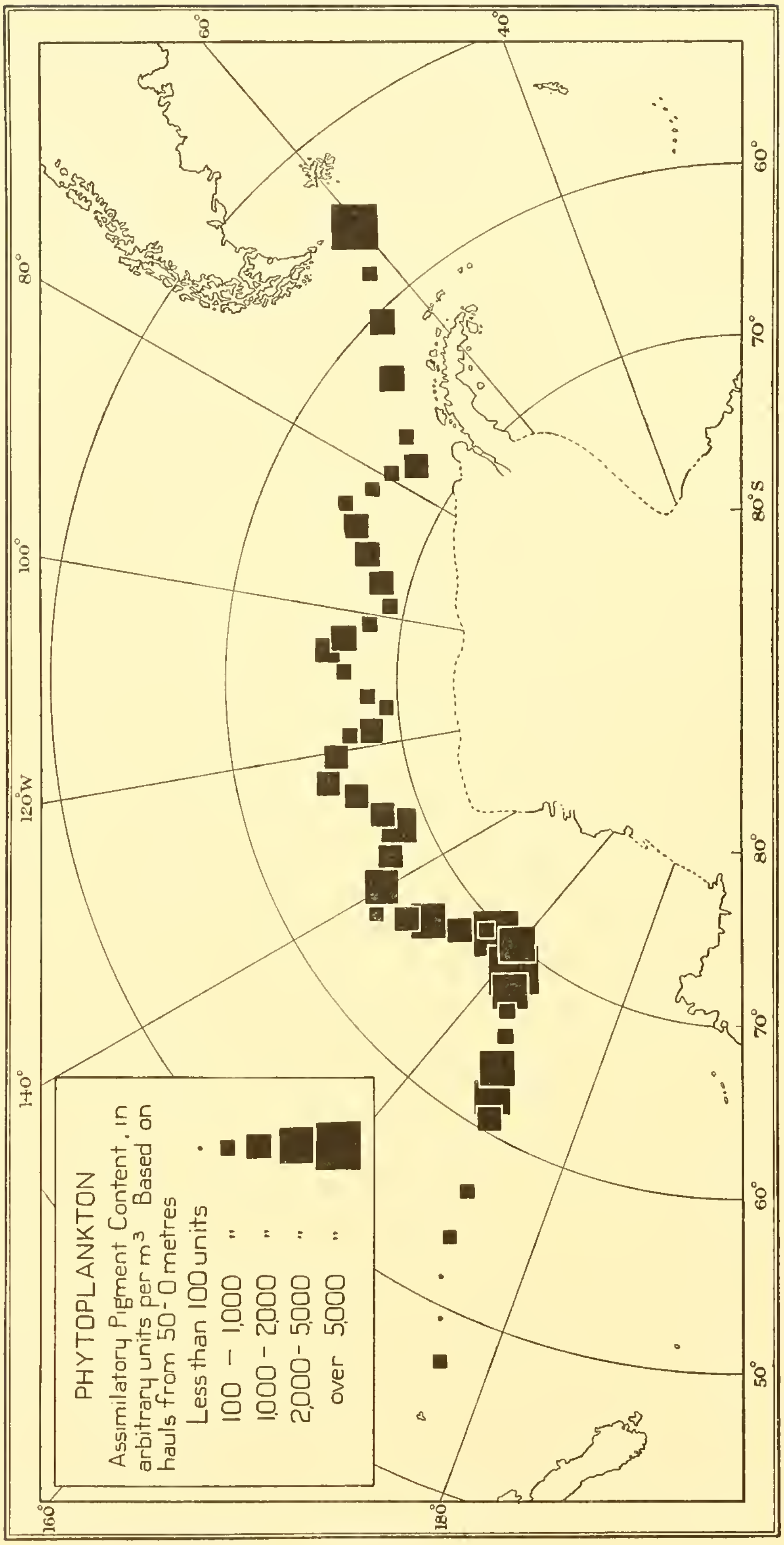


Fig. 5. Quantitative differences observed on the second Pacific cruise, 1934.

We sailed to the south-west again early in August 1934, and obtained good evidence of the negligible quantities of phytoplankton in winter in the Northern Region, on our way to South Georgia. From 25 August to 3 September, in the South Georgia area, the quantities were more than twice as great—still very small. During the following week it was found that in the Scotia Sea the values, though lower than at South Georgia, were double those obtained in corresponding latitudes in the open ocean a fortnight earlier, but in the eastern South Pacific they were still negligible.

Between 26 September and 12 October a double series of observations in the Scotia Sea showed that the phytoplankton had increased to three or four times the values observed earlier in September, though still poor when considered in relation to the quantities to be found there later on, during the main increase.

During the first half of November an extended series of observations was made in the eastern South Pacific. The main increase seemed to be in progress from 2 November, when the first estimation exceeding 1000 units of plant pigments per $m.^3$ was obtained. The values, however, were low even when compared with those for other oceanic regions at this season. Possibly the weather conditions, which were exceptionally bad throughout this cruise, may have been, in part, responsible for this. A uniform poverty of phytoplankton in the eastern South Pacific seems to be the rule at all seasons, however, when we compare the results with those from other areas.

For the next two months the ship was engaged in carrying stores for the British Graham Land Expedition, and in survey work round the South Shetland Islands. No routine phytoplankton observations were made, but interesting observations on the exceptionally dense neritic development at Deception Island and in de Gerlache Strait were possible on two occasions.

At the conclusion of the survey programme a line of stations was worked from the South Orkney Islands northwards across the Scotia Sea, beginning on 23 January 1935. At the two southernmost stations, nearest to the shoal water of the Scotia Arc, a very rich neritic phytoplankton was encountered. Farther north the quantities observed were more moderate. About the beginning of February some moderate hauls were obtained to the north of South Georgia, but east of the more southerly part of that island the phytoplankton was poor.

The work of the third commission was concluded by a long cruise eastward across the Intermediate and Southern Regions of the Antarctic zone, south of the Atlantic and beyond to 43° E, during February and March 1935. Some high values were recorded in both regions up to the third week of February, but the phytoplankton was evidently distributed very irregularly, with considerable evidence of heavy grazing causing local scarcity. During the latter part of this cruise the values in the Intermediate Region fell off indicating post-maximal decrease, while slightly higher values in the Northern Region in March may have indicated the beginnings of the secondary autumnal increase. On leaving Antarctic waters observations were continued northwards through the Mozambique Channel before the ship made her way home through the Red Sea and the Mediterranean.

During the fourth commission the phytoplankton estimations were carried out by our assistant, Mr W. F. Fry, under the supervision of Mr J. W. S. Marr. The positions of the stations considered here are shown in Figs. 6 and 7. Work in the Antarctic zone was begun late in November 1935, on an eastward cruise along the ice-edge south of the Indian Ocean. The observations were arranged along a series of zigzags with the ice-edge as the southern turning point for each leg of the course, as in most of our long range work. Quantities of phytoplankton were very moderate in both Intermediate and Northern Regions, with indications of the beginning of the main increase at the end of November. It may, of course, have been an exceptionally late season, but we have subsequently found indications of similar moderate development in November, followed by a very sudden main increase, in this part of the Northern Region. The average position of the Antarctic convergence is slightly farther south there than it is to the south of the Atlantic. At the same time, the land to the south is somewhat farther north, so that to the south of the Indian Ocean a slight degree of 'telescoping' in the north-south gradient of the conditions may occur. This is probably the cause of the incidence of the main increase being slightly later there, but the difference does not seem to be sufficient to necessitate consideration of this region as a 'special area'.

At the beginning of December it became necessary for the ship to proceed at once to the rescue of Lincoln Elsworth at 'Little America'. This she did after a record passage through the Ross Sea pack, and observations were resumed far south in the Ross Sea at the middle of January 1936. Eighteen stations were worked south of the Antarctic circle, some as far as 78° S. Most of the hauls were very moderate in quantity, as we had already learnt to expect at this time of the year in the Southern Region. Two stations yielded richer catches towards the end of the month. Mr Marr's preliminary qualitative observations indicate that there are probably features peculiar to these most southerly waters known, but quantitatively the results fit in quite normally with those from the Southern Region in general.

On the voyage northwards to Australia very small quantities of phytoplankton were recorded in February in the Intermediate Region, and throughout the month of March when the ship was working in the Northern and Intermediate Regions south of Australia, the quantities observed were also poor. The summer post-maximal decrease is evidently marked in these waters. Observations on the southward run suggested that it may be even more marked in the Intermediate than in the Northern Region.

After crossing the Indian Ocean westwards to South Africa in lower latitudes, observations in the Antarctic zone were resumed at the end of May and continued throughout the first fortnight of June, between 0 and 20° E, where several results from the Intermediate as well as the Northern Region were obtained. In the Intermediate Region some vestiges of the autumnal secondary increase were still apparent—possibly as a result of transport from farther south. To the north minimal winter values only were recorded.

The following season, after refitting at Simonstown, the ship crossed to South Georgia on the usual zigzag type of course, the general direction being south-west.

Fig. 6. Positions of the observations obtained within the Antarctic zone during the fourth commission of R.R.S. 'Discovery II', excluding those from the South Georgia area which are shown separately in Fig. 7.

Owing to the northerly position of the ice-edge at this time of year (September-October 1936) most of the observations fell in the northern region of the Antarctic zone. They showed the first small increase above the minimal winter values quite clearly.

At South Georgia a considerable plankton survey was undertaken which showed the main increase to be beginning sporadically during the last week of October, when three really high phytoplankton concentrations were observed. During the first fortnight of

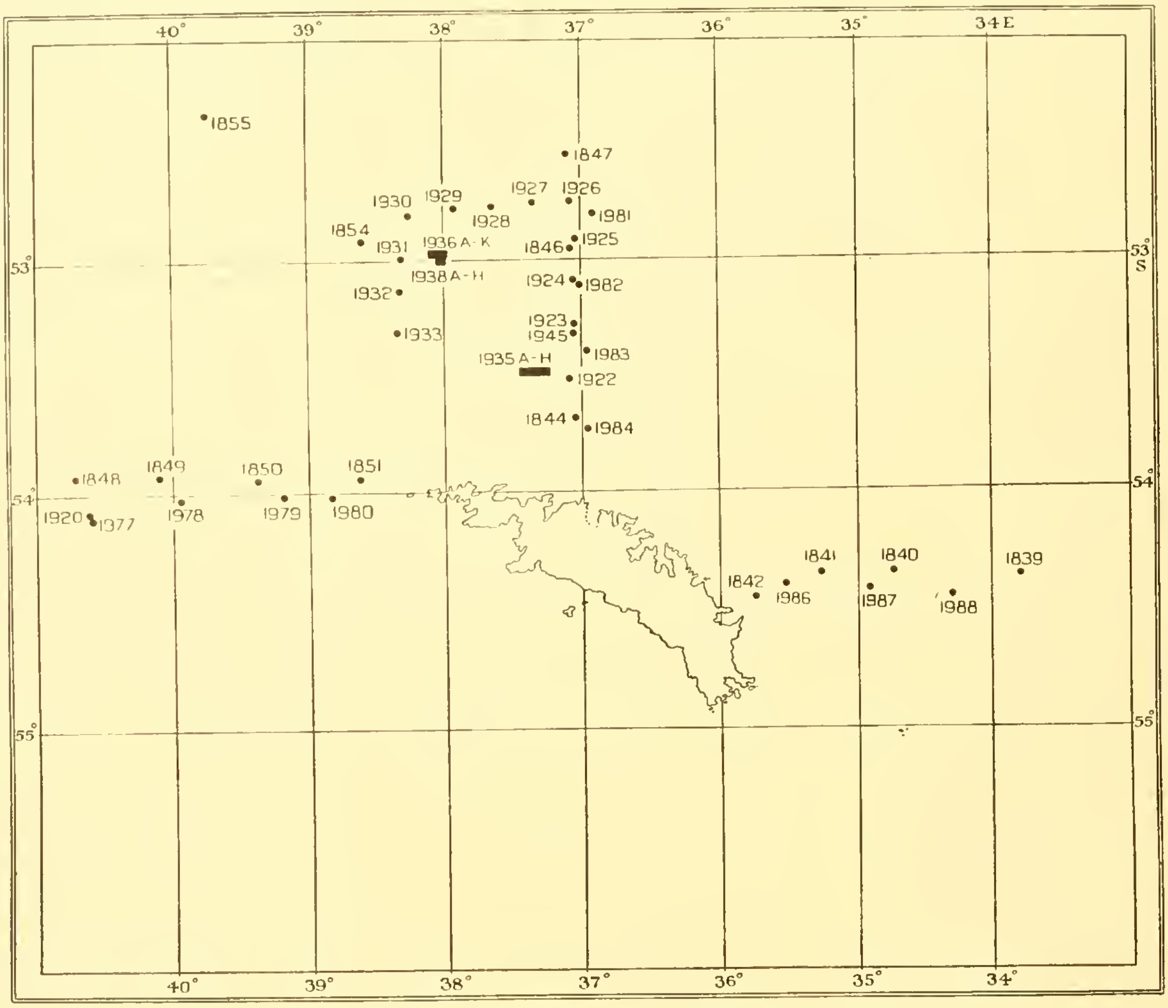


Fig. 7. Positions of observations in the South Georgia area during the fourth commission of R.R.S. 'Discovery II'.

November observations were obtained suggesting a similar sporadic increase in some parts of the Scotia Sea, but on a smaller scale, as we have learnt to expect. Farther south, in the Weddell Sea, no production on a considerable scale was yet apparent.

After an extensive series of observations in sub-Antarctic waters west of the Falkland Islands, work was continued in the South Georgia area during the first three weeks of December 1936. It appeared that the main increase was at or just past its maximum, and many high values were recorded. In addition to the routine plankton survey three 24 hr. stations were worked in phytoplankton concentrations ranging from the highest to the lowest that could be found, with a view to testing Professor Hardy's animal exclusion hypothesis. The results obtained at these stations appear incidentally to provide valuable proof that our methods are adequate for broad determinations of the order of magnitude of the standing crop, of the type aimed at in this paper.

At the New Year 1936–7 a line of stations was worked south-westwards across the Scotia Sea, showing two fairly high values to the north. For the next six weeks the ship was engaged on hydrographic survey work round the South Shetland Islands. Plankton work was resumed in the middle of February with a line of stations worked northwards across the Scotia Sea to the Falkland Islands. It was evident that the post-maximal falling off was considerable. Early in March extremely varied quantities of phytoplankton were observed round South Georgia, in keeping with our ideas of the irregularity of the autumnal increase.

The work of the fourth commission in the Antarctic zone was concluded by a cruise eastwards to the meridian of Greenwich, mainly in the Intermediate Region, followed by a line of close stations worked due northwards to the Antarctic convergence. The chief result was a clear demonstration of an autumnal secondary increase in the Intermediate Region in the latter half of March 1937.

The phytoplankton observations obtained within the Antarctic zone during the fifth commission of the R.R.S. 'Discovery II' are shown in Figs. 8 and 9. The work falls naturally into two parts: a circumpolar cruise, working on a zigzag course east about from Cape Town, during the summer and autumn of 1937–8, and a long series of repeated observations between 0 and 20° E, starting at mid-winter and continued throughout the whaling season of 1938–9.

Leaving Cape Town in November 1937, we first crossed the Antarctic convergence on the 20th, and until 10 December when we were making our way northwards to Fremantle, all the observations fell within the Northern and Intermediate Regions. At first the quantities of phytoplankton recorded were small, though greater than the minimal winter values. The main increase became apparent rather suddenly, the first estimations exceeding 1000 units of plant pigments were recorded on 27 November in the Northern Region and on 7 December in the Intermediate Region. Prior to this the Intermediate Region was appreciably the poorer of the two.

We sailed from Fremantle before the New Year and next crossed the convergence on 6 January 1938. Our zigzag course took us eastward mainly through the Intermediate Region to the vicinity of the Balleney Islands before we worked north to New Zealand. At the Balleney Islands we encountered an extraordinarily rich neritic phytoplankton, and two stations near by showed that the main increase in the extreme north of the Southern Region had begun by the third week in January. Throughout the main part of this cruise it appeared that the main increase in the Intermediate Region was in progress, but some low values were recorded, and it seemed that grazing might already be causing local poverty. In the Northern Region the post-maximal decrease was clearly apparent at the end of January. Grazing again seemed a possible explanation—an extraordinary profusion of salps at this time has repeatedly been observed slightly

Fig. 8. Positions of the observations obtained within the Antarctic zone during the circumpolar cruise, fifth commission of R.R.S. 'Discovery II'. The observations from the repeated cruises between 0 and 20° E are shown separately in Fig. 9.

farther north, and one species at least extends southwards into our Northern Region in abundance.

After leaving New Zealand we made our way southwards through the 'special area' north of the Ross Sea, where the more southerly position of the Antarctic convergence renders the distinction of Northern and Intermediate Regions impossible. Here the phytoplankton in the middle of February was poor—almost certainly post-maximal. Our eastward crossing of the Pacific during the latter half of February and the first week in March was carried out in high latitudes. Most of the stations fell in the Southern Region, where the main increase was evidently proceeding up to the end of February, with slight falling off subsequently. Working northwards through another 'special area', the eastern South Pacific, a moderately rich phytoplankton was observed at the two most northerly Antarctic stations, which may have represented the secondary autumnal increase in this generally poor locality. Throughout the remainder of March 1938, however, when our work lay in the Scotia Sea, it was evident from the very small quantities of phytoplankton observed that the post-maximal decrease was still in force, and that any autumnal secondary increase would probably come later.

The circumpolar cruise was completed by a line of stations from South Georgia eastwards to the meridian of Greenwich, whence observations were continued southwards from the vicinity of the Antarctic convergence to 65° S, and after an eastward zigzag, northwards from 67° S up the 20° E meridian to South Africa. This last portion of the circumpolar cruise occupied the greater part of April 1938, and covered the same area that was worked in detail throughout the following season. The results gave clear indications of the secondary autumnal increase in the Northern Region. In the Intermediate Region the quantities of phytoplankton were small, but slightly greater, on the average, than those recorded in March and on other occasions.

After refitting at Simonstown we again sailed south on 1 July 1938, on the first of seven repeated series of observations between 0 and 20° E. On each of these cruises our general procedure was the same. We aimed to reach the Greenwich meridian in about 40° S, worked due south to the ice-edge, then turned to the north and east until we reached the neighbourhood of 10° E, then turned south and east for the ice-edge, and finally northwards in about 20° E. The extent of the north and south legs of this W-shaped course necessarily varied with the influence of the weather and the position of the ice-edge upon our fuel consumption. Throughout the winter and up to December 1938 the ice lay around 55–56° S, and it was possible to work north until we had nearly reached the Antarctic convergence again in about 10° E on each of the first five cruises. Later the ice-edge lay some hundreds of miles farther south. In February-March 1939 we reached the edge of the Antarctic continent itself between 0 and 4° E, and it became necessary to cut out the middle zigzag altogether. This particular cruise gives a good example of the enormous distances that have to be covered in this type of work. Proceeding from Cape Town to approximately 40° S in 0°, down to the Antarctic continent and back up the 20° E meridian, the ship actually had to steam farther than she did in her crossing of the South Pacific the previous season.

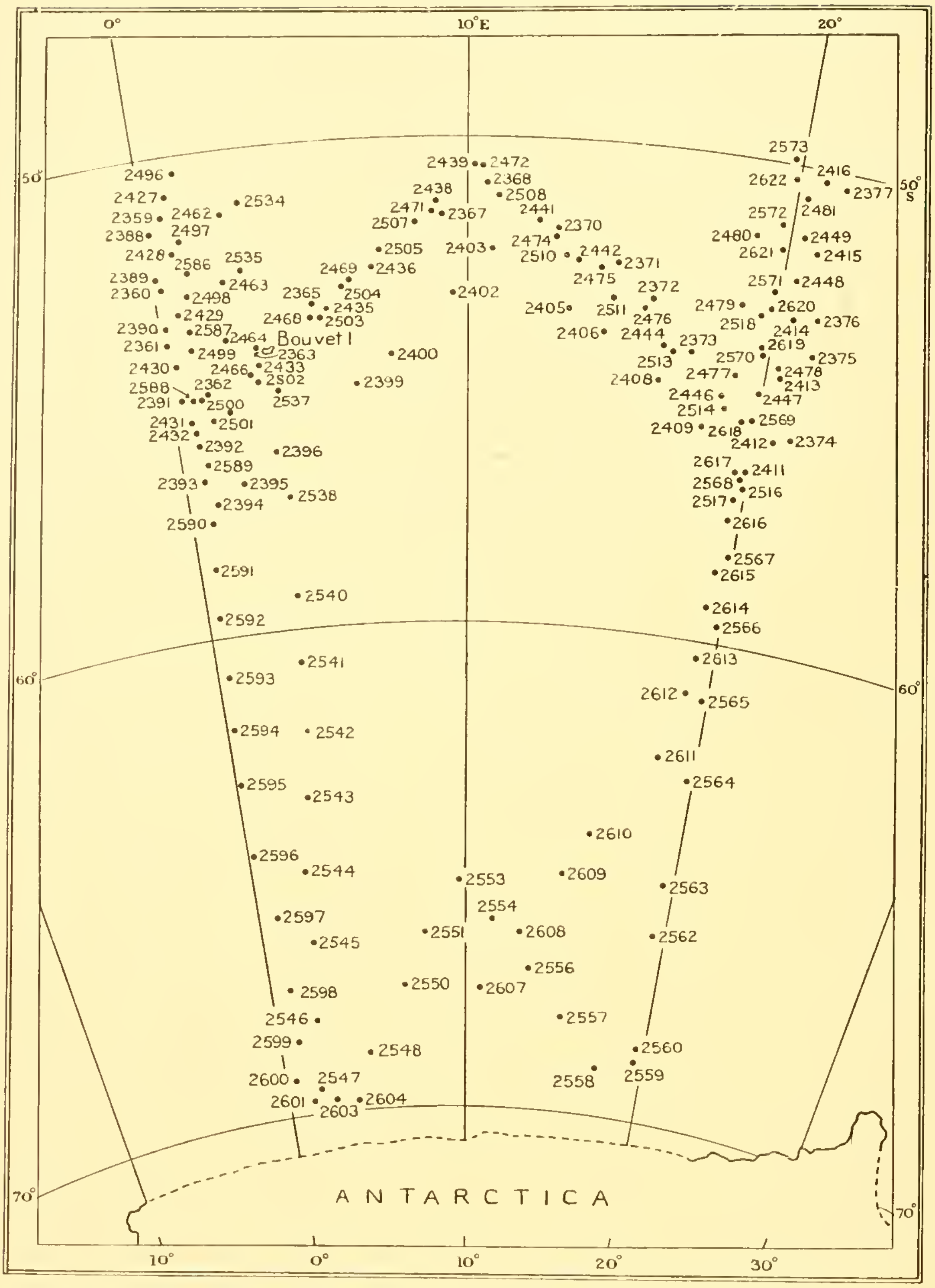


Fig. 9. Positions of observations obtained within the Antarctic zone during the repeated cruises, July 1938–March 1939.

The results of these repeated cruises were very valuable in giving a complete picture of the annual cycle in the Northern Region. The Intermediate and Southern Regions were reached only from January to March 1939, when the results confirmed our previous findings. It also became clear that the abundance of *Phaeocystis*, particularly in the Intermediate Region, was confined to the period immediately after the break-up of the pack-ice. In the Northern Region the quantitative phytoplankton cycle followed a course we expected to find normal from our earlier and more widely dispersed observations, except that the maximum was rather later. Apparently the season 1938–9 was a rather 'late' year, as instanced also by the northerly position of the ice-edge as late as December.

DESCRIPTION OF THE OBSERVATIONS OBTAINED

THE NORTHERN REGION

The seasonal variation in pigment content of the phytoplankton of the Northern Region, as indicated by meaning all our available estimations at mean dates, is shown by the figures in Table 1, and also in graphic form in Fig. 10. It will be noted that the November figure is lower than that for October, and that this is thought to be an anomaly due to the limitations of the data, and not representative of the true state of affairs. The majority of our November figures were derived from the part of the Northern

Table 1

Mean date	No. of observations	Mean units of pigments per m.^{3}
16 July	16	50
20 August	29	60
27 September	22	120
14 October	33	520
20 November	24	380
6 December	35	1690
15 January	12	1210
12 February	10	960
19 March	22	560
16 April	19	840
21 May	4	290
9 June	8	50

Region lying south of the Indian Ocean, where we have twice observed that the main increase seems to take place rather later and more suddenly than elsewhere (cf. Itinerary). The October figures, on the other hand, were widely distributed. There is little doubt that if more widely distributed observations for November were available, the shape of the graph would approximate to that shown by the pecked line, over the period in question. As already remarked, it does not seem advisable to regard the area south of the Indian Ocean as essentially different from the rest of the Northern Region on this account alone, for at other seasons the agreement is good. The figures given in Table 2, obtained over the short period covering the main increase in the locality in

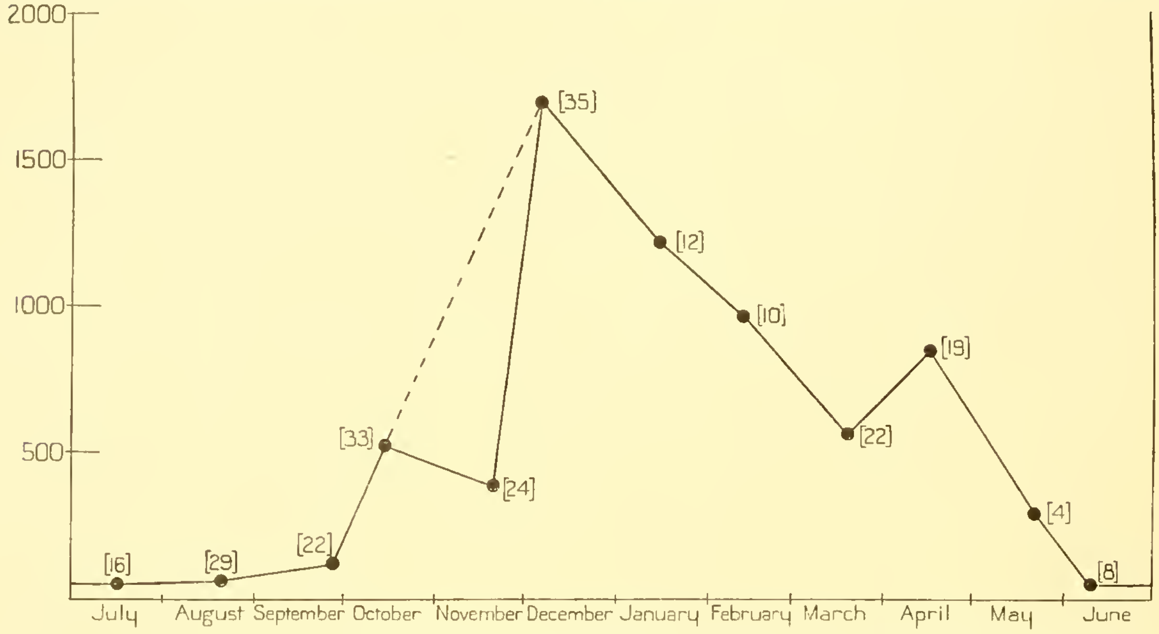


Fig. 10. Northern Region. Annual variation in plant pigments per m.³; means of all available observations (50–0 m. hauls) at mean dates. Numbers of observations in brackets. Note anomalous figure for November mentioned in text.

question during the circumpolar cruise in 1937, clearly show how maximal values were observed early in December in spite of the November values being lower than elsewhere.

Table 2

Station	Date	Colour units per m.³, 50–0 m. hauls	P mg. atoms per m.³	Si mg. atoms per m.³
2089	20. xi. 37	450	2·11	38·6
2091	21. xi.	190	2·03	36·6
2093	22. xi.	130	2·09	33·3
2106	27. xi.	1170	2·05	28·8
2131	5. xii. 37	5760	1·54	14·4
2141	9. xii.	1630	1·98	15·8
2143	10. xii.	5040	1·50	2·5

The very close agreement between nutrient salt content of the water and estimated quantities of plant pigments is also clearly shown by this table. It would not be so good over a longer period when the effect of the biological uptake would be masked by regeneration or replacement in varying degrees, but it seems to me that if our Harvey estimations do not reflect the real quantity of phytoplankton production fairly closely, the high degree of correlation with chemical data obtained quite independently by our hydrologists at the critical period would be utterly impossible.

