

OCEANOGRAPHICAL STATION LIST

VOLUME 80

INVESTIGATIONS BY F.R.V. *LANCELIN* IN WESTERN
AUSTRALIAN WATERS IN 1963

DIVISION OF FISHERIES AND OCEANOGRAPHY
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION, AUSTRALIA 1968

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When citing this station list, abbreviate as follows:
CSIRO Aust. Oceanogr. Stn List 80.

OCEANOGRAPHICAL STATION LIST

VOLUME 80

Investigations by F.R.V. Lancelin in Western Australian Waters in 1963

I. INTRODUCTION

This report records the hydrological data collected during two months' work in Western Australian waters by F.R.V. Lancelin in 1963.

The cruise was planned to investigate the spawning of Western Australian salmon. Track charts and station positions are given in Figures 1 (a)-(e).

II. WORK ACCOMPLISHED

Ninety-five stations were worked. Surface samples were taken at 54 stations, and subsurface temperatures were taken at 41 stations. Surface horizontal plankton tows were made at 95 stations; horizontal plankton tows-underway samples were taken at 82 stations. The cruise was staffed by Messrs I.S.R. Munro and R. Favelle.

III. METHOD OF COLLECTION AND ANALYSIS OF SAMPLES

1. Physics

Temperature.—Surface temperatures were taken with a fisherman's thermometer (Vaux 1961). Subsurface temperatures were taken with a deep-sea reversing-thermometer; the values are uncorrected for index error and expansion of the mercury column after reversal of the thermometer. Surface and subsurface temperatures are considered accurate to about ± 0.2 degC.

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

2. Chemistry

Salinity.—Sea-water samples were analysed at Cronulla for chlorinity, by a meter of the conductivity type (Hamon 1956). The results were converted to salinity by the relation -

$$\text{Salinity} = 0.03 + 1.805 \times \text{Chlorinity}$$

Salinities are considered accurate to about $\pm 0.05\%$.

REFERENCES

- HAMON, B.V. (1956).—A portable temperature-chlorinity bridge for estuarine investigations and seawater analysis. J. scient. Instrum. 33, 329-33.
- LA FOND, E.C. (1951).—Processing oceanographic data. U.S. Navy Hydrogr. Off. Publ. No. 614.
- VAUX, D. (1961).—Measurement of sea water temperatures by fishermen. Aust. Fish. Leafl. No. 6.

