

KONGLIGA SVENSKA

VETENSKAPS-AKADEMIENS

H A N D L I N G A R.

NY FÖLJD.

TRETTIOFEMTE BANDET.

STOCKHOLM
KUNGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER
1901—1902

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THE PLANKTON

OF

THE NORTH SEA AND THE SKAGERAK

IN

1900

BY

P. T. CLEVE

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STOCKHOLM

KUNGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER
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During the year 1900 samples of plankton were collected regularly, 3 to 4 times a month, at Måseskär (or about 58° Lat N.) and Väderöboda (or about 59° Lat N.), on the west-coast of Sweden, in the North Sea, four times (February, April, August, November) by steamers on different routes and, besides, occasionally, by the Government-steamer »Svensksund» in the Skagerak and, in July-August, by a fishing boat off the Shetlands.

The following account contains the results obtained by the microscopical analysis of the samples and has been completed by hydrographical data, communicated by Professor S. O. PETERSSON.

January 1900.

Samples were collected at Måseskär (1 sample), at Väderöboda (3 samples) and by the steamer Svensksund on the route Vinga, Marstrand, Lysekil and Dröbak (mouth of Christiania Fjord). Most samples were collected from the surface water of the low salinity characterizing the Baltic Current, but at Dröbak a sample was hauled from the depth of 30 m. in water of 34 p. m. salinity, so also at 57° 59' N. 11° 14' E. from 90 m. The two samples from the water of 34 p. m. salinity were very different, and the temperature of the water was also different, viz. 7,46 at Dröbak, but 4,45 in the central Skagerak.

The plankton from Dröbak had a more oceanic character, but the plankton from Skagerak contained about the same species as the Baltic Current at that season, as will be seen from the following list:

	Hollö-Vinga 57° 59' N. 11° 14' E. Temp. 4,45. Sal. 34,35. 90 m.	Dröbak (Christiania- fjord). Temp. 7,46. Sal. 34,26. 30 m.		Hollö-Vinga 57° 59' N. 11° 14' E. Temp. 4,45. Sal. 34,35. 90 m.	Dröbak (Christiania- fjord). Temp. 7,46. Sal. 34,26. 30 m.
<i>Calanus finmarchiens</i>	—	r	<i>Gonyaulax spinifera</i>	—	rr
<i>Centropages hamatus</i>	—	—	<i>Biddulphia aurita</i>	r	—
<i>Microsetella atlantica</i>	—	c	<i>B. mobilensis</i>	r	—
<i>Oithona similis</i>	+	r	<i>Chaetoceros debilis</i>	c	—
<i>Oncaea minuta</i>	—	r	<i>C. decipiens</i>	r	—
<i>Pseudocalanus elongatus</i>	c	r	<i>C. diadema</i>	c	—
<i>Temora longicornis</i>	c	—	<i>Coccolodiscus polyehordus</i>	r	rr
<i>Acanthometron pellucidum</i>	—	+	<i>C. radiatus</i>	—	r
<i>Pleotophora arachnoides</i>	—	rr	<i>C. stellaris</i>	—	r
<i>Codonella ventricosa</i>	—	r	<i>Ditylum Brighwellii</i>	r	—
<i>Ceratium longipes</i>	c	—	<i>Rhizosolenia setigera</i>	r	—
<i>C. macroceros</i>	—	rr	<i>Thalassiosira gelatinosa</i>	r	—
<i>C. tripos</i>	c	r	<i>Thalassiothrix Frauenfeldii</i>	+	—
<i>Peridinium depressum</i>	—	r	<i>Halosphaera</i>	—	r
<i>P. divergens</i>	—	r			

The water of the Baltic Current proved very variable as to the salinity. At Kalfsund it only reached 6,94, and the plankton at that spot contained abundantly the euryhaline Copepods *Acartia longiremis*, *Centropages hamatus* and *Temora longicornis*, but besides, some fresh-water species, as *Asterionella gracillima*, *Tabellaria flocculosa* and colonies of a flagellate. At Marstrand and »Islandsbergs Hufvud» the water (15,80 and 18,37 p. m. s.) was sterile. The other samples from the surface-water of the Baltic Current contained a number of species, the most generally distributed of which were:

Copepoda.

