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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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 Væro	0—50, 0—100, 0—180	41—52
3	—	Vestfjord II. nearer Væro	0—50, 0—100, 0—200	53—63
4	14_{1}	Moskenstrommen	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 Gaukværo	0—50, 0—110	91—97
9	19_{1}	40 miles NW of Gaukværo	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}	Tromsosundet	0—5	134
12	24_{1}	Kvænangen I. between Logo 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 Stonnesbotn	0—100, 0—300	182—194
18	31_{1}	Folstad, Ostnesfjord	0—50, 0—135	214—223
19	—	Helle, Ostnesfjord	0—50, 0—150	224—234
20	—	Hola, 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}	Tranodybet, between Tranø and Lodingen	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 Oijord	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	—	Strommen I. at Hemmingsvær	0—80	332—335
37		Strommen II. at Hemmingsvær	0—30	336—338
38	16_{2}	Mouth of the Raftsund	0—275	
39	17_{2}	Oxsund, between Hammero 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	—	Moskenstrommen	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. $9^{1}{}_{2}$ miles SSE of U.	0—100, 0—200	436—443
50		Henningsvær I. 6 miles SWbW$^{1}{}_{2}$W of H.	0—100, 0—140	444—450
51	10_{3}	Raftsundet	0—45	479—481
52	—	Risværflaket, outside the Ogsfjord	0—50, 0—150	455—460
53	11_{3}	Kanstadfjord III, inside the ridge	0—90	488
54	14_{3}	Ogsfjord I. at the head of the fjord	0—90	522—525
55	—	Ogsfjord II. at Halvarso	0—200	526—531
56	16_{3}	Tranodybet, between Tranø and Lodingen	0—50, 0—100, 100—200, 200—300, 300—400, 400—500, 500—600	532—542
57	18_{3}	Tranodybet	0	544
58	20_{3}	Henningsvær II. 6 miles SbE$^{1}{}_{2}$E of H.	0—100, 0—280	579—589
59	21_{3}	Væro. 7 miles SbW of Maahornet	0—100, 0—170	596—603
60	22_{3}	Rosthavet, 60 miles NW of Rost	0—100, 0—900	604—618
61	24_{3}	Rost I. outside R.	0—120	623—628
62	—	Rost II. outside R.	0—100	631—633

Nr.	Date	Name	Depth in metres	Corresponding samples in the hydr. tables
	1899			
63	25/3	Rost II, further in than Rost	0—150	640—644
64	28/3	Tysfjord I, further in than Skarberget	0—100, 0—700	651—663
65	29/3	Tysfjord II, further in than the Tysfjord church	0—100, 0—400	664—672
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	Folstad, Ostnesfjorden	0—3	688—689
69	—	Helle, Ostnesfjorden	0—3	692—693
70	—	Brettesnes II	0—3	682—683
71	—	Skroven	0—3, 0—150	697—702
72	—	Hola, at Svolvær	0—3, 0—150	703—709
73	10/4	Stene in Bo, Vesteraalen	0	
74	11/4	Gaukværø II, Vesteraalen	0—3, 0—250	748—756
75	12/4	Malangen, off Stonnesbotn	0—100, 0—380	757—767
76	13/4	Stonnesbotn	0—3	
77	—	Senjenhavet	0—80	772
78	14/4	Malangen	0—3, 0—50, 50—100, 100—200, 200—300, 300—380	773—782
79	19/4	Kvænangen I, betw. Spilderen and Kvænangstinderne	0—50, 0—160	783—789
80	—	Kvænangen II, off Noklen island	0—90	790—793
81	20/4	Jøkelfjord, at the head of the fjord	0—3, 0—50, 0—100	794—798
82	21/4	Jøkelfjord III, off the Tverfjord	0—90	799—802
83	—	Kvænangen, between Spilderen and the northern mainland	0—100, 100—200, 200—300	803—810
84	22/4	Hammerfest harbour	0—8	
85	23/4	Troldfjord, in Rolfso	0—6	
86	24/4	Ingøhavet	0—100, 0—300	811—823
87	25/4	Breisund	0—3	830—832
88	26/4	Repvaag harbour, Porsangerfjord	0—10	
89	27/4	Porsangerfjord	0—75, 100—200	833—840
90	1/5	Vardø	0—200	847—853
91	3/5	Lyngen I, off Skibotn	0—100	861—866
92	—	Lyngen II, off the Kaafjord	0—250	867—874
93	—	Lyngen III, between Gamvik and Ulo	0—300	875—884
94	5/5	Hola, Svolvær	0—150	885—893
	1900			
95	20/3	Hola, Svolvær	0—50, 0—140	894—901
96	—	Skroven, 1 mile SSE of S.	0—50, 0—100, 0—400	902—912
97		Henningsvær, $2^3/_4$ miles off H.	0—50, 0—100, 0—200	914—921
98	21/3	Strommen at Henningsvær	0—60	929—931
99	—	Balstad I	0—50, 0—100, 0—200	932—941
100	—	Reine	0—110	957—960
101	22/3	Tranedybet	0—600	961—973
102	23/3	Ostnesfjord I, at the head	0—25	981—982
103	—	Ostnesfjord II, between Vaterfjord and Folstad	0—130	983—988
104	—	Ostnesfjord III, off Helle	0—130	989—994
105	26/3	Orsnes	0—100	995—998
106	—	Balstad	0—130	1004—1008
107	27/3	Reine	0—150	1009—1013
108	30/3	Vestfjord	0—25	
109	2/4	Skjerstadfjord II	0—100, 0—180	1025—1030
110	—	Skjerstadfjord IV	0—330	1031—1033
111	—	Skjerstadfjord V	0—420	1034—1043
112	3/4	Skjerstadfjord VII	0—490	
113	4/4	Skjerstadfjord XII	0—50, 0—100, 0—500	1047—1054
114	5/4	Misværfjord	0—25	
115	—	Seivaagen, Saltenfjord	0—20	
116	—	Saltenfjord II	0—50, 0—330	1056—1066
117	6/4	Foldenfjord	0—530	1067—1078
118	—	Foldenfjord I	0—100, 100—200, 200—300, 300—400, 400—500	1067—1078
119	7/4	Vestfjord, between Flado and Skroven	0—50, 0—315	1079—1089