IV. TRACK CHARTS

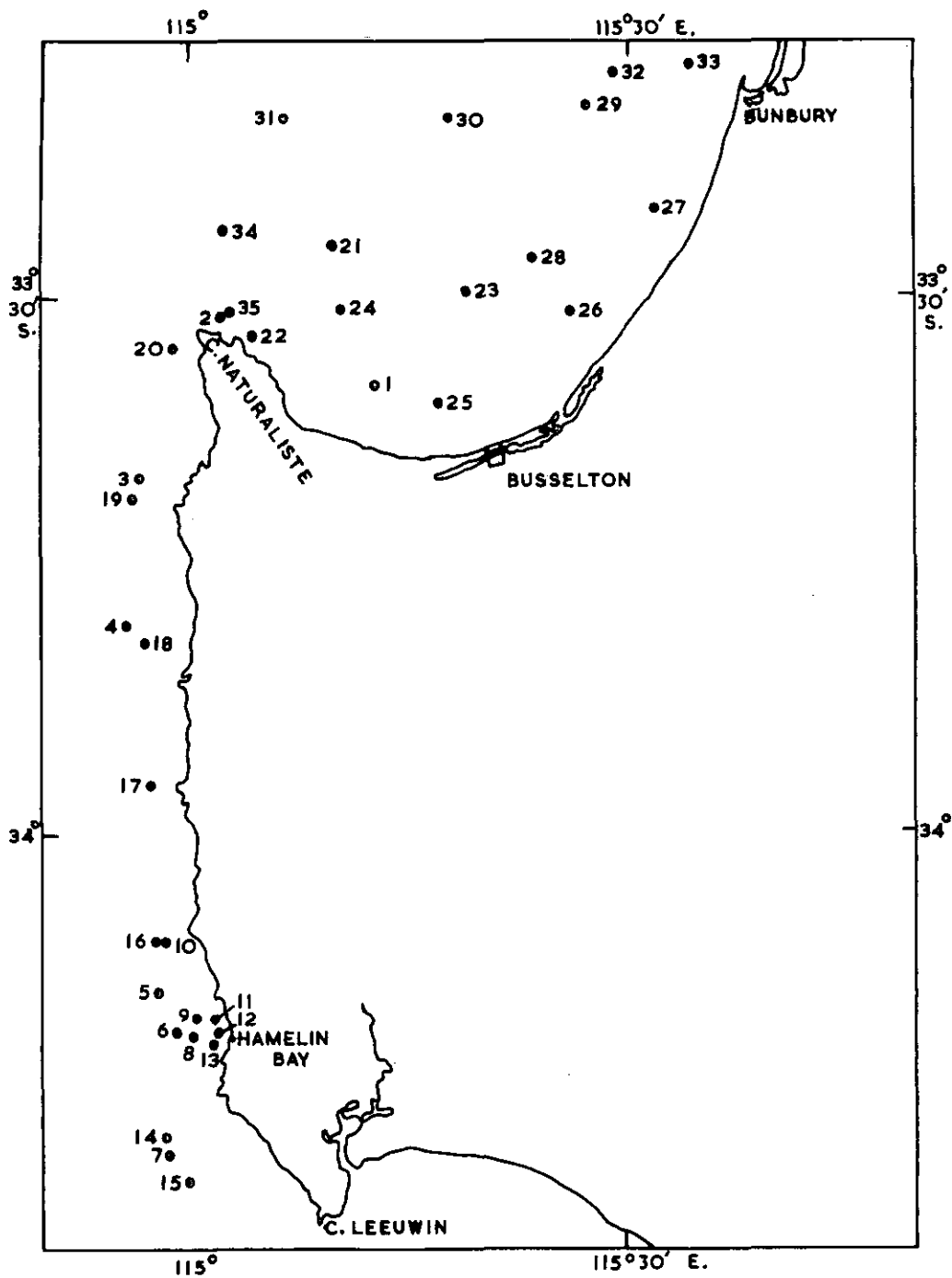


Fig. 1(a)-Track chart Cruise Ln 1/63. Stations 1-35

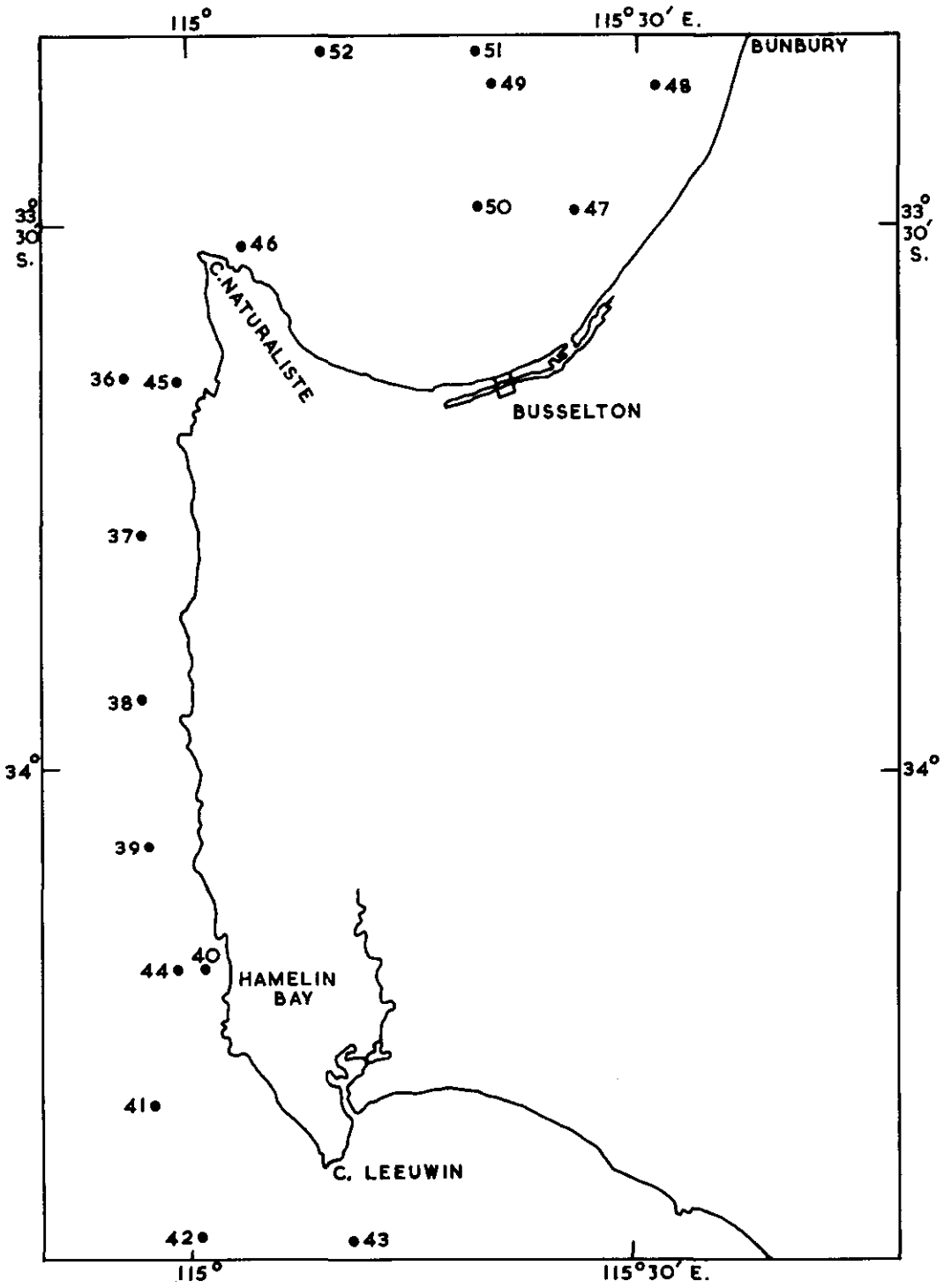


Fig.1 (b)-Track chart Cruise Ln 1/63. Stations 36-52

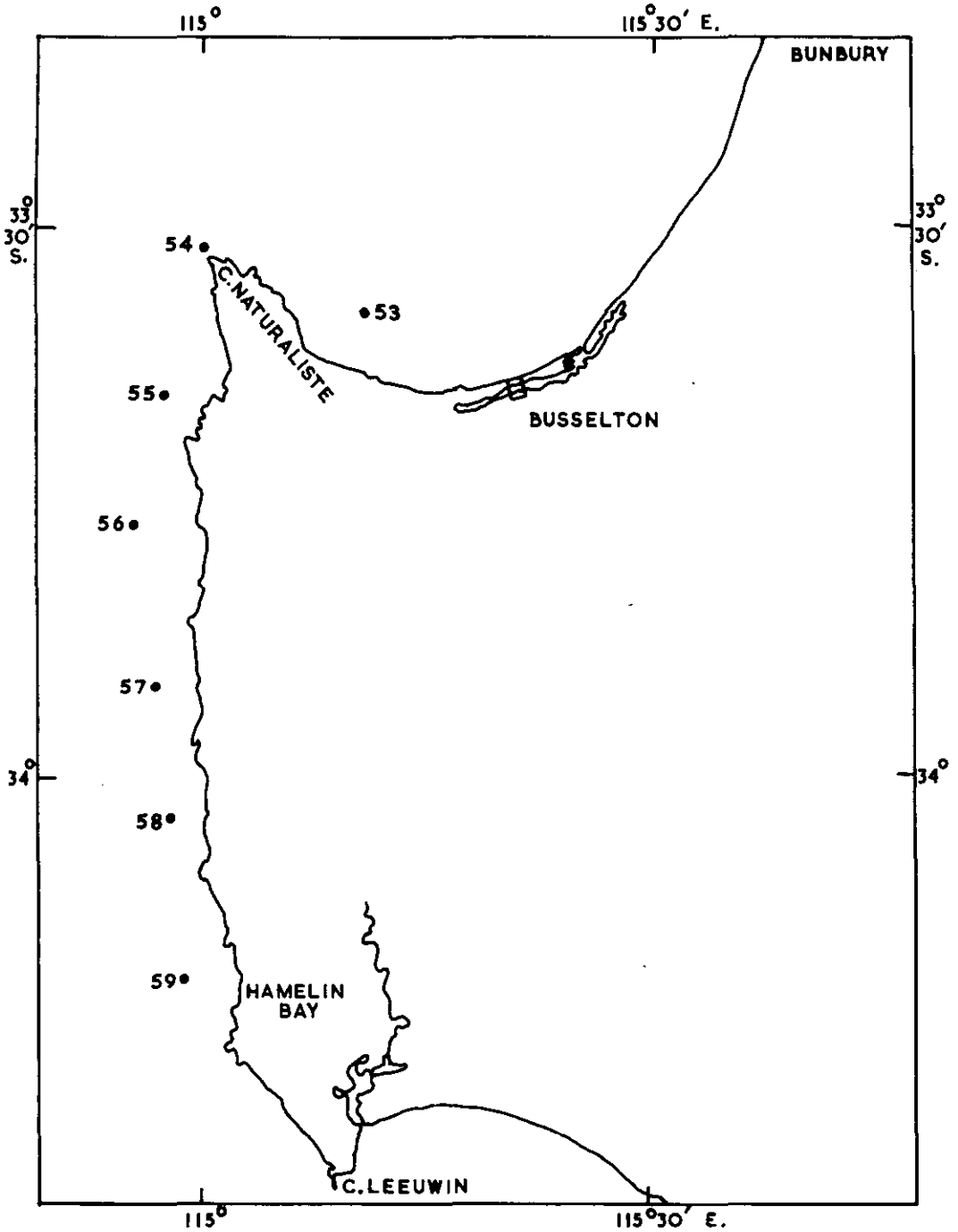


Fig. 1(c).-Track chart Cruise Ln 1/63. Stations 53-59

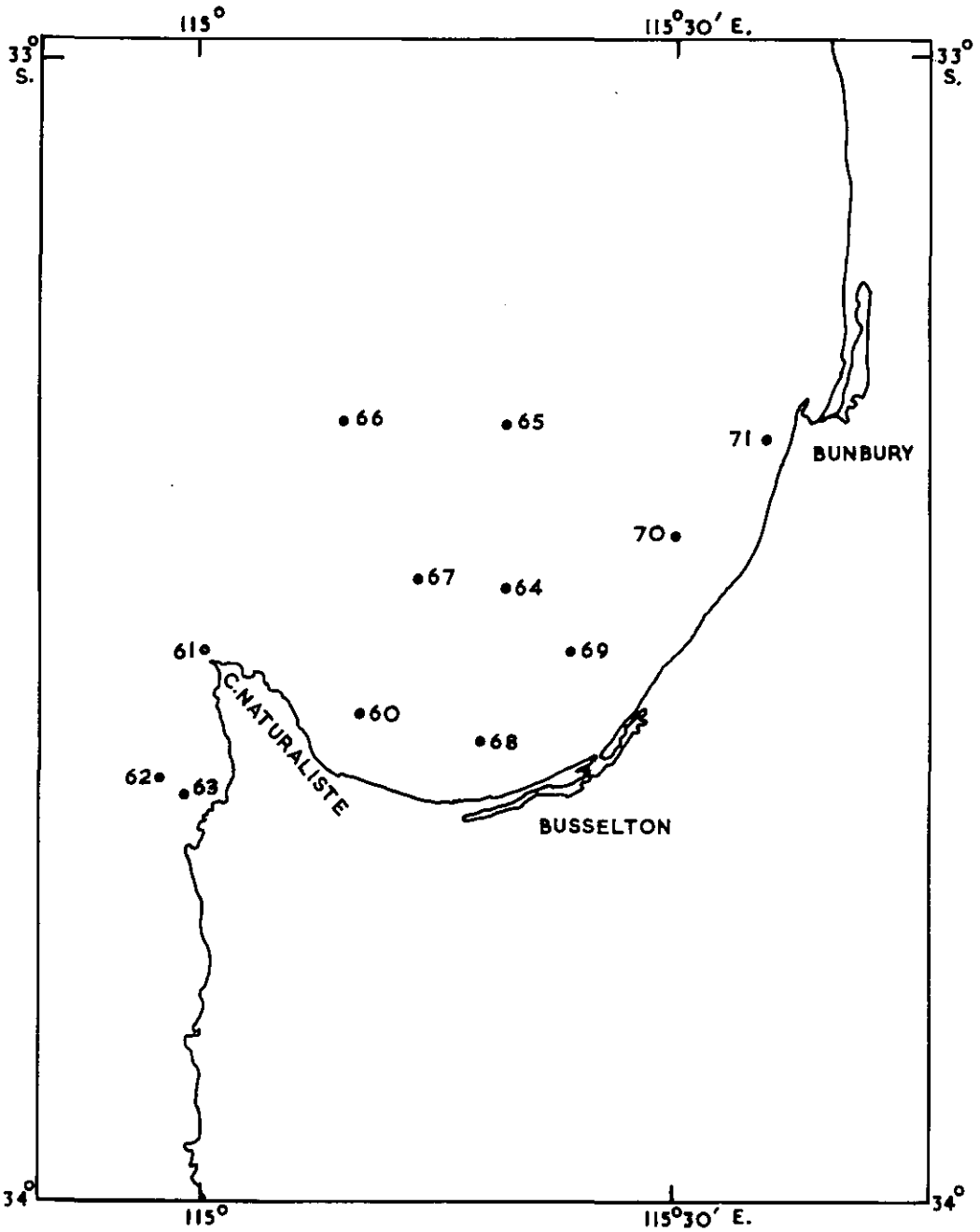


Fig. 1(d)-Track chart Cruise Ln 1/63. Stations 60 - 71

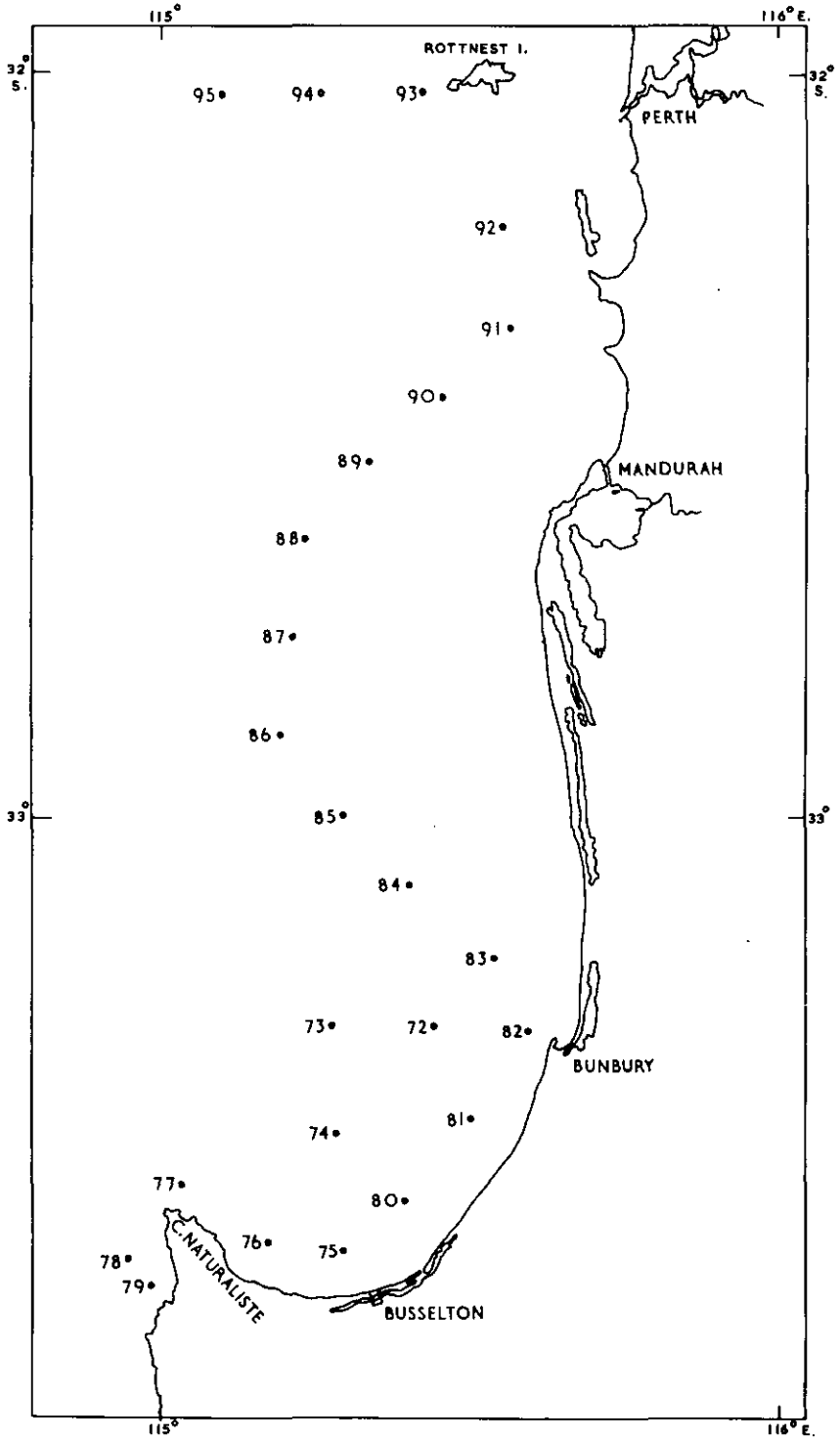


Fig. 1(e): Track chart Cruise Ln 1/63 Stations 72-95

V. DATA

The data were processed in a C.D.C. 3600 Computer.

EXPLANATION OF HEADINGS

Parts 1 and 2Hydrology

STATION	Gives the station identification. For example, L1/36/63 signifies the 36th station worked by <u>Lancelin</u> in 1963, on her 1st cruise for that year
DATE	Given as day/month/year
TIME	Given in Zone Time, and is the time at the beginning of the first cast. Zone Time throughout the cruise was Western Australian Standard Time, GMT +8 hr, Code H
LATITUDE LONGITUDE	Given in degrees and minutes
CAST	Gives the cast number
DEPTH	Sampling depth given in metres
TEMP.	Sea temperatures recorded in °C
SALINITY	Given in parts per thousand