<i>Acartia longiremis</i>	}	boreal, euryhaline forms.
<i>Centropages hamatus</i>		
<i>Pseudocalanus elongatus</i>		
<i>Temora longicornis</i>		
<i>Oithona similis</i> ; temperate, euryhaline and eurytherm.		

Ciliata.

Ptychocylis acuta; arctic, neritic.

Dinoflagellates.

Ceratium tripos; temperate, eurytherm. euryhaline.

Dinophysis acuta; boreal.

Chlorophyllaceæ.

Halosphaera; temperate.

Diatomaceæ.

Chaetoceros borealis; boreal and arctic.

C. danicus; temperate.

C. debilis; arctic and boreal.

C. diadema; arctic and boreal.

Coscinodiscus concinnus; boreal.

Thalassiothrix Frauenfeldii; boreal.

February 1900.

A. The North Sea was in the first days of February explored by steamers on different routes. The result of the examination of the plankton-samples collected by these steamers has been registered in Table I.

The plankton in the North Sea was very scarce in February as a rule and occurred in any quantity only above the edge of the 50-metre plateau of the bottom, chiefly north of the Dogger Bank.

The water of 35 p. m. salinity, E. of Scotland, was almost sterile. Most characteristic species of the water of 35 p. m. sal. were besides *Halosphaera*, *Acanthonia Mülleri*, *Acanthometron pellucidum*, *Plectophora arachnoides* and *Chaetoceros decipiens*. Other species seem to have migrated into this kind of water from that of 34 p. m. sal.

The water of 34 p. m. salinity contained *tripos-plankton*, and this plankton type was the ruling kind between Newcastle and Skagen, and most plentiful north of the Dogger Bank, thus above the limit between the 50- and 100-metre plateau of the bottom.

The bank-water west of Scotland contained abundantly *Coscinodiscus concinnus* and *C. radiatus*, which were carried with the 35 p. m. water round Scotland towards the mouth of the Skagerak. The only other characteristic forms which occurred in the bank-water were *Fungella arctica* (E. of Scotland) and *Tintinnopsis beroidea*, *Biddulphia aurita* and *Coscinodiscus polychordus* (W. of Denmark). Along the Dutch coast traces merely of southern neritic plankton occurred. Thus, the typical neritic plankton had not yet developed. In its place from the mouth of the Schelt to the West of Schleswig appeared the copepods *Temora longicornis* and *Pseudocalanus elongatus*, which evidently had spread from the depressions of the bottom S. of the Dogger Bank and W. of the Fisher Bank.

B. **The Skagerak.** The water at the two stations, where plankton was collected, had, between the 2nd and 6th of February a temperature between 2,1 and 3,0 and a salinity of 32 to 33 p. m., thus considerably higher than in January. This kind of water contained sparingly *tripos-plankton*, mixed with *Halosphaera*, but the condition of things soon became changed, as there appeared on the 7th of February at Måseskär *boreal neritic* and *sira-plankton* in water of the temperature — 0,35 and the salinity 22,72 p. m. This kind of plankton prevailed to the end of the month, both at Måseskär and at Väderöboda, the temperature varying from — 0,35 to — 1,0 and the salinity from 21,39 to 26,96. This kind of plankton was, as usually, very poor in animals and in one sample only were the copepods *Acartia longiremis* and *Temora longicornis* found in any amount. The diatoms were, on the contrary, very abundant, and among them the most important were the following:

<i>Biddulphia aurita</i> ,	<i>Coscinodiscus polychordus</i> ,
<i>Chaetoceros debilis</i>	<i>Skeletonema costatum</i> ,
<i>C. diadema</i> ,	<i>Thalassiosira Nordenskiöldii</i> ,
<i>C. socialis</i> ,	<i>Thalassiothrix Frauenfeldii</i> .

March 1900.

