BERGENS MUSEUM

HYDROGRAPHICAL AND BIOLOGICAL INVESTIGATIONS

IN

NORWEGIAN FIORDS

By

O. NORDGAARD

THE PROTIST PLANKTON AND THE DIATOMS IN BOTTOM SAMPLES

BY

E. JØRGENSEN

WITH 21 PLATES AND 10 FIGURES IN THE TEXT

BERGEN
JOHN GRIEG
1905

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PREFACE.

In the present work, I have collected the results of the hydrographical and biological investigations made by me in some the fiords in the north of Norway, in the winter of 1899 and 1900, when at the cost of the Norwegian government and the Ber Museum I made investigations in the fishing waters of Lofoten. For this purpose, I hired a little steamer „Gunnar Berg" from Janu to the beginning of May, 1899. During these months, observations were made in the Vest Fiord and in the sea beyond Lofo Vesteraalen, Senjen and Finmarken. Several fiords were also visited, as for instance, the Kirk, the Øgs, the Kanstad, the Sag, Tys and the Ofoten Fiords, Skjomen, Rombaken, Malangen, Lyngen, Kvænangen (including the Jøkel Fiord), the Porsanger Fiord

In the winter of 1900, S/S „Asbjørn Selsbane" was hired for one month, so that investigations might be made in the fish banks which would furnish material with which to compare the results obtained the previous year. We were also able to visit Morsdal, Salten, Skjerstad and Folden Fiords. Of these, the Skjerstad Fiord proved to be especially interesting.

The following apparatus were used:—

1. Dr. Petterson's water bottle and meter wheel,
2. A crab with 1000 meters af bronze-line,
3. German nets for plankton gatherings,
4. Dr. Petersen's closing net,
5. Dredges and a small trawl for zoological gatherings,
6. Lines and ropes.

The dredges and trawl were drawn up by the steam winch, but we took in the water bottle and the plankton nets w one worked by hand.

I had a very capable assistant, Mr. Niels Haagensen, both winters, he rendered very great service in many ways. the sake of uniformity, I took all the temperatures personally. In determining the zoological material, I have had many helpers, N wegians and foreigners. But, unless otherwise stated, I am personally responsible for the arrangement of the species, and for the remar which, in some cases, are added. I am especially indebted to my friend, Mr. E. Jørgensen, for his exceedingly careful treatment the Protistplankton and the Diatoms in the Bottom samples.

To the following naturalists, I also wish to tender my hearty thanks for their kind assistance, viz:—

A. Appellöf, O. Bidenkap, Miss K. Bonnevie, Edw. Browne, O. Carlgren, R. Collett, M. Foslie, Herman Friel James Grieg, R. Hartmeyer, Johan Kiær, Hans Kiær, J. Huitfeldt-Kaas, G. W. R. Levinsen, W. Lundbeck, R. C. Punne G. O. Sars, J. Sparre Schneider and Hj. Östergren.

My thanks are also due to the Norwegian government officials and to the managing board of the Bergen Museum, for hav been by them enabled to undertake these investigations. Finally, I would especially thank the Director of the Bergen Museum, J. Brunchorst, who has, in so many ways, given me valuable assistance.

Bergen, $^{8}/_{11}$ 1904.

O. Nordgaard.

CONTENTS.

ERRATA.

Page 3, line 2 from foot, for 150 m. (sample nr. 154), read 180 m.
— 9, for Landego 3° 19′ E, read Landego 14° 4′ E.
— 9, for Arnø 3° 15′ E, read Arnø 14° E.
— 10, line 2 from foot, for E t S, read E b S.
— 172, line 21, for *Rhamphostella*, read *Rhamphostomella*.

I. HYDROGRAPHY.

NOTES.

The water samples were taken by means of prof. Pettersson's water-bottle and the titration has been made at the laboratory the Bergen Biological Station by Messrs. Thomas Mathiesen (samples of 1899) and Ragnar Barman (samples of 1900) according the methods of prof. Pettersson. I have made every temperature observation myself with a termometer of dr. H. Geissler Nachf. z. Müller in Bonn.

The distances of the tables are expressed in nautical miles (= 1852 metres).

A. Observations at the Northern Coast and in the Northern Fjords.

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Saline contents: Salt per litre	Saline contents: Salt per mille
	January	Høla at Svolvær	Metres	Metres	C⁰			
1	11	68°10′.5 N.,	150	0	3.3	18.79	34.00	33.16
2		14°35′.5 E.		10	3.5	18.79	34.00	33.16
3				20	3.6	18.79	34.00	33.16
4				30	3.7	18.79	34.00	33.16
5				40	3.7	18.79	34.00	33.16
6				50	3.7	18.82	34.05	33.21
7				80	3.8	18.82	34.05	33.21
8				100	4.6	18.82	34.05	33.21
9				110	6.4	19.37	35.04	34.17
10				127	6.6	19.45	35.18	34.30
11				150	6.6	19.58	35.41	34.52
12		Outside Skroven.		0	4.0	18.85	34.11	33.26
13		Between Grøtø		0	4.4	18.92	34.23	33.39
14		and Skroven.		10	4.4	18.92	34.23	33.39
15		In the middle of		20	4.4	18.92	34.23	33.39
16		the Vestfjord.		30	4.5	18.92	34.23	33.39
17				40	4.6	18.92	34.23	33.39
18				50	4.8	18.99	34.36	33.50
19				60	5.0	18.99	34.36	33.50
20				70	5.3	18.99	34.36	33.50
21				80	6.3	19.13	34.60	33.74
22				100	6.9	19.48	35.24	34.35
23				150	6.3	19.68	35.59	34.69
24				200	6.3	19.79	35.78	34.87
25				250	6.2	19.79	35.78	34.87
26	12	Off Fladø.		0	4.2	18.89	34.18	33.33
27		4 miles W of		0	4.2	18.89	34.18	33.33
		Husøbaran.						
28		10 miles NW of		0	4.3	18.92	34.23	33.39
29		Helligvær.		10	4.3	18.92	34.23	33.39
30				20	4.3	18.92	34.23	33.39
31				30	4.4	18.92	34.23	33.39
32				50	4.4	18.92	34.23	33.39
33				80	5.0	18.99	34.36	33.50
34				100	5.0	19.17	34.68	33.82
35				110	7.0	19.41	35.10	34.23
36				120	7.3	19.58	35.41	34.52
37				140	7.6	19.71	35.64	34.74
38				150	7.6	19.71	35.64	34.74
39				200	7.4	19.86	35.91	34.99
40				250	7.3	19.93	36.04	35.11
41	13	Vestfjord I.	180	0	4.6	18.99	34.36	33.50
42		Between Helligvær		10	4.7	18.99	34.36	33.50
43		and Værø in the		20	4.7	18.99	34.36	33.50
44		middle of the fjord.		30	4.8	18.99	34.36	33.50
45				50	4.9			
46				80	5.1	19.07	34.50	33.65
47				100	5.3	19.10	34.56	33.70
48				110	6.7	19.41	35.10	34.23
49				120	7.2	19.45	35.18	34.30
50				130	7.2	19.55	35.36	34.47
51				150	6.4	19.61	35.47	34.57
52				180	6.5	19.61	35.47	34.57
53		Vestfjord II.	225	0	3.9	18.85	34.11	33.26
54		Between Vestfj. I		10	4.0	18.85	34.11	33.26
55		and Værø.		20	4.0	18.85	34.11	33.26
56				30	4.6	18.92	34.23	33.39
57				50	4.6	18.92	34.23	33.39
58				80	4.8	18.99	34.36	33.50
59				100	6.4	19.27	34.86	34.00
60				120	7.2	19.41	35.10	34.23
61				150	7.6	19.61	35.47	34.57
62				200	7.2	19.79	35.78	34.87
63				225	6.8	19.82	35.84	34.92
64	14	Off Mosken.		0	3.9	18.85	34.10	33.26
65		Moskenstrømmen.		0	4.0	18.85	34.10	33.26
66		Moskenstrømmen.	150	0	4.1	18.92	34.23	33.39
67		10 miles SOtO of		30	4.3	18.92	34.23	33.39
68		Evenstad.		50	4.5	18.96	34.31	33.46
69				80	4.6	18.96	34.31	33.46
70				100	4.7	18.96	34.31	33.46
71				120	5.4	19.13	34.60	33.74
72				150	6.5	19.65	35.54	34.64
73	17	Reine.	130	0	4.18	18.92	34.23	33.39
74		8 miles SO of R.		10	4.2	18.92	18.23	33.39
75				30	4.3	18.92	18.23	33.39
76				50	4.3	18.92	18.23	33.39
77				80	4.3	18.92	34.23	33.39
78				100	5.1	19.09	34.54	33.68

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Saline contents: Salt per litre	Saline contents: Sa pe mil
	January		Metres	Metres	C⁰			
79	17	Reine.		110	7.0	19.41	35.10	34.
80				130	7.1	19.51	35 27	34.
81		Stamsund.		0	3.9	18.89	34.18	33.
82		8 miles StO of	150	10	4.1	18.92	34.23	33.
83		Stamsund.		30	4.2			
84				50	4.3	18.92	34.23	33.
85				80	4.45	18.96	34.31	33.
86				100	5.5	19.13	34.60	33.
87				120	6.9	19.51	35.28	34.
88				150	6.8	19.58	35.41	34.
89		Henningsvær.	180	0	4.2	18.92	34.23	33.
90		7 miles S of.		10	4.2	18.92	34.23	33.
91	18	Yttersiden.	110	0	4.1	18.99	34.36	33.
92		Outside the Lofoten		10	4.6	18.99	34.36	33.
93		islands.		20	4.6	18.99	34.36	33.
94				30	4.6	18.99	34.36	33.
95				50	4.7	18.99	34.36	33.
96				60	4.9	19.07	34.50	33.
97				80	5.5	19.20	34.74	33.
98		Gaukværø.	250	0	4.1	19.02	34.42	33.
99		68°35′ N.,		10	4.4	19.02	34.42	33.
100		14°13′ E.		20	4.5	19.02	34.42	33.
101				30	4.5	19.02	34.42	33.
102				80	5.6	19.30	34.91	34.
103				150	6.9	19.43	35.14	34.
104				250	7.1	19.50	35.27	34.
105	19	Havet.		0	5.9	19.50	35.27	34.
106		40 miles NNW of		10	6.2	19.50	35.27	34.
107		Gaukværø.		20	6.4	19.50	35.27	34.
108				30	6.4	19.61	35.47	34.5
109				40	6.4	19.50	35.27	34.
110				50	6.4	19.50	35.27	34.
111				80	6.7	19.50	35.27	34.
112				100	6.9	19.58	35.42	34.5
113				120	7.0	19.58	35.42	34.5
114				150	6.8	19.58	35.41	34.5
115				200	6.7	19.58	35.41	34.5
116				250	6.6	19.58	35.41	34.5
117				300	6.5	19.58	35.41	34.5
118				400	6.2	19.58	35.41	34.5
119				500	5.9	19.50	35.27	34.
120				600	4.2	19.50	35.27	34.
121				700	3.6	19.50	35.27	34.
122				800	2.0	19.43	35.14	34.2
123				1000	2.0	19.43	35.14	34.2
124		32 miles NNW of		0	5.0	19.16	34.66	33.8
		Gaukværø.						
125		24 miles NNW of		0	4.0	18.77	33.96	33.1
		Gaukværø.						
126	21	Senjen.	130	0	3.3	18.77	33.96	33.1
127		12 miles NWtW of		10	3.9	18.77	32.96	33.1
128		Maanesodden.		20	3.9	18.77	33.96	33.1
129				40	3.9	18.77	33.96	33.1
130				50	4.3	18.77	33.96	33.1
131				80	4.5	18.89	34.18	33.3
132				100	4.6	18.89	34.18	33.3
133				120	4.4	18.89	34.18	33.3
134	23	Tromsøsund.		0	0.6	19.00	34.38	33.5
135	24	Kvænangen I.	150	0	3.6	19.32	34.95	34.08
136		Between Løgø and		10	3.7	19.32	34.95	34.08
137		Brynilen.		20	3.7	19.32	34.95	34.08
138				30	3.7	19.32	34.95	34.08
139				40	3.9	19.32	34.95	34.08
140				50	3.9	19.32	34.95	34.08
141				80	3.9	19.32	34.95	34.04
142				100	3.9	19.32	34.95	34.08
143				120	3.9	19.32	34.95	34.08
144				140	4.0	19.32	34.95	34.08
145		Kvænangen II.	180	0	2.6	19.20	34.74	33.87
146		70°1′ N.,		10	2.6	19.20	34.74	33.87
147		21°28′.5 E.		20	2.6	19.20	34.74	33.87
148		Between Spilderen		30	2.6	19.20	34.74	33.87
149		and Kvænangs-		50	2.6	19.20	34.74	33.87
150		tinderne.		80	2.6	19.20	34.74	33.87
151				100	2.6	19.20	34.74	33.87
152				120	2.6	19.20	34.74	33.87
153				150	2.8	19.20	34.74	33.87
154				150	3.1	19.20	34.74	33.87
155	27	Lyngen I.	118	0	1.1	19.20	34.74	33.87

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	January	Lyngen I.	Metres	Metres	C⁰			
56	27	Abreast of Ski-		10	1.1	19.20	34.74	33.87
57		botten.		20	1.1	19.20	34.74	33.87
58				30	1.1	19.20	34.74	33.87
59				50	1.1	19.20	34.74	33.87
60				80	1.1	19.20	34.74	33.87
61				100	1.1	19.20	34.74	33.87
62				118	1.1	19.20	34.74	33.87
63		Lyngen II.	250	0	3.0	19.17	34.68	33.82
64		63⁰37′ N.,		10	3.1	19.20	34.74	33.87
65		20⁰24′ E.		20	3.1	19.20	34.74	33.87
66		Off the Kaafjord.		30	3.0	19.24	34.80	33.94
67				50	2.6	19.32	34.95	34.08
68				80	2.5	19.20	34.74	33.87
69				100	2.5	19.20	34.74	33.87
70				150	2.2	19.17	34.68	33.82
71				180	1.9	19.17	34.68	33.82
72				200	1.7	19.17	34.68	33.82
73				250	1.6	19.17	34.68	33.82
74		Lyngen III.		0	1.8	18.47	33.41	32.60
75		69⁰45.5 N.,		10	3.2	19.09	34.54	33 68
76		20⁰22′ E.		30	3.4	19.20	34.74	33.87
77		Abreast of Spokenes.		50	3.4	19.20	34.74	33.87
78				80	3.4	19.20	34.74	33.87
79				100	3.4	19.24	34.80	33.94
80				150	3.4	19.24	34.80	33.94
81				200	2.9	19.24	34.80	33.94
82	29	Malangen.	350	0	2.8	19.23	34.79	33.92
83		Between Lysbotn		10	2.9	19.23	34.79	33.92
84		and Stønnesbotn.		20	2.9	19.23	34.79	33.92
85				30	2.9	19.23	34.79	33.92
86				50	2.9	19.23	34.79	33.92
87				80	2.9	19.23	34.79	33.92
88				100	2.9	19.23	34.79	33.92
89				120	3.0	19.26	34.84	33.97
90				150	3.2	19.26	34.84	33.97
91				180	3.9	19.33	34.97	34.10
92				200	4.1	19.33	34.97	34.10
93				250	5.5	19.58	35.41	34.52
94				300	5.5	19.58	35.41	34.52
95				350	5.5	19.58	35.41	34.52
96	31	Høla.	150	0	2.1	18.84	34.09	33.25
97		Svolvær, Lofoten.		10	2.5	18.84	34.09	33.25
98				20	2.5	18.84	34.09	33.25
99				30	2.6	18.84	34.09	33.25
200				40	2.7	18.84	34.09	33.25
201				50	3.3	18.91	34.22	33.37
202				60	3.9	18.95	34.30	33.44
203				80	5.2	19.11	34.57	33.72
204				100	6.4	19.39	35.07	34.20
205				120	6.7	19.54	34.34	34.45
206				150	6.8	19.62	35.48	34.59
207		Lilandsbugten.		0	2.2	18.80	34.01	33.18
208		Østnesfjord.		10	2.2	18.84	34.09	33.25
209				20	2.4	18.84	34.09	33.25
210				30	3.3	18.91	34.22	33.37
211				40	3.4	18.91	34.22	33.37
212				46	3.5	18.95	34.30	33.44
213				55	4.7	19.10	34.56	33.70
214		Følstad.	120	0	2.5	18.84	34.09	33.25
215		Østnesfjord.		10	2.7	18.84	34.09	33.25
216				20	2.8	18.84	34.09	33.25
217				30	3.4	18.95	34 30	33.44
218				40	4.0	18.99	34.36	33.50
219				50	4.3	19.03	34 44	33.58
220				60	4.6	19.07	34.50	33.65
221				80	5.5	19.23	34.79	33.92
222				100	6.5	19.50	35.27	34.38
223				120	6.7	19.58	35.41	34.52
224		Helle.	140	0	2.1	18.84	34.09	33.25
225		Østnesfjord.		10	2.2	18.72	33.87	33.04
226				20	2.3	18 80	34.01	33.18
227				30	2.5	18.80	34.01	33.18
228				40	2.7	18.80	34.01	33.18
229				50	3.75	18.95	34.30	33.44
230				60	4.3	19.03	34.44	33.58
231				80	5.4	19.09	34.54	33.68
232				100	6.4	19.32	34.95	34.08
233				120	6.7	19.54	35.34	34.45
234				140	6.7	19.62	35.48	34.59
	February							
235	1	Henningsvær.	100	10	3.4	18.98	34.34	33.49

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	February	Henningsvær.	Metres	Metres				
236	1	8 miles StW of H.		30	3.6	18.98	34.34	33.49
237				50	3.6	18.91	34.22	33.37
238				60	3.6	18.98	34.34	33.49
239				80	5.3	19 13	34.60	33.74
240				100	6.2	19.32	34 95	34.08
241		Skroven.	300	0	3.3	18.94	34.27	33.42
242		4 miles S of		50	3.4	18.98	34.34	33.49
243		Skroven.		100	5.6	19.24	34.81	33.94
244				200	6.9	19.88	35.95	35.03
245				300	6.4	19.88	35.95	35.03
246	3	Raftsund I.	40	0	2.9	18.87	34.14	33.30
247		Abreast of the		10	3.1	18.87	34.14	33.30
248		Troldfjord.		20	3.3	18.91	34.22	33.37
249				30	3.4	18.94	34.27	33.42
250				40	3.4	18.94	34.27	33.42
251		Raftsund II.	270	0	2.7	18.91	34.22	33.37
252		Between Aarstenen		20	2.9	18.91	34.22	33.37
253		and Ulvaag.		50	2.9	18.99	34.36	33.50
254				80	4.0	19.05	34.46	33.61
255				100	6.2	19.51	35.28	34.40
256				150	6.5	19.65	35.54	34.64
257				200	6.5	19.69	35.60	34.70
258				250	6.6	19.69	35.60	34.70
259	4	Skroven.	380	0	3.0	19.02	34.42	33.56
260		5 miles OSO of S.		50	3.3	19.02	34 42	33.56
261				80	3.5	19.02	34.42	33.56
262				90	4.8	19.17	34.18	33.82
263				100	6.4	19.43	35.14	34.26
264				150	7.1	19.80	35.80	34.89
265				200	7.0	19.95	36.07	35.14
266				250	6.9	19.95	36.07	35.14
267				300	6.4	19.95	36.07	35.14
268				375	6.3	19.95	36.07	35.14
269	6	Tranødybet.	630	0	2.5	18.99	34.36	33.50
270		68⁰15.5 N.,		20	2.7	18.99	34.36	33 50
271		15⁰49′ E.		50	2.8	18.99	34.36	33.50
272		Between Lødingen		80	4.6	19.13	34.60	33.74
273		and Tranø.		100	5.5	19.36	35.02	34.15
274				150	6.5	19.80	35.80	34.89
275				200	6.4	19.88	35.95	35.03
276				250	6.4	19.88	35.95	35.03
277				300	6.3	19.95	36.07	35.14
278				400	6.3	19.95	36.07	35.14
279				500	6.3	19.95	36.07	35.14
280				600	6.3	19.95	36.07	35.14
281				630	6.3			
282	7	Ofoten I.	360	0	1.7	18 87	34.14	33.30
283		Between Havnes		20	1.9	18.87	34.14	33.30
284		and Ramsund.		50	1.9	18.87	34 14	33.30
285				80	3.6	19.02	34.42	33.56
286				100	5.7	19.32	34.95	34.08
287				120	6.2	19.61	35.47	34.57
288				150	6.4	19.73	35.68	34.77
289				200	6.3	19.84	35.87	34.96
290				250	6.3	19.84	35.87	34.96
291				300	6.3	19.88	35.95	35.03
292				350	6.3	19.88	35.95	35.03
293		Ofoten II.	258	0	1.5	18.87	34.14	33.30
294		Between Bogen		20	1.8	18.87	34.14	33.30
295		and Ballangen.		50	1.8	18.87	34.14	33.30
296				80	1.9	18.91	34.22	33.37
297				100	5.4	19.40	35.09	34.21
298				120	6.2	19.65	35.54	34.64
299				150	6.2	19.73	35.68	34.77
300				200	6.2	19.80	35.80	34.89
301				250	6.2	19.84	35.87	34.96
302	8	Rombaken I.	40	0	0.2	18.80	34.01	33.18
303		At the head of R.		10	0.2	18.84	34.09	33.25
304				20	0.3	18.84	34.09	33.25
305				30	0.4	18.84	34.09	33.25
306				40	0.5	18.84	34.09	33.25
307		Rombaken II.	110	0	0.2	18.84	34.09	33.25
308		Abreast of ytre		20	0.5	18.84	34.09	33.25
309		Sildvik.		50	0.7	18.84	34.09	33.25
310				80	0.7	18.84	34.09	33.25
311				110	0.6	18.91	34.22	33.37
312		Rombaken III.	310	0	1.4	18.87	34.14	33.30
313		Inside Øijord.		20	1.4	18.87	34.14	33.30
314				50	1.4	18.87	34.14	33.30
315				80	1.4	18.87	34.14	33.30
316				100	4.8	19 28	34.88	34.01

1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents		
					Cl. per litre	Salt per litre	Salt per mille
February 8	Rombaken III.	Metres	Metres	C⁰			
			120	6.0	19.54	35.34	34.45
			150	6.0	19.69	35.60	34.70
			200	6.0	19.69	35.60	34.70
			250	6.0	19.76	35.73	34.82
			300	6.0	19.76	35.73	34 82
9	Skjomen I.	40	0	1.9	18.91	34.22	33.37
	At Elvegaard.		20	1.9	18.84	34.09	33.25
			40	2.0	18.94	34.27	33.42
	Skjomen II.	150	0	1.8	18.99	34.36	33.50
	Abreast of Rontind.		20	1.8	18.91	34.22	33.37
			50	1.8	18.91	34.22	33.37
			100	1.7	18.91	34.22	33.37
			150	1.7	18.94	34.27	33.42
	At Frostisen.		0	1.7	18.94	34.27	33.42
	At the head of the Skjomenfjord.						
	Ofotenfjord.		550	6.3	19.95	36.07	35.14
	Abreast of Skarstad.						
13	Strømmen I.	80	0	2.2	19.02	34 42	33.56
	At Henningsvær.		20	2.3	18.94	34.27	33.42
			50	3.3	18.94	34.27	33.42
			80	3.4	19.13	34.60	33.74
	Strømmen II.	35	0	1.7	19.02	34.42	33.56
			20	1.7	18.94	34.27	33.42
			30	1.75	18.94	34.27	33.42
	Skroven.	248	0	2.1	19.05	34.46	33.61
	5 miles SWtS of S.		20	2.9	19.02	34.42	33.56
			50	3.0	19.02	34.42	33.56
			80	3.1	19.05	34.46	33.61
			90	3.8	19.13	34.60	33.74
			100	5.4	19.35	35.00	34.13
			110	6.4	19.51	35.28	34.40
			120	6.85	19.69	35.60	34.70
			150	6.8	19.83	35.85	34.94
			200	6.7	19.91	36.00	35.08
			240	6.6	19.91	36.00	35.08
	Brettesnes—Skroven.		410	6.3	19.91	36.00	35.08
	Between Brettesnes and Skroven.						
17	Øxsund.	630	0	1.1	18.83	34.07	33.23
	68°1′ N.,		20	1.8	18.86	34.13	33.28
	15°18′.5 E.		50	2.7	18.97	34.32	33.48
	Between Hammerø		80	5.4	19.29	34.90	34.02
	and Lundø.		100	6.4	19.38	35.06	34.19
			150	6.9	19.72	35.66	34.75
			200	6.8	19.83	35.85	34.94
			250	6.6	19.83	35.85	34 94
			300	6.6	19.91	36.00	35.08
			400	6.4	19.91	36.00	35.08
			500	6.3	19.91	36.00	35.08
			630	6.3	19.91	36.00	35 08
	Sagfjord I.	210	0	2.7	18.97	34.32	33.48
	At Furrunesvæggen.		10	3.1	19.00	34.38	33.52
			20	3.9	19.08	34.52	33.66
			50	6.1	19.37	35.04	34.16
			100	6.85	19.58	35.42	34.52
			200	6.4	19.80	35.80	34.89
21	Henningsvær I.	85	0	2.6	19.00	34.38	33.52
	4 miles SSW of H.		20	2.6	19.00	34.38	33.52
			50	3.2	19.12	34.59	33.73
			85	4.2	19.29	34.90	34.02
	Henningsvær II.	98	0	2.6	19.00	34.38	33.52
	6 miles SSW of H.		20	2.6	19.00	34.38	33.52
			60	3.0	19.08	34.52	33.66
			90	3.9	19.26	34.84	33.97
	Henningsvær III.	260	0	2.6	19.00	34.38	33.52
	16 miles SSW of H.		20	2.9	19.08	34.52	33.66
			50	4.0	19.26	34.84	33 97
			80	5.3	19.44	35.16	34.28
			100	6.9	19.62	35.48	34.59
			120	7.0	19.69	35.60	34.70
			150	6.9	19.80	35.80	34.89
			200	6.7	19.88	35.95	35.03
			250	6.6	19.88	35.95	35.03
22	Mortsund I.	230	220	6.6	19.88	35.95	35.03
	SO of Mortsund.						
23	Reine I.	180	0	2.7	19.04	34.45	33.59
	12 miles OtS of R.		20	2.7	19.04	34.45	33.59
			50	4.1	19.29	34.90	34.02
			80	5.0	19.58	35.42	34.52
			100	5.2	19.51	35.28	34.40

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents		
						Cl. per litre	Salt per litre	Salt per mille
	February	Reine I.	Metres	Metres	C⁰			
392	23			120	6.5	19.69	35.60	34.70
393				150	6.2	19.91	36.00	35.08
394				180	6.2	19.91	36.00	35.08
395		Reine II.	130	0	3.0	19.12	34.59	33.73
396		8 miles OtS of R.		20	3.1	19.12	34.59	33.73
397				50	4.5	19.29	34.90	34.02
398				80	5.0	19.44	35.16	34.28
399				100	5.6	19.51	35.23	34.40
400				120	6.8	19.72	35.66	34.75
401		Reine III.	85	0	2.7	19.04	34.45	33.59
402		4 miles OtS of R.		20	3.7	19.19	34.72	33.85
403				50	4.5	19.33	34.97	34.10
404				85	6.1	19.55	35.36	34.47
	March							
405	1	Evenstad I.	157	0	3.9	19.31	34.93	34.06
406		7 miles SO of		20	3.9	19.31	34.93	34.06
407		Lofotodden.		50	4.3	19.40	35.09	34 21
408				80	4.5	19.47	35.22	34.34
409				100	5.55	19.62	35.47	34.58
410				120	5.8	19.65	35.53	34.64
411				150	5.6	19.69	35.60	34.70
412		Moskenstrømmen I.	204	0	2.8	19.16	34.66	33.80
413		10 miles SO of		20	3.4	19.20	34.74	33.87
414		Lofotodden.		50	3.4	19.20	34.74	33.87
415				80	3.9	19.35	35.00	34.13
416				100	4.5	19.43	35.15	34.20
417				120	4.7	19.47	35.22	34.34
418				150	5.0	19.51	35.28	34.40
419				200	6.6	19.85	35.89	34.97
420	3	Kirkfjord I.	108	0	2.0	18.79	34.00	33.16
421		Inside the Vorfjord.		20	2.5	18.90	34.18	33.33
422				50	2.6	18.97	34.33	33.48
423				100	2.7	18.97	34 33	33.48
424		Kirkfjord II.	50	0	1.5	18.67	33.78	32.98
425		In the middle of the Kirkfjord.		50	2.5	18.93	34.26	33.40
		Reine I.	150	0	2.1	19.01	34.40	33.54
426	4	11 miles SO of R.		20	2.3	19.01	34.40	33.54
427				40	2.35	19.01	34.40	33.54
428				50	2.5	19.05	34.47	33.6
429				60	3.4	19.13	34.60	33.7
430				70	5.1	19.35	35.00	34.1
431				80	5.9	19.43	35.15	34.2
432				100	6.5	19.58	35.41	34.5
433				120	6.6	19.62	35.48	34.5
434				150	6.7	19.69	35.60	34.7
435								
436	5	Ure I.	230	0	2.6			
437		9½ miles SSO of U.		20	2.7	19.13	34.60	33.7
438				50	2.7	19.13	34.60	33.7
439				80	2.8	19.13	34.60	33.7
440				100	4.0	19.24	34.80	33.9
441				120	5.2	19.43	35.15	34.2
442				150	6.7	19.65	35.53	34.6
443				200	6.8	19.85	35.89	34.9
444	6	Henningsvær I.	142	0	2.1	19.01	34 40	33.5
445		6 miles SWtW½W		20	2.0	19.01	34.40	33.5
446		of H.		50	2.1	19.01	34.40	33.5
447				80	3.1	19.13	34.60	33.7
448				100	5.4	19.39	35.07	34.2
449				120	5.4	19.39	35.07	34.2
450				140	6.2	19.58	35.41	34.5
451		Henningsvær II.	110	0	1.7	18.97	34.32	33.4
452		5 miles SWtW of H.		50	2.1	19.01	34.40	33.5
453				80	2 5	19.04	34.45	33.5
454				100	5.1	19.39	35.07	34.2
455	10	Risværflaket.	175	0	1.2	18.82	34.05	33.2
456		Outside the Øgs-		20	1.25	18.90	34.20	33.3
457		fjord.		50	1.3	18.90	34.20	33.3
458				80	1.3	18.90	34.20	33.3
459				100	1.4	18.93	34 26	33.4
460				150	1.5	18.93	34.26	33.4
461				170	1.6	18.93	34.26	33.4
462		Flaket II.	225	220	1.7	18.93	34.26	33.4
		Nearer to the mouth of the Øgsfjord.						
463		Brettesnes I.	177	0	1.7	19.01	34.40	33.5
464		2¼ miles SO¼O		20	1.8	19.01	34.40	33.5
465		of B.		50	1.9	19.01	34.40	33.5
466				100	2.7	19.13	34 60	33.7
467				120	4.9	19.35	35.00	34.1
468				150	6.7	19.65	35.53	34.6