The seasonal variation in the quality of the phytoplankton of the Northern Region would seem to be best exemplified by the repeated series of observations carried out between 0 and 20° E during the season 1938–9, with some work carried out in the same area during the previous autumn. This seems to give a better representation of the sequence than the consideration of material collected in different seasons. Observations in other parts of the northern zone tallied extremely well with this series, however, and it was this that led to the possibility of recognizing the biogeographical zonation used in this paper. It will be realized that it is impracticable to give all the data for the whole of the Northern Region in detail. The figures for the 1938–9 series are given in summarized form in Table 3. This gives the mean percentage at mean dates for each category of microplankton included in the 'qualitative counts' in ordinary type, and the number of stations at which each was observed is given as a fraction of the total number of observations available.

It is readily seen that Group I, oceanic pennate diatoms with *Distephanus speculum*, was important at all times except in autumn, and to a lesser extent during the post-maximal decrease period. *Fragilariopsis antarctica* was most important in the early part of the main increase, but formed a considerable proportion of all microplankton present at all seasons except late autumn. *Nitzschia seriata* was most important at the peak of the main increase and subsequently through late summer and autumn.

The larger diatom species of Group II were most important during late summer and autumn, when large local concentrations of *Chaetoceros criophilum*, *Rhizosolenia alata* and *Rh. hebetata semispina* phase were encountered. *Corethron criophilum*, the most important member of this oceanic group, was present in moderate proportion at all seasons, most important during the early part of the main increase and during the post-maximal decrease.

The position of the neritic and ice-edge forms (Group III) in the qualitative sequence is very clearly brought out by the figures in the table. *Chaetoceros sociale* and *Thalassiosira* spp. were by far the most numerous in this truly oceanic area. With the rest of the group they reached their maximum importance as the ice dispersed—immediately before the peak of the main increase in the season studied. At other times they formed a relatively insignificant proportion of the phytoplankton.

The oceanic Chaetocerids (Group IV) were more evenly distributed throughout the year, mainly owing to the ubiquity of the two leading members of the group in the Northern Region—*Chaetoceros atlanticum* and *Ch. dichaeta*. Even with these, however, the tendency to show maximum relative importance during the post-maximal summer decrease and in autumn, characteristic of the group as a whole, was fairly clear.

The small oceanic Discoidae (Group V) were quite unimportant except in the extremely scanty winter phytoplankton, and the same may be said of the non-holophytic members of the microplankton that were included in the qualitative counts.

The colonial green flagellate *Phaeocystis brucei*, whose numbers cannot be estimated by our methods and which is clearly a first colonist when pack-ice melts and does not long persist thereafter, is naturally of only local importance in the Northern Region,

Table 3. *Northern Region. Seasonal variation in relative abundance. Individual categories. Mean percentages and frequency of occurrence at mean dates*

Mean date ...	12 Apr. 1938	27 Apr. 1938	16 July 1938	21 Aug. 1938	27 Sept. 1938	30 Oct. 1938	7 Dec. 1938	16 Jan. 1939	1 Feb. 1939	25 Feb. 1939	13 Mar. 1939
Fragilariopsis antarctica	3·7 3/5	1·5 2/4	31·6 13/15	27·8 20/20	52·7 18/18	28·6 16/17	16·0 18/18	18·6 3/3	25·2 5/5	11·0 3/4	20·7 6/6
Nitzschia seriata (? + *delicatissima*)	5·3 2/5	2·4 3/4	>0·1 1/15	1·7 12/20	1·0 8/18	3·4 17/17	13·4 18/18	31·8 3/3	17·1 3/5	11·7 3/4	11·3 6/6
Distephanus speculum	0·5 2/5	1·3 3/4	0·4 7/15	1·1 17/20	0·7 14/18	1·1 16/17	1·0 17/18	0·2 1/3	1·1 5/5	1·8 4/4	0·4 2/6
Total Group I	9·5 4/5	5·2 3/4	32·1 13/15	30·6 20/20	54·4 18/18	33·1 17/17	30·4 18/18	50·6 3/3	43·4 5/5	24·5 4/4	32·2 6/6
Chaetoceros boreale	— —	— —	— —	— —	— —	0·1 2/17	0·2 5/18	1·4 3/3	— —	2·2 2/4	0·7 2/6
Ch. criophilum	5·2 4/5	56·5 4/4	12·3 10/15	4·3 17/20	2·3 15/18	2·7 16/17	3·1 17/18	4·2 3/3	4·5 5/5	12·8 4/4	8·7 5/6
Rhizosolenia spp.	48·4 5/5	3·2 4/4	1·3 10/15	2·2 17/20	1·8 17/18	2·8 17/17	3·5 18/18	1·9 3/3	3·9 5/5	22·7 4/4	4·9 6/6
Dactyliosolen antarcticus	4·3 5/5	3·9 4/4	4·1 14/15	8·1 20/20	2·8 17/18	1·2 17/17	1·1 15/18	0·2 2/3	1·6 5/5	3·1 4/4	4·2 6/6
Corethron criophilum	4·3 5/5	1·5 3/4	2·5 11/15	5·8 20/20	8·7 18/18	13·8 17/17	8·7 18/18	3·6 3/3	2·0 5/5	6·9 4/4	1·5 5/6
Synedra pelagica	0·4 1/5	— —	0·2 1/15	0·8 3/20	0·5 4/18	0·4 7/17	0·8 11/18	2·0 2/3	0·7 2/5	0·8 2/4	0·7 4/6
Thalassiothrix antarctica	0·3 1/5	1·1 3/4	0·6 7/15	0·3 7/20	0·1 2/18	0·6 10/17	1·1 13/18	6·4 3/3	2·0 5/5	6·1 3/4	3·8 6/6
Total Group II	62·8 5/5	66·1 4/4	20·8 15/15	21·5 20/20	16·0 18/18	21·6 17/17	18·5 18/18	19·6 3/3	14·6 5/5	54·3 4/4	24·4 6/6
Thalassiosira spp.	— —	— —	— —	— —	1·3 4/18	8·1 12/17	7·7 13/18	6·8 2/3	— —	— —	— —
Asteromphalus parvulus	0·1 1/5	— —	— —	0·3 7/20	0·1 4/18	>0·1 5/17	>0·1 4/18	0·5 2/3	0·1 1/5	0·9 3/4	— —
Biddulphia striata	— —	— —	— —	— —	>0·1 1/18	>0·1 2/17	0·1 2/18	— —	— —	— —	— —
Eucampia balaustium	0·1 1/5	— —	— —	0·2 2/20	0·2 3/18	1·0 11/17	1·1 16/18	0·6 1/3	1·0 3/5	0·2 1/4	>0·1 1/6
Chaetoceros flexuosum	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —
Ch. neglectum	— —	— —	— —	— —	0·4 2/18	1·3 5/17	0·2 2/18	— —	0·4 2/5	— —	— —
Ch. sociale	0·5 1/5	0·4 1/4	— —	0·1 1/20	0·4 2/18	8·6 12/17	18·2 16/18	0·4 1/3	4·6 3/5	2·5 1/4	— —
Ch. tortissimum	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —
Fragilaria spp., etc.	— —	— —	— —	— —	>0·1 1/18	0·1 3/17	0·4 6/18	— —	1·7 3/5	— —	0·2 1/6
Nitzschia closterium	— —	— —	— —	— —	0·5 1/18	— —	1·0 11/18	— —	1·0 2/5	0·1 1/4	0·1 1/6
Total Group III	0·8 2/5	0·4 1/4	— —	0·6 9/20	2·9 11/18	19·2 15/17	28·7 18/18	8·3 2/3	8·8 3/5	3·9 4/4	0·3 2/6
Chaetoceros atlanticum	1·8 2/5	6·9 4/4	6·7 12/15	6·5 19/20	6·9 16/18	8·4 16/17	3·1 13/18	5·9 2/3	6·3 5/5	4·6 4/4	18·8 6/6
Ch. castracanei	0·4 1/5	0·5 1/4	0·1 3/15	0·3 5/20	0·1 5/18	0·2 5/17	0·6 9/18	0·5 1/3	1·6 3/5	1·6 2/4	0·7 2/6
Ch. chunii	0·1 1/5	3·4 2/4	0·5 6/15	2·9 15/20	2·3 8/18	2·3 14/17	2·2 16/18	2·2 2/3	10·3 5/5	2·7 4/4	5·2 5/6
Ch. curvatum	3·0 2/5	0·4 2/4	>0·1 3/15	0·6 9/20	0·9 11/18	0·5 8/17	1·2 9/18	0·2 2/3	0·4 4/5	0·6 3/4	0·6 4/6
Ch. dichaeta	5·2 1/5	10·8 4/4	2·1 10/15	4·8 17/20	1·3 10/18	5·4 16/17	3·7 14/18	7·1 3/3	3·2 5/5	3·0 4/4	6·5 6/6
Ch. d. tenuicornis phase	3·0 1/5	0·9 1/4	— —	— —	1·6 4/18	1·0 5/17	1·1 4/18	0·5 1/3	6·6 3/5	0·4 1/4	5·4 4/6
Ch. pendulum	0·1 1/5	— —	— —	— —	— —	— —	0·1 1/18	— —	— —	— —	— —
Ch. radiculum	1·6 1/5	— —	>0·1 1/15	0·4 7/20	0·4 10/18	1·3 11/17	1·1 12/18	— —	0·1 1/5	— —	0·5 1/6
Ch. schimperianum	— —	— —	— —	— —	0·3 2/18	0·8 9/17	6·3 15/18	1·7 1/3	1·7 2/5	— —	0·3 2/6
Total Group IV	15·2 4/5	23·0 4/4	9·4 13/15	15·5 19/20	13·8 18/18	19·9 17/17	19·0 18/18	18·1 3/3	30·1 5/5	12·9 4/4	38·0 6/6
Coscinodiscus spp.	0·8 3/5	0·2 1/4	8·3 15/15	8·7 20/20	3·2 18/18	1·4 15/17	0·5 16/18	0·7 3/3	0·6 4/5	0·3 2/4	0·9 4/6
Actinocyclus spp.	0·5 2/5	1·8 2/4	7·1 14/15	7·9 20/20	2·1 17/18	2·4 15/17	0·6 16/18	1·0 3/3	0·1 1/5	1·6 2/4	0·4 3/6
Asteromphalus spp.	0·5 2/5	1·1 4/4	1·6 14/15	0·9 16/20	0·3 11/18	0·2 7/17	>0·1 3/18	— —	70·1 1/5	— —	0·3 2/6
Total Group V	1·8 3/5	3·1 4/4	17·6 15/15	17·4 20/20	5·6 18/18	3·9 17/17	1·1 17/18	1·7 3/3	0·8 4/5	1·9 2/4	1·6 4/6
Foraminifera	0·5 1/5	— —	1·8 13/15	1·8 18/20	0·9 13/18	0·5 6/17	>0·1 2/18	— —	— —	>0·1 1/4	>0·1 1/6
Cymatocyclis spp.	— —	— —	0·4 5/15	0·4 6/20	0·8 13/18	>0·1 2/17	0·1 4/18	0·1 1/3	0·1 1/5	>0·1 1/4	0·1 1/6
Other Tintinnidae	0·8 3/5	0·8 1/4	1·1 11/15	1·3 20/20	0·9 14/18	0·2 8/17	0·9 10/18	1·1 3/3	0·8 3/5	0·9 3/4	0·4 3/6
Acanthometridae	0·8 2/5	— —	0·7 3/15	1·9 17/20	0·9 13/18	0·2 6/17	0·1 5/18	0·1 1/3	0·1 1/5	0·3 1/4	0·6 4/6
Challengeridae	>0·1 1/5	— —	5·2 15/15	2·6 19/20	0·4 16/18	>0·1 3/17	>0·1 1/18	0·1 1/3	>0·1 1/5	>0·1 1/4	0·7 3/6
Other Radiolaria	— —	— —	1·0 6/15	>0·1 1/20	0·2 2/18	>0·1 1/17	— —	— —	— —	0·2 1/4	— —
Sticholonche	— —	1·0 2/4	— —	>0·1 2/20	0·1 5/18	— —	— —	— —	— —	— —	— —
Total Holozoic Protozoa	2·1 3/5	1·8 2/4	12·3 15/15	8·0 20/20	4·3 18/18	1·1 13/17	1·2 12/18	1·4 3/3	1·0 3/5	1·5 4/4	1·9 5/6
Copepoda	1·1 2/5	0·1 1/4	4·2 15/15	2·1 19/20	0·6 12/18	0·1 3/17	0·1 5/18	— —	0·3 1/5	0·2 1/4	0·3 1/6
Nauplii	2·8 3/5	0·2 1/4	4·5 15/15	4·0 19/20	1·8 17/18	0·5 7/17	0·4 7/18	0·2 2/3	0·3 1/5	0·3 2/4	0·4 2/6
Other Crustacea	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —
Limacina juv.	— —	— —	— —	— —	>0·1 1/18	— —	— —	— —	— —	— —	— —
Ova	0·1 1/5	— —	0·2 2/15	— —	0·2 1/18	0·1 1/17	— —	— —	— —	— —	— —
Total Metazoa	4·1 3/5	0·3 1/4	8·9 15/15	6·2 19/20	2·6 17/18	0·8 8/17	0·5 8/18	0·2 2/3	0·6 1/5	0·5 2/4	0·7 2/6

which is mainly ice-free throughout the year. It was most frequently observed in December 1938, rarely earlier in the year, our earliest record being in September. We have already had occasion to remark that 1938–9 seems to have been an unusually heavy ice year, and it may well be that the heaviest incidence of *Phaeocystis* in the Northern Region is normally somewhat earlier. *Phaeocystis* has not been observed later in the season than December at any time in the Northern Region. At the time of its maximum importance it was present at only nine out of thirty-two stations and abundant at only three of these.

THE INTERMEDIATE REGION

As one would expect, it was not possible to obtain many winter observations in the Intermediate Region, but there is no doubt that the pigment values are minimal at that time. Although it was necessary to consider results from different seasons together, the large number of observations for most months that are available renders the mean figures given in Table 4 and graphically in Fig. 11 fairly conclusive, and there seems

Table 4

Mean date	No. of observations	Mean units of pigments per m.^{3}
23 August	1	50
12 October	2	50
27 November	19	150
5 December	9	630
18 January	50	1380
19 February	44	1130
14 March	60	920
22 April	30	310
6 May	11	470
5 June	7	220

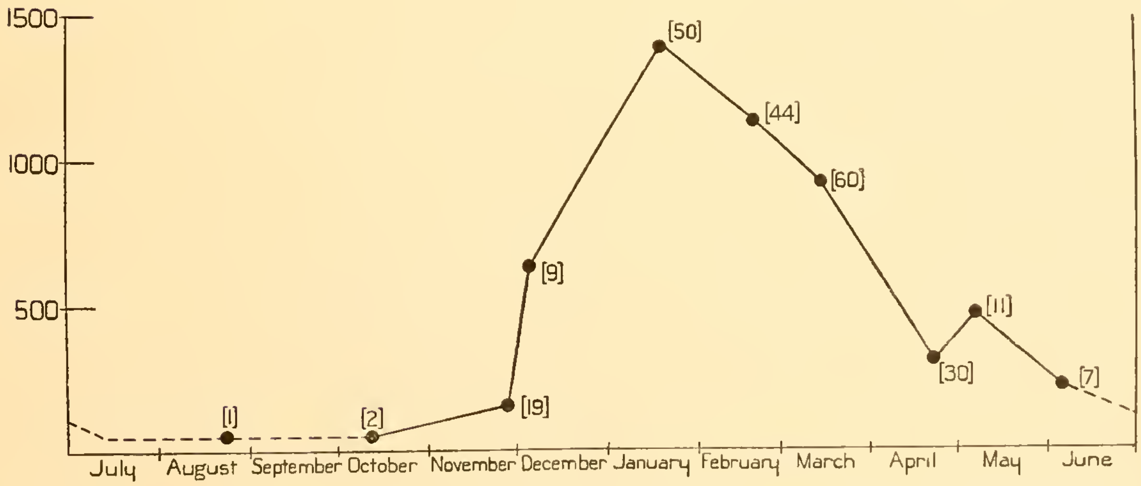


Fig. 11. Intermediate Region. Annual variation in plant pigments per m.^{3}, means of all available observations at mean dates. Numbers of observations shown in brackets.

little doubt that the shape of the graph reflects the normal seasonal variation in quantity of standing crop fairly closely. It will be seen that up to the end of November the increase over minimal winter values is but slight. From then until the mid-January maximum the main increase is rapid, followed by gradual falling off through February

Table 5. *Intermediate Region. Seasonal variation in relative abundance. Individual categories. Mean percentages and frequency of occurrence at mean dates*

Mean date ...	23 Aug.		27 Nov.		5 Dec.		18 Jan.		24 Feb.		8 Mar.		20 Apr.	
Fragilariopsis antarctica	9·9	1/1	30·3	10/10	13·4	7/7	24·5	41/45	19·1	11/12	33·6	13/13	24·0	21/23
Nitzschia seriata ? + *delicatissima*	—	—	17·1	9/10	8·3	6/7	12·7	42/45	13·1	12/12	13·2	13/13	3·5	16/23
Distephanus speculum	4·1	1/1	0·5	7/10	1·9	6/7	1·6	41/45	1·9	12/12	0·9	12/13	0·6	16/23
Total Group I	14·0	1/1	47·9	10/10	23·6	7/7	38·8	44/45	34·1	12/12	47·7	13/13	28·1	23/23
Chaetoceros boreale	—	—	0·4	3/10	—	—	0·1	2/45	0·1	1/12	—	—	0·9	6/23
Ch. criophilum	10·5	1/1	10·0	10/10	13·1	7/7	6·8	35/45	2·1	9/12	3·9	12/13	10·0	21/23
Rhizosolenia spp.	9·0	1/1	4·3	10/10	6·1	7/7	4·6	42/45	8·6	11/12	2·7	13/13	3·6	23/23
Dactyliosolen antarcticus	5·3	1/1	0·6	7/10	0·5	3/7	1·6	33/45	3·9	10/12	4·9	12/13	15·7	23/23
Corethron criophilum	2·1	1/1	11·2	10/10	16·1	7/7	9·3	45/45	4·7	11/12	1·8	11/13	5·8	22/23
Synedra pelagica	—	—	0·3	5/10	0·3	3/7	1·5	34/45	1·5	11/12	0·8	11/13	0·7	8/23
Thalassiothrix antarctica	0·4	1/1	2·5	10/10	3·7	5/7	1·1	26/45	1·9	5/12	1·7	11/13	13·6	19/23
Total Group II	27·3	1/1	29·3	10/10	38·8	7/7	25·0	45/45	22·8	12/12	15·8	13/13	50·3	23/23
Thalassiosira spp.	—	—	<0·1	1/10	0·8	2/7	2·0	14/45	0·2	1/12	0·1	1/13	—	—
Asteromphalus parvulus	—	—	<0·1	1/10	0·1	2/7	0·3	22/45	0·5	10/12	0·3	5/13	0·3	9/23
Biddulphia striata	—	—	—	—	0·1	1/7	0·1	5/45	—	—	—	—	—	—
Eucampia balaustium	—	—	—	—	0·1	1/7	0·4	9/45	0·7	5/12	—	—	—	—
Chaetoceros flexuosum	—	—	—	—	—	—	0·1	3/45	—	—	—	—	—	—
Ch. neglectum	—	—	9·4	9/10	1·7	2/7	1·9	10/45	—	—	—	—	—	—
Ch. sociale	—	—	—	—	9·7	3/7	3·3	17/45	1·0	2/12	0·2	1/13	—	—
Ch. tortissimum	—	—	0·2	1/10	—	—	—	—	—	—	—	—	—	—
Fragilaria spp., etc.	—	—	<0·1	1/10	3·2	4/7	4·1	28/45	3·3	5/12	1·1	4/13	0·1	2/23
Nitzschia closterium	—	—	1·0	4/10	1·7	4/7	2·1	17/45	1·7	7/12	1·0	4/13	—	—
Total Group III	—	—	10·6	9/10	17·4	6/7	14·3	39/45	7·4	12/12	2·7	7/13	0·4	10/23
Chaetoceros atlanticum	2·5	1/1	0·8	5/10	2·4	4/7	4·9	34/45	3·0	11/12	6·9	11/13	4·0	15/23
Ch. castracanei	—	—	0·3	2/10	<0·1	1/7	1·1	22/45	5·0	12/12	1·8	8/13	0·3	4/23
Ch. chunii	1·2	1/1	0·7	2/10	1·4	3/7	2·1	29/45	2·5	10/12	1·0	6/13	0·5	7/23
Ch. curvatum	—	—	1·4	5/10	0·1	1/7	0·3	17/45	0·5	3/12	0·5	8/13	0·2	8/23
Ch. dichaeta	7·4	1/1	2·2	7/10	3·3	6/7	5·8	40/45	3·8	12/12	2·4	13/13	3·6	18/23
Ch. d. tenuicornis phase	—	—	1·8	7/10	1·9	2/7	3·8	17/45	15·8	11/12	19·8	10/13	4·1	5/23
Ch. pendulum	—	—	0·1	1/10	0·9	4/7	0·1	7/45	0·4	4/12	—	—	—	—
Ch. radiculum	—	—	—	—	—	—	0·1	6/45	0·1	4/12	0·1	2/13	2·9*	8/23
Ch. schimperianum	—	—	1·1	5/10	2·9	6/7	0·6	23/45	0·5	5/12	0·3	6/13	—	—
Total Group IV	11·1	1/1	8·4	10/10	12·9	6/7	18·8	44/45	31·6	12/12	32·8	13/13	15·6	22/23
Coscinodiscus spp.	4·9	1/1	1·0	9/10	1·5	7/7	0·4	25/45	0·1	4/12	>0·1	4/13	0·9	19/23
Actinocyclus spp.	8·3	1/1	0·9	8/10	0·7	4/7	0·5	20/45	0·5	8/12	>0·1	4/13	1·6	19/23
Asteromphalus spp.*	0·8	1/1	0·1	2/10	0·6	5/7	0·2	19/45	0·3	6/12	>0·1	2/13	0·3	14/23
Total Group V	14·0	1/1	2·0	10/10	2·8	7/7	1·1	30/45	0·9	8/21	0·4	6/13	2·8	23/23
Foraminifera	1·6	1/1	0·7	5/10	0·6	3/7	<0·1	5/45	<0·1	1/12	—	—	—	—
Cymatocyclis spp.	—	—	—	—	—	—	—	—	—	—	<0·1	1/13	—	—
Other Tintinnidae	1·2	1/1	0·4	4/10	0·3	1/7	0·1	9/45	0·7	10/12	0·3	7/13	0·1	6/23
Acanthometridae	0·4	1/1	—	—	—	—	—	—	—	—	0·1	5/13	0·6	11/23
Challengeridae	8·2	1/1	<0·1	1/10	0·2	1/7	<0·1	3/45	—	—	0·1	2/13	0·9	17/23
Other Radiolaria	—	—	—	—	—	—	<0·1	2/45	0·2	4/12	—	—	—	—
Sticholonche	—	—	—	—	0·2	1/7	—	—	—	—	<0·1	1/13	—	—
Total Holozoic Protozoa	11·4	1/1	1·2	7/10	1·3	3/7	>0·1	13/45	0·9	10/12	0·5	10/13	1·6	21/23
Copepoda	8·2	1/1	0·1	1/10	—	—	<0·1	3/45	<0·1	1/5	<0·1	1/13	0·3	7/23
Nauplii	14·0	1/1	0·2	2/10	0·4	3/7	0·1	10/45	>0·1	4/7	<0·1	2/13	0·5	11/23
Other Crustacea	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Limacina juv.	—	—	—	—	—	—	—	—	—	—	—	—	<0·1	2/23
Ova	—	—	<0·1	1/10	—	—	<0·1	2/45	—	—	—	—	<0·1	1/23
Total Metazoa	22·2	1/1	0·3	2/10	0·4	3/7	0·2	12/45	0·2	5/12	<0·1	2/13	0·8	13/23

and March. The secondary minimum in April and slight secondary autumnal increase in May are well marked. It may be noted that the observations early in June indicate that the descent to minimal winter values is less rapid than in the Northern Region, as might be expected from the fact that the whole cycle is centred later in the year.

The qualitative sequence in the Intermediate Region is shown in Table 5. Adequate observations are available only for the period from the beginning of the main increase through the post-maximal decrease period to the autumnal secondary maximum, so that the major trends are not so clearly discernible as elsewhere. The relative importance of Group I forms varies in very much the same way as in the Northern Region, if we remember the later time of incidence of the main increase. While present in fairly high proportions throughout the season, the group was most important in the early part of the main increase, and during the post-maximal decrease. It was least important in autumn. The only marked difference from the conditions observed in the Northern Region was that *Nitzschia seriata* was more important in the earlier stages of the main increase than it had been in that area, though reaching its maximum relative importance in corresponding periods later in summer.

The larger oceanic diatoms of Group II were of considerable importance in the early part of the main increase in the Intermediate Region. *Corethron criophilum* and *Chaetoceros criophilum* were much more prevalent than in the Northern Region at the corresponding period. After the main increase the group as a whole showed a characteristic rise in relative importance during the first part of the post-maximal decrease period. Maximum relative importance of the group was attained in April—during the secondary autumnal increase.

In the Intermediate Region the neritic and ice-edge diatom species were most important up to the peak of the main increase, as we found in the Northern Region. *Chaetoceros sociale* was still one of the most important species, but *Fragilaria* spp. with other more definitely tychopelagic ice forms and *Nitzschia closterium* were present in proportions appreciably greater than those found farther north.

Oceanic Chaetocerids (Group IV) were most important during the post-maximal decrease in late summer. Thus far they showed close agreement with the proportions of the group found in the Northern Region, but were relatively scarcer in autumn. Among individual species the small *tenuicornis* phase of *Chaetoceros dichaeta* was more important than in the Northern Region and *Chaetoceros atlanticum* was not so common.

The other categories of microplankton counted were very scarce in the Intermediate Region and showed a slight tendency towards maximum relative importance before the main increase and in autumn as one would expect. They were abundant at the isolated winter observation, and there is little doubt that they would be found to form an important part of the scanty winter plankton, as they do farther north, if it had been possible to obtain more winter observations.

Phaeocystis was important in the Intermediate Region in December and January—up to the time of the peak of the main increase. In December it was present at five out of seven stations, and dominant at two. In January when observations were much more numerous it was present at 62% of the stations, and dominant at 16%. In February and March it fell off in quantity so that it did not obviously predominate over the diatoms anywhere, but was still present at more than half the stations. In April (autumn) it was only observed in very small quantity at three out of twenty-seven stations.

THE SOUTHERN REGION

Except for the three months immediately after midsummer this region is almost inaccessible, and we have only isolated observations in spring and autumn. It may be that wherever Polynas exist in the pack-ice, some production takes place from November onwards, but this can only be a very local effect. From the known climatic and ice conditions it is obvious that large-scale production can only begin when the first large areas of open water are formed in January, and as new ice begins to form in March it follows that the annual production must be crowded into three summer months with no possibility of a secondary autumnal increase. Our observations fully bear this out, the main increase evidently begins very suddenly in January and rises to a high maximum (as the oceanic values go) in February. A few moderately high values have been recorded in the early days of March, but taking that month as a whole the falling off was most marked. The relevant figures are given in Table 6 and are also plotted on the same scale as for the Northern and Intermediate Regions in Fig. 12.

