euphausiids in the Ocean. The fish larvae net was designed by Nakai (1962) as a Maruchi type net for spawning surveys of sardine and anchovy. A modified fish larvae net was used for collecting fish larvae at the surface. The Longhurst-Hardy Plankton Recorder, as it has come to be called LHPR, was described by Longhurst *et al.* (1966) for collecting multiple discrete sequential zooplankton samples. A modified version of the LHPR was towed obliquely for clarifying the actual spatial and temporal structure of macroplankton on smaller scales.

Although measurements of biomass and primary sorting of these net samples are being undertaken, the data record of plankton net samplings has not been published yet. This report is prepared for the sake of making available to interested persons some preliminary data on plankton samples stored at the National Institute of Polar Research.

Inquires about details of the data record should be addressed to: Department of Biological Data
Division of Data Collection and Processing
National Institute of Polar Research
9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173

2. Methods and Data Record

All samples obtained were preserved in 5-10 % buffered formalin sea water immediately after samplings on board. Wet weight of net samples was measured in a laboratory of the National Institute of Polar Research. Data record of each plankton net sampling are summarized as follows.

2.1. Data on plankton collected by vertical hauls with NORPAC net

Vertical hauls with the NORPAC net, ø 45 cm x 180 cm, made of nylon bolting cloth NGG 54, 0.33 mm mesh openings, were carried out from a depth of 150 or 200 m estimated by the wire angle to the surface. The net was hauled at a speed of *ca.* 1 m/s.

A flow-meter was occassionally mounted at the center of the mouth ring of the net to register the volume of water filtered through the net. A flow-meter calibration was made by hauling the flow-meter fixed at the center of the mouth ring from which the net was removed. Data on the NORPAC net hauls are listed in Tables 1, 2, 3, 4, 5 and 6.

2.2. Data on plankton collected by simultaneous horizontal tows with MTD horizontal closing nets

Simultaneous tow was carried out with four to eleven MTD horizontal closing nets, ø 56 cm x 200 cm, made of polyethylene cloth NIP #60, 0.35 mm mesh openings. Nets were lowered in open position (no collection by means of a simple device) and towed horizontally by proceeding the ship at a dead speed of *ca*. 2 kt (= 1 m/s) keeping the angle of wire cable at 45°. After 20 min horizontal towing, nets were successively throttled by lowering messengers. A flow-meter was not used. A volume of water filtered through the net for a 20 min horizontal tow was tentatively calculated to be 295 m^3 when filtration efficiency of the net is 100 %. Data on the MTD net tows are listed in Tables 7, 8, 9 and 10.

2.3. Data on zooplankton collected by oblique tows with ORI-C net

Oblique tows with the ORI-C net, ø 160 cm x 750 cm, made of 1.97 mm vinylon fabric cloth and nylon bolting cloth NGG 54, 0.33 mm mesh aperture, were carried out from a maximum depth of 190 - 354 m estimated by a TS depth distance recorder or by the wire angle to the surface. The net was released from the stern while the ship sailed at a speed of 3-4 kt. After a 15 min horizontal tow at a maximum depth, the net was recovered. The speed of the ship was not changed until the net was lifted up to the surface. Data on the ORI-C net tows are listed in Tables 11, 12 and 13.

2.4. Data on fish larvae net tows

Horizontal surface tows by a fish larvae net, ø 100 cm x 400 cm, made of 1.97 mm vinylon fabric cloth and nylon bolting cloth NGG 54, 0.33 mm mesh aperture, were carried out for 20 min while the ship sailed at a speed of *ca.* 2 kt. Data on the fish larvae net tows are listed in Table 14.

2.5. Data on LHPR oblique tows

A single NORPAC net was attached to the BENTHOS Type 315 LHPR (Benthos Inc., U. S. A.), instead of two collecting nets employed by Longhurst *et al.* (1966). The net and the filtering gauze in the Cod-End Sampler were made of polyethylene cloth NIP #60, 0.35 mm mesh openings. The strips of gauze were advanced every 30 s. The LHPR was released at a speed of 1 m/s from the stern while the ship proceeded at a speed of 2-3 kt. Immediately after the LHPR reached a maximum depth of 392-492 m, it was recovered to the surface at a speed of 0.5 m/s. The speed of the ship was not changed during towing. Therefore, a symmetrical course of the LHPR between the descending and the ascending courses could be obtained. The time required for one oblique tow was about one hour. Data on the LHPR are listed in Table 15.