Nr.	1899 Dato	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents		
						Cl. per litre	Salt per litre	Salt per mille
	March		Metres	Metres	C⁰			
469	10	Brettesnes I.		170	6.7	19.77	35.75	34.87
470		Brettesnes II.	180	0	1.5	18.97	34.32	33.48
471		1 mile NtO$^1/_2$O		20	1.8	18.97	34.32	33.48
472		of B. I.		50	1.9	19.01	34.40	33.54
473				80	2.4	19.13	34.60	33.76
474				100	2.6	19.16	34.66	33.80
575				120	4.0	19.31	34.93	34.06
476				140	6.3	19.58	35.41	34.52
477				150	6.8	19.73	35.68	34.77
478				180	6.7	19.80	35.80	34.89
479		Raftsund I.	48	0	2.3	18 82	34.05	33.21
480		Off the Troldfjord.		20	2.4	18.97	34.32	33.48
481				45	3.1	19.04	34.45	33.59
482	11	Kanstadfjord I.	30	0	1.6	18.79	34.00	33.16
483		At the head of K.		30	2.2	18.97	34.32	33.48
484		Kanstadfjord II.	84	0	1.7	18.86	34.13	33.28
485		Inside the Kvalø.		20	2.2	18.97	34.32	33.48
486				50	2.0	18.97	34.32	33.48
487				80	1.8	18.97	34.32	33.48
488		Kanstadfjord III. Inside the ridge.	94	90	1.6	18.97	34.32	33.48
489		Kanstadfjord IV.	95	20	1.4	18.90	34.20	33.35
490		Outside the ridge.		90	4.4	19.31	34.93	34.06
491	13	Høla.	150	0	1.3	18.97	34.32	33.48
492		Svolvær, Lofoten.		20	1.5	18.97	34.32	33.48
493				50	2.0	19.13	34.60	33.76
494				80	3.45	19.20	34.74	33.87
495				100	4.0	19.27	34.86	34.00
496				120	5.1	19.43	35.15	34.26
497				150	6.1	19.62	35.48	34.59
498		Henningsvær I.	100	0	1.5	19.04	34.45	33.59
499		5 miles SOtO$^1/_2$O		50	2.4	19.13	34.60	33.76
500		of H.		100	3.2	19.31	34.93	34.06
501		Henningsvær II.	250	0	1.8	19.04	34.45	33.59
502		6 miles StO$^1/_2$O		20	2.2	19.13	34.60	33.76
503		of H.		50	2.6	19.13	34.60	33.76
504				80	3.7	19.35	35.00	34.13
505				100	5.3	19.51	35.28	34.40
506				120	5.9	19.58	35.41	34.52
507				150	6.7	19.73	35.68	34.77
508				200	6.8	19.88	35.95	35.03
509				250	6.7	19.96	36.09	35.16
510	14	Risvær I. At Risvær in East Lofoten.		60	2.0	19.04	34.45	33.59
511		Risvær II.	250	100	4.6	19.39	35.07	34.20
512				150	6.1	19.65	35.53	34.64
513				200	6.6	19.80	35.80	34.89
514		Risvær III.		50	2.8	19.16	34.66	33.80
515				85	4.7	19.43	35.15	34.26
516		Paulsgrunden.	125	20	1.6	18.96	34.31	33.46
517		Fishingplace at		50	1.8	18.96	34.31	33.46
518		Risvær.		80	2.7			
519				100	3.4	19.22	34.77	33.91
520				110	4 3	19.32	34.95	34.08
521				120	5.6	19.55	35.36	34.47
522		Øgsfjord I.		0	2.1	18.43	33.34	32.54
523		At the head of the		20	2.2	18.72	33.87	33.04
524		fjord.		50	2.1	18.75	33.92	33.10
525				100	2.1	18.75	33.92	33.10
526		Øgsfjord II.	207	0	1.3	18.67	33.78	32.95
527		At Halvarsø.		20	1.6	18.86	34.13	33.28
528				50	1.7	18.89	34.18	33.33
529				100	1.5	18.89	34.18	33.33
530				150	1.4	18.89	34.18	33.33
531				200	1.4	18.89	34.18	33.33
532	16	Tranødybet.	640	0	1.5	19.03	34.44	33.58
533		Between Tranø and		20	1.6	19.00	34 38	33.53
534		Lødingen.		60	3.0	19.18	34.70	33.84
535				80	4.2	19.29	34.90	34.03
536				100	4.2	19.29	34.90	34.03
537				150	6.5	19.72	35.66	34.75
538				200	6.4	19.83	35.86	34.94
539				250	6.5	19.90	35.99	35.06
540				300	6.5	19.90	35.99	35.06
541				500	6.3	19.90	35.99	35.06
542				607	6.3	19.90	35.99	35.06
543				640	6.3	19.90	35.99	35.06
544	18			0	1.4	18.93	34.25	33.41
545				20	1.5	19.00	34.38	33.53
546				50	3.0	19.18	34.70	33.84

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline conte	
						Cl. per litre	Salt per litre
	March	Tranødybet.	Metres	Metres	C⁰		
547	18			100	5.0	19.47	35.22
548				150	6.2	19.72	35.66
549				200	6.5	19.87	35.92
550				500	6.5	19.87	35.92
551	20	Høla.	150	0	1.0	18.96	34.31
552		At Svolvær.		20	1.2	19.00	34.38
553				50	1.3	19.03	34.44
554				80	4.0	19.29	34.90
555				100	4.5	19.36	35.02
556				120	5.2	19.51	35.28
557				150	6.5	19.77	35.75
558		Balstad.		95	4.3	19.44	35.17
559		Balstad I.	180	0	2.0	19.18	34.70
560		10$^1/_2$ miles SSO		20	2.1	19.11	34.57
561		of B.		50	2.6	19.22	34.77
562				80	3.1	19.39	35.07
563				100	3.4	19.32	34.95
564				120	5.15	19.47	35.22
565				150	6.3	19.69	35.60
566				180	6.7	19.69	35.60
567		Balstad II.	130	0	2.0	19.15	34.65
568		6$^1/_2$ miles SSO of B.		20	2.0	19.15	34.65
569				50	2.1	19.15	34.65
570				80	3.0	19.25	34.82
571				100	3.95	19.39	35.07
572				130	5.75	19.58	35.41
573		Balstad III.		75	3.5	19.22	34.77
574		Henningsvær I.	105	0	1.5	19.08	34.52
575		3$^1/_2$ miles StO of H.		20	1.5	19.08	34.52
576				50	1.5	19.08	34.52
577				80	2.0	19.08	34.52
578				105	4.8	19.39	35.07
579		Henningsvær II.	280	0	1.7	19.08	34.52
580		6 miles StO$^1/_2$O		20	2.0	19.04	34.45
581		of H.		50	1.8	19.08	34.52
582				80	2.5	19.37	35.04
583				100	3.9	19.44	35.17
584				120	5.5	19.51	35.28
585				150	6.5	19.72	35.66
586				180	6.8	19.79	35.78
587				200	6.8	19.82	38.84
588				250	6.6	19.87	35.92
589				280	6.55	19.90	35.98
590	21	Moskenstrømmen.	100	100	6.5	19.72	35.66
		5 miles SOtS of Lofotodden.					
591		Reine I.	105	0	2.5	19.19	34.72
592		5 miles SOtS of R.		20	2.65	19.22	34.77
593				50	2.80	19.22	34.77
594				80	2.95	19.22	34.77
595				105	5.00	19.51	35.28
596		Værø.	175	0	3.2	19.33	34.97
597		7 miles StW of		20	3.25	19.33	34.97
598		Maahornet.		50	3.3	19.33	34.97
599				80	4.3	19.43	35.14
600				100	5.1	19.58	35.41
601				120	5.65	19.65	35.53
602				150	6.7	19.83	35.85
603				170	6.8	19.90	35.98
604	22	Røsthavet.	930	0	5.05	19.87	35.92
505		68°3′ N.,		20	5.2	19 87	35.92
606		10°0′.5 E.		50	6.0	19.92	36.01
607				80	6.4	20.01	36.18
608				100	6.4	20.05	36.25
609				120	6.4	20.05	36.25
610				150	6.3	20.05	36.25
611				200	6.15	20.05	36.25
612				250	5.8	20.05	36.25
613				300	5.6	20.05	36.25
614				400	5.4	20.05	36.25
615				500	4.05	19.94	36.05
616				600	2.5	19.94	36.05
617				700	1.3	19.87	35.92
618				900	1.1	19.87	35.92
619		20 miles NW of Røst.		0	3.7	19.51	35.28
620		30 miles NW of Røst.		100	5.6	19.72	35 66
621				195	6.4	19.97	36.10
622		40 miles NW of Røst.		0	4.4	19.68	35.59
623	24	Røst I.	120	0	3.1	19.52	35.30

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	March	Røst I.	Metres	Metres	C⁰			
24	24	Outside Røst.		20	3.15	19.52	35.30	34.42
25				50	3.05	19.52	35.30	34.42
26				80	3.05	19.52	35.30	34.42
27				100	3.5	19.55	35.36	34.47
28				120	4.25	19.63	35.50	34.60
29		Røst II.	105	0	2.9	19.55	35.36	34.47
30		Outside Røst		20	3.35	19.55	35.36	34.47
31				50	4.4	19.67	35.57	34.67
32				80	4.5	19.67	35.57	34.67
33				100	4.85	19.74	35.70	34.79
34	25	Røst I.	136	0	2.9	19.44	35.16	34 28
35		Inside Røst.		20	2.8	19.44	35.16	34.28
36				50	3.4	19.52	35.30	34.42
37				80	3.5	19.52	35.30	34.42
38				100	3.8			
39				120	3.8	19.55	35.36	34 47
40		Røst II.	150	0	2.5	19.74	35.70	34.79
41		Inside Røst.		50	4.05	19.55	35.36	34.47
42				100	5.6	19.74	35 70	34.79
43				120	6.6	19.85	35.90	34.97
44				150	6.7	19.93	36.04	35.11
45	27	Risvær.	45	45	2.8	19.33	34.97	34.10
46		Gulvik.	100	0	0.9	19.03	34.44	33.58
47				20	1.2	19.11	34.57	33.72
48				50	2.5	19.22	34.77	33.91
49				80	5.4	19.55	35.36	34 47
50				100	6.1	19.74	35.70	34.79
51	28	Tysfjord I.	725	0	0.75	19.03	34.44	33.58
52		68⁰12′.5 N.,		50	2.3	19.15	34.65	33.79
53		16⁰12′.5 E.		90	4.4	19.44	35.16	34.28
54		Inside Skarberget.		100	5.5	19.59	35.43	34.54
55				120	6.4	19.67	35.57	34.67
56				150	6.4	19.81	35.82	34.91
57				200	6.3	19.85	35.90	34.97
58				250	6.3	19.85	35.90	34.97
59				300	6.3	19.93	36.04	35.11
60				400	6.3	19.93	36.04	35.11
61				500	6.3	19.93	36.04	35.11
62				600	6.3	19.93	36.04	35.11
63				700	6.3	19.93	36.04	35.11
64	29	Tysfjord II.	409	0	1.55	19.07	34.50	33.65
65		Inside Tysfjord		50	1.4	19.11	34.57	33.72
66		church.		80	5.2	19 48	35.24	34.35
67				100	5.75	19.59	35.43	34.54
68				120	6.1	19.67	35.57	34.67
69				150	6.2	19.74	35.70	34.79
70				200	6.2	19.81	35.81	34.90
71				250	6.3	19.85	35.90	34.98
72				400	6.3	19.93	36.03	35.11
73	April							
74	1	Gulvik.		100	5.3	19.59	35.43	34.53
75				190	6.5	19 81	35.81	34 90
76	4	Lilandsbugten.	58	0	0.4	18.86	34.13	33.28
77		Østnesfjorden.		20	1.1	19.07	34.50	33.65
78				58	3.4	19.33	34.97	34.10
79		Brettesnes I.	77	0	1.05	19 03	34.44	33.58
80		Inside Moldøra.		20	1.1	19.07	34.50	33.65
81				50	2.5	19.22	34.77	33.91
82				77	4.7	19.48	35.23	34.35
83		Brettesnes II.	145	0	1.1	19.07	34 50	33.65
84				20	1.1	19.07	34.50	33.65
85				50	2.9	19.26	34.84	33.97
86				80	4.75	19.48	35.23	34.35
87				100	6.2	19.70	35.62	34.72
88				140	6.5	19.81	35.81	34.90
89		Følstad.	77	0	÷0.4	18.88	34.16	33.32
90		Østnesfjorden.		20	0.25	19.07	34.50	33.65
91				50	2.9	19.22	34.77	33 91
92				77	4.9	19.48	35.23	34.35
93		Helle.	118	0	0.5	19.86	34.13	33.28
94		Østnesfjorden.		20	1.0	19.07	34.50	33.65
95				50	2.9	19.26	34.84	33.97
96				80	5.0	19.48	35.23	34.35
97				118	5.7	19.63	35.50	34.60
98		Skroven.	190	0	1.1	19.11	34.57	33.72
99		At the edge inside S.		50	2.2	19.18	34.70	33.84
00				80	4.9	19 48	35.23	34.53
01				100	5.3	19.59	35.43	34.53
02				120	6.2	19.74	35.70	34.79
03				180	6.7	19.89	35.96	35.04
		Høla.	150	0	0.8	19.11	34.57	33.72

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	April	Høla.	Metres	Metres	C⁰			
704	4	At Svolvær.		20	1.0	19.03	34.44	33.58
705				50	1.05	19.15	34.65	33.78
706				80	4.1	19.41	35.10	34.23
707				100	5.6	19.63	35.50	34.60
708				120	5.9	19.74	35.70	34.79
709				150	6.4	19.85	35.89	34.97
710	6	Henningsvær I.	95	0	1.1	19.18	34.40	33.84
711		4½ miles SO of H.		20	1.1	19.18	34.40	33.84
712				50	1.1	19.18	34.40	33.84
713				70	1.4	19.18	34.40	33 84
714				80	1.7	19.18	34.40	33.84
715				93	2.55	19.33	34.96	34.10
716		Henningsvær II.	165	0	1.75	19.22	34.77	33.91
717		6 miles SO of H.		20	1.85	19.22	34.77	33.91
718				50	1.85	19.22	34.77	33.91
719				80	2.85	19.30	34.91	34.05
720				100	4.3	19.37	35.04	34.17
721				120	5.55	19.56	35.37	34.49
722				160	6.6	19.74	35.70	34.79
723	7	Stene I.	85	0	1.05	19.06	34.49	33.63
724		6½ miles StO of S.		20	1.3	19.10	34.56	33.70
725				50	1.5	19.14	34.63	33.77
726				80	1.65	19.14	34.63	33.77
727		Stene II.	194	0	1.95	19.21	34.75	33.89
728		9½ miles StO of S.		20	1.95	19.21	34.75	33.89
729				50	2.9	19.37	35.04	34.17
730				80	2.95	19.37	35.04	34.17
731				100	4.6	19.52	35.30	34.42
732				120	5.7	19.67	35.57	34.67
733				150	6.6	19.78	35.77	34.86
734				194	6.6	19.86	35.91	34.99
735		Reine.	110	0	2.0	19.21	34.75	33.89
736		6½ miles SSO		20	2.0	19.21	34.75	33.89
737		of R.		50	2.35	19.21	34.75	33.89
738				80	4.0	19.44	35.17	34 29
739				110	4.5	19.52	35.30	34.42
740		Moskenstrømmen.	90	0	1.95	19.21	34.75	33.89
741		5 miles S of Lofot-		20	2.0	19.21	34.75	33.89
742		odden.		50	2.3	19.21	34.75	33.89
743				90	4.1	19.44	35.17	34.29
744	11	Off Gaukværø.		0	2.75	19.44	35.17	34.29
745		Gaukværø I.	40	0	2.6	19.37	35.04	34.17
746		68⁰41′ N.,		20	2.6			
747		14⁰2′ E.		40	3.7	19.48	35.23	34.35
748		Gaukværø II.		0	2.85	19.37	35.04	34.17
749		68⁰34′ N.,		20	2.65	19.37	35.04	34.17
750		14⁰17′ E.		50	2.7	19.37	35.04	34.17
751				80	3.2	19.44	35.17	34.29
752				100	4.0	19.56	35.37	34.49
753				120	4.4	19.63	35.50	34.60
754				150	4.6	19.71	35.64	34.74
755				200	5.05	19.74	35.70	34.79
756				250	5.2	19.78	35.77	34.86
757	12	Malangen.	380	0	1.6	19.25	34.82	33.96
758		69⁰33′ N.,		20	1.75	19.33	34.96	34.10
759		18⁰0′ E.		50	1.6	19.33	34.96	34.10
760		Off Stønnesbotn.		80	1.85	19.40	35.09	34.21
761				100	2.15	19.48	35.23	34.35
762				120	2.3	19.48	35.23	34.35
763				150	3.25	19.56	35.37	34.49
764				200	3.7	19.59	35.43	34.54
765				250	4.05	19.67	35.57	34.67
766				300	4.01	19.67	35.57	34.67
767				380	4.1	19.67	35.57	34.67
768	13	Senjenhavet.	80	0	3.35	19.63	35.50	34.60
769		69⁰40′ N.,		20	3.45	19.63	35.50	34.60
770		16⁰47′ E.		50	5.1	19.85	35.90	34.97
771				80	5.3	19.85	35.90	34.97
772		Nearer land.		0	2.6	19.56	35.37	34.49
		69⁰38′ N.,						
		17⁰9′ E.						
773	14	Malangen.	382	0	1.7	19.37	35.04	34.17
774		Off Stønnesbotn.		10	1.65	19.37	35.04	34.17
775				20	1.7	19.37	35.04	34.17
776				30	1.7	19.37	35.04	34.17
777				40	1.75	19.40	35.09	34.21
778				50	1.8	19.40	35.09	34.21
779				80	2.15	19.44	35.17	34.29
780				100	2.4	19.48	35.23	34.35
781				120	2.7	19.48	35.33	34.35
782				350	4.1	19.67	35.57	34.67

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	April		Metres	Metres	C⁰			
783	19	Kvænangen I.	167	0	0.75	19.40	35.09	34.21
784		Between Spilderen		20	0.75	19 40	35.09	34.21
785		and Kvænangs-		50	0.75	19.40	35.09	34.21
786		tinderne.		80	0.75	19.40	35.09	34.21
787				100	0.75	19.40	35.09	34.21
788				120	0.75	19.40	35.09	34.21
789				160	2.0	19.56	35.37	34.49
790		Kvænangen II.	90	0	1.0	19.44	35.17	34.29
791		At Nøklen island.		20	0.75	19.40	35.09	34.21
792				50	0.75	19.40	35 09	34.21
793				90	0.75	19.40	35.09	34 21
794	20	Jøkelfjord I.	110	0	0.85	19.40	35.09	34.21
795		At the head of the		20	0.85	19.40	35.09	34.21
796		fjord.		50	0.85	19.40	35.09	34.21
797				80	0.90	19.44	35.17	34.29
798				100	1.00	19.44	35.17	34.29
799	21	Jøkelfjord III.	95	0	0.80	19.44	35.17	34.29
800		Off the Tverfjord.		20	0.75	19.44	35.17	34.29
801				50	0.90	19.44	35.17	34.29
802				90	1.4	19.48	35.23	34.35
803		Kvænangen.	343	0	1.05	19.48	35.23	34.35
804		70⁰2′.5 N,		20	0.8	19.48	35.23	34.35
805		21⁰41′ E.		50	0.8	19.44	35.17	34.29
806		Between Spilderen		100	1.2	19.48	35.23	34.35
807		and the northern		150	1.45	19.48	35.23	34.35
808		mainland.		200	1.95	19.63	35.50	34.60
809				250	2.2	19.56	35.37	34 49
810				340	2.3	19.56	35.37	34.49
811	24	Ingøhavet.	315	0	3.2	19.78	35.77	34.86
812		71⁰10′ N.,		10	3.15	19.82	35.84	34.93
813		23⁰10′ E.		20	3.10	19.82	35.84	34.93
814				30	3.3	19.86	35.91	34.99
815				50	3.65	19.90	35.98	35.06
816				70	3.65	19.93	36.04	35.12
817				80	3.8	19.93	36.04	35.12
818				100	3.8	19.97	36.10	35.18
819				120	3.65	20.01	36.17	35.24
820				150	3.55	20.01	36.17	35.24
821				200	3.5	20.01	36.17	35.24
822				250	3.45	20.01	36.17	35.24
823				300	3.45	20.01	36.17	35.24
824		Ingøhavet II.		0	2.75	19.67	35.57	34.67
825		Between Ingø and		20	2.80	19.67	35.57	34.67
826		the preceding		50	3.25	19.74	35.70	34.79
827		station.		100	3.8	19.86	35.91	34.99
828				200	3.8	19.97	36.10	35.18
829		Havet III.		0	2 0	19.63	35.50	34.60
		3 miles off Ingø.						
830		Breisund.	100	0	1.7	19.59	35.43	34.54
831		Between Hjelmesø		50	1.65	19.59	35.43	34.54
832		and Havø.		100	1.7	19.59	35.43	34.54
833	27	Porsangerfjord.	200	0	1.05	19.63	35 50	34.60
834		Between Great and		20	1.05	19.63	35.50	34.60
835		Litle Tamsø.		50	1.0	19.67	35 57	34.67
836				80	1.0	19.67	35.57	34 67
837				100	0.95	19.63	35.50	34.60
838				120	0 95	19.63	35.50	34.60
839				150	0.75	19.67	35.57	34.67
840				200	0.20	19.56	35.57	34.48
841	28	Porsangerfjord.	275	0	2.25	19.59	35.43	34.54
842		70⁰58′.5 N.,		20	2.25	19.59	35.43	34.54
843		26⁰25′ E.		50	2.15	19.59	35.43	34 54
844		Off Sværholt-		100	1.4	19.55	35.36	34.47
845		klubben.		200	1.3	19.59	35.43	34.54
846				250	2.75	19.73	35.68	34.78
	May							
847	1	Vardø.	225	0	2.0	19.70	35.62	34.72
848		70⁰24′.5 N.,		20	1.9	19.66	35.55	34.65
849		31⁰28′ E.		50	1.95	19.66	35.55	34 65
850				80	1.95	19.66	35.55	34.65
851				100	1.95	19.66	35.55	34 65
852				150	2.25	19.66	35.55	34.65
853				200	2.25	19.66	35.55	34.65
854		Vardø II.	183	0	1.9	19 66	35.55	34.65
855				180	2.05	19.66	35.55	34.65
856		Vardø III.		0	1.45	19.63	35.50	34.60
		Close up to						
		Vardø.						
857		Nordkyn.	53	0	1.9	19.63	35.50	34.60
858		71⁰8′ N.,		20	2.05	19.63	35.50	34.60
859		27⁰42′ E.		50	2.05	19.63	35.50	34.60

Nr.	1899 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	Mai		Metres	Metres	C⁰			
860	2	Silden.		0	1.55	19.41	35.10	34
		At Silden Island.						
861	3	Lyngen I.	120	0	1.7	19.37	35.04	34
862		Off Skibotten.		20	1.9	19.41	35.10	34
863				50	1.9	19.41	35.10	34
864				80	2.1	19.45	35.18	34
865				100	2.3	19.45	35.18	34
866				120	2.55	19.48	35.23	34
867		Lyngen II.	250	0	1.1	19.37	35.04	34
868		Off the Kaafjord.		20	1.1	19.37	35.04	34
869				50	1.15	19.37	35.04	34
870				80	2.05	19.45	35.18	34
871				100	2.2	19.48	35.23	34
872				150	2.55	19.48	35.23	34
873				200	2.7	19.55	35.36	34
874				250	2.85	19.55	35.36	34
875		Lyngen III.	320	0	1.35	19.37	35.04	34
876		69⁰54′ N.,		20	1.25	19.37	35.04	34
877		20⁰27′ E.		50	1.7	19.45	35.18	34
878		Between ytre Gam-		80	2.15	19.48	35.23	34
879		vik and Ulø.		100	3.05	19.55	35.36	34
880				120	3.25	19.59	35.43	34
881				150	3.45	19.66	35.55	34
882				200	3.3	19.66	35.55	34
883				250	3.5	19.73	35.68	34
884				320	3.65	19.77	35.75	34
885	5	Høla.	150	0	2.65	19.12	34.59	34
886		At Svolvær.		10	2.55	19.12	34.59	34
887				20	1.9	19.12	34.59	34
888				30	2.45	19.23	34.79	34
889				50	4.5	19.45	35.18	34
890				80	5.35	19.66	35.55	34
891				100	5.5	19.66	35.55	34
892				120	5.8	19.73	35.68	34
893				150	6.15	19.77	35.75	34
	1900							
	March							
894	20	Høla.	150	0	2.85	19.28	34.88	34
895				10	2.85	19.35	35.01	34
896				20	2.9	19.35	35.01	34
897				50	2.95	19.35	35.01	34
898				80	3.4	19.43	35.15	34
899				100	4.05	19.44	35.17	34
900				120	4.6	19.51	35.30	34
901				150	5.4	19.65	35.55	34
902		Skroven.	400	0	2.75	19.35	35.01	
903		1 mile SSO of S.		20	2.80	19.35	35.01	
904				50	2.85	19.39	35.08	
905				80	3.15	19.39	35.08	
906				100	4.55	19.54	35.35	
907				120	5.10	19.65	35.55	
908				150	6.10	19.80	35.82	
909				200	6 5	19.88	35.96	
910				250	6.5	19.94	36.07	
911				300	6 5	19.94	36.07	
912				400	6.35	19.94	36.07	
913		Henningsvær.	270	0	2.85	19.35	35.01	
914		6¾ miles SSO of H.		20	2.85	19.35	35.01	
915				50	2.9	19.35	35.01	
916				80	3.0	19.37	35.04	
917				100	3.15	19 41	35.12	
918				120	3.7	19.49	35.26	
919				135	5.40	19.65	35.55	
920				150	6.10	19.76	35.75	
921				200	6.6	19.80	35.82	
922		Henningsvær II.	165	0	2.7	19.29	34.90	
923		2¾ miles of H.		20	2.8	19.30	34.92	
924				50	2.9	19.31	34.94	
925				100	2.95	19.33	34.97	
926				120	4.0	19.56	35.39	
927				150	6.25	19.81	35.81	
928				165	6.95	19.81	35.94	
929	21	Strømmen.	65	0	2.8			
930		Between Hennings-		20	2.7	19.35	34 97	
931		vær and Valberg.		60	2.7	19.36	35.03	
932		Balstad I.	212	0	3.05	19.33	34.97	
933		3 miles of B.		20	2.9	19.36	35.03	
934				50	2.9	19.39	35.08	
935				80	5.35	19.47	35.22	
936				88	5.65	19.47	35.22	