Samples were collected at Måseskär and by the steamer „Svensksund“ in Kattegatt (at Middelgrundet and 56° 33' N. 12° 16' E.) and at Vinga. The temperature of the water varied from 1,2 to 3 and the salinity from 25,21 to 33,63. The plankton was everywhere uniform, or *sira-plankton*, composed chiefly of diatoms. Besides the species, which occurred in February (among which *Chaetoceros debilis*, *C. diadema* and *Thalassiosira Nordenskiöldii* were very common) the following recurred constantly in almost all samples:

<i>Chaetoceros borealis</i> ,	<i>Rhizosolenia semispina</i> ,
<i>C. contortus</i> ,	<i>R. setigera</i> ,
<i>C. teres</i> .	

The animals occurred in some few samples only. The following were noted:

<i>Fritillaria borealis</i> ,	<i>Pseudocalanus elongatus</i> ,
<i>Caprella septentrionalis</i> ,	<i>Temora longicornis</i> ,
<i>Acartia longiremis</i> ,	<i>Cyttarocylis denticulata</i> ,
<i>Centropages hamatus</i> ,	<i>Ptychocylis acuta</i> ,
	<i>Tintinnopsis subacuta</i> .

All these animals are boreal or arctic.

At the station Vinga one sample of plankton was collected at the depth of 70 m., where the water had the temperature 4,91 and the salinity 34,52. The plankton was of the same kind as in the superficial stratum, but very poor.

April 1900.

A. **The North Sea** was explored on several routes by steamers, and the results of the examination of the samples of plankton have been registered in Table II.

It appears from the hydrographical determinations that water with 34—35 p. m. salinity extends from Scotland towards Skagerak and also E. and S. of the Dogger Bank.

The plankton of this kind of water is totally different from what it was in the winter. Of the then prevailing tripos-plankton insignificant traces only remain. Now the plankton consists chiefly of boreal, more or less neritic species, but intermingled with comparatively rare specimens of a considerable number of southern forms.

The plankton of the bank-water has a great number of species in common with the 34-water, so it is difficult to decide what forms characterize the one and other kind of water. In order to determine this question I noted the number of spots at which every species had been found in the one and other kind of water. If, with due consideration for the relative number of samples collected in the water of 34 p. m. and in the water of lower salinity, one species was found more frequently in one of these kinds of water, I concluded that it belonged properly to that kind.

The result of this investigation has been set forth in the following lists, in which frequently recurring forms have been printed with larger types.

Southern forms	Boreal or arctic forms
<i>Oikopleura dioica</i> ,	<i>Calanus hyperboreus</i> ,
<i>Paracalanus parvus</i> ,	<i>Phaeocystis Pouchetii</i> ,
<i>Codonella ventricosa</i> ,	<i>Gonyaulax spinifera</i> ,
<i>Halosphera</i> ,	<i>Chaetoceros brevis</i> ,
<i>Ceratium bucephalum</i> ,	<i>C. debilis</i> ,

<i>C. lineatum,</i>	<i>Rhizosolenia semispina,</i>
<i>C. macroceros,</i>	<i>Thalassiosira gravida,</i>
<i>Cerataulina Bergonii,</i>	<i>T. Nordenskiöldii,</i>
<i>Chætoceros curvisetus,</i>	<i>Thalassiothrix Frauenfeldi.</i>
<i>C. densus,</i>	
<i>C. Schüttii,</i>	
<i>Ditylum Brightwellii,</i>	
<i>Eucampia Zodiacus,</i>	
<i>Guinardia flaccida,</i>	
<i>Lauderia annulata,</i>	
<i>Rhizosolenia Stolterfothii,</i>	
<i>R. styliformis.</i>	

There can be no doubt that the southern forms have been transported from the west of Scotland and the boreal species from the region of Iceland or the Färöes. Among the southern forms we meet, although usually sparingly, a number of forms, which form the *didymus-plankton* of autumn. It seems thus that this kind of plankton, or the summer- and autumn-plankton of the continental coasts, originated, at least in part, from the development of specimens from the west of Scotland carried towards the Dogger and Fisher Banks and drifted through the depression of the bottom S. and E. of the Dogger Bank towards the continental coasts. This does not disprove that the *didymus-plankton* may originate, in part, in the English Channel, an opinion I held previously and for which a number of facts can be adduced.

