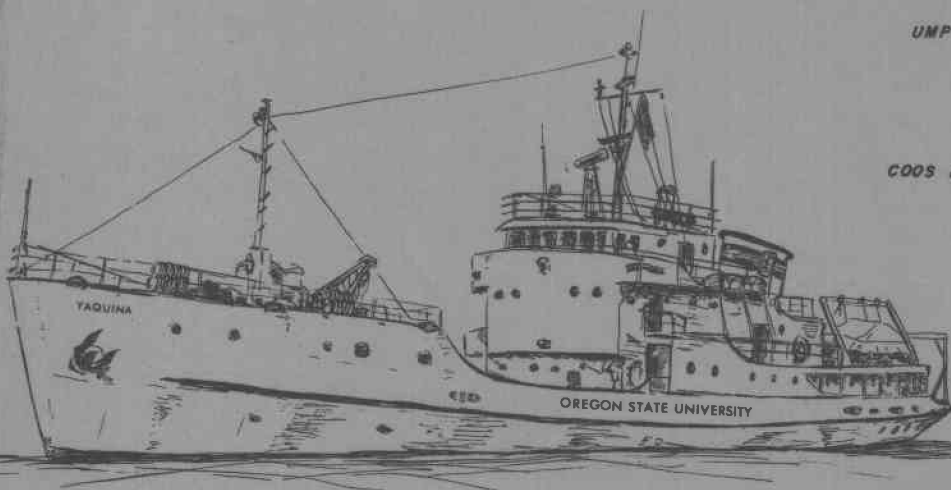
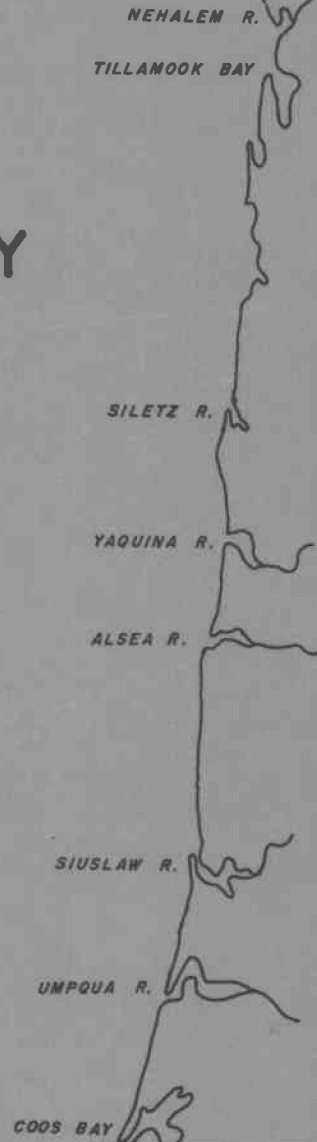


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## JOHNSTON ISLAND LIGHT SCATTERING AND TRANSMISSION DATA

By  
G. F. Beardsley, Jr., R. T. Hodgson,  
J. R. V. Zaneveld, and R. L. Smith

OFFICE OF NAVAL RESEARCH  
Johnston Island Project  
and  
Contract Nonr(1286) 10, Project NR 083-102

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Department of Oceanography  
School of Science  
Oregon State University  
Corvallis, Oregon

JOHNSTON ISLAND LIGHT SCATTERING  
AND TRANSMISSION DATA

A Data Report

by

G. F. Beardsley, Jr.  
R. T. Hodgson  
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## JOHNSTON ISLAND SCATTERING DATA

The data contained in this report represents over 3000 individual scattering measurements taken in the equatorial Pacific in the vicinity of Johnston Island. The purpose of the measurements was to obtain data that would aid in the determination of a correct model for the mixing processes in the vicinity of the island. Consequently a majority of the measurements are vertical profiles of the volume scattering function accompanying standard hydrographic data of salinity, temperature, and depth.

The instrument used for the scattering measurements was a Brice-Phoenix Scattering Photometer. Water samples were taken with Nansen bottles, Niskin bottles and buckets. It was found that the Nansen bottles were not optically clean. The data from the Nansen casts is thus suspect and is not included in this report. The majority of the samples were taken by a remote controlled Niskin sampler which permitted sampling at the desired depths and times. The sampler had ten bottles. Each second bottle had a thermometer rack. Temperatures are thus available for five out of ten bottles in each cast. In some cases temperatures were determined from a simultaneous Bathythermograph. Lowerings using the Niskin sampler are labeled "Niskin Casts." The wire available for the sampler was 250 m long so that deeper casts were made using the hydro wire with Niskin bottles. These casts are labeled "Hydro-Niskin Casts." Surface samples were obtained either by using buckets or by towing the Niskin sampler near the surface.