b. Plankton tables.

Date	12/4 1899		13/4						14/4		17/4						18/4	
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
Fish eggs																		
Pasiphæa tarda																		
Nyctiphanes norvegica																		
Boreophausia inermis											rr							
Thysanoessa neglecta																		
— *longicaudata*			rr				rr											
Boreomysis arctica																		
Hemimysis abyssicola																		
Eggs and Larvæ of *Schizopoda*																		
Parathemisto oblivia													rr					
Euthemisto compressa																		
Nauplii and *Cypris* of *Cirripedia*																		
Conchoecia sp.																		
Calanus finmarchicus	r	c	r	r	c	r	r	c		r	+	r	r		c	r	+	
hyperboreus																		
Eucalanus elongatus	r	r		r	+		r	r		+	r					r		
Chiridius armatus																		
tenuispinus																		
Euchæta norvegica				rr									rr		rr			
Scolecithricella minor																		
Temora longicornis										rr								
Metridia lucens		c		r	+	rr	r	+		r	r		rr	rr	r		r	
— *longa*		r																
Pleuromamma robusta																		
Heterochabdus norvegicus																		
Candacia armata																		
Acartia sp.		r	r		r	r	r	r		r	r		r		r	r	r	
Oithona similis	+	c	+	+	c	+	c	c	+	c	+	r	+	r	+	c	c	
— *plumifera*					r		r	r	rr	rr			rr				rr	
Microsetella atlantica	r		+	+	r	r	r	r	r		r		r	r	r	+	+	
Oncæa conifera																		
Young and Larvæ of *Copepoda*		+	+		+	r		+		+						r		
Limacina balea								r		r								rr
Larvæ of *Gastropoda*																		
— - *Pelecypoda*																		
Oikopleura sp.																		
Fritillaria sp.								r										
Cyphonautes																		
Larvæ of *Echinodermata*																		
— - *Polychæta*																		
Chætognata							rr											
Bolina sp.																		
Arachnactis albida																		
Cuphita sarsii																		
Physophora borealis																		