Table 6

Mean date	No. of observations	Mean units of pigments per m.^{3}
14 November	1	470
13 December	1	230
8 January	18	910
25 January	33	1020
22 February	40	2180
5 March	35	970
22 April	1	80

There is nothing exceptional about the qualitative sequence in the Southern Region. The results are summarized in Table 7 and follow a very similar course to those found in the Intermediate Region over the period of the main increase. The most noteworthy differences from the conditions farther north, allowing for the difference in time scale, are: Group I showed maximum relative importance at the maximum (quantitative) period instead of before and after the maximum, and was less important than it is farther north throughout the year. Group II was more important here than in either of the more northerly oceanic regions, especially before and after the maximum. This was almost entirely due to dense local concentrations of *Chaetoceros criophilum* and more especially *Corethron criophilum*, with *Rhizosolenia alata gracillima* phase in lesser amounts. At the single autumn observation *Dactyliosolen antarcticus* was the most numerous species; it is known to show greatly increased importance in the Intermediate Region also at this time, so that this observation may be quite typical.

Among the neritic and ice-edge diatoms (Group III) the increased importance of *Nitzschia closterium*, *Fragilaria* spp. and the more truly tychopelagic ice forms is even more pronounced than in the Intermediate Region, as one would expect. Of the oceanic Chaetocerids (Group IV) it need only be said that in the Southern Region *Chaetoceros*

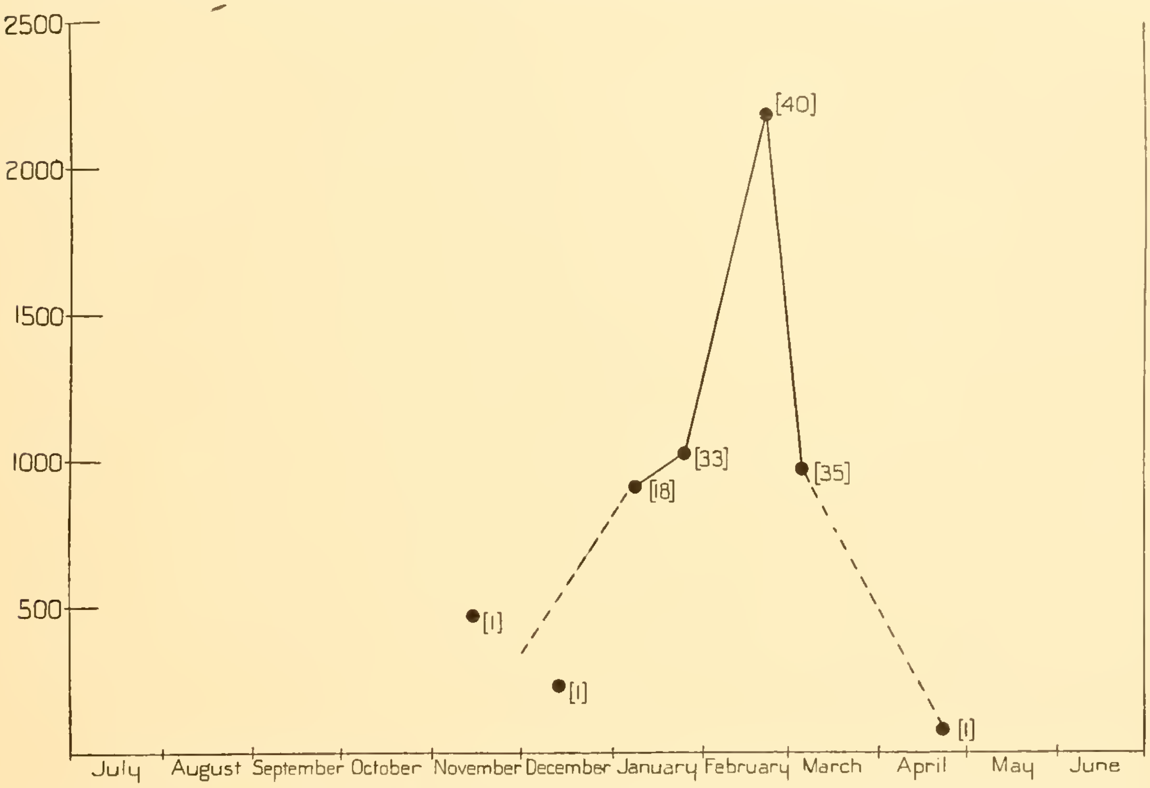


Fig. 12. Southern Region. Seasonal variation in plant pigments per m.^{3}, means of all available observations at mean dates. Number of observations shown in brackets.

dichaeta, and more particularly the minute *tenuicornis* phase of that species, were by far the most important. The group reached its highest importance during the height of the main increase.

The other categories of microplankton counted were quite insignificant in the Southern Region, but *Phaeocystis brucei* was important, as would be expected. This organism was less frequently dominant over the diatoms and rather more unevenly distributed than it had been in the Intermediate Region, however. It was observed most abundantly in January and February; fairly frequently, but in appreciably smaller quantities, early in March.

Table 7. *Southern Region. Seasonal variation in relative abundance. Individual categories. Mean percentages and frequency of occurrence at mean dates*

Mean date ...	20 Jan.		25 Feb.		4 Mar.		22 Apr.	
Fragilariopsis antarctica	10·5	8/11	19·5	14/14	22·4	12/17	11·8	1/1
Nitzschia seriata ? + *delicatissima*	4·9	7/11	9·3	12/14	8·0	13/17	2·0	1/1
Distephanus speculum	1·1	5/11	5·2	14/14	0·7	10/17	0·2	1/1
Total Group I	16·5	11/11	34·0	14/14	31·1	14/17	14·0	1/1
Chaetoceros boreale	0·1	1/11	0·7	2/14	—	–	5·6	1/1
Ch. criophilum	19·4	11/11	3·1	11/14	6·6	17/17	5·1	1/1
Rhizosolenia spp.	5·7	11/11	0·9	10/14	3·0	13/17	2·6	1/1
Dactyliosolen antarcticus	0·7	4/11	2·4	13/14	1·1	12/17	24·5	1/1
Corethron criophilum	29·1	11/11	1·4	10/14	20·5	17/17	18·0	1/1
Synedra pelagica	0·7	7/11	1·0	10/14	1·6	12/12	—	–
Thalassiothrix antarctica	0·1	3/11	0·8	7/10	0·4	6/17	18·5	1/1
Total Group II	55·8	11/11	10·3	14/14	33·2	17/17	69·3	1/1
Thalassiosira spp.	2·5	4/11	0·2	2/14	0·2	1/17	—	–
Asteromphalus parvulus	0·2	3/11	3·5	14/14	0·2	9/17	—	–
Biddulphia striata	0·3	3/11	—	–	<0·1	1/17	—	–
Eucampia balaustium	1·0	3/11	0·8	9/14	0·2	3/17	—	–
Chaetoceros flexuosum	—	–	—	–	0·3	3/17	—	–
Ch. neglectum	4·1	4/11	0·3	2/14	0·2	1/17	—	–
Ch. sociale	6·4	3/11	0·3	3/14	<0·1	1/17	—	–
Ch. tortissimum	—	–	—	–	—	–	—	–
Fragilaria spp., etc.	1·8	5/11	7·8	11/14	6·3	11/17	—	–
Nitzschia closterium	0·6	3/11	3·7	12/14	1·4	5/17	—	–
Total Group III	16·9	8/11	16·6	14/14	8·8	13/17	—	–
Chaetoceros atlanticum	1·0	3/11	0·8	9/14	1·1	10/17	2·0	1/1
Ch. castracanei	<0·1	1/11	4·0	11/14	1·8	10/17	—	–
Ch. chunii	1·1	5/11	1·1	8/14	2·9	12/17	—	–
Ch. curvatum	—	–	0·1	3/14	<0·1	1/17	0·2	1/1
Ch. dichaeta	4·0	7/11	6·8	13/14	3·9	15/17	5·1	1/1
Ch. d. tenuicornis phase	0·7	2/11	22·3	10/14	14·3	13/17	—	–
Ch. pendulum	<0·1	2/11	0·3	7/14	0·7	10/17	—	–
Ch. radiculum	0·2	1/11	<0·1	3/14	<0·1	2/17	—	–
Ch. schimperianum	1·4	4/11	0·1	4/14	0·3	6/17	—	–
Total Group IV	8·5	10/11	35·5	13/14	25·0	17/17	7·3	1/1
Coscinodiscus spp.	0·1	2/11	0·5	6/14	0·2	5/17	—	–
Actinocyclus spp.	—	–	0·3	10/14	0·2	5/17	0·5	1/1
Asteromphalus spp.*	0·4	2/11	0·2	7/14	0·2	9/17	—	–
Total Group V	0·5	4/11	1·0	12/14	0·6	11/17	0·5	1/1
Foraminifera	0·1	2/11	<0·1	1/14	—	–	—	–
Cymatocyclis spp.	—	–	—	–	—	–	—	–
Other Tintinnidae	0·1	1/11	1·1	7/14	0·2	6/17	—	–
Acanthometridae	—	–	—	–	—	–	1·2	1/1
Challengeridae	—	–	—	–	—	–	1·5	1/1
Other Radiolaria	—	–	—	–	<0·1	2/17	—	–
Sticholonche	—	–	—	–	—	–	—	–
Total Holozoic Protozoa	0·2	3/11	1·1	8/14	0·2	7/17	2·7	1/1
Copepoda	<0·1	1/11	0·1	2/14	<0·1	1/17	0·5	1/1
Nauplii	0·1	1/11	0·4	3/14	<0·1	2/17	0·7	1/1
Other Crustacea	—	–	—	–	—	–	—	–
Limacina juv.	—	–	—	–	<0·1	2/17	—	–
Ova	<0·1	1/11	—	–	—	–	—	–
Total Metazoa	0·2	2/11	0·5	3/14	0·1	3/17	1·2	1/1

THE SOUTH GEORGIA AREA

This is the area that saw the first development of modern whaling on a large scale. This was due in part to the fact that in the earlier days good harbours and shore bases were essential, but also to the exceptional richness of the plankton. The production of phytoplankton during the main increase is indeed probably as great as that to be found anywhere else in the world.

The earlier observations of Hardy (Hardy and Gunther, 1935) and Hart (1934) give a good idea of the qualitative sequence here. The great difference from the oceanic Northern Region lies, of course, in the immense quantities of neritic species present during the main increase, particularly *Chaetoceros sociale*, *Ch. neglectum*, *Thalassiosira* spp., *Biddulphia striata* and *Eucampia balaustium*. Members of the oceanic groups were also more abundant by far than in more truly oceanic areas, though less important in their proportion of the total phytoplankton. During the post-maximal decrease Group II, the larger oceanic diatom species, became predominant, with *Corethron criophilum* in spineless chains and *Thalassiothrix antarctica* together forming some 80% of the phytoplankton during January-February 1930. The very detailed description of the qualitative aspect of the South Georgia phytoplankton given in previous work (Hart, 1934, pp. 29–69; Hardy, Hardy and Gunther, 1935, pp. 39–87) has been fully borne out by our subsequent surveys. These have been less extensive, but far more numerous, so that some attempt at a picture of the seasonal variation in quantity can now be drawn. Also observations have been obtained at intervals sufficiently close to permit of theoretical calculations of the crop in terms of the consumption of nutrient salts, which it had been thought would be impossible. Of course, such calculations can only give very approximate minimal values, but they are of great help in comparing conditions with better known ones in the northern hemisphere.

From the observations made subsequently to 1931 the seasonal variation in quantity can be pictured as being reflected in Fig. 13. It will be seen that results from different seasons have had to be considered together in order to get this, but when all our previous work quoted above is taken into account, there is little doubt that the figure represents the main trends in a normal year quite fairly. The observations upon which this figure is based are given in Table 8, with data on nutrient salt content which permits of the somewhat speculative calculations mentioned above. It is important to bear in mind that owing to the quantities of phytoplankton present off South Georgia during the main increase being from five to ten times greater than in the oceanic Northern Region, for instance, it has been necessary to plot these results on a much smaller scale than that uniformly adopted for the three oceanic regions.

It will be seen that the main increase begins suddenly late in October and rises to a high peak about the end of November. There is then a marked post-maximal decrease to a late summer minimum in February, and a secondary autumnal maximum in March before the final descent towards minimal winter values. No doubt the height and precise time of the peak period fluctuate somewhat from year to year, and the secondary autumnal maximum is probably even more variable. Some of our earlier work, and observations in the adjacent waters of the Scotia Sea, suggests that in some years it may take place as late as April or even May, and that sometimes it is hardly apparent at all. Wherever the seasonal cycle has been studied intensively in temperate—polar waters,

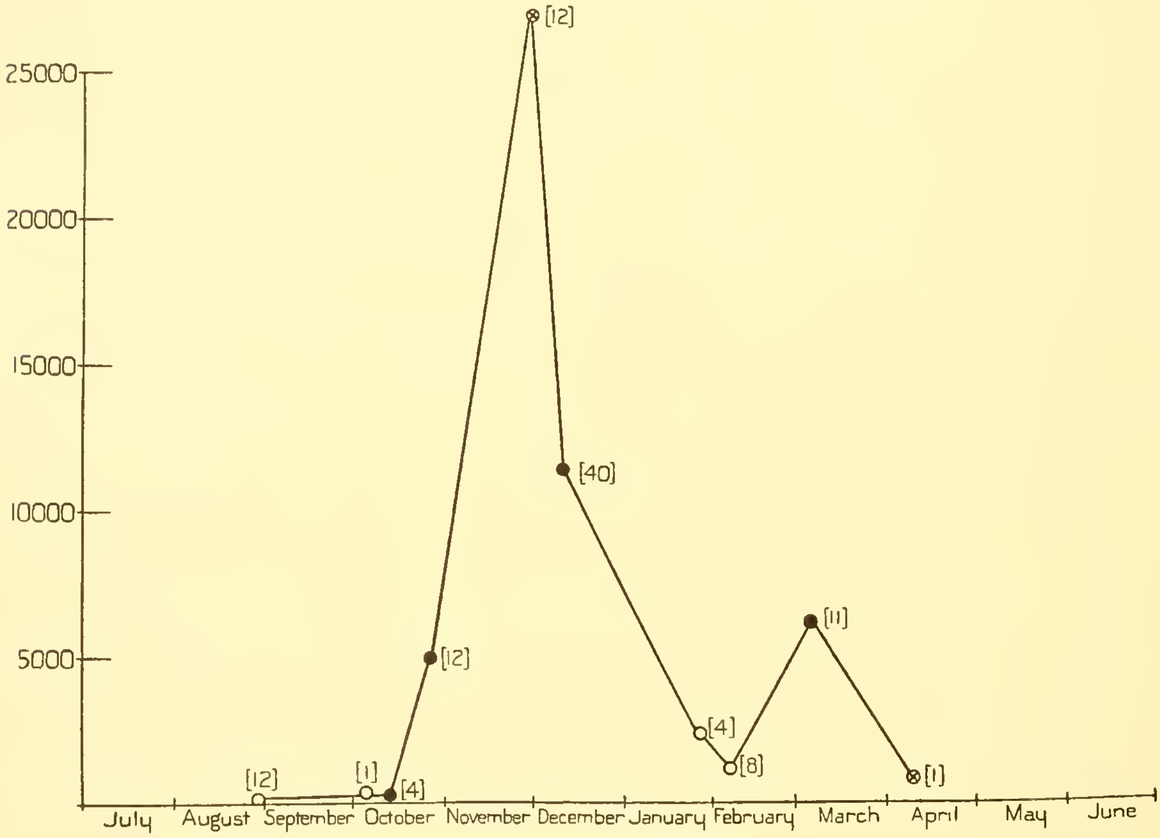


Fig. 13. South Georgia area. Seasonal variations in plant pigments per m.³, means of 50–0 m. hauls at mean dates. Numbers of observations shown in brackets. Note scale is necessarily much smaller than that used for oceanic regions and for the Scotia Sea. ⊗ = 1933–4. ○ = 1934–5. ● = 1936–7.

Table 8

Mean date	Station nos.	No. of observations	Mean units of pigments per m.³	Mean P mg. atoms 50–0 m.	Mean Si mg. atoms 50–0 m.
29. viii. 34	1394–1406	12	120	2·30	30·1
5. x. 34	1437	1	380	—	—
13. x. 36	1839–1842	4	230	2·13	36·8
27. x. 36	1843–1855	12	4,980	1·84	27·1
1. xii. 33	1199–1211	12	26,820	2·03	11·8
11. xii. 36	1920–1939	40	11,360	1·01	3·2
27. i. 35	1496–1499	4	2,380	1·43	16·0
6. ii. 35	1501–1508	8	1,170	1·46	11·0
6. iii. 37	1977–1988	11	6,130	1·37	6·7
9. iv. 34	1340	1	780	—	—

the autumnal secondary increase appears to show this irregularity (cp. Harvey *et al.* 1935, p. 439). It would appear to be far more dependent upon prevailing weather conditions than the main increase.

Before leaving the South Georgia area it may be mentioned that in the exceptional spring of 1930–1, when pack-ice actually extended some way to the north-east of the island, *Phaeocystis* was found in moderate quantity in the ice. It has not been observed there on other occasions, but may be expected in small quantities whenever the pack gets so unusually far north. The Chlorophycean *Halosphaera viridis* was recorded by Hardy in enormous numbers, but from three stations only and from subsequent work it would seem to be so local that it can hardly be considered a regular constituent of the phytoplankton.

THE SCOTIA SEA

Eighty-nine estimations of pigment content are available from this area; they were obtained in different seasons, but being fairly well distributed over the whole of the productive period appear to give a good idea of the probable seasonal cycle. The relevant figures are given in Table 9, and are also plotted in Fig. 14. It must again be noted that the graph has had to be constructed on a smaller scale than that used for the oceanic Northern Region, but larger than that used for the South Georgia area.

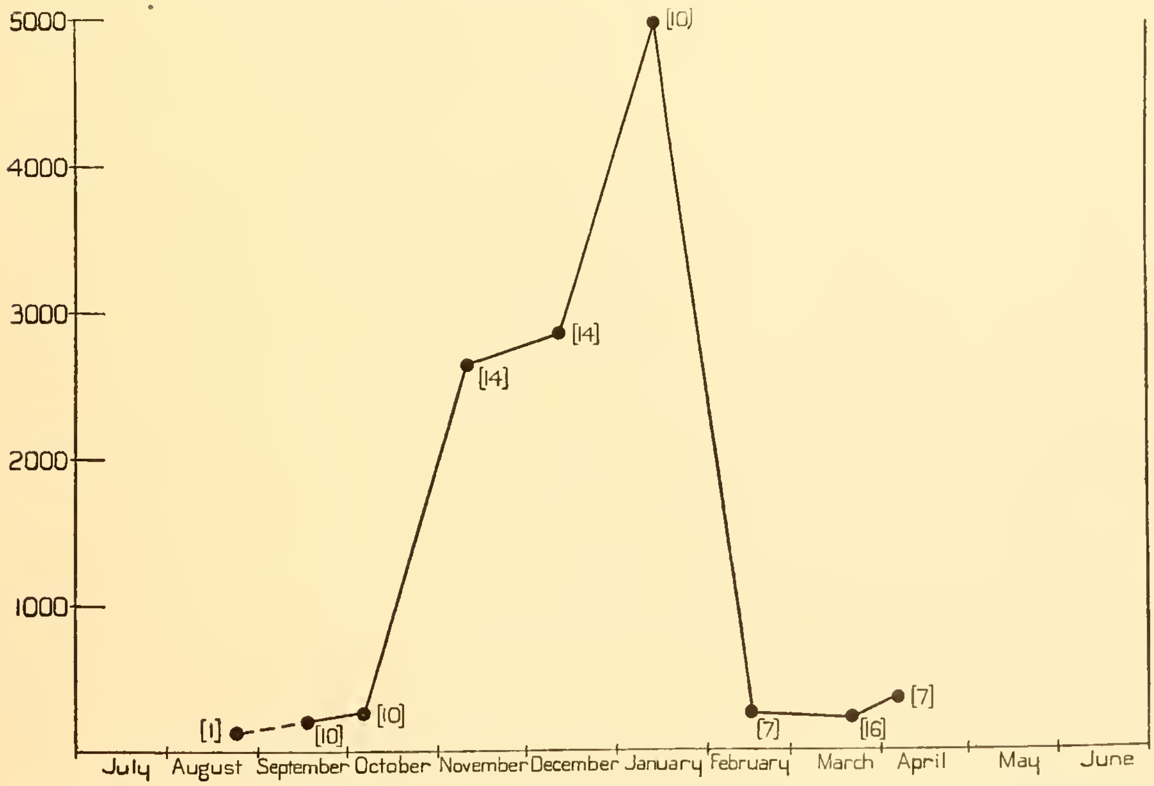


Fig. 14. Scotia Sea. Seasonal variation in plant pigments per m.^{3}, means of available observations at mean dates. Numbers of observations in brackets. Note necessarily smaller scale than that used for oceanic regions.

The values are of the order of twice as great as those found in the oceanic Northern Region.

Table 9

Mean date	No. of observations	Mean units of pigments per m.³
July	Nil	
24 August	1	130
17 September	10	200
6 October	10	260
11 November	14	2650
12 December	14	2860
13 January	10	4990
15 February	7	260
21 March	16	230
6 April	7	360
May	Nil	
June	Nil	

It will be seen that here the sudden onset of the main increase is well marked, and that the peak period is reached in January, as is to be expected from the fact that the area includes some more southerly waters than the oceanic Northern Region. These observations are not sufficient to show whether the very slight secondary autumnal increase indicated, after the profound post-maximal decrease, is a regular feature. Some of our earlier work (Hart, 1934, p. 76) indicates that it may be quite considerable locally, in some seasons.

Qualitatively, the phytoplankton of the Scotia Sea shows populations intermediate in character between that of the South Georgia area and the more northerly oceanic regions, as one would expect. While the neritic ice-edge Group III diatom species—particularly *Thalassiosira* spp. and *Chaetoceros sociale*—are extremely abundant during the main increase, members of the oceanic groups play a larger part than off South Georgia. This applies especially to *Nitzschia seriata* of Group I, the *Rhizosolenia* spp. in Group II and to *Chaetoceros atlanticum* of Group IV. *Phaeocystis brucei* may be locally important where the area is invaded by pack-ice—not later than January as a rule. In the autumn Group IV and *Nitzschia seriata* may be particularly prominent in some seasons and, quite locally, *Biddulphia striata*, almost the only member of Group III to develop in numbers later than the period of the main increase.

The qualitative aspect of the phytoplankton in the Scotia Sea has already been very fully treated in our previous work (Hart, 1934, pp. 69–88). Many of the estimations used in the description of the quantitative cycle described here were obtained during the fourth commission when I was serving elsewhere, so that there has not yet been any opportunity to work them up qualitatively. In view of the considerable amount of evidence already available it did not seem necessary to go further into the qualitative aspect for the purpose of the present report.

OTHER SPECIAL AREAS

In the other special areas our data are scanty, so that it is not possible to do more than indicate some of the probabilities that suggest themselves in the light of the more detailed work elsewhere. We have most data in the eastern South Pacific, but unfortunately there are no observations for February, and those in December and January are inadequate. Data for the winter months are also lacking, but there is no doubt that values must then be minimal. The figures, which are given in Table 10, suggest that the main increase takes place in November, and a secondary increase in March, but are too scanty to be conclusive. Certainly one would expect the secondary increase to extend into April, but no observations for that month are available. The marked poverty of the phytoplankton of this area at all times when it has been sampled is probably a constant feature consequent upon the peculiar hydrological conditions.

Table 10

Mean date	No. of observations	Mean units of pigments per m.^{3}
12 September	2	80
30 October	5	550
7 November	20	800
15 December	4	490
4 January	5	400
9 March	8	620

In the area north of the Ross Sea we have only fifteen observations in all. Five centred round 20 January showed an average of 1170 units, and ten centred round 13 February averaged only 270 units of pigments per m.^{3} From this it may be permissible to conclude that the main increase takes place before the end of January as one would expect, that the post-maximal decrease is well marked, and that the area is not so poor as the eastern South Pacific.

In the Weddell Sea, between the southern boundary of the Scotia Sea and the northern boundary of the Southern Region, we have very few observations. Earlier work indicated that the main increase takes place in January-February (Hart, 1934, pp. 96–108). Five observations carried out from 10 to 12 November 1936 averaged only 90 units of pigments per m.^{3}, the highest value recorded being 210 units. From this it seems probable that no considerable production takes place before mid-November. A single observation late in March gave a very low value. It is, therefore, just possible that there is a marked post-maximal decrease here, prior to the autumnal secondary increase with small Chaetocerids dominant described by Lohmann. The conditions in Bransfield Strait and round the Palmer Archipelago have also been very thoroughly investigated in our earlier work (Hart, 1934, pp. 109–36). Very few observations by our present improved methods are available for this area; three in December 1934 yielded fairly high values and two in September very low ones. This merely gives slight confirmation of the conclusion that the main increase takes place in December, which was reached as a result of the earlier work mentioned.

At a single station, 2199, worked on 21 January 1938 close into the Balleney Islands, a value of 57,830 units of pigments was recorded. This is comparable to the highest values recorded in the South Georgia area, and shows that neritic conditions can give rise to intense local concentrations much farther south at the corresponding time of year. This particular concentration was clearly very local, however, for stations worked within some 30 miles were oceanic in character, as regards both quantity and quality of the phytoplankton. At St. 2199 neritic species were strongly dominant, the minute *Chaetoceros sociale* was by far the most numerous, but there were also large quantities of *Thalassiosira* spp., *Eucampia balaustium* in summer phase, and the large, richly pigmented *Biddulphia striata*.

BIOLOGICAL FEATURES OF SPECIAL INTEREST

DISTRIBUTION WITH DEPTH OF THE ANTARCTIC PHYTOPLANKTON

We have seen that in view of the inaccuracy of the centrifuge method demonstrated by Nielsen, it has not been considered worth while to discuss in detail the results obtained during the third commission. Nevertheless, it is at least probable that, where the quality of the phytoplankton is fairly uniform down to the lowest depths sampled (100 m.), the largest count will indicate the neighbourhood of the maximum density of the population. Selecting these uniform stations we have 117 series of observations scattered throughout the Antarctic zone during the productive period, and it appeared to me that by considering the frequency with which the apparent optimum occurred at different depths, one should obtain an idea of the normal type of distribution with depth not far from the truth.

The frequencies with which maximum numbers of phytoplankton organisms were found at various depths are shown in the following table:

Table 11

Depth in m.	Actual no. of stations	No. expressed as % of total comparable stations
0	29	24·8
5	51	43·6
10	13	11·1
20	10	8·5
50	13	11·1
30*	1*	0·9*

* Samples from 30 m. were taken at only a few stations, where a marked thermocline between 20 and 50 m. suggested that depth might prove critical.

These figures strongly suggest that by far the greater part of the phytoplankton production in the Antarctic zone takes place in the upper 10 m. of the surface layer. This is in striking agreement with what would be expected from the classic oxygen consumption experiments of Marshall and Orr (1928) and others, when we remember that both higher latitude and increased scattering due to rough weather will both tend to reduce penetration of light to a greater extent than in north temperate regions. The importance of the loss of light due to scattering and reflexion at the surface where rough weather prevails was first clearly recognized by Atkins (1926, p. 456) who is responsible for the development of so many of our concepts concerning the growth of phytoplankton in relation to its environment. We may say that in comparison with the conditions studied experimentally in north temperate seas, the euphotic layer is centred higher in the water column. The optimum depth, in the Antarctic zone, would appear to be around 5 m. as a general rule. The effects of systrophe in lessening production above the optimum are evidently less than in north temperate waters, while it is probable that for most species the lower limit of the productive layer, or compensation point, will not be below 35 m., even at the height of the southern summer. Summing up, we may say that the figures provide some concrete evidence that the suggestions put forward in earlier work (Hart, 1934, pp. 189–91) regarding the effects of light and interrelated factors upon the depth distribution of the Antarctic phytoplankton are, in the main, correct.

THE COLONIAL HABIT IN RELATION TO ENVIRONMENT

It will have been evident from the notes on the individual categories of phytoplankton organisms dealt with that many of the most important forms show a pronounced development of the colonial habit, which is most marked at the height of the main increase. It would seem that the hardening of protoplasmic connexions following fixation in formalin renders the colonies brittle, so that they disintegrate easily, for very much longer chains or larger colonies may be seen in fresh material than in preserved samples.