A commercially built transmissometer was also available. We had hoped that it would provide us with in situ transmission data enabling us to trip the sample bottles in "optically interesting locations." Unfortunately, the meter seemed to have been poorly designed, it apparently being more sensitive to temperature, pressure and/or minor vibrations than water clarity. We soon decided that the manufacturers marketed the meter as a clarity meter after an unsuccessful attempt to develop a clairvoyance meter!

For most samples the volume scattering function was determined using white and green light. The optical properties of the samples are summarized by tabulation of the normalized scattering function for white and green light in the directions 30° and 90°, and the ratio of 30° scattering to 90° scattering. These values are labeled  $\beta (30^\circ)$ ,  $\beta (90^\circ)$  and  $\frac{\beta (30^\circ)}{\beta (90^\circ)}$  respectively. The values of the scattering function were normalized by dividing by the reading for 0°. The values are tabulated in relative units. The values do not correspond to absolute light intensities, but they do give an indication of the relative clarity of the water.

The transmissometer data, although unreliable, is presented whenever measured in conjunction with a Niskin cast. The percentage transmission is given in a column labeled % Tr. Three charts indicate the positions of the casts.

## DATA SUMMARY

Date	Time	Location		Type Cast	Depth Range Meters	Comments
		North Lat.	West Long.			
3 May	0845- 1225	16° 45.6' 16° 41.5'	169° 33.4' 169° 34.3'	Surface Samples	Surface	No green light measurements for some samples, No temperature and salinity data.
6 May	0839- 1124	16° 41.2' 16° 43.3'	169° 34.3' 169° 33.9'	Surface Samples	Surface	No temperature and salinity data.
6 May	1600	16° 46.5'	169° 35.1'	Niskin Cast	0-46.8	No temperature and salinity data.
7 May	1052- 1057	16° 42.45' 16° 42.5'	169° 33.8' 169° 33.9'	Niskin Cast	0-15.7	
7 May	1252- 1258:30	16° 44.0'	169° 33.5'	Niskin Cast	0-30.4	
7 May	1435- 1445	16° 42.4'	169° 34.0'	Niskin Cast	0-162	
7 May	1732- 1746	16° 43.5'	169° 33.4'	Niskin Cast	0-33.8	
7 May	1945- 1954	16° 37.2'	169° 35.5'	Niskin Cast	0-94.5	
8 May	1323- 1357	16° 43.2'	169° 33.7'	Surface Samples	Surface	No temperature and salinity data.
8 May	1323- 1400	16° 43.2'	169° 33.7'	Constant Depth Niskin Cast	16.2	
8 May	1932	16° 36.1'	169° 19'	Hydro-Niskin	100-402	
8 May	2235	16° 35.7'	169° 18.6'	Hydro-Niskin	0 - 193	
9 May	0308	16° 36.0'	169° 37.4'	Hydro-Niskin	100-985	
9 May	0549	16° 36.0'	169° 37.4'	Hydro-Niskin	0 - 191	
10 May	1111- 1211	16° 43.9'	169° 33.8'	Niskin Cast	0- 200	
10 May	1303- 1312	16° 43.9'	169° 34.0'	Niskin Cast	0 - 250	
10 May	1414:30- 1420:30	16° 43.5'	169° 33.8'	Niskin Cast	0 - 250	No salinity data
10 May	1604- 1630	16° 43.8'	169° 33.7'	Niskin Cast	0 - 250	
10 May	1953	16° 50.5'	169° 37.8'	Hydro-Niskin	98-985	
10 May	2112	16° 51.2'	169° 37.4'	Hydro-Niskin	0 - 182	

## SURFACE SAMPLES

DATE: 3 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr.
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	
0845	16° 45.6'	169° 33.4'	Surface	.64	1.12	.57	.12	.10	1.20	--
0859	16° 46.4'	169° 31.7'	Surface	.62	.97	.64	.10	.09	1.14	--
0907	16° 45.7'	169° 32.6'	Surface	.99	1.38	.71	.18	.15	1.18	--
0916	16° 45.9'	169° 32.7'	Surface	.86	1.16	.74	.56	.12	4.62	--
0925	16° 44.7'	169° 34.5'	Surface	1.74	1.65	1.05	.29	.22	1.34	--
0934	16° 44.2'	169° 34.4'	Surface	.70	1.00	.70	.12	.09	1.25	--
1110	16° 41.2'	169° 34.8'	Surface	.53	.86	.61	.08	.07	1.07	77
1140	16° 43.3'	169° 34.6'	Surface	1.04	1.24	.84	.18	.14	1.28	84
1153	16° 43.6'	169° 34.1'	Surface	.94	1.04	.91	--	--	--	85
1159	16° 43.4'	169° 34.2'	Surface	.78	1.07	.73	--	--	--	84
1207	16° 42.6'	169° 34.2'	Surface	2.03	2.55	.80	--	--	--	78
1211	16° 42.4'	169° 34.2'	Surface	1.73	2.39	.73	--	--	--	74
1213	16° 42.2'	169° 34.2'	Surface	1.59	2.00	.80	--	--	--	76
1220	16° 41.9'	169° 34.3'	Surface	1.20	1.47	.85	--	--	--	82
1225	16° 41.5'	169° 34.3'	Surface	.64	1.02	.63	--	--	--	84