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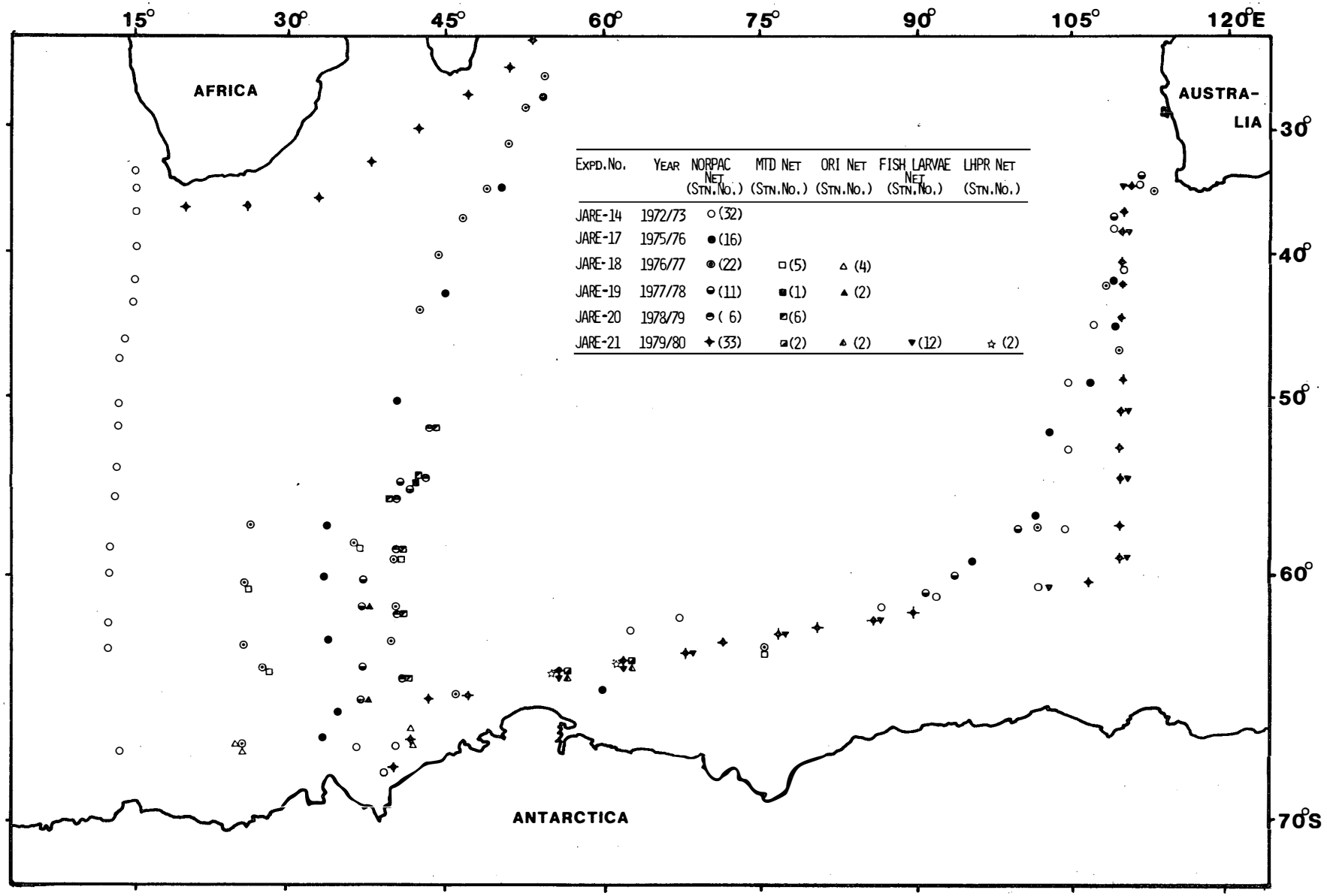

Fig. 1. Stations of plankton net samplings on board the icebreaker FUJI in the Indian sector of the Antarctic Ocean, 1972-1980.

Table 1. Data on plankton collected by vertical haul with NORPAC standard net (0.33 mm mesh openings) in the JARE-14 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Dec. 1972-Mar. 1973. Samplings were carried out by K. Kuroda.

Stn.No.	Position	Ship's time Date	Time	Length of wire (m)	Angle of wire(°)	Estimated depth of haul	RGS Flow-meter No.Revolutions	Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
1	34°22'S 111°19'E	1972 Dec.17	0820	213	20	185		35.00	—	—	14N001	
2	38°02'S 109°05'E	Dec.18	0915	280	46	213		56.00	1.0	17.5	14N002	
3	41°14'S 110°08'E	Dec.19	0900	231	30	200*		43.70	4.7	108.0	14N003	
4	45°03'S 107°25'E	Dec.20	0824	310	50	250		72.60	0.8	11.0	14N004	
5	48°51'S 104°47'E	Dec.21	0841	216	22	210		35.90	13.0	361.6	14N005	
6	52°56'S 104°51'E	Dec.22	0850	210	15	207		35.30	49.5	1401.7	14N006	
7	57°29'S 104°38'E	Dec.23	0920	226	28	215		37.60	51.7	1374.5	14N007	
8	60°26'S 101°57'E	Dec.24	0830	213	20	204		36.60	6.9	187.4	14N008	
9	60°50'S 91°48'E	Dec.25	0850	213	20	204		36.50	9.0	247.1	14N009	
10	61°25'S 81°51'E	Dec.26	0910	247	36	225		42.20	2.4	56.4	14N010	
11	61°55'S 72°26'E	Dec.27	0840	204	12	200		31.50	8.4	265.4	14N011	
12	62°31'S 63°29'E	Dec.28	0840	260	42	216		47.70	14.4	301.0	14N012	
13	68°22'S 39°07'E	1973 Jan. 1	1750	200	0	200		31.00	0.4	12.3	14N013	

Table 1. Continued.

Stn.No.	Position	Ship's time Date	Ship's time Time	Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter No. Revolutions	Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
13	68°22'S 39°07'E	Jan. 2	0950	200	0	200		31.50	0,4	12,1	14N014	
14	67°21'S 40°33'E	Feb.24	2320	200	0	200		32.30	5,4	166,9	14N015	
15	67°07'S 36°37'E	Feb.25	0845	202	8	200		33.10	0,4	10,9	14N016	
16	67°05'S 13°43'E	Feb.27	0910	150	45	115		29.80	1,9	62.4	14N017	
17	63°21'S 12°37'E	Feb.28	0915	250	40	192*		51.00	10,0	195.3	14N018	
18	62°15'S 12°51'E	Feb.28	1845	230	30	209		41.20	8.0	194,7	14N019	
19	59°52'S 12°53'E	Mar. 1	0850	250	45	177*		51.00	3.0	59,6	14N020	
20	58°29'S 12°57'E	Mar. 1	1705	250	43	200		52.70	43.8	831.9	14N021	
21	55°49'S 13°07'E	Mar. 2	0900	250	45	194		45.20	33,3	737,2	14N022	
22	54°24'S 13°25'E	Mar. 2	1904	250	42	205		51.00	4.5	87.8	14N023	
23	51°46'S 13°29'E	Mar. 3	0845	215	22	200		40.30	7.2	179,2	14N024	
24	50°22'S 13°35'E	Mar. 3	1903	213	22	198*		34.10	13.4	391.8	14N025	
25	47°37'S 13°43'E	Mar. 4	0847	219	24	206		36.70	2.4	66.5	14N026	
26	46°14'S 14°16'E	Mar. 4	1904	204	12	201		34.50	1,5	42,6	14N027	

Table 1. Continued.