The phenomenon would appear to be bound up with the rapidity of binary fission when conditions are at their optimum. Many of the 'ribbon-forming' species, notably *Fragilariopsis antarctica* and *Eucampia balaustium moelleria* phase, show it in an extreme degree that involves marked torsion of the chains. The shorter chains common at other seasons are straight, or curved in one plane only. Besides the typical 'ribbon-forming' species, many of the larger Group II diatoms show a similar increase in length of chains, but with few exceptions; this is more marked after the peak of the main increase, when they reach their maximum relative importance.

Rhizosolenia alata gracillima phase often forms very long chains far south at the time of the main increase, but these are composed of few extremely elongated frustules. Farther north, at the corresponding period, *Rhizosolenia antarctica* and *Rh. chunii* also form very long chains, but with these species larger numbers of frustules are conjoined. The large pennate diatom *Thalassiothrix antarctica* is usually found in rafts of from four to twenty-four frustules where it is most abundant, as already described in the notes on the species, and even the typically solitary *Synedra pelagica* may be seen in rafts when it is dividing rapidly. When we remember that the oceanic Chaetocerids of Group IV and the smaller neritic species of that genus are all colonial in habit, it is obvious that the property is general for the majority of the important Antarctic species at the time when conditions are at their optimum.

The minority include the important solenoid diatom *Corethron criophilum*, of Group II. This species also has the habit of forming chains, but under different environmental conditions which it is possible to study in some detail. In the minute type phase of the far south, and the *hystrix*/type intermediates so characteristic of the main increase in the Northern Region, this species is solitary. As already explained in the notes on the species, the large strongly silicified spinose phase of the Northern Region, and the more northerly special areas, tends to give way to a population of the less strongly silicified, usually spineless, *inerme* phase, which forms very long chains, during the post-maximal decrease and in autumn. This change was almost a total one in the South Georgia area in January-February 1930.

The change over to a largely spineless, thinner walled chain form of *Corethron* at a definite season provides an opportunity for testing any correlation that may exist between type of *Corethron* population and differences in the environmental conditions. The fact that the change accompanies the rise to maximum temperature for the year might lead one to conclude that temperature alone, or perhaps temperature with seasonal rhythm inherent in the organisms themselves, is its primary cause. But the change also coincides with maximum depletion of nutrient salts in the medium. Although the depletion of phosphate may be large, it is always present in considerable quantity in the Antarctic zone, and there is little likelihood of its exercising more than a secondary influence. On the other hand, the depletion of silica (directly involved with cell wall thickness, one of the features of the change) may be relatively enormous (Clowes, 1938, p. 112), and Pearsall (1932) has shown that concentrations lower than 500 mg. per $m.^3$ may affect the development of certain fresh-water diatoms. We know that diatom populations can flourish at lower concentrations in the sea, but it is strongly suggestive that the fall to some 300 mg. or less quoted by Clowes occurs at the time at which the maximum change in form of the *Corethron* population has been observed. In fact, it would seem that temporary shortage of silica is most likely the main cause of this change, as, no doubt, it is connected with the lessening quantity of the phytoplankton as a whole. This suggestion had already been made hypothetically (Hart, 1934, p. 185). No analyses for silica were available at that time, but some of Cooper's (1933, p. 697) observations strongly favoured such a view.

From 1933 onwards silicate analyses were adopted as part of our routine observations, and there is much support for the above hypothesis on general grounds, as Clowes (1938, pp. 111–14) has already shown. In an endeavour to make a more exact test of the possible correlation between silica content and the proportion of the spineless chain form in the *Corethron* population, I have attempted a statistical analysis of the observations available from forty-five stations in the Northern Region within the one season 1938–9, covered by the repeated cruises between 0 and 20° E. It was thought that by limiting period and locality in this way a fairer comparison would be obtained than by using more widely dispersed data. I am largely ignorant of mathematics myself, but Mr G. M. Spooner, of the Plymouth Laboratory, has very kindly checked my use of the methods, taken from Fisher (1930), and informs me that they are applicable to the work in hand.

The first step was to determine the degree of direct correlation assuming a linear regression, between percentage of *Corethron* in spineless phase and silica content, percentage spineless and temperature, and between silica content and temperature, according to the well-known formula

$$r = \frac{S(xy)}{n.\sigma x \sigma y}.$$

This yielded the correlation coefficients tabulated below. In testing their significance I have used the formula

$$t = \frac{r}{\sqrt{(1-r^2)}}.\sqrt{(n-2)},$$

which Fisher recommends for small samples in preference to use of the standard error, which tends to exaggerate the significance of the correlations obtained, but standard error has also been given:

	r	σ_r	t	$\therefore P=$
% spineless/silica	−0·5739	±0·1011	4·595	less than 0·01
% spineless/T° C.	+0·5365	±0·1074	4·169	less than 0·01
Silica/T° C.	−0·7700	±0·0614	7·913	less than 0·01

Next applying the formula $r_{12.3} = \dfrac{r_{12} - r_{13}r_{23}}{\sqrt{[(1-r_{13}^2)(1-r_{23}^2)]}}$ to get the partial correlation between percentage spineless and silica content, eliminating the effect of temperature, we get

$$r = -0{\cdot}3007,\ \sigma r = \pm 0{\cdot}1363,\ t = 2{\cdot}043, \text{ with } P \text{ between } 0{\cdot}02 \text{ and } 0{\cdot}05.$$

But applying the same formula for the partial correlation between percentage spineless and temperature, eliminating the effect of silica content, we get

$$r = +0{\cdot}1811,\ \sigma r = \pm 0{\cdot}1458,\ t = 1{\cdot}193, \text{ whence } P \text{ lies between } 0{\cdot}2 \text{ and } 0{\cdot}3.$$

This means that this second partial correlation is much less significant in itself, but the main point is to determine how far the difference between the two partial correlations is significant in order to see what justification there is for the view that silica content is the more important of the two factors. From the initial direct correlations it is already probable that both act together to a large extent.

To test the significance of the difference between the two partial correlations the method given by Fisher (1930, p. 168) involving the z transformation has been used, with the following result:

	r	z	$n'-4$	Reciprocal
1st partial correlation	−0·3007	−0·3103	41	0·02439
2nd partial correlation	+0·1811	+0·1813	41	0·02439

Difference 0·4934 ± 0·2209. Sum 0·04878.

It will be seen that the difference is slightly greater than twice the standard error, so that one may conclude the difference has some slight significance.

Thus the general conclusion: that while silicate reduction and rise in temperature combine to favour an increased proportion of the spineless-chain form in the *Corethron* population, silicate reduction is the more important of the two factors; appears to be justified.

SPORE FORMATION IN ANTARCTIC PLANKTON DIATOMS

The recent experimental work of Gross (1937–40) has shown that in the future it will be necessary to make more observations upon spore formation in the endeavour to understand the relations between populations of marine plankton diatoms and their environment. Most important points arise in the consideration of the conditions leading up to auxospore formation and the formation and germination of resting spores. Gross's observations led him to doubt the existence of microspores among centricate diatoms. Among the Antarctic solenoid species Karsten has described probable microspore formation in *Corethron criophilum*, and both Hendey and I have seen stages similar to those described by him, as I have described in earlier sections of this paper. I have also seen a very similar appearance in *Rhizosolenia polydactyla* Castracane (Hart, 1937, p. 436). It will be an important task of the future to prove whether these 'appearances' really are microspores.

In working up large numbers of plankton samples from a general point of view, proper investigation of spore formation is not possible, but some incidental observations of spore formation in the solenoid group, etc., have been included in the notes on the species. As the whole problem deserves separate study in the future, it seems desirable to summarize these observations here.

In preserved material, auxospore formation is most readily seen in the solenoid diatoms. In *Corethron criophilum* it was fairly frequent in the upper water-layers at and just after the period of the main increase, in all regions and areas, usually at stations where the species was abundant. At these stations the process was actually taking place in from 1 to 10% of the population, and very rarely the proportion was higher. Notes on the possibility of microspore formation in this species have already been given.

Of all plankton diatoms *Rhizosolenia alata* exhibits auxospore formation most frequently. In the Antarctic zone, at some 10% of the stations worked at all seasons, up to 50% (rarely more) of the individuals showed this phenomenon. It would appear to be most frequent in late summer, however, as seems true of most other members of the genus, even in the northern hemisphere (cf. Wimpenny, 1936). Other *Rhizosolenia* spp. which have frequently been observed forming auxospores in the Antarctic zone, chiefly in late summer, are *Rh. bidens*, *Rh. chunii* and *Rh. truncata*.

On one occasion auxospore formation of *Dactyliosolen antarcticus* was observed, as shown in Fig. 15. This evidently represents a stage beyond that shown by Gross (1937, pl. 3, fig. 16) in *Ditylum brightwellii*. The cell wall of the new broad cell formed from the auxospore was already visible, though still adhering to the two halves of the original narrow cell that gave rise to it by rupture of the connective zone at one side.

Auxospore formation in some *Chaetoceros* spp. has been seen quite frequently but not recorded systematically, for most of the stages are too early to enable one to determine their numbers with certainty in preserved samples. One good example of the process in *Thalassiosira antarctica*, after mid-season when that species is rapidly decreasing in numbers, has also been observed.

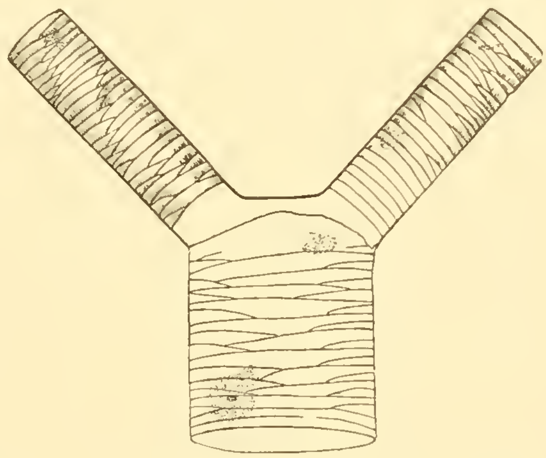


Fig. 15. An auxospore of *Dactyliosolen antarcticus*. × 500.

The formation of resting spores has been noted with certainty in a few species, most frequently in *Rhizosolenia alata*, *Rh. simplex* and *Rh. truncata*. In the autumn of 1938 in the Scotia Sea and at South Georgia, most of the population of *Biddulphia striata*, which predominated in the scanty phytoplankton present, was in process of forming resting spores as described in the separate notes on that species.

It will be noted that so far as these scanty observations go resting-spore formation would seem to follow marked decreases in the numbers of the population as conditions become unfavourable, precisely as one would expect. It is even probable that the so-called type phase, or winter phase, of *Eucampia balaustium*, are the resting spores of the species, which is abundant only in the summer *moelleria* phase.

THE FEEDING OF PLANKTON ORGANISMS

Some progress has been made with the examination of the stomach contents of *Euphausia superba* and other important plankton animals. The observations were aimed at the determination of 'competitors' and 'enemies' of that most important of Antarctic plankton animals, but have only reached a preliminary stage.

All the *Euphausia superba* examined have contained recognizable diatom remains, and Foraminifera have been the only animals identified with certainty in their stomachs. *Euphausia frigida*, the Copepods *Rhincalanus gigas*, *Calanus acutus* and *C. propinquus*, and the Pteropods *Limacina helicina* and *Cleodora sulcata*, were all found to have been feeding on plankton diatoms. The great difficulty in the proper interpretation of these findings lies in the different degree of silicification of the cell walls of different diatom species. Those identifiable with certainty in the stomachs of plankton organisms are those most strongly silicified—the same that remain recognizable in bottom deposits and in bird guano, such as: *Fragilariopsis*, *Thalassiosira*, other Discoidae, fragments of *Thalassiothrix*, of spines of *Chaetoceros criophilum*, terminal spines of *Rhizosolenia* spp., etc. As I have already pointed out (Hart, 1934, pp. 11, 186) the more typically oceanic, less strongly silicified forms are probably quite as important as food for the planktonic

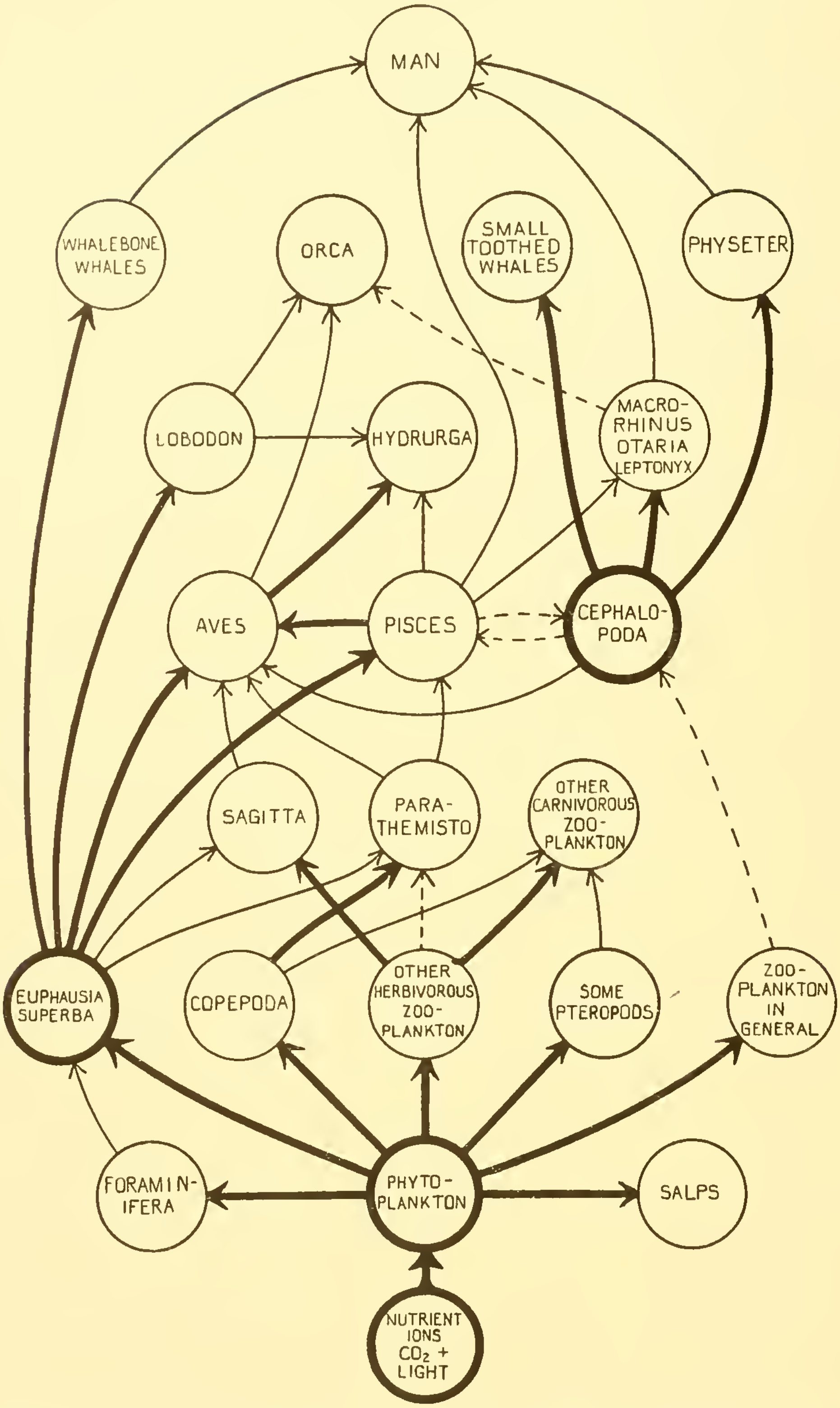


Fig. 16. Diagram indicating some of the more important food relations in Antarctic seas. Heavy arrows indicate that the groups *from* which they point are believed to constitute the main diet of the groups *to* which they point. Pecked arrows indicate uncertain connexions.

herbivores, but are digested too thoroughly to be identified in the stomach contents. The elucidation of the full dietary of *Euphausia superba*, therefore, could only be accomplished by special and prolonged study for which there has not yet been sufficient opportunity.

Large specimens of *Sagitta gazellae* have been seen with entire post-larval *Euphausia superba* in their stomachs, and we have been able to add one or two species of birds and fishes to the long list of those already known to prey upon that unhappy key-industry animal.

With the aid of the numerous records in the literature by naturalists to the earlier expeditions as well as our own, it becomes possible to draw up a tentative food-chain diagram (Fig. 16), illustrating some of the more important links in the Antarctic zone with fair certainty, though future work will no doubt lead to minor modifications and considerable extension of it.

DISCUSSION

One of the main results of the investigations described in this paper has been the confirmation of several of the generalizations regarding the phytoplankton cycle made as the result of earlier and more restricted work (Hart, 1934). The fact that the time of the main increase falls later in the year as one proceeds southwards is most clearly seen

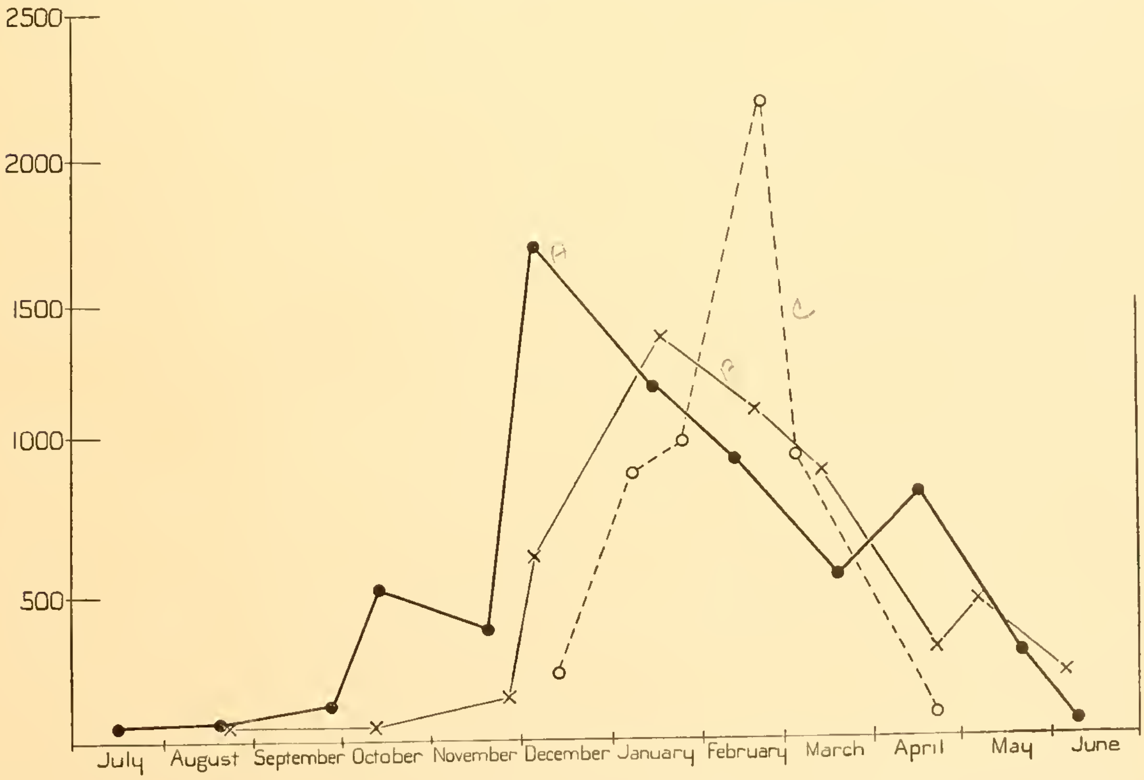


Fig. 17. Seasonal variation in plant pigments per m.³, in the three oceanic regions compared, means of 50–0 m. hauls at mean dates. For numbers of observations see Figs. 10–12. Thick line: Northern Region. Thin line: Intermediate Region. Pecked line: Southern Region.

in the three main oceanic regions, as shown in Fig. 17. Another interesting point may be seen on comparing Fig. 10, which shows the cycle in the oceanic Northern Region, with Fig. 13 showing the cycle in the neritic South Georgia area. Apart from the vastly greater richness of the latter it will be seen that the maximum is attained somewhat earlier in the year, in striking agreement with Gran's observations upon offshore and inshore phytoplankton off the coast of Norway.

Our ideas of the extreme richness of phytoplankton production in Antarctic seas were gained when the work was chiefly confined to the Falkland sector. Now that

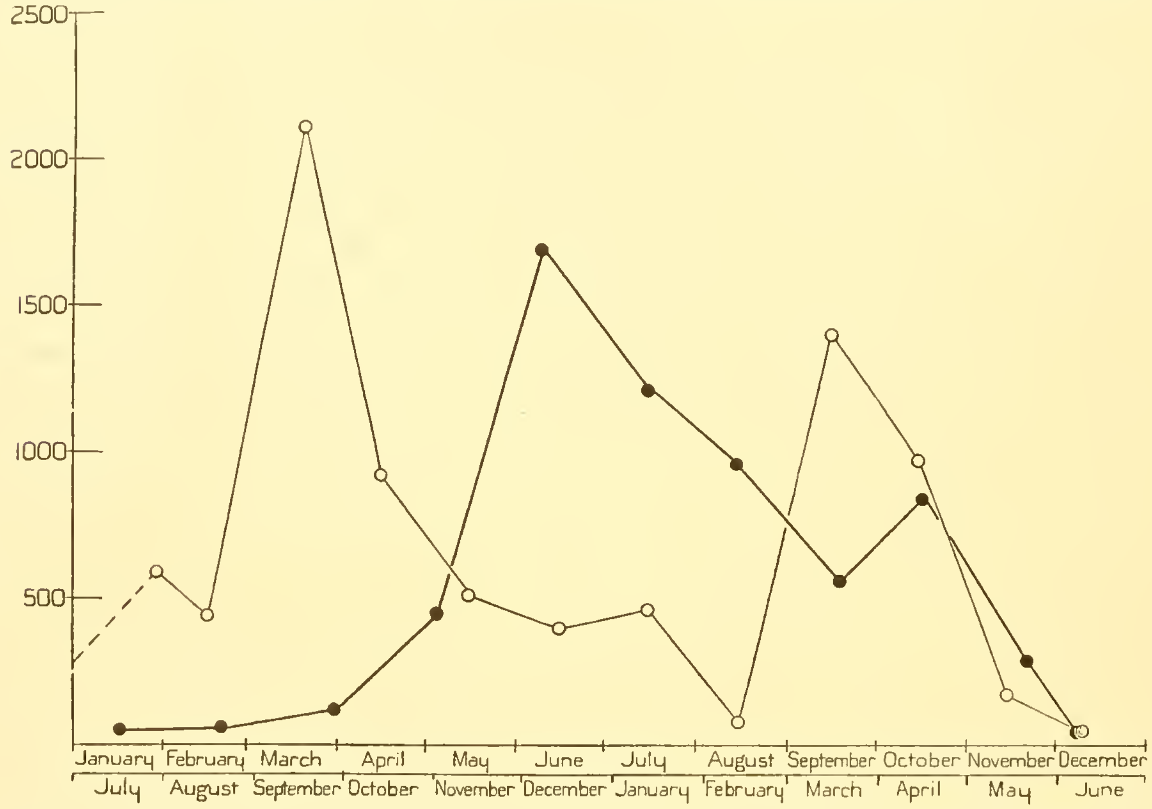


Fig. 18. Seasonal variation in plant pigments per m.^{3} in the Northern Region of the Antarctic zone compared with that in the English Channel (monthly figures calculated from Harvey *et al.* 1935, Fig. 1). Thick line: Northern Region. Thin line: English Channel.

larger numbers of observations from more truly oceanic areas are available it is evident that these ideas stand in need of some modification. The effect of land masses in producing conditions suitable for rapid, rich phytoplankton development appears to be very important, as has long been known in the northern hemisphere. In the far south, however, where all biophysical phenomena appear on the grand scale, the beneficial effects of neritic influence appear at much greater distances from land. Only where these influences are felt do the Antarctic seas retain their claim to be amongst the richest in the world.

A comparison of the cycle in the oceanic Northern Region and that in the English Channel (with the appropriate double-time scale) is given in Fig. 18. It will be seen that the values in the oceanic region are nearly as high as those in the neritic area in the northern hemisphere in nearly corresponding latitudes, thus leaving little doubt of the greater richness of Antarctic surface waters over north temperate seas, which would be expected from their greater nutrient salt content. Another interesting feature clearly brought out by this figure is the relative lateness of the main increase in Antarctic as compared with north temperate seas. Possible reasons for this have already been discussed (Hart, 1934, pp. 189–90).

The great differences in climate and hydrological conditions which account for such a contrast between the two hemispheres, described in the earlier work quoted, are all bound up with the extension of polar conditions so much farther towards the equator in the southern hemisphere. For this reason it may appear that the comparison given in Fig. 18 is obviously too remote to be of direct significance, but I find it very helpful to be able to visualize our results against those obtained by similar methods under conditions which, while vastly different from those obtained in the southern hemisphere, have been studied intensively for half a century.

Some idea of the relative density of standing crop in the several areas with which we have been chiefly concerned may be gained from Fig. 19. This shows the average quantities of plant pigments per 50–0 m. haul over the period of the main increase, and below, on a necessarily smaller scale, the highest individual value recorded in each region or area. For this com-

Fig. 19. Comparisons of the average quantities of plant pigments per m.^{3}, over the period of the main increase in different areas. The highest individual observations are shown on a smaller scale below.

parison the period of the main increase has been taken as from the date of the first clear increase over the minimal winter values to the first pronounced descent towards the post-maximal decrease. These dates naturally differ in the several areas, and the figures have, therefore, been tabulated below in addition to the diagrammatic representation.

Table 12

Region or area	Northern	Inter-mediate	Southern	South Georgia	Scotia Sea	English Channel L 4
Period	27 Sept. to 1 Feb. 1938–9	27 Nov. to 8 Mar.	20 Jan. to 4 Mar.	13 Oct. to 27 Jan.	6 Oct. to 15 Feb.	1 Mar. to 3 July 1934
No. of observations	61	87	42	72	55	16
Mean units/m.^{3}	1210	1100	1150	11,690	2390	1000
Highest individual observation	7540	9420	12,050	60,040	21,040	3850

It will be seen that in the three oceanic areas the values are much the same and slightly higher than in the English Channel. In the Southern Region, where the period of the main increase is much shorter (and where there is no secondary autumnal increase), the total production will, of course, be much smaller. Off South Georgia and in the Scotia Sea the much higher values correspond with the relative degree of neritic influence in these two areas.

The seasonal cycles described clearly support the views already put forward (Hart, 1934, p. 193) that the physical factors of the environment play the most important part in determining the course of phytoplankton production within the Antarctic zone. Most important are: light, the degree of stability of the surface layers, and the interrelated effects of pack-ice. These are certainly prime causes in the determination of the time of the onset of the main increase, and the extent and duration of the autumnal secondary increase in the more northerly parts of the Antarctic zone. However, they do not by themselves explain the post-maximal summer decrease in the more northerly Antarctic surface waters, or the vastly greater production in neritic as compared with oceanic areas. Since physical factors alone do not sufficiently account for these features, their probable explanation must be sought among chemical and biological factors.

From earlier work we know that while decrease in phosphate content of the surface waters may augment the post-maximal decrease in phytoplankton, it is extremely unlikely that shortage of this nutrient salt is ever sufficient to account by itself for that decrease (Hart, 1934, p. 184; Clowes, 1938, p. 112). So far as the scantier evidence goes, the same may be said of nitrate. The reduction of silicate, on the other hand, is a very probable cause of the post-maximal decrease in the almost purely diatomaceous phytoplankton with which we are concerned, as has already been suggested hypothetically (Hart, 1934, pp. 185–6). Frequent observation of immense numbers of faecal pellets accompanying a comparatively poor phytoplankton during the post-maximal decrease have been made, mainly in the Northern and Intermediate Regions, in the course of the work at sea. As described in the itinerary these observations suggested that heavy grazing by zooplankton herbivores was in part responsible for the decrease, and is thus probably the most important biological factor influencing production.