SIGMA-T	Sigma-t to 2 decimal places

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

DATA
PART 1
HYDROLOGY
SURFACE SAMPLES

VESSEL CRUISE STATION YR. MTH. DAY TIME LATITUDE LONGITUDE TEMP. SALINITY WIND SEA SWELL WEA. VIS. TIDOC
 DN. AMT. DN. AMT. DN. AMT. DN. AMT.

A7	1	1	63	3	28	0755	H	33	35	S	115	14	E	22.0	36.00		
A7	1	2	63	3	28	0950	H	33	31	S	115	03	E	22.8	35.63		
A7	1	3	63	3	28	1150	H	33	40	S	114	57	E	23.2	35.54		
A7	1	4	63	3	28	1320	H	33	48	S	114	56	E	23.2	35.71		
A7	1	5	63	3	28	1635	H	34	09	S	114	58	E	23.2	35.58		
A7	1	6	63	3	29	0905	H	34	11	S	114	59	E	22.5	35.71		
A7	1	7	63	3	29	1040	H	34	18	S	114	59	E	22.7			
A7	1	8	63	3	29	1220	H	34	12	S	115	01	E	22.6	35.69		
A7	1	9	63	3	29	1250	H	34	10	S	115	00	E	22.4	35.60		
A7	1	10	63	3	29	1410	H	34	06	S	114	59	E	22.8	35.65		
A7	1	11	63	3	30	0910	H	34	11	S	115	02	E	22.0			
A7	1	12	63	3	30	0923	H	34	12	S	115	01	E				
A7	1	13	63	3	30	0940	H	34	12	S	115	01	E				
A7	1	14	63	3	30	1415	H	34	17	S	114	59	E	22.7	35.63		
A7	1	15	63	3	30	1515	H	34	20	S	115	00	E	22.9	35.60		
A7	1	16	63	3	31	1105	H	34	06	S	114	58	E	22.5	36.03		
A7	1	17	63	3	31	1220	H	33	58	S	114	58	E	22.7	35.63		
A7	1	18	63	3	31	1350	H	33	49	S	114	57	E	22.7	35.62		