## SURFACE SAMPLES

DATE: 6 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr.
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	
0839	16° 41.2'	169° 34.3'	Surface	.55	.81	.68	.08	.08	.96	84
0859	16° 41.7'	169° 35.9'	Surface	.55	.73	.75	.09	.07	1.29	90
0925	16° 42.1'	169° 34.1'	Surface	1.03	1.61	.64	.18	.16	1.13	88
0928	16° 42.4'	169° 33.9'	Surface	1.76	2.39	.74	.26	.33	.80	76
0951	16° 43.2'	169° 35.6'	Surface	.83	1.07	.78	.12	.11	1.07	94
1015	16° 42.4'	169° 44.0'	Surface	.50	.71	.70	.08	.07	1.08	94
1017	16° 42.4'	169° 44.0'	Surface	2.52	2.96	.85	.46	.41	1.13	72
1031	16° 42.8'	169° 33.9'	Surface	2.39	2.83	.84	.39	.38	1.02	--
1037	16° 42.8'	169° 33.9'	Surface	.77	1.09	.70	.12	.14	.82	--
1048	16° 42.8'	169° 33.9'	Surface	1.76	2.43	.72	.27	.27	1.00	72
1051	16° 42.8'	169° 33.9'	Surface	1.40	2.46	.57	.29	.24	1.22	72
1107	16° 43.3'	169° 33.9'	Surface	2.19	2.70	.81	.33	.35	.96	--
1113	16° 43.3'	169° 33.9'	Surface	1.52	2.25	.68	.26	.19	1.35	--
1118	16° 43.3'	169° 33.9'	Surface	1.24	1.72	.72	.21	.19	1.12	--
1122	16° 43.3'	169° 33.9'	Surface	1.91	2.39	.80	.31	.28	1.10	--
1124	16° 43.3'	169° 33.9'	Surface	.74	1.00	.74	.13	.17	1.10	--

## NISKIN CAST

DATE: 6 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	
1600	16° 46.5'	169° 35.1'	0	.19	.45	.42	.027	.048	.56	76
"	"	"	5.2	.35	.68	.51	.030	.082	.37	79
"	"	"	10.4	.31	.88	.35	.041	.062	.66	78
"	"	"	15.6	.29	.55	.52	.047	.062	.76	78
"	"	"	20.8	.17	.44	.38	.024	.045	.53	73
"	"	"	26.0	.23	.49	.46	.033	.061	.54	76
"	"	"	31.2	.28	.47	.61	.042	.060	.70	74
"	"	"	36.4	.21	.47	.45	.032	.061	.52	68
"	"	"	41.6	.21	.45	.48	.034	.046	.74	68
"	"	"	46.8	.19	.42	.46	.031	.043	.72	69

## NISKIN CAST

DATE: 7 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$			
1052:00	16° 42.45'	169° 33.8'	Surface	.14	.41	.34	.020	.042	.48	84	--	--
1053:00			1.9	.20	.43	.47	.028	.049	.57	82	26.87	34.06
1053:30			3.8	.14	.43	.33	.018	.042	.43	81	--	--
1054:00			5.7	.20	.52	.38	.029	.056	.52	82	26.80	34.05
1054:30			7.6	.16	.40	.40	.022	.042	.52	78	--	--
1054:45			9.5	.21	.48	.43	.025	.049	.51	76	26.75	34.05
1055:10			11.4	.60	1.09	.55	.080	.125	.64	66	--	--
1055:30			13.3	.45	.80	.56	.074	.100	.74	74	26.64	34.05
1055:45			15.7	.17	.40	.43	.019	.042	.45	78	--	--
1057:00	16° 42.5'	169° 33.9'	Surface	.53	.88	.61	.061	.116	.53	74	26.75	34.05

Samples were taken about .1 mile apart between  
16° 42.45' N, 169° 33.8' W and 16° 42.5' N, 169° 33.9' W.

## NISKIN CAST

7

DATE: 7 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			
1252	16° 44.0'	169° 33.5'	Surface	.18	.44	.41	.022	.044	.50	88	--	--
1253	"	"	9.5	.45	.64	.71	.061	.089	.69	78	26.82	34.06
1253:30	"	"	13.3	.37	.50	.75	.047	.057	.82	75	--	--
1254	"	"	17.1	.24	.33	.74	.033	.043	.77	76	26.67	34.10
1254:30	"	"	20.9	.20	.27	.74	.029	.072	.40	75	--	--
1255	"	"	30.4	.32	.46	.71	.059	.045	1.31	73	26.61	34.13
1257	"	"	Surface	.47	1.14	.41	.065	.149	.44	81	26.83	34.06
1258	"	"	9.5	.44	.92	.47	.058	.100	.58	73	--	--
1258:30	"	"	5.7	.44	.85	.52	.070	.103	.68	73	26.69	34.06