With the data available for earlier work it was impossible to use calculations of minimum crop from observed decrease in nutrients because of the lack of repeated observations in one area over short intervals of time. The speed of horizontal movements of the surface layers made it seem improbable that such calculations could ever be usefully attempted (Hart, 1934, pp. 184–5). Since that paper was written numerous repeated series of observations at short time intervals have been obtained which render such calculations possible. They must always remain somewhat speculative, but as the following considerations should show, they support the view that temporary shortage of silica combined with the grazing-down factor, are largely responsible for the post-maximal decrease. This view is also largely supported, on general grounds, by the work of Clowes (1938).

Minimal crop calculations based on observed reduction of nutrient substances in the sea were first made by Moore *et al.* (1914) and Atkins (1926). They are made by simple proportion from the observed reduction and the minimal amounts of the particular substances present in phytoplankton, or, as with CO_2 assimilation, equivalent quantities of carbohydrate. The figures for amounts of the various substances present in the plankton are derived from divers separate investigations quoted by Cooper (1933, pp. 741 et seq.). It has become usual to express the results of such calculations in metric tons wet weight of phytoplankton per km. sq. of sea surface, the depth covered by the investigation being duly taken into account. An example of the method of working is as follows:

At station L 4 in the English Channel, Cooper (1933, p. 743) records a drop of 116 mg./m.^{3} in nitrogen content, over the whole water column (72–0 m.) between 4 December 1930 and 10 July 1931. Nitrogen has been found to form 0·5% of the wet weight of algae. It follows that at least 23,200 mg. or 23·2 gm. per m.^{3} of phytoplankton was produced during this period, for the initial figure refers to nitrate + nitrite nitrogen only and takes no account of other less important sources of nitrogen known to be available to the plants. The sum may be continued:

$$\begin{aligned} 23{\cdot}2 \text{ gm. per m.}^3 &\equiv 23{\cdot}2 \times 72 \times 1{,}000{,}000 \text{ gm. per km. sq. on 72 m. depth} \\ &\equiv 23{\cdot}2 \times 72{,}000 \text{ kgm.} \\ &\equiv 1{,}670{\cdot}4 \text{ metric tons.} \end{aligned}$$

Cooper (1933, p. 744) has compared the theoretical minimum production in the English Channel on the basis of the observed reduction of carbon dioxide, phosphate, nitrate and silica; obtaining good agreement by the first three methods, rendered even closer by correction of the phosphate result for salt error (Cooper, 1938, p. 190). The figure works out at around 1650 metric tons wet weight of phytoplankton per sq. km. of sea surface. For silica, the apparent production is very much less, yielding a theoretical crop of some 115 metric tons only—less than one-twelfth of that calculated from consumption of other nutrient materials. It is true, of course, that some phytoplankton organisms do not require silica, but diatoms are definitely the dominant group in the English Channel, so that as Cooper has convincingly shown (1933, pp. 695–7, 744) it is highly probable that owing to a comparatively rapid mechanism of resolution silica takes part several times over in the main diatom increase.

Three series of observations over suitable periods from the northern part of the Antarctic zone have been selected for comparison of the minimum theoretical crop deduced from consumption of phosphorous and of silica, including one from the neritic South Georgia area. The figures, with those from the English Channel for comparison are given in Table 13.

Table 13

Locality and depth studied	Period	P_2O_5 mg./m.^{3} reduction	Minimum crop metric tons per km./sq.	Period	SiO_2 mg./m.^{3} reduction	Minimum crop metric tons per km./sq.	Ratio crop calc. from Si/crop calc. from P_2O_5
English Channel, 72–0 m. (whole column)	Winter max. to May 1931	—	1450*	13. i. 31–18. v. 31	208	115†	1 : 12·6 or 7·9 %
South Georgia area, 50–0 m.	Winter max. to 11. xii. 36	91·8	3075	13. x. 36–11. xii. 36	2020	775	1 : 3·96 or 25·3 %
Northern Region (south of Indian Ocean), 50–0 m.	20. xi. 37–7. i. 38	43·2	1447	20. xi. 37–7. i. 38	2170	833	1 : 1·74 or 57·5 %
Northern Region 0–20° E, 50–0 m.	27. ix. 38–16. i. 39	54·0	1809	30. x. 38–16. i. 39	1318	505	1 : 3·58 or 27·9 %

* Cooper, 1938, p. 187. † Cooper, 1933, p. 743.

From the table it is at once apparent that silica is consumed on a very much larger scale in the far south, and that the consumption most nearly parallels the phosphate reduction over the shortest period studied, as one would expect if silica is redissolved and used over again during the same plant cycle. Even over the shortest period, however, calculated production, on the basis of phosphate reduction, is sufficiently greater than that calculated from silicate reduction, to make it practically certain that even here silica must have been used at least twice over.

Factors which would naturally lead to a relatively great 'take out' of silica in our southern areas are: (*a*) loss of silica to the 50–0 m. layer through rapid sinking of faecal pellets of zooplankton herbivores, accentuated by the considerable diurnal vertical migrations of the latter; (*b*) greater individual requirements of certain dominant diatom species, such as the heavily silicified *Fragilariopsis antarctica*; (*c*) greater silica requirements of the phytoplankton community as a whole—a more purely diatomaceous one than in the English Channel; (*d*) the possibility of lower temperatures lessening the rate of regeneration of silica. In deep seas (even in the South Georgia area, where the surface layers are under neritic influence, the area with depths less than 200 m. is very small and oceanic depths preponderate) there is also loss through death and sinking of the diatoms themselves to be considered, though this is not likely to be so important over the period of the main increase as later in the year. Lastly, the return of silica should perhaps be regarded as due to replacement rather than to regeneration on the spot—'younger' surface water continually passing into the northern parts of the Antarctic zone from the south. The slower processes of oceanic circulation are thus involved.

It is also to be remarked that in deep waters the effect of the stratification of the upper layers in summer will effectively prevent immediate return from much of the regeneration *in situ*. A complicating factor which must not be lost sight of is that the silicate content of the northward flowing Antarctic surface water will be modified not only by the production of phytoplankton in the Northern Region, but by the extent to which production has proceeded in the higher latitudes through which it has passed, and by the past history of the upwelling deep water that took part in the formation of that surface water, and determined its initial content of nutrient materials.

Speculative calculations on the lines of those made by Harvey *et al.* (1935, p. 430) have proved interesting and profitable in considering the probable influence of the grazing-down factor as a cause of the post-maximal decrease in the phytoplankton of the more northerly parts of the Antarctic zone. From estimations of the phosphorous content of the phytoplankton these workers were able to show that this was related to the pigment content in the ratio 0·08 mg. P per 1000 units of plant pigments, so that from the observed reduction of phosphate in the sea, the probable minimum crop could be calculated. For the years they studied, 1933 and 1934, the calculated values over the period of the main increase were 85,000 and between 75,000 and 100,000 units per $m.^3$ respectively. In the same two periods the average values of the actual standing crop observed were 2500 and 1800 units per $m.^3$, or only 2·9%, and between 1·8 and 2·4% of the theoretical total crops. Harvey *et al.* have marshalled strong evidence in favour of the view that by far the greater part of this huge loss is due to heavy grazing of the phytoplankton by herbivorous zooplankton. They also sound the warning that though the basic ratio 0·08 mg. P per 1000 units of pigments seems sound it may not be applicable to mixed diatom populations in other localities.

Before embarking on similar calculations for our southern results it is necessary to consider the probability of error in applying this figure, for direct analyses of the Antarctic phytoplankton are lacking. We know that prior to the main increase, in the South Georgia area, the nutrient salt content is very much higher than in the corresponding period in the English Channel, the figures are around 550 mg. $NO_3(+NO_2)/N$ and 164 mg. P_2O_5 per $m.^3$ as against E 1 figures around 115 mg. NO_3/N and 39 $mg.^3$ P_2O_5 (Cooper, 1933, p. 706, the phosphate figure being corrected for salt error). Recent laboratory experiments on cultures of *Nitzschia closterium* by Ketchum (1939) suggest that at the higher concentration of phosphate, the proportionate intake relative to that of nitrate may be higher. This raises the whole question of the ratio of nitrogen to phosphorus present in sea water and in the plankton. Harvey (1928, p. 48) first drew attention to the apparent constancy of this ratio in widely different seas and suggested that in the main the relative requirements of the plankton (as a whole) for the two elements would be found to be in the same proportion. This idea was subsequently elaborated by Redfield (1934) and Cooper (1937). In sea water the general agreement was close, but analyses of plankton gave more variable ratios. Consistent variations in particular sea areas gave rise to Cooper's concept of the 'anomaly of the nitrate-phosphate ratio'. The variable ratios obtained in analyses of plankton are doubtless due to specific differences in the proportions of the two elements required by different classes of organisms—the resultant ratio in the sea water being the summation of the effect of the biological 'take-out' over a given period of the seasonal cycle. It is to be expected, therefore, that the anomaly of the nitrate-phosphate ratio in a given sea area will vary with time according to the seasonal sequence of dominant forms in the phytoplankton, as well as with the rate of regeneration and replacement by circulation of water masses. Where one group of phytoplankton organisms predominates over the whole of a given period—diatoms in Antarctic and boreale waters or (say) Coccolithophores in tropic seas—the anomaly may be found to vary accordingly. Direct evidence of differing requirements of the two elements on the part of phytoplankton organisms of different classes is furnished by some of Pearsall's work in fresh waters (1932).

With these considerations in view, it would appear that if the ratio of nitrate-phosphorus consumed, over the period of the main increase, in the South Georgia area could be shown to be fairly close to that obtained in the English Channel, it would follow that the crop calculated from consumption of the two elements should vary in the same proportions in the two areas, and hence the ratio of phosphorus to units of plant pigments present should be similar in both.

Unfortunately, minimal nitrate figures for South Georgia are not available, but from analyses in closely adjacent waters it seems safe to conclude that the nitrate content there must fall at least to some 300 mg. per m.^{3}

The relevant figures are shown in the following table, in which Cooper's (1938) correction for salt error in phosphate analyses has been made which bring down the ideal ratio N : P from 20 : 1 to 15 : 1 expressed in mg. atoms, or from 9 : 1 to 6·7 : 1 by weight.

	NO_3 consumed mg./m.^{3}	P consumed mg./m.^{3}	N : P by wt.	N : P mg. atoms
English Channel, E 1 (Cooper, 1933)	88	15·5	$\overset{6}{5}$·7 : 1	12·6 : 1
South Georgia area	250	39	6·4 : 1	14·1 : 1

From this it would seem that the effects observed in short-period culture experiments by Ketchum do not apply to these mixed diatom populations over longer intervals.

From the ratios obtained we see that in the English Channel the relative consumption of NO_3/N is less than that at South Georgia, but this is to be expected, for we know that the nitrate content of the southern waters is considerably greater than that in the English Channel, which makes it probable that other forms of available nitrogen are available in greater relative quantity in the English Channel. Additional significance is given to this point by Harvey's recent demonstration that ammonium compounds may be absorbed in preference to nitrate in mixed diatom cultures (Harvey, 1940, p. 119).

Using Cooper's revised ratio (1938, p. 179) of N : P = 15 : 1 mg. atoms or 6·7 : 1 by weight, and the figure relating phosphorus to plant pigments given by Harvey *et al.*, we get the ratios

0·08 mg. P : 0·536 mg. N : 1000 units of pigments,

and from this the theoretical minimum production in the two areas may be calculated thus, on the basis of observed consumption of the two elements:

E 1: 15·5 mg. P consumed, then from the above total production should be

$$\frac{15\cdot5}{0\cdot08} \times 1000 = \text{some } 194{,}000 \text{ units per m}^3.$$

88 mg. N consumed, then total production should be

$$\frac{88}{0\cdot536} \times 1000 = \text{some } 164{,}000 \text{ units per m.}^3$$

South Georgia area: 39·3 mg. P consumed, then as before total production should be

$$\frac{39\cdot3}{0\cdot08} \times 1000 = \text{some } 490{,}000 \text{ units per m.}^3$$

250 mg. N consumed, then total production should be

$$\frac{250}{0\cdot536} \times 1000 = \text{some } 466{,}000 \text{ units per m.}^3$$

Bearing in mind the fact that figures from consumption of nitrate will always be too small, because the plants can utilize other sources of nitrogen, it would appear that the agreement is sufficiently close to warrant the assumption that the N : P ratio in the phytoplankton populations of the two areas is much the same.

If the relation 0·08 mg. P per 1000 units of plant pigments may be applied to discussions of crop in the northern part of the Antarctic zone without much risk of error, then we can proceed to consider the observed standing crop as a fraction of the crop calculated from the minimum take out in three southern areas where figures are available over periods suitable for comparison with those studied by Harvey *et al.*, and to discuss the implications of the apparent loss of crop.

Observed reduction of phosphate and observed average standing crop are alone

Table 14

Locality	Year	Period	No. of observations	Reduction of P mg./m.³	Colour units per m.³ Average standing crop	Highest individual observation	Calculated minimum crop	Average standing crop / C.M.C. as %	Highest observation / C.M.C. as %
English Channel, E 1	1933	16. ii.–28. iii (38 days)	5	6·75	2500	6,890	85,000	2·9	8·1
English Channel, E 1	1934	14. ii.–15. iv. (60 days)	8	6–8	1800	3,850	75,000–100,000	1·8–2·4	5·1–3·9
Northern Region (south of Indian Ocean)	1937 to 1938	20. xi.–7. i. (48 days)	15	18·86	1870	6,760	235,750	0·79	2·87
Northern Region (south of Atlantic Ocean)	1938 to 1939	27. ix.–16. i. (80 days)	56	23·58	1110	7,570	294,750	0·38	2·57
South Georgia area	1936	13. x.–11. xii. (58 days)	66	34·78	7840	60,040	434,750	1·8	13·81

sufficient to show that there must be a huge loss in our southern localities. From the reasons already given it seems probable that this is mainly due to grazing, as in the English Channel, but it must not be overlooked that actual death and sinking of diatoms may account for some of it—in the far south we are considering only the 50–0 m. layer in deep seas, while in the English Channel it is possible to consider the conditions throughout the whole water column (72·0 m.). The extensive deposition of diatom ooze and diatomaceous mud is not necessarily proof of the sinking of diatoms during the period of the main increase, however. The forms that remain intact or as recognizable fragments in the bottom deposits are precisely those which retain their structure in the stomachs of plankton animals and in bird guano. Less strongly silicified forms, known to be exceedingly numerous in the plankton, are very rarely recognizable in the bottom deposits. It is quite probable that most of the diatom remains in the bottom deposits of deep waters have passed through the stomachs of several animals on their way down. Even the observation that chlorophyll granules are present in some deposits (Neaverson, 1934, p. 299) does not detract from this argument, for it is now known that when the phytoplankton is abundant the zooplankton herbivores tend to feed far in excess of their requirements, and to excrete many diatoms in a very partially digested condition (Harvey *et al.* 1935, p. 425, confirmed by direct observation in the Antarctic zone). Later in the year actual sinking may be important, but over the period of the main increase, grazing is probably responsible for nearly all the loss of crop in the far south.

To return to the table, we now see that taking the average standing crop/calculated minimum crop as our standard of comparison, it would seem that the relative intensity of grazing must be from three to five times as great in our Northern Region as it is in the English Channel, while in the South Georgia area it is very slightly greater. In actual fact some years have shown a much greater average standing crop at South Georgia during the main increase than 1936. This year was selected for comparison because of the abundance of data during the earlier part of the increase. If it were permissible to include the figures for November-December 1933 the average standing crop value would be increased so that one would deduce a grazing intensity somewhat less than in the English Channel.

These deductions are based on a phosphorus/plant pigment ratio which *may* be inaccurate for our southern species, though as shown above the error should not be great. Whatever the ratio may be it will not affect the conclusion that grazing intensity is from three to five times greater in the Northern Region (oceanic) than in the South Georgia area (neritic). With regard to the comparison with conditions in the English Channel it is obvious also that if the figure 0·08 mg. P per 1000 units is too high, the greater intensity of grazing down south will be even more marked. A positive correction of 100%, which is not likely to be needed, would still leave us with a greater grazing intensity in the Northern Region than in the English Channel, where the grazing would work out at double that of the South Georgia area.

It seems clear, therefore, that in actual fact the grazing intensity in the Northern Region is of the order of three times that found in the English Channel. In the South Georgia area it is probably somewhat less than in the English Channel. This would, I think, be considered probable by anyone with extensive experience of collecting plankton in the areas concerned, on the grounds of the relative sizes of the zoo- and phytoplankton catches. It would also tend to reconcile the facts that while in the Northern Region we have found some evidence that grazing may be the chief cause of the post-maximal decrease in standing crop, in the South Georgia area, in the dense phytoplankton at the height of the main increase, Professor Hardy finds evidence of the converse effect—animal exclusion.

While temporary shortage of silica and grazing by zooplankton are probably largely responsible for the post-maximal decrease in the more northerly parts of the Antarctic zone, none of the factors so far examined adequately account for the vastly greater richness of the neritic areas as compared with the oceanic regions. We are left with the hypothesis that extremely small amounts of organic compounds, iron, and manganese (cf. Harvey, 1937, 1939) derived from the land, exert a strongly favourable influence on phytoplankton production. The work of Harvey, Cooper and others at the Plymouth Laboratory during the last few years strongly supports such an hypothesis.

One important feature of the work described in this paper which cannot be too strongly emphasized is the great importance of the pack-ice in maintaining the flora within the Antarctic zone and in giving rise to what might be termed pseudo-coastal conditions at vast distances from land, where neritic species maintained by the ice flourish for short periods when the latter disperses. This effect of the ice is even more marked than earlier observations led us to suppose, but cannot be fully demonstrated until there is opportunity for more detailed study of material collected from the ice itself during the last six years.

SUMMARY

The aim of this work was to provide a picture of the major differences in phytoplankton distribution at different times of the year throughout the whole of the Antarctic zone of the southern ocean. In dealing with such a vast area it is impossible to do more than consider the larger qualitative and quantitative differences at as many stations as practicable, and then to study the changes throughout the year in single areas where conditions seem typical, so that one can distinguish between the effects of the probable seasonal variation and inherent distributional differences.

The principal method employed was estimation of the pigment content of catches from 50 to 0 m. vertical hauls with a net fitted with a meter recording the volume of water filtered. The results are expressed in arbitrary colour units per m.^{3} (Harvey, 1934*a*). The relative abundance of the leading forms was determined by counts from the same hauls. Evidence from centrifuged water samples and other sources has also been briefly considered with a full survey of previous work bearing on the problem in hand.

The limitations of our methods are fully discussed in relation to recent advances in phytoplankton technique. Nielsen's sedimentation method has many disadvantages for long-range work of this type. It is shown that loss of nannoplankton forms through the nets is probably less serious in the Antarctic than in any other large sea area.

A division of the Antarctic zone into biogeographical regions or areas, designed to facilitate the presentation of these results and the problems presented by them, is described. It is based mainly on two fundamental environmental considerations, degree of neritic influence, and the northward extent of the Antarctic surface water in the longitudes concerned. The degree to which the Antarctic surface waters extend towards the equator involves corresponding differences in the duration and intensity of the light available for photosynthesis. The division is also in part arbitrary—unavoidably so—for it is obvious that in nature conditions will merge gradually, while in practice it becomes essential to draw boundaries somewhere if the descriptions are to be reduced to manageable proportions.

The divisions are:

The Northern Region: between the Antarctic convergence and a line 330 miles south of it, all round the world with the exceptions of special areas between 30 and 110° W; and 150° W and 170° E.

The Intermediate Region: between the southern limit of the above and the Antarctic circle, all round the world with the exclusion of the same complicated areas.

The Southern Region: all seas south of the Antarctic circle, excluding immediate coastal areas.

These three regions may be regarded as providing essentially oceanic habitats, apart from the influence of pack-ice.

The special areas include those where neritic influence is strong, or where the Antarctic convergence is situated considerably to the south of its mean latitude (53° S).

This leads to a 'telescoping' of the N–S gradient in the conditions of existence which renders the distinction of three zones as in the typical oceanic regions impracticable. To make the scheme complete one must treat the more oceanic portions of the Weddell Sea, between the Southern Region and the southern limit of the Scotia Sea, as a special area, but we have very few observations there. The special areas have been dealt with as follows:

The South Georgia area: between 52 and 55° S, 33 and 41° W.

The Scotia Sea: between the Antarctic convergence and 62° S, 30 and 70° W, excluding the South Georgia area.

Other special areas: where our observations are too few for detailed consideration, the best known being the eastern South Pacific.

The most important phytoplankton species have been grouped on a system which takes into account their general distribution, both seasonal and geographical. The classic concepts of Gran's binary system are difficult to apply, owing mainly to the relatively slight temperature gradient over the whole vast region studied. Other individual environmental features give little help, with the result that while Gran's ideas have been followed as closely as possible the system remains much more arbitrary, and is intended only to facilitate consideration of these results.

A very brief outline of this grouping is as follows:

Group I. Small oceanic pennate diatoms: *Fragilariopsis*, *Nitzschia seriata*, etc., with *Distephanus*.

Group II. Large oceanic diatom species: Solenoids, large Chaetocerids, etc.

Group III. Neritic and ice-edge forms—all diatoms whose restricted distribution warrants this description.

Group IV. Oceanic Chaetocerids—e.g. *Chaetoceros atlanticum*, *Ch. dichaeta*.

Group V. Oceanic Discoidae—some small species of *Coscinodiscus*, *Actinocyclus* and large *Asteromphalus* spp.

The observations summarized in the following paragraphs form the factual basis of this grouping.

An itinerary of the phytoplankton observations in the Antarctic zone during the last three commissions (1933–9) of the R.R.S. 'Discovery II' is given. Localities of all the estimations are tabulated in the Appendix.

The observations within each region or area are then described. In the *Northern Region* there is a slight increase over the minimal winter values in early spring, followed by the rapid main increase in November-December, when the maximum may be reached, though sometimes not achieved until January. The standing crop shows a marked decline in late summer followed by a secondary increase, small and more irregular than the main, during March-April. During May the decline towards the negligible winter values is probably rapid.

The qualitative sequence is marked by the close coincidence of the maximum relative importance of neritic/ice-edge diatoms (Group III) and the onset of the main increase. By the time the maximum is reached they are again becoming relatively scarce, and at all other seasons form a negligible proportion of the phytoplankton. This evidently shows close correlation with the pack-ice, these mainly meroplanktonic forms flourishing in the open ocean only for a short time after the pack begins to disperse. Small pennate forms (Group I) form the basis of the population in the Northern Region, as in most other parts of the Antarctic zone. Autumn seems to be the only time when they are numerically unimportant. At this time the rather heterogeneous collection of 'large species' in Group II take up the running with Group IV (oceanic Chaetocerids). Group II are also important during the period of post-maximal decrease in late summer. The oceanic Discoidae (Group V), always present in small numbers, reach their greatest relative importance in the scanty winter phytoplankton when the holozoic constituents of the microplankton also become prominent in the small samples obtainable.

In the *Intermediate Region* no appreciable increase was observed until the end of November, and the maximum appears to be reached about the middle of January. The post-maximal decrease is more gradual and less marked, and a slight autumnal increase appears to take place in May. Thus the whole cycle is later than in the Northern Region, as we expected from earlier less conclusive evidence. The Intermediate Region was relatively richer in the large diatom species (Group II) than the Northern Region. The other outstanding qualitative feature was the dominance of *Phaeocystis brucei* in the period immediately following the break up of the pack. The relative importance of the diatom groups varied with the seasons in very much the same way as in the Northern Region. Neritic/ice-edge forms (Group III) showed the same peak early in the season. The post-maximal preponderance of Group IV (oceanic Chaetocerids) and Group II is even more marked and would almost certainly be found during the slight autumnal increase also, though qualitative data from the May observations are lacking.

In the *Southern Region* it is impossible to obtain adequate data for all seasons. It is only on rare occasions that our ships have been able to penetrate to it in spring and autumn. The evidence suggests that production must be altogether negligible during winter, but that a small increase in phytoplankton takes place from November onwards wherever there is sufficient open water. The main increase begins in January, when there are always considerable areas free from pack, and rises steadily to a peak late in February. Early in March the diminution is slight but the phytoplankton must decrease very rapidly later in that month as new ice is formed. In this region Group II species are even more important, but not at the height of the main increase. Two of them, *Corethron criophilum* and *Chaetoceros criophilum*, are particularly prominent in January and again in March. Our single autumnal observation shows these, together with *Dactyliosolen antarcticus* and *Thalassiothrix antarctica*, strongly dominant. Group III is again most important early on, as was *Phaeocystis brucei*, which is not so all-pervading here as during the early part of the main increase in the Intermediate Region. Oceanic Chaetocerids (Group IV) were scarce in January but prominent in February and March.

Observations in the *South Georgia area* show in striking fashion the enormous fertility of the more northerly Antarctic surface waters when neritic influences are at work. Though results from different seasons have had to be considered together it seems clear that the essential form of the seasonal cycle is similar to that of the oceanic northern zone. The quantitative values recorded are nearly ten times as great, however, and the whole cycle oriented so that the maximum falls somewhat earlier in the year. The same conditions are reflected in a lesser degree in the larger area of the Scotia Sea. Here of course neritic influences are less pronounced, but the quantitative values are still twice as great as in corresponding oceanic latitudes.

The qualitative sequence of the phytoplankton in these two areas has not been considered in detail here, for many observations on it have already been published. The main features are predominance of Group III and, to a lesser extent, Group II during the main increase, the latter increasing in importance later in the year. Members of all groups probably reach their maximum 'absolute' abundance during the main increase of the very rich mixed South Georgia plankton. Under the slightly more oceanic conditions of the Scotia Sea area, predominance of Group III species is much more sporadic, and the relative importance of the small oceanic pennate forms (Group I) is much greater.

The *other special areas* have not been worked sufficiently to permit of more than suggestions of the probable implications of the scanty data available. In some these are strengthened by a considerable body of previous evidence. The eastern South Pacific is the best known, and it appears that the time cycle here is roughly intermediate between that of the Northern and Intermediate Regions, and the phytoplankton exceptionally scanty.

Incidental observations on biological features of special interest are described. The Antarctic phytoplankton exhibits extreme development of the colonial habit which cannot be fully realized unless fresh samples are examined. A possible correlation between change of form with adoption of the chain-forming habit in *Corethron* with reduction of silicate content of the medium, previously suggested on theoretical grounds, is partly confirmed. Some observations on spore formation are discussed in the light of recent laboratory experiments. Examinations of stomach contents showed that in addition to *Euphausia superba*, other Antarctic Euphausians, some of the most important Calanoids, and some of the more abundant Pteropods, all feed extensively upon diatoms. Moreover, the Calanoids are capable of triturating and swallowing the large spiny diatom species as well as ingesting smaller ones entire.

In discussing the implications of the work as a whole it is seen that in the Antarctic zone neritic influences extend farther from the land than elsewhere, but when truly oceanic observations throughout the year are available, it becomes evident that they are just as important as in other parts of the world. This was not readily apparent from earlier work confined to the complicated Falkland sector. As it seems impossible for phosphate and nitrate to be factors limiting phytoplankton production in any part of the Antarctic zone, the observed differences in distribution both in time and space must be explained on other grounds. The importance of the physical factors, light, stability of the surface layers, and the (interrelated) effects of pack-ice, which was recognized in earlier work, cannot be doubted. They are certainly prime causes in determining the time of the onset of the main increase, and the extent and duration of the autumnal secondary increase in the more northerly parts of the Antarctic zone. However, they do not by themselves explain the post-maximal summer decrease in the more northerly Antarctic surface waters, or the vastly greater richness of the neritic areas. Now that truly oceanic observations throughout the year are available, it is seen that it is only in the neritic areas that Antarctic seas retain their claim to be the richest in the world. Since the physical factors do not sufficiently account for this, explanation must be sought among chemical and biological factors. Among chemical factors there is now some direct evidence that temporary shortage of silica may be in part responsible for the post-maximal summer decrease in both oceanic and neritic areas. The greater richness of neritic areas remains inexplicable unless we assume that minute quantities of inorganic compounds, as iron or manganese, or of organic compounds derived from the land, exert a strongly favourable influence on diatom growth. We have no direct evidence of this, but the growing body of experimental work by Harvey, Cooper and others favours such an hypothesis.