Stn.No.	Position	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter		Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
		Date	Time				No. Revolutions						
27	43°34'S 15°14'E	Mar. 5	0842	210	15	202			36.10	1.0	28.3	14N028	
28	42°08'S 15°14'E	Mar. 5	1734	220	24	211			38.50	0.8	20.5	14N029	
29	39°33'S 15°23'E	Mar. 6	0837	201	3	200			31.80	0.2	6.9	14N030	
30	37°32'S 15°22'E	Mar. 6	1852	200	8	198			33.00	1.3	37.9	14N031	
31	35°10'S 15°14'E	Mar. 7	0834	220	25	200			41.50	4.4	105.1	14N032	
32	33°49'S 15°18'E	Mar. 7	1853	235	36	206			46.90	9.6	204.9	14N033	

*Depths with asterisks were estimated by wire angle. Other depths were determined by a depth recorder.

Table 2. Data on plankton collected by vertical haul with NORPAC standard net (0.33 mm mesh openings) in the JARE-17 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Dec. 1975-Mar. 1976. A flow-meter was not used. The volume of water filtered by a vertical haul was estimated by assuming 100 % filtration efficiency of the net. Samplings were carried out by Y. Ohyama and T. Mayama.

Stn.No.	Position	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter		Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
		Date	Time				No. Revolutions						
1	42°04'S 109°00'E	1975 Dec.19	0900	300	*				47.69	1.1	23.7	17N001	
2	45°50'S 109°12'E	Dec.20	0900	200	*				31.79	2.3	71.4	17N002	
3	49°10'S 106°53'E	Dec.21	0900	200	*				31.79	4.1	129.9	17N003	
4	52°27'S 103°00'E	Dec.22	0900	200	*				31.79	13.4	420.6	17N004	
5	57°00'S 101°45'E	Dec.23	0900	200	*				31.79	22.4	704.4	17N005	
6	59°43'S 95°40'E	Dec.24	0830	200	*				31.79	24.0	755.7	17N006	
7	65°11'S 60°07'E	Dec.28	0800	200	*				31.79	5.5	173.3	17N007	
8	67°34'S 33°25'E	1976 Feb.25	0800	200	*				31.79	2.4	76.4	17N008	
9	66°08'S 34°41'E	Feb.26	0800	200	*				31.79	0.9	29.3	17N009	
10	63°05'S 33°34'E	Feb.27	0800	200	*				31.79	0.7	20.4	17N010	
11	60°19'S 33°32'E	Feb.28	0800	200	*				31.79	2.8	87.5	17N011	
12	57°44'S 33°45'E	Feb.29	0800	200	*				31.79	3.9	123.6	17N012	
13	50°39'S 40°19'E	Mar. 2	0800	200	*				31.79	2.0	63.2	17N013	
14	43°06'S 45°03'E	Mar. 4	0800	200	*				31.79	3.3	105.1	17N014	1 fish larva (0.69 gr)
15	35°00'S 50°16'E	Mar. 6	0800	200	*				31.79	0.4	13.5	17N015	
16	27°19'S 54°02'E	Mar. 8	0800	200	*				31.79	0.3	8.2	17N016	

* Wire angle was not recorded.

Table 3. Data on plankton collected by vertical haul with NORPAC standard net (0.33 mm mesh openings) in the JARE-18 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Dec. 1976-Mar. 1977. A flow-meter was not used. The volume of water filtered by a vertical haul was estimated by assuming 100 % filtration efficiency of the net. Samplings were carried out by M. Fukuchi.

Stn.No.	Position	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter	Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
		Date	Time				No. Revolutions					
1	35°18'S 113°08'E	1976 Dec.17	0837	150	15	145		23.85	2.1	87.3	18N001	
2	42°43'S 108°41'E	Dec.19	0834	150	20	141		23.85	1.9	78.9	18N002	
3	47°03'S 109°59'E	Dec.20	1237	150	50	96		23.85	3.9	164.9	18N003	
4	57°43'S 102°26'E	Dec.23	0820	150	35	123		23.85	6.8	285.3	18N004	
5	63°41'S 75°54'E	Dec.26	0845	150	20	141		23.85	1.2	52.0	18N005	
6	65°43'S 46°04'E	Dec.29	0830	150	3	150		23.85	14.6	613.3	18N006	
7	64°50'S 39°59'E	1977 Feb.18	0805	150	18	143		23.85	42.4	1778.7	18N007	
8	61°48'S 40°00'E	Feb.19	0820	150	16	144		23.85	0.8	34.8	18N008	
9	59°20'S 40°17'E	Feb.20	0815	150	50	96		23.85	2.9	120.0	18N009	
10	58°38'S 36°45'E	Feb.22	0820	150	30	130		23.85	3.7	155.6	18N010	
11	64°16'S 27°50'E	Feb.24	0825	150	30	130		23.85	0.1	5.9	18N011	
12	67°35'S 25°39'E	Feb.25	0905	150	33	126		23.85	4.3	179.5	18N012	
13	63°54'S 25°42'E	Feb.27	0805	150	6	149		23.85	0.3	11.7	18N013	
14	60°38'S 25°54'E	Feb.28	0827	150	34	124		23.85	5.1	214.8	18N014	

Table 3. Continued.