Date	19/1			21/1			23/1	24/1										
Station	Gaukværø			Senjen			Troms sund	Kvænangen I				Kvænangen II			Lyngen I			
Depth in metres	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—115	
Fish eggs																		
Pasiphaea 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	cc	
— *hyperboreus*																		
Pseudocal. elongatus						r	r			r	r			r	r		r	
Chiridius armatus																		
— *tenuispinus*																		
Euchaeta norvegica																		
Scolecithricella minor																		
Temora longicornis																		
Metridia lucens											r	r		r				
— *longa*																		
Pleuromamma robusta																		
Heterorhabdus norvegicus																		
Candacia armata																		
Acartia sp.		r				r	r							ri				
Oithona similis	r	+	r		—	+	r		r	+	+	r	r	r	+	+	c	
— *plumifera*					rr													
Microsetella atlantica				rr	rr	r	—		+	+	+	r	r	r	r	r	+	
Oncaea conifera																		
Young and Larvæ of *Copepoda*																		
Limacina balea						rr												
Larvæ of *Gastropoda*																		
— *Pelecypoda*																		
Oikopleura sp.										r				r				
Fritillaria sp.																		
Cyphonautes																		
Larvæ of *Echin. decimata*																		
— *Polychæta*																		
Chætognata		rr								rr	i			rr		rr		
Bolina sp.																		
Arachnactis albida																		
Cupulita sarsii							c											
Physophora hercalis																		

27/1						29/1		31/1							1/2					3/2					
Lyngen II				Lyngen III		Malangen		Folstad		Helle		Hola			Henningsvær		Vestfjord		Skrovven	Raftsund	Raftsund II				
0—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—250		
					rr				rr																
										rr	r						rr					r			
								r	r	r	r	rr						rr			rr	+	r		
c	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			r		
		r			r																		rr		
						r	r									r									
		r				r	r									r									
+	+	+	+	c		+	+	r	c	+	c	c	c		c		—	+	c	—	+	c	c		
									rr							rr		rr	rr			rr			
r	r	r	r	+		+	+	r	c	+	c	c	c		c	c	+	c	+	+	—	e			
												rr													
							r															r			
						r	r																		
																							rr		
rr	rr								rr				rr			rr	rr	rr				rr			
		+																							

Date	4/2					6/2				7/2								
Station	Skroven					Tranodybet				Ofoten I				Ofoten II			Rombaken I	Romb. II
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—110
Fish eggs																			
Pasiphæa tarda														rr					
Sycliphanes norvegica																			
Boreophausia inermis																			
Thysanoessa neglecta																			
— *longicaudata*																			
Boreomysis arctica																			
Lemimysis 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	cc	+	+		+				rr	
Calanus finmarchicus	c	r	cc	cc	cc	+	+	c	cc		c	cc	cc	cc	c	cc	cc		
— *hyperboreus*	r				+				+			rr	rr	c		r	—		
Pseudocal. elongatus	r				r						r	+	+	+			+	r	+
Thiridius armatus					rr														
tenuispinus														rr					
Euchæta norvegica			r	r	+			+	rr			+	+	+	+	+	+		
Scolecithricella minor																			
Temora longicornis																			
Metridia lucens			rr	r	r														
— *longa*	r			rr	r				r			+	+	+		r	+		
Neuromamma robusta					rr														
Heterorhabdus norvegicus														r		rr			
Candacia armata					rr														
Lucicutia sp.			r																
Oithona similis	+	+	c	c	c		+	+	+	+	+	c	+	+	c	c	+	c	cc
— *plumifera*			rr	rr	rr		rr			rr			rr		rr	rr	rr		
Microsetella atlantica	+	+	c	c	c		+	+	+	c	+	c	+	+	c	c	+	c	c
Oncæa conifera				rr														rr	
Young and Larvæ of *Copepoda*																			
Limacina balea	r			r								r	r			r	r		
Larvæ of *Gastropoda*																			
— - *Pelecypoda*																			
Dikopleura sp.																			
Tectillaria sp.																		+	
Typhomantes																			
Larvæ of *Echinodermata*																			
— - *Polychæta*																			
Chætognati	rr				rr			rr	r		rr	r	rr	r	rr	rr	rr		
Salina sp.																			
Brachiactis albida																			
Unpalita sarsii																			
Thysophora borealis																			

Rombaken III			Skjom. I	Ofotenfj.	Skrøven				Strøm I	Strøm II	Rødsand	Oxebåe							Sørfjord		
0—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—200
															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	+	+	c	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		r	rr				
								rr	rr												
+	c	+	+		r	c	+	c	+	r	c	r	c	r	c	+	c	r		+	c
								rr				r	+		rr						
+	+	r			r	r	r	+	+	r	+	c	c	c	c	—	c	c	r	+	+
														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		Moskenstrom	Kirkfj. I	Reine I		Üre I		Henningsvær 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—140
Fish eggs														rr				
Pasiphaea 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	
Raftsund	Risværflaket		Kanstadfj. III	Øgsfj. I	Øgsfj. II	Tranødybet								Henningsvær II		Værø		Røsthavet		Røst I	Røst II
0—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—100
														+	+	rr				+	r
							rr			rr		rr			rr						
																			rr		
																				+	
								+	c	+	+	+									
r	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
r	+	+	c	c	+	c	c	+	+	r	r	r	rr	+	+	r	+	+	+	+	+
	rr						rr	rr			rr							rr			
r	+	+	c		+	+	+	+	+	r	r	r		+	+	r	+	r	r	+	+
																				rr	
						rr	rr		r	rr	r	+		rr	rr						