Nr.	1900 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	March		Metres	Metres	C⁰			
937	21	Balstad I.		100	6.2	19.69	35.62	34 72
938				120	6.2	19.70	35.64	34.74
939				150	6.6	19.82	35.68	34.94
940				180	6.6	19.96	36.11	35.18
941				200	6.6	19.96	36.11	35.18
942		Balstad II.	110	0	2.95	19.32	34.95	34.09
943				20	2.8	19.34	34.99	34.12
944				50	2.8	19.39	35.08	34.21
945				80	3.45	19.39	35.08	34.21
946				100	3.1	19.32	34.95	34.09
947		Balstad III.		0	2.95	19.32	34.95	34.09
948				50	2.80	19.32	34.95	34.09
949				70	2.85	19.32	34.95	34.09
950				80	3.85	19.36	35.03	34.16
951				100	2.85	19.36	35.03	34.16
952		Nufsfjord.	125	0	3.05	19.29	34.90	34.04
953		$6^1/_2$ miles SSO of N.		50	2.95	19.29	34.90	34.04
954				80	2.95	19.32	34.95	34.09
955				100	2.95	19.39	35.08	34.21
956				120	3.0			
957		Reine.	112	0	2.95	19.32	34.95	34.09
958				50	2.85	19.32	34.95	34.09
959				80	2.85	19.32	34.95	34.09
960				100	4.2	19.39	35.08	34.21
961	22	Tranødybet.	620	0	2.7	19.32	34.95	34 09
962		Between Tranø and		50	2.75	19.32	34.95	34.09
963		Lødingen.		80	2.75	19.32	34.95	34.00
964				100	2.7	19.32	34.95	34.09
965				120	2.65	19.32	34.95	34 09
966				150	2.7	19.32	34.95	34.09
967				180	2.8	19.52	35.31	34.43
968				190	6.25	19.75	35.73	34.83
969				200	5.5	19.75	35.73	34.83
970				250	6.25	19.75	35.73	34.83
971				400	6.3	19.91	36.02	35.10
972				500	6.3	19.91	36.02	35.10
973				600	6.3	19.91	36.02	35.10
974		Øgsfjord.	195	0	2.05	19.22	34.77	33.92
975		At the mouth.		20	2.2	19.24	34.81	33.95
976				50	2.3	19.24	34.81	33.95
977				80	2.35	19.24	34.81	33.95
978				100	2.35	19.24	34.81	33.95
979				150	2.4	19.24	34.81	33.95
980				190	2.6	19.27	34.86	34.00
981	23	Østnesfjord I.	27	0	2.1	19.22	34.77	33.92
982		At the head of the fjord.		20	2.35	19.24	34.81	33.95
983		Østnesfjord II.	135	0	2.3	19.22	34.77	33.92
984		Between Vaterfjord		20	2.3	19.22	34.77	33.92
985		and Følstad.		50	2 5	19.24	34 81	33.95
986				80	2.9	19.24	34.81	33.95
987				100	3.45	19.32	34.95	34.09
988				130	5.75	19.36	35.03	34.16
989		Østnesfjord III.	135	0	2.35	19.22	34.77	33.92
990		Abreast of Helle		20	2.45	19.22	34.77	33.92
991				50	2.6			
992				80	2.65	19.24	34.81	33.95
993				100	3.2	19.36	35 03	34.16
994				130	4.4			
995	26	Ørsnes.	105	0	2.8	19 39	35.08	34.21
996				50	2.8	19.39	35.08	34.21
997				80	2.8	19.39	35.08	34.21
998				100	4.7	19.50	35.28	34.39
999		Henningsvær.	160	0	2.7	19.32	34.95	34.09
1000				50	2.8	19.32	34.95	34.09
1001				80	2.8	19.40	35.01	34.23
1002				100	4.3	19.46	35.21	34.33
1003				140	4.65	19.54	35.35	34.45
1004				0	2.8	19.32	34.95	34.09
1005		Balstad.	135	50	2.8	19.32	34.95	34.09
1006				80	3.3	19.54	35.35	34.47
1007				100	4.5	19.57	35.40	34.52
1008				130	4.6	19.57	35.40	34.52
1009				0	2.55	19.36	35.03	34.16
1010			170	50	2.8	19.40	35.01	34.23
1011		Reine.		80	2.9	19.40	35.01	34.23
1012				100	4.6	19.54	35.35	34.47
1013				150	6.3	19.75	35.73	34.83
1014				0	3.25	19.57	35.40	34.52
1015			450	50	3.95	19.50	35.27	34.39
1016				100	3.65	19.54	35.35	34.47
1017				120	4.3	19.64	35.53	34.64

Nr.	1900 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents: Cl. per litre	Salt per litre	Salt per mille
	March		Metres	Metres	C⁰			
1018	30	Landego.		150	5.3	19.66	35.57	34.67
1019				200	5.9	19.90	36.00	35.09
1020				260	6.0	19.90	36.00	35.08
1021				300	6.05	19.93	36.04	35.13
1022				400	6.2	19.93	36.04	35.13
1023				450	4.0?			
1024		Arnø.	410	400	6.55	19.96	36.11	35.18
		67⁰11′ N.,						
	April	3⁰15′ E.						
1025	2	Skjerstadfjord II.	185	0	2.5	19.11	34 58	33.73
1026				50	3.25	19.18	34.70	33.85
1027				80	3.5	19.19	34.72	33.87
1028				100	3.5	19.21	34.75	33.90
1029				150	3.2	19.26	34.85	33.99
1030				185	3.35	19.26	34.85	33.99
1031		Skjerstadfjord IV.	330	250	3.2	19.29	34.90	34.04
1032				300	3.2	19.29	34.90	34.04
1033				330	3.15	19.29	34.90	34.04
1034		Skjerstadfjord V.	420	0	2.4	19.18	34.70	33.85
1035		Off Kvænflaaet.		20	2.45	19.18	34.70	33.85
1036				50	3.4	19.18	34.70	33.85
1037				80	3.55	19.21	34.76	33.90
1038				100	3.5	19.21	34.76	33.90
1039				150	3.3	19 26	34.85	33.99
1040				200	3.2	19.26	34.85	33.99
1041				250	3.2	19.27	34.86	34.00
1042				300	3.15	19.29	34.90	34.04
1043				400	3.15	19.32	34.95	34.09
1044		Skjerstadfjord III.	230	200	3.2	19.26	34.85	33.99
1045		Skjerstadfjord VII.	480	400	3.2	19.32	34.85	33.99
1046		Off Fauske.		475	3.15	19.32	34 85	33.99
1047	4	Skjerstadfjord XII.	515	0	2.3	19.11	34.58	33 73
1048		Off Skjerstad		20	2.7	19.11	34.58	33.73
1049		church.		50	3.45	19.18	34.70	33.85
1050				100	3.4	19.24	34.81	33.95
1051				150	3.3	19.26	34.85	33.99
1052				200	3.25	19.26	34.85	33.99
1053				300	3.2	19.29	34.95	34.04
1054				500	3.15	19.32	34.95	34.09
1055		Skjerstadfjord XIV.	400	400	3.05	19.32	34.95	34.09
1056	5	Saltenfjord II.	320	0	3.2	19.33	34.97	34.11
1057		67⁰14′.5 N.,		20	3.15	19.33	34.97	34.11
1058		14⁰26′ E.		50	3.1	19.33	34.97	34.11
1059				60	3.6	19.54	35.35	34.47
1060				80	4.4	19.62	35.49	34.60
1061				100	5.0	19.73	35.69	34.79
1062				120	5.9	19.76	35.75	34.84
1063				150	6.2	19.82	35 86	34.94
1064				200	6.55	19.89	35 98	35.06
1065				250	6.65	19.93	36.05	35.13
1066				320	6.65	19.93	36.05	35.13
1067	6	Foldenfjord I.	530	0	3.2	19.33	34.97	34.11
1068		67⁰37′ N.,		20	3.1	19.33	34.97	34.11
1069		15⁰2′ E.		50	3.1	19.46	35.21	34.33
1070				80	4.2	19.46	35.21	34.33
1071				100	4.15	19.50	35.28	34.39
1072				120	5.55	19.78	35.78	34.88
1073				150	6.4	19.91	36.02	35.10
1074				200	6.6	19.78	35.78	34.88
1075				250	6.6	19.82	35.86	34.94
1076				300	6.6	19.82	35.86	34.94
1077				400	6.55	19.92	36.04	35.12
1078				500	6.55	19.85	35.91	35.00
1079	7	Vestfjord.	315	0	2.85	19.31	34.94	34.07
1080		Between Fladø and		20	2.8	19.33	34.97	34.11
1081		Skroven.		50	3.6	19.38	35.06	34.19
1082				60	4.55	19.60	35.46	34.57
1083				80	5.65	19.63	35.51	34.62
1084				100	6.4	19 63	35 51	34.62
1085				120	6.45	19.83	35 87	34.96
1086				150	6.45	19.85	35.91	35.00
1087				200	6.5	19 90	36.00	35.08
1088				250	6.5	19.90	36.00	35.08
1089				300	6.5	19.92	36.04	35.12
1090			150	0	2.95	19.25	34.33	33.97
1091		Høla.		10	2.55	19.25	34.33	33.97
1092		At Svolvær.		20	2.5	19.32	34.95	34.09
1093				50	2.5	19.34	34.99	34.12
1094				80	2.75	19.25	34.83	33.97
1095				100	3.95	19.51	35.30	34.41
1096				120	4.95	19.57	35.40	34.52
1097				150	5.85	19.78	35.80	34.88

B. Remarks on the Observations.

a. The Vest Fiord and the Coast Sea.

The observations, made in the Vest Fiord in January 1899, proved that at that time a comparatively high temperature prevailed on the surface of the water.

At Høla, near Svolvær, the surface temperature was 3°.3 C. on January 11th, halfway between Grøtø and Skroven 4.4 was registered on the surface and between Helligvær and Værø on the 13th of the month 4.6. About 4.0 was the surface temperature in Moskenstrømmen, and on the fishinggrounds beyond Reine, Stamsund and Henningsvær.

The highest degree which was registered in January, and in fact the highest surface temperature which was registered during the whole winter by this expedition was 5.9 ($^{19}/_{1}$) beyond Vesteraalen, 40 miles NNW of Gaukværø.

Further, as a result of the observations in the Vest Fiord, it is found that in the majority of places the maximum temperature is not reached at the bottom. At the station in the middle of the fiord between Grøtø and Skroven ($^{11}/_{1}$) the maximum (6.9) was at a depth of 100 meters.

At the station at Helligvær ($^{12}/_{1}$) the maximum (7.6) was reached at a depth og 140—150 meters, and at the station between Helligvær and Værø the maximum 7.2—7.6 at a depth af 120—150 meters.

In the Lofot fishingbanks too, there was a less clearly defined maximum, for instance at Stamsund ($^{17}/_{1}$) 6.9 at 120 m., and on the same day 6.7 at 120—150 m. at Henningsvær. On January 31st, the minimum at Høla was 2.5 on the surface, and the maximum 6.8 near the bottom at a depth of 150 meters. Corresponding conditions were noticed on the same day in the Østnes Fiord (Lilands Bay, Følstad, Helle).

Also at Skroven on February 4th the maximum (7.1) was found at a depth of 150 meters, the bottom temperature being 6.3 (380 m.). In the deep off Tranø the maximum ($^{6}/_{2}$) was reached about 150 m. down, the bottom temperature being 6.3 at 630 meters.

In Øxsund ($^{17}/_{2}$) the highest temperature (6.9) was at a depth of 150 meters, and here too the temperature at 630 meters was 6.3.

Here are some instances from the Lofot fishing banks: —

$^{21}/_{2}$. 16 miles SSW of Henningsvær.

Surface temperature 2.6, maximum 7.0 at depth of 120 mtrs., bottom temperature (260 mtrs.) 6.6.

$^{23}/_{2}$. 12 miles EtS of Reine.

Surface 2.7, max. (120 mtrs.) 6.5, bottom temp. 6.2.

Hence it may be gathered that in the months of January a February, the maximum temperature was to be found at a dep of 120—150 meters. Towards the end of February this maxim will be found near the bottom over large portions of the fishi banks.

Observations on the Lofot banks in March show minimum the surface, and, as a rule. maximum near the bottom at a de of 150—200 meters.

At greater depths in the fiords a less clearly defined maxim could at the same time be traced at a depth of 150—200 met Measurements taken in April show a continued cooling of the up layers, with a surface temperature of 1—2 at Henningsvær, St and Reine.

The section beyond Ingø ($^{24}/_{4}$ 1899) 71° 10′ N. 23° 10 showed minimum (3.2) on the surface, and maximum (3.8) at a d of about 100 meters.

But on the other hand, from observations made off Nord and Vardø ($^{1}/_{5}$) it was found that the temperature at these pl was evenly disposed from the surface to the bottom.

On the first days of May there was no indication of any sp minimum, on the sea coast of Finmark nor in the Lyngen Fio But when on May 5th I again took the temperatures at Høla Svolvær the surface showed 2.65 and minimum (1.9) there had alr reached a depth of 20 meters.

To give an idea of the changes in temperature and salini the course of the winter months, a table of observations mad Gaukværø off Vesteraalen is subjoined.

$^{18}/_{1}$ 1899	68° 35′ N.	14° 13′ E.	$^{11}/_{4}$ 1899	68° 34′ N.	14° 17
Depth in meters	Temperature C°.	Salinity °/₀₀	Depth in meters	Temperature C°.	Salin °/₀₀
0	4.1	33.56	0	2.85	34.1
10	4.4	33.56	20	2.65	34.1
20	4.5	33.56	50	2.70	34.1
30	4.5	33.56	80	3.2	34.2
80	5.6	34.04	100		
150	6.9			4.0	
250	7.1	34.27	120		34.49
		34.38		4.4	
			150		34.60
			200	4.6	34.74
			250	5.05	34.79
				5.2	

[1]) At Lyngen III (cf. no. 875—884) there is, however, a depth of 20 m.

Høla near Svolvær.

Depth in meters	9/4 1896		19/2 1897		5/3 1897		10/3 1897		11/1 1899		31/1 1899		13/3 1899		20/3 1899		4/4 1899		5/5 1899		20/3 1900		7/4 1900	
	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S
0	1.8	32.24	2.1	33.36	2.4		2.3	33.68	3.3	33.16	2.1	33 25	1.3	33.48	1.0	33 46	0.8	33.72	2.65	33.73	2.85	34.02	2.95	33.9
10	2.05	32.60					2 3	33.68	3.5	33.16	2.5	33.25							2.55	33.73	2.85	34.14	2.55	33.9
20	3.67	33.27							3.6	33.16	2.5	33.25	1.5	33.48	1.2	33.53	1.0	33.58	1.9	33.73	2.9	34.14	2.5	34.0
30	3.70	33.39					2.3		3.7	33.16	2.6	33.25							2.45	33.92				
40	3.93	33.58							3.7	33.16	2 7	33.25												
50			2.3	33.42	2.5	33.61	2.4	33.68	3.8	33.21	3.3	33.37	2.0	33.76	1.3	33.58	1.05	33.78	4.5	34.30	2.95	34 14	2.5	34.1
80									3.8	33.21	5.2	33.72	3.45	33.87	4.0	34.03	4.1	34.23	5.35	34 65	3.4	34.28	2.75	33.9
100	4.95	33.98	4.2	33.80	2.7	33.68	2.5	33.68	4.6	33.21	6.4	34.20	4.0	34.00	4.5	34.14	5.6	34.60	5.5	34.65	4.05	34.29	3.95	34.4
120			4.7	33.92							6.7	34.45	5.1	34.26	5.2	34.40	5.9	34.79	5.8	34.78	4.6	34.41	4.95	34.5
130					4.7	34.11	4.6	34.11	6.6	34.30														
150	5.93	34.29							6.6	34.52	6.8	34.59	6.1	34 59	6.5	34 84	6.4	34.97	6.15	34.84	5.4	34.65	5.85	34.8

From the above table it seems to be sufficiently clear that the alinity of the layers of water increases all through the months of January to April inclusive.

The reason for this is probably that the rainfall in the winter months is less than in the autumn. The fall which takes the form of snowis also at that time of year a factor which may be ignored. A good deal of influence on the salinity of the water in the winter, is probably to be found in the fact that much fresh water is imprisoned in the ice, which is formed in the smaller fiords and at the ends of the greater ones.

Generally speaking it may be affirmed that the surface temperature and the surface salinity decreases the further in one goes in the Vest Fiord, and the values are of course least at the ends of the branch fiords.

This will be made clear if one follows the results of the observations made, e. g. from Rombaken to Værø and Røst. With regard to the factors mentioned, it may be said that the continental and the oceanic powers oppose each other, and one would at once expect to find that the oceanic influence would be more strongly felt in proportion to distance from the ends of the fiords and *vice versa*.

While the temperature and salinity of the surface in the deep off Tranø (Tran Island) 16/3 1899 was 1.5 and 33.58, the corresponding figures at Værø were 3.2 and 34.10 on the 21st of the same month. And on the 22nd, there was found 35 pro mille water on the surface of the sea NW of Røst and a temperature of 5.05.

The observations made there are of considerable interest.

22/3 1899. 68° 3′ N., 10°.05′ E.

Depth in meters	Temp. C°.	Salinity °/₀₀
0	5.05	35.00
20	5.2	35.00
50	6.0	35.09
80	6.4	35.24
100	6.4	35.31
120	6.4	35.31
150	6.3	35.31
200	6.15	35.31
250	5.8	35.31
300	5.6	35 31
400	5.4	35.31
500	4.05	35.13
600	2.5	35.13
700	1.3	35.00
900	1.1	35.00

So that comparisons may be made, I also give Professor Mohn's observations made at a neighbouring station in June 1877.

29/6 1877. 68° 3′ N., 9° 53′ E.

Depth in meters	Temperature C°.
0	8.2
91	7.1
183	6.2
366	5.3
549	3.5
732	— 0.5
914	— 1.1
1083	— 1.12

These observations are made with a Miller-Casella's deep wate thermometer, while I used Professor Petterson's waterbottle, whic although it is an excellent instrument can hardly be depended upo with respect to its isolating properties when the depths are as grea as from 7 to 9 hundred meters.

The observations made on 22/3 1899 at any rate show tha 35 pro mille water may off the banks of Lofot—Vesteraalen reac to a depth of at least 900 meters.

By comparing the measurements on the Røst Sea (22/3) wit those in the Tys Fiord (28/3) very interesting results are obtained

28/3 1899. The Tys Fiord I.

Depth in meters	Temperature C°.	Salinity °/₀₀
0	0.75	33.58
50	2.3	33.79
90	4.4	34.28
100	5.5	34.54
120	6.4	34.67
150	6.4	34.91
200	6.3	34.97
250	6.3	34.97
300	6.3	35.11
400	6.3	35.11
500	6.3	35.11
600	6.3	35.11
700	6.3	35.11

As the places at which these observations were made are so ıear each other that one may, without any fear of making any nistake worthy of the name, consider them as one and the same, t is made clear from this table that from January to April there is considerable decrease in the temperature, but an increase in the alinity of the layers of water on the Northern coast banks. We ee too that although at Vardø and Norkyn there was no indication f the spring minimum, yet on the sea coast off Vesteraalen the ıinimum (2.65) was reached at a depth of 20 meters as early as \pril 11th.

Here is a table of observations made on the coast sea off Senjen.

$^{21}/_{1}$ 1899. The Senjen Sea, 12 miles NWtW of Maanesodden			$^{13}/_{4}$ 1899. The Senjen Sea.		
Depth in meters	Temp. C°.	Salinity °/₀₀	Depth in meters	Temp. C°.	Salinity °/₀₀
0	3.3	33.13	0	3 35	34.60
10	3.9	33.13	20	3.45	34.60
20	3.9	33 13	50	5.1	34.97
40	3.9	33.13	80	5.3	34.97
50	4.3	33.13			
80	4.5	33.33			
100	4.6	33.33			
120	4.4	33.33			

The comparatively high temperatures and salinity on $^{13}/_{4}$ indicate ıat water from the south has displaced the water whose temperature ıd salinity on $^{21}/_{1}$ is mentioned above. That the layers of water ı the banks of the northern coast are tolerable homogeneous in ıe winter, was also gathered from the observations of previous ears.

Captain Bie on $^{15}/_{4}$ 1897 found the following conditions at a ation situated west of Sørøen:

$^{15}/_{4}$ 1897. 70° 45′ N., 20° 30′ E.

Depth in meters	Temperature C°.	Salinity °/₀₀
0	4.1	34.56
10	4 1	34.56
20	4.1	34.54
50	4.0	34 54
80	4.0	34 56
120	4.3	34.61

In February 1897 I measured off Vesteraalen:

$^{10}/_{2}$ 1897. 68° 50′ N., 14° 36′ E.

Depth in meters	Temperature C°.	Salinity °/₀₀
0	3.9	33.87
50	4.2	33.92
100	4.35	33.92
150	4.35	33.92
170	4.35	33.92

When the salinity is as even as tabulated above, a fall in the urface temperature caused by the giving off of heat to the atmo-phere is easily balanced by the vertical currents. So as to give clear idea of the decrease of surface temperatures, I will now compare observations made in the deep off Tranø — The Vest Fic — on Feb. 6th and March 16th 1899.

Tranødybet. 68° 15′.5 N., 15° 49′ E.

	$^{6}/_{2}$ 1899		$^{16}/_{3}$ 1899	
Depth in meters	Temp.	Salinity	Temp.	Salinity
0	2.5	33.50	1 5	33.58
20	2.7	33.50	1.6	33.53
50	2.8	33.50		
60			3.0	33.84
80	4.6	33.74	4.2	34.03
100	5.5	34.15	4.2	34 03
150	6.5	34.89	6.5	34.75
200	6.4	35.03	6.4	34.94
250	6.4	35.03	6.5	35.06
300	6.3	35.14	6.5	35.06
400	6.3	35.14		
500	6.3	35.14	6.3	35.06
600	6.3	35.14	6.3	35.06
630	6.3	35.14	6.3	35.06

It will be noticed that the fall in temperature has principal taken place in the upper 20 meters, which in the time mention became about 1° colder.

The observations made along the Lofot fishing banks in Mar 1900 bear great resemblance to those in March of the year befo

Minimum (2—3) was found on the surface, and maximum a depth of 150—200 meters.

This again proved that the maximum temperature is found or near the bottom in the majority of the fishing banks.

Measurements at Høla near Svolvær and in the Vest Fior halfway between Skroven and Fladø ($^{17}/_{4}$) proved that spring mir mum was even then beginning to be evident.

The salinity of the waters which covered the Lofot banks January 1899 was from 33—35 °/₀₀. The titration of the sampl taken in that month only rarely, however, show so high a salinity 35. The complete series of observations made on $^{19}/_{1}$ on the s off Vesteraalen (40 miles NNW of Gaukværø) did not even rea so high as 35 although samples were taken from the surface rig down to a depth of 1000 meters. But as this is an isolated cas I will not give any particular weight to it.

During measurements in February, 35 °/₀₀ was reached in sor places, e. g.:—

$^{13}/_{2}$	1899, near Skroven	200 m.	35.08.
$^{17}/_{2}$	„ Øxsund	300 m.	35.08.
$^{21}/_{2}$	„ Henningsvær III	200 m.	35.03.
$^{23}/_{2}$	„ Reine I	150 m.	35.08.

It will be found too that measurements in the Vest Fiord March showed a salinity of about 35 at a depth of 200 m. a the same holds good with regard to April. Neither was any e ception to this rule discovered in the measurements in the Ve Fiord in March 1900.

If the salinity on different dates be compared, for instance th åt Gaukværø (Gaukvær Island) on $^{18}/_{1}$ and $^{11}/_{4}$ 1899 and at Senj on $^{21}/_{1}$ and $^{13}/_{4}$ it will at once be seen that a considerable increa has taken place.

So as to emphasize this fact still more, I will mention r observations at Høla near Svolvær.

The temperature values in the upper layers show considerable ɔase, while in the deep a great constancy prevails. But on other hand, on the Røst Sea the upper layers show a comtively high temperature.

At a depth of 120 meters, the temperature at both places was but then there is a great difference between them. On the the temperature falls from 6.4 to 1.3 between 120 and 700 ɛrs, but in the Tys Fiord at the same depths it only falls from to 6.3.

What can be the reason of this extraordinary difference?

It will at once be noticed that the salinity of the different ɛrs in the sea are pretty much the same, while a considerable ɔrence is found in the Tys Fiord. At the former place, the ling of the surface gives rise to vertical currents, which in their ı almost balance the difference in temperature.

In this way even a pretty deep layer of water may exchange ɹt with the atmosphere. But when the conditions are like those the Tys Fiord, where the salinity in the upper layers is so varied, n a considerable decrease of surface temperature will not disturb equilibrium of the water.

As now the distribution of heat through the water takes place wly, the result must be that the surface itself decreases considery in temperature, and that it is only a comparatively thin layer ich exchanges heat with the atmosphere.

So as to get an idea of the extent of the changes which take ce in the upper layers, let us examine H. H. Gran's observations de in the Tys Fiord in the summer of 1898[1]) (Hydrographical bles s. XXVII).

$^{26}/_{7}$ 1898. 68° 15′.4 N., 16° 7′.3 E.
Korsnes in the Tys Fiord.

Depth in meters	Temperature C°.	Salinity ‰
0	13.6	30.71
10	11.5	33.05
20	9.18	33.48
30	7.08	33.62
40	6.05	33.84
50	5.5	33.89
70	5.4	34.20
100	5.4	

As Gran's station was close to the place where I made my obɛrvations (Tys Fiord I), the results may be compared.

We get the impression that the top layers are subject to great ıcrease of temperature in summer and great decrease in winter, nd wee see too that the temperature at a depth of 100 meters on ıe $^{26}/_{7}$ was 5.4 and 5.5 on the $^{28}/_{3}$.

It is wellknown that the natural conditions in the depths of he large fiords are firmly established. The water in the deep fiord asins is tolerably homogeneous, the temperature and salinity are lmost unvarying throughout the whole mass, and there are only very slight differences in the course of a year. There are especially two things which control this.

In the first place, the topography of the bottom of the sea is of extreme importance, for, if for instance the deep part of the Tys Fiord was lengthened out towards the ocean, the probability is that conditions would then be somewhat different.

In the second place, the supply of continental fresh water, which by weakening the surface layers forms these into an isolating belt, is doubtless of great importance in connection with the stability of the conditions in the depths of the fiords.

There is certainly every reason to believe that there is a thicker layer on the sea which gives off heat to the atmosphere than in the fiords, but this does not, all the same, explain the great fall in temperature in the deep which takes place beyond the sea boundary.

One can scarcely think that this is kept up in any other way than by the flow of water from colder regions. There must be a cold undercurrent in the ocean.[1])

b. The Fiords.

In the winter of 1899, I had an opportunity of visiting several of the northern fiords, and as I was able to make two sets of observations in some of these, I am in a position to give results which make it possible to compare. I was however prevented from making observations in the same fiords during the following winter. But I had the pleasure of obtaining several observations in the Skjerstad Fiord, which presents many peculiarities on account of its considerable depth and its being so shut off from the sea.

In the following pages, some details will first be given of each of the fiords visited, then an attempt will be made to give a general characteristic, by help of which the similarities and dissimilarities in physical conditions will be made clear.

Sandhornö (ö-island) which is situated S. of Bodö on the south side of the Salten Fiord is separated from the mainland by two smaller fiords. Between Gildeskaal and Sandhornö we have Morsdal Fiord (also called S. Beier Fiord and Sund Fiord) and on the opposite side we have N. Beier Fiord. In these two small fiords dredgings were made $^{31}/_{3}$ 1900.

The farm Sund lies at the point of Gildeskaal peninsula. Here dredgings were made at a depth of 50—150 meters, and in the adjoining fiord just inside Kvarsnes at a depth of 50 meters. Neither of these fiords seemed to be very deep.

The Salten Fiord is the tolerably broad fiord arm which runs into the land near Bodö. The islands Strömö and Godö separate it from the Skjerstad Fiord, which farther in is also called the Saltdal Fiord. The Salten and the Skjerstad Fiord are connected by three comparatively shallow streams, of which the central one, the famous „Saltström" is a rival to the Moskenström in bulk and force. With regard to the depth of the Salten Fiord, two soundings are marked on the sea chart about half way between Sandhornö and the peninsula on which Bodö is situated, the one states a depth of 131 f. (246.60 m.) the other 112 f. (210.84 m.). A little further in, I sounded 380 meters but it was from a depth of 320 m. that the samples of water were taken (Saltenfiord II).

[1]) H. H. Gran. Hydrographical, Biological Studies of the North Atlantic ɔcean and the Coast of Nordland. (Report on Norwegian Fishery and Marine ıvestigations. Vol. I. 1900. Nr. 5).

[1]) Cf. Mohn, the North Ocean, and Nansen, Some oceanographical Results of the Expedition with the „Michael Sars" in the Summer of 1900. N. Mag. f. Naturv. B. 39, H. 2. Kristiania 1901.

Thus it appears that the bed of the Salten Fiord, which has a maximum depth of at least 380 meters, slopes fairly evenly outwards, but somewhat steeply inwards; for at the outer end of Saltströmmen 40 m. was reached and at the inner 60 m.