Stn.No.	Position	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter	Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
		Date	Time				No. Revolutions					
15	57°45'S 26°31'E	Mar. 1	0810	150	45	106		23.85	0.3	11.3	18N015	
16	44°18'S 42°45'E	Mar. 5	0820	150	35	123		23.85	4.0	167.0	18N016	
17	40°25'S 44°47'E	Mar. 6	0824	150	39	117		23.85	0.2	8.4	18N017	
18	37°39'S 46°51'E	Mar. 7	0817	150	30	130		23.85	0.4	14.7	18N018	
19	35°21'S 48°51'E	Mar. 8	0820	230	50	148		36.56	0.5	13.7	18N019	
20	31°57'S 51°01'E	Mar. 9	0818	200	43	146		31.79	0.5	15.4	18N020	
21	28°43'S 52°55'E	Mar.10	0824	150	18	143		23.85	0.9	39.0	18N021	
22	24°58'S 54°54'E	Mar.11	0818	150	31	129		23.85	2.0	83.1	18N022	

Table 4. Data on plankton collected by vertical haul with NORPAC standard net (0.33 mm mesh openings) in the JARE-19 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Dec. 1977-Mar. 1978. A flow-meter was not used. The volume of water filtered by a vertical haul was estimated by assuming 100 % filtration efficiency of the net. Samplings were carried out by H. Kanda.

Stn.No.	Position	Ship's time Date	Ship's time Time	Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter No. Revolutions	Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
1	34°06'S 111°41'E	1977 Dec.17	0815	180	30	156		28.62	52.3	1828.1	19N001	
2	37°17'S 108°58'E	Dec.18	0815	150	0	150		23.85	82.4	3454.1	19N002	
3	57°40'S 99°49'E	Dec.23	0815	150	0	150		23.85	25.3	1060.4	19N003	
4	60°01'S 93°41'E	Dec.24	0815	150	0	150		23.85	6.4	267.5	19N004	
5	60°53'S 91°05'E	Dec.24	1715	150	0	150		23.85	8.5	354.7	19N005	
6	65°28'S 36°41'E	1978 Feb.26	0815	200	45	141		31.79	2.6	82.4	19N006	
7	64°13'S 36°59'E	Feb.26	1810	200	45	141		31.79	1.6	51.0	19N007	
8	61°31'S 37°04'E	Feb.27	0810	150	0	150		23.85	1.6	65.0	19N008	
9	60°12'S 37°06'E	Feb.27	1810	200	45	141		31.79	0.5	15.1	19N009	
10	55°24'S 41°34'E	Mar. 1	0810	200	45	141		31.79	0.2	7.5	19N010	
11	55°14'S 41°01'E	Mar. 1	1810	200	45	141		31.79	2.3	73.6	19N011	

Table 5. Data on plankton collected by vertical haul with NORPAC standard net (0.33 mm mesh openings) in the JARE-20 cruise of the Fuji to the Indian sector of the Antarctic Ocean, February-March 1979. Samplings were carried out by M. Fukuchi and S. Tamura.

Stn.No.	Position	Ship's time Date	Time	Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter No.	Revolutions	Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
1	64°44'S 40°52'E	1979 Feb.24	1200	173	30	150	51	2483	36.28	2.8	75.8	20N001	
2	61°50'S 40°04'E	Feb.25	1153	196	40	150	51	2450	35.80	17.8	497.8	20N002	
3	58°45'S 40°18'E	Feb.26	1200	173	30	150	51	2260	33.02	9.3	281.0	20N003	
4	56°08'S 40°25'E	Feb.27	0800	173	30	150	51	2420	35.36	4.2	119.6	20N004	
5	55°01'S 43°05'E	Feb.28	1252	255	45	180	51	3897	56.94	7.7	135.7	20N005	
6	52°04'S 43°17'E	Mar.1	1303	196	40	150	51	2366	34.57	4.4	126.1	20N006	

Table 6. Data on plankton collected by vertical haul with NORPAC standard net (0.33 mm mesh openings) in the JARE-21 cruise of the Fuji to the Indian sector of the Antarctic Ocean, December 1979-March 1980. Samplings were carried out by A. Tanimura and E. Takahashi.

Stn.No.	Position	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter		Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
		Date	Time				No.	Revolutions					
32	34°41'S 110°30'E	1979 Dec.13	1830	150	0	150	51	2105	30.35	0.7	23.1	21N001	
39	36°51'S 110°00'E	Dec.14	0810	202	42	150	51	2492	37.36	0.5	13.4	21N002	
44	38°28'S 110°01'E	Dec.14	1800	209	44	150	51	2593	37.38	5.3	141.8	21N003	
51	40°48'S 110°01'E	Dec.15	0820	224	48	150	51	2522	36.36	8.0	220.0	21N004	
56	42°26'S 110°00'E	Dec.15	1800	202	42	150	51	2332	33.62	9.1	270.7	21N005	
63	44°47'S 109°58'E	Dec.16	0830	255	54	150	51	3268	47.11	5.8	123.1	21N006	
75	48°55'S 110°04'E	Dec.17	0820	202	42	150	51	2651	38.21	8.2	214.6	21N007	
80	50°42'S 109°59'E	Dec.17	1800	300	60	150	51	4308	62.10	20.4	328.5	21N008	
87	53°05'S 109°58'E	Dec.18	0800	300	60	150	51	3726	53.71	30.4	566.0	21N009	
92	54°50'S 110°00'E	Dec.18	1833	181	34	150	51	2190	31.57	26.8	848.9	21N010	
99	57°24'S 109°57'E	Dec.19	0818	193	39	150	51	2445	35.25	3.6	102.4	21N011	
104	59°13'S 109°59'E	Dec.19	1840	173	30	150	51	2190	31.57	4.8	152.0	21N012	
106	60°14'S 106°40'E	Dec.20	0820	224	48	150	51	3410	49.16	6.9	140.4	21N013	
112	61°42'S 89°55'E	Dec.22	0814	170	28	150	51	1753	25.27	4.1	162.2	21N014	

Table 6. Continued.