A7	1	19	63	3	31	1515	H	33	42	S	114	57	E	22.8	36.03		
A7	1	20	63	3	31	1635	H	33	35	S	115	00	E	22.8	35.67		
A7	1	21	63	4	1	1415	H	33	27	S	115	11	E	23.6	35.63		
A7	1	22	63	4	1	1605	H	33	32	S	115	05	E	23.3			
A7	1	23	63	4	3	1345	H	33	30	S	115	20	E	22.7	35.69		
A7	1	24	63	4	3	1510	H	33	31	S	115	11	E	23.0	35.63		
A7	1	25	63	4	3	1635	H	33	36	S	115	18	E	22.3	35.74		
A7	1	26	63	4	4	1220	H	33	31	S	115	27	E	21.9	36.03		
A7	1	27	63	4	4	1345	H	33	25	S	115	33	E	21.9	36.18		
A7	1	28	63	4	5	0945	H	33	28	S	115	24	E	21.8	35.80		
A7	1	29	63	4	5	1105	H	33	20	S	115	28	E	21.4	36.14		
A7	1	30	63	4	5	1230	H	33	20	S	115	19	E	22.3	35.78		
A7	1	31	63	4	5	1350	H	33	20	S	115	07	E	22.3	35.71		
A7	1	32	63	4	5	1700	H	33	18	S	115	30	E	21.8	36.27		
A7	1	33	63	4	5	1745	H	33	17	S	115	35	E	21.7	36.14		
A7	1	34	63	4	7	1325	H	33	27	S	115	03	E	22.2	35.83		
A7	1	35	63	4	7	1445	H	33	31	S	115	04	E	22.2	35.71		
A7	1	36	63	4	9	1055	H	33	38	S	114	56	E	22.1	35.74		
A7	1	37	63	4	9	1215	H	33	47	S	114	57	E	22.2	35.67		
A7	1	38	63	4	9	1350	H	33	56	S	114	57	E	22.2	35.63		
A7	1	39	63	4	9	1535	H	34	05	S	114	58	E	22.2	35.63		
A7	1	40	63	4	9	1700	H	34	11	S	115	01	E	21.8	35.63		