It is said that in the most shallow part of the stream the depth is only about 20 meters.

Several soundings were taken in the Skjerstad Fiord, by means of which a very good idea of the depth can be formed.

If not otherwise specified, it may be taken for granted that the soundings were made in the middle of the fiord. At the end of the fiord (Skjerstad Fiord I) the bottom was reached at 30—50 m. About 1.5 miles out (S. II) the depth was 100—185. S. III and S. IV lie in the outer half of that part of the Skjerstad Fiord which runs southwards, and the depths here were respectively 230 and 330 meters.

Opposite Kvænflaact (S. V.) I sounded at 420 m., and in the arm of the fiord close to Fauske (S. VI) at 100—150 m.; while the depth in the middle of the fiord opposite Fauske (S. VII, VIII) was 470—490 m. Just off the coast of Skjerstad in the direction of the Misvær. Fiord the depth was 80—50 m. and at the mouth of the Misvær Fiord (S. X) 10—30 m., while a little further in the same fiord the depth was 50 m. (S. XI). On the other hand, the depth in the middle of the Skjerstad Fiord just opposite the church (S. XII) was 515 m.

A little further out (S. XIII) strangely enough it was only 110 m. deep, and from here the bed again sinks to the greatest depth sounded in the whole fiord, viz. 518 meters.

Then it again inclines evenly upwards, for at the following stations in the direction of Saltströmmen (S. XIV, S. XV, S. XVI) the respective depths were 400, 380, 330 m. Measurements taken in the middle of the fiord from the end to the inner part of Saltströmmen give the following figures: 30, 50, 100, 185, 230, 330, 420, 470, 490, 515, 110, 518, 400, 380, 330, 40 m.

How far the rise from 110 to 515 and 518 is an isolated point, or whether there is a ridge stretching across the fiord, I am not able with certainty to decide.

It will be seen from the foregoing that the Skjerstad Fiord is considerably deeper than the Salten Fiord, and that the greatest depth sounded in it up to the present time is 518 meters.

Observations in the Skjerstad Fiord gain increased interest as the Norwegian North Atlantic Expedition in 1877 had a couple of stations here.[1])

Temperature registrations are here given for the sake of comparison.

$^{15}/_{8}$ 1877. The Skjerstad Fiord.

Depth in meters.	Temp. C°.
0	13.0
481	3.23

[1]) H. Mohn: The Depths, Temperature and Circulation of the North Ocean, p. 53.

$^{17}/_{8}$ 1877. The Skjerstad Fiord.

Depth in meters.	Temperature C°.
0	11.4
18	8.7
37	7.8
55	7.5
73	6.7
91	5.7
110	5.0
128	4.0
146	3.2
165	3.1
183	3.0
201	3.2
219	3.1
238	3.3
457	3.4
494	3.2

Now I will compare this table with one from my series observations.

$^{4}/_{4}$1900. The Skjerstad Fiord XII.

Depth in meters.	Temperature C°.	Salinity $^{0}/_{00}$.
0	2.3	33.73
20	2.7	33.73
50	3.45	33.85
100	3.4	33.95
150	3.3	33.99
200	3.25	33.99
300	3.2	34.04
500	3.15	34.09

These last two tables resemble each other in so far as in bo of them the physical conditions from a depth of 150 m. down a seen to be pretty much alike, and this can hardly be looked up as due to chance.

The Skjerstad Fiord is a typical shut in basin, so that the can be no renewal of the water in its bottom from any unde current.

The temperature waves must come from above downward and according to what has already been mentioned one must b able to conclude that, e. g. the distribution of heat in the dee is in a high degree prevented by the mixing of fresh water wit the surface layers. There are also signs which seem to indicat that the changes in degrees of heat take place exceedingly slowl in the water at considerable depths.

Reference has already been made to the conditions with regar to the maximum of temperature in the month of March in the Lofo Banks. But if one looks over the measurements in the Skjersta Fiord in the beginning of April, it will be seen that even so lat as that the maximum has not got very far.

Thus $^{2}/_{4}$ S. II. 80 m. 3.5 (max.)
$^{2}/_{4}$ S. V. 80 - 3.55 „

Judging from the figures just noted for $^{4}/_{4}$ S. XII, it may also ɔncluded that the maximum lies between 50 and 100 m. But again shows that the changes in temperature take place very ly. In the Salten Fiord, where the ocean water has free access, › was no sign of the maximum at a depth of 80 m., the autumn mum had entirely disappeared and the highest temperature was ned at the bottom at a depth of 320 m.
See the following table.

$^{5}/_{4}$ 1900. The Salten Fiord II.

Depth in meters.	Temperatur C°.	Salinity ‰.
0	3.2	34.11
20	3.15	34.11
50	3.1	34.11
60	3.6	34.47
80	4.4	34.60
100	5.0	34.79
120	5.9	34.84
150	6.2	34.94
200	6.55	35.06
250	6.65	35.13
320	6.65	35.13

If the above table be compared to that of the section S. XII), a striking difference will at once be noticed. Not only is the tom temperature in the Salten Fiord much higher than in the jerstad Fiord (3°.5 difference) but the salinity on the surface of › former is even a little higher than at the depth of 500 m. in XII. That such decided differences in the hydrographical con- ions of the Salten and Skjerstad Fiords, as shown by tempera- 'e and salinity, also cause biological differences, is a foregone nclusion. This subject will be dealt with further on in this atise.

From the Folden Fiord, I have only one sounding ($^{6}/_{4}$ 1900 ldenfj. I) taken halfway between Hjertö and the south mainland. ıe depth was 530 meters. From the high temperature and sali- :y of the water from the bottom (*Vide* no. 1067—1078) one ıy conclude that the ocean water is not prevented from flowing to, at any rate, the outer part of the fiord. It should be added at there is another Norwegian fiord which bears the name of e Folden Fiord, it is in the county of North Trondhjem, just uth of the 65th degree of latitude. In the old days, the Kristi- ıia Fiord also used to be known by this name.

The Öx Sound and the Sag Fiord.

One of the entrances to the Sag Fiord from the Vest Fiord formed by the Öx Sound (between Hammerö and Lundö).

While in the sea chart for that part of the Vest Fiord which beyond the Öx Sound the depth is given as 211—252 fathoms 97.21—474.38 m.) we took in the Öx Sound the following depths om the mouth inwards: 455, 450, 630, 620, 620 meters. So at this short, narrow sound (the length is about 5 miles, and e breadth about 1 mile) has a maximum depth of 630 meters. I lieve this is the one single case in the whole of Norway.

Respecting temperature and salinity, attention is drawn to the bles (nr. 351—362).

It will be seen that it is especially from the upper 20 meters that the accumulation of the summer heat is given off to the atmosphere. It may probably also be stated as a fact that the less salt surface layers serve as an isolating belt, by means of which the loss of heat from the layers beneath is to a great extent prevented.

In the Sag Fiord proper, only a couple of soundings were taken in the inner end outside Furrunes (Sagfj. I, II). The depths here were respectively 210 and 315 m. From the high temperature and salinity of the water at the bottom (*Vide* nr. 363—368) I conclude that this inner part of the fiord is not shut off by any ridge from the rest of it.

The innermost parts of the Vest Fiord and of the Tys Fiord are very interesting on account of their great depths. The greatest depth in the Vest Fiord is found north of Tranö, for the sake of brevity I refer to this as the Tranö deep (Tranödybet). On the old sea charts soundings are not marked beyond a line Kjeö—Tranö, but I have taken many soundings from here, from which it is made clear that the great fall of 5—600 m. and more continues almost up to Barö.

Halfway between Barö and Rotvær 280 m. were sounded, from here in the direction of Tranö the following depths were noted: 324, 570, 608, 610, 630, 620, 535. In a straight line across the fiord from Offersö in the direction of Tiltvigtind the following were sounded: 250, 630, 680, 640 m. and from Offersö to the mouth of the Tys Fiord: 485, 580, 585, 320, 465 m. Thus it will be seen that there is a rise directly outside the mouth of the Tys Fiord.

After this rise there is again a fall in the bed of the Tys Fiord, for soundings taken in a straight line from the centre of the mouth of the Tys Fiord to the inner half of Skarberget gave the following figures: 615, 630, 615, 725, 725 m. This great depth is almost without variation right up to Skarberg.

As far as I know, 725 m. is the greatest depth reached in any fiord north of Trondhjem, and I take the liberty of calling the great basin which stretches from Korsnes to Skarberg, the Tysfiord deep. The innermost boundary for this basin I am unable to give precisely; the last sounding at 725 m. was taken a little further in than Skarberg, and here dredgings were made and samples of plankton and water taken (Tysfiord I).

A sounding between Ulvö and the Northern mainland gave a depth of 230 m., while the depth at the station Tysfiord II, which is a little further in than Tysfiord church, was 409.

A little further in, in the same arm of the fiord, the bottom was reached at 130 and 140 m. respectively.

That there is no high submarine ridge between Tys Fiord church and the mouth of the fiord, may be seen by comparing the observations made at the two stations (*Vide* nrs. 651—672). The observations made in the basins of the Tys Fiord and Tranö show a great similarity. There is reason to believe that the bottom temperature at the places mentioned remains for years at 6—7, with a salinity of about 35. The animal and plant existences in the basins, thus live in physical conditions of remarkable constancy.

The Vest Fiord is continued in the Ofot Fiord, which again has several important arms. Of these, the Skjomen Fiord and the Rombak Fiord were visited in 1899.

There is a rise in the bed a little west of Barö, which is again succeeded by a fall towards the Ofot Fiord. Between Barö and Tjelodden 545 m. were reached, and opposite Skarstad 550. Then there is a rise; for opposite Havnes the depth was 360 (Ofoten I, $^{7}/_{2}$ 1899) and between Bogen—Ballangen (Ofoten II, $^{7}/_{2}$ 1900) 258 m. There are considerable depths also in the Rombak

Fiord, a little further in than Öijord 310 m. was sounded (Rombaken III, 8/2 1899). Furthest in at Rombakbotnen the depth was only 40 m. (Rombaken I) and opposite outer Sildvig 110 m. (Rombaken II, *Vide* nrs. 302—311). At the station Skjomen I at the end of the Skjomen Fiord near Elvegaard the depth was also only 40 m. (nrs. 322—324).

In the middle part of this fiord (Skjomen II) the depth however was 150 m. (nrs. 325—329) and the same depth was sounded just a little further in than the mouth, while a sounding taken in the mouth proper gave only 85. Moreover, judging from the figures giving the temperature and salinity at the station Skjomen I and II, it may be concluded that this fiord is shut off by a submarine ridge from any flow of warm, salt ocean water.

Thus we have

9/2 1899. Skjomen II.

Depth in meters.	Temperature C°.	Salinity °/₀₀.
0	1.8	33.50
20	1.8	33.37
50	1.8	33.37
100	1.7	33.37
150	1.7	33.42

Generally there is ice on the Skjomen Fiord in the winter.

Similar physical conditions are found in Rombakbotnen, which is connected to the Rombak Fiord proper by a shallow stretch known as „Strömmen" (The current). On the other hand, observations in the outer Rombak Fiord (R. III, 8/2 1899, nrs. 312—321) show that the warm, salt ocean water has been able to get access to this place. From the measurements taken in February in 1897 and 1899 in the Ofot Fjord, it is made sufficiently clear that the surface layers of the fiord in question gave off much more heat than is the case in the Lofot fishing grounds, and the loss of heat is still greater in the smaller fiords which adjoin the Ofot Fiord.

The Ögs Fiord is shut off from the Vest Fiord by innumerable small islands and holms, but the Kanstad Fiord has a more direct connection with the principal fiord. When we visited the Kanstad Fiord on 11/3 1899 its inner part was covered with ice, our first station (K. I) thus being just beyond „Strömmen" which connects the inner and outer half. The depth here is only 30 m. Further in than Kvalö 84 m. was reached. Just beyond Kvalö outwards there is a rise in the bed which is called „the ridge" (revet). From this point onwards to just opposite Nes the following depths were reached: 46, 75, 95 m.

About halfway between Offersö and Barö the depth was found to be 215 meters.

On 11/3 1899 the temperature inside „the ridge" at a depth of 90 meters was 1.6 and the salinity 33.48; outside at the same depth the temperature 4.4 and the salinity 34.06. It may also be gathered from this that the outer part of the Kanstad Fiord is connected with the Vest fiord by an unbroken channel, while the ridge prevents the warmer bottom water from penetrating into the inner part of the fiord.

Outside the mouth of the Ögs Fiord, there is a stretch of water, which is nearly free for islands and holms, which is called „Flaket"; and here I have sounded from 175—220 meters. This comparatively open stretch of water continues towards Punc vaagen and Aarstenen.

Observations made on 10/3 1899 however (nrs. 455—463) such low temperature and salinity that one must conclude „Flaket" is pretty much shut off. At a depth of 220 m., instance, the temperature was 1.7 and salinity only 33.40.

On the inner part of the Ögs Fiord there is ice in the wi Station I (14/3 1899) was just on the border of the ice. The d here was 100 m.; temperature 2.1 from the surface to the bot but the salinity varied from 32.54—33.10 (nrs. 522—525). Sta II (14/3 1899) was situated near Halvorsö towards the mouth of Ögs Fiord. The depth here was 207 m. As several observat were made here, I adjoin the various results for the sake of c parison.

14/3 1899. The Ögs Fiord II.

Depth in meters.	Temperature C°.	Salinity °/₀₀.
0	1.3	32.95
20	1.6	33.28
50	1.7	33.33
100	1.5	33.33
150	1.4	33.33
200	1.4	33.33

On 23/2 1897 I also had a station not far from Halvors (Hydr. Tables p. 16).

Then the following results were obtained:

Depth in meters.	Temperature C°.	Salinity °/₀₀.
0	1.4	33.25
10	2.1	33.49
50	2.3	33.49
100	2.6	33.61
145	2.7	33.61

At the same place on 23/3 1900 the following results we obtained:

Depth in meters.	Temperature C°.	Salinity °/₀₀.
0	2.05	33.92
20	2.2	33.95
50	2.3	33.95
80	2.35	33.95
100	2.35	33.95
150	2.4	33.95
190	2.6	34.00

It will be seen from these observation tables that the hydro graphical conditions in the Ögs Fiord vary in no small degree fron year to year. One might almost be tempted to say that more o

[1]) Hjort, Gran and Nordgaard. Report on Norwegian Marine Investi gations 1895—97. Bergen 1899.

salter water flows in one year than another, which again one might ɔunt for, as the curve for 34 pro mille in the corresponding part :he Vest Fiord reached higher one year than the other. How- r nothing certain can be said on this point.

There is another fiord, the Östnes Fiord, which from the Vest rd goes into Östvaagö, and this fiord is of far more importance nomically speaking than the two fiords just mentioned on Hinnö. the Östnes Fiord there is often very good cod fishing.

The greatest depth which was measured in 1899 was 140 ters just opposite Helle in the outer part of the fiord. Respec- g the hydrographical conditions refer to the tables nrs. 207—234, 1—994.

The Kirk Fiord stretches in to Moskenesö from the Vest ɔrd. The greatest depth we measured on $^{3}/_{3}$ 1899, a little ıy from the mouth of the Vor Fiord inwards, was 130 meters. om 0—100 m. here the temperature rose from 2.0 to 2.7, while ə salinity increased from 33.16 to 33.48.

At Station II in the inner half of the fiord the rise in tem- rature and salinity was respectively (from 0—50 m.) 1.5—2.5 and 1.95—33.40. *Vide* the tables nrs. 420—425. In the Vest Fiord the same time (11 miles SE of Reine) the temperature at a ɔpth of 100 m. was 6.5 and salinity 34.52.

In the Malang Fiord, I have only observations from the ɔepest part between Senjen and Kvalö. But I have two sets of ɔservations taken on $^{29}/_{1}$ and $^{12}/_{4}$ 1899 respectively.

It is interesting to compare these, nrs. 182—195, 757—767). In this fiord just as at several other places in the month of anuary, there was on $^{29}/_{1}$ a homogenous layer from the surface ɔ a depth of 100 m. with a temperature of 2.9 and a salinity of 3.92. From 120—350 m. the temperature rose from 3.0 to 5.5 nd salinity from 33.97 to 34.52. On $^{12}/_{4}$ the conditions were con- iderably altered. As one would expect, the cooling of the surface ayers was still further advanced. The upper 50 m. had a tempe- ature of 1.6, which is equal to more than one degree's fall.

There is nothing remarkable in this, but more unexpected was t to find that the temperature at a depth of 350 m. had fallen rom 5.5 to 4.1.

Such a considerable change of temperature at such a great lepth has not previonsly been observed in our fiords.

Neither can it be explained as the result of a cooling process, ɔy which the layers of water have given off heat to the atmosphere. The most likely solution of this problem is that this change is ɔccasioned by an undercurrent from the ocean. A hint in this lirection is also given by the fact that the salinity was also some- what higher.

Measurements in the Lyngen Fiord ($^{27}/_{1}$ and $^{3}/_{5}$ 1899) also furnish interesting examples of a considerable change in hydro- graphical conditions. With regard to the depths in this fiord it should be mentioned that we sounded 118—125 m. opposite Ski- botten; 250 m. outside the mouth of the Kaa Fiord; 200 m. op- posite Spokenes, and 320 m. between outer Gamvik and the north point of Ulö. Thus it appears that Lyngen, like the majority of the northern fiords, is deepest in the outer part.

Observations made on $^{27}/_{1}$ (nrs. 155—162) at station L. II show a remarkable uniformity from the surface to the bottom.

At the next station the state of things was still more remark- able (nrs. 163—173), as the temperature decreased from the sur- face downwards. This is exactly contrary to what is usual in the fiords in the winter, and I therefore call it the reversed win- ter state. At station L. III too, there was an indication of some- thing similar, the temperature at a depth of 150 m. being 3.4 and at 200 m. 2.9 (nrs. 174—181). But on the other hand on $^{3}/_{5}$ the state of things in the same fiord was altogether different. On this date at station L. I there was an inequality, both in temperature and salinity (nrs. 861—866), and at st. L. II the usual winter state, with quite an even rise in the temperature from the surface downwards (nrs. 868—875). The same conditions were also found at st. L. III[1]) (nrs. 875—884). The question now arises how can the unusual distribution of heat which was found at st. L. II on $^{27}/_{1}$ (the reversed winter state) be explained. As, however, the case here mentioned is not an isolated one, I will not give my theory to explain it, until I have described the other similar cases. In the Kvænang Fiord we took soundings between Lökö and Bry- nilen at a depth of 150 m., between Spilderen and the south main- land at a depth of 180 m. Between Spilderen and the north main- land 343 m. was sounded, and it is probable that this is the grea- test fall in the bed of the Kvænang Fiord. Further in the fiord near the island Nöklan the depth was only 90 m., and in the Jöke- Fiord which joins the Kvænang on the north 110 m. were reached on the border of the ice right in at the end of the fiord close to the glacier. This depth was also reached just outside the Tve- Fiord. Measurements on $^{24}/_{1}$ 1899 at K. I and II (nrs. 135—154 showed a remarkable uniformity in the temperature and salinity of the layers of water. This uniformity was also found on $^{19}/_{4}$. To verify this the values are compared in the following table. It should be noticed that K. I on $^{24}/_{1}$ = K. I on $^{19}/_{4}$.

Kvænangen 70° 1′ N., 21° 28′.5 E.
Between Spilderen and the southern mainland.

	$^{24}/_{1}$ 1899		$^{19}/_{4}$ 1899	
Depth in meters	Temp. C°	Salinity ‰	Temp. C°	Salinity ‰
0	2.6	33.87	0.75	34.21
10	2.6	33.87	0.75	34.21
20	2.6	33.87	0.75	34.21
30	2.6	33.87	0.75	34.21
50	2.6	33.87	0.75	34.21
80	2.6	33.87	0.75	34.21
100	2.6	33.87	0.75	34.21
120	2.6	33.87	0.75	34.21
150	2.8	33.87	0.75	34.21
160			2.0	34.49
180	3.1	33.87		

From this table it will be seen that from $^{24}/_{1}$ to the $^{19}/_{4}$ there was a cooling in the upper 120 m. of nearly 2°, and that during the same period the salinity increased.

The slight irregularity found in the observations on $^{21}/_{4}$ (nrs 803—810) is probably to be accounted for by some process of mix- ing. On the other hand, the physical conditions in the Jöke- Fiord are particularly uniform (nrs. 794—802) with a low tempe- rature and a rather high salinity.

The depths in the Porsanger Fiord are well known, as it has been sounded long ago. According to the sea chart the maxi- mum depth 150 f. (282.37 m.) is reached in the mouth betwee Sværholtklubben and Helnes on Magerö. Hence and inwards t

[1]) L. III for $^{3}/_{5}$ did not correspond to L. III on $^{27}/_{1}$.

Store Tamsö the depth is about 200 m. or more. Depths of about 200 m. have also been sounded further in than the island mentioned; but the Porsanger Fiord on the whole may be said to be comparatively shallow.

According to dr. HJORT[1]) a remarkably low temperature ÷ 1°.15 C. was registered, at a depth of from 90—100 meters, in the summer of 1900, by the „Michael Sars" expedition.

Further out in the fiord at a depth of 200 m. a temperature of 3°.6 C. was measured. When we visited the Porsanger Fiord at the end of April 1899, the whole of the inner part of the fiord was covered vith ice, but, as the observations made on ^{27}—$^{28}/_{4}$ (nrs. 833—846) show, a temperature so low as 0°.2 C. was taken between Store and Lille Tamsö at a depth of 200 m., and this is the lowest temperature which has ever been registered in any Norwegian fiord at such a great depth. And the temperature ÷ 1°.15 C., which was registered by the „Michael Sars" expedition in the summer of 1900, is the lowest which has been found at all in any Norwegian fiord.

The temperatures noted in the Porsanger fiord give similar results to those already known from the Lyngen Fiord. There is a fall in temperature from the surface downwards (the reversed winter state).

At the mouth of the Porsanger Fiord on $^{28}/_{4}$ 1900 the following conditions were noted:

Depth in meters	Temp. C°	Salinity ‰
0	2.25	34.54
20	2.25	34.54
50	2.15	34.54
100	1.4	34.47
150	1.4	34.54
200	1.3	34.54
250	2.75	34.78

From the surface down to 200 m. the salinity is fairly uniform, but the temperature falls from 2.25 to 1.3. On the other hand, along the bottom at a depth of 250 m. a flow of warmer and salter water has penetrated (2°.75 C. and 34.78 ‰). Between Store and Lille Tamsö where observations were made on $^{27}/_{4}$ 1899 we noted the following:

Depth in meters	Temp. C°	Salinity ‰
0	1.05	34.60
20	1.05	34.60
50	1.0	34.67
80	1.0	34.67
100	0.95	34.60
120	0.95	34.67
150	0.75	34.67
200	0.2	34.48

[1]) Cf. HJORT, Fiskeri og Hvalfangst. (Bergen 1902), p. 18 and H. FRIELE, Iollusken der ersten Nordmeerfahrt. (Bergens museums aarbog, 1902, p. 3).

There is reason to believe that the „reversed winter st describes conditions which are easily disturbed. It is true I no opportunity of repeating the vertical section at any other pl than those in the Lyngen Fiord, but there it was found that usual winter conditions were again prevalent on the $^{3}/_{5}$. W giving oneself the task of judging concerning these peculiar c ditions, it is helpful to remember that nothing corresponding been noticed in the western fiords (vestlandske fjorde) where have for several years taken measurements also in the winter. settle the hydrographical conditions, in any single fiord for instar several factors may have to be reckoned with. That the tempe ture of the atmosphere plays an important one, is clear, and comparing the results obtained in the northern and southwest fiords, as I have done, I have come to the conclusion that the f of rain is a factor which must be considered.

From MOHN's rainfall-charts[1]) it will be seen that the fall most uneven in the different parts of the country. Although the has of course been some slight variations in the fall in one a the same place from one year to another, yet on the whole it seen that the distribution has been fairly uniform during the peri that these measurements were made. It is another matter th there may possibly be something periodical in the distribution the fall.

It may thus be stated that there is a greater fall in the w stern fiord districts than in the fiords of Tromsö and Finmark, a it is reasonable to suppose that this circumstance must have son influence both hydrographically and biologically speaking. I wi now only allude to the hydrographical part of the subject.

One must expect in the Finmark fiords, where there is le fall, to be able to trace a rise in salinity, especially as so muc falls in the form of snow so that it does not at once make it influence felt. Besides this, in the northern fiords large quantitie of fresh water is retained in the layers of ice in the inner part of the fiords. From these circumstances one might attempt to ex plain the greater average salinity of the surface layers of the no thern fiords in winter as compared to the fiords in the west countr (vestlandske fjorde).

On account of the slight flow of fresh water into such a fior as the Kvænang, in the course of a winter a great uniformity i salinity may be established, and (*Vide* observations) just for thi very reason the cooling of the atmosphere will exert a great in fluence on the cooling of the layers, the vertical current takin with it the water with its low temperature (which it has reache by being cooled by the atmosphere) from the surface downwards

The observations made furnish sufficient proof that in the course of the winter a great levelling in temperature and salinity goes on, and there are instances of complete uniformity from the surface right down to the bottom. However, it is possible that these conditions may be disturbed by warmer coast water being driven into the fiord by the wind. And in such a case the „reversed winter state" would be found, the original fiord water having cooled so much that it settles under the inflowing coast water, even if the latter is slightly salter. After all, this is only a parallel case to that in the „Nordhav" (the North Ocean) where the warm salt ocean water from more southerly regions settles above the cold and less salt water which comes from the north.

[1]) Cf. Nedboriagttagelser i Norge, Aarg. V, VI.

c. Hydrographical Characteristic of the Fiords of Northern Norway.

It is a well known feature in the western (vestlandske) fiords ; the maximum depth is found in the inner parts, but several the northern fiords are found to be different in this respect. s true that the greatest depth (about 650 m.) in the Vest Fiord 'urther in than Tranö (Tranö-deep) and in the Varanger Fiord greatest depth (424 m.) is just off the Bög Fiord (in the middle t of the fiord), but it may be stated that the maximal depth is nd in the outer half of many of the fiords.

In the following table I have given a special name to the ɔe where the greatest depth is found.

Fiord	Max. depth	Situation
ang	Malangs deep 433 m.	Just opposite Stönnesbotn. 69°33′ N., 18°0′ E.
gen	Gamvik deep 320 m.	Between outer Gamvik and Ulö. 69°54′ N., 20°27′ E.
enang.....	Kvænangs deep 343 m.	Between Spilderen and the northern mainland. 70°2′.5 N., 21°41′ E.
sanger	Porsanger deep 282 m.	Between Sværholt and Helnes. 70°58′.5 N., 26°25′ E.
se	Sværholt deep 326 m.	A little inside the mouth. 70°56′ N., 26°53′.5 E.
a	Tana deep 318 m.	Just off the Ty Fiord. 70°50′ N., 28°36′ E.
anger.....	Varanger deep 424 m.	Just off the Bög Fiord. 69°56′.5 N., 30°10′ E.

I owe the majority of the above data to the general charts of ographical Survey. I have relied on my own measurements, ich are on the whole not a large number, with regard to the ngen and Kvænang fiords.

A little beyond the mouth of the Salten Fiord inwards I have nded 380 m.; but this depth is less than may be found in the erstad Fiord which is still further in, I reached a depth of 518 a little outside Skjerstad church. It is quite remarkable in the rict between the Skjerstad and the Ofot Fiords how many ressions there are, as will be seen from the following table.

Fiord	Depth	Situation
rstad	Skjerstad deep 518 m.	A little beyond Skjerstad church.
en	Hjertö deep 530 m.	Between Hjertö and the southern mainland, 67°37′ N., 15°2′ E.

Fiord	Max. depth	Situation
Öxsund	Öxsund deep 630 m.	Between Hammerö and Lundö. 68°1′ N., 15°18′.5 E.
Tys	Tysfiord deep 725 m.	A little inside Skarberg. 68°12′.5 N., 16°12′.5 E.
Ofot.....	Skarstad deep 550 m.	Just opposite Skarstad. 68°23 .5 N., 16°17′.5 E.

This series of greater depths lies between 67° and 68°30′ N The powers which combine to form fiords must have been exe cised in an unusually large degree in this district, and it is probab very difficult to find any parallel instance of such depths in suc a limited area.

It will be found on careful consideration of the observatio taken that a great many of the fiord deeps are very uniform wi regard to temperature and salinity. So as to make this clear at glance the following tabulated observations have been inserted.

Fiord	Locality	Date of observation	Soundings in m.	Depth measured m.	Temp. C°	Salinity ‰
Salten	67°14′.5 N. 14°26′ E.	5/4 1900	380	320	6.65	35.13
Folden	67°37′ 15°2′	6/4 1900	530	500	6.55	35.00
Öxsund	68°1′ 15°18′.5	17/2 1899	630	630	6.3	35.08
Tys	68°12′.5 16°12′.5	28/3 1899	725	700	6.3	35.11
Vest.....	68°15′.5 15°49′	6/2 1899	630	630	6.3	35.14
Ofot	68°23′.5 16°17′.5	9/2 1899	550	550	6.3	35.14

Observations made at different times of the year have prove that a considerable constancy in temperature and salinity prevai in these fiord deeps. Another set of fiords shall now come in consideration.