Stn.No.	Position	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter		Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
		Date	Time				No.	Revolutions					
114	62°02'S 86°08'E	1979 Dec.22	1800	177	32	150	51	2103	30.32	1.2	39.6	21N015	
115	62°25'S 80°40'E	Dec.23	0820	154	13	150	51	1687	24.32	0.2	8.2	21N016	
117	62°44'S 77°04'E	Dec.23	1823	173	30	150	51	1663	23.97	1.7	70.9	21N017	
118	63°11'S 71°33'E	Dec.24	0815	175	31	150	51	1992	28.72	1.8	62.7	21N018	
120	63°36'S 68°02'E	Dec.24	1815	156	16	150	51	1630	23.50	1.9	80.9	21N019	
121	63°54'S 62°00'E	Dec.25	0805	209	44	150	51	2257	32.54	5.1	156.7	21N020	
122	64°20'S 56°00'E	Dec.26	0740	162	22	150	51	1680	24.22	11.6	478.9	21N021	
125	65°20'S 47°17'E	Dec.28	1805	185	36	150	51	2045	29.48	3.5	118.7	21N022	
126	65°27'S 43°21'E	Dec.29	0810	224	48	150	51	2660	38.34	7.5	195.6	21N023	
128	67°07'S 41°38'E	Dec.29	1800	162	22	150	51	1630	23.50	4.5	191.5	21N024	
129	68°10'S 40°01'E	Dec.30	0800	168	27	150	51	1863	26.86	0.2	7.4	21N025	
160	36°45'S 19°46'E	1980 Mar.1	0830	224	48	150	51	2745	39.57	3.6	91.0	21N026	
162	36°39'S 25°51'E	Mar.2	0814	229	49	150	51	2588	37.31	1.1	29.5	21N027	
164	35°57'S 32°39'E	Mar.3	0811	151	8	150	51	1517	21.87	0.2	9.1	21N028	

Table 6. Continued.

Stn.No.	Position	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of haul (m)	RGS Flow-meter		Estimated volume of water filtered (m^3)	Wet weight of sample in a haul (g)	Wet weight of sample per 1000 m^3 of water(g)	Sample No.	Unusual large organisms removed before weighing
		Date	Time				No.	Revolutions					
166	33°04'S 34°38'E	1980 Mar.4	0818	224	48	150	51	2543	36.66	0.7	19.1	21N029	
168	30°17'S 42°20'E	Mar.5	0820	233	50	150	51	2310	33.30	0.3	9.0	21N030	
170	27°25'S 46°56'E	Mar.6	0820	166	25	150	51	2141	30.86	0.4	13.0	21N031	
172	24°59'S 50°56'E	Mar.7	0813	300	60	150	51	4305	62.06	0.6	9.7	21N032	
174	22°59'S 53°20'E	Mar.8	0815	161	21	150	51	1519	21.90	0.4	18.3	21N033	

Table 7. Data on plankton collected by simultaneous horizontal tows with MTD horizontal closing nets (0.35 mm mesh openings) in the JARE-18 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Dec. 1976-Feb. 1977. The volume of water filtered by a 20 min horizontal tow is calculated to be 295 m^3 when filtration efficiency of the net is 100 %. Samplings were carried out by M. Fukuchi.

Stn.No.	Position	Date	Series of sampling	Net No.	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Wet weight of sample per 1000 m^3 of water (g)	Sample No.	Unusual large organisms removed before weighing
					Net out	Net in							
5	63°41'S	1976	1	1	0953	1022	42	45	30	19.0	64.4	18M0101	
	75°42'E	Dec.26		2	0951	1025	85	45	60	12.5	42.3	18M0102	
				3	0945	1026	140	45	100	7.2	24.5	18M0103	
				4	0943	1028	210	45	150	5.5	18.6	18M0104	
9	59°20'S	1977	1	1	0958	1022	42	45	30	1.9	6.3	18M0201	
	40°17'E	Feb.20		2	0954	1024	85	45	60	1.6	5.3	18M0202	
				3	0950	1027	140	45	100	11.0	37.1	18M0203	
				4	0945	1030	210	45	150	9.9	33.7	18M0204	
10	58°38'S	Feb.22	1	1	0952	1018	42	45	30	76.2	258.4	18M0301	
	36°45'E			2	0947	1021	85	45	60	36.6	124.1	18M0302	
				3	0940	1022	140	45	100	18.9	64.2	18M0303	
				4	0935	1025	210	45	150	14.2	48.2	18M0304	
11	64°18'S	Feb.24	1	1	0930	1000	42	60	21	0.3	0.9	18M0401	
	27°47'E			2	0927	1001	85	60	43	2.5	8.3	18M0402	
				3	0923	1003	140	60	70	3.4	11.6	18M0403	
				4	0920	1005	210	60	105	22.8	77.2	18M0404	
14	60°38'S	Feb.28	1	1	0827	0853	42	45	30	41.4	140.3	18M0501	
	25°54'E			2	0824	0855	85	45	60	20.8	70.4	18M0502	
				3	0821	0857	140	45	100	18.8	63.8	18M0503	
				4	0817	0859	210	45	150	16.5	55.8	18M0504	

Table 8. Data on plankton collected by simultaneous horizontal tows with MTD horizontal closing nets (0.35 mm mesh openings) in the JARE-19 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Mar. 1978. The volume of water filtered by a 20 min horizontal tow is calculated to be 295 m^3 when filtration efficiency of the net is 100 %. Samplings were carried out by H. Kanda.