Date	$^{25}/_{3}$	$^{28}/_{3}$		$^{29}/_{3}$									$^{1}/_{4}$			
Station	Røst II	Tysfjord I		Tysfjord II				Tysfjord I					Lille Molla	Folstad	Helle	Bretnesnes II
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—3
Fish eggs	+													c	r		+
Pasiphaea 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				
Oncæa 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																	

$^{4}/_{4}$				$^{10}/_{4}$	$^{11}/_{4}$			$^{12}/_{4}$		$^{13}/_{4}$		$^{14}/_{4}$							$^{18}/_{4}$			$^{20}/_{4}$		
Skroven		Høla		Stene	Gaukværø II			Malangen		Stonnesbotn	Senjenhavet	Malangen							Kvænangen I		Kvæn. II	Jokelfjord		
0—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	
									rr							+	+			r	r		c	c
	r		r																					
																								rr
	r															rr	rr						c	+
	+										+		rr		rr				+	+	+		+	–
																	rr							
	c		r					rr							r	r			r	r	r		c	c
																					rr			rr
	+	c									+								+	+	+			
																					r			
											r													
																			+	+	+			
																							rr	
																							r	
																						–	c	+

Date	21/4				22/4	23/4	24/4		25/4	26/4	27/4		1/5	3/5			5/5
Station	Jokelfjord III	Kvænangen			Hammerfest	Troldfjord	Ingohavet		Breisund	Repvaag	Porsangerfj.		Vardo	Lyngen I	L. II	L. III	Hola
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—150
Fish eggs					rr				rr		rr						rr
Pasiphœa tarda																	
Nyctiphanes norvegica																	
Boreophausia inermis																	
Thysanoessa neglecta																	
— *longicaudata*																	
Boreomysis arctica																	
Hemimysis abyssicola																	
Eggs and Larvæ of *Schizopoda*							r				r		c				
Parathemisto oblivia																	rr
Enthemisto compressa																	
Nauplii and *Cypris* of *Cirripedia*		+			+	—							+				+
Conchoecia sp.																	
Calanus finmarchicus		+	r		rr								+			rr	c
— *hyperboreus*																	+
Pseudocal. elongatus	+	+		r	r												
Chiridius armatus																	
— *tenuispinus*																	
Euchæta norvegica																	r
Scolecithricella minor		r															
Temora longicornis																	
Metridia lucens	rr		rr		rr												
longa															rr		
Pleuromamma robusta																	
Heterorhabdus norvegicus																	
Candacia armata																	
Acartia sp.																	
Oithona similis		r	r										r			r	r
— *plumifera*							rr										
Microsetella atlantica	c	r	r	r	r	r						rr		rr			rr
Oncæa conifera																	
Young and Larvæ of *Copepoda*													c		r		cr
Limacina balea																	
Larvæ of *Gastropoda*																	
— - *Pelecypoda*																	
Oikopleura sp.			r		r											rr	
Fritillaria sp.																	
Cyphonautes																	
Larvæ of *Echinodermata*																	r
— - *Polychæta*		r			+	r				r							+
Chætognata			rr														
Bolina sp.					r												
Arachnactis albida																	
Cupulita sarsii		r			c												
Physophora borealis																	

20/3 1900								21/3					22/3	23/3			26/3		27/3	30/3	2/4	
Hola		Skroven			Henningsvær			Strømmen	Balstad I			Reine	Tranødybet	Østnesfjord I	II	III	Orsnes	Balstad	Reine	Vestfj.	Skjerstad II	
0–50	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	0–180
	r	rr	r		r	+	+	r		rr		cc		r			r		cc			
													r									r
				rr																		
								r							r					r	+	
				+									c		+							
		+	+	c	+	+	+	r	r	+	+	c	c				r	+	+			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									r
				rr																		rr
+	c	+	+	+	r	r	r	+	r	r	+	+	c		c	+	c	+	+		c	c
											rr						rr					
+	c	+	+	+	r	r	r	+	r	r	+	+	c		c	c	c	+	+		c	c
																					rr	rr
+	+	r	+	c	c	c	c	+	+	+	+	c	c		+	c	c	c	cc		+	c
																				r		
r	r	r	r			r	r	r					r	r	+		r		r			r
								r				r	r	r	+	—	—	r	r			
				rr									—									c