## NISKIN CAST

DATE: 7 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			
1435	16° 42.4'	169° 34.0'	162	.13	.38	.35	.019	.029	.66	48	--	--
1436	"	"	135	.19	.59	.33	.027	.055	.49	44	23.56	34.91
1437	"	"	118	.17	.36	.46	.021	.030	.70	48	--	--
1438	"	"	81	.19	.44	.43	.028	.046	.61	55	24.68	34.54
1439	"	"	67.5	.44	.92	.48	.063	.081	.78	56	--	--
1440	"	"	40.5	.50	.85	.59	.066	.077	.86	60	26.53	34.12
1441	"	"	27	.55	1.02	.54	.080	.092	.87	60	--	--
1442	"	"	20	.65	1.21	.54	.091	.088	1.03	62	26.65	34.11
1443	"	"	13.5	.97	.72	1.35	.136	.164	.83	62	--	--
1445	"	"	Surface	1.72	2.39	.72	.291	.235	1.24	60	--	--

## NISKIN CAST

DATE: 7 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			
1732	16° 43.5'	169° 33.4'	Surface	.59	1.10	.54	.097	.089	1.09	79	--	--
1734	"	"	27.0	.39	.81	.48	.060	.045	1.33	81	26.79	34.13
1734:30	"	"	24.3	.40	.78	.51	.063	.045	1.40	77	--	--
1735	"	"	24.3	.45	.93	.48	.063	.088	.72	76	26.75	34.10
1736	"	"	24.3	.54	1.01	.51	.093	.116	.80	76	--	--
1738	"	"	Surface	.62	1.21	.51	.103	.130	.79	78	27.18	34.05
1739	"	"	33.8	.32	.68	.47	.049	.058	.85	80	--	--
1740	"	"	16.2	.81	1.36	.59	.139	.147	.96	68	26.77	34.06
1741	"	"	Surface	.66	1.03	.65	.094	.145	.65	79	--	--
1746	"	"	Surface	.71	1.06	.67	.113	.116	.97	76	26.71	34.06



## NISKIN CAST

DATE: 7 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. °C	Salinity ‰	
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			%Tr
1945	16° 37. 2'	169° 35. 5'	5. 4	. 19	. 50	. 38	. 025	. 043	. 58	86	--	--
1946	"	"	10. 1	. 19	. 39	. 47	. 025	. 045	. 56	78	26. 68	34. 05
1947	"	"	24. 3	. 22	. 38	. 57	. 028	. 043	. 65	60-75	--	--
1948	"	"	35. 1	. 15	. 44	. 35	. 026	. 044	. 59	72-80	26. 42	34. 33
1949	"	"	44. 6	. 21	. 39	. 55	. 033	. 030	1. 10	63-77	--	--
1950	"	"	55. 4	. 21	. 38	. 56	. 028	. 029	. 97	60-80	25. 79	34. 41
1951	"	"	64. 8	. 21	. 44	. 48	. 034	. 045	. 76	64	--	--
1952	"	"	75. 6	. 23	. 48	. 48	. 034	. 044	. 77	63-68	25. 36	34. 63
1953	"	"	85. 0	. 22	. 46	. 48	. 032	. 044	. 73	62-65	--	--
1954	"	"	94. 5	. 21	. 40	. 52	. 032	. 029	1. 10	58-61	26. 00	34. 73

## SURFACE SAMPLES AND NISKIN CAST

DATE: 8 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. °C	Salinity ‰	
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			%Tr
1323	16° 43. 2'	169° 33. 7'	0	1. 53	3. 00	. 51	. 28	. 36	. 77	68	--	--
1332	"	"	0	. 76	1. 22	. 63	. 11	. 12	. 95	62	--	--
1339	"	"	0	2. 72	2. 72	1. 00	. 48	. 25	1. 93	63	--	--
1348	"	"	0	. 91	1. 48	. 62	. 12	. 11	1. 14	61	--	--
1357	"	"	0	. 73	. 77	. 95	. 14	. 07	1. 93	75	--	--
1323	"	"	16. 2	. 47	. 93	. 51	. 07	. 09	. 84	-	--	--
1326	"	"	16. 2	. 42	. 81	. 52	. 06	. 07	. 84	-	26. 69	34. 12
1329	"	"	16. 2	. 35	. 67	. 53	. 06	. 06	1. 00	-	--	--
1332	"	"	16. 2	. 44	. 90	. 49	. 07	. 10	. 69	-	26. 78	34. 11
1334	"	"	16. 2	. 70	1. 24	. 57	. 12	. 13	. 90	-	--	--
1336	"	"	16. 2	. 51	. 83	. 62	. 08	. 09	. 87	-	26. 79	34. 11
1342	"	"	16. 2	. 53	1. 02	. 52	. 08	. 10	. 84	-	--	--
1351	"	"	16. 2	. 35	. 64	. 55	. 06	. 06	. 90	-	26. 84	34. 11
1356	"	"	16. 2	. 30	. 59	. 50	. 05	. 06	. 74	-	--	--
1400	"	"	16. 2	. 23	. 51	. 46	. 04	. 05	. 80	-	26. 83	34. 10

Note: The ship was stationary, maintaining position against a 1 knot current direction WSW.