If we now carry out a similar investigation for the plankton-forms of the bank-water, we get the following result:

Southern or temperate forms

Centropages typicus,
Oithona similis,
Evadne Nordmani,
Sagitta bipunctata,
Ceratium tripos,

Boreal and arctic forms

Fritillaria borealis,
Acartia longiremis,
Calanus finmarchicus,
Pseudocalanus elongatus,
Temora longicornis,
Fungella arctica,
Ptychocylis acuta,
Tintinnus bottnicus,
Pterosphaera Möbii,
Dinophysis rotundata,
D. Vanhöffeni,
Peridinium depressum,
P. ovatum,
P. pellucidum,
Asterionella Japonica,
Biddulphia aurita,

Chaetoceros atlanticus,
C. borealis,
C. contortus,
C. scolopendra,
Coscinodiscus concinnus,
C. radiatus,
C. oculus iridis,
Skeletonema costatum.

Of species found in the bank-water a few rare specimens only are of southern origin, but the boreal and arctic forms are enormously prevalent. It is thus proved that the bank-water at the end of the winter becomes at first populated by arctic and boreal species, which disappear or diminish during the summer, when the species of southern origin, which arrive in the spring, increase.

Species which occurred as often in the 34 p. m. water as in the bank-water were

<i>Acartia Clausii</i> ,	<i>Chaetoceros decipiens</i> ,
<i>Centropages hamatus</i> ,	<i>C. teres</i> ,
<i>Paracalanus parvus</i> ,	<i>Leptocylindrus danicus</i> .
<i>Ceratium furca</i> ,	
<i>C. fusus</i> ,	
<i>C. longipes</i> ,	
<i>Dinophysis acuta</i> ,	
<i>Peridinium pallidum</i> .	

B. **The Skagerak.** The plankton was, to judge from the samples collected at Måseskär, on the whole poor. Most arctic forms had disappeared. The only forms of any importance were *Chaetoceros borealis*, *C. contortus*, *C. decipiens*, *Rhizosolenia semispina*, *R. setigera*, *Thalassiothrix Frauenfeldii* and *Dinobryum*.

May 1900.

A. **The North Sea.** I have received three samples only from the Northeast of Scotland 58°—59° N. 1' E.—2' W., all collected in water of 35.32 p. m. sal. and the temperature 6.7 to 7.6. These samples contained the following species:

<i>Oikopleura dioica</i> +,	<i>Sagitta bipunctata</i> +,
<i>Calanus finmarchicus</i> c,	<i>Cyttarocylis denticulata</i> +,
<i>Centropages hamatus</i> r,	<i>Ceratium furca</i> r,
<i>Oithona similis</i> r,	<i>Chaetoceros decipiens</i> +,
<i>Pseudocalanus elongatus</i> c,	<i>Rhizosolenia styliformis</i> c,

The plankton was thus styli- and tricho-plankton, containing some neritic forms.

B. **The Skagerak.** The only samples examined were from Måseskär and Väderöboda. To judge from these samples the formerly prevailing arctic and boreal species had disappeared or died out. Still *Ceratium longipes* and *Coscinodiscus concinnus* are abundant and more common than formerly. On the other hand a number of southern forms commence to develop, for instance *Acartia Clausii*, *Oithona similis*, *Evadne Nordmani*, *Rhizosolenia gracillima*.

June 1900.

A. **The North Sea.** The only samples received that month were 7 collections taken by a fishing-boat on the 18th to 30th of June near the Shetland Islands, at 60° 20'—60° 40' N. 0° 17' E—2° 45' W., in water of the salinity 35,29 to 35,45 and the temperature 9,8 to 13,2.