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					Vestfjord	
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—315
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																		
Acartia 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*																		
— - *Telecypoda*																		
Oikopleura sp.																		
Fritillaria sp.																		
Cyphonautes																		
Larvæ of *Echinodermata*	r									r	r							
— - *Polychæta*		r				r	r	+	+			r						
Chætognata	c	c	r			r					c		rr		r	cc		
Bolina sp.																		
Arachnactis albida																		
Capulita sarsii																		
Physophora horeatis																		

Siphonophora.

Diphyes arctica, Chun.

It is very interesting to be able to class this arctic siphonophor among the Norwegian fauna, as it is looked upon as being a typical or leading organism of the cold currents[1]).

C. Chun writes in this connection: — „*Diphyes arctica* ist eine hochnordische Form, welche in allen warmen Stromgebieten fehlt und gerade während der kältesten Jahreszeit (von Januar bis März) in der Baffins-Bai häufig erscheint."

A complete list of the distribution of this species as far as then known is given by F. Römer[2]). Both Römer and Chun have specially emphasized the fact that this species is not found on the Scandinavian coasts. But this is no longer a fact; for in the winter of 1900, I found *Eudoxia arctica* at the following places:—

$^{3}/_{5}$ 1900. The Skjerstad Fiord VII, 0—490 m.

$^{6}/_{4}$ — The Folden Fiord I, 300—400 m.

I availed myself of Prof. Chun's excellent descriptions and drawings, in „Die Siphonophoren der Plankton-Expedition" (Se Tab. I, Fig. 6), when identifying these specimens.

The bracts were of precisely the same shape, and there was the same arrangement of the canals, but there were no eggs in the gonophor. So I think that there can be no doubt that *Diphyes arctica* also belongs to the Norwegian fauna; this does not, however, necessarily weaken Chun's opinion with regard to the zoogeographical character of this species. True the temperature at the place where I found it in The Folden Fiord was 6°.6 C. and salinity about 35 pro mille, but so many of the relict organisms from the glacial period have adapted themselves to the physical conditions in which they find themselves in a corresponding manner to the case here under consideration.

Cupulita sarsi, Haeckel.

Agalmopsis elegans, M. Sars (part), Fauna littoralis Norvegiae (1846). Part I. p. 32, pl. V, figs. 1—6, pl. VI.

Cupulita sarsi, Haeckel, Siphonophora (1888) Challenger Report, Vol. XXVIII, p. 234, 367.

— E. T. Browne. The Fauna and Flora of Valencia Harbour. R. I. A. Proc. Ser. III. Vol. V. p. 678.

Agalmopsis elegans. Nordgaard, Some Hydrographical Results. Berg. Mus. Aarbog 1899, no. VIII, pag. 25.

As is well known Michael Sars in 1846 gave a detailed description with drawings of Siphonophora collected at Floro (61° 30′ N.) including *Agalmopsis elegans*. Concerning this Haeckel writes in 1888[3]). „The genus *Agalmopsis* was described very accurately by Sars in 1846, and illustrated by excellent figures. The North Atlantic Agalmidæ, however, which are represented in his pls. V and VI, belong to two (or even three?) different genera. The first form, figured in pl. V, has simple terminal filaments of the tentilla, and belongs therefore to the genus *Cupulita*.

The second form, represented in pl. VI, has tricornuate tentilla, with an odd terminal vesicle and two paired lateral horns. This form may retain the original name *Agalmopsis elegans* and represent the type of this genus."

After a careful examination of the description and drawings given by Michael Sars of *Agalmopsis elegans* one will certainly agree that Haeckel is right in dividing into two genera. But, on the other hand, I have come to a different conclusion with regard to Sars's figures as applied to the two genera.

On Sars's pl. V the figs. 5 and 6 represent tentilla „with a spiral cnidoband, enveloped by a campanulate involucre"[1]), and these, as well as fig. 1 show that the tentilla have simple terminal filaments, consequently they illustrate a species of *Cupulita*. But pl. V, figs. 7 and 8 represent tentilla with a terminal ampulla and two horns, and these are characteristic of the genus *Agalmopsis*. Neither can it be correct as Haeckel mentions (l. c. p. 367) that pl. VI in Sars's work, represents *Agalmopsis elegans*.