Among biological factors the effect of the grazing down of the phytoplankton by the herbivorous zooplankton is probably of great importance in the poorer pastures of the open ocean. In neritic areas of exceptionally rich phytoplankton Hardy has shown that the converse effect, 'animal exclusion' may occur, but there is little doubt that the post-maximal summer decrease in diatoms must be accentuated, and to some extent caused directly by grazing. In the Antarctic zone, and all other areas with marked seasonal changes so far investigated, all available evidence shows that the zooplankton reaches its peak at a distinct interval of time after the phytoplankton maximum.

ACKNOWLEDGEMENTS

It is a great pleasure to record my indebtedness to many kind friends on the staff of the Marine Biological Association at Plymouth, where the work was concluded, by kind permission of the Director, Dr S. W. Kemp, after the outbreak of war. I am fortunate in having been able to discuss phytoplankton problems with Dr H. W. Harvey for several years and am particularly indebted to him for information and demonstration of his methods in 1933 before he had published the account of them. By kind permission of Dr E. J. Allen this enabled us to utilize the method throughout the third commission, two years earlier than would have otherwise been possible. I am particularly indebted to Misses N. G. Sproston and D. R. Dibben, and my wife, for help in preparing the MS. for the press.

My indebtedness to my colleagues on the Discovery Staff will be obvious from the text, and, as with all our work, the able co-operation of the marine staff, and the patience and skill of the seamen in handling the gear under trying conditions, cannot be too highly praised.

REFERENCES

ALLEN, E. J., 1919. *A contribution to the quantitative study of plankton.* Journ. Mar. Biol. Assoc., n.s., XII, no. 1.

ALLEN, W. E., 1934. *The problem of methods in marine plankton investigations.* Internat. Rev. d. ges. Hydrobiol. usw. XXXI, 40–65. Leipzig.

ATKINS, W. R. G., 1926. *The phosphate content of sea water in relation to the growth of the algal plankton. Part III.* Journ. Mar. Biol. Assoc., n.s., XIV, pp. 447–67.

—— 1926. *A quantitative consideration of some factors concerned in plant growth in water.* Journ. du Cons. Internat. pour l'Expl. de la Mer, I, pp. 197–226.

BARKER, H. A., 1935. *The culture and the physiology of the marine Dinoflagellates.* Arch. f. Mikrobiol., Bd. VI, Heft 2, pp. 157–81.

BRAARUD, T., 1935. *The 'Øst' Expedition to the Denmark Strait,* 1929. II. *The Phytoplankton and its conditions of growth.* Hvabrådets Skrifter, Nr. 10, pp. 7–173.

CASTRACANE, F., 1886. *Report on the Diatomaceae collected by H.M.S. 'Challenger' during the years* 1873–6. Repts. Challenger Exped., Botany, II, pp. i–iii, 1–178, pls. i–xxx.

CLOWES, A. J., 1934. *Hydrology of the Bransfield Strait.* Discovery Rep., IX, pp. 1–64.

—— 1938. *Phosphate and silicate in the Southern Ocean.* Discovery Rep., XIX, pp. 1–120, pls. i–xxv.

COOPER, L. H. N., 1933. *Chemical constituents of biological importance in the English Channel, November* 1930 *to January* 1932. *Parts I and II.* Journ. Mar. Biol. Assoc., XVIII, pp. 677–753.

—— 1937. *On the ratio of nitrogen to phosphorus in the sea.* Journ. Mar. Biol. Assoc., XXII, pp. 177–82.

—— 1938. *Salt error in determinations of phosphate in sea water.* Journ. Mar. Biol. Assoc., XXIII, pp. 171–8.

DEACON, G. E. R., 1933. *A general account of the hydrology of the South Atlantic Ocean.* Discovery Rep., VII, pp. 171–238.

—— 1937. *The hydrology of the Southern Ocean.* Discovery Rep., XV, pp. 1–124, pls. i–xliv.

FISHER, R. A., 1930. *Statistical Methods for Research Workers.* London.

GRAN, H. H., 1902. *Das Plankton des Norvegischen Nordmeeres von biologischen und hydrographischen Gesichtpunkten behandelt.* Report on Norwegian Fish and Marine Investigations, II, p. 5.

—— 1929. *Quantitative plankton investigations carried out during the expedition with the 'Michael Sars', July–Sept.,* 1924. Rapports et Procés-verbaux des Réunions, Conseil Internat. pour l'Explor. de la Mer, LVI, pp. 1–50.

—— 1932. *Phytoplankton. Methods and Problems.* Journ. du Conseil, VII, pp. 343–58.

GRAN, H. H. and BRAARUD, T., 1935. *A quantitative study of the phytoplankton in the Bay of Fundy and the Gulf of Maine (including observations on hydrography, chemistry and turbidity).* Journ. Biol. Bd. Canada, I, no. 5, pp. 279–467.

GROSS, F., 1937. *The life history of some marine plankton diatoms.* Phil. Trans. Roy. Soc. Lond., Ser. B, no. 548, vol. CCXXVIII, pp. 1–47, pls. 1–4.

—— 1940. *The development of isolated resting spores into auxospores in* Ditylum Brightwelli (*West.*). Journ. Mar. Biol. Assoc., XXIV, pp. 375–80.

HAECKEL, E., 1890. *Plankton Studien.* Wien.

HARDY, A. C. and GUNTHER, E. R., 1935. *The plankton of the South Georgia whaling grounds and adjacent waters,* 1926–7. Discovery Rep., XI, pp. 1–486.

HARDY, A. C., 1939. *Ecological investigations with the continuous plankton recorder: object, plan and methods.* Hull Bull. Mar. Ecol., I, (1), pp. 1–57.

HART, T. J., 1934. *On the phytoplankton of the south-west Atlantic and the Bellingshausen Sea,* 1929–31. Discovery Rep., VIII, pp. 1–268.

—— 1937. Rhizosolenia curvata *Zacharias, an indicator species in the Southern Ocean.* Discovery Rep., XVI, pp. 413–46, pl. xiv.

HARVEY, H. W., 1928. *The Biological Chemistry and Physics of Sea Water.* pp. 1–194. Cambridge.

—— 1934 *a*. *Measurement of phytoplankton population.* Journ. Mar. Biol. Assoc., n.s., XIX, pp. 761–73.

—— 1934 *b*. *Annual variation of planktonic vegetation,* 1933. Journ. Mar. Biol. Assoc., n.s., XIX, pp. 775–92.

Harvey, H. W., 1937. *The supply of iron to diatoms.* Journ. Mar. Biol. Assoc., n.s., xxii, pp. 205–19.

—— 1939. *Substances controlling the growth of a diatom.* Journ. Mar. Biol. Assoc., n.s., xxiii, pp. 499–520.

—— 1940. *Nitrogen and phosphorus required for the growth of phytoplankton.* Journ. Mar. Biol. Assoc., n.s., xxiv, pp. 115–23.

Harvey, H. W., Cooper, L. H. N., Lebour, M. V. and Russell, F. S., 1935. *Plankton production and its control.* Journ. Mar. Biol. Assoc., n.s., xx, pp. 407–41.

Heiden, H. and Kolbe, R. W., 1928. *Die Marinen Diatomeen der Deutschen Südpolar Expedition*, 1901–3. Deutsche Südpolar Exped., viii, Heft v, pp. 450–714.

Hendey, N. I., 1937. *The plankton diatoms of Southern Seas.* Discovery Rep., xvi, pp. 151–364, pls. vi–xiii.

Hentschel, E., 1932. *Die Biologischen Methoden und das Biologische Beobachtungsmaterial der 'Meteor' Expedition.* Wiss. Ergeb. Deutschen Atlantischen Expedition 'Meteor', 1925–7, vol. x.

—— 1936. *Allgemeine Biologie des Südatlantischen Ozeans.* Wiss. Ergeb. Deutschen Atlantischen Expedition 'Meteor', 1925–7, vol. xi.

Herdman, H. F. P., 1932. *Report on soundings taken during the Discovery Investigations*, 1926–32. Discovery Rep., vi, pp. 205–36, pls. xlv–xlvii, charts 1–7.

Karsten, G., 1905. *Das Phytoplankton des Antarktischen Meeres nach dem Material der Deutschen Tiefsee Expedition*, 1898–9. Wiss. Ergeb. Deutsch. Tiefsee-Exped., Zweiter Band, Zweiter Teil, Lief. 1, pp. 1–136, Taf. i–xix.

—— 1906. *Das Phytoplankton des Atlantischen Ozeans nach dem Material der Deutschen Tiefsee-Expedition*, 1898–9. Wiss. Ergeb. Deutsch. Tiefsee-Exped., Zweiter Band, Zweiter Teil, Lief. 2, pp. 139–219, Taf. xx–xxxiv.

—— 1907. *Das Indische Phytoplankton.* Wiss. Ergeb. Deutsch. Tiefsee-Exped., Zweiter Band, Zweiter Teil, Lief. 3, pp. 223–548, Taf. xxxv–liv.

Ketchum, B. H., 1939. *The adsorption of phosphate and nitrate by illuminated cultures of* Nitzschia closterium. American Journ. Bot., xxvi, pp. 399–407.

Kreps, E. and Verjbinskaya, N., 1930. *Seasonal changes in the phosphate and nitrate content and in the hydrogen-ion concentration in the Barents Sea.* Journ. du Conseil., v, pp. 327–45.

Krey, J., 1939. *Die Bestimmung des Chlorophylls in Meerwasser-Schöpfproben.* Journ. du Conseil, xiv, (2), pp. 201–9.

Lucas, C. E., 1940. *Ecological investigations with the continuous plankton recorder: The phytoplankton in the southern North Sea*, 1932–7. Hull Bull. Mar. Ecol., i, (3), pp. 73–170, pls. i–lxiv.

Mangin, L., 1915. *Phytoplancton de l'Antarctique.* Deuxième Expéd. Antarct. Française commandée par le Dr Jean Charcot, pp. 1–95, pls. i–iii. Paris.

—— 1922. *Phytoplancton Antarctique.* Expédition Antarctique de la 'Scotia', 1902–4, Mém. Acad. Sci. Paris, lxvii, pp. 1–134.

Marshall, S. M. and Orr, A. P., 1928. *The photosynthesis of diatom cultures in the Sea.* Journ. Mar. Biol. Assoc., n.s., xv, pp. 321–60.

Marshall, S. M., 1933. *The production of microplankton in the Great Barrier Reef region.* Great Barrier Reef Expedition, 1928–9, Sci. Rep., ii, (5), pp. 111–57.

Moore, B., Prideaux, E. and Herdman, G., 1914. *I. Seasonal variations in the reaction of sea-water in relation to the activities of vegetable and animal plankton. II. The limitations of photosynthesis by algae in sea water.* Annual Rep. Lancs. Sea Fisheries Laboratory.

Neaverson, E., 1934. *The sea floor deposits.* I. *General characters and distribution.* Discovery Rep., ix, pp. 295–350, pls. xvii–xxii.

Nielsen, E. S., 1933. *Über quantitative Untersuchung von marinen Plankton mit Utermöhls umgekehrten Mikroskop.* Journ. du Conseil, viii, pp. 201–10.

—— 1935. *The production of phytoplankton at the Faroe Isles, Iceland, East Greenland and the waters around.* Medd. Komm. Danmarks Fiskeri og Havundersögelser, Ser. Plankton, Bd. iii, Nr. 1.

—— 1937. *On the relation between the quantity of phytoplankton and zooplankton in the sea.* Journ. du Conseil, xii, (1), pp. 147–54.

—— 1938. *Über die Anwendung von Netzfängen bei quantitativen Phytoplankton untersuchungen.* Journ. du Conseil, xiii, (2), pp. 197–205.

Pearsall, W. H., 1932. *Phytoplankton in the English Lakes.* II. *The composition of the phytoplankton in relation to dissolved substances.* Journ. Ecol., xx, pp. 241–62.

PETERS, N., 1934. *Die Bevölkerung des Südatlantischen Ozeans mit Ceratien.* Wiss. Ergeb. Deutsch. Atlant. Exped. 'Meteor', 1925–7, XII, pp. 1–69.

REDFIELD, A. C., 1934. *On the proportions of organic derivatives in sea water and their relation to the composition of plankton.* James Johnstone Memorial Volume, Univ. of Liverpool, pp. 176–92.

RILEY, G. A., 1938. *The measurement of phytoplankton.* Internat. Rev. d. ges. Hydrobiol. usw., XXXVI, pp. 371–3.

VAN HEURCK, H., 1909. *Diatomées.* Resultats du Voyage du S.Y. 'Belgica' en 1897–9 sous le commandement de A. de Gerlache de Gomery, Rapports Scientifiques-Botanique, pp. 3–126, pls. i–xiii.

WIMPENNY, R. S., 1936. *The size of diatoms.* I. *The diameter variation of* Rhizosolenia styliformis *Brightwell and* Rhizosolenia alata *Brightwell in particular, and of pelagic marine diatoms in general.* Journ. Mar. Biol. Assoc., n.s., XXI, pp. 29–60.

ZENKEVITCH, L. A., 1931. *Fish-food in the Barents Sea* (*Introduction*). Rep. First Session State Oceangr. Inst. Moscow.

APPENDIX

Results obtained by Harvey's Method during the Third, Fourth and Fifth Commissions of the R.R.S. Discovery II

The region or area within which each observation was made, according to the scheme of geographical subdivision used in this paper, is shown in the last column by one of the following contractions: N = Northern Region, I = Intermediate Region, S = Southern Region, SS = Scotia Sea, SG = South Georgia Area, ESP = Eastern South Pacific, NRS = Area North of the Ross Sea, W = Mid. Weddell Sea and Sp. = Other special Areas. B = Bransfield Strait and Palmer Archipelago.

Station	Date	Position		Colour units per m.³	Region or area	Station	Date	Position		Colour units per m.³	Region or area
		Lat. S	Long.					Lat. S	Long.		
1198	25. xi. 33	50° 51·9′	31° 25·6′ W	15,940	SS	1251	8. i 34	69° 24·6′	114° 45·9′ W	340	S
1199	27. xi	52° 40·0′	37° 06·4′ W	13,390	SG	1252	9. i	68° 30·4′	116° 38·6′ W	1,150	S
1200	27. xi	53° 00·8′	37° 07·0′ W	24,530	SG	1253	9. i	67° 13·6′	118° 05·8′ W	600	S
1201	27. xi	53° 19·9′	37° 07·4′ W	25,160	SG	1254	10. i	66° 24·1′	120° 41·8′ W	1,020	I
1202	27. xi	53° 40·7′	37° 07·3′ W	32,540	SG	1255	10. i	65° 38·0′	123° 10·2′ W	1,030	I
1203	28. xi	54° 17·5′	34° 14·4′ W	23,600	SG	1256	11. i	66° 50·7′	126° 13·5′ W	680	S
1204	28. xi	54° 17·7′	34° 48·6′ W	31,250	SG	1257	11. i	67° 52·4′	129° 27·5′ W	880	S
1205	28. xi	54° 20·2′	35° 25·2′ W	28,750	SG	1258	12. i	68° 39·9′	132° 52·1′ W	2,420	S
1206	28. xi	54° 22·2′	35° 53·4′ W	18,510	SG	1259	12. i	67° 26·6′	135° 53·7′ W	790	S
1208	4. xii. 33	54° 04·2′	38° 37·3′ W	34,100	SG	1260	13. i	66° 11·9′	139° 00·6′ W	1,320	I
1209	4. xii	54° 04·0′	39° 12·8′ W	40,260	SG	1261	13. i	65° 06·0′	141° 51·1′ W	420	I
1210	4. xii	54° 05·0′	39° 45·9′ W	35,960	SG	1262	14. i	66° 03·1′	144° 39·3′ W	820	I
1211	4. xii	54° 06·2′	40° 18·9′ W	13,840	SG	1263	14. i	66° 58·3′	147° 21·4′ W	2,870	S
1212	5. xii	55° 38·9′	44° 52·5′ W	13,640	SS	1264	15. i	68° 06·8′	150° 49·1′ W	1,000	S
1213	6. xii	57° 41·7′	48° 47·0′ W	3,260	SS	1265	15. i	69° 07·7′	153° 41·0′ W	640	S
1214	7. xii	58° 38·9′	53° 45·6′ W	4,280	SS	1266	16. i	69° 14·2′	156° 30·4′ W	4,610	S
1215	8. xii	61° 10·5′	57° 49·2′ W	1,590	SS	1267	16. i	69° 49·4′	159° 12·6′ W	2,040	S
1216	9. xii	63° 22·5′	61° 48·0′ W	4,730	B	1268	18. i*	68° 34·7′	161° 20·0′ W	3,800	S
1217	10. xii	64° 05·7′	64° 18·5′ W	2,670	B	1269	18. i	67° 33·8′	162° 53·7′ W	1,800	S
1218	10. xii	64° 48·1′	67° 26·2′ W	14,380	B	1270	19. i	66° 29·5′	164° 30·2′ W	510	NRS
1220	13. xii	67° 45·3′	77° 50·6′ W	230	S	1271	19. i	65° 05·3′	166° 08·4′ W	140	NRS
1221	14. xii	66° 26·1′	78° 01·7′ W	660	ESP	1272	20. i	63° 41·3′	167° 36·3′ W	1,660	NRS
1222	14. xii	65° 02·7′	78° 01·7′ W	100	ESP	1273	20. i	62° 08·1′	168° 59·5′ W	2,660	NRS
1223	15. xii	63° 31·9′	78° 01·6′ W	990	ESP	1274	21. i	60° 41·4′	169° 17·8′ W	890	NRS
1224	15. xii	62° 11·5′	78° 01·1′ W	200	ESP	1282	20. ii. 34	66° 05·9′	170° 32·5′ W	200	NRS
1235	30. xii	60° 46·6′	65° 30·6′ W	970	SS	1283	23. ii	72° 01·2′	171° 25·7′ W	770	S
1236	31. xii	63° 29·1′	69° 40·9′ W	1,100	SS	1284	24. ii	69° 48·1′	167° 20·7′ W	2,020	S
1237	1. i. 34	66° 06·4′	74° 25·4′ W	120	ESP	1285	24. ii	68° 45·0′	164° 35·8′ W	810	S
1238	2. i	67° 29·1′	77° 05·0′ W	650	S	1286	24. ii†	67° 42·2′	162° 08·0′ W	60	S
1239	2. i	66° 39·3′	79° 36·7′ W	140	S	1287	24. ii†	68° 05·3′	158° 56·6′ W	760	S
1240	3. i	65° 59·5′	82° 37·5′ W	220	ESP	1288	25. ii	68° 27·8′	156° 16·0′ W	1,920	S
1241	3. i	65° 12·9′	85° 59·7′ W	90	ESP	1289	25. ii	69° 08·0′	152° 42·4′ W	4,690	S
1242	4. i	66° 16·2′	88° 31·3′ W	800	ESP	1290	26. ii	69° 45·8′	149° 42·9′ W	12,050	S
1243	4. i	67° 28·0′	91° 24·1′ W	1,210	S	1291	26. ii	70° 28·2′	145° 55·2′ W	4,020	S
1244	5. i	68° 36·6′	94° 22·9′ W	650	S	1292	27. ii	71° 25·1′	143° 34·6′ W	3,250	S
1245	5. i	69° 16·4′	98° 09·7′ W	380	S	1293	27. ii.	70° 08·4′	140° 26·0′ W	4,030	S
1246	6. i	68° 11·9′	101° 15·1′ W	530	S	1294	28. ii	69° 05·9′	137° 28·2′ W	5,030	S
1247	6. i	66° 59·2′	104° 18·2′ W	820	S	1295	28. ii	68° 01·4′	134° 14·8′ W	2,130	S
1248	7. i.	66° 15·5′	106° 22·0′ W	760	ESP	1296	1. iii. 34	69° 06·6′	131° 42·6′ W	2,020	S
1249	7. i	67° 11·9′	108° 41·5′ W	470	S	1297	1. iii	70° 25·2′	129° 15·7′ W	2,980	S
1250	8. i	68° 17·8′	111° 49·3′ W	470	S	1299	2. iii	68° 45·3′	123° 56·8′ W	420	S

* 17. i. 34 omitted west bound.

† Two 24. ii east bound.

Appendix (*continued*)

Station	Date	Position Lat. S	Position Long.	Colour units per m.³	Region or area	Station	Date	Position Lat S	Position Long.	Colour units per m.³	Region or area
1300	3. iii. 34	67° 53·7′	120° 57·2′ W	200	S	1364	11. v. 34	56° 38·6′	44° 45·4′ E	550	I
1301	3. iii	67° 06·9′	117° 41·5′ W	1,760	S	1365	12. v	55° 12·8′	44° 52·5′ E	740	N
1302	4. iii	66° 29·9′	114° 57·8′ W	2,850	S	1366	14. v	50° 42·3′	44° 54·1′ E	270	N
1303	4. iii	67° 04·8′	111° 50·0′ W	3,820	S	1382	11. viii. 34	50° 03·3′	06° 29·0′ W	< 50	N
1304	5. iii	67° 47·3′	108° 47·7′ W	2,040	S	1383	12. viii	51° 08·2′	09° 00·6′ W	< 50	N
1305	5. iii	68° 22·6′	105° 57·0′ W	560	S	1384	13. viii	51° 58·4′	11° 07·8′ W	< 50	N
1306	7. iii	69° 40·6′	97° 03·7′ W	1,920	S	1386	15. viii	54° 11·9′	15° 47·8′ W	< 50	N
1307	7. iii	69° 00·6′	95° 27·1′ W	1,700	S	1389	18. viii	53° 38·4′	20° 58·0′ W	40	N
1308	8. iii	68° 33·1′	91° 50·9′ W	670	S	1390	19. viii	51° 30·5′	22° 14·6′ W	50	N
1309	8. iii	67° 45·9′	89° 23·5′ W	1,460	S	1392	23. viii	51° 25·3′	29° 24·1′ W	30	N
1310	9. iii	67° 12·9′	86° 53·8′ W	1,580	S	1393	24. viii	52° 55·9′	31° 54·6′ W	130	SS
1311	9. iii	67° 18·8′	82° 54·0′ W	870	S	1394	25. viii	54° 23·5′	34° 08·4′ W	190	SG
1312	10. iii	68° 18·0′	79° 33·8′ W	900	S	1395	25. viii	54° 23·5′	34° 43·9′ W	100	SG
1313	11. iii	66° 02·4′	79° 22·2′ W	810	ESP	1396	26. viii	54° 23·5′	35° 17·7′ W	130	SG
1314	11. iii	64° 31·5′	79° 14·5′ W	380	ESP	1397	26. viii	54° 23·5′	35° 54·2′ W	30	SG
1315	12. iii	62° 55·1′	79° 06·3′ W	200	ESP	1399	1. ix. 34	53° 39·9′	37° 06·4′ W	90	SG
1325	28. iii	55° 56·4′	56° 00·4′ W	190	SS	1400	1. ix	53° 19·0′	37° 05·9′ W	150	SG
1326	29. iii	57° 26·6′	55° 18·0′ W	80	SS	1401	2. ix	52° 58·7′	37° 05·5′ W	200	SG
1327	29. iii	58° 48·5′	55° 10·3′ W	70	SS	1402	2. ix	52° 36·3′	37° 04·9′ W	200	SG
1328	30. iii	60° 17·0′	55° 03·2′ W	50	SS	1403	2. ix	53° 59·3′	38° 46·6′ W	60	SG
1331	4. iv. 34	60° 11·5′	44° 23·9′ W	—	SS	1404	3. ix	53° 59·8′	39° 27·4′ W	70	SG
1332	5. iv	58° 39·1′	44° 24·8′ W	20	SS	1405	3. ix	54° 00·1′	40° 07·4′ W	80	SG
1333	5. iv	57° 35·2′	44° 20·8′ W	30	SS	1406	3. ix	54° 00·3′	40° 46·9′ W	110	SG
1334	6. iv	55° 54·3′	44° 14·4′ W	1,180	SS	1407	4. ix	55° 51·0′	44° 47·2′ W	110	SS
1335	6. iv	54° 37·8′	44° 12·6′ W	120	SS	1408	5. ix	57° 19·1′	48° 21·5′ W	110	SS
1336	7. iv	53° 38·8′	44° 11·2′ W	90	SS	1409	6. ix	59° 01·8′	52° 31·2′ W	140	SS
1337	7. iv	52° 25·1′	44° 09·6′ W	100	SS	1410	7. ix	59° 26·3′	55° 25·2′ W	110	SS
1339	8. iv	51° 54·1′	41° 21·9′ W	900	SS	1411	8. ix	60° 51·5′	58° 38·7′ W	70	SS
1340	9. iv	52° 56·6′	38° 55·7′ W	780	SG	1412	9. ix	62° 00·9′	62° 47·3′ W	50	B
1343	22. iv	53° 34·0′	27° 26·2′ W	150	N	1413	10. ix	62° 52·9′	67° 33·7′ W	60	B
1344	22. iv	53° 46·3′	24° 57·4′ W	210	N	1415	12. ix	63° 40·6′	78° 03·5′ W	70	ESP
1345	23. iv	54° 21·6′	23° 24·1′ W	410	N	1416	13. ix	62° 31·5′	78° 18·3′ W	80	ESP
1346	23. iv	55° 24·9′	22° 57·1′ W	50	N	1425	26. ix	56° 36·3′	55° 25·0′ W	90	SS
1347	24. iv	56° 28·7′	22° 38·7′ W	40	I	1426	26. ix	57° 47·6′	54° 52·2′ W	300	SS
1348	25. iv	57° 48·3′	22° 18·2′ W	80	I	1427	27. ix	58° 56·1′	54° 30·4′ W	400	SS
1349	26. iv	60° 13·4′	22° 11·9′ W	60	I	1428	27. ix	59° 51·0′	54° 08·8′ W	240	SS
1350	26. iv	61° 19·5′	21° 39·1′ W	700	I	1429	30. ix	57° 28·6′	45° 56·3′ W	400	SS
1351	27. iv	60° 18·6′	14° 13·8′ W	60	I	1430	1. x. 34	56° 32·7′	45° 50·8′ W	360	SS
1352	28. iv	60° 04·5′	08° 06·5′ W	30	I	1431	1. x	55° 46·6′	45° 45·6′ W	170	SS
1353	30. iv	59° 25·7′	03° 30·1′ E	30	I	1432	2. x	54° 55·0′	45° 39·6′ W	300	SS
1354	1. v. 34	59° 06·0′	10° 38·3′ E	90	I	1433	2. x	54° 00·5′	45° 33·3′ W	310	SS
1355	2. v	58° 43·3′	16° 38·1′ E	280	I	1434	3. x	52° 16·3′	45° 21·4′ W	260	SS
1356	3. v	60° 12·8′	19° 37·5′ E	270	I	1436	4. x	51° 07·1′	43° 00·9′ W	70	SS
1357	4. v	61° 23·7′	24° 12·2′ E	490	I	1437	5. x	53° 22·3′	38° 03·3′ W	380	SG
1358	5. v	62° 36·4′	30° 15·6′ E	780	I	1438	10. x	53° 12·5′	43° 22·2′ W	480	SS
1359	6. v	63° 45·2′	36° 41·1′ E	500	I	1439	11. x	52° 54·9′	47° 13·2′ W	430	SS
1360	7. v	64° 27·0′	41° 08·9′ E	60	I	1440	12. x	52° 19·3′	51° 59·0′ W	210	SS
1361	8. v	64° 37·6′	44° 16·3′ E	70	I	1447	29. x	62° 37·7′	79° 28·6′ W	360	ESP
1362	9. v	61° 45·5′	44° 15·9′ E	1,430	I	1448	29. x	63° 43·8′	79° 21·8′ W	490	ESP
1363	10. v	59° 14·0′	44° 27·9′ E	650	I	1449	30. x	65° 03·4′	79° 23·6′ W	270	ESP

Appendix (*continued*)