## HYDRO-NISKIN CAST #1

9

DATE: 8 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. C°	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$		
1932	16° 36.1'	169° 19'	100	.30	.54	.55	.048	.062	.77	25.40	34.68
"	"	"	200	.48	1.37	.35	.062	.143	.43	17.90	34.72
"	"	"	300	.42	.43	.98	.024	.030	.80	11.32	34.28
"	"	"	384	.35	.67	.53	.016	.060	.27	8.50	34.30
"	"	"	486	.40	.43	.94	.017	.034	.50	7.47	34.37
"	"	"	585	.21	.47	.45	.020	.030	.67	6.35	34.38
"	"	"	696	.10	.35	.28	.012	.030	.40	5.74	34.46
"	"	"	777	.25	.7	.52	.021	.048	.44	5.23	34.49
"	"	"	834	.15	.37	.41	.020	.033	.61	4.80	34.49
"	"	"	902	.13	.40	.33	.023	.033	.70	4.52	34.51

## HYDRO-NISKIN CAST #2

DATE: 8 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. C°	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta (30^\circ)}{\beta (90^\circ)}$		
2235	16° 35.7'	169° 18.6'	0	1.23	1.16	1.06	.209	.151	1.38	26.38	34.31
"	"	"	20	.38	1.00	.38	.059	.125	.47	26.38	34.31
"	"	"	40	.31	.76	.40	.046	.088	.52	26.20	34.33
"	"	"	60	.29	.49	.58	.042	.051	.82	26.06	34.43
"	"	"	80	.36	.67	.54	.045	.069	.65	25.64	34.58
"	"	"	99	.27	.51	.53	.034	.049	.69	25.38	34.66
"	"	"	123	.23	.49	.47	.033	.050	.66	25.05	34.69
"	"	"	144	.15	.43	.35	.023	.033	.70	24.10	35.00
"	"	"	169	.13	.42	.30	.018	.066	.27	20.46	34.96
"	"	"	193	.11	.41	.27	.016	.033	.49	17.94	34.72

## HYDRO-NISKIN CAST #3

10

DATE: 9 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$		
0308	16° 36.0'	169° 37.4'	100	.25	.45	.55	.032	.034	.94	25.29	34.68
"	"	"	200	.14	.35	.41	.022	.033	.67	18.66	34.79
"	"	"	300	.10	.34	.29	.010	.033	.30	11.86	34.29
"	"	"	380	.10	.34	.28	.012	.033	.36	8.70	34.27
"	"	"	484	.18	.44	.40	.017	.052	.33	7.48	34.38
"	"	"	587	.11	.40	.29	.016	.034	.47	6.63	34.42
"	"	"	625	.26	.47	.56	.017	.034	.50	5.98	34.45
"	"	"	752	.26	.48	.54	.019	.035	.54	5.28	34.48
"	"	"	875	.14	.43	.33	.018	.036	.50	4.84	34.49
"	"	"	985	.21	.47	.44	.017	.037	.46	4.48	34.50

## HYDRO-NISKIN CAST #4

DATE: 9 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$		
0549	16° 36.0'	169° 37.4'	Surface	.23	1.09	.21	.029	.062	.47	26.50	34.21
"	"	"	20	.19	.51	.37	.024	.045	.53	26.56	34.21
"	"	"	40	.22	.53	.41	.030	.045	.67	26.31	34.34
"	"	"	60	.27	.49	.54	.034	.046	.74	25.76	34.46
"	"	"	80	.25	.54	.47	.034	.062	.55	25.59	34.55
"	"	"	99	.87	.51	1.71	.028	.063	.44	23.61	34.66
"	"	"	123	.25	.80	.31	.041	.090	.44	24.34	34.85
"	"	"	145	.20	.49	.40	.024	.048	.50	20.97	34.10
"	"	"	168	.16	.55	.29	.023	.062	.37	19.24	34.85
"	"	"	191	.14	.49	.28	.019	.046	.41	17.57	34.71

## NISKIN CAST

11

DATE: 10 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			
1111	16°43.9'	169°33.8'	Surface	.42	.84	.50	.062	.045	1.38	75	26.7	34.26
1113	"	"	20	.29	.57	.52	.040	.031	1.29	78	26.4	34.34
1114	"	"	40	.26	.51	.52	.036	.031	1.16	72	26.4	34.38
1115	"	"	60	.21	.49	.43	.028	.023	1.22	71	26.4	34.46
1116	"	"	80	.17	.43	.41	.025	.016	1.56	65	25.8	34.57
1117	"	"	100	.18	.43	.41	.025	.016	1.56	62	25.8	34.59
1118	"	"	125	.22	.45	.49	.040	.024	1.66	57	24.8	34.94
1119	"	"	150	.16	.42	.37	.023	.038	.61	45	22.2	34.97
1121	"	"	200	.14	.39	.35	.018	.038	.47	31	17.8	34.88