On pl. VI fig. 1 the tentilla are drawn partly with, and partly without terminal filaments. Fig. 10, on the same pl. gives a detailed drawing of the latter kind, and this has given rise to the thought that Sars possibly had a third genus under examination when preparing his account. There is, however, no longer any reason for this supposition. In fig. 1 the tentilla without terminal filament are drawn smaller than those which are furnished with the terminal filament, and it is reasonable to conclude that the former represent them in course of development. If one compares pl. VI fig. 10 in Sars's work with pl. II fig. 8 in Fewkes[2]) a striking resemblance will be noticed. Fewkes describes his fig. as representing an „embryonic tentacular knob" of *Cupulita (Nanomia) cara*, A. Agassiz.

It may surely be considered certain that Sars's fig. 10 represents a corresponding condition in *Cupulita sarsi*. This must be a *Cupulita* and not an *Agalmopsis*, for the tentilla which are developed are furnished with a terminal filament.

Thus it will be seen that Sars's descriptions and drawings almost exclusively are of the organism which Haeckel das designated *Cupulita sarsi*, as only pl. V, figs. 7 and 8 can be considered as representing *Agalmopsis elegans*, M. Sars.

According to E. T. Brown *C. Sarsi* is found on the west coast of Ireland (Valentia Harbour). As before mentioned, Sars made his collection at Floro.

I have observed this species in Moskenstrommen ($^{1}/_{8}$ 1899) in Tromsø Sound ($^{22}/_{1}$ 1899), at Lyngen II ($^{27}/_{1}$ 1899), at Kvænangen II ($^{19}/_{4}$ 1899), in the Jokel Fiord ($^{20}/_{4}$ 1899), at Kvænangen ($^{21}/_{4}$ 1899) in Hammerfest Harbour ($^{22}/_{4}$ 1899). At all these places they were found in great numbers near the surface of the water. Hammerfest is as far as is now known, the northernmost limit for *Cupulita sarsi*.

The question naturally suggests itself as to whether *Cupulita sarsi* and *C. cara* are one and the same.

To throw light on this point, I have compared both M. Sars's and Fewkes' (l. c. p. 213—223, pls. I, II, IIII) descriptions and drawings. There is a considerable coincidence with regard to figures representing general appearance (Fewkes pl. I, Sars pl. V fig. 1 and pl. VI fig. 1).

There is similarity with regard to the appearance of the adult tentilla (F. pl. II fig. 9 and S. pl. 5 fig. 5, 6) and the resemblance between the embryonic tentacular knobs (F. pl. II fig. 8, S. pl. 6, fig. 10) I have already mentioned. On the other hand, the tasters (hydrocystæ) appear to differ. Fewkes describes them (l. c. p. 218) as follows: — „They (the tasters) arise directly from the stem, and are destitute of a basal peduncle. The distal extremity is closed." Pl. II fig. 7 answers in every detail to this description. On comparing with this S. pl. 5 fig. 2, 3, where the tasters are described

[1]) Die Siphonophoren der Plankton-Expedition, p. 20.

[2]) Die Siphonophoren (Fauna arctica, II B., p. 174).

[3]) Challenger Report. Vol. XXVIII. p. 234.

[1]) Haeckel, (*loco citato* p. 233).

[2]) On certain Medusæ from New England 1888. Bull. Comp. Zool. (Harvard, Mass.). Vol. XIII.

as „lange Bläschen“ (distinguished by the letter e), it will be seen that they are furnished with a basal peduncle, and that the top of the taster is somewhat extended and pointed. In his description of the tasters, Fewkes says that „the most marked peculiarity in their anatomy is the existence of an „oil globule“ near their base.“ This „oil globule“ is drawn by the writer mentioned and will be found on pl. II fig. 7. Nothing corresponding to this is found in Sars's pl. 5 figs. 2, 3. To discover if any such „oil globules“ exist in *Cupulita sarsi* I examined the remains of a specimen from Tromsø sound. It was at once evident that while the majority of the various organs as usual fell to the bottom of the glass, there were a few small bits which remained on the surface of the preserving fluid (formalin). On closer examination, it was found that the little pièces floating on the surface were tasters which had risen to the top on account of their oil globules. Here too, there appears to be a difference between the two species under discussion. While the oil globules of *C. cara* according to Fewkes are sessile, those of *C. sarsi* are provided with a short peduncle. It is possible that the reason, why the oil globules do not appear on Sars's pl. 5 figs. 2, 8 is that they so easily burst on being touched. Sars has, however, given a drawing (pl. 6 fig. 11) of a taster with oil globule, which he considers to be „eine seltene Form der ovalen Bläschen“, while the oil globule itself is described as „Kugeliger Anhang“. These oil globules are most likely intended to act as a kind of hydrostatic apparatus.