Stn.No.	Position	Date	Series of sampling	Net No.	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Wet weight of sample per 1000 m^3 of water (g)	Sample No.	Unusual large organisms removed before weighing
					Net out	Net in							
10	55°24'S	1978	1	1	1115	1135	15	45	11	15.4	52.2	19M0101	
	41°34'E	Mar. 1		2	1113	1137	58	45	41	14.4	48.8	19M0102	
				3	1107	1141	113	45	80	22.1	74.9	19M0103	
				4	1105	1143	183	45	129	34.6	117.3	19M0104	

Table 9. Data on plankton collected by simultaneous horizontal tows with MTD horizontal closing nets (0.35 mm mesh openings) in the JARE-20 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Feb.-Mar. 1979. The volume of water filtered by a 20 min horizontal tow is calculated to be 295 m^3 when filtration efficiency of the net is 100%. Samplings were carried out by M. Fukuchi and S. Tamura.

Stn.No.	Position	Date	Series of sampling	Net No.	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Wet weight of sample per 1000 m^3 of water (g)	Sample No.	Unusual large organisms removed before weighing
					Net out	Net in							
1	64°44'S	1979	1	1	1544	1604	0	45	0	31.3	106.1	20M0101	
	40°52'E	Feb.24		2	1536	1608	35	45	25	42.7	144.8	20M0102	
				3	1534	1610	71	45	50	53.3	180.7	20M0103	
				4	1530	1612	106	45	75	45.0	152.6	20M0104	
				5	1527	1613	141	45	100	45.7	154.9	20M0105	
				6	1524	1614	177	45	125	33.3	112.9	20M0106	
				7	1521	1615	212	45	150	19.5	66.1	20M0107	
				8	1516	1617	283	45	200	8.4	28.5	20M0108	
				9	1511	1618	354	45	250	10.6	35.9	20M0109	
				10	1507	1621	424	45	300	-	-	- *	
2	61°50'S	Feb.25	1	1	1520	1540	0	45	0	117.5	398.3	20M0201	
	40°04'E			2	1519	1545	35	45	25	138.6	469.8	20M0202	
				3	1517	1547	71	45	50	210.7	714.3	20M0203	
				4	1515	1548	106	45	75	117.8	399.3	20M0204	
				5	1513	1549	141	45	100	24.5	83.1	20M0205	
				6	1509	1550	177	45	125	14.5	49.2	20M0206	
				7	1507	1552	212	45	150	15.4	52.2	20M0207	
				8	1503	1554	283	45	200	6.3	21.4	20M0208	
				9	1500	1556	354	45	250	5.8	19.7	20M0209	
				10	1458	1557	424	45	300	3.8	12.9	20M0210	
3	58°45'S	Feb.26	1	1	1633	1653	0	45	0	75.8	257.0	20M0301	
	40°18'E			2	1630	1658	35	45	25	75.2	254.9	20M0302	
				3	1628	1659	71	45	50	150.3	509.5	20M0303	
				4	1626	1700	106	45	75	50.6	171.5	20M0304	
				5	1623	1702	141	45	100	6.2	21.0	20M0305	
				6	1621	1703	177	45	125	2.5	8.5	20M0306	
				7	1619	1704	212	45	150	4.7	15.9	20M0307	
				8	1617	1706	283	45	200	4.3	14.6	20M0308	
				9	1615	1707	354	45	250	11.5	39.0	20M0309	
				10	1601	1709	424	45	300	9.8	33.2	20M0310	

Table 9. Continued.

Stn.No.	Position	Date	Series of sampling	Net No.	Ship's time Net out	Ship's time Net in	Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Wet weight of sample per 1000 m^3 of water (g)	Sample No.	Unusual large organisms removed before weighing
4	56°08'S 40°25'E	Feb.27	1	1	0722	0742	0	45	0	12.2	41.4	20M0401	
				2	0719	0745	35	45	25	46.1	156.3	20M0402	
				3	0717	0747	71	45	50	47.3	160.3	20M0403	
				4	0715	0748	106	45	75	42.5	144.1	20M0404	
				5	0713	0749	141	45	100	40.1	135.9	20M0405	
				6	0711	0751	177	45	125	32.7	110.9	20M0406	
				7	0708	0753	212	45	150	25.1	85.1	20M0407	
				8	0704	0754	283	45	200	18.5	62.7	20M0408	
				9	0702	0756	354	45	250	24.2	82.0	20M0409	
				10	0659	0757	424	45	300	35.3	119.7	20M0410	
4	56°08'S 40°25'E	Feb.27	2	1	1228	1248	0	45	0	8.5	28.8	20M0501	
				2	1212	1251	35	45	25	75.8	257.0	20M0502	
				3	1209	1253	71	45	50	62.0	210.2	20M0503	
				4	1207	1254	106	45	75	75.5	255.9	20M0504	
				5	1205	1256	141	45	100	46.2	156.6	20M0505	
				6	1203	1257	177	45	125	24.6	83.4	20M0506	
				7	1200	1258	212	45	150	14.5	49.2	20M0507	
				8	1157	1259	283	45	200	15.0	50.9	20M0508	
				9	1154	1302	354	45	250	25.7	87.1	20M0509	
				10	1152	1303	424	45	300	38.6	130.9	20M0510	
4	56°08'S 40°25'E	Feb.27	3	1	1814	1834	0	45	0	6.5	22.0	20M0601	
				2	1810	1835	35	45	25	24.7	83.7	20M0602	
				3	1807	1837	71	45	50	42.1	142.7	20M0603	
				4	1805	1839	106	45	75	61.8	209.5	20M0604	
				5	1803	1841	141	45	100	35.3	119.7	20M0605	
				6	1801	1842	177	45	125	4.8	-	20M0606**	
				7	1759	1843	212	45	150	20.4	69.2	20M0607	
				8	1757	1845	283	45	200	16.3	55.3	20M0608	
				9	1754	1846	354	45	250	19.4	65.8	20M0609	
				10	1751	1848	424	45	300	24.4	82.7	20M0610	

Table 9. Continued.