Fiord	Locality	Date of observation	Soundings m.	Depth measured m.	Temp. C°	Salinity ‰
Malang	69°33′ N. 18°0′ E.	29/1 1899	433	350	5.5	34.52
Lyngen	69°54′ 20°27′	3/5 1899	320	300	3.65	34.84
Kvænang....	70°2′.5 21°41′	21/4 1899	343	340	2.3	34.49

Fiord	Locality	Date of observation	Sounding m.	Depth measured m.	Temp. C°	Salinity ‰
›rsanger ...	70°58′.5 26°25′	28/4 1899	282	250	2.75	34.78
ıma[1].....	70°47′ 28°30′	25/6 1878	232	232	2.8	
›ranger[2]) ..	69°56′5 30°10′	Aug.1875	424	424	3.1	

A special characteristic of the places above mentioned is that e temperature was below 6° C. and the salinity less than 35 pro lle. There is also reason for supposing that these two factors e more subject to change here than in the fiords mentioned in e former table. For instance, in the Malang Fiord on 14/4 1899 e temperature was 4.1 and the salinity 34.67. There are also ıny smaller fiords, which show similar conditions. Instances of is are tabulated in the following list.

Fiord	Locality	Date of observation	Soundings m.	Depth measured m.	Temp. C°	Salinity ‰
jerstad....	S. XII	4/4 1900	515	500	3.15	34.09
jomen	S. II	9/9 1899	150	150	1.7	33.42
nstad.....	K. III	11/3 1899	94	90	1.6	33.48
s	Ö. II	14/3 1899	207	200	1.4	33.33
·k.....	K. I	3/3 1899	108	100	2.7	33.48

The fiords above mentioned are certainly connected with those ıich have a bottom temperature of 6°—7°, and a salinity of about ‰, but submarine ridges prevent the warm bottom water from wing in. The heat which the Gulf Stream brings with it does not exert any influence worth considering on the deeper laye water in these fiords, and the condition of things in the dept determined by the local meteorological factors in a special de

A few examples, showing the loss of heat caused where a is shut off by a submarine ridge, will be of interest. On M 10th 1899 at a depth of 200 meters in the Ögs Fiord the perature was 1.7 and the salinity 33.40 ‰. On the same da the same depth in the Vest Fiord outside the temperature 6.7 the salinity 34.87; there thus being a difference of 5° C. in perature.

On April 4th 1900 at a depth of 200 meters in the Skje Fiord, the temperature was 3°.25 C. and the salinity 33.99 while in the Salten Fiord the figures were respectively 6°.55 35.06; there thus being a difference of 3°.3 in temperature.

It is not to be wondered at that these differences evid themselves in the distribution of fauna.

As a result of the observations and particulars detailed i preceding pages it would seem reasonable and natural to d the northern fiords into two groups[1]) as follows: —

1. Fiords in which the bottom temperature is 6°—7° C. wi salinity of about 35 ‰ in the water at the bottom.
   (Examples: The Salten, the Folden, the Tys, the and the Vest Fiord).
2. Fiords in which the bottom temperature is less than 6° C. the salinity at the same depth is less than 35 ‰.
   (Examples: The Malang, Lyngen, Kvænang, Porsar Tana, Varanger, Skjerstad, Skjomen, Kanstad, Ögs and Fiords.)

The Malang Fiord is a kind of connecting link betv the two groups. It must also be mentioned that the Skjer Fiord, for instance, belongs to the second group on account o being shut off by a submarine ridge which prevents the inflo the ocean water; while the Lyngen and Porsanger Fiords fo stance, on the other hand, must classify under the second g on account of their being situated so far north that the o water has been considerably cooled and their salinity has reduced by mixing with fresh water.

Later on we shall show that the distribution of fauna an character in the two groups are so different, that the above cl fication of the fiords is justifiable also for that reason.

[1]) The North Atlantic Expedition, 1878.
[2]) Professor Mohn.

[1]) Cf. Nordgaard: Some Hydrographical Results. (Bergens museums bog 1899, p. 23).

II. PLANKTON.

NOTES.

In my plankton tables the marks have the following signification:

rr = very scarce,
r = scarce,
\+ = somewhat numerous,
c = common,
cc = very common.

A. The greater Forms of animal Plankton.

a. Plankton Stations 1899—1900.

Nr.	Date	Name	Depth in metres	Corresponding samples in the hydr. tables
	1899			
1	12/1	Helligvær, 10 miles NW of H.	0—50, 0—250	28—40
2	13/1	Vestfjord I, between Helligvær and Værø	0—50, 0—100, 0—180	41—52
3	—	Vestfjord II, nearer Værø	0—50, 0—100, 0—200	53—63
4	14/1	Moskenstrømmen	0—50, 0—100	66—70
5	17/1	Reine. 8 miles SE of R.	0—150	73—80
6	—	Stamsund, 8 miles SbE of S.	0—50, 0—100	81—86
7	—	Henningsvær, 7 miles S of H.	0—50, 0—180	89—90
8	18/1	Yttersiden, 23 miles NW of Gaukværø	0—50, 0—110	91—97
9	19/1	40 miles NW of Gaukværø	0—50, 0—100, 0—700	105—121
10	21/1	Senjen, 12 miles NWbW of Maanesodden	0—5, 0—50, 0—130	126—133
11	23/1	Tromsøsundet	0—5	134
12	24/1	Kvænangen I, between Løgø and Brynilen	0—5, 0—50, 0—140	135—144
13	—	Kvænangen II, between Spildern and Kvænangstinderne	0—5, 0—50, 0—180	145—154
14	27/1	Lyngen I, off Skibotn	0—5, 0—50, 0—115	155—162
15	—	Lyngen II, off Kaafjord	0—50, 0—100, 0—250	163—173
16	—	Lyngen III, off Spokenes	0—50, 0—200	174—181
17	29/1	Malangen, between Lysbotn and Stønnesbotn	0—100, 0—300	182—194
18	31/1	Følstad, Østnesfjord	0—50, 0—135	214—223
19	—	Helle, Østnesfjord	0—50, 0—150	224—234
20	—	Høla, Svolvær	0—50, 0—150	196—206
21	1/2	Henningsvær, 8 miles SbW of H.	0—50, 0—100	235—240
22	—	Vestfjord, 8 miles SSE of H.	0—50, 0—200	
23	—	Skroven, 4 miles S og S.	0—300	241—245
24	3/2	Raftsundet, off the Troldfjord	0—50	246—250
25	—	Raftsund II, between Aarstenen and Ulvaag	0—100, 0—200, 0—260	251—258
26	4/2	Skroven, 5 miles ESE of S.	300—350, 0—100, 0—200, 0—300, 0—380	259—268
27	6/2	Tranødybet, between Tranø and Lødingen	0—50, 0—100, 0—200, 0—630	269—281
28	7/2	Ofoten I, between Havnes and Ramsund	0—100, 100—200, 200—300, 300—350	282—292
29	—	Ofoten II, between Bogen and Ballangen	0—100, 100—200, 200—250	293—301
30	8/2	Rombaken I, at the head of R.	0—40	302—306
31	—	Rombaken II, off ytre Sildvik	0—100	307—311
32	—	Rombaken III, inside Øijord	0—100, 100—200, 200—300	312—321
33	9/2	Skjomen I, at Elvegaard	0—40	322—324
34	—	Ofotenfjord, off Skarstad	500—550	331
35	13/2	Skroven, 5 miles SWbS of S.	0—50, 0—100, 0—200, 0—250	339—349
36	—	Strømmen I, at Henningsvær	0—80	332—335
37	—	Strømmen II, at Henningsvær	0—30	336—338
38	16/2	Mouth of the Raftsund	0—275	
39	17/2	Øxsund, between Hammerø and Lundø	0—100, 0—150, 150—250, 250—350, 350—450, 450—550, 550—620	351—362
40	18/2	Sagfjorden I. inside Furrunesvæggen	0—50, 0—100, 0—200	363—368
41	—	Sagfjorden II, outside Furrunesvæggen	0—300	
42	21/2	Henningsvær I, 4 miles SSW of H.	0—85	369—372
43	—	Henningsvær III, 16 miles SSW of H.	0—100, 0—200' 0—250	377—385
44	1/3	Evenstad I, 7 miles SE of Lofotodden	0—50, 0—150	405—411
45	—	Evenstad II, 10 miles SE of Lofotodden	0—100, 0—200	412—419
46	—	Moskenstrømmen	0	
47	3/3	Kirkfjord I, inside Vorfjorden	0—100	420—423
48	4/3	Reine I, 11 miles SE of R.	0—50, 0—150	426—435
49	6/3	Ure I, 9½ miles SSE of U.	0—100, 0—200	436—443
50	—	Henningsvær I, 6 miles SWbW½W of H.	0—100, 0—140	444—450
51	10/3	Raftsundet	0—45	479—481
52	—	Risværflaket, outside the Øgsfjord	0—50, 0—150	455—460
53	11/3	Kanstadfjord III, inside the ridge	0—90	488
54	14/3	Øgsfjord I, at the head of the fjord	0—90	522—525
55	—	Øgsfjord II, at Halvarsø	0—200	526—531
56	16/3	Tranødybet, between Tranø and Lødingen	0—50, 0—100, 100—200, 200—300, 300—400, 400—500, 500—600	532—542
57	18/3	Tranødybet	0	544
58	20/3	Henningsvær II, 6 miles SbE½E of H.	0—100, 0—280	579—589
59	21/3	Værø, 7 miles SbW of Maahornet	0—100, 0—170	596—603
60	22/3	Røsthavet, 60 miles NW of Røst	0—100, 0—900	604—618
61	24/3	Røst I, outside R.	0—120	623—628
62	—	Røst II, outside R.	0—100	631—633

Nr.	Date	Name	Depth in metres	Corresp samples in tab
	1899			
63	25/3	Røst II, further in than Røst	0—150	640-
64	28/3	Tysfjord I, further in than Skarberget	0—100, 0—700	651-
65	29/3	Tysfjord II, further in than the Tysfjord church	0—100, 0—400	664-
66	—	Tysfjord I	0—50, 0—100, 100—200, 200—300, 300—400, 400—500, 500—600, 600—700	
67	1/4	Lille Molla	0	
68	4/4	Følstad, Østnesfjorden	0—3	688-
69	—	Helle, Østnesfjorden	0—3	692-
70	—	Brettesnes II	0—3	682-
71	—	Skroven	0—3, 0—150	697-
72	—	Høla, at Svolvær	0—3, 0—150	703-
73	10/4	Stene in Bø, Vesteraalen	0	
74	11/4	Gaukværø II, Vesteraalen	0—3, 0—250	748-
75	12/4	Malangen, off Stønnesbotn	0—100, 0—380	757-
76	13/4	Stønnesbotn	0—3	
77	—	Senjenhavet	0—80	7'
78	14/4	Malangen	0—3, 0—50, 50—100, 100—200, 200—300, 300—380	773-
79	19/4	Kvænangen I, betw. Spilderen and Kvænangstinderne	0—50, 0—160	783-
80	—	Kvænangen II, off Nøklen island	0—90	790-
81	20/4	Jøkelfjord, at the head of the fjord	0—3, 0—50, 0—100	794-
82	21/4	Jøkelfjord III, off the Tverfjord	0—90	799-
83	—	Kvænangen, between Spilderen and the northern mainland	0—100, 100—200, 200—300	803-
84	22/4	Hammerfest harbour	0—8	
85	23/4	Troldfjord, in Rolfsø	0—6	
86	24/4	Ingøhavet	0—100, 0—300	811-
87	25/4	Breisund	0—3	830-
88	26/4	Repvaag harbour, Porsangerfjord	0—10	
89	27/4	Porsangerfjord	0—75, 100—200	833-
90	1/5	Vardø	0—200	847-
91	3/5	Lyngen I, off Skibotn	0—100	861-
92	—	Lyngen II, off the Kaafjord	0—250	867-
93	—	Lyngen III, between Gamvik and Ulø	0—300	875-
94	5/5	Høla, Svolvær	0—150	885-
	1900			
95	20/3	Høla, Svolvær	0—50, 0—140	894-
96	—	Skroven, 1 mile SSE of S.	0—50, 0—100, 0—400	902-
97	—	Henningsvær, 2 3/4 miles off H.	0—50, 0—100, 0—200	914-
98	21/3	Strømmen at Henningsvær	0—60	929-
99	—	Balstad I	0—50, 0—100, 0—200	932-
100	—	Reine	0—110	957-
101	22/3	Tranødybet	0—600	961-
102	23/3	Østnesfjord I, at the head	0—25	981-
103	—	Østnesfjord II, between Vaterfjord and Følstad	0—130	983-
104	—	Østnesfjord III, off Helle	0—130	989-
105	26/3	Ørsnes	0—100	995-
106	—	Balstad	0—130	1004-
107	27/3	Reine	0—150	1009-
108	30/3	Vestfjord	0—25	
109	2/4	Skjerstadfjord II	0—100, 0—180	1025-
110	—	Skjerstadfjord IV	0—330	1031-
111	—	Skjerstadfjord V	0—420	1034-
112	3/4	Skjerstadfjord VII	0—490	
113	4/4	Skjerstadfjord XII	0—50, 0—100, 0—500	1047-
114	5/4	Misværfjord	0—25	
115	—	Seivaagen, Saltenfjord	0—20	
116	—	Saltenfjord II	0—50, 0—330	1056-
117	6/4	Foldenfjord	0—530	1067-
118	—	Foldenfjord I	0—100, 100—200, 200—300, 300—400, 400—500	1067-
119	7/4	Vestfjord, between Fladø and Skroven	0—50, 0—315	1079-

b. Plankton tables.

Date	12/1 1899		13/1						14/1		17/1					18/1	
Station	Helligvær		Vestfjord I			Vestfjord II			Mosken-strømmen		Reine	Stamsund		Henningsvær		Yttersiden	
Depth in metres	0—50	0—250	0—50	0—100	0—180	0—50	0—100	0—200	0—50	0—100	0—150	0—50	0—100	0—50	0—180	0—50	0—110
ı eggs																	
iphœa tarda																	
tiphanes norvegica																	
eophausia inermis											rr						
ısanoessa neglecta																	
— *longicaudata*			rr				rr										
eomysis arctica																	
nimysis abyssicola																	
gs and Larvæ of *Schizopoda*																	
athemisto oblivia													rr				
hemisto compressa																	
ıplii and *Cypris* of *Cirripedia*																	
choecia sp																	
anus finmarchicus	r	c	r	r	c	r	r	c		r	+	r	r		c	r	+
— *hyperboreus*																	
ıdocal. elongatus	r	r		r	+		r	r		+	r					r	
ridius armatus																	
— *tenuispinus*																	
hæta norvegica				rr									rr		rr		
olecithricella minor																	
ıora longicornis										rr							
tridia lucens		c		r	+	rr	r	+		r	r		rr	rr	r		r
— *longa*		r															
ıromamma robusta																	
terorhabdus norvegicus																	
ıdacia armata																	
rtia sp		r	r		r	r	r	r		r	r		r		r	r	r
hona similis	+	c	+	+	c	+	c	c	+	c	+	r	+	r	+	c	c
— *plumifera*					r		r	r	rr	rr			rr				rr
rosetella atlantica	r	+	+	+	r	r	r	r	r		r		r	r	r	+	+
æa conifera																	
ıng and Larvæ of *Copepoda*		+	+		+	r		+		+						r	
nacina balea								r		r							rr
væ of Gastropoda																	
— - *Pelecypoda*																	
opleura sp																	
tillaria sp								r									
honautes																	
væ of Echinodermata																	
— - *Polychæta*																	
etognata							rr										
lina sp																	
ıchnactis albida																	
ıulita sarsii																	
ysophora borealis																	

Date	19/1			21/1			23/1	24/1									
Station	Gaukværø			Senjen			Troms-øsund	Kvænangen I				Kvænangen II			Lyngen I		
Depth in meters	0—50	0—100	0—700	0—5	0—50	0—130	0—5	0—5	0—50	0—100	0—140	0—5	0—50	0—180	0—5	0—50	0—
Fish eggs																	
Pasiphæa tarda																	
Nyctiphanes norvegica																	
Boreophausia inermis																	
Thysanoessa neglecta																	
— *longicaudata*																	
Boreomysis arctica																	
Hemimysis abyssicola																	
Eggs and Larvæ of *Schizopoda*																	
Parathemisto oblivia																	
Euthemisto compressa											rr						
Nauplii and *Cypris* of *Cirripedia*																	
Conchoecia sp.			rr														
Calanus finmarchicus	r		rr			r		rr	r	+	c	cc	cc	cc	cc	cc	c
— *hyperboreus*																	
Pseudocal. elongatus						r	r			r	r			r	r		
Chiridius armatus																	
— *tenuispinus*																	
Euchæta norvegica																	
Scolecithricella minor																	
Temora longicornis																	
Metridia lucens											r	r		r			
— *longa*																	
Pleuromamma robusta																	
Heterorhabdus norvegicus																	
Candacia armata																	
Acartia sp.		r				r	r							rr			
Oithona similis	r	+	r		+	+	r		r	+	+	r	r	r	+	+	c
— *plumifera*					rr												
Microsetella atlantica				rr	rr	r	+		+	+	+	r	r	r	r	r	-
Oncæa conifera																	
Young and Larvæ of *Copepoda*																	
Limacina balea						rr											
Larvæ of *Gastropoda*																	
— - *Pelecypoda*																	
Oikopleura sp.										r				r			
Fritillaria sp.																	
Cyphonautes																	
Larvæ of *Echinodermata*																	
— - *Polychæta*																	
Chætognata		rr								rr	r			rr		rr	
Bolina sp.																	
Arachnactis albida																	
Cupulita sarsii							c										
Physophora borealis																	

$^{27}/_{1}$					$^{29}/_{1}$		$^{31}/_{1}$						$^{1}/_{2}$					$^{3}/_{2}$			
Lyngen II			Lyngen III		Malangen		Følstad		Helle		Høla		Henningsvær		Vestfjord		Skroven	Raftsund	Raftsund II		
50	0—100	0—250	0—50	0—200	0—100	0—300	0—50	0—135	0—50	0—150	0—50	0—150	0—50	0—100	0—50	0—200	0—300	0—50	0—100	0—200	0—260
				rr				rr													
				rr					rr	r					rr					rr	
							r	r	r	r	rr					rr			rr	+	r
	c	cc	r	c	r	r	r	c	r	c	r	+	+	+	r	cc	cc		+	c	c
		rr															rr			rr	r
	r	r		+	r	r	r	+		c	r	r		r					+	+	+
								rr		rr	rr					+	r			rr	
				rr																	
				+				r						+				rr			rr
		r		r																	rr
							r														
		r			r	r								r							rr
-	+	+	+	c	+	+	r	c	+	c	c	c	c		+	+	c	+	+	c	c
								rr						rr		rr	rr			rr	
	r	r	r	+	+	+	r	c	+	c	c	c	c	c	+	c	+	+	+	c	c
											rr										
						r														r	
					r	r															
																					rr
r	rr							rr				rr		rr	rr	rr				rr	rr
		+																			

Date	4/9					6/9				7/9								
Station	Skroven					Tranødybet				Ofoten I				Ofoten II			Rombaken I	Rc
Depth in meters	300—350	0—100	0—200	0—300	0—380	0—50	0—100	0—200	0—630	0—100	100—200	200—300	300—350	0—100	100—200	200—250	0—40	0—
Fish eggs																		
Pasiphæa tarda													rr					
Nyctiphanes norvegica																		
Boreophausia inermis																		
Thysanoessa neglecta																		
— *longicaudata*																		
Boreomysis arctica																		
Hemimysis abyssicola									+									
Eggs and Larvæ of *Schizopoda*																		
Parathemisto oblivia				rr	rr						rr	rr	rr	rr	rr	rr		
Euthemisto compressa																		
Nauplii and *Cypris* of *Cirripedia*																		
Conchoecia sp.	r	r		+	+				c	+	+		+					
Calanus finmarchicus	c	r	cc	cc	cc	+	+	c	cc	c	cc	cc	cc	c	cc	cc	rr	
— *hyperboreus*	r				+				+		rr	rr	c		r	+		
Pseudocal. elongatus	r				r					,r	+	+	+			+	r	
Chiridius armatus					rr													
— *tenuispinus*													rr					
Euchæta norvegica			r	r	+			+	rr		+	+	+	+	+	+		
Scolecithricella minor																		
Temora longicornis																		
Metridia lucens			rr	r	r													
— *longa*	r			rr	r				r			+	+		r	+		
Pleuromamma robusta					rr													
Heterorhabdus norvegicus													r		rr			
Candacia armata					rr													
Acartia sp.			r															
Oithona similis	+	+	c	c	c	+	+	+	+	+	c	+	+	c	c	+	c	
— *plumifera*			rr	rr	rr	rr			rr			rr		rr	rr	rr		
Microsetella atlantica	+	+	c	c	c	+	+	+	c	+	c	+	+	c	c	+	c	
Oncæa conifera				rr													rr	
Youngs and Larvæ of *Copepoda*																		
Limacina balea	r			r							r	r			r	r		
Larvæ of *Gastropoda*																		
— - *Pelecypoda*																		
Oikopleura sp.																		
Fritillaria sp.																	+	
Cyphonautes																		
Larvæ of *Echinodermata*																		
— - *Polychæta*																		
Chætognata	rr				rr			rr	r	rr	r	rr	r	rr	rr	rr		
Bolina sp.																		
Arachnactis albida																		
Cupulita sarsii																		
Physophora borealis																		

B. Remarks on the Observations.

a. The Vest Fiord and the Coast Sea.

The observations, made in the Vest Fiord in January 1899, oved that at that time a comparatively high temperature prevailed the surface of the water.

At Høla, near Svolvær, the surface temperature was 3°.3 C. January 11th, halfway between Grøtø and Skroven 4.4 was gistered on the surface and between Helligvær and Værø on the th of the month 4.6. About 4.0 was the surface temperature in oskenstrømmen, and on the fishinggrounds beyond Reine, Stamnd and Henningsvær.

The highest degree which was registered in January, and in ct the highest surface temperature which was registered during ie whole winter by this expedition was 5.9 ($^{19}/_{1}$) beyond Vesteralen, 40 miles NNW of Gaukværø.

Further, as a result of the observations in the Vest Fiord, it found that in the majority of places the maximum temperature not reached at the bottom. At the station in the middle of the ord between Grøtø and Skroven ($^{11}/_{1}$) the maximum (6.9) was at depth of 100 meters.

At the station at Helligvær ($^{12}/_{1}$) the maximum (7.6) was eached at a depth og 140—150 meters, and at the station between Helligvær and Værø the maximum 7.2—7.6 at a depth af 120—150 eters.

In the Lofot fishingbanks too, there was a less clearly defined aximum, for instance at Stamsund ($^{17}/_{1}$) 6.9 at 120 m., and on ie same day 6.7 at 120—150 m. at Henningsvær. On January 1st, the minimum at Høla was 2.5 on the surface, and the maximum 6.8 near the bottom at a depth of 150 meters. Corresponding onditions were noticed on the same day in the Østnes Fiord (Linds Bay, Følstad, Helle).

Also at Skroven on February 4th the maximum (7.1) was found t a depth of 150 meters, the bottom temperature being 6.3 (380 m.). n the deep off Tranø the maximum ($^{6}/_{2}$) was reached about 150 m. own, the bottom temperature being 6.3 at 630 meters.

In Øxsund ($^{17}/_{2}$) the highest temperature (6.9) was at a depth f 150 meters, and here too the temperature at 630 meters was 6.3.

Here are some instances from the Lofot fishing banks: —

/2. 16 miles SSW of Henningsvær.

Surface temperature 2.6, maximum 7.0 at depth of 120 mtrs., bottom temperature (260 mtrs.) 6.6.

/2. 12 miles EtS of Reine.

Surface 2.7, max. (120 mtrs.) 6.5, bottom temp. 6.2.

Hence it may be gathered that in the months of January and February, the maximum temperature was to be found at a depth of 120—150 meters. Towards the end of February this maximum will be found near the bottom over large portions of the fishing banks.

Observations on the Lofot banks in March show minimum on the surface, and, as a rule. maximum near the bottom at a depth of 150—200 meters.

At greater depths in the fiords a less clearly defined maximum could at the same time be traced at a depth of 150—200 meters. Measurements taken in April show a continued cooling of the upper layers, with a surface temperature of 1—2 at Henningsvær, Stene and Reine.

The section beyond Ingø ($^{24}/_{4}$ 1899) 71° 10′ N. 23° 10′ E showed minimum (3.2) on the surface, and maximum (3.8) at a depth of about 100 meters.

But on the other hand, from observations made off Nordkyn and Vardø ($^{1}/_{5}$) it was found that the temperature at these places was evenly disposed from the surface to the bottom.

On the first days of May there was no indication of any spring minimum, on the sea coast of Finmark nor in the Lyngen Fiord[1]. But when on May 5th I again took the temperatures at Høla near Svolvær the surface showed 2.65 and minimum (1.9) there had already reached a depth of 20 meters.

To give an idea of the changes in temperature and salinity in the course of the winter months, a table of observations made at Gaukværø off Vesteraalen is subjoined.

$^{18}/_{1}$ 1899	68° 35′ N.	14° 13′ E.	$^{11}/_{4}$ 1899	68° 34′ N.	14° 17′ E.
Depth in meters	Temperature C°.	Salinity ‰	Depth in meters	Temperature C°.	Salinity ‰
0	4.1	33.56	0	2.85	34.17
10	4.4	33.56	20	2.65	34.17
20	4.5	33.56	50	2.70	34.17
30	4.5	33.56	80	3.2	34.29
80	5 6	34.04	100	4.0	34.49
150	6.9	34.27	120	4.4	34.60
250	7.1	34 38	150	4.6	34.74
			200	5 05	34.79
			250	5.2	34.86

[1]) At Lyngen III (cf. no. 875—884) there is, however, a minimum at depth of 20 m.