VESSEL CRUISE STATION YR. MTH, DAY TIME LATITUDE LONGITUDE TEMP. SALINITY WIND SEA SWELL WEA. VIS. BAROM.
 DN. AMT. DN. AMT. DN. AMT. DN. AMT.

A7	1	41	63	4	10	1050	H	34	19 S	114	57 E	22.1	35.45
A7	1	42	63	4	10	1225	H	34	26 S	115	01 E	22.3	35.49
A7	1	43	63	4	10	1400	H	34	27 S	115	12 E	21.6	35.71
A7	1	44	63	4	11	1035	H	34	11 S	114	59 E	22.0	35.74
A7	1	45	63	4	11	1520	H	33	39 S	114	59 E	21.9	35.71
A7	1	46	63	4	11	1655	H	33	31 S	115	04 E	21.7	35.96
A7	1	47	63	4	13	1140	H	33	29 S	115	27 E	21.0	36.12
A7	1	48	63	4	13	1305	H	33	23 S	115	32 E	21.1	35.63
A7	1	49	63	4	13	1530	H	33	23 S	115	21 E	21.3	36.07
A7	1	50	63	4	14	1140	H	33	29 S	115	20 E	21.4	36.00
A7	1	51	63	4	14	1305	H	33	21 S	115	20 E	21.4	36.00
A7	1	52	63	4	14	1445	H	33	21 S	115	10 E	21.6	35.98
A7	1	53	63	4	17	0940	H	33	34 S	115	12 E	21.5	36.01
A7	1	54	63	4	17	1055	H	33	32 S	115	01 E	21.3	35.94
A7	1	55	63	4	17	1215	H	33	39 S	114	59 E	23.1	35.67
A7	1	56	63	4	17	1345	H	33	46 S	114	57 E	22.9	35.58
A7	1	57	63	4	17	1500	H	33	55 S	114	58 E	22.7	35.65
A7	1	58	63	4	17	1620	H	34	03 S	114	59 E	21.6	35.74
A7	1	59	63	4	17	1745	H	34	11 S	115	00 E	21.8	35.72
A7	1	60	63	5	2	1000	H	33	35 S	115	11 E	19.6	36.00
A7	1	61	63	5	2	1140	H	33	31 S	115	00 E	19.9	35.96
A7	1	62	63	5	2	1305	H	33	38 S	114	58 E	20.9	35.72
A7	1	63	63	5	3	1440	H	33	29 S	114	59 E	20.4	35.74
A7	1	64	63	5	3	1040	H	33	28 S	115	20 E	19.8	36.00
A7	1	65	63	5	3	1205	H	33	19 S	115	20 E	20.2	35.96
A7	1	66	63	5	3	1340	H	33	19 S	115	10 E	20.8	35.72
A7	1	67	63	5	3	1500	H	33	28 S	115	15 E	20.3	35.80
A7	1	68	63	5	3	1630	H	33	36 S	115	19 E	18.6	36.25
A7	1	69	63	5	4	1050	H	33	31 S	115	25 E	19.6	36.01
A7	1	70	63	5	4	1215	H	33	25 S	115	31 E	19.4	36.01
A7	1	71	63	5	4	1340	H	33	20 S	115	37 E	20.1	35.98
A7	1	72	63	5	9	1115	H	33	17 S	115	27 E	20.2	35.72
A7	1	73	63	5	9	1256	H	33	17 S	115	17 E	20.2	35.74
A7	1	74	63	5	9	1430	H	33	26 S	115	18 E	18.8	35.85
A7	1	75	63	5	9	1605	H	33	36 S	115	19 E	18.8	36.18
A7	1	76	63	5	10	1015	H	33	35 S	115	11 E	19.4	36.01
A7	1	77	63	5	10	1145	H	33	30 S	115	02 E	19.6	35.91
A7	1	78	63	5	10	1310	H	33	36 S	114	58 E	20.6	35.56
A7	1	79	63	5	10	1445	H	33	38 S	115	00 E	20.4	35.62
A7	1	80	63	5	11	1105	H	33	31 S	115	25 E	18.4	36.07

VESSEL	CRUISE	STATION	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND	SEA	SWELL	WEA.	VIS.	BAROM.
		NUMBER									DN. AMT.	DN. AMT.	DN. AMT.	DN. AMT.		
A7	1	81	63	5	11	1225	H 33	25 S 115	31 E 19.2	35.89						
A7	1	82	63	5	11	1345	H 33	18 S 115	37 E 19.0	35.89						
A7	1	83	63	5	12	1100	H 33	12 S 115	33 E 19.3	35.82						
A7	1	84	63	5	12	1230	H 33	06 S 115	26 E 20.1	35.71						
A7	1	85	63	5	12	1355	H 32	00 S 115	19 E 20.4	35.71						
A7	1	86	63	5	12	1530	H 32	54 S 115	12 E 21.0	35.63						
A7	1	87	63	5	12	1655	H 32	46 S 115	13 E 21.5	35.54						
A7	1	88	63	5	12	1830	H 32	38 S 115	15 E 21.8	35.63						
A7	1	89	63	5	12	2005	H 32	32 S 115	21 E 21.6							
A7	1	90	63	5	12	2140	H 32	27 S 115	28 E 21.6	35.54						
A7	1	91	63	5	12	2320	H 32	21 S 115	35 E 22.0	35.54						
A7	1	92	63	5	13	0045	H 32	13 S 115	34 E 22.4	35.45						
A7	1	93	63	5	14	1000	H 32	02 S 115	26 E 22.6	35.38						
A7	1	94	63	5	14	1125	H 32	02 S 115	16 E 22.4	35.42						
A7	1	95	63	5	14	1255	H 32	03 S 115	06 E 22.6	35.44						