The samples contained the following species:¹

<i>Cleodora pyramidata</i> c,	<i>Diplopsalis lenticula</i> r,
<i>Acartia Clausii</i> r,	<i>Peridinium depressum</i> +,
<i>Calanus finmarchicus</i> c,	<i>P. ovatum</i> +,
<i>Metridia lucens</i> +,	<i>P. pellucidum</i> r,
<i>Oithona plumifera</i> r,	<i>Dinobryum pellucidum</i> r,
<i>O. similis</i> +,	<i>Chaetoceros borealis</i> r,
<i>Oncœa minuta</i> rr,	<i>C. decipiens</i> r,
<i>Pseudocalanus elongatus</i> +,	<i>C. Lorenzianus</i> r,
<i>Ecadne Nordmani</i> +,	<i>C. peruvianus</i> r,
<i>Amphorella Norvegica</i> rr,	<i>Coscinodiscus oculus iridis</i> r,
<i>Cyttarocyclus denticulata</i> c,	<i>Dactyliosolen antarcticus</i> rr,
<i>Acanthometron catervatum</i> +,	<i>Guinardia flaccida</i> r,
<i>Ceratium bucephalum</i> r,	<i>Lauderia annulata</i> r,
<i>C. furca</i> c,	<i>Rhizosolenia ulata</i> r,
<i>C. fusus</i> r,	<i>R. gracillima</i> c,
<i>C. longipes</i> c,	<i>R. semispina</i> +,
<i>C. macroceros</i> rr,	<i>R. Shrubsolei</i> r,
<i>C. tripos</i> +,	<i>R. styliiformis</i> c,
<i>Dinophysis acuta</i> r,	<i>Thalassiosira Nordenskiöldii</i> +.

This list shows that the plankton was a mixture of styli-plankton and a number of boreal species. Especially interesting is the occurrence of *Thalassiosira Nordenskiöldii* at that time of the year near the Shetlands. *Cleodora pyramidata* is also of interest. According to BOAS² and MUNTHER³ the distribution of this pteropod is in the north of a line between Buenos Ayres and the Cape of Good Hope to about 50° N., besides, according to Boas, from the mouth of Davis' Strait to the Shetlands. This species thus belongs to the *desmo-plankton*. The occurrence of the antarctic species *Dactyliosolen antarcticus* is also remarkable.

¹ Boreal or arctic forms marked by larger types.

² Acta Havn. (6) IV n. 1 p. 69 1886

³ Bihang till K. Sv. Vet. Ak. Handl. Vol. XIII Part. IV n:r 2 p. 17.

B. **The Skagerak.** Samples were collected at Måseskär and Väderöboda. These samples contained abundantly *Rhizosolenia gracillima* and *Coscinodiscus concinnus*; other diatoms were of no importance. *Ceratium tripos* was very common and indicates that the *tripos-plankton* now was, together with a kind of *southern neritic plankton*, *N m α*, the prevailing type. Characteristic species other than these were *Oithona similis*, *Evadne Nordmani*, the latter, as usually, accompanied by *Podon Leuckarti*. The occurrence of *Temorella affinis* indicates a strong flow of the Baltic Current.

July—August 1900.

A. **The Shetlands.** Some samples were collected by a fishing vessel on the 2nd of July at 60° 40' N. and 2° 45' W. from the depths of 200—50 m., 50—10 m. and the surface. The contents of the 3 samples have been registered in the following table:

	Surface (t. 12, ³⁰ s. 35, ⁴⁴)	50—10 m. (at 40 m. t. 11, ⁸⁰ s. 35, ⁴⁶)	200—50 m. (at 200 m. t. 9, ⁰⁰ s. 35, ⁴²)		Surface (t. 12, ³⁰ s. 35, ⁴⁴)	50—10 m. (at 40 m. t. 11, ⁸⁰ s. 35, ⁴⁶)	200—50 m. (at 200 m. t. 9, ⁰⁰ s. 35, ⁴²)
<i>Calanus finmarchicus</i>	—	r	+	<i>C. longipes</i>	—	—	+
<i>Metridia lucens</i>	—	—	r	<i>C. tripos</i>	c	+	+
<i>Microsetella atlantica</i>	—	r	r	<i>Dinophysis acuta</i>	—	r	—
<i>Oithona plumifera</i>	—	—	+	<i>D. homunculus</i>	—	—	rr
<i>O. similis</i>	r	+	+	<i>Diplopsalis lenticula</i>	—	r	—
<i>Onca minuta</i>	—	—	rr	<i>Peridinium divergens</i>	—	r	—
<i>Pseudocalanus elongatus</i>	—	—	r	<i>P. oceanicum</i>	—	—	rr
<i>Salpa</i> sp.	—	—	r	<i>P. ovatum</i>	r	—	—
<i>Cyttarocypris denticulata</i>	r	r	—	<i>Chaetoceros Lorenzianus</i>	rr	—	—
<i>Acanthometron catervatum</i>	—	—	+	<i>Coscinodiscus oculus iridis</i>	—	—	rr
<i>Acanthonia Mülleri</i>	—	—	r	<i>Dactyliosolen antarcticus</i>	—	r	—
<i>Challengeria xiphodon</i>	—	—	rr	<i>Nitzschia liucola</i>	r	—	—
<i>Collozoum inerme</i>	—	r	r	<i>Rhizosolenia gracillima</i>	+	+	c
<i>Hexalonche hexacantha</i>	—	—	rr	<i>R. styliformis</i>	r	+	—
<i>Ceratium furca</i>	c	c	+	<i>Thalassiothrix longissima</i>	r	—	—
<i>C. fusus</i>	—	+	+				