Nr.	1900 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents		
						Cl. per litre	Salt per litre	Salt per mille
	March		Metres	Metres	C⁰			
937	21	Balstad I.		100	6.2	19.69	35.62	34 72
938				120	6.2?	19.70	35.64	34.74
939				150	6.6	19.82	35.68	34.94
940				180	6.6	19.96	36.11	35.18
941				200	6.6	19.96	36.11	35.18
942		Balstad II.	110	0	2.95	19.32	34.95	34.09
943				20	2.8	19.34	34.99	34.12
944				50	2.8	19.39	35.08	34.21
945				80	3.45	19.39	35.08	34.21
946				100	3.1	19.32	34.95	34.09
947		Balstad III.		0	2.95	19.32	34.95	34.09
948				50	2.80	19.32	34.95	34.09
949				70	2.85	19.32	34.95	34.09
950				80	3.85	19.36	35.03	34.16
951				100	2.85	19.36	35.03	34.16
952		Nufsfjord.	125	0	3.05	19.29	34.90	34.04
953		$6^1/_2$ miles SSO of N.		50	2.95	19.29	34.90	34.04
954				80	2.95	19.32	34.95	34.09
955				100	2.95	19.39	35.08	34.21
956				120	3.0			
957		Reine.	112	0	2.95	19.32	34.95	34.09
958				50	2.85	19.32	34.95	34.09
959				80	2.85	19.32	34.95	34.09
960				100	4.2	19.39	35.08	34.21
961	22	Tranødybet.	620	0	2.7	19.32	34.95	34 09
962		Between Tranø and Lødingen.		50	2.75	19.32	34.95	34.09
963				80	2.75	19.32	34.95	34.00
964				100	2.7	19.32	34.95	34.09
965				120	2.65	19.32	34.95	34 09
966				150	2.7	19.32	34.95	34.09
967				180	2.8	19.52	35.31	34.43
968				190	6.25	19.75	35.73	34.83
969				200	5.5	19.75	35.73	34.83
970				250	6.25	19.75	35.73	34.83
971				400	6.3	19.91	36.02	35.10
972				500	6.3	19.91	36.02	35.10
973				600	6.3	19.91	36.02	35.10
974		Øgsfjord.	195	0	2.05	19.22	34.77	33.92
975		At the mouth.		20	2.2	19.24	34.81	33.95
976				50	2.3	19.24	34.81	33.95
977				80	2.35	19.24	34.81	33.95
978				100	2.35	19.24	34.81	33.95
979				150	2.4	19.24	34.81	33.95
980				190	2.6	19.27	34.86	34.00
981	23	Østnesfjord I.	27	0	2.1	19.22	34.77	33.92
982		At the head of the fjord.		20	2.35	19.24	34.81	33.95
983		Østnesfjord II.	135	0	2.3	19.22	34.77	33.92
984		Between Vaterfjord		20	2.3	19.22	34.77	33.92
985		and Følstad.		50	2 5	19.24	34 81	33.95
986				80	2.9	19.24	34.81	33.95
987				100	3.45	19.32	34.95	34.09
988				130	5.75	19.36	35.03	34.16
989		Østnesfjord III.	135	0	2.35	19.22	34.77	33.92
990		Abreast of Helle		20	2.45	19.22	34.77	33.92
991				50	2.6			
992				80	2.65	19.24	34.81	33.95
993				100	3.2	19.36	35 03	34.16
994				130	4.4			
995	26	Ørsnes.	105	0	2.8	19 39	35.08	34.21
996				50	2.8	19.39	35.08	34.21
997				80	2.8	19.39	35.08	34.21
998				100	4.7	19.50	35.28	34.39
999		Henningsvær.	160	0	2.7	19.32	34.95	34.09
000				50	2.8	19.32	34.95	34.09
001				80	2.8	19.40	35.01	34.23
002				100	4.3	19.46	35.21	34.33
003				140	4.65	19.54	35.35	34.45
004		Balstad.	135	0	2.8	19.32	34.95	34.09
005				50	2.8	19.32	34.95	34.09
006				80	3.3	19.54	35.35	34.47
007				100	4.5	19.57	35.40	34.52
008				130	4.0	19.57	35.40	34.52
009	27	Reine.	170	0	2.55	19.36	35.03	34.16
010				50	2.8	19.40	35 01	34.23
011				80	2.9	19.40	35.01	34.23
012				100	4.6	19.54	35.35	34.47
013				150	6.3	19.75	35.73	34.83
014	30	Landego.	450	0	3.25	19.57	35.40	34.52
015		67°22′ N.,		50	3.95	19.50	35.27	34.39
016		3°19′ E.		100	3.65	19.54	35.35	34.47
017				120	4.3	19.64	35.53	34.64

Nr.	1900 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline co	
						Cl. per litre	Salt per litre
	March		Metres	Metres	C⁰		
1018	30	Landego.		150	5.3	19.66	35.57
1019				200	5.9	19.90	36.00
1020				260	6.0	19.90	36.00
1021				300	6.05	19.93	36.04
1022				400	6.2	19.93	36.04
1023				450	4.0?		
1024		Arnø.	410	400	6.55	19.96	36.11
		67°11′ N.,					
	April	3°15′ E.					
1025	2	Skjerstadfjord II.	185	0	2.5	19.11	34 58
1026				50	3.25	19.18	34.70
1027				80	3.5	19.19	34.72
1028				100	3.5	19.21	34.75
1029				150	3.2	19.26	34.85
1030				185	3.35	19.26	34.85
1031		Skjerstadfjord IV.	330	250	3.2	19.29	34.90
1032				300	3.2	19.29	34.90
1033				330	3.15	19.29	34.90
1034		Skjerstadfjord V.	420	0	2.4	19.18	34.70
1035		Off Kvænflaaet.		20	2.45	19.18	34.70
1036				50	3.4	19.18	34.70
1037				80	3.55	19.21	34.76
1038				100	3.5	19.21	34.76
1039				150	3.3	19 26	34.85
1040				200	3.2	19.26	34.85
1041				250	3.2	19.27	34.86
1042				300	3.15	19.29	34.90
1043				400	3.15	19.32	34.95
1044		Skjerstadfjord III.	230	200	3.2	19.26	34.85
1045		Skjerstadfjord VII.	480	400	3.2	19.32	34.85
1046		Off Fauske.		475	3.15	19.32	34.85
1047	4	Skjerstadfjord XII.	515	0	2.3	19.11	34.58
1048		Off Skjerstad		20	2.7	19.11	34.58
1049		church.		50	3.45	19.18	34.70
1050				100	3.4	19.24	34.81
1051				150	3.3	19.26	34.85
1052				200	3.25	19.26	34.85
1053				300	3.2	19.29	34.95
1054				500	3.15	19.32	34.95
1055		Skjerstadfjord XIV.	400	400	3.05	19.32	34.95
1056	5	Saltenfjord II.	320	0	3.2	19.33	34.97
1057		67°14′.5 N.,		20	3.15	19.33	34.97
1058		14°26′ E.		50	3.1	19.33	34.97
1059				60	3.6	19.54	35.35
1060				80	4.4	19.62	35.49
1061				100	5.0	19.73	35.69
1062				120	5.9	19.76	35.75
1063				150	6.2	19.82	35.86
1064				200	6.55	19.89	35 98
1065				250	6.65	19.93	36.05
1066				320	6.65	19.93	36.05
1067	6	Foldenfjord I.	530	0	3.2	19.33	34.97
1068		67°37′ N.,		20	3.1	19.33	34.97
1069		15°2′ E.		50	3.1	19.46	35.21
1070				80	4.2	19.46	35.21
1071				100	4.15	19.50	35.28
1072				120	5.55	19.78	35.78
1073				150	6.4	19.91	36.02
1074				200	6.6	19.78	35.78
1075				250	6.6	19.82	35.86
1076				300	6.6	19.82	35.86
1077				400	6.55	19.92	36.04
1078				500	6.55	19.85	35.91
1079	7	Vestfjord.	315	0	2.85	19.31	34.94
1080		Between Fladø and		20	2.8	19.33	34.97
1081		Skroven.		50	3.6	19.38	35.06
1082				60	4.55	19.60	35.46
1083				80	5.65	19.63	35.51
1084				100	6.4	19 63	35 51
1085				120	6.45	19.83	35 87
1086				150	6.45	19.85	35.91
1087				200	6.5	19 90	36.00
1088				250	6.5	19.90	36.00
1089				300	6.5	19.92	36.04
1090		Høla.	150	0	2.95	19.25	34.33
1091		At Svolvær.		10	2.55	19.25	34.33
1092				20	2.5	19.32	34.95
1093				50	2.5	19.34	34.99
1094				80	2.75	19.25	34.83
1095				100	3.95	19.51	35.30
1096				120	4.95	19.57	35.40
1097				150	5.85	19.78	35.80

8/2			9/2		13/2						16/2	17/2							18/2		
Rombaken III			Skjom. I	Ofotenfj.	Skroven				Strøm. I	Strøm. II	Raftsund	Øxsund							Sagfjord		
-100	100—200	200—300	0—40	500—550	0—50	0—100	0—200	0—250	0—80	0—30	0—275	0—100	0—150	150—250	250—350	350—450	450—550	550—620	0—50	0—100	0—20
															rr						
											rr										
		rr		+		rr		rr				r	rr		rr	rr	rr	rr			
				c								r	+	+	+	+	+	+			
+	c	cc	rr	c	r	+	c	cc	r	rr	c	cc	cc	cc	c	+	+	+	+	c	c
		+		+				r						rr	+	+	+	rr			
+	+					r	r						r	r	r	r					
																	rr				
							+					r	+	+	+	r	r	rr			r
												rr									
		rr					rr	r				rr	r	rr	rr						
		r		r									r	r	+	r	r	rr			
														rr		rr	rr				
								rr	rr												
+	c	+	+		r	c	+	c	+	r	c	c	c	c	c	+	c	r		+	c
								rr				r	+		rr						
+	+	r			r	r	r	+	+	r	+	c	c	c	c	+	c	c	r	+	c
														rr	rr						
		r		r								rr	rr	rr	rr	rr	rr	rr			

Date	18/2	21/2				1/3					3/3	4/3		6/3			
Station	Sagfj. II	Henningsvær I	Henningsvær III			Evenstad I		Evenstad II		Moskenstrøm	Kirkfj. I	Reine I		Ure I		Henningsv I	
Depth in meters	0—300	0—85	0—100	0—200	0—250	0—50	0—150	0—100	0—200	0	0—100	0—50	0—150	0—100	0—200	0—100	0—
Fish eggs													rr				
Pasiphæa tarda																	
Nyctiphanes norvegica																	
Boreophausia inermis																	
Thysanoessa neglecta																	
— longicaudata														rr	rr		
Boreomysis arctica																	
Hemimysis abyssicola																	
Eggs and Larvæ of Schizopoda																	
Parathemisto oblivia				rr	rr		rr						rr			rr	r
Euthemisto compressa																	
Nauplii and Cypris of Cirripedia																	
Conchoecia sp.																	
Calanus finmarchicus	c	+	+	c	cc	+	c	r	c		r	r	c	r	c	c	cc
— hyperboreus	r				r												
Pseudocal. elongatus		r		r	r		r	r	r							r	+
Chiridius armatus																	
— tenuispinus																	
Euchæta norvegica	r			r	r				rr								r
Scolecithricella minor																	
Temora longicornis																	
Metridia lucens		r					rr										
— longa	r																rr
Pleuromamma robusta																	
Heterorhabdus norvegicus																	
Candacia armata																	
Acartia sp.							rr										
Oithona similis	c	c	+	c	c	rr	c	r	+		cc	c	c	c	+	+	+
— plumifera	rr		rr	rr	rr	rr	r										
Microsetella atlantica	c	c	+	c	c		+	r	+		c	c	+	+	+	+	+
Oncæa conifera																	
Young and Larvæ of Copepoda																	
Limacina balea																	
Larvæ of Gastropoda																	
— - Pelecypoda																	
Oikopleura sp.																	
Fritillaria sp.																	
Cyphonautes																	
Larvæ of Echinodermata																	
— - Polychæta																	
Chætognata				rr	rr						r						
Bolina sp.																	
Arachnactis albida										+							
Cupulita sarsii										c							
Physophora borealis										+							

	10/3		11/3	14/3		16/3							18/3	20/3		21/3		22/3		24/3	
t- d	Risværflaket		Kanstadfj. III	Øgsfj. I	Øgsfj. II	Tranødybet								Henningsvær II		Værø		Røsthavet		Røst I	Røs II
45	0—50	0—150	0—90	0—90	0—200	0—50	0—100	100—200	200—300	300—400	400—500	500—600	0	0—100	0—280	0—100	0—170	0—100	0—900	0—120	0—1
														+	+	rr				+	r
							rr			rr		rr			rr						
																			rr		
																				+	
								+	c	+	+	+									
	c	+	+		c	cc	c	r	r	+	r	r		c	c	+	c	c	c	c	+
									+	r	r	r									
		r		c	+	+	+	r		r		r							r		
						r	r	+	+		r	r		r							
															rr					rr	
								rr		rr	rr	rr									
								rr													
																		rr			rr
	+	+	c	c	+	c	c	+	+	r	r	r	rr	+	+	r	+	+	+	+	+
	rr						rr	rr			rr							rr			
	+	+	c		+	+	+	+	+	r	r	r		+	+	r	+	r	r	+	+
																				rr	
						rr	rr		r	rr	r	+		rr	rr						

Date	25/3	28/3		29/3									1/4			
Stations	Røst II	Tysfjord I		Tysfjord II		Tysfjord I							Lille Molla	Følstad	Helle	I te
Depth in meters	0—150	0—100	0—700	0—100	0—400	0—50	0—100	100—200	200—300	300—400	400—500	500—600	600—700	0	0—3	0—3	0
Fish eggs	+													c	r		
Pasiphœa tarda									rr								
Nyctiphanes norvegica																	
Boreophausia inermis																	
Thysanoessa neglecta																	
— *longicaudata*																	
Boreomysis arctica																	
Hemimysis abyssicola																	
Eggs and Larvæ of *Schizopoda*																	
Parathemisto oblivia			r				rr	rr									
Euthemisto compressa																	
Nauplii and *Cypris* of *Cirripedia*																	
Conchoecia sp.			+				r	+		c	+	+	+				
Calanus finmarchicus	c	+	c	+	c	c	c	+	rr	rr	rr	rr	rr				
— *hyperboreus*			+		+	+	+	+	+	+	r	rr					
Pseudocal. elongatus			r	r													
Chiridius armatus																	
— *tenuispinus*																	
Euchæta norvegica		r	+		r		+	+	rr		rr		rr				
Scolecithricella minor																	
Temora longicornis																	
Metridia lucens																	
— *longa*			r					rr	rr	r			rr				
Pleuromamma robusta																	
Heterorhabdus norvegicus			rr									rr	rr				
Candacia armata																	
Acartia sp.																	
Oithona similis	+	+	+	r	r	+	r	+			r	r					
— *plumifera*																	
Microsetella atlantica	+	+	+	r	+	r	+	+		r	r	rr	rr				
Oncœa conifera																	
Young and Larvæ of *Copepoda*							cc	c		r		r	+				
Limacina balea																	
Larvæ of *Gastropoda*																	
— - *Pelecypoda*																	
Oikopleura sp.																	
Fritillaria sp.																	
Cyphonautes																	
Larvæ of *Echinodermata*																	
— - *Polychæta*							+										
Chætognata			+				r	+		+	+	+	+				
Bolina sp.																	
Arachnactis albida																	
Cupulita sarsii																	
Physophora borealis																	

				10/4	11/4		12/4		13/4		14/4						19/4			20/4		
kroven		Høla		Stene	Gaukværø II		Malangen		Stønnesbotn	Senjenhavet	Malangen						Kvænangen I		Kvæn. II	Jøkelfjord		
3	0—150	0—3	0—150	0	0—3	0—250	0—100	0—380	0—3	0—80	0—3	0—50	50—100	100—200	200—300	300—380	0—50	0—160	0—90	0—3	0—50	0—100
	c	r	c														rr			c	r	r
							+		rr													
																rr						
							+	+		+	+	+	+	+	+	r						
				r			r	r						rr	rr	rr	r		r			
	c		c		rr	rr				c			rr	r			+	+	c		+	+
			rr																		rr	
																r		r	r		c	c
								rr							+	+						
	r		r																			
																						rr
	r														rr	rr					c	+
	+									+		rr		rr			+	+	+		+	+
																rr						
	c		r				rr							r	r		r	r	r		c	c
	+	c								+									rr			rr
																	+	+	+			
										r									r			
																	+	+	+			
																					rr	
																					r	
																					c	+

Date	21/4				22/4	23/4	24/4		25/4	26/4	27/4		1/5	3/5			
Station	Jøkelfjord III	Kvænangen			Hammerfest	Troldfjord	Ingøhavet		Breisund	Repvaag	Porsangerfj.		Vardø	Lyngen I	L. II	L. III	H
Depth in meters	0—90	0—100	100—200	200—300	0—8	0—6	0—100	0—300	0—3	0—10	0—75	100—200	0—200	0—100	0—250	0—300	0—
h eggs					rr				rr		rr						
siphœa tarda																	
ctiphanes norvegica																	
reophausia inermis																	
ysanoessa neglecta																	
— *longicaudata*																	
comysis arctica																	
mimysis abyssicola																	
gs and Larvæ of *Schizopoda*								r			r		c				
rathemisto oblivia																	1
themisto compressa																	
uplii and *Cypris* of *Cirripedia*		+			+	+							+				–
ichoecia sp.																	
lanus finmarchicus		+	r		rr								+			rr	c
— *hyperboreus*																	+
udocal. elongatus	+	+		r	r												
iridius armatus																	
— *temispinus*																	
chæta norvegica																	1
olecithricella minor		r															
mora longicornis																	
tridia lucens	rr		rr		rr												
— *longa*															rr		
euromamma robusta																	
eterorhabdus norvegicus																	
ndacia armata																	
artia sp.																	
thona similis		r	r										r			r	1
— *plumifera*							rr										
icrosetella atlantica	c	r	r	r	r	r						rr		rr			r
icœa conifera																	
ung and Larvæ of *Copepoda*													c		+		c
macina balea																	
rvæ of *Gastropoda*																	
— - *Pelecypoda*																	
kopleura sp.			r		r											rr	
itillaria sp.																	
phonautes																	
rvæ of *Echinodermata*																	r
— - *Polychæta*		r			+	r				r							+
ætognata			rr														
olina sp.					r												
achnactis albida																	
pulita sarsii		r			c												
hysophora borealis																	

$^{20}/_{3}$ 1900								$^{21}/_{3}$					$^{22}/_{3}$	$^{23}/_{3}$			$^{26}/_{3}$		$^{27}/_{3}$	$^{30}/_{3}$	$^{2}/_{4}$	
Hola		Skroven			Henningsvær			Strom-men	Balstad I			Reine	Tranø-dybet	Østnesfjord I	II	III	Ørs-nes	Bal-stad	Reine	Vestfj.	Skjerstad	
-50	0—140	0—50	0—100	0—400	0—50	0—100	0—200	0—60	0—50	0—100	0—200	0—110	0—600	0—25	0—130	0—130	0—100	0—130	0—150	0—25	0—100	0—
	r	rr	r		r	+	+	r		rr		cc		r			c		cc			
													r									
				rr																		
								r							r					r	+	
				+									c		+							
		+	+	c	+	+	+	r	r	+	+	c	c				r	+	+			
			rr	+									+									
	r		r	r	r	r	+	+	r	r	+	r	+		+	+		r	r		r	
			rr	+		rr	rr	rr		rr	+	rr	+		rr			rr	rr			
								rr														
				rr									r									
				rr																		
+	c	+	+	+	r	r	r	+	r	r	+	+	c		c	+	c	+	+		c	
											rr						rr					
+	c	+	+	+	r	r	r	+	r	r	+	+	c		c	c	c	+	+		c	
																					rr	
+	+	r	+	c	c	c	c	+	+	+	+	c	c		+	c	c	c	cc		+	
																				r		
r	r	r	r			r	r	r					r	r	+		r		r			
								r				r	r	r	+	+	+	r	r			
				rr									+									

Date	2/4		3/4	4/4			5/4				6/4						7/4	
Station	Skjerstadfj. IV	S. V	S. VII	S. XII			Misværfj.	Seivaag	Saltenfj. II		Folden	Foldenfj. I					Vestfjor	
Depth in meters	0—330	0—420	0—490	0—50	0—100	0—500	0—25	0—20	0—50	0—330	0—530	0—100	100—200	200—300	300—400	400—500	0—50	0—
Fish eggs											r	r						
Pasiphæa tarda		rr																
Nyctiphanes norvegica																		
Boreophausia inermis																		
Thysanoessa neglecta																		
— longicaudata																		
Boreomysis arctica																		
Hemimysis abyssicola																		
Eggs and Larvæ of *Schizopoda*	+										r	r			r			
Parathemisto oblivia						rr					rr							
Euthemisto compressa																		
Nauplii and *Cypris* of *Cirripedia*	r		r	r	r	r		+	r	+		+						r
Conchoecia sp.	+	+	+		r	r					c	rr			+	+		
Calanus finmarchicus	r	r	rr	r	r	r			rr	r	r	+			rr	rr	r	
— hyperboreus	r	+	r	rr	r	+				r	+	+		rr	r	r	r	+
Pseudocal. elongatus	+	+		+	+	+						+	r					
Chiridius armatus																		
— tenuispinus																		
Euchæta norvegica	rr	rr	rr		rr					rr	r	rr	rr	rr	rr	rr		
Scolecithricella minor																		
Temora longicornis																		
Metridia lucens																		
— longa	r	r	r			r					r	rr			rr	rr		
Pleuromamma robusta																		
Heterorhabdus norvegicus														rr	r	r		
Candacia armata																		
Icartia sp.																		
Oithona similis	c	c	r	r	+	+	r	r		r	+	+	r		r			
— plumifera																		
Microsetella atlantica	c	c		+	+	+	+	r		r	+	+	r			rr		r
Oncæa conifera	rr	rr	rr	rr	rr	rr	rr											
Young and Larvæ of *Copepoda*	c	c	r	c	c	c	c	+	+	+	+	c	r		r	r		r
Limacina balea																		
Larvæ of *Gastropoda*																		
— - *Pelecypoda*																		
Pleurobrachia sp.																		
Fritillaria sp.																		
Physonautes																		
Larvæ of *Echinodermata*	r									r	r							
— - *Polychæta*		r				r	r	+	+			r						
Chætognata	c	c	r			r					c		rr		r	cc		
Bolina sp.																		
Parachnactis albida																		
Tupulita sarsii																		
Physophora borealis																		

c. Remarks on some Plankton Forms.

Pisces.

Eggs and Larvæ.

In March and April 1896, fish spawn was regularly found ıe plankton on the Lofoten banks. That the greater part of belonged to cod was, I consider, unquestionable. In 1897, fish n was also noticed from $^{17}/_{2}$ to $^{1}/_{5}$[1]). In 1899, a considerable tity of fish eggs was to be seen in the sea at Vest Lofoten, [arch 20th and on April 1st a mass of fish eggs was seen on East Lofoten banks. Also in 1900, fish spawn was noticed in atter half of the month of March.

Particularly in 1897 several samples containing spawn were ined. Various sizes were found, right up to a diameter of ım.; but the diameter of the majority was about 1.3 mm., which s that most of it was cod spawn. We also got a few cod ; in the tow net, as for instance on $^{1}/_{4}$ 1897 on the fishing ıd at Reine. The characteristic pigment bands left no room loubt that we really had caught larvæ of cod — their length about 3.5 mm. It was quite remarkable how seldom one came a sterile egg. One cannot, however, because of this fact con- that fertilization was carried out in a particularly effective way, d one can hardly exercise any control over this in the open For cod spawn is doubtless subject to the same law as for ıce, salmon spawn, which dies pretty quickly if it has not been ized. Some cod eggs were put into a glass of sea water, it was seen that the eggs fell to the bottom as soon as they In the open sea also, the dead eggs without doubt sink to ıottom, so that it is not possible to gain a correct idea of the iveness of fertilization by counting the eggs capable of devel- nt which are found in the water.

Respecting the spawning of the skrei (*Gadus callarias* L.) ence should be made to HJORT's book „Fiskeri og Hvalfangst" ery and Whale Catching), page 37 *et seq.*

Decapoda.

Pasiphæa tarda, KRÖYER.

By tow-netting, I have only obtained young individuals of this es. Quite rarely, single specimens have been found.

$^{7}/_{2}$ 1899. Ofoten I, 300—350 mm., 1 specimen, length 27 mm.[2])
$^{29}/_{3}$ 1899. Tys Fiord I, 200—300 m., 1 specimen, length 26 mm.
$^{2}/_{4}$ 1900. Skjerstad Fiord V, 0—420 m., 1 specimen, length 33 mm.
$^{25}/_{11}$ 1902. The By Fiord, Bergen, 250—450 m., 1 specimen, length 12 mm.

I made the following notes about the specimen from Ofoten:— , quite transparent, brown eyes and a reddish tail appendix. In „Bidrag til Kundskab om Christiania Fjordens Fauna" (Con- tion to a Knowledge of the Fauna in The Kristiania Fiord) ARS describes the young of this species (p. 56—63, fig. 81—90). were taken near Skroven in Lofoten by G. O. SARS and the est was 10 mm. in length.

As far as I can see, G. O. SARS was the first to observe t pelagic habits of this species. In „Crustacea II" from the Nor North Atlantic Expedition (1876—78) he says (page 11): „Mea while, though the specimens in question all came up in the tra from very considerable depths, reaching 1760 fathoms, yet the anin may, considering its obviously pelagic habits, have entered the tra in some of the higher strata, during the upward passage of t apparatus." The expedition above mentioned also took its spe mens of *Pasiphæa* with a trawl at the stations 33, 213 and 29 Of these stations 33 is in the southern part of the North Ocea 213 about halfway between Jan Mayen and Norway and 295 (L 71° 59′ N., Long 11° 40′ E.) is somewhat further north and ea It is easier now with the improved apparatus for pelagic fishing catch the animal. It appeared in considerable numbers in the Nor Ocean[1]). With regard to the distribution of this species in the fiords Norway, it may be mentioned that it has been found from T Kristiania Fiord up to Lofoten, but its distribution is now known be extended over a larger area. In April 1899, I took specime with a trawl in The Malang Fiord from a depth of 380 m. There no doubt that it is rather common in certain other fiords. For stance, I have often seen it in the stomach of *Macrurus rupestr Spinax niger* and *Gadus virens* from The Herlø Fiord near Berge The young individuals of this species mentioned as being taken The Ofot, Tys and Skjerstad Fiords were all caught in the mont February—April. Although it is not stated, it is likely that G. SARS took the young stages on which M. SARS has based his d scription, also sometime during the early spring months, for G. SARS was, in the years mentioned, making winter researches in Lofot

One would be inclined to think that about the middle of t winter is the time of propagation for this species. It is, howev reasonable to suppose that the propagation stretches over a peri of several months. In the stomach of *Spinax niger* from The He Fiord, I found $^{16}/_{7}$ 1897 a female with large eggs attached.

Another *Pasiphæa* female with eggs was found in the stoma of a *Gadus virens* from The Herlø Fiord $^{12}/_{6}$ 1902.

KRÖYER based his original description on specimens from Gree land, and the species is also said to be found on the east co of North America.

Schizopoda.

Nyctiphanes norvegica, M. SARS.

As is the case with *Pasiphæa tarda*, this is a plankton for which it is difficult to catch in small tow-nets. A large numb of my specimens have been taken in a trawl. Here is a list the various places in which they have been found.

$^{10}/_{2}$ 1897.	Sunderø (Vesteraalen), several specimens in the stoma of *Gadus virens*.			
$^{31}/_{1}$ 1899.	Helle (Østnes Fiord),	0—120 m.	1 jun.	(tow-net)
$^{16}/_{2}$ —	Raftsund	0—275 m.	rr	—
$^{31}/_{1}$ —	Følstad, (Østnes Fd.),	0—135 m.	rr	—

[1]) Cf. NORDGAARD, „Contribution to the Study of Hydrography and Biology Coast of Norway". Tables 2, 4 a, 4 b.

[2]) Measured from the point of the rostrum to the tip of the tail.

[1]) Cf. HJORT, „Fiskeri og Hvalfangst" (Fishery and Whale Catching), p.

/3	1899.	In Sea N. W. of Røst,	0—500 m. r	(trawl).
/4	—	Gaukværø II,	0—250 m. rr	—
/4	—	Kvænangen	0—340 m. rr	—
/4	—	In Sea off Ingø,	0—300 m. rr	—

I have specimens from the following places on the west coast Norway: —

/4	1897.	The Fiord outside Bergen in the stomach of *Gadus virens.*		
/1	1899.	Herlø Fd.,	0—400 m. *jun.* rr	(tow-net).
/1	—	On the coast off Herlø,	0—150 m. —	—
/9	—	The Norw. Channel off the Kors Fiord.	—	—
/5	—	The Herlø Fiord, in the stomach of *Gadus virens.*		
/9	—	The Hjelte Fiord about 100 m. rr (tow-net).		
/11	—	Hennø in the „skjærgaard" beyond Bergen in the stomach of *Gadus virens.*		

On NANSEN's „Fram" expedition, a single specimen was taken 1 May 22nd 1894.[1])

On the Norw. North Atl. Exp. (1876—78) this species was)ticed at most of the stations.

G. O. SARS writes[2]): „The present beautiful species was obser-ed on the expedition in several localities, at a considerable distance om the coast, swimming about on the surface of the water, as a ıle, however exclusively young individuals. At one of the stations St. 75) west of the Namsen Fiord, the animal occurred in such rofusion that the sea in some localities had a peculiar brownish nt." Professor SARS also mentions the species from the Kristi-nia, the Hardanger and the Vest Fiords.

AURIVILLIUS[3]) has observed it in the surface layers of the kagerack in August, and in the Gulmar Fiord towards the end f November. In the months of August and September, the spe-imens he obtained were generally found rather deep down.

The species is distributed from the Arctic Ocean to the coast f Portugal, and from Greenland to Massachusetts Bay.

C. KOELBEL[4]) states the length of the largest specimen caught t Jan Mayen to be 36 mm. My largest specimen, taken in the ea off Ingø in Finmark, has precisely the same length; the largest pecimen from the Herlø Fiord, near Bergen, was 32 mm.

Boreophausia inermis, KRØYER.

This species constitutes, as is well known, the principal food f the coal-fish and plankton eating whales. I will therefore give complete account of the observations I have been able to make especting the distribution of this animal.

/2	1897.	Svolvær (Lofoten), in the stomach of *Gadus callarias*	+
/2	—	Øgs Fiord, 0—150 m. (tow-net)	r
—	—	Between Barø and Lødingen, 0—200 m. (tow-net)	r
/3	—	Svolvær in the stomach of *Gadus callarias*	c
/3	—	Østnes Fd. at various places, 0—120 m. (tow-net)	+
—	—	Raftsund, Trold Fd., Grund Fd. —	r
/3	—	Reine, in the stomach of *Gadus callarias*	+
/1	1899.	Reine, (Lofoten), 0—150 m. (tow-net)	rr
/1	—	8 miles S. E. of Reine —	rr
/1	—	Lyngen III, 0—200 m. —	rr
/1	1899.	Helle (Østnes Fd.), 0— 50 m.	(tow-net).
/2	—	Vest Fiord, 0— 50 m.	—
/2	—	Raftsund, 0—200 m.	—
/4	—	Stene, (Lofoten) 100—200 m.	—
/4	—	Malang Fiord, 0 m.	—
/4	—	Stønnesbotn 0— 3 m.	—
/4	—	Sea off Ingø, 0—300 m.	(trawl)
/3	1900.	Henningsvær I, 0—140 m.	(tow-net) *jun.*
/3	—	Beier Fiord, 0—150 m.	(trawl)

The contents of the stomachs of coal-fish which were cau in the Porsanger Fiord[1]) in the summer of 1898, were for the m part composed of this species.