DATA
PART 2
HYDROLOGY
SUBSURFACE SAMPLES

VESSEL	CRUISE	STATION	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND	SEA	SWELL	WEA.	VIS.	BAROM.
		NUMBER								DN, AMT.	DN, AMT.	DN, AMT.	DN, AMT.			
38	5	81	65	3	22	1630	K 43	01 S 148	E 14.1	35.16	27	1	18	02	7	1016.0
38	6	82	65	4	3	0820	K 41	16 S 148	E 14.3	35.00	32	34	14	01	7	1020.0
38	6	83	65	4	3	0925	K 41	16 S 148	E 14.7	35.16	34	34	14	01	7	1020.0
38	6	84	65	4	3	1025	K 41	16 S 148	E 15.0	35.26	34	34	14	01	7	1019.0
38	6	85	65	4	3	1135	K 41	16 S 148	E 15.2	35.28	34	34	14	01	7	1019.0
38	6	86	65	4	3	1245	K 41	16 S 148	E 15.0	35.17	34	34	14	01	7	1019.0
38	6	87	65	4	8	0730	K 41	52 S 148	E 14.0	34.96	36	32	16	02	7	1038.0
38	6	88	65	4	8	0835	K 41	52 S 148	E 14.1	35.07	36	36	16	02	7	1038.0
38	6	89	65	4	8	0940	K 41	52 S 148	E 14.4	35.08	02	3	16	02	7	1038.0
38	6	90	65	4	8	1105	K 41	52 S 148	E 14.0	34.90	02	2	16	02	7	1037.0
38	6	91	65	4	8	1215	K 41	52 S 148	E 14.1	34.90	02	2	16	02	7	1036.0
38	6	92	65	4	13	0910	K 42	56 S 148	E 14.1	34.97	14	14	09	02	7	1028.0
38	6	93	65	4	13	1015	K 42	52 S 148	E 14.1	35.03	10	10	09	01	7	1027.0
38	6	94	65	4	13	1120	K 42	52 S 148	E 14.1	35.05	10	10	09	01	7	1027.0
38	6	95	65	4	13	1240	K 42	52 S 148	E 14.3	34.96	09	10	09	01	7	1027.0
38	6	96	65	4	13	1355	K 42	52 S 148	E 14.3	34.88	10	10	09	02	7	1025.0
38	6	97	65	4	13	1505	K 42	52 S 148	E 14.1	34.96	27	1	09	45	3	1024.0
38	6	98	65	4	15	0805	K 43	09 S 148	E 13.9	34.96	32	1	09	45	3	1024.0
38	6	99	65	4	15	0905	K 43	09 S 148	E 13.9	34.97	02	1	09	45	3	1024.0
38	6	100	65	4	15	0905	K 43	09 S 148	E 13.9	34.97	02	1	09	45	3	1024.0
38	6	101	65	4	15	1125	K 43	09 S 148	E 14.3	34.99	02	1	09	45	3	1024.0
38	7	102	65	4	27	0420	K 41	16 S 148	E 13.8	35.01	14	14	14	03	7	1028.0
38	7	103	65	4	27	1125	K 41	16 S 148	E 13.8	35.03	00	14	14	01	7	1024.0
38	7	104	65	4	27	1335	K 41	41 S 148	E 14.0	35.03	00	14	14	01	7	1024.0
38	7	105	65	4	27	1530	K 41	53 S 148	E 14.2	35.03	32	14	14	01	7	1023.0
38	7	106	65	4	27	1730	K 42	03 S 148	E 13.6	35.01	32	14	14	01	7	1023.0
38	7	107	65	4	28	0315	K 42	16 S 148	E 13.5	35.05	27	1	14	01	7	1026.0
38	7	108	65	4	28	1115	K 42	28 S 148	E 13.6	35.05	27	2	14	01	7	1025.0
38	7	109	65	4	28	1415	K 42	40 S 148	E 13.7	35.01	27	2	14	01	7	1025.0
38	7	110	65	4	28	1415	K 42	49 S 148	E 13.6	35.03	18	2	14	01	7	1025.0
38	7	111	65	5	28	1615	K 43	01 S 148	E 13.4	34.97	18	2	14	01	7	1025.0
38	8	112	65	5	7	0740	K 41	16 S 148	E 13.4	34.97	09	2	09	02	7	1038.0
38	8	113	65	5	7	0850	K 41	16 S 148	E 13.4	34.97	09	2	09	02	7	1038.0
38	8	114	65	5	14	0335	K 41	16 S 148	E 13.4	35.01	20	0	05	02	7	1020.0
38	8	115	65	5	14	0445	K 41	16 S 148	E 14.2	35.25	00	0	05	01	7	1020.0
38	8	116	65	5	14	1155	K 41	16 S 148	E 13.1	35.08	36	0	05	01	7	1020.0
38	8	117	65	5	17	0650	K 41	52 S 148	E 13.0	34.96	27	2	14	02	7	1009.0
38	8	118	65	5	17	0750	K 41	52 S 148	E 13.0	34.92	27	2	14	02	7	1009.0
38	8	119	65	5	17	0850	K 41	52 S 148	E 13.0	34.99	23	2	14	02	7	1011.0
38	8	120	65	5	24	0845	K 42	32 S 148	E 12.5	34.94	32	2	14	01	7	1018.0

STATION	DATE	TIME	LATITUDE	LONGITUDE				
L 1/ 30/63	14/ 4/63	1140 H	33 29 S	115 20 E				
SONIC AIR TEMP.	WIND	CLOUD	ANEM.	SEA	SHELL	ATMOS.	WIRE ANGLES	
DEPTH WET DRY	DIR. SP.	HEIGHT	TYPE	AMT.	VIS.	DIR. AMT.	PRESSURE	CAS1 CAST2 CAST3
***	***	*	*	*	*	*	*	*
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN X SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.40	25.16	***	***	***	***	***
1	25	21.30	***	***	***	***	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE				
L 1/ 31/63	14/ 4/63	1305 H	33 21 S	115 20 E				
SONIC AIR TEMP.	WIND	CLOUD	ANEM.	SEA	SHELL	ATMOS.	WIRE ANGLES	
DEPTH WET DRY	DIR. SP.	HEIGHT	TYPE	AMT.	VIS.	DIR. AMT.	PRESSURE	CAS1 CAST2 CAST3
***	***	*	*	*	*	*	*	*
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN X SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.40	25.16	***	***	***	***	***
1	15	21.30	***	***	***	***	***	***
1	30	21.20	***	***	***	***	***	***