## NISKIN CAST

DATE: 10 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			
1303	16°43.9'	169°34.0'	Surface	.28	.57	.48	.037	.062	.60	65-80	26.7	34.36
1306	"	"	20	.23	.55	.42	.032	.062	.52	59	26.7	34.38
1307	"	"	40	.23	.59	.39	.034	.062	.55	58	26.4	34.40
1307:30	"	"	60	.21	.52	.41	.031	.062	.50	56	26.4	34.46
1307:45	"	"	80	.26	.56	.46	.038	.062	.61	53	26.1	34.49
1308	"	"	100	.21	.49	.43	.029	.046	.63	50	26.1	34.59
1309	"	"	125	.21	.60	.35	.030	.063	.48	45	25.8	34.88
1309:30	"	"	150	.20	.52	.39	.032	.063	.51	41	25.1	34.76
1310:30	"	"	200	.17	.54	.32	.030	.067	.45	32	21.6	34.96
1312	"	"	250	.14	.50	.27	.019	.047	.44	24	18.3	34.43

## NISKIN CAST

DATE: 10 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$		
1414:30	16°43.5'	169°33.8'	Surface	.32	.78	.41	.059	.078	.76	52	27.2
1415	"	"	20	.27	.63	.43	.040	.062	.65	58	26.4
1416	"	"	40	.29	.73	.40	.042	.081	.52	37-50	26.4
1416:30	"	"	60	.21	.52	.41	.030	.063	.48	51	26.4
1417	"	"	80	.22	.47	.46	.029	.046	.63	50	26.4
1418	"	"	100	.19	.44	.43	.032	.046	.70	49	26.4
1418:30	"	"	125	.17	.44	.40	.030	.047	.64	42	25.1
1419	"	"	150	.13	.46	.28	.020	.031	.65	37	22.2
1420	"	"	200	.13	.41	.30	.019	.047	.40	29	18.3
1420:30	"	"	250	.09	.35	.25	.012	.031	.39	20	--

## NISKIN CAST

12

DATE: 10 MAY 1968

Time	Position		Depth Meters	White			Green			%Tr	Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$			
1604	16° 43.8'	169° 33.7'	20	.12	.38	.30	.017	.031	.55	57	26.4	34.66
1605	"	"	40	.27	.58	.46	.039	.047	.83	56	26.4	34.34
1606	"	"	60	.24	.62	.39	.031	.059	.53	53	26.4	34.41
1609	"	"	80	.25	.68	.36	.034	.075	.45	49	26.1	34.46
1610	"	"	100	.27	.66	.40	.035	.076	.46	46	25.8	34.52
1611	"	"	125	.24	.57	.41	.033	.061	.54	41	24.8	34.56
1612	"	"	150	.21	.59	.35	.028	.060	.47	37	22.2	34.72
1614	"	"	200	.25	.56	.45	.037	.059	.63	29	17.8	34.75
1616	"	"	250	.18	.59	.30	.027	.061	.44	22	12.8	34.92
1630	"	"	Surface	.56	.84	.66	.086	.092	.94	54	26.7	34.32

## HYDRO-NISKIN CAST #1

DATE: 10 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$		
1953	16° 50.5'	169° 37.8'	98	.23	.55	.41	.032	.067	.48	25.58	34.65
"	"	"	197	.31	.52	.59	.047	.048	.98	17.78	34.79
"	"	"	295	.18	.44	.41	.025	.048	.52	11.21	34.29
"	"	"	394	.18	.46	.40	.024	.045	.53	8.72	34.27
"	"	"	492	.11	.40	.28	.016	.044	.36	7.18	34.38
"	"	"	591	.16	.42	.38	.020	.029	.69	6.31	34.45
"	"	"	690	.14	.42	.34	.017	.042	.41	5.64	34.46
"	"	"	788	.17	.43	.41	.022	.044	.50	5.22	34.49
"	"	"	887	.14	.41	.34	.016	.029	.55	4.76	34.50
"	"	"	985	.21	.43	.48	.032	.029	1.10	4.40	34.52