Station	Date	Position		Colour units per m.³	Region or area	Station	Date	Position		Colour units per m.³	Region or area
		Lat. S	Long.					Lat. S	Long.		
1450	30. x. 34	66° 03·1′	79° 42·2′ W	70	ESP	1519	15. ii. 35	66° 31·0′	3° 40·0′ W	450	S
1451	31. x	64° 00·5′	84° 02·3′ W	470	ESP	1520	16. ii	65° 28·8′	1° 20·3′ W	2,060	I
1452	1. xi. 34	63° 06·8′	86° 00·6′ W	950	ESP	1521	16. ii	64° 34·5′	0° 45·8′ E	2,390	I
1453	1. xi	62° 13·1′	87° 57·4′ W	160	ESP	1522	17. ii	65° 32·9′	3° 02·9′ E	700	I
1454	2. xi	63° 03·0′	89° 34·5′ W	1,110	ESP	1523	17. ii	66° 39·2′	5° 28·2′ E	2,970	S
1455	2. xi	63° 52·3′	91° 25·9′ W	450	ESP	1524	18. ii	67° 41·3′	8° 00·6′ E	780	S
1456	3. xi	64° 19·0′	92° 44·6′ W	750	ESP	1525	18. ii	68° 41·8′	10° 34·8′ E	1,410	S
1458	4. xi	65° 06·3′	94° 55·3′ W	570	ESP	1526	19. ii	68° 02·6′	12° 32·2′ E	7,810	S
1460	4. xi	65° 02·9′	99° 12·1′ W	790	ESP	1527	19. ii	66° 57·2′	15° 10·3′ E	1,200	S
1461	5. xi	64° 03·3′	101° 43·2′ W	1,420	ESP	1528	20. ii	66° 01·7′	17° 20·5′ E	2,450	I
1462	5. xi	63° 01·3′	104° 15·8′ W	650	ESP	1529	20. ii	64° 54·7′	20° 00·6′ E	9,420	I
1463	6. xi	63° 50·9′	106° 01·1′ W	1,110	ESP	1530	21. ii	63° 55·5′	22° 06·6′ E	7,820	I
1464	6. xi	64° 56·5′	108° 06·6′ W	1,020	ESP	1531	21. ii	62° 50·0′	24° 28·2′ E	1,280	I
1465	7. xi	65° 38·8′	109° 33·7′ W	1,560	ESP	1532	22. ii	64° 01·1′	25° 46·2′ E	660	I
1466	9. xi	61° 32·7′	107° 00·5′ W	670	ESP	1533	22. ii	65° 24·3′	27° 07·8′ E	3,310	I
1467	11. xi	59° 28·3′	96° 12·2′ W	890	ESP	1534	23. ii	66° 35·3′	28° 26·1′ E	600	S
1468	11. xi	60° 46·5′	95° 57·3′ W	320	ESP	1535	23. ii	67° 18·0′	30° 34·1′ E	280	S
1469	12. xi	62° 18·9′	95° 52·4′ W	260	ESP	1536	24. ii	66° 03·4′	31° 46·8′ E	160	I
1470	12. xi	63° 23·9′	95° 40·8′ W	820	ESP	1537	24. ii	64° 33·6′	33° 09·4′ E	180	I
1471	13. xi	64° 44·5′	88° 35·6′ W	590	ESP	1538	25. ii	63° 23·8′	34° 23·3′ E	1,180	I
1472	14. xi	66° 31·6′	81° 18·4′ W	470	S	1539	25. ii	62° 02·1′	35° 54·5′ E	220	I
1473	15. xi	63° 47·5′	80° 40·2′ W	740	ESP	1540	26. ii	63° 03·5′	37° 28·5′ E	780	I
1474	16. xi	62° 49·9′	80° 28·3′ W	1,110	ESP	1541	26. ii	64° 26·6′	39° 17·7′ E	80	I
1477	4. xii. 34	58° 27·6′	59° 56·8′ W	440	SS	1543	27. ii	65° 16·4′	40° 27·7′ E	730	I
1478	5. xii	61° 14·8′	61° 20·9′ W	1,320	SS	1544	28. ii	65° 29·3′	43° 12·7′ E	250	I
1491	23. i. 35	59° 15·7′	43° 36·4′ W	21,040	SS	1545	28. ii	64° 11·0′	44° 05·1′ E	100	I
1492	23. i	57° 56·2′	43° 48·5′ W	13,090	SS	1546	1. iii. 35	63° 09·9′	42° 27·5′ E	140	I
1493	24. i	54° 54·4′	44° 03·9′ W	4,670	SS	1547	1. iii	61° 53·4′	40° 29·8′ E	130	I
1494	25. i	53° 30·8′	44° 03·6′ W	5,880	SS	1548	2. iii	60° 39·8′	38° 59·6′ E	380	I
1495	25. i	52° 05·6′	44° 05·3′ W	1,380	SS	1549	2. iii	59° 14·3′	38° 04·3′ E	270	I
1496	26/27. i	53° 55·4′	40° 28·9′ W	210	SG	1550	3. iii	56° 19·2′	35° 48·8′ E	1,590	N
1497	27. i	53° 54·7′	39° 49·9′ W	3,710	SG	1551	4. iii	53° 48·2′	33° 53·0′ E	1,100	N
1498	27. i	53° 54·1′	39° 16·5′ W	4,870	SG	1552	6. iii.	51° 11·0′	32° 55·2′ E	810	N
1499	27. i	53° 53·5′	38° 41·1′ W	720	SG	1560	3. iv. 35	51° 08·9′	23° 55·3′ E	100	N
1501	5. ii. 35	52° 43·7′	36° 57·9′ W	4,330	SG						
1502	5. ii	53° 03·6′	36° 58·5′ W	2,790	SG	1619	22. xi. 35	51° 22·9′	56° 15·2′ E	220	N
1503	5. ii	53° 24·5′	36° 59·1′ W	680	SG	1620	22. xi	52° 44·5′	56° 32·0′ E	290	N
1504	5. ii	53° 41·8′	36° 59·2′ W	160	SG	1621	23. xi	52° 53·5′	56° 49·4′ E	290	N
1505	7. ii	54° 21·0′	34° 41·4′ W	920	SG	1622	23. xi	55° 36·8′	57° 19·3′ E	150	N
1506	7. ii	54° 22·4′	35° 12·7′ W	120	SG	1623	24. xi	56° 37·3′	57° 39·0′ E	110	N
1507	7. ii	54° 22·6′	35° 47·5′ W	150	SG	1624	24. xi	58° 02·2′	58° 01·3′ E	30	I
1508	8. ii	54° 22·6′	34° 08·6′ W	200	SG	1625	25. xi	58° 51·0′	59° 10·5′ E	60	I
1509	9. ii	56° 22·1′	31° 37·8′ W	650	SS	1626	25. xi	58° 27·3′	60° 25·9′ E	40	I
1510	10. ii	59° 36·9′	26° 57·7′ W	2,410	I	1627	26. xi	57° 55·6′	61° 49·8′ E	270	I
1513	12. ii	63° 54·2′	18° 21·2′ W	530	I	1628	26. xi	57° 49·5′	64° 33·4′ E	140	I
1514	13. ii	65° 03·6′	16° 17·2′ W	1,510	I	1629	27. xi	57° 45·3′	66° 53·0′ E	240	I
1515	13. ii	66° 14·7′	15° 50·2′ W	740	I	1630	27. xi	57° 38·4′	69° 57·4′ E	260	I
1516	14. ii	67° 22·0′	11° 31·4′ W	910	S	1631	28. xi	57° 46·9′	73° 11·1′ E	440	I
1517	14. ii	68° 44·7′	9° 20·3′ W	480	S	1632	28. xi	57° 04·5′	75° 43·3′ E	80	I
1518	15. ii	67° 40·9′	6° 31·8′ W	580	S	1633	29. xi	56° 35·7′	78° 07·8′ E	60	N

Appendix (*continued*)

Station	Date	Position: Lat. S	Position: Long.	Colour units per m.³	Region or area	Station	Date	Position: Lat. S	Position: Long.	Colour units per m.³	Region or area
1634	29. xi. 35	56° 44·8′	80° 20·1′ E	440	N	1704	18. iii. 36	62° 33·4′	135° 51·5′ E	390	I
1635	30. xi	57° 35·7′	82° 49·2′ E	1,270	N	1705	18. iii	61° 29·8′	133° 32·5′ E	510	I
1636	30. xi	57° 49·2′	84° 23·9′ E	770	N	1706	19. iii	62° 22·8′	131° 56·9′ E	380	I
1637	1. xii. 35	57° 58·1′	86° 24·7′ E	210	N	1707	19. iii	63° 36·9′	129° 24·7′ E	230	I
1638	1. xii	58° 31·0′	88° 25·6′ E	820	N	1708	20. iii	64° 30·0′	127° 31·8′ E	320	I
1639	2. xii	58° 35·0′	92° 06·2′ E	350	N	1709	20. iii	65° 05·8′	127° 02·4′ E	130	I
1640	3. xii	59° 50·2′	93° 31·7′ E	250	I	1711	21. iii	65° 10·5′	124° 02·9′ E	80	I
1642	3. xii	58° 53·3′	95° 49·0′ E	70	I	1712	22. iii	65° 25·7′	120° 48·4′ E	90	I
1644	16. i. 36	78° 24·8′	164° 10·3′ W	820	S	1713	22. iii	65° 00·9′	118° 34·9′ E	50	I
1645	17. i	77° 43·3′	166° 18·2′ W	420	S	1714	23. iii	64° 29·9′	116° 59·1′ E	90	I
1646	17. i	77° 04·2′	168° 17·1′ W	80	S	1715	23. iii	63° 15·9′	113° 58·4′ E	90	I
1647	18. i	77° 43·8′	171° 31·1′ W	240	S	1716	24. iii	63° 43·4′	112° 20·0′ E	20	I
1648	18. i	78° 18·0′	174° 24·0′ W	160	S	1717	24. iii	63° 42·7′	108° 15·0′ E	110	I
1651	22. i	77° 04·3′	176° 26·1′ W	170	S	1718	25. iii	64° 22·6′	106° 33·3′ E	20	I
1652	23. i	75° 56·2′	178° 35·5′ W	310	S	1719	25. iii	64° 15·5′	104° 03·4′ E	40	I
1653	23. i	74° 55·0′	179° 49·1′ E	960	S	1720	26. iii	63° 59·1′	100° 11·1′ E	120	I
1654	25. i	75° 43·6′	176° 59·4′ E	150	S	1722	28. iii	61° 14·7′	102° 03·1′ E	260	I
1655	25. i	76° 35·9′	173° 54·0′ E	770	S	1723	28. iii	60° 06·7′	102° 48·6′ E	270	I
1659	26. i	75° 43·9′	173° 10·6′ E	1,860	S	1724	29. iii	58° 51·6′	103° 41·3′ E	190	I
1660	27. i	74° 46·4′	178° 23·4′ E	3,040	S	1725	29. iii	57° 17·4′	104° 52·6′ E	200	N
1662	28. i	72° 57·4′	177° 40·6′ E	100	S	1726	30. iii	56° 09·9′	105° 36·3′ E	190	N
1663	29. i	72° 05·4′	178° 42·3′ E	560	S	1727	30. iii	54° 32·2′	106° 25·9′ E	140	N
1664	30. i	71° 29·8′	178° 27·1′ E	530	S	1728	31. iii	53° 14·9′	107° 02·0′ E	100	N
1665	30. i	70° 27·1′	178° 39·6′ E	190	S	1729	31. iii	51° 48·2′	107° 50·2′ E	110	N
1666	31. i	68° 47·0′	178° 16·1′ E	200	S	1777	29. v. 36	49° 58·9′	00° 07·1′ E	90	N
1667	31. i	67° 44·9′	176° 26·4′ E	110	S	1778	30. v.	52° 14·7′	00° 01·0′ W	70	N
1668	1. ii. 36	66° 02·5′	176° 03·8′ E	160	NRS	1779	1. vi. 36	54° 34·8′	00° 04·9′ W	30	N
1669	1. ii	66° 04·0′	172° 23·0′ E	370	NRS	1781	2. vi	57° 41·8′	00° 19·8′ W	170	I
1670	2. ii	65° 59·4′	168° 11·5′ E	60	I	1782	3. vi	58° 44·6′	00° 01·5′ E	190	I
1671	2. ii	66° 00·1′	164° 44·6′ E	40	I	1784	4. vi	57° 07·3′	04° 29·2′ E	60	I
1672	3. ii	66° 13·2′	161° 57·1′ E	80	I	1785	5. vi	56° 53·0′	08° 41·6′ E	150	I
1674	5. ii	66° 03·2′	160° 53·6′ E	40	I	1787	6. vi	58° 05·9′	12° 48·6′ E	560	I
1675	5. ii	64° 29·5′	161° 00·4′ E	70	I	1788	7. vi	59° 11·7′	17° 01·9′ E	380	I
1676	6. ii	62° 34·9′	161° 05·3′ E	470	I	1789	8. vi	57° 11·4′	17° 12·6′ E	20	I
1677	6. ii	61° 05·2′	161° 47·5′ E	110	I	1790	8. vi	56° 25·1	17° 24·8′ E	60	N
1678	7. ii	59° 30·3′	162° 38·0′ E	1,340	I	1791	9. vi	55° 09·8′	17° 41·8′ E	30	N
1679	7. ii	58° 00·1′	163° 00·8′ E	630	N	1792	9. vi	54° 20·1′	17° 53·5′ E	30	N
1680	8. ii	55° 20·2′	162° 49·0′ E	70	N	1793	10. vi	53° 17·7′	18° 12·3′ E	60	N
1692	11. iii. 36	56° 51·3′	145° 36·2′ E	560	N	1794	10. vi	52° 35·8′	18° 24·7′ E	30	N
1693	12. iii	58° 01·6′	145° 45·3′ E	760	N	1795	11. vi	51° 29·6′	18° 40·7′ E	50	N
1694	12. iii	59° 34·0′	145° 49·3′ E	530	N	1796	11. vi	50° 17·7′	18° 40·9′ E	30	N
1695	13. iii	60° 46·9′	145° 52·4′ E	250	N	1812	26. ix. 36	50° 29·8′	00° 09·8′ E	50	N
1696	14. iii	62° 18·2′	145° 41·6′ E	490	I	1813	27. ix	52° 28·0′	00° 21·3′ E	20	N
1697	14. iii	63° 19·5′	145° 46·0′ E	210	I	1814	28. ix	52° 49·2′	00° 20·6′ W	30	N
1698	15. iii	64° 23·3′	145° 54·4′ E	100	I	1815	28. ix	51° 55·9′	01° 41·3′ W	30	N
1699	15. iii	64° 59·5′	145° 48·8′ E	70	I	1816	29. ix	51° 04·0′	03° 01·6′ W	30	N
1700	16. iii	65° 11·9′	143° 40·4′ E	130	I	1817	29. ix	50° 20·2′	04° 10·6′ W	100	N
1701	16. iii	64° 53·6′	141° 33·8′ E	50	I	1818	30. ix	51° 08·3′	05° 35·8′ W	80	N
1702	17. iii	64° 20·1′	139° 54·0′ E	50	I	1819	1. x. 36	52° 26·5′	07° 47·7′ W	190	N
1703	17. iii	63° 28·0′	137° 50·0′ E	220	I	1820	1. x	52° 52·1′	08° 33·2′ W	30	N

Appendix (*continued*)

Station	Date	Position Lat. S	Position Long.	Colour units per m.³	Region or area	Station	Date	Position Lat. S	Position Long.	Colour units per m.³	Region or area
1821	2. x. 36	53° 56·4′	10° 31·7′ W	110	N	1877	14. xi. 36	57° 30·9′	55° 11·8′ W	90	SS
1822	3. x	54° 12·4′	11° 14·9′ W	90	N	1878	15. xi	56° 15·7′	55° 28·7′ W	30	SS
1823	3. x	54° 48·8′	12° 24·9′ W	120	N	1916	2. xii. 36	53° 38·2′	49° 19·6′ W	260	SS
1824	4. x.	55° 20·9′	13° 49·9′ W	210	N	1917	3. xii	53° 48·7′	46° 27·7′ W	220	SS
1825	5. x	55° 42·8′	14° 44·1′ W	120	N	1918	3. xii	53° 54·8′	44° 22·6′ W	1,450	SS
1826	6. x	54° 24·5′	17° 19·2′ W	80	N	1919	4. xii	54° 02·9′	42° 10·8′ W	300	SS
1827	6. x	53° 25·9′	19° 00·4′ W	170	N	1920	4. xii	54° 05·7′	40° 35·6′ W	440	SG
1828	7. x	52° 21·7′	20° 41·7′ W	120	N	1921	7. xii	Off Jason Is. Lt.		5,380	SG
1829	7. x	51° 25·4′	22° 11·6′ W	320	N	1922	9. xii	53° 32·4′	37° 06·1′ W	27,850	SG
1830	8. x	52° 16·1′	23° 30·8′ W	110	N	1923	9. xii	53° 18·8′	37° 04·7′ W	40,000	SG
1831	8. x	53° 11·2′	24° 54·8′ W	150	N	1924	9. xii	53° 06·9′	37° 03·8′ W	11,390	SG
1832	9. x	53° 51·4′	26° 00·7′ W	170	N	1925	9. xii	52° 55·8′	37° 03·6′ W	13,370	SG
1833	9. x	54° 37·3′	27° 29·7′ W	190	N	1926	9. xii	52° 46·0′	37° 04·4′ W	4,270	SG
1834	10. x	55° 23·1′	28° 50·2′ W	30	N	1927	9. xii	52° 46·3′	37° 21·1′ W	15,590	SG
1835 A	10. x	55° 43·4′	29° 26·2′ W	30	N	1928	9. xii	52° 46·9′	37° 38·9′ W	8,210	SG
1835 B	10. x	55° 49·5′	29° 36·6′ W	30	N	1929	10. xii	52° 47·9′	37° 55·8′ W	2,490	SG
1836	11. x	57° 47·5′	29° 28·3′ W	30	I	1930	10. xii	52° 48·7′	38° 15·2′ W	3,170	SG
1837	12. x	58° 17·0′	29° 23·5′ W	50	I	1931	10. xii	52° 59·4′	38° 16·3′ W	9,800	SG
1838	12. x	57° 10·2′	30° 42·5′ W	30	SS	1932	10. xii	53° 09·9′	38° 17·3′ W	5,300	SG
1839	13. x	54° 22·6′	33° 50·6′ W	50	SG	1933	10. xii	53° 20·5′	38° 18·3′ W	7,170	SG
1840	14. x	54° 20·9′	34° 46·1′ W	270	SG	1935 A	10. xii (1613)	53° 31·6′	37° 11·0′ W	42,090	SG
1841	14. x	54° 20·9′	35° 16·0′ W	460	SG	1935 B	10. xii (1920)			60,040	SG
1842	14. x	54° 27·6′	35° 45·5′ W	120	SG	1935 C	10. xii (2115)			21,700	SG
1843	19. x	Jason Is. Lt.	299° dist. 3·4 miles	130	SG	1935 E	11. xii (0411)	53° 31·8′	37° 19·5′ W	53,590	SG
1844	20. x	53° 42·7′	37° 04·6′ W	140	SG	1935 F	11. xii (0656)			35,430	SG
1845	20. x	53° 20·5′	37° 05·1′ W	11,760	SG	1935 G	11. xii (1005)			39,150	SG
1846	20. x	52° 56·9′	37° 06·5′ W	9,610	SG	1935 H	11. xii (1315)	53° 32·0′	37° 25·2′ W (noon)	20,480	SG
1847	21. x	52° 32·8′	37° 07·9′ W	20,400	SG	1936 A	14. xii (0845)	52° 57·5′	38° 03·7′ W (noon)	890	SG
1848	22. x	53° 56·6′	40° 41·3′ W	350	SG	1936 B	14. xii (1246)			450	SG
1849	22. x	53° 56·7′	40° 05·1′ W	100	SG	1936 C	14. xii (1529)			200	SG
1850	22. x	53° 57·4′	39° 22·8′ W	9,670	SG	1936 D	14. xii (1756)			230	SG
1851	23. x	53° 58·0′	38° 38·6′ W	50	SG	1936 E	14. xii (2022)			510	SG
1852	24. x	Jason Is. Lt.	300° dist. 2·7 miles	380	SG	1936 F	14. xii (2242)			710	SG
1854	3. xi. 36	52° 55·2′	38° 36·1′ W	2,210	SG	1936 G	15. xii (0114)	52° 58·0′	38° 00·4′ W (m'night)	640	SG
1855	4. xi	52° 21·6′	39° 41·3′ W	4,970	SG	1936 H	15. xii (0350)			750	SG
1859	6. xi	51° 27·1′	43° 06·2′ W	410	SS	1936 J	15. xii (0607)	52° 58·8′	37° 59·8′ W (0800)	570	SG
1860	6. xi	52° 42·9′	42° 56·8′ W	10,150	SS	1936 K	15. xii (0827)			930	SG
1861	7. xi	54° 06·6′	42° 49·3′ W	30	SS	1938 A	16 xii (1600)	52° 59·3′	38° 00·5′ W	2,670	SG
1862	7. xi	55° 35·2′	42° 40·1′ W	330	SS	1938 B	16. xii (1900)			2,870	SG
1863	8. xi	57° 10·3′	42° 29·3′ W	4,380	SS	1938 C	16. xii (2200)			1,790	SG
1865	9. xi	59° 41·2′	42° 37·4′ W	440	SS	1938 D	17. xii (0100)	52° 59·3′	38° 00·5′ W (approx.)	1,540	SG
1866	9. xi	61° 03·9′	42° 38·1′ W	40	SS	1938 E	17. xii (0400)			2,570	SG
1867	10. xi	61° 37·6′	43° 56·1′ W	40	SS	1938 F	17. xii (0700)			1,080	SG
1868	10. xi	62° 08·6′	45° 48·0′ W	90	W	1938 G	17. xii (1000)			2,970	SG
1869	11. xi	62° 37·3′	48° 05·2′ W	40	W	1938 H	17. xii (1430)			3,230	SG
1870	11. xi	63° 02·9′	50° 34·9′ W	210	W	1939	20. xii	Jason Is. Lt.	300° dist. 2·5 miles	3,260	SG
1871	12. xi	64° 04·4′	52° 57·5′ W	30	W	1942	31. xii	55° 11·7′	36° 12·6′ W	4,480	SS
1872	12. xi	63° 29·6′	54° 03·1′ W	30	W	1943	31. xii	56° 03·7′	38° 39·4′ W	6,710	SS
1875	13. xi	60° 26·6′	54° 08·4′ W	130	SS						
1876	14. xi	58° 37·7′	54° 54·4′ W	160	SS						

Appendix (*continued*)

Station	Date	Position: Lat. S	Position: Long.	Colour units per m.³	Region or area	Station	Date	Position: Lat. S	Position: Long.	Colour units per m.³	Region or area
1944	2. i. 37	57° 43·5′	43° 45·2′ W	2,240	SS	2089	20. xi. 37	51° 49·1′	24° 58·6′ E	450	N
1945	2. i	58° 22·0′	45° 53·5′ W	1,080	SS	2090	21. xi	52° 58·6′	28° 10·0′ E	150	N
1946	3. i	59° 09·2′	48° 26·6′ W	300	SS	2091	21. xi	54° 11·3′	28° 52·4′ E	190	N
1947	3. i	59° 59·7′	50° 32·2′ W	120	SS	2092	22. xi	54° 49·4′	29° 18·4′ E	170	N
1948	4. i	60° 49·4′	52° 40·0′ W	60	SS	2093	22. xi	55° 39·8′	29° 47·4′ E	130	N
1965	15. ii. 37	59° 54·6′	46° 30·7′ W	60	SS	2094	23. xi	56° 56·9′	31° 25·2′ E	70	I
1966	16. ii	59° 07·4′	47° 45·8′ W	750	SS	2095	24. xi	56° 10·5′	32° 02·3′ E	70	N
1967	16. ii	58° 07·2′	49° 31·7′ W	200	SS	2097	24. xi	56° 01·1′	33° 31·9′ E	160	N
1968	17. ii	57° 20·2′	50° 42·6′ W	140	SS	2098	25. xi	56° 20·7′	37° 33·1′ E	170	I
1969	17. ii	56° 10·7′	52° 26·8′ W	70	SS	2100	25. xi	57° 24·2′	39° 15·1′ E	210	I
1970	18. ii	55° 03·0′	54° 04·2′ W	70	SS	2101	26. xi	57° 56·9′	40° 55·0′ E	250	I
1974	1. iii. 37	52° 58·4′	48° 20·4′ W	340	SS	2103	26. xi	56° 41·4′	43° 16·7′ E	140	I
1975	1. iii	53° 23·6′	45° 58·6′ W	2,260	SS	2104	27. xi	55° 10·1′	46° 24·7′ E	330	N
1976	2. iii	53° 46·1′	44° 18·8′ W	60	SS	2106	27. xi	54° 46·1′	47° 31·0′ E	1,170	N
1977	3. iii	54° 06·0′	40° 36·2′ W	820	SG	2107	28. xi	55° 38·8′	49° 42·7′ E	520	N
1978	3. iii	54° 02·8′	39° 56·7′ W	80	SG	2109	28. xi	56° 41·7′	52° 26·2′ E	70	I
1979	3. iii	54° 02·5′	39° 24·2′ W	35,400	SG	2110	29. xi	57° 30·6′	54° 36·8′ E	100	I
1980	4. iii	54° 02·1′	38° 52·1′ W	60	SG	2113	29. xi	58° 22·9′	57° 10·5′ E	40	I
1981	4. iii	52° 49·7′	36° 56·5′ W	8,170	SG	2114	30. xi	59° 09·7′	59° 36·3′ E	100	I
1982	4. iii	53° 07·5′	37° 00·5′ W	16,560	SG	2116	30. xi	59° 38·7′	61° 03·3′ E	60	I
1983	5. iii	53° 24·7′	36° 58·5′ W	2,790	SG	2117	1. xii. 37	60° 07·1′	65° 20·2′ E	60	I
1984	5. iii	53° 45·0′	36° 58·5′ W	3,350	SG	2119	1. xii	59° 47·6′	68° 05·1′ E	60	I
1986	9. iii	54° 23·7′	35° 31·5′ W	40	SG	2122	2. xii	58° 12·9′	72° 30·6′ E	40	I
1987	9. iii	54° 24·6′	34° 55·8′ W	80	SG	2123	3. xii	57° 14·0′	74° 34·3′ E	110	I
1988	9. iii	54° 26·6′	34° 18·9′ W	50	SG	2125	3. xii	56° 14·7′	76° 37·4′ E	170	N
1990	10. iii	57° 02·2′	31° 28·5′ W	50	SS	2126	4. xii	57° 05·9′	78° 28·6′ E	1,620	N
1992	11. iii	58° 49·5′	29° 07·4′ W	40	I	2127	4. xii	57° 31·0′	79° 38·8′ E	1,720	N
1994	12. iii	60° 35·6′	26° 40·4′ W	9,510	I	2128	4. xii	56° 56·5′	80° 28·7′ E	2,300	N
1996	13. iii	62° 32·5′	24° 32·0′ W	4,950	I	2129	5. xii	55° 56·1′	82° 23·7′ E	1,900	N
1998	14. iii	64° 16·4′	22° 46·6′ W	490	I	2131	5. xii	54° 49·5′	84° 40·3′ E	5,760	N
2000	15. iii	66° 00·4′	20° 54·1′ W	940	I	2132	6. xii	55° 47·1′	86° 36·0′ E	2,020	N
2002	16. iii	68° 19·0′	17° 55·2′ W	120	S	2134	6. xii	57° 05·7′	88° 55·4′ E	1,020	N
2004	17. iii	69° 49·1′	15° 25·3′ W	50	S	2135	7. xii	58° 19·4′	91° 07·7′ E	1,820	N
2006	19. iii	66° 16·7′	13° 23·3′ W	1,350	I	2137	7. xii	59° 28·1′	92° 59·6′ E	4,440	I
2007	19. iii	66° 09·9′	10° 12·3′ W	3,120	I	2138	8. xii	58° 03·9′	93° 47·0′ E	4,140	N
2008	20. iii	66° 06·5′	06° 45·6′ W	4,470	I	2139	8. xii	56° 34·8′	95° 03·4′ E	2,150	N
2010	21. iii	67° 14·3′	00° 39·7′ E	90	S	2140	9. xii	55° 23·0′	96° 07·6′ E	1,750	N
2011	22. iii	65° 14·3′	00° 29·7′ E	230	I	2141	9. xii	53° 50·5′	97° 15·9′ E	1,630	N
2012	22. iii	64° 31·9′	00° 28·6′ E	1,020	I	2142	10. xii	52° 25·7′	98° 19·7′ E	6,760	N
2013	23. iii	62° 43·3′	00° 34·2′ E	2,920	I	2143	10. xii	50° 52·1′	99° 19·1′ E	5,040	N
2014	23. iii	61° 46·5′	00° 35·1′ E	1,580	I	2159	6. i. 38	51° 34·8′	115° 49·0′ E	300	N
2015	25. iii	59° 23·8′	00° 09·3′ E	290	I	2160	6. i	53° 01·4′	115° 49·5′ E	240	N
2016	25. iii	57° 45·9′	00° 04·0′ E	1,480	I	2161	7. i	54° 31·6′	115° 51·5′ E	160	N
2017	26. iii	56° 34·3′	00° 06·7′ E	1,800	I	2162	7. i	56° 06·2′	115° 51·4′ E	660	N
2018	26. iii	54° 55·3′	00° 11·8′ E	2,460	N	2163	8. i	57° 31·9′	115° 46·6′ E	180	N
2019	27. iii	53° 15·4′	00° 16·1′ E	20	N	2164	8. i	58° 48·7′	115° 43·7′ E	190	I
2020	27. iii	52° 25·6′	00° 18·5′ E	50	N	2165	9. i	59° 57·2′	115° 38·1′ E	1,290	I
2021	28. iii	51° 01·7′	00° 24·4′ E	40	N	2166	9. i	61° 06·9′	115° 35·1′ E	1,070	I
2022	28. iii	50° 17·7′	00° 23·1′ E	110	N	2167	10. i	62° 19·6′	115° 30·3′ E	3,060	I