STATION DATE TIME LATITUDE LONGITUDE
 L 1/ 52/63 14/ 4/63 1445 H 33 21 S 115 10 E

SONIC AIR TEMP. WIND ANEM. CLOUD SWELL ATMOS. WIRE ANGLES
 DEPTH WET DRY DIR. SP. HEIGHT TYPE AMT. VIS. DIR. AMT. DIR. AMT. PRESSURE CAST1 CAST2 CAST3

*** ** *

CAST DEPTH TEMP. SALINITY SIGMA-T OXYGEN OXYGEN % SAT. INORG. P TOTAL P NITRATE

1 0 21.60 35.980 25.09 *** *** *** *** ***

1 15 21.40 *** *** *** *** ***

1 30 21.40 *** *** *** *** ***

STATION DATE TIME LATITUDE LONGITUDE
 L 1/ 55/63 17/ 4/63 1215 H 33 39 S 114 59 E

SONIC AIR TEMP. WIND ANEM. CLOUD SWELL ATMOS. WIRE ANGLES
 DEPTH WET DRY DIR. SP. HEIGHT TYPE AMT. VIS. DIR. AMT. DIR. AMT. PRESSURE CAST1 CAST2 CAST3

*** ** *

CAST DEPTH TEMP. SALINITY SIGMA-T OXYGEN OXYGEN % SAT. INORG. P TOTAL P NITRATE

1 0 23.10 35.670 24.43 *** *** *** *** ***

1 20 21.40 *** *** *** *** ***

1 40 21.20 *** *** *** *** ***

STATION	DATE	TIME	LATITUDE	LONGITUDE			
L 1/ 73/63	9/ 5/63	1256 H	33 17 S	115 17 E			
SONIC AIR TEMP.	WIND	ANEM.	CLOUD	SEA	SWELL	ATMOS.	WIRE ANGLES
DEPTH WET DRY	DIR. SP.	HEIGHT	TYPE	DIR. AMT.	DIR. AMT.	PRESSURE	CAST1 CAST2 CAST3
*** **	*** **	** *	** *	** *	** *	** *	** *
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P NITRATE
1 0	20.20	35.740	25.29	***	***	***	***
1 15	20.20	***	***	***	***	***	***
1 30	20.25	***	***	***	***	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE			
L 1/ 74/63	9/ 5/63	1430 H	33 26 S	115 18 E			
SONIC AIR TEMP.	WIND	ANEM.	CLOUD	SEA	SWELL	ATMOS.	WIRE ANGLES
DEPTH WET DRY	DIR. SP.	HEIGHT	TYPE	DIR. AMT.	DIR. AMT.	PRESSURE	CAST1 CAST2 CAST3
*** **	*** **	** *	** *	** *	** *	** *	** *
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P NITRATE
1 0	18.80	35.850	25.74	***	***	***	***
1 15	19.20	***	***	***	***	***	***
1 30	19.10	***	***	***	***	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE			
L 1/ 91/63	12/ 5/63	2320 H	32 21 S	115 35 E			
SONIC AIR TEMP.	WIND DIR, SP.	WIND ANEM. HEIGHT	CLOUD TYPE AMT.	SEA DIR. AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3
*** **	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P NITRATE
1 0	22.00	35.540	24.65	***	***	***	***
1 30	21.80	***	***	***	***	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE			
L 1/ 92/63	13/ 5/63	0045 H	32 13 S	115 34 E			
SONIC AIR TEMP.	WIND DIR, SP.	WIND ANEM. HEIGHT	CLOUD TYPE AMT.	SEA DIR. AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3
*** **	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *	*** ** *
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P NITRATE
1 0	22.40	35.450	24.47	***	***	***	***
1 30	22.40	***	***	***	***	***	***

STATION	DATE	TIME	LATITUDE		LONGITUDE		
L 1/ 93/63	14/ 5/63	1000 H	32 02 S		115 26 E		
SONIC AIR TEMP.	WIND DIR, SP,	ANEM. HEIGHT	CLOUD TYPE	SEA DIR. AMT.	SWELL DIR. AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3
DEPTH WET DRY	*** ** *	*** * *	** * *	** * *	** * *	** * *	** * *
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P NITRATE
1 0	22.60	35.380	24.36	***	***	***	***
1 30	22.40	***	***	***	***	***	***

STATION	DATE	TIME	LATITUDE		LONGITUDE		
L 1/ 94/63	14/ 5/63	1125 H	32 02 S		115 16 E		
SONIC AIR TEMP.	WIND DIR, SP,	ANEM. HEIGHT	CLOUD TYPE	SEA DIR. AMT.	SWELL DIR. AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3
DEPTH WET DRY	*** ** *	*** * *	** * *	** * *	** * *	** * *	** * *
CAST DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P NITRATE
1 0	22.40	35.420	24.44	***	***	***	***
1 25	22.20	***	***	***	***	***	***
1 50	22.20	***	***	***	***	***	***

STATION DATE TIME LATITUDE LONGITUDE
 L 1/ 95/63 14/ 5/63 1255 H 32 03 S 115 06 E

SONIC AIR TEMP. WIND ANEM. CLOUD VIS. SEA SWELL ATMOS. WIRE ANGLES
 DEPTH WET DRY DIR. SP. HEIGHT TYPE AMT. DIR. AMT. DIR. AMT. PRESSURE CAST1 CAST2 CAST3

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CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.60	35.440	24.40	***	***	***	***	***
1	25	22.40	***	***	***	***	***	***	***
1	50	22.40	***	***	***	***	***	***	***