Stn.No.	Position	Date	Series of sampling	Net No.	Ship's time Net out	Ship's time Net in	Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Wet weight of sample per 1000 m^3 of water (g)	Sample No.	Unusual large organisms removed before weighing
5	55°01'S 43°05'E	Feb.28	1	1	1220	1240	0	45	0	18.9	64.1	20M0701	
				2	1216	1241	35	45	25	41.3	140.0	20M0702	
				3	1214	1243	71	45	50	2.2	-	20M0703**	
				4	1212	1244	106	45	75	64.8	219.7	20M0704	
				5	1210	1245	141	45	100	77.6	263.1	20M0705	
				6	1208	1246	177	45	125	23.7	80.3	20M0706	
				7	1206	1248	212	45	150	16.3	55.3	20M0707	
				8	1203	1249	283	45	200	12.3	41.7	20M0708	
				9	1201	1251	354	45	250	11.1	37.6	20M0709	
				10	1159	1252	424	45	300	14.0	47.5	20M0710	
6	52°04'S 43°17'E	Mar. 1	1	1	1228	1248	0	45	0	1.7	5.8	20M0801	
				2	1226	1252	35	45	25	10.2	34.6	20M0802	
				3	1224	1253	71	45	50	72.8	246.8	20M0803	
				4	1222	1255	106	45	75	53.6	181.7	20M0804	
				5	1220	1256	141	45	100	36.8	127.8	20M0805	
				6	1218	1257	177	45	125	18.0	61.0	20M0806	
				7	1216	1258	212	45	150	13.5	45.8	20M0807	
				8	1214	1300	283	45	200	10.6	35.9	20M0808	
				9	1211	1301	354	45	250	6.3	21.4	20M0809	
				10	1209	1302	424	45	300	17.0	57.6	20M0810	

* Collecting bag was lost.
**Cod end was entangled with the wire cable.

Table 10. Data on plankton collected by simultaneous horizontal tows with MTD horizontal closing nets (0.35 mm mesh openings) in the JARE-21 cruise of the Fuji to the Indian sector of the Antarctic Ocean, December 1979. The volume of water filtered by a 20 min horizontal tow is calculated to be 295 m^3 when filtration efficiency of the net is 100 %. Samplings were carried out by A. Tanimura and E. Takahashi.

Stn.No.	Position	Date	Series of sampling	Net No.	Ship's time Net out	Ship's time Net in	Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Wet weight of sample per 1000 m^3 of water (g)	Sample No.	Unusual large organisms removed before weighing
121	63°54'S	1979	1	1	1220	1241	0	55	0	55.8	189.2	21M0101	
	62°00'E	Dec.25		2	1212	1248	35	55	20	42.5	144.1	21M0102	
				3	1209	1252	70	55	40	35.7	121.0	21M0103	
				4	1207	1254	106	55	61	16.1	54.6	21M0104	
				5	1204	1255	141	55	81	10.7	36.3	21M0105	
				6	1202	1257	177	55	102	9.4	31.9	21M0106	
				7	1159	1259	212	55	122	5.2	17.6	21M0107	
				8	1155	1301	283	55	162	4.2	14.2	21M0108	
				9	1149	1303	353	55	202	3.8	12.9	21M0109	
				10	1146	1305	424	55	243	8.4	28.5	21M0110	3 Medusae(145.2 gr)
				11	1142	1307	495	55	283	3.9	13.2	21M0111	
			2	1	1339	1441	565	53	340	4.5	15.3	21M0112	
				2	1336	1445	636	53	383	3.6	12.2	21M0113	
				3	1333	1447	707	53	425	10.3	34.9	21M0114	Many Medusae(54.5 gr)
				4	1330	1450	778	53	468	3.7	12.5	21M0115	
				5	1327	1452	848	53	510	3.0	10.2	21M0116	
				6	1324	1455	923	53	555	2.7	9.2	21M0117	
				7	1321	1458	990	53	596	6.9	23.4	21M0118	
				8	1317	1500	1131	53	681	1.4	4.7	21M0119	
				9	1312	1503	1273	53	766	1.1	3.7	21M0120	
				10	1309	1506	1417	53	853	1.4	4.7	21M0121	Many Medusae(14.4 gr)

Table 10. Continued.