It is apparent from this list that the plankton (styli-plankton) originated in the temperate Atlantic and contained only few and rare northern forms. The occurrence of *Dinophysis homunculus* and of *Chaetoceros Lorenzianus* at the Shetlands marks the extreme northern limit for these species.

B. **The North Sea in July-August.** The North Sea was explored at the end of July and the beginning of August by a number of steamers on different routes. The results of the analysis of the numerous samples of plankton collected have been registered in Table III.

The determinations of the salinity prove that all kinds of water, from 35 to 24,⁶², are represented. If the species found in the plankton be classified according to the sali-

nity, it will be found that most species occur in all kinds of water. Still, I have tried to make out whether some species could not be considered as occurring chiefly in the one or other kind. The result was the following:

The 35 p. m. water contained exclusively or prevalently the following forms:

- Isias clavipes* (doubtless neritic),
- Podon Leuckartii* (doubtless neritic).

These species are to be considered as occasional intruders in a kind of water, to which they do not belong properly.

The 34 p. m. water:

- Acartia longiremis* (boreal, neritic),
- Labidocera Wollastoni* (meridional, neritic),
- Codonella ventricosa* (neritic, meridional and boreal),
- Ceratium longipes* (boreal),
- Dinophysis Vanhöffeni* (boreal, arctic),
- Gonyaulax spinifera* (boreal),
- Peridinium ovatum* (arctic and boreal),
- Peridinium pallidum* (arctic and boreal),
- Rhizosolenia Stolterfothii* (meridional, neritic).

The forms derive thus in part from the north and in part from the south.

Water of 32,⁴⁹ to 33,⁹⁵ p. m. salinity contained as most characteristic the following forms.

- Temora longicornis* (boreal, neritic),
- Sagitta bipunctata* (meridional),
- Amphorella subulata* (neritic, meridional and boreal),
- Noctiluca miliaris* (meridional, neritic),
- Ceratium bucephalum* (meridional),
- Peridinium globulus* (meridional, oceanic),
- P. oceanicum* (meridional, oceanic),
- Guinardia flaccida* (meridional, neritic),
- Leptocylindrus danicus* (meridional, boreal, neritic),
- Rhizosolenia calcar avis* (meridional),
- R. Shrubsolei* (meridional),
- R. styliiformis* (meridional, oceanic).

Most species characteristic for this kind of bank-water are thus of southern, in part of oceanic, origin. This indicates that they have been swept from the southern continental coasts by a flow of Atlantic water containing *styli-plankton*. As the characteristic Atlantic species *Rhizosolenia styliiformis* occurred abundantly along the dutch coast and from there sparingly to the Limfjord, it is evident, that water with *styli-plankton* had been driven through the English Channel.

Water of 24,60 to 32,05 p. m. salinity contained as characteristic forms:

- Proto pedata* (meridional, neritic),
- Cyttarocypris denticulata* (oceanic, boreal and arctic),
- Tintinnopsis campanula* (meridional, neritic),
- T. fistularis* (neritic, meridional),
- Noctiluca miliaris* (in common with the last kind of water),
- Bellerophon malleus* (neritic, meridional),
- Rhizosolenia gracillima* (oceanic and neritic, euryhaline, meridional).