## HYDRO-NISKIN CAST #2

DATE: 10 MAY 1968

Time	Position		Depth Meters	White			Green			Temp. °C	Salinity ‰
	North Lat.	West Long.		$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$	$\beta$ (30°)	$\beta$ (90°)	$\frac{\beta(30^\circ)}{\beta(90^\circ)}$		
2112	16° 51.2'	169° 37.4'	0	.21	.48	.43	.031	.060	.52	26.32	34.39
"	"	"	20	.25	.58	.43	.044	.074	.59	26.36	34.40
"	"	"	40	.22	.54	.40	.032	.058	.55	26.39	34.45
"	"	"	60	.26	.56	.44	.036	.061	.59	25.94	34.52
"	"	"	80	.34	.56	.60	.026	.059	.44	25.38	34.64
"	"	"	100	.19	.47	.41	.029	.058	.50	24.74	34.76
"	"	"	124	.23	.61	.38	.033	.075	.44	23.89	34.88
"	"	"	148	.17	.60	.29	.019	.060	.32	22.41	34.96
"	"	"	170	.13	.44	.30	.019	.045	.42	19.74	34.91
"	"	"	182	.14	.50	.27	.019	.059	.32	18.17	34.70

10 V 2152  
10 V 1953

169° 30' W

# JOHNSTON ISLAND NISKINS AND HYDROCASTS MAY 1968

45'