Stn.No.	Position	Date	Series of sampling	Net No.	Ship's time Net out	Ship's time Net in	Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Wet weight of sample per 1000 m^3 of water (g)	Sample No.	Unusual large organisms removed before weighing
122	64°20'S 56°00'E	1979 Dec.26	2	1	1425	1450	0	45	0	178.1	603.7	21M0201*	
				2	1418	1455	35	45	25	—	—	— **	
				3	1416	1457	70	45	50	53.5	181.4	21M0203*	
				4	1414	1459	106	45	75	35.4	120.0	21M0204*	
				5	1411	1501	141	45	100	55.4	187.8	21M0205*	
				6	1409	1504	177	45	125	18.0	61.0	21M0206*	
				7	1407	1505	212	45	150	15.9	53.9	21M0207*	1 Medusa (33.6 gr)
				8	1404	1507	283	45	200	8.9	30.2	21M0208*	
				9	1401	1509	353	45	250	10.8	36.6	21M0209*	
				10	1359	1510	424	45	300	6.6	22.4	21M0210*	
				11	1355	1512	495	45	350	7.1	24.1	21M0211*	
			1	1	1231	1330	565	54	332	6.1	20.7	21M0212	
				2	1227	1332	636	54	374	4.0	13.6	21M0213	
				3	1224	1335	707	54	416	4.7	15.9	21M0214	1 Medusa (25.8 gr)
				4	1220	1337	778	54	457	5.6	20.0	21M0215	
				5	1216	1339	848	54	498	3.2	10.8	21M0216	
				6	1213	1341	923	54	543	3.3	11.2	21M0217	
				7	1210	1343	990	54	582	4.3	14.6	21M0218	
				8	1205	1347	1131	54	665	4.5	15.3	21M0219	
				9	1202	1349	1273	54	748	2.4	8.1	21M0220	
				10	1150	1352	1417	54	833	1.9	6.4	21M0221	

* Failure in net closing.
** Collecting bag was lost.

Table 11. Data on plankton collected by oblique tows with ORI-C net (1.97 and 0.33 mm mesh openings) in the JARE-18 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Feb. 1977. Samplings were carried out by M. Fukuchi.

Stn.No.	Position	Date	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Sample No.	Unusual large organisms removed before weighing
			Net in	Net out						
R01	67°18'S 42°39'E	1977 Feb.17	0812	0900	500		290 *	109.4	18R001	
R02	66°36'S 41°28'E	Feb.17	1452	1530	500		290 *	222.6	18R002	
12	67°35'S 25°39'E	Feb.25	0820	0905	500		230 *	54.8	18R003	
R04	67°33'S 25°39'E	Feb.26	0807	0905	500		230 *	65.5	18R004	1 medusa

* Depths were estimated by a TS depth distance recorder.

Table 12. Data on plankton collected by oblique tows with ORI-C net (1.97 and 0.33 mm mesh openings) in the JARE-19 cruise of the Fuji to the Indian sector of the Antarctic Ocean, Feb. 1978. Samplings were carried out by H. Kanda.

Stn.No.	Position	Date	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Sample No.	Unusual large organisms removed before weighing
			Net in	Net out						
R01	65°28'S 36°41'E	1978 Feb.26	1030	1120	500	45	354	125.8	19R001	
8	61°31'S 37°04'E	Feb.27	1015	1115	400	45	283	45.8	19R002	

Table 13. Data on plankton collected by oblique tows with ORI-C net (1.97 and 0.33 mm mesh openings) in the JARE-21 cruise of the Fuji to the Indian sector of the Antarctic Ocean, December 1979. Samplings were carried out by A. Tanimura and E. Takahashi.

Stn.No.	Position	Date	Ship's time		Length of wire (m)	Angle of wire (°)	Estimated depth of tow (m)	Wet weight of sample in a tow (g)	Sample No.	Unusual large organisms removed before weighing
			Net in	Net out						
121	63°54'S 62°00'E	1979 Dec.25	1537	1619	350	55	200	161.6	21R001	
122	64°20'S 56°00'E	Dec.26	1535	1618	350	57	190	270.9	21R002	

Table 14. Data on plankton collected by surface horizontal tows with fish larvae net (1.97 and 0.33 mm mesh openings) in the JARE-21 cruise of the Fuji to the Indian sector of the Antarctic Ocean, December 1979. Samplings were carried out by A. Tanimura and E. Takahashi.

Stn. No.	Position	Date	Ship's time		Wet weight of sample in a tow (g)	Sample No.	Unusual large organisms removed before weighting	Remarks
			Net out	Net in				
32	34°41'S 110°30'E	1979 Dec.13	1810	1830	7.5	21F001		
44	38°28'S 110°01'E	Dec.14	1810	1830	34.5	21F002		
56	42°26'S 110°00'E	Dec.15	1810	1830	15.6	21F003		
80	50°42'S 109°59'E	Dec.17	1800	1820	13.6	21F004		
92	54°50'S 110°00'E	Dec.18	1811	1831	8.9	21F005		
104	59°13'S 109°59'E	Dec.19	1830	1850	20.7	21F006		
108	60°37'S 103°16'E	Dec.20	1753	1808	2.6	21F007		
114	62°02'S 86°08'E	Dec.22	1753	1813	5.4	21F008		
117	62°44'S 77°04'E	Dec.23	1800	1820	3.3	21F009		
120	63°36'S 68°02'E	Dec.24	1752	1812	2.3	21F010		
121	63°54'S 62°00'E	Dec.25	1536	1556	31.1	21F011		
122	64°20'S 56°00'E	Dec.26	1535	1600	32.4	21F012		

Table 15. Data on plankton collected by oblique tows with LHPR (0.35 mm mesh openings) in the JARE-21 cruise of the Fuji to the Indian sector of the Antarctic Ocean, December 1979. Samplings were carried out by A. Tanimura and E. Takahashi.

Stn. No.	Position	Date	Ship's time		length of wire (m)	Estimated* depth of tow (m)	Sample No.	No. of serial samples		Remarks
			Net out	Net in				Descending	Ascending	
121	63°54'S 62°00'E	1979 Dec.25	1629	1720	1000	392	21L001	46	59	A flow-meter did not work.
122	64°20'S 56°00'E	Dec.26	1627	1719	1000	492	21L002	*ca.* 40	*ca.* 18	A strip chart recorder did not work.

* Depths were calculated by depth recorder.