OCEANOGRAPHICAL STATION LISTS

1. Hydrological and planktological observations by F.R.V. *Warreen* in south-eastern Australian waters, 1938-39
2. Hydrological and planktological observations by F.R.V. *Warreen* in south-eastern Australian waters, 1940-42
3. Hydrological and planktological observations by F.R.V. *Warreen* in south-western Australian waters, 1947-50
4. Onshore hydrological investigations in eastern Australia, 1942-50
5. Estuarine hydrological investigations in eastern Australia, 1940-50. Queensland: Nerang and Coomera Rivers, Moreton Bay and Brisbane River, Logan River, Dunwich Oyster Lease; New South Wales: Richmond River, Clarence River, Macleay River, Hastings River, Manning River, Port Stephens, Tilligerry Creek, Hawkesbury River
6. Estuarine hydrological investigations in eastern Australia, 1940-50. New South Wales: Middle Harbour and Port Jackson, Georges River-Botany Bay
7. Estuarine hydrological investigations in eastern Australia, 1940-50. New South Wales: Port Hacking, Lake Illawarra, Shoalhaven River, Jervis Bay, Clyde River, Moruya River, Tuross River, Wagonga Inlet; Victoria: Port Phillip; Tasmania: Tamar River, Derwent River, Huon River, D'Entrecasteaux Channel, Pittwater, Lake Dobson (freshwater), Penna Dam (freshwater)
8. Hydrological investigations in south-western Australia, 1944-50
9. Records of twenty-four hourly hydrological observations at selected stations in eastern Australian estuarine systems, 1942-50. Queensland: Logan River; New South Wales: Richmond River, Clarence River, Macleay River, Hastings River, Manning River, Port Stephens, Hawkesbury River, Georges River, Port Hacking, Clyde River, Tuross River; Tasmania: Tamar River, Derwent River
10. Records of twenty-four hourly hydrological observations at Shell Point, Georges River, New South Wales, 1942-50
11. Analyses of bottom deposits in eastern Australia, 1946-50
12. Estuarine hydrological investigations in eastern and south-western Australia, 1951
13. Analysis of bottom deposits in eastern and south-western Australia, 1951 and records of twenty-four hourly hydrological observations at selected stations in eastern Australian estuarine systems, 1951
14. Onshore hydrological investigations in eastern and south-western Australia, 1951
15. Estuarine hydrological investigations in eastern and south-western Australia, 1952
16. Analysis of bottom deposits in eastern and south-western Australia, 1952 and records of twenty-four hourly hydrological observations at selected stations in eastern Australian estuarine systems, 1952
17. Onshore hydrological investigations in eastern and south-western Australia, 1952
18. Onshore hydrological investigations in eastern and south-western Australia, 1953
19. Onshore planktological investigations in eastern Australia, 1945-54
20. Surface sampling in the Tasman Sea, 1953
21. Estuarine hydrological investigations in eastern and south-western Australia, 1953
22. Further onshore planktological investigations in eastern Australia, 1945-54
23. Planktological investigations made by F.R.V. *Derwent Hunter* in eastern Australian waters, 1952-54
24. Onshore hydrological investigations in eastern and south-western Australia, 1954
25. Surface sampling in the Tasman Sea, 1954
26. Estuarine hydrological investigations in eastern and south-western Australia, 1954
27. Onshore and oceanic hydrological investigations in eastern and south-western Australia, 1955
28. Surface sampling in the Tasman and Coral Seas, 1955
29. Estuarine hydrological investigations in eastern and south-western Australia, 1955
30. Onshore and oceanic hydrological investigations in eastern and south-western Australia, 1956
31. Surface sampling in the Tasman and Coral Seas and the south-eastern Indian Ocean, 1956
32. Estuarine hydrological investigations in eastern and south-western Australia, 1956
33. Coastal hydrological investigations in eastern and south-western Australia, 1957
34. Coastal hydrological investigations at Port Hacking, New South Wales, 1957
35. Coastal hydrological investigations at Eden, New South Wales, 1957

OCEANOGRAPHICAL STATION LISTS

(Continued)

36. Surface sampling in the Tasman and Coral Seas, 1957
37. Hydrological investigations from F.R.V. *Derwent Hunter*, 1957
38. Coastal hydrological investigations in the New South Wales tuna fishing area, 1958
39. Surface sampling in the Coral and Tasman Seas, 1958
40. Coastal hydrological investigations in south-eastern Australia, 1958
41. Oceanic investigations in eastern Australian waters, F.R.V. *Derwent Hunter*, 1958
42. Coastal investigations at Port Hacking, New South Wales, 1958
43. Oceanic investigations in eastern Australia, H.M.A. Ships *Queenborough*, *Quickmatch*, and *Warrego*, 1958
44. Oceanic observations in Antarctic waters, M.V. *Magga Dan*, 1959
45. Coastal hydrological investigations in eastern Australia, 1959
46. Coastal hydrological investigations in the New South Wales tuna fishing area, 1959
47. Coastal investigations at Port Hacking, New South Wales, 1959
48. Oceanic investigations in eastern Australian waters, F.R.V. *Derwent Hunter*, 1959
49. Coastal hydrological sampling Rottnest Island, W.A., and Port Moresby, Papua, during the I.G.Y. (1957-58), and surface sampling in the Tasman and Coral Seas, 1959
50. Surface sampling in the Coral and Tasman Seas, 1960
51. Coastal hydrological investigations in eastern Australia, 1960
52. Coastal investigations at Port Hacking, New South Wales, 1960
53. Coastal hydrological investigations in the New South Wales tuna fishing area, 1960
54. Investigations by F.R.V. *Derwent Hunter* on the eastern Australian tuna grounds in 1961
55. Investigations by F.R.V. *Weerutta* on the South Australian tuna grounds in 1961
56. Investigations by F.R.V. *Marelda* on the eastern Australian tuna grounds in 1961
57. Investigations by F.V. *Estelle Star* in Western Australian waters in 1961
58. Temperature observations from Australian tuna fishing vessels in 1961
59. Investigations by F.R.V. *Derwent Hunter* on the eastern Australian tuna grounds in 1962
60. Investigations by F.R.V. *Investigator* on the South Australian tuna grounds in 1962
61. Investigations by F.R.V. *Marelda* on the eastern Australian tuna grounds in 1962
62. Investigations by F.V. *Estelle Star* in Western Australian waters in 1962
63. Temperature and salinity observations from Australian tuna fishing vessels in 1962
64. Investigations by F.R.V. *Investigator* on the South Australian tuna grounds in 1963
65. Investigations by F.R.V. *Marelda* on the eastern Australian tuna grounds in 1963
66. Temperature and salinity observations from Australian tuna fishing vessels in 1963
67. Investigations by F.R.V. *Investigator* on the South Australian tuna grounds in 1964
68. Investigations by F.R.V. *Marelda* on the eastern Australian tuna grounds in 1964
69. Temperature and salinity observations from Australian tuna fishing vessels in 1964
70. Investigations by F.R.V. *Investigator* on the South Australian tuna grounds in 1965
71. Investigations by F.V. *Estelle Star* in South Australian and New South Wales waters in 1965
72. Investigations by F.R.V. *Marelda* on the eastern Australian tuna grounds in 1965
73. Investigations by F.V. *Degei* in Queensland waters in 1965
74. Temperature and salinity observations from Australian tuna fishing vessels in 1965
75. Investigations by F.V. *Degei* in New South Wales, South, and Western Australian waters in 1966
76. Investigations by F.V. *Estelle Star* in South and Western Australian waters in 1966
77. Temperature and salinity observations from Australian tuna fishing vessels in 1966
78. Drift bottle releases and recoveries in Bass Strait and adjacent waters, 1958-1962
79. Drift bottle releases and recoveries in Western Australia, 1956-1957
80. Investigations by F.R.V. *Lancelin* in Western Australian waters in 1963