16° 45' N

6 V 1600  
6 V 1842  
6 V 1530

10 V 1115  
10 V 1310  
10 V 1415  
10 V 1615

5 V 1009

5 V 1627  
5 V 1840

5 V 1305

7 V 1200  
7 V 1730  
8 V 1330  
7 V 1030  
7 V 1400

7 V 1720  
7 V 1950  
7 V 2148

9 V 0308  
9 V 0549

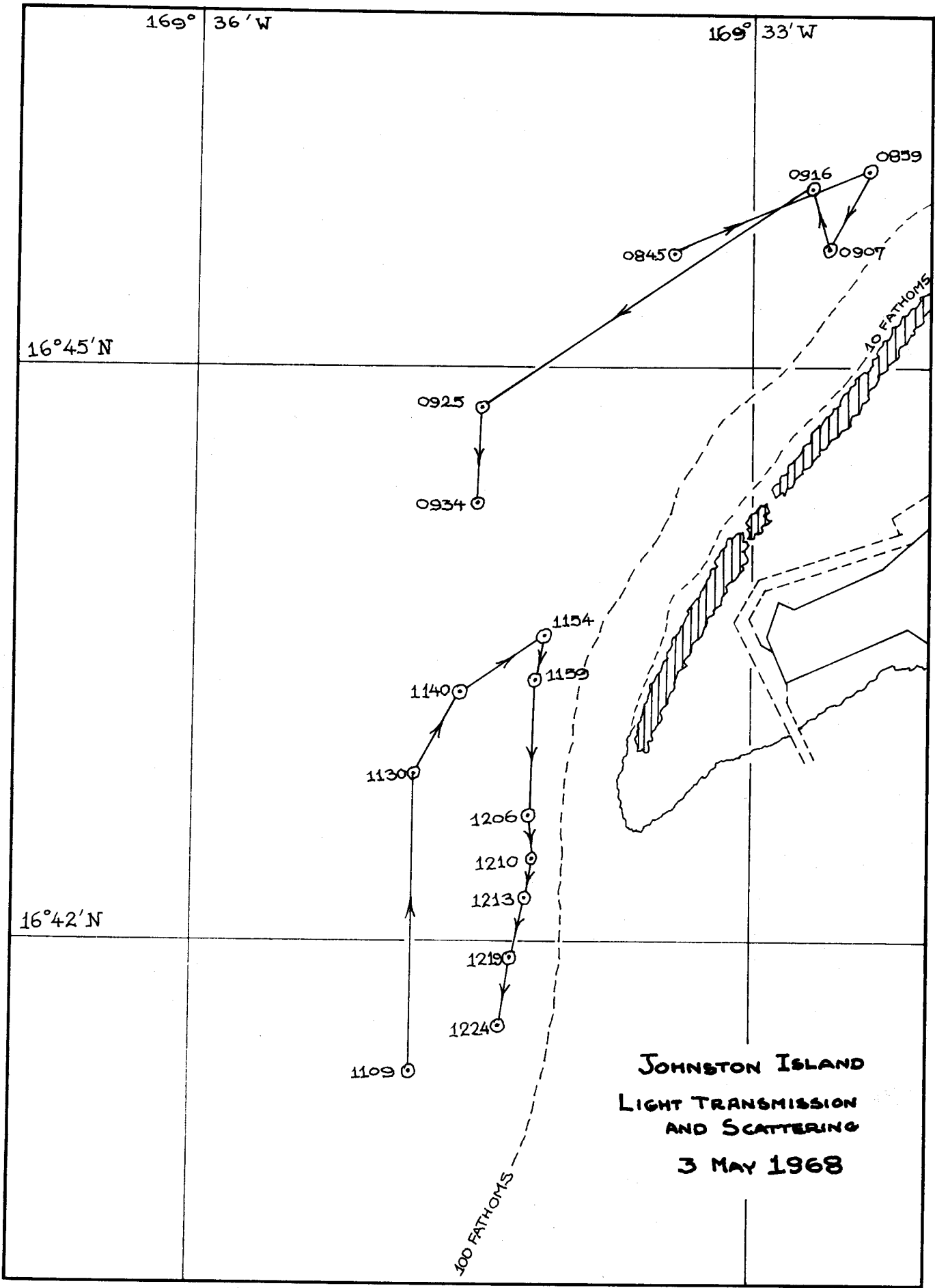
8 V 2235  
8 V 1932

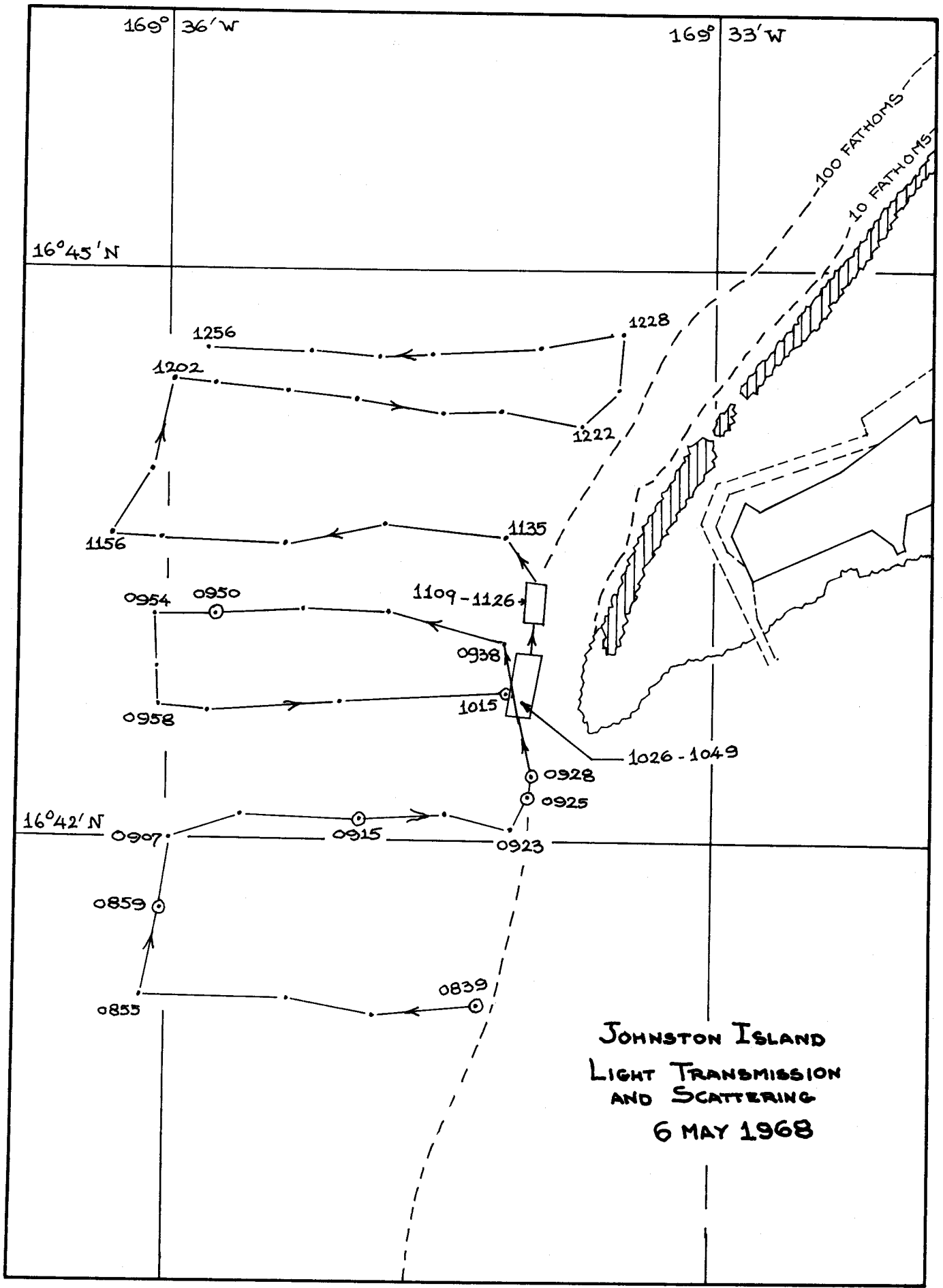
35'

40'

35'

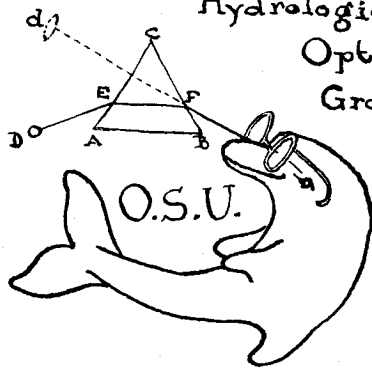
30'







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