Almost all these forms are thus of southern origin.

Most common or generally distributed in all kinds of water were the following:

- Oikopleura dioica* (meridional, neritic),
- Acartia Clausii* (meridional, oceanic),
- Anomalocera Patersonii* (meridional, neritic),
- Calanus finmarchicus* (boreal and arctic, oceanic),
- Centropages hamatus* (boreal, neritic, euryhaline),
- C. typicus* (meridional, oceanic),
- Oithona similis* (meridional, oceanic, euryhaline, eurytherm),
- Paracalanus parvus* (meridional, oceanic),
- Evadne Nordmani* (temperate or boreal, oceanic, euryhaline),
- E. spinifera* (meridional, oceanic),
- Podon intermedius* (meridional, neritic),
- Sagitta bipunctata* (meridional, neritic and oceanic),
- Amphorella Steenstrupii* (meridional, oceanic),
- Ceratium furca* (meridional, oceanic),
- C. macroceros* (meridional, oceanic),
- C. tripos* (meridional, oceanic),
- Peridinium divergens* (meridional, oceanic).

The common species are printed with larger types in the above list. Most common of all were *Ceratium macroceros* and *C. tripos*, and as they occurred in all kinds of water, the plankton of the whole North Sea at this time of the year may be classified as *tripos-plankton*. It is apparent from the last list that the bulk of this kind of plankton is of southern origin, a comparatively small amount only originating in boreal regions. There had thus since April been a complete change of water in the whole North Sea.

C. **The Skagerak, in July.** The only samples collected in June in the Skagerak were taken at the two stations Måseskär and Väderöboda. The temperature of the water varied at these stations from 13,0 to 18,80 and the salinity from 18,70 to 32,92.

The plankton was partly *tripos-plankton* and the variety of southern neritic-plankton, in which *Rhizosolenia gracillima* predominates (*N m a*). If the plankton at both stations be compared, a slight difference is apparent. At the more southern station, Måseskär,

thus appeared suddenly and abundantly *Rhizosolenia styliformis* and some other southern forms, not found or occurring only sparingly at Väderöboda, as *Rhizosolenia Shrubsolei*, *Guinardia flaccida*, *Chatoceros Schüttii*, *Evadne spinifera*; at Väderöboda on the contrary the northern *Pseudocalanus elongatus* and more abundantly than at Måseskär the southern *Acartia Clausii*, *Oithona similis*, *Paracalanus parvus*, *Evadne Nordmani*, *Sagitta bipunctata*. This is most satisfactorily explained by assuming that the water of the Jutland Current goes straight to the station Måseskär, and that the water from the Norwegian depression appears sooner at the northern station Väderöboda than at Måseskär.

D. The Skagerak in August. The samples taken at the two stations Måseskär and Väderöboda had a temperature varying between 16,3 and 19,20. The salinity varied between 26,84 and 20,79.

The prevailing plankton was at both stations *tripos-plankton*, but at Måseskär intermingled with *didymus-plankton*, as in the last month. Besides, there appeared at Måseskär *Evadne Nordmani*, *Paracalanus parvus*, *Sagitta bipunctata* etc., which occurred in July at Väderöboda and not at all or sparingly at Måseskär.

September 1900.

The Skagerak. Samples of plankton were collected at Måseskär and Väderöboda only. The temperature of the water varied from 16,0 to 13,20 and the salinity between 29,98 and 22,16.

At both stations the prevailing plankton was *tripos-plankton*, that had remained from the last month, but at the more southern station Måseskär this kind of plankton was more or less abundantly intermingled with *didymus-plankton*, characterized by *Chatoceros contortus*, *C. curvisetus*, *C. Schüttii* and *Skeletonema costatum*, no doubt brought by the Jutland Current. The total number of planktonforms noted during September amounted to 37.

October 1900.