The presence of *Boreophausia inermis* along the coast of B gen is also satisfactorily ascertained, a large quantity having b found in the stomachs of young coal-fishes caught off Hennø /11 1902.

But it is not certain if the species is to be met with annua on this coast.

AURIVILLIUS mentions the species in the Skagerack, and N MAN[2]) gives Banff, Shetland, Moray Firth and Clyde district places where it is found. The species is observed from Spitzberg to the Skagerack and England, as well as from Greenland al the east coast of North America to about 42° N. The larg specimens I have found (in the Malang Fiord) were 25 mm. lo

Boreophausia raschi, M. SARS.

This species is distinguished from the foregoing by a toothl projection on the sides of the carapace. The dorsal tooth, howev in front of telson is missing in *raschi.*

I have only found this species once, and that was at Hell the Østnes Fiord, (5/3 1897, 0—120 m.).

It is known from the Kristiania Fiord (M. and G. O. SA The latter also mentions having ocasionally found the species the west coast of Norway. It is also known from Greenland Great Britain, a list of places where it has been found has b given by NORMAN[3]) and T. SCOTT.[4])

Thysanoessa neglecta, KRØYER.

There was no example of this species among the specim taken in 1899—1900, but on 5/3 1897 I found it in the Øst Fd., plankton 0—60 m. It was also found in the stomach of oce cod (*skrei*) which was fished at Svolvær 10/3 1897.

G. O. SARS mentions having taken the species in the Var ger Fiord.

I have the following notes from the west coast of Norway

30/1	1900.	The Hjelte Fiord, 0—220 m. tow-net
18/10	1902.	Manger, in the stomach of *Clupea harengus*
10/11	1902.	Hennø, in the stomach of *Gadus virens jun.*

The species is known from Greenland, (H. I. HANSEN) Siberian coast (BRANDT), N. E. America. (S. I. SMITH), besi NORMAN and T. T. SCOTT have mentioned several places on British coast where it has been found.

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[1]) G. O. SARS, Crustacea, p. 13. The Norw. North Polar Exped. 1893—1896.

[2]) Crustacea II. The Norw. North Atl. Exp. 1876—78, p. 12.

[3]) Die Plankton Fauna des Skageraks, p. 74. Kgl. Svenska Vet. Akad. Handl. 30, N. 3.

[4]) Die Oesterreichische Polarstation Jan Mayen. Beobactungs-Ergebnisse, III B. p. 48.

[1]) SPARRE-SCHNEIDER have taken specimens at Kvænangen.

[2]) British Schizopoda of Families Laphogastridæ and Ephausiidæ. Ann. Nat. Hist., S. 6. Vol. IX, p. 461.

[3]) British Schizopoda, p. 462.

[4]) On the Distribution of Pelagic Invertebrate Fauna of the Firth of F and its vicinity. Part III. Sixteenth Annual Report of the Fishery Board Scotland, V, p. 160.

Thysanoessa longicaudata, KRØYER.

With tow-nets, this species has only been caught at the follo- g places: —

13/1	1899.	The Vest Fiord I, 0—100 m.	rr
6/3	—	Ure I, 0—100 m., 0—200 m.	rr

My specimens were 10—12 mm. long.

On NANSEN's Fram-expedition single specimens were taken at r different places in the Arctic Ocean; and SARS mentions the anger Fiord and the Sea between Norway and Jan Mayen rw. North Atl. Exped.) as other places where it has been found.

According to NORMAN[1]) this species together with *Nyctiphanes egica* was „trown up in enormous quantity in St. Andrew's Bay, ril 22nd 1886". It is also known from Greenland (HANSEN) P. T. CLIVE[2]) has given a list of places where it has been nd in recent years from 48°—67° N.

Boreomysis arctica, KRØYER.

As far as I know, this is the first time this species has been uded in any account of plankton organisms.

There can, however, hardly be any room for doubt that it has iktonic habits, as it has several times been taken by townetting. for instance on

1899 in the Malang Fd., 300—380 m. rr

From the western fiords of Norway I have noted the follo- g: —

1898.	The Herlø Fiord, in the stomach of *Macrurus rupestris*			+
—	The Herlø Fd.,	0—400 m.	tow-net	rr
1901.	The Herlø Fd.,	0—400 m.	—	rr
1902.	Fiord off Bergen,	250—450 m.	—	rr

This species, which was first described by KRØYER as being id in Greenland, has by G. O. SARS been taken in the Kristi- , Hardanger and Vest Fiords.

It has not yet been observed on the British Coasts.

Hemimysis abyssicola, G. O. SARS.

This species also seems to be a bathy-planktonic organism, vas at any rate found in the tow-net on 6/2 1899 in the deep Tranø, 0—630 m.; both as *adulta* and *juniores*.

In the western fiords it has never been seen in plankton but been found in considerable quantity in the stomach of *Macrurus estris* from the Herlø Fiord, 29/7 1898. *Boreomysis arctica* was found in the same place.

G. O. SARS has taken this organism in the Kristiania and danger Fiords and at Lofoten. It has not yet been included in British fauna.[3]) NORMAN has caught it in the Trondhjem Fiord.

Eggs and Larvæ of *Schizopoda*.

As the *Schizopoda* play such a very important part in the nomy of the northern seas, I will mention some observations e in the northern fiords.

14/4	1899.	The Malang Fd.,	0— 3 m.	+
	—	Ingø	0—300 m.	r
	—	The Porsanger Fd.,	0— 75 m.	r
	—	Vardø,	0—200 m.	c
20/3	1900.	The Østnes Fd.,	0—130 m.	+
2/4	—	The Skjerstad Fd.,	0—330 m.	+
6/4	—	The Folden Fd.,	0—100 m.	r

The majority of these probably belonged to the species *Boreophausia inermis*.

Cumacea.

Pseudocuma longicornis, SP. BATE.

On 22/7 1897 I got a specimen of this species in the harbour at Brettesnes in Lofoten, the animal was swimming about on the surface.

T. SCOTT[1]) has on the other hand, several times caught it by tow-netting in the Firth of Forth. SPARRE-SCHNEIDER has observed this species at Hillesø in the Malang Fiord, which is the northern limit for it.

With regard to its distribution cf. Dr. CARL ZIMMER.[2])

Amphipoda.

Parathemisto oblivia, KRÖYER.

This species is also, without doubt, one of the important organisms in the economy of the sea. I have specimens from a great many stations both in the northern fiords and on the west coast of Norway. Is is distributed from Greenland (KRÖYER, HANSEN) to 45° N. 50° W. (CLEVE)[3]) and from Arctic Ocean, where it was taken by NANSEN at 12 different stations, to The British Isles. AURIVILLIUS has found this species in the Skagerack, but it has not up to the present time been noticed in the fiords of Sweden and southern Norway. The most southerly place at which I have taken this species was off Stavanger (58° 59′ N. 5° 21′ W.), where I found *juniores* in plankton on 7/3 1896.

In the plankton which I had under examination from „Heimdals" section between the Sogne Fiord and Iceland about the middle of May 1896, I constantly came across *juniores* from the surface layers, both from the region of the Gulf Stream and in the arctic water. Likewise *juniores* and sometimes *adulta* were observed in the Pudde Fiord (Bergen) from the middle of November 1896 to February 1897, 0—8 m. In the plankton material which the seal catcher Capt. H. ANDRESEN collected for the biological station, a considerable number of *P. oblivia* were found, among them also a large number of *juniores* from the sea north of Jan Mayen (June and July 1897.[4])

Parathemisto is characterized by H. H. GRAN[5]) as an arctic-oceanic organism, and the same author mentions for instance:—

„Im Mai 1901 hatte z. B. *P. oblivia* von ihrem Verbreitungscentrum im Eismeere bis zu Lofoten eine zusammenhängende Verbreitung an der Oberfläche." In another place (p. 95) numerous specimens of young *Parathemisto* are mentioned in May as one of the first appearances of the flourishing spring plankton.

In the North Ocean the months of May and June appear to be the most important time for the development of this species; although I have, on the other hand, observed young individuals in

[1]) British Schizopoda, p. 463.

[2]) The Seasonal Distribution of Atlantic Plankton Organisms, p. 31, 32.

[3]) Cf. NORMAN, On British Mysidæ, p. 146. Ann. Mag. Nat. Hist. S. 6, X.

[1]) The Distribution of Pelagic Invertebrate Fauna of Firth of Forth, p. 167.

[2]) Die arktischen Cumaceen (Fauna arctica), B. I, p. 428.

[3]) The Distribution of Atlantic Plankton Organisms, p. 33.

[4]) Cf. NORDGAARD, Contributions to the Hydrography of the North Ocean. Berg. Mus. Aarb. 1901, No. 2, p. 29.

[5]) Das Plankton des norwegischen Nordmeeres. Report on Norwegian Fishery and Marine Investigations. Vol. II, No. 5, 1902, p. 83.

the months from November to May in the neighbourhood of Bergen. In the Arctic sea, *Parathemisto* is of great importance as food for plankton eaters.

I have seen it in the stomach of *Gadus virens* both from Bergen and from Vesteraalen; and in March 1897 I noticed it also in the stomach of *Gadus callarias*, caught near Svolvær in Lofoten.

Euthemisto compressa, Goes.

G. O. Sars[1]) gives the following distribution for this species:— Davis Strait, East coast of Greenland, Jan Mayen, Hasvig (in West Finmark). Norman[2]) states that near Redcar from 10th to 12th of February 1892 there was a very rich Crustacean plankton, which was eagerly sought after by *Rissa tridactyla*. This plankton consisted chiefly of *Euthemisto compressa* which at that time was new to the British fauna, and there was also *Nematoscelis megalops* and *Thysanoessa longicaudata*. From the Firth of Forth T. Scott[3]) refers to this animal as occuring in February and November 1892 and in November 1893.

My observations are the following:—

$^{8}/_{2}$ 1897. Sunderø (Vesteraalen), from stomach of *Gadus virens*.
$^{24}/_{1}$ 1899. Kvænangen I, 0—140 m. tow-net. 1 ♀.
$^{22}/_{3}$ — The Røst sea, 0—700 m. —

Euthemisto bispinosa, Boeck.

$^{8}/_{2}$ 1897. Sunderø (Vesteraalen) from stomach of *Gadus virens*.

G. O. Sars states the distribution of this species as follows:— Greenland, Spitzbergen (?) off Novia Scotia, Sørvær and Hasvig (in West Finmark).

Amathilla homari, Fabr.

Adulta, but still more *juniores* were noticed on $^{10}/_{2}$ 1897 in the surface water at Sunderø in Vesteraalen. Also in the sea beyond the belt of skerries (Skjærgaard) off Bergen on $^{28}/_{6}$ 1900, 0—5 m., young of this species were observed. Development would thus appear to take place in the winter and spring.

Cirripedia.

Lepas anatifera, Linn.

A splendid bunch on a glass ball (from a fishing net) drifted ashore in March 1899 on the outer side of Moskenesø in Lofoten.

Nauplii and Cypris of Cirripedia.

At certain times larvæ of *Cirripedia* may be found in large numbers in plankton. Amongst those I have myself noticed I will mention for instance those seen in April 1896 at Balstad in Lofoten, and in April 1897 at Røst. At the latter place, I also on March 24th 1899 noticed a number of these larvæ (Røst I, 0—120 m.), and about the middle of April in the same year they were numerous just beyond Vesteraalen, in the Malang Fiord, at Kvænangen, the Trold Fiord, at Vardø and at Høla near Svolvær.

[1]) An Account of the Crustacea of Norway, vol. I, p. 13.
[2]) British Schizopoda. Ann. Mag. Nat. Hist., s. 6, vol. IX, p. 463.
[3]) The Distribution of the Pelagic Fauna. 16th Ann. Rep. of the Fishery Board for Scotland. Part III, p. 176.

Ostracoda.

While arranging the specimens which have been collected, have not in every case classified them according to species, I have grouped them as *Conchoecia sp.*

Single specimens have been classified, some by Prof. G. O. Sa and I have identified some others by reference to Professor G. Müller's article in „Nordisches Plankton". The following spec have been found.

Conchoecia elegans, G. O. Sars.

This species is, comparatively speaking, common in the V and adjoining fiords, as for instance the Ofot Fiord and Øx Su and is found rather deep down. In the Ofot Fiord on Febru 9th 1899, I took up a quantity of a species of *Conchoecia* i closing net, a blueish light gleamed from the forepart of its bo Unfortunately, I was not, then and there, in a position to dec whether the flash of bluelight came from *borealis* or *elegans* perhaps from both.

Conchoecia borealis, G. O. Sars.

This species too has been observed in the Vest and adjoin Fiords, e. g.

$^{4}/_{2}$	1899.	Skroven I,	0—300 m.
$^{6}/_{2}$	—	Tranø dybet	0—630 m.
$^{7}/_{2}$	—	The Ofot Fiord I,	300—350 m.
$^{17}/_{2}$	—	Øxsund,	450—550 m.

Conchoecia obtusata, G. O. Sars.

Among the specimens which I took at Reine in Lofoten (1896, 0—130 m.) were a few conchoecia, which Sars declared belong to this species.

It is very likely that there were examples of this species the collection made in 1899, but I can not state this with certai

Philomedes brenda, Baird.

On April 20th 1899 I took a specimen of this species the Jøkel Fiord, and it was by G. O. Sars declared to be a m Sparre-Schneider has noticed this species, both in the Kvæn and Malang Fiords.

Cladocera.

Evadne nordmanni, Lovén.

As far as my experience goes, it appears that *Cladocer* very seldom seen in the winter plankton on our coasts, and the species I can with certainty say I have noticed is *E. nordma* There were single specimens in the samples from Lofoten, April 1

Copepoda.

Calanus finmarchicus, Gunnerus.

In his important work „Das Plankton des norwegischen N meeres" (p. 56—66) Dr. H. H. Gran has given an exhaus biological account of this species, and to this account I refer. page 64 Dr. Gran says: „*Calanus finmarchicus* hat eine für j

ebiet bestimmte Fortpflanzungszeit, und die Thiere sterben ab, chdem sie sich einmal fortgepflanzt haben. Die Fortpflanzungsit ist an Norwegens Nordwest Küste April—Mai; die Thiere könn wahrscheinlich hier ihre ganze Entwicklung in einem Jahre llenden."

GRAN calls this a working hypothesis, and as such it is very teresting, and future examinations must prove how far facts bear t the hypothesis.

GRAN's remarks concerning the vertical movements of this spees are of special interest (p. 64). „Die Thiere können bedeutende rtikale Wanderungen unternehmen, namentlich suchen sie im ätherbst die Tiefe und kommen im Frühling wieder herauf; im mmer sind die Jungen hauptsächlich in den oberen, erwärmten hichten zu finden, während die älteren oft in der Tiefe umherhwimmen."

I have also noticed the vertical „wanderings" and I believe at we here have a very important factor to deal with.

For it will probably be proved that the movements of herrings e affected by the vertical alterations in the places where *C. finarchicus* is to be found at different times of the year.

It will be seen in my plankton-tables too that this species the winter shows itself in the upper layers of water, quite inly spread in the surface layers, while the majority is in much eeper water. But some exceptions from this state of things have en noticed, and these deserve attention. For instance, on Januy 24th 1899, there were quantities of these animals at Kvænann no deeper than 0—5 meters, and the same was seen to be the se on the 27th of the same month in the same year in the inner lf of the Lyngen Fiord. To this striking biological phenomenon parallel peculiarity is evidenced in the physical conditions of the yers of water, these being altogether unvarying both with regard temperature and salinity (cf. nrs. 145—154, 155—162).

And in this fact there seems to lie an explanation for the ppearance of herrings at times in the winter so far up near the rface in some of the northern fiords that they can be caught ith nets.

To give an idea of the distribution of this species deeper down the winter, in those fiords into which the ocean water flows, e following list of observations made is useful. Dr. PETERSEN's osing-net, with an aperture of about 0.09 sq. m. was used.

Calanus finmarchicus.

$^{7}/_{2}$ 1899. Ofoten I.

Depth. m.	Number of specimens.
0—100	105
100—200	474
200—300	930
300—350	772

Bottom 360 m.

$^{9}/_{2}$ 1899. Ofoten II.

Depth. m.	Number of specimens.
0—100	63
100—200	1031
200—250	1575

Bottom 258 m.

$^{8}/_{2}$ 1899. Rombaken III.

Depth. m.	Number.
0—100	10
100—200	52
200—300	677

Bottom 310 m.

$^{17}/_{2}$ 1899. Øxsund.

Depth. m.	Number.
0—100	424
0—150	520
150—250	260
250—350	148
350—450	41
450—550	32
550—620	18

Bottom 630 m.

These figures speak for themselves. In February 1899 th number of *C. finmarchicus* reached the maximum at a depth o 200—300 m.

It will also be seen from these observations that in th winter a really considerable number of this important planktoform may be found in the basins of the fiords, as that it may truthfully be said that there is food there for eventual winter herrin shoals.

Again it will be noticed on reference to the table dealing wit Øxsund ($^{17}/_{2}$ 1899), that *C. finmarchicus* is only found very sparsel distributed at the greater depths of 400—600 m. This is stil further emphasized in the following figures.

$^{16}/_{3}$ 1899. Tranødybet.

Depth. m.	Number.
0—100	211
100—200	9
200—300	9
300—400	10
400—500	6
500—600	2

Bottom 640 m.

$^{29}/_{3}$ 1899. The Tys Fiord I.

Depth. m.	Number.
0— 50	55
0—100	110
100—200	15
200—300	2
300—400	1
400—500	1
500—600	1
600—700	1

Bottom 725 m.

At the two places last mentioned, however, the maximum proved to be in the upper 100 meters, while their appearance in the lower layers was very seldom.

These observations tend to show that even in winter there is no accumulation of *C. finmarchicus* in the greater depths in our fiords (400 mtrs. and more). One is tempted to ask whether the vertical movements previously mentioned are active or passive. It may be replied that the vertical currents, which are caused by the cooling of the surface during the winter, must necessarily influence the movements of the plankton and have a share in their downward course. If the movements of the animals are active, these are in this case assisted by the current in the water.

— It is not so easy to determine the spawning time for those species in which the ovisack is wanting. But even here there are interesting things to be noticed which have some connection with spawning, as for instance the fastening of spermaphores to the genital segment.

I have only a time or two observed females of *C. finmarchicus* with spermaphores affixed, *viz.* on $^{7}/_{2}$ 1899 Ofoten II, 200—250 m. and on $^{17}/_{2}$ 1899 Øxsund, 0—150 m.

Calanus hyperboreus, Kröyer.

I have found single specimens of this organism in the depths of our fiords, and in the Ofot Fiord in the winter of 1899 they were sufficiently numerous to deserve to be considered of importance as food for plankton-eating fish.

I will give a series of observations made of the numbers taken at different depths with Dr. Petersen's closing-net, which had an opening whose surface measure was about 0.09 m.^{2}.

$^{7}/_{2}$ 1899. Ofoten I.

Depth. m.	Number of females.	Number of males.	Total.
0—100			
100—200	1		1
200—300	29		29
300—350	74	8	82

Bottom 360 m.

$^{7}/_{2}$ 1899. Ofoten II.

Depth. m.	Number of females.	Number of males.	Total.
0—100			
100—200	9		9
200—250	25	1	26

Bottom 258 m.

$^{17}/_{2}$ 1899. Øxsund.

Depth. m.	Number of females.	Number of males.	Total.
0—150			
150—250	3		3
250—350			24[1])
350—450			28[1])
450—550	17	4	21
550—620	2	2	4

Bottom 630 m.

$^{16}/_{3}$ 1899. Tranødybet.

Depth. m.	Number of females.	Number of males.	Total.
0—100			
100—200			
200—300	11	1	12
300—400	5		5
400—500	6	2	8
550—600	4		4

Bottom 640 m.

$^{29}/_{3}$ 1899. The Tys Fiord I.

Depth. m.	Number of females.	Number of males.	Total.
0— 50			11 *juniores*
0—100			14 *juniores*
100—200			15
200—300			8
300—400			25
500—600			8
600—700			1

Bottom 725 m.

[1]) Consisting of both females, males and *juniores*.

These tables show the distribution of this copepod in the ths of the northern fiords. The number seems to reach its imum at a depth of 300—400 metres, decreasing both at greater lesser depths. It is of special interest that *juniores* may be in the layers of water no deeper than 0—50 m. (cf. $^{29}/_{3}$ 1899. Tys Fiord I). In this way the supply can be replenished in ns which are shut off by comparatively high submarine ridges. s a matter of importance to be able to determine the propaga- time for plankton organisms, so I will mention some of the ervations which I have made and which will serve as helps to rmine this matter as far as *C. hyperboreus* is concerned.

As the foregoing tables show, there are many more females than es. Then again, at certain times of the year, not a single e is to be seen. It would seem that, except just at spawning , hardly any fully developed males are to be found; or at any , only as a very great rarity. In plankton samples from the in the neigbourhood of Jan Mayen ($^{25}/_{6}$ 1897) I have, for in- ce, found hundreds of females, but not a single male.

As I mentioned previously, the development of spermaphores be considered as a proof that spawning time has come. rmaphores affixed to the first abdominal segments of females e thus been observed by me in specimens from the following es: —

$^{6}/_{2}$ 1899. Tranødybet, 0—630 m.
$^{7}/_{2}$ 1899. Ofoten II, 200—250 m.
$^{17}/_{2}$ 1899. Øxsund, 450—550 m.

In one single instance I have observed that a spermaphore almost left the spermaphore-duct through its opening on the side of the first abdominal segment, the fifth leg on the left being at the same time inclined towards the spermaphore so to be able to seize it ($^{2}/_{4}$ 1900. The Skjerstad Fiord II, 0— m.). In several cases I have observed eggs in the oviducts their way towards the genital segment, and this too is a sure that spawning time has come. Dates for such observations are, ng others, $^{7}/_{2}$ 1899. Ofoten I; $^{17}/_{2}$ 1899 Øxsund; $^{2}/_{4}$ 1900. Skjerstad Fiord IV.

The eggs, which lay in a row in the canal leading from the y, were of a yellowish colour and were placed like beads on ring. These yellow strings of beads could be seen with the d eye.

There is another thing, which in all probability has some pur- to serve at spawning time. I have noticed at such time, and ar as I remember only then, two red spots on the ventral side he swollen genital segment in the females of *C. hyperboreus*. hese spots are not seen at other times, one has every reason hink that they are intended to serve some special purpose at particular time, and it is natural to conclude that they are the guidance of the males, possibly to show them were the maphores should be deposited.

Juniores have been frequently observed, as, for instance, on

$^{17}/_{2}$ 1899. Øxsund, 350—450 m.
$^{29}/_{3}$ 1899. The Tys Fiord I 0— 50 m.
$^{5}/_{5}$ 1899. Høla, 0—150 m.
$^{20}/_{3}$ 1900. Skroven, 0 100 m.
$^{22}/_{3}$ 1900. Tranødybet, 0—600 m.
$^{6}/_{4}$ 1900. The Folden Fiord, I 300—500 m.

From the foregoing statements it would seem that propagation for *C. hyperboreus* in the northern fiords may be taken to be months of February, March and April. I have no observations for the summer and autumn months from the fiords mentioned, so that I am unable to say anything as to whether propagation continues after April.

There is no doubt that this arctic copepod propagates in our fiords, but as young have been found in the upper layers (0—50 m.) there seems to be nothing unlikely in presuming an inflow, also in those basins which are shut off by submarine ridges.

Pseudocalanus elongatus, Boeck.

A glance at plankton tables will convince us that this is one of the most common copepoda in the winter plankton in the northern fiords.

It is easier to determine the propagating time for this species than for the two previously mentioned, as the females carry their eggs affixed to the genital segment. I have, however, only a few observations from the northern fiords, as for instance on $^{23}/_{3}$ 1900 when I saw females with eggs in the Østnes Fiord and again on $^{2}/_{4}$ in the same year in the Skjerstad Fiord. But from the skjærgaard off Bergen, I have observed such females from February to the beginning of May. It is possible that propagation continues after this time.

Chiridius armatus, Boeck.

Pl. II, Fig. 14.

Among the many samples of plankton from the northern fiords, I have only noted this species as being found at the following places: —

$^{4}/_{2}$ 1899. Skroven I, 0—380 m.
$^{17}/_{2}$ 1899. Øxsund, 450—550 m.
$^{12}/_{4}$ 1899. The Malang Fiord, 0—380 m.
$^{14}/_{4}$ 1899. The Malang Fiord, 200—300 and 300—380 m.

G. O. Sars[1]) has found this species from the Kristiania Fiord up to the Vest Fiord, which was its northern limit as far as was previously known. Now this limit can be extended to the Malang Fiord.

Chiridius tenuispinus, G. O. Sars.

Pl. II, Fig. 13.

This arctic copepod has only once been found in Norway. I counted every copepod in the samples from Ofoten I ($^{7}/_{2}$ 1899), 300—350 m. and found among them only one specimen of this species, a female 3.5 mm. in length.

Euchaeta norvegica, Boeck.

This species is a giant one among copepoda. I have measured several specimens of females which have reached a length of 8.3 mm. Below are some particulars which will give an idea of the distribution of *E. norvegica* at various depths.

$^{7}/_{2}$ 1899. Ofoten I.

Depth. m.	Number of females.	Number of males.	Total.
0—100			
100—200	3	2	5
200—300			9
300—350			11

Bottom 360 m.

[1]) Crustacea of Norway, Vol. IV, p. 28—29.

$^{17}/_{2}$ 1899. Øxsund.

Depth. m.	Number of females.	Number of males.	Total.
0—150	1		1
150—250	5	2	7
250—350	3	3	6
350—450	1	2	3
450—550		3	3
550—620			

Bottom 630 m.

$^{16}/_{3}$ 1899. Tranødybet.

Depth. m.	Number of females.	Number of males.	Total.
0— 60	2		2
0—100	1		1
100—200	2		2
200—300	2		2
300—400			
400—500	1		1
500—600		2	2

Bottom 640 m.

In 1899 *juniores* were observed in the plankton from January to April inclusive, and during the same time I have notes of many specimens of females with ovisacks. In some of them the bent ovarial tubes were seen to be full of the blueish eggs which shone through the body so that the blue ovarial tubes could be seen by the naked eye. In this species too, I noticed two red spots on the ventral side of the genital segment in females. I have suggested the hypothesis that these are for the guidance of the males when they deposit spermaphores.

It has been found on examination in the southern fiords that the spawning time for this species also takes place at other times than mentioned above, but I suppose that in the northern fiords the special time for spawning is during the first few months in the year, from January to April.

This species is one of the few plankton organisms, which I have found in the stomach of Lofot cod.

Scolecithricella minor, Brady.

This species was very rare in the plankton from the northern fiords.

G. O. Sars[1]) mentions having come across it from the Kristiania Fiord right up to Lofoten. I have found it in Øxsund ($^{17}/_{2}$ 1899, 0—100 m.) and in Kvænang ($^{21}/_{4}$ 1899, 0—100 m.) which must be taken as the most northernly place where this species has, up to the present, been observed.

[1]) Crustacea of Norway, Vol. IV, p. 56.

Centropages hamatus, Lilljeborg.

A single specimen of this species was found in a sample fro Røst (Lofoten Islands) $^{1}/_{5}$ 1897, and this was a female.

Temora longicornis, O. F. Müller.

This species provides a considerable amount of food in o waters for plankton-eating fish. As, however, on the south we coast it is particularly prominent in the summer and autumn month it was not to be expected that it would often be met with samples from the northern fiords, which were taken in the mont of January, February, March and April. I have only noted from Moskenstream ($^{14}/_{1}$ 1899, 0—100 m.). On the contrary has frequently been referred to as being found in several of t northern fiords in the autumn of 1898 and 1899 by Dr. Gran Professor P. T. Cleve[2]) fixes the northern limit on the Norwegi coast at 70° N. for this species.

Metridia lucens, Boeck.

Off the coast of Bergen this species is at times so plentif that it becomes of importance as food for plankton eaters. I ha for instance found large quantities in the stomachs of young „se (coal-fish).

By a look at the accompanying plankton tables it will be se that this species is very generally distributed also in the northe fiords of Norway in the winter, but it is not seen in large numbe

The following table gives the result of examination in th respect of the samples from Øxsund: —

$^{17}/_{2}$ 1899. Øxsund.

Depth. m.	Number of females.	Number of males.	Total.
0—100	1		1
0—150	9		9
150—250	2		2
250—350	4		4
350—450			
450—550			
550—620			

The most northerly place at which I have found this speci is Kvænang ($^{24}/_{1}$ 1899). It emits a blueish light during preservatio and so does the species next to be considered.

Metridia longa, Lubbock.

This species is a typical deep water form in the fiords. Th following tables give an idea of the quantities in which it is fou at the various depths.

[1]) Hydr. Biol. Stud. of the North Atlantic Ocean and the Coast of Nor land. Cf. Plankton Tables.

[2]) Atlantic Plankton Organisms, p. 87.

$^{7}/_{2}$ 1899. Ofoten I.