Appendix (*continued*)

Station	Date	Position: Lat. S	Position: Long.	Colour units per m.^{3}	Region or area	Station	Date	Position: Lat. S	Position: Long.	Colour units per m.^{3}	Region or area
2168	10. i. 38	63° 29·1′	115° 26·8′ E	5,420	I	2247	24. ii. 38	68° 59·9′	130° 24·7′ W	3,770	S
2169	11. i	64° 44·6′	115° 16·3′ E	190	I	2248	25. ii	69° 26·6′	128° 08·0′ W	2,010	S
2171	11. i	64° 51·3′	117° 24·2′ E	220	I	2250	25. ii	69° 56·6′	125° 33·3′ W	1,580	S
2172	12. i	64° 21·7	119° 23·0′ E	500	I	2251	26. ii	69° 17·4′	123° 43·7′ W	2,100	S
2174	12. i	63° 33·3′	121° 41·7′ E	2,740	I	2253	26. ii	68° 30·1′	121° 22·5′ W	930	S
2175	13. i	62° 54·3′	124° 05·7′ E	1,480	I	2254	27. ii	67° 55·5′	119° 43·7′ W	2,090	S
2177	13. i	62° 05·7′	127° 05·9′ E	190	I	2255	27. ii	67° 40·8′	119° 10·4′ W	1,730	S
2178	14. i	61° 19·0′	129° 57·5′ E	220	I	2256	28. ii	67° 18·1′	118° 14·3′ W	3,460	S
2180	14. i	62° 19·3′	132° 01·6′ E	250	I	2258	28. ii	66° 26·1′	115° 42·6′ W	2,040	I
2181	15. i	63° 28·8′	134° 25·7′ E	230	I	2259	1. iii. 38	65° 57·0′	114° 20·6′ W	100	I
2183	15. i	64° 53·5′	137° 27·4′ E	630	I	2261	1. iii	66° 50·8′	111° 40·0′ W	740	S
2184	16. i	65° 53·3′	139° 40·4′ E	3,000	I	2262	2. iii	67° 38·7′	109° 15·2′ W	1,240	S
2185	16. i	66° 13·8′	139° 46·4′ E	1,460	I	2264	2. iii	68° 40·6′	106° 16·6′ W	920	S
2186	16. i	65° 18·0′	139° 10·6′ E	870	I	2265	3. iii	69° 38·2′	103° 39·3′ W	1,170	S
2187	17. i	64° 44·6′	141° 28·5′ E	330	I	2266	4. iii	69° 53·7′	103° 24·7′ W	910	S
2189	17. i	64° 06·3′	145° 21·4′ E	260	I	2268	4. iii	70° 11·1′	100° 56·4′ W	340	S
2190	18. i	63° 32·1′	148° 42·8′ E	2,830	I	2269	5. iii	69° 38·2′	97° 52·2′ W	40	S
2192	18. i	62° 44·0′	151° 47·8′ E	1,760	I	2271	5. iii	68° 52·4′	93° 57·6′ W	100	S
2193	19. i	64° 04·7′	153° 43·4′ E	5,190	I	2272	6. iii	68° 17·8′	91° 03·7′ W	670	S
2195	19. i	65° 33·3′	155° 52·8′ E	430	I	2274	6. iii	67° 25·3′	87° 58·4′ W	360	S
2196	20. i	66° 55·6′	157° 59·5′ E	5,660	S	2275	7. iii	66° 24·9′	84° 58·4′ W	120	ESP
2198	20. i	66° 29·9′	160° 16·9′ E	2,220	I	2277	7. iii	65° 19·6′	81° 42·0′ W	90	ESP
2199	21. i	66° 25·3′	162° 06·5′ E	57,830	Sp.	2278	8. iii	64° 31·6′	79° 21·1′ W	70	ESP
2200	21. i	67° 09·6′	163° 27·7′ E	3,270	S	2280	8. iii	64° 25·9′	75° 47·1′ W	2,000	ESP
2201	22. i	65° 48·1′	162° 17·6′ E	1,580	I	2281	9. iii	64° 23·0′	73° 18·5′ W	1,280	ESP
2202	23. i	64° 07·9′	162° 14·7′ E	6,600	I	2283	9. iii	63° 57·6′	69° 56·6′ W	590	SS
2204	23. i	62° 31·4′	162° 58·4′ E	2,270	I	2284	10. iii	63° 33·8′	67° 27·5′ W	1,120	SS
2205	24. i	60° 49·1′	164° 07·6′ E	330	N	2285	10. iii	63° 26·1′	66° 57·9′ W	1,870	SS
2206	24/25.	59° 26·0′	165° 08·9′ E	430	N	2286	11. iii	61° 18·9′	65° 24·5′ W	230	SS
2207	25. i	58° 30·0′	165° 50·7′ E	640	N	2287	12. iii	59° 43·2′	64° 12·1′ W	300	SS
2220	13. ii. 38	58° 38·8′	169° 33·6′ W	120	NRS	2293	22. iii	57° 34·9′	51° 06·2′ W	< 100	SS
2221	14. ii	60° 56·1′	168° 20·1′ W	120	NRS	2294	23. iii	58° 44·8′	49° 47·8′ W	< 100	SS
2222	15. ii	62° 11·9′	167° 40·2′ W	120	NRS	2295	23. iii	59° 58·0′	48° 28·1′ W	< 100	SS
2223	16. ii	63° 19·4′	167° 20·9′ W	1,080	NRS	2296	24. iii	61° 22·7′	46° 43·1′ W	160	SS
2224	16. ii	64° 51·3′	166° 34·6′ W	130	NRS	2297	25. iii	62° 21·2′	45° 05·3′ W	< 100	W
2225	17. ii	65° 56·2′	166° 09·8′ W	70	NRS	2298	25. iii	61° 09·6′	43° 15·6′ W	< 100	SS
2226	17. ii	67° 19·6′	165° 07·4′ W	480	S	2299	26. iii	59° 52·6′	41° 40·4′ W	< 100	SS
2227	18. ii	68° 25·9′	164° 11·2′ W	1,150	S	2300	26. iii	58° 33·0′	39° 54·7′ W	< 100	SS
2229	18. ii	68° 09·3′	161° 19·6′ W	410	S	2301	27. iii	57° 14·0′	38° 13·5′ W	< 100	SS
2230	19. ii	67° 34·2′	158° 47·3′ W	1,050	S	2302	27. iii	55° 56·3′	36° 42·9′ W	< 100	SS
2232	19. ii	67° 10·1′	155° 17·1′ W	3,460	S	2304	4. iv. 38	54° 03·9′	33° 54·4′ W	< 100	SG
2233	20. ii	66° 22·0′	152° 43·7′ W	280	NRS	2305	5. iv	54° 13·6′	29° 08·9′ W	< 100	N
2235	20. ii	65° 22·8′	149° 34·6′ W	510	I	2306	6. iv	53° 32·4′	24° 16·4′ W	1,640	N
2236	21. ii	64° 35·4′	147° 11·2′ W	670	I	2307	7. iv	52° 54·2′	19° 47·9′ W	3,400	N
2238	21. ii	63° 40·5′	144° 26·4′ W	730	I	2308	8. iv	52° 14·4′	15° 07·8′ W	420	N
2239	22. ii	64° 31·8′	142° 01·6′ W	1,540	I	2309	9. iv	51° 32·1′	10° 25·2′ W	100	N
2241	22. ii	65° 39·0′	139° 16·7′ W	1,240	I	2310	10. iv	50° 46·2′	05° 14·1′ W	100	N
2242	23. ii	66° 29·5′	137° 05·5′ W	550	I	2311	11. iv	50° 05·2′	00° 03·0′ W	100	N
2244	23. ii	67° 21·8′	134° 30·0′ W	1,230	S	2312	12. iv	51° 24·9′	00° 15·4′ E	630	N
2245	24. ii	68° 04·0′	132° 51·6′ W	740	S	2313	12. iv	52° 27·0′	00° 29·2′ E	60	N

Appendix (*continued*)

Station	Date	Position: Lat. S	Position: Long.	Colour units per m.³	Region or area	Station	Date	Position: Lat. S	Position: Long.	Colour units per m.³	Region or area
2314	13. iv. 38	53° 41·6′	00° 48·6′ E	80	N	2392	17. viii. 38	55° 59·7′	00° 31·5′ E	<50	N
2315	14. iv	56° 07·9′	01° 20·8′ E	3,620	N	2393	17. viii	56° 42·3′	00° 38·3′ E	<50	N
2316	14. iv	57° 15·5′	01° 13·4′ E	1,600	I	2394	18. viii	57° 18·5′	00° 52·2′ E	<50	N
2317	15. iv	58° 07·4′	01° 06·6′ E	1,830	I	2395	18. viii	56° 48·9′	01° 59·5′ E	<50	N
2318	15. iv	58° 58·7′	01° 00·0′ E	240	I	2396	19. viii	56° 17·7′	03° 07·9′ E	<50	N
2319	16. iv	60° 01·3′	00° 51·6′ E	1,040	I	2399	19. viii	54° 47·1′	06° 31·3′ E	<50	N
2320	16. iv	61° 10·6′	00° 43·7′ E	<100	I	2400	20. viii	54° 29·3′	07° 23·7′ E	<50	N
2321	17. iv	62° 21·5′	00° 37·5′ E	<100	I	2402	20. viii	53° 15·3′	09° 22·9′ E	70	N
2322	17. iv	63° 53·0′	00° 24·4′ E	<100	I	2403	21. viii	52° 16·4′	10° 44·1′ E	<50	N
2323	18. iv	65° 04·5′	01° 00·9′ E	<100	I	2405	21. viii	53° 23·3′	13° 05·2′ E	<50	N
2325	18. iv	64° 39·2′	03° 14·8′ E	220	I	2406	22. viii	53° 53·4′	14° 14·6′ E	<50	N
2326	19. iv	64° 45·2′	06° 19·8′ E	140	I	2408	22. viii	54° 52·4′	16° 22·2′ E	<50	N
2328	19. iv	64° 51·2′	09° 05·7′ E	80	I	2409	23. viii	55° 31·5′	17° 53·2′ E	<50	N
2329	20. iv	64° 57·6′	12° 12·2′ E	280	I	2411	23. viii	56° 25·0′	19° 54·7′ E	<50	I
2331	20. iv	65° 13·0′	15° 55·3′ E	270	I	2412	24. viii	55° 41·9′	20° 29·4′ E	<50	N
2332	21. iv	65° 25·3′	18° 08·8′ E	100	I	2413	25. viii	54° 25·7′	20° 21·6′ E	<50	N
2334	21. iv	66° 04·3′	20° 11·2′ E	120	I	2414	25. viii	53° 11·6′	20° 25·9′ E	90	N
2335	22. iv	67° 10·6′	20° 24·5′ E	80	S	2415	26. viii	51° 44·4′	20° 49·0′ E	90	N
2336	22. iv	66° 21·4′	20° 21·2′ E	110	I	2416	26. viii	50° 15·5′	20° 43·7′ E	120	N
2337	23. iv	64° 50·7′	20° 09·6′ E	50	I	2427	23. ix. 38	50° 48·7′	00° 39·8′ E	<50	N
2338	23. iv	63° 41·7′	20° 01·2′ E	130	I	2428	23. ix	51° 57·7′	00° 35·8′ E	<50	N
2339	24. iv	62° 43·1′	19° 53·1′ E	110	I	2429	24. ix	53° 15·8′	00° 31·1′ E	80	N
2340	24. iv	61° 35·4′	19° 45·9′ E	180	I	2430	24. ix	54° 14·1′	00° 29·0′ E	80	N
2341	25. iv	60° 10·7′	19° 40·5′ E	60	I	2431	25. ix	55° 26·2′	00° 25·5′ E	90	N
2342	25. iv	58° 53·9′	19° 33·9′ E	210	I	2432	25. ix	55° 36·7′	00° 30·4′ E	<50	N
2343	26. iv	57° 28·9′	19° 32·9′ E	320	I	2433	26. ix	54° 24·4′	02° 57·5′ E	580	N
2344	26. iv	56° 18·4′	19° 32·6′ E	1,140	N	2435	26. ix	53° 19·3′	05° 16·4′ E	140	N
2345	27. iv	55° 05·1′	19° 30·4′ E	950	N	2436	27. ix	52° 37·0′	06° 51·9′ E	100	N
2346	27. iv	53° 35·5′	19° 29·3′ E	2,250	N	2438	27. ix	51° 25·2′	08° 52·5′ E	60	N
2347	28. iv	52° 15·0′	19° 27·5′ E	690	N	2439	28. ix	50° 33·7′	10° 09·6′ E	120	N
2359	10. vii. 38	51° 11·4′	00° 25·2′ E	<50	N	2441	28. ix	51° 45·1′	12° 14·7′ E	150	N
2360	11. vii	52° 37·6′	00° 11·3′ E	<50	N	2442	29. ix	52° 30·9′	13° 33·8′ E	400	N
2361	11. vii	53° 50·6′	00° 00·8′ E	<50	N	2444	30. ix	54° 06·5′	16° 21·5′ E	80	N
2362	12. vii	54° 59·3′	01° 10·2′ E	<50	N	2446	30. ix	55° 01·0′	18° 21·0′ E	80	N
2363	13. vii	54° 11·6′	02° 50·1′ E	<50	N	2447	1. x. 38	54° 46·6′	19° 51·0′ E	110	N
2365	13. vii	53° 23·4′	04° 50·5′ E	<50	N	2448	2. x	52° 21·9′	20° 15·9′ E	580	N
2367	14. vii	51° 33·1′	09° 04·8′ E	<50	N	2449	2. x	51° 34·7′	20° 16·4′ E	120	N
2368	15. vii	50° 59·2′	10° 32·9′ E	<50	N	2462	26. x	51° 19·2′	02° 13·3′ E	<50	N
2370	15. vii	51° 47·9′	12° 42·8′ E	<50	N	2463	26. x	52° 41·8′	02° 11·4′ E	1,280	N
2371	16. vii	52° 30·3′	14° 36·7′ E	<50	N	2464	27. x	53° 52·4′	01° 56·7′ E	480	N
2372	16. vii	53° 10·6′	15° 47·5′ E	<50	N	2465	27. x	55° 16·6′	01° 38·4′ E	140	N
2373	17. vii	54° 13·0′	17° 18·8′ E	<50	N	2466	28. x	54° 41·2′	02° 33·9′ E	1,320	N
2374	19. vii	55° 41·8′	21° 08·6′ E	140	N	2468	28. x	53° 32·1′	04° 50·6′ E	4,000	N
2375	20. vii	53° 54·9′	21° 17·6′ E	<50	N	2469	29. x	52° 52·6′	06° 07·2′ E	690	N
2376	20. vii	53° 07·6′	21° 15·0′ E	<50	N	2471	29. x	51° 34·2′	08° 50·9′ E	170	N
2377	22. vii	50° 19·8′	21° 22·2′ E	<50	N	2472	30. x	50° 45·6′	10° 26·8′ E	<50	N
2388	15. viii. 38	51° 32·2′	00° 03·9′ E	<50	N	2474	30. x	51° 53·6′	12° 40·6′ E	1,730	N
2389	15. viii	52° 35·3′	00° 04·5′ E	<50	N	2475	31. x	52° 35·1′	14° 05·9′ E	2,670	N
2390	16. viii	53° 37·0′	00° 11·5′ E	<50	N	2476	31. x	53° 18·7′	15° 33·0′ E	1,410	N
2391	16. viii	55° 03·3′	00° 19·1′ E	<50	N	2477	1. xi. 38	54° 30·4′	18° 46·0′ E	180	N

Appendix (*continued*)

Station	Date	Position: Lat. S	Position: Long.	Colour units per m.^{3}	Region or area	Station	Date	Position: Lat. S	Position: Long.	Colour units per m.^{3}	Region or area
2478	2. xi. 38	54° 17·3′	20° 16·4′ E	190	N	2562	28. i. 39	66° 05·3′	19° 11·6′ E	1,800	I
2479	2. xi	53° 02·5′	18° 33·0′ E	210	N	2563	28. i	65° 06·5′	19° 16·5′ E	3,010	I
2480	3. xi	51° 37·8′	18° 46·0′ E	810	N	2564	29. i	62° 54·3′	19° 39·6′ E	2,110	I
2481	3. xi	50° 44·2′	20° 16·4′ E	780	N	2565	29. i	61° 16·0′	19° 43·5′ E	1,210	I
2496	2. xii. 38	50° 20·7′	01° 03·3′ E	120	N	2566	30. i	59° 37·4′	19° 47·8′ E	1,480	I
2497	3. xii	51° 50·1′	00° 55·2′ E	990	N	2567	30. i	58° 12·0′	19° 46·0′ E	750	I
2498	3. xii	52° 53·5′	00° 50·3′ E	1,260	N	2568	31. i	56° 40·2′	19° 43·4′ E	1,840	I
2499	4. xii	53° 50·7′	00° 46·6′ E	4,030	N	2569	31. i	55° 21·1′	19° 39·3′ E	4,140	N
2500	4. xii	55° 05·8′	00° 51·7′ E	7,570	N	2570	1. ii. 39	54° 04·0′	19° 33·6′ E	2,560	N
2501	5. xii	55° 30·2′	01° 23·7′ E	2,260	N	2571	1. ii	52° 43·4′	19° 34·4′ E	3,050	N
2502	5. xii	54° 54·4′	02° 35·0′ E	3,670	N	2572	2. ii	51° 16·1′	19° 39·1′ E	130	N
2503	6. xii	53° 33·9′	05° 06·3′ E	5,130	N	2573	2. ii	49° 59·1′	19° 42·4′ E	1,200	N
2504	6. xii	53° 08·1′	05° 51·0′ E	1,070	N	2586	24. ii	52° 29·1′	00° 59·4′ E	980	N
2505	7. xii	52° 20·1′	07° 11·9′ E	430	N	2587	25. ii	53° 50·5′	00° 46·8′ E	340	N
2507	7. xii	51° 41·8′	08° 16·7′ E	270	N	2588	25. ii	55° 08·5′	00° 42·4′ E	180	N
2508	8. xii	51° 10·4′	10° 56·4′ E	200	N	2589	26. ii	56° 24·4′	00° 43·5′ E	490	N
2510	8. xii	52° 20·6′	13° 01·2′ E	4,090	N	2590	26. ii	57° 32·0′	00° 40·1′ E	120	I
2511	9. xii	53° 16·7′	14° 41·0′ E	1,360	N	2591	27. ii	58° 32·2′	00° 27·8′ E	240	I
2513	9. xii	54° 10·2′	16° 35·4′ E	790	N	2592	27. ii	59° 30·7′	00° 23·6′ E	130	I
2514	10. xii	55° 08·5′	18° 33·6′ E	310	N	2593	28. ii	60° 46·2′	00° 17·9′ E	160	I
2516	10. xii	56° 29·7′	19° 50·6′ E	180	I	2594	28. ii	61° 51·7′	00° 11·7′ E	310	I
2517	11. xii	56° 56·9′	19° 30·3′ E	460	I	2595	1. iii. 39	63° 05·0′	00° 00·8′ E	1,210	I
2518	12. xii	53° 07·2′	19° 30·8′ E	1,540	N	2596	1. iii	64° 29·0′	00° 12·0′ E	2,980	I
2519	12. xii	51° 56·8′	19° 32·4′ E	560	N	2597	2. iii	65° 53·3′	00° 40·3′ E	1,010	I
2534	16. i. 39	51° 11·0′	02° 48·5′ E	1,940	N	2598	2. iii	67° 15·6′	00° 44·5′ E	100	S
2535	16. i	52° 40·8′	02° 45·4′ E	5,200	N	2599	3. iii	68° 28·5′	00° 39·5′ E	50	S
2537	17. i	54° 56·8′	03° 31·2′ E	270	N	2600	3. iii	69° 11·2′	00° 24·2′ E	620	S
2538	18. i	57° 11·9′	03° 33·7′ E	980	I	2601	4. iii	69° 43·7′	01° 05·1′ E	1,090	S
2540	19. i	59° 22·6′	03° 23·3′ E	160	I	2603	4. iii	69° 47·8′	02° 21·7′ E	1,030	S
2541	19. i	60° 41·7′	03° 13·9′ E	1,130	I	2604	5. iii	69° 54·9′	03° 32·7′ E	1,010	S
2542	20. i	62° 01·8′	03° 02·8′ E	350	I	2607	7. iii	67° 25·4′	10° 39·7′ E	550	S
2543	20. i	63° 24·7′	02° 44·7′ E	640	I	2608	7. iii	66° 17·0′	12° 29·8′ E	660	I
2544	21. i	64° 59·3′	02° 22·0′ E	140	I	2609	8. iii	65° 05·0′	14° 21·3′ E	1,100	I
2545	21. i	66° 23·7′	02° 16·2′ E	180	I	2610	8. iii	64° 11·3′	15° 38·5′ E	490	I
2546	22. i	68° 01·2′	02° 08·4′ E	180	S	2611	9. iii	62° 26·6′	18° 03·8′ E	1,100	I
2547	22. i	69° 30·2′	02° 04·7′ E	1,110	S	2612	9. iii	61° 10·3′	19° 01·4′ E	60	I
2548	23. i	68° 43·8′	04° 37·0′ E	< 100	S	2613	10. iii	60° 24·3′	19° 06·7′ E	240	I
2550	23. i	67° 27·8′	06° 35·3′ E	130	S	2614	10. iii	59° 17·4′	19° 10·1′ E	370	I
2551	24. i	66° 21·9′	07° 54·2′ E	580	I	2615	11. iii	58° 25·9′	19° 15·0′ E	550	I
2553	24. i	65° 18·6′	09° 52·4′ E	740	I	2616	11. iii	57° 23·9′	19° 18·3′ E	3,490	I
2554	25. i	66° 05·2′	11° 10·3′ E	610	I	2617	12. iii	56° 29·0′	19° 24·3′ E	4,000	I
2556	25. i	67° 04·1′	13° 01·3′ E	80	S	2618	12. iii	55° 21·9′	19° 27·6′ E	1,780	N
2557	26. i	68° 01·6′	14° 56·1′ E	< 50	S	2619	13. iii	53° 58·7′	19° 32·7′ E	740	N
2558	26. i	69° 00·7′	17° 06·6′ E	140	S	2620	13. iii	52° 57·1′	19° 36·8′ E	610	N
2559	27. i	68° 49·7′	19° 10·5′ E	130	S	2621	14. iii	51° 44·5′	19° 42·6′ E	< 50	N
2560	27. i	68° 38·4′	19° 13·3′ E	380	S	2622	14. iii	50° 19·5′	19° 43·0′ E	100	N

DISCOVERY REPORTS

Issued by the Discovery Committee, Colonial Office, London
on behalf of the Government of the Dependencies of the Falkland Islands

Vol. XXI, pp. i–vi

TITLE-PAGE AND LIST OF CONTENTS

CAMBRIDGE
AT THE UNIVERSITY PRESS
1942

Price ninepence net

CAMBRIDGE
UNIVERSITY PRESS
LONDON: BENTLEY HOUSE
NEW YORK, TORONTO, BOMBAY
CALCUTTA, MADRAS: MACMILLAN

PRINTED
IN GREAT BRITAIN
BY
WALTER LEWIS MA
AT
THE CAMBRIDGE
UNIVERSITY
PRESS

DISCOVERY REPORTS

Vol. XXI, pp. 1–226, plates I–IV

Issued by the Discovery Committee, Colonial Office, London
on behalf of the Government of the Dependencies of the Falkland Islands

STATION LIST

1931—1933

CAMBRIDGE
AT THE UNIVERSITY PRESS
1941

Price thirty-three shillings net

CAMBRIDGE
UNIVERSITY PRESS
LONDON: BENTLEY HOUSE
NEW YORK, TORONTO, BOMBAY
CALCUTTA, MADRAS: MACMILLAN
TOKYO: MARUZEN COMPANY LTD

PRINTED
IN GREAT BRITAIN
BY
WALTER LEWIS MA
AT
THE CAMBRIDGE
UNIVERSITY
PRESS

DISCOVERY REPORTS

Vol. XXI, pp. 227–234, plates V, VI

Issued by the Discovery Committee, Colonial Office, London
on behalf of the Government of the Dependencies of the Falkland Islands

A RARE PORPOISE OF THE SOUTH ATLANTIC, *PHOCAENA DIOPTRICA* (LAHILLE, 1912)

by

J. E. Hamilton, D.Sc.

CAMBRIDGE
AT THE UNIVERSITY PRESS
1941

Price two shillings net

LONDON
Cambridge University Press
BENTLEY HOUSE, N.W.1

NEW YORK · TORONTO
BOMBAY · CALCUTTA · MADRAS
Macmillan

TOKYO
Maruzen Company Ltd

PRINTED
IN GREAT BRITAIN
BY
WALTER LEWIS MA
AT
THE CAMBRIDGE
UNIVERSITY
PRESS

DISCOVERY REPORTS

Vol. XXI, pp. 235–260, plates VII, VIII

Issued by the Discovery Committee, Colonial Office, London
on behalf of the Government of the Dependencies of the Falkland Islands

THE ECHIURIDAE, SIPUNCULIDAE AND PRIAPULIDAE COLLECTED BY THE SHIPS OF THE DISCOVERY COMMITTEE DURING THE YEARS 1926 TO 1937

by

A. C. Stephen, D.Sc.
The Royal Scottish Museum, Edinburgh

CAMBRIDGE
AT THE UNIVERSITY PRESS
1941

Price four shillings and sixpence net

LONDON
Cambridge University Press
BENTLEY HOUSE, N.W.1

NEW YORK · TORONTO
BOMBAY · CALCUTTA · MADRAS
Macmillan

TOKYO
Maruzen Company Ltd

PRINTED
IN GREAT BRITAIN
BY
WALTER LEWIS MA
AT
THE CAMBRIDGE
UNIVERSITY
PRESS

DISCOVERY REPORTS

Vol. XXI, pp. 261–356

Issued by the Discovery Committee, Colonial Office, London
on behalf of the Government of the Dependencies of the Falkland Islands

PHYTOPLANKTON PERIODICITY IN ANTARCTIC SURFACE WATERS

by

T. John Hart, D.Sc.

CAMBRIDGE
AT THE UNIVERSITY PRESS
1942

Price thirteen shillings and sixpence net

CAMBRIDGE
UNIVERSITY PRESS
LONDON: BENTLEY HOUSE
NEW YORK, TORONTO, BOMBAY
CALCUTTA, MADRAS: MACMILLAN

PRINTED
IN GREAT BRITAIN
BY
WALTER LEWIS MA
AT
THE CAMBRIDGE
UNIVERSITY
PRESS