As will be seen from the foregoing, differences can clearly be pointed out between *C. cara* and *C. sarsi*, and it is probable that they represent two different species which are, however, very similar. The fact of *C. sarsi* being found in large quantities in the winter in such fiords as Lyngen, Kvænang and Jokel would seem to indicate that it is an arctic form, but one cannot be sure of this until its distribution is more clearly defined.

Physophora borealis. M. Sars.

Pl. IV. Figs. 1, 2.

In The Mosken current (Moskenstrømmen) several specimens of a *Physophora* were found swimming about near the surface, on March 1st 1899. On comparing M. Sars's drawings and descriptions[1]), I was convinced that it was his species which I had found. It has been thought that *borealis* was identical to *Physophora hydrostatica* of the Mediterranean, but this is, however, not altogether so sure as to be beyond doubt. If this should be proved to be the case Sars's name would have to give way for the older one, *hydrostatica*, Forsk.

M. Sars himself had an opportunity of comparing the Mediterranean form with the one he describes (l. c. p. 33) and it seems that he was acquainted with Claus's, Gegenbaur's and Köllicker's researches and examination of the former species. And as he still maintained that they were different, there is every reason to be wary before one concludes that they are not so.

M. Sars says, on page 40, „None of the urticary knobs observed by me shewed more than 5 spiral coils; but Claus (l. c. p. 26, fig. 26)[2]) in *P. hydrostatica* delineates 9—10 of them, and Gegenbaur remarks that the spiral in the most perfect urticary knobs becomes decomposed and lies twisted together in irregular coils, which is also apparent in some of the specimens brought home by me from the Mediterranean.“

In *borealis* too during the development of the tentacular knob, a dissolution of the spiral coils of the cnidoband takes place, after which they are reformed into irregular coils.

On Pl. IV fig. 1 in the present work a tentacular knob with spiral twisted cnidoband will be seen, while fig. 2, depicts a later stage, the spiral being unwound. I have observed intermediate stages between these two.

A thoroughly developed tentillum is depicted on Sars's pl. VI, fig. 7.

If it is a fact that the Coil unwinds itself in *P. hydrostatica*, then the figure given by Claus (pl. 26, fig. 26) cannot designate „ein vollkommen entwickelter Nesselknopf“. But even if on this point there is a similarity, there would still remain the dissimilarity that during development the spiral twist in the tentacular knobs are more numerous in *hydrostatica* than in *borealis*.

Cruspedota.

(Notes and identification are due to Dr. Edward T. Browne, University College, London).

Aequorea sp.

1/6 1899. Moskenstrømmen o. m.
This is probably a new species.

Aglantha digitalis. Müller.

22/3 1899. NW of Rost (Lofoten), 3 specimens.
This is a northern species. Recorded from Greenland, Norway, Faeroe Channel and in the North Atlantic by the „National“ Plankton Expedition. There is no evidence that it has been taken south of about latitude 58°.

Aglantha rosea, Forbes.

2/4 1900. The Skjerstad Fiord IV, 0—330 m., 1 specimen.
— „ — „ V, 0—420 m., 1 specimen.
This medusa got mixed up with *A. digitalis* until I found out (1898) that it had eight sense organs. (*A. digitalis* has only four). Recorded from The British Isles and Heligoland.

Ptychogastria polaris, Alman.

6/4 1900. Folden Fiord, 3 specimens.
2/4 1900. The Skjerstad Fiord IV, 0—330 m., 1 specimen.
3/4 1900. „ — „ VII, 0—490 m., 2 specimens.
This medusa was taken in Discovery Bay in Grinnel Land, up Smith Sound on the west side of Greenland. (*Peetyllis arctica* from Greenland and off Halifax—Challenger Exped.).

Homoeonema platygonon, Maas.

2/4 1900. The Skjerstad Fiord V, 0—420 m., 1 specimen.
3/4 1900. „ — „ VII, 0—490 m., 2 specimens.
H. platygonon was taken by the „National“ Plankton Expedition. The station is omitted in the Report.

[1]) Fauna littoralis Norvegiæ, h. 3. p. 32, pl. V, VI figs. 1—8.