Depth in meters	Number of females	Number of males	Total
0—100			
100—200			
200—300			10
300—350			15

Bottom 360 m.

$^{7}/_{2}$ 1899. Ofoten II.

Depth in meters	Number of females	Number of males	Total
0—100			
100—200	7	1	8
200—250	23	1	24

Bottom 258 m.

$^{17}/_{2}$ 1899. Øxsund.

Depth in meters	Number of females	Number of males	Total
0—100			
0—150	3		3
150—250	8		8
250—350	13		13
350—450	4		4
450—550	2	4	6
550—620	1		1

Bottom 630 m.

Pleuromamma robusta, Dahl.

Pl. II, Fig. 1—12.

In samples from The Vest Fiord (Skroven I, $^{4}/_{2}$ 1899, 0—300 m.) found one single female specimen of a Pleuromamma, which I at first mistook for a *P. abdominalis*.

But on closer examination, I found that the first pair of antennæ were without the peculiar hooks which specially distinguish the latter species. Then I continued my examination on the lines laid down by Dr. Giesbrecht in his tables[1]), and came to the conclusion that my specimen was identical with the form described by F. Dahl found in the Atlantic, *viz. P. robusta*. As there were no drawings nor detailed description of the latter, I decided that I would treat my specimen very thoroughly and examine it still more closely, and then I prepared detailed drawings.

[1]) Copepoda (in „Das Tierreich"), p. 109.

Meanwhile, G. O. Sars's excellent drawings and description were published, so that my work became superfluous. I have, nevertheless, had my sketches reproduced, as the place where my specimen was found is considerably further north than there the only previously mentioned have been found. My sketches may then be used as proofs that it was really a *P. robusta* I secured at Skroven in The Vest Fiord. Its length was 3.7 mm. According to G. O. Sars this species was taken by Dr. Hjort on the „Michael Sars" expedition, somewhat north of The Færoe Islands (stat. 9) and in The Stor Fiord in Søndmøre (stat. 4).

Heterorhabdus norvegicus, Boeck.

I have specimens of this species from The Østnes Fiord, The Vest Fiord (Skroven, Tranødybet), Øxsund, The Ofot Fiord, The Tys Fiord, The Folden Fiord and The Skjerstad Fiord. It was only found in small quantities at all these places. There were few fully developed males in addition to the more plentiful females. With respect to propagating time, it may be mentioned that *juniores* were noticed $^{7}/_{2}$ 1899 (Ofoten I, 300—350 m.), $^{17}/_{2}$ 1899 (Øxsund 350—450, 450—550 m.) and again $^{6}/_{4}$ 1900 (The Folden Fiord 200—300, 300—400, 400—500 m.).

Sars has found this species at various places from The Kristiania Fiord right up to Lofoten.

Candacia armata, Boeck[2]).

In The Vest Fiord ($^{4}/_{2}$ 1899, Skroven I, 0—380 m.) I took a single female specimen of this species, length 2.6 mm. This station at Skroven is the most northerly place where this species has, up to the present, been noticed.

Acartia clausi, Giesbrecht.

Under *Acartia sp.* in the tables, both *clausi* and *longiremis* are included. The form which was seen about the middle of January 1899 (12th—18th of January) was principally *clausi*.

Acartia longiremis, Lilljeborg.

This species was found occasionally among the samples, but never in any quantity worth mentioning.

Oithona similis, Claus.

Even if there should be no other plankton copepod to be found this species, however, is usually present, at any rate one may almost certainly find a few specimens, and, on account of its very general appearance, this species must be reckoned among the most important copepoda with regard to its ecological worth.

I have noticed females carrying their eggs in every month of the year in the fiords in the neighbourhood of Bergen.

Oithona plumifera, Baird.

As the tables show, this species was found at many places but never in any quantity. It was also found off Ingø ($^{24}/_{4}$ 189 Ingøhavet, 0—300 m.), and this is its northernmost limit as far as is now known. The geographical position of this station is: 7 10′ N., 23° 10′ E.

[1]) Crustacea of Norway, Vol. IV, p. 115, Pl. 78, 79.

[2]) G. O. Sars, Crustacea of Norway, Vol. IV, pag. 135, pl. XCI.

Microsetella atlantica, Brady & Rob.

A glance at the tables will suffice to convince one that this ecies is one of the most important plankton copepoda. Propagating ne is extended over a great part of the year, at any rate I have ticed females with ovisacks from February to July in the fiords the neighbourhood of Bergen.

Oncœa conifera, Giesbrecht.

This easily recognized form was only rarely seen in the plankton. was found in The Vest Fiord, The Jøkel Fiord and the Kvænang.

Pteropoda.

Limacina balea, Möller.

This species, which may sometimes be found in large quantities the autumn, were only rarely found in the plankton. *Vide* tables.

Appendicularia.

Fritillaria borealis, Lohman.

What was found of *Oikopleura*, I have not been able to identify, t, on the other hand, the specimens which in the tables are ssified under *Fritillaria sp.* are without doubt *F. borealis*.

Bryozoa.

Cyphonautes.

The larval form, which at times is tolerably general in the rds in the neighbourhood of Bergen, can only with certainty be ntioned as having been found by me at one single place, *viz.* ftsund. ($^3/_2$ 1899. Raftsund II, 0—260 m.).

Chætognatha.

Sagitta bipunctata, Quoy & Gaimard.

Under the designation *Chætognatha* two species, *(viz.* this and e following) will be found in my tables.

Meanwhile, however, I have noticed several places where *S. nunctata* has been found, e. g. $^{16}/_3$ 1899, Tranødyb, 0—50 m.; $_3$ 1899. Henningsvær II, 0—100 m.; $^{29}/_3$ 1899, Tysfiord I, —100 m.; $^{19}/_1$ 1899, 40 miles NNW of Gaukværø, 0—100 m. s far as my experience goes, this species on our coast is only found the upper layers of water, but *Spadella hamata* is almost without ception found in samples taken from deep water. The species st mentioned has been found by me in quantities in the stomachs young „sei“ caught on the coast off Bergen.

Spadella hamata, Möbius.

I have found this species in large quantities in samples taken om deep water. Among the many places where it has been found, may mention The Vest Fiord, Øxsund, The Ofot Fiord, The Tys ord, The Folden Fiord, The Skjerstad Fiord, &c. I have taken it both with townet and trawl[1]). I counted the specimens fr Øxsund.

$^{17}/_2$ 1899. Øxsund.

Depth m.	Number of specimens
0—100	2
0—150	2
150—250	1
250—350	3
350—450	2
450—550	1
550—620	2

Bottom 630 m.

As before mentioned, this species as a rule is found at great depths, but I can mention one exception. In the Skjerstad Fic ($^3/_4$ 1900, Skjerstad fj. VIII, 0 m.) several large specimens we found swimming about in the surface water. This circumstan may perhaps be accounted for when the peculiar hydrographic character of The Skjerstad Fiord is remembered. The length the fully developed specimens was 30—35 mm.; while those fr Skjerstad Fiord were about 40 mm.

In samples from The Vest Fiord ($^{16}/_3$ 1899, Tranødyb, 300—40 500—600 m.) there were specimens with eggbags. The hinderpa of the side fin was bent downwards, thus forming a hollow in whi the eggs lay tightly pressed together.

In samples from the same place taken at a depth of 400—5 m. there were quantities of *juniores* (2—3 mm.) of a chætogna which most probably was *S. hamata*.

Similar young individuals were also found, e. g. in The T Fiord ($^{29}/_3$ 1899, Tysfd. I) in samples taken at a depth af 300—5 m. but they were especially numerous in samples taken from depth of 500—600 and 600—700 m.

Ctenophora.

Bolina infundibulum, Fabr.

Prof. Chun has identified *B. norvegica* M. Sars with t species. Chun writes[2]): — „Falls die von Mertens (1833) aus Bering-Strasse beschriebene *B. septentrionalis* mit unserer Art ide tisch wäre (was aus der Abbildung nicht ohne weiteres hervorgeh so dürfte auch *B. infundibulum* eine circumpolare Verbreitung a wiesen.“

This lobate Ctenophore has been noticed by me in the Jø Fiord ($^{20}/_4$ 1899) as well as in the sea at Hammerfest ($^{22}/_4$ 189 Unfortunately I did not succeed in preserving any specimen. Vogt observed this beautiful form in 1861 in Lofoten.

Anthozoa.

Arachnactis albida, M. Sars.

Several specimens of this species were found in the surf water of Moskenstrømmen on March 1st 1899.

[1]) On the whole I have seen several of the larger plankton forms in trawl, e. g. *Calanus hyperboreus*, *Euchæta norvegica*, *Parathemisto oblivia*, et

[2]) Die Beziehungen zwischen dem arktischen und antarktischen Plank (Stuttgart, 1897), p. 22.

PLATE I.

Map showing the northern part of Norway. The curves are isohyets and represent downfall in mm. for the year 189
ue) and 1900 (green).

PLATE I.


Oversigtskart
over
Det nordlige Norge.
Nordkyn
Nordkap
Skarsvaag
Mehavn
Kjöllefjord
Sværholt
Ingö
Hjelmsö
Maasö
Mager-ö
Troldfj.
Bred-sd
Rolfsö
Repvaag
st. Tamsö
Laksefjord
Tana-fjord
Vardö
Vadsö
Varangerfjord
Hammerfest
Sörö
Komagfjord
Porsangerfj.
Loppen
Arnö
Lökö
Rödö
Öx fjord
Altenfj.
Jökelfj.
Spilderen
Skorpen
Nöklen
Badderen
Kvænangen
Ganvik
Ulö
Lyngenfj.
Kaafjord
Skibotten
Kvalö
Tromsö
Ulfsfj.
Malangen
Balsfjord
Senjen
Vesteraalen
Stene
Lofoten
Liland
Ofoten-fjord
Herjangen
Rombaken
Skjomen
Lödingen
Tysfjord
Korsnes
Tranö
Hammerö
Svolvær
Kabelvaag
Skroven
Henningsvær
Brettesnes
Digermulen
Stene
Balstad
Nufsfjord
Sund
Kirkfjord
Reine
Moskenes
Helseggen
Værö
Röst
Vestfjord
Engelö
Flatö
Grötö
Lundö
Foldenfj.
Landego
Helligvær
Bodö
Saltenfj.
Sjerstadfj.
Arnö
Sandhornö
Gildeskaal
200
400
600
800
1000
1200
1400
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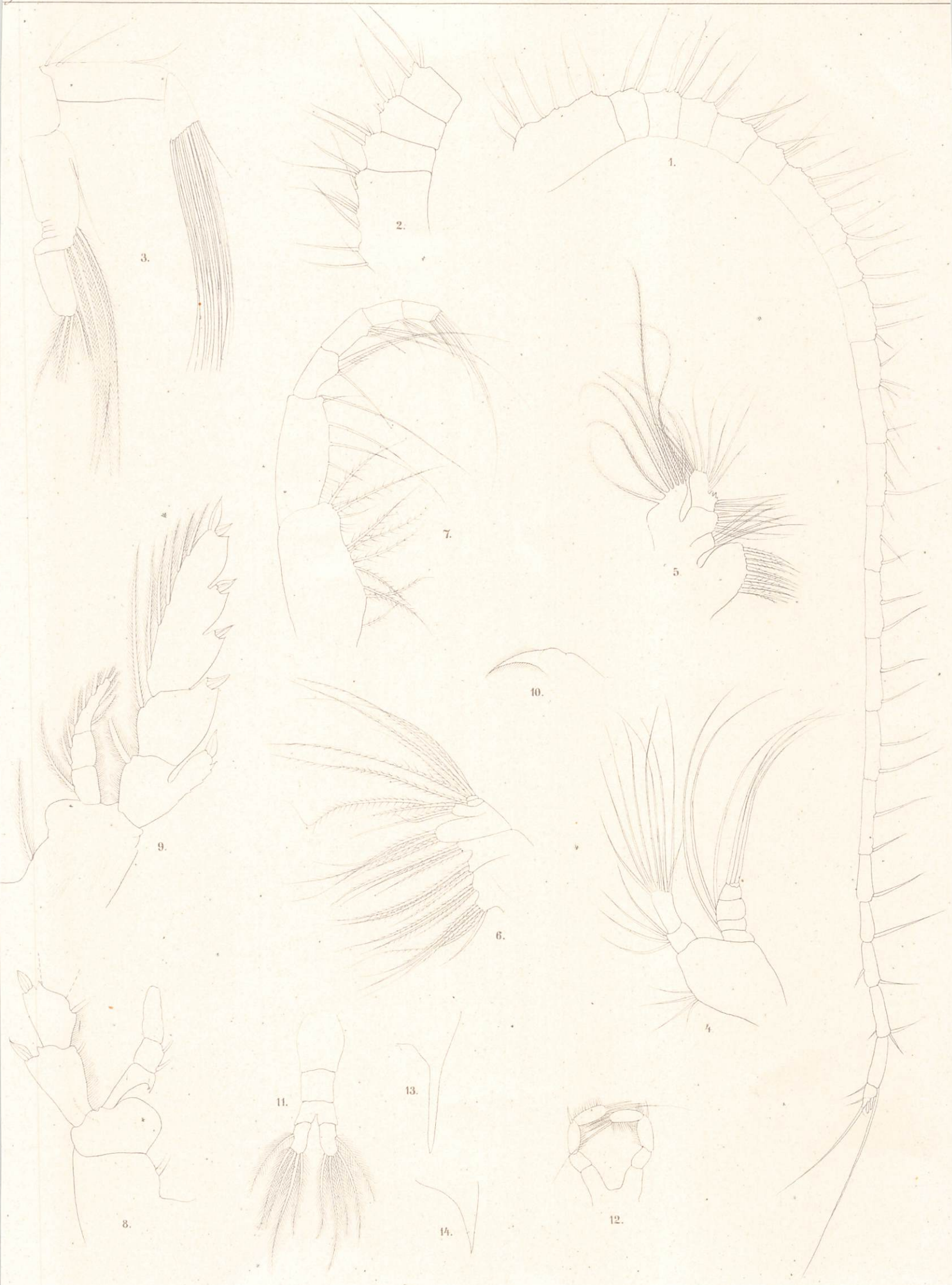
PLATE II.

PLATE II.

Fig. 1—12. *Pleuromamma robusta*, DAHL, Skroven (Vestfiord), 0—300 m., $^{4}/_{2}$ 1899.
„ 1. Anterior antenna, right side, $^{83}/_{1}$.
„ 2. First joints of anterior antenna, left side, $^{83}/_{1}$.
„ 3. Posterior antenna, $^{83}/_{1}$.
„ 4. Mandible, $^{83}/_{1}$.
„ 5. Maxilla, $^{83}/_{1}$
„ 6. 1. Maxilliped, $^{83}/_{1}$.
„ 7. 2. Maxilliped, $^{83}/_{1}$.
„ 8. 2. pair of natatory legs, $^{83}/_{1}$.
„ 9. 3. pair of natatory legs, $^{83}/_{1}$.
„ 10. Rostrum, $^{83}/_{1}$.
„ 11. Abdomen, $^{27}/_{1}$.
„ 12. 5. pair of natatory legs, $^{83}/_{1}$.
„ 13. *Chiridius tenuispinus*, G. O. SARS, female, Ofotfjord, 300—350 m., $^{7}/_{2}$ 1899. Spine of the last segment of cephalothorax, $^{83}/_{1}$.
„ 14. *Chiridius armatus*, BOEBK, female, The Malang Fiord, 0—380 m., $^{14}/_{4}$ 1899. Spine of the last segment of cephalothorax, $^{83}/_{1}$.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B. Remarks on the Observations.

a. The Vest Fiord and the Coast Sea.

The observations, made in the Vest Fiord in January 1899, ved that at that time a comparatively high temperature prevailed the surface of the water.

At Høla, near Svolvær, the surface temperature was 3°.3 C. January 11th, halfway between Grøtø and Skroven 4.4 was stered on the surface and between Helligvær and Værø on the h of the month 4.6. About 4.0 was the surface temperature in skenstrømmen, and on the fishinggrounds beyond Reine, Stamd and Henningsvær.

The highest degree which was registered in January, and in the highest surface temperature which was registered during whole winter by this expedition was 5.9 ($^{19}/_{1}$) beyond Vester-en, 40 miles NNW of Gaukværø.

Further, as a result of the observations in the Vest Fiord, it found that in the majority of places the maximum temperature not reached at the bottom. At the station in the middle of the d between Grøtø and Skroven ($^{11}/_{1}$) the maximum (6.9) was at epth of 100 meters.

At the station at Helligvær ($^{12}/_{1}$) the maximum (7.6) was ched at a depth og 140—150 meters, and at the station between lligvær and Værø the maximum 7.2—7.6 at a depth af 120—150 ters.

In the Lofot fishingbanks too, there was a less clearly defined ximum, for instance at Stamsund ($^{17}/_{1}$) 6.9 at 120 m., and on same day 6.7 at 120—150 m. at Henningsvær. On January t, the minimum at Høla was 2.5 on the surface, and the maxim 6.8 near the bottom at a depth of 150 meters. Corresponding ditions were noticed on the same day in the Østnes Fiord (Lids Bay, Følstad, Helle).

Also at Skroven on February 4th the maximum (7.1) was found a depth of 150 meters, the bottom temperature being 6.3 (380 m.). the deep off Tranø the maximum ($^{6}/_{2}$) was reached about 150 m. vn, the bottom temperature being 6.3 at 630 meters.

In Øxsund ($^{17}/_{2}$) the highest temperature (6.9) was at a depth 150 meters, and here too the temperature at 630 meters was 6.3.

Here are some instances from the Lofot fishing banks: —

. 16 miles SSW of Henningsvær.

Surface temperature 2.6, maximum 7.0 at depth of 120 mtrs., bottom temperature (260 mtrs.) 6.6.

. 12 miles EtS of Reine.

Surface 2.7, max. (120 mtrs.) 6.5, bottom temp. 6.2.

Hence it may be gathered that in the months of January and February, the maximum temperature was to be found at a depth of 120—150 meters. Towards the end of February this maximum will be found near the bottom over large portions of the fishing banks.

Observations on the Lofot banks in March show minimum on the surface, and, as a rule. maximum near the bottom at a depth of 150—200 meters.

At greater depths in the fiords a less clearly defined maximum could at the same time be traced at a depth of 150—200 meters. Measurements taken in April show a continued cooling of the upper layers, with a surface temperature of 1—2 at Henningsvær, Stene and Reine.

The section beyond Ingø ($^{24}/_{4}$ 1899) 71° 10′ N. 23° 10′ E' showed minimum (3.2) on the surface, and maximum (3.8) at a depth of about 100 meters.

But on the other hand, from observations made off Nordkyn and Vardø ($^{1}/_{5}$) it was found that the temperature at these places was evenly disposed from the surface to the bottom.

On the first days of May there was no indication of any spring minimum, on the sea coast of Finmark nor in the Lyngen Fiord[1]). But when on May 5th I again took the temperatures at Høla near Svolvær the surface showed 2.65 and minimum (1.9) there had already reached a depth of 20 meters.

To give an idea of the changes in temperature and salinity in the course of the winter months, a table of observations made at Gaukværø off Vesteraalen is subjoined.

$^{18}/_{1}$ 1899	68° 35′ N.	14° 13′ E.	$^{11}/_{4}$ 1899	68° 34′ N.	14° 17′ E.
Depth in meters	Temperature C°.	Salinity ‰	Depth in meters	Temperature C°.	Salinity ‰
0	4.1	33.56	0	2.85	34.17
10	4.4	33.56	20	2.65	34.17
20	4.5	33.56	50	2.70	34.17
30	4.5	33.56	80	3.2	34.29
80	5 6	34.04	100	4.0	34.49
150	6.9	34.27	120	4.4	34.60
250	7.1	34 38	150	4.6	34.74
			200	5 05	34.79
			250	5.2	34.86

[1]) At Lyngen III (cf. no. 875—884) there is, however, a minimum at a depth of 20 m.

Nr.	1900 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents		
						Cl. per litre	Salt per litre	Salt per mille
	March		Metres	Metres	C⁰			
937	21	Balstad I.		100	6.2	19.69	35.62	34.72
938				120	6.2?	19.70	35.64	34.74
939				150	6.6	19.82	35.68	34.94
940				180	6.6	19.96	36.11	35.18
941				200	6.6	19.96	36.11	35.18
942		Balstad II.	110	0	2.95	19.32	34.95	34.09
943				20	2.8	19.34	34.99	34.12
944				50	2.8	19.39	35.08	34.21
945				80	3.45	19.39	35.08	34.21
946				100	3.1	19.32	34.95	34.09
947		Balstad III.		0	2.95	19.32	34.95	34.09
948				50	2.80	19.32	34.95	34.09
949				70	2.85	19.32	34.95	34.09
950				80	3.85	19.36	35.03	34.16
951				100	2.85	19.36	35.03	34.16
952		Nufsfjord.	125	0	3.05	19.29	34.90	34.04
953		6½ miles SSO of N.		50	2.95	19.29	34.90	34.04
954				80	2.95	19.32	34.95	34.09
955				100	2.95	19.39	35.08	34.21
956				120	3.0			
957		Reine.	112	0	2.95	19.32	34.95	34.09
958				50	2.85	19.32	34.95	34.09
959				80	2.85	19.32	34.95	34.09
960				100	4.2	19.39	35.08	34.21
961	22	Tranødybet.	620	0	2.7	19.32	34.95	34.09
962		Between Tranø and		50	2.75	19.32	34.95	34.09
963		Lødingen.		80	2.75	19.32	34.95	34.00
964				100	2.7	19.32	34.95	34.09
965				120	2.65	19.32	34.95	34.09
966				150	2.7	19.32	34.95	34.09
967				180	2.8	19.52	35.31	34.43
968				190	6.25	19.75	35.73	34.83
969				200	5.5	19.75	35.73	34.83
970				250	6.25	19.75	35.73	34.83
971				400	6.3	19.91	36.02	35.10
972				500	6.3	19.91	36.02	35.10
973				600	6.3	19.91	36.02	35.10
974		Øgsfjord.	195	0	2.05	19.22	34.77	33.92
975		At the mouth.		20	2.2	19.24	34.81	33.95
976				50	2.3	19.24	34.81	33.95
977				80	2.35	19.24	34.81	33.95
978				100	2.35	19.24	34.81	33.95
979				150	2.4	19.24	34.81	33.95
980				190	2.6	19.27	34.86	34.00
981	23	Østnesfjord I.	27	0	2.1	19.22	34.77	33.92
982		At the head of the fjord.		20	2.35	19.24	34.81	33.95
983		Østnesfjord II.	135	0	2.3	19.22	34.77	33.92
984		Between Vaterfjord		20	2.3	19.22	34.77	33.92
985		and Følstad.		50	2.5	19.24	34.81	33.95
986				80	2.9	19.24	34.81	33.95
987				100	3.45	19.32	34.95	34.09
988				130	5.75	19.36	35.03	34.16
989		Østnesfjord III.	135	0	2.35	19.22	34.77	33.92
990		Abreast of Helle		20	2.45	19.22	34.77	33.92
991				50	2.6			
992				80	2.65	19.24	34.81	33.95
993				100	3.2	19.36	35.03	34.16
994				130	4.4			
995	26	Ørsnes.	105	0	2.8	19.39	35.08	34.21
996				50	2.8	19.39	35.08	34.21
997				80	2.8	19.39	35.08	34.21
998				100	4.7	19.50	35.28	34.39
999		Henningsvær.	160	0	2.7	19.32	34.95	34.09
1000				50	2.8	19.32	34.95	34.09
1001				80	2.8	19.40	35.01	34.23
1002				100	4.3	19.46	35.21	34.33
1003				140	4.65	19.54	35.35	34.45
1004		Balstad.	135	0	2.8	19.32	34.95	34.09
1005				50	2.8	19.32	34.95	34.09
1006				80	3.3	19.54	35.35	34.47
1007				100	4.5	19.57	35.40	34.52
1008				130	4.0	19.57	35.40	34.52
1009	27	Reine.	170	0	2.55	19.36	35.03	34.16
1010				50	2.8	19.40	35.01	34.23
1011				80	2.9	19.40	35.01	34.23
1012				100	4.6	19.54	35.35	34.47
1013				150	6.3	19.75	35.73	34.83
1014	30	Landego.	450	0	3.25	19.57	35.40	34.52
1015		67°22′ N.,		50	3.95	19.50	35.27	34.39
1016		3°19′ E.		100	3.65	19.54	35.35	34.47
1017				120	4.3	19.64	35.53	34.64

Nr.	1900 Date	Locality	Soundings	Depth from which sample was obtained	Temperature of the water at that depth	Saline contents		
						Cl. per litre	Salt per litre	Sa pe mi
	March		Metres	Metres	C⁰			
1018	30	Landego.		150	5.3	19.66	35.57	34
1019				200	5.9	19.90	36.00	35
1020				260	6.0	19.90	36.00	35
1021				300	6.05	19.93	36.04	35
1022				400	6.2	19.93	36.04	35
1023				450	4.0?			
1024		Arnø.	410	400	6.55	19.96	36.11	35
		67°11′ N.,						
	April	3°15′ E.						
1025	2	Skjerstadfjord II.	185	0	2.5	19.11	34.58	33
1026				50	3.25	19.18	34.70	33
1027				80	3.5	19.19	34.72	33
1028				100	3.5	19.21	34.75	33
1029				150	3.2	19.26	34.85	33
1030				185	3.35	19.26	34.85	33
1031		Skjerstadfjord IV.	330	250	3.2	19.29	34.90	34
1032				300	3.2	19.29	34.90	34
1033				330	3.15	19.29	34.90	34
1034		Skjerstadfjord V.	420	0	2.4	19.18	34.70	33
1035		Off Kvænflaaet.		20	2.45	19.18	34.70	33
1036				50	3.4	19.18	34.70	33
1037				80	3.55	19.21	34.76	33
1038				100	3.5	19.21	34.76	33
1039				150	3.3	19.26	34.85	33
1040				200	3.2	19.26	34.85	33
1041				250	3.2	19.27	34.86	34
1042				300	3.15	19.29	34.90	34
1043				400	3.15	19.32	34.95	34
1044		Skjerstadfjord III.	230	200	3.2	19.26	34.85	33
1045		Skjerstadfjord VII.	480	400	3.2	19.32	34.85	33
1046		Off Fauske.		475	3.15	19.32	34.85	33
1047	4	Skjerstadfjord XII.	515	0	2.3	19.11	34.58	33
1048		Off Skjerstad		20	2.7	19.11	34.58	33
1049		church.		50	3.45	19.18	34.70	33
1050				100	3.4	19.24	34.81	33
1051				150	3.3	19.26	34.85	33
1052				200	3.25	19.26	34.85	33
1053				300	3.2	19.29	34.95	34
1054				500	3.15	19.32	34.95	34
1055		Skjerstadfjord XIV.	400	400	3.05	19.32	34.95	34
1056	5	Saltenfjord II.	320	0	3.2	19.33	34.97	34
1057		67°14′.5 N.,		20	3.15	19.33	34.97	34
1058		14°26′ E.		50	3.1	19.33	34.97	34
1059				60	3.6	19.54	35.35	34
1060				80	4.4	19.62	35.49	34
1061				100	5.0	19.73	35.69	34
1062				120	5.9	19.76	35.75	34
1063				150	6.2	19.82	35.86	34
1064				200	6.55	19.89	35.98	35
1065				250	6.65	19.93	36.05	35
1066				320	6.65	19.93	36.05	35
1067	6	Foldenfjord I.	530	0	3.2	19.33	34.97	34
1068		67°37′ N.,		20	3.1	19.33	34.97	34
1069		15°2′ E.		50	3.1	19.46	35.21	34
1070				80	4.2	19.46	35.21	34
1071				100	4.15	19.50	35.28	34
1072				120	5.55	19.78	35.78	34
1073				150	6.4	19.91	36.02	35
1074				200	6.6	19.78	35.78	34
1075				250	6.6	19.82	35.86	34
1076				300	6.6	19.82	35.86	34
1077				400	6.55	19.92	36.04	35
1078				500	6.55	19.85	35.91	35
1079	7	Vestfjord.	315	0	2.85	19.31	34.94	34
1080		Between Fladø and		20	2.8	19.33	34.97	34
1081		Skroven.		50	3.6	19.38	35.06	34
1082				60	4.55	19.60	35.46	34
1083				80	5.65	19.63	35.51	34
1084				100	6.4	19.63	35.51	34
1085				120	6.45	19.83	35.87	34
1086				150	6.45	19.85	35.91	35
1087				200	6.5	19.90	36.00	35
1088				250	6.5	19.90	36.00	35
1089				300	6.5	19.92	36.04	35
1090		Høla.	150	0	2.95	19.25	34.33	33
1091		At Svolvær.		10	2.55	19.25	34.33	33
1092				20	2.5	19.32	34.95	34
1093				50	2.5	19.34	34.99	34
1094				80	2.75	19.25	34.83	33
1095				100	3.95	19.51	35.30	34
1096				120	4.95	19.57	35.40	34
1097				150	5.85	19.78	35.80	34