[2]) Ueber *Physophora hydrostatica* nebst Bemerkungen ueber andere Siphonophoren. Sep. Abdruck aus Zeitschr. f. wiss. Zoologie. 10 B.

PLATE IV.

PLATE IV.

Fig. 1—2. *Physophora borealis,* M. Sars, Moskenstrømmen, 0 m., $^1/_2$ 1899.
„ 1. Tentacular knob, $^{83}/_1$.
„ 2. Older tentacular knob, $^{83}/_1$.
„ 3—5. *Eschara moskensis*, n. sp., Moskenstrømmen II, 150 m.
„ 3. Zooecium, $^{52}/_1$.
„ 4. Ooecium, $^{52}/_1$.
„ 5. Operculum, $^{83}/_1$.
„ 6—7. *Schizoporella candida,* Smitt, The Malangen Fiord, 100—200 m.
„ 6. Zooecium, $^{52}/_1$.
„ 7. Operculum, $^{83}/_1$.
„ 8—11. *Porella proboscidea.* Hincks, The North Cape.
„ 8. Zooecium, lateral view. a. a = avicular aperture, r. p = rosette-plate, h = hole, $^{52}/_1$.
„ 9. Mandible, $^{83}/_1$.
„ 10. Operculum, $^{83}/_1$.
„ 11. Oral aperture, the condyles are seen, $^{83}/_1$.
„ 12. *Pubnicellaria skenei* var. *tridens*, Busk, Radøsund, a little north of Bergen, 100 m., operculum, $^{83}/_1$.
„ 13. *Pubnicellaria skenei* var. *bicornis,* Busk, Jøkel Fiord III, 100 m., operculum, $^{83}/_1$.
„ 14—15. *Monoporella spinulifera,* Hincks, Hammerfest.
„ 14. Ooecium and oral aperture, $^{52}/_1$.
„ 15. Zooecium, lateral view, $^{52}/_1$.
„ 16—17. *Schizoporella reticulato-punctata*, Hincks, The Porsanger Fiord, 200 m.
„ 16. Ooecium with the upper part of the zooecium, $^{52}/_1$.
„ 17. Operculum, $^{83}/_1$.
„ 18—20 b. *Porella propinqua,* Smitt, Nordkap (1894).
„ 18. Zooecia, lateral view, a. u, avicularian umbo, o, ooecium, r. p, rosette-plate, $^{52}/_1$.
„ 19. The back side of the zoarium, $^{52}/_1$.
„ 20 a. Operculum, $^{83}/_1$.
„ 20 b. Ooecium, $^{83}/_1$.
„ 21—23. *Porella princeps*, Norman, Mehavn (1894).
„ 21. Operculum, $^{83}/_1$.
„ 22. Mandible, $^{83}/_1$.
„ 23. The under side of the front wall of the zooecium, showing the avicularian chamber (a. c) and the lateral channels (c h), $^{52}/_1$.
„ 24. *Smittina smitti*, Kirchenp., The Øgs Fiord I, 100 m., ooecium and the upper part of the zooecium. $^{52}/_1$.
„ 25—26. *Escharella labiata*, Boeck, Svolvær, on coal.
„ 25. Zooecium, lateral view, $^{83}/_1$.
„ 26. Base of the ooecium, $^{83}/_1$.
„ 27. Oral denticle of *Escharella immersa,* Flem., Moskenstrømmen, $^{83}/_1$.
„ 28. —:— — *ventricosa,* Hass., Hammerfest, $^{83}/_1$.
„ 29. —:— — *laqueata*, Norm., Hammerfest, $^{83}/_1$.
„ 30. —:— — *abyssicola*, Norm., The Bømmel Fiord, $^{83}/_1$.
„ 31. —:— — *labiata,* Boeck, Svolvær, $^{83}/_1$.
„ 32—35. *Eschara nordlandica*, n. sp., The Kvænang Fiord, 90 m.
„ 32. A young zooecium and ooecium, $^{52}/_1$.
„ 33. Oral aperture of the zooecium, c, condylus, r, opercular rib, $^{83}/_1$.
„ 34. Ooecium, $^{83}/_1$.
„ 35. Operculum, $^{83}/_1$.
„ 36—38. *Smittina majuscula,* Smitt, The Porsanger Fiord, 90 m.
„ 36. Zooecium and ooecium, $^{52}/_1$.
„ 37. Operculum, $^{83}/_1$.
„ 38. Mandible, $^{83}/_1$.