The Skagerak. Samples were collected at the stations Måseskär and Väderöboda in water, the temperature of which varied from 12,65 to 9,95 and the salinity between 27,38 and 31,09. The plankton collected at both stations was, on the whole, very similar and consisted of *tripos-* and *didymus-plankton* intermingled. The latter kind was more predominant at the southern station, Måseskär.

The number of species collected at these stations was large and had increased considerably since the last month. It now amounted to 84 different forms. The prevailing forms of the *didymus-plankton* were the following:

Chatoceros contortus,
C. curvisetus,
C. debilis,
C. didymus,
C. Schüttii.

Eucampia zodiacus,
Guinardia flaccida,
Rhizosolenia Stolterfothii,
Skeletonema costatum.

The *didymus*-plankton consists chiefly of southern neritic forms, but contains a certain number of northern forms as *Chatoceros debilis*, *Skeletonema costatum* a. o. There cannot, on the other hand, be any doubt that this kind of plankton is brought into the Skagerak with the Jutland Current and from the southern North Sea. Therefore it seems necessary to admit, that the northern forms have migrated from the northern part of the North Sea and, through the submarine channels S. and E. of the Dogger Bank, penetrated towards the continental coasts. These submarine channels really seem to exercise a very great influence on the distribution of the plankton above the 50-metre plateau of the bottom and also on the migration of the fishes.

November 1900.

A. **The North Sea.** In that month a large collection of samples were taken by steamers crossing the North Sea in different directions. The microscopical examination of the plankton proves that the prevailing types were *tripos*- and *didymus*-plankton. The former kind occurred chiefly between 58°—59° N. 0° E. and 55°—56° N. 1° E., most abundantly between 55° and 57° N., and especially W. of the Danish Peninsula. The *didymus*-plankton prevailed in the southern North Sea, from Holland to Skagen, where it became intermingled with *tripos*plankton.

The plankton was collected in all kinds of water, containing 35 to 28 p. m. salinity. I tried, as in the former cases, to make out what species characterize the one or other kind and with the following result:

Water of 35 p. m. salinity contained *Acanthometron catervatum* and *Chatoceros atlanticus*, which may be considered as characteristic, as other forms also occurred in the 34 p. m. salinity.

Water of 34 p. m. salinity contained chiefly *tripos*-plankton. That also was the case with some samples from the 33 p. m. water, both having in common a number of species of almost equal frequency in both kinds.

Common to both kinds of water were the following forms:

Forms of southern origin.

Centropagus typicus +,
Oithona plumifera rr,
O. similis +,
Paracalanus parvus +,
Sagitta bipunctata +,
Amphorella Steenstrupi r,
Codonella ventricosa +,
Dictyocysta elegans rr,
Dictyocha fibula r,
Disteplanus speculum r,
Ceratium furca c,
C. fusus c,
C. macroceros cc,
C. tripos cc,

Forms of northern origin.

Calanus finmarchicus +,
Metridia lucens rr,
Pseudocalanus elongatus c,
Temora longicornis c,
Cyrtarocyliis denticulata r.
Tintinnus acuminatus, r,
Dinophysis acuta r,
Gonyaulax spinifera rr,
Peridinium pallidum r,
P. pellucidum rr,
Xanthidium hystrix rr,
Asterionella japonica rr,
Chatoceros decipiens r,
Coscinodiscus radiatus r.

Peridinium divergens +,
Pyrophacus horologium r,
Chatoceros Schüttii r,
Roperia tessellata rr.

The *tripos*-plankton contained thus, as usually, a mixture of southern and northern forms, the former far more prevalent in number of individuals. This kind of plankton evidently originates N. of Scotland by the fusion of water from the temperate eastern Atlantic with water from Iceland, the Färöes and the Shetlands.

As characteristic for the 34 p. m. water or occurring there more frequently than in the 33 p. m. water, I consider the following forms:

Forms of southern origin.	Forms of northern origin.
<i>Acartia Clausii</i> r,	<i>Spirialis retroversa</i> r,
<i>Labidocera Wollastonii</i> rr,	<i>Acartia longirenis</i> r.
<i>Evadne spinifera</i> r,	<i>Centropages hamatus</i> rr,
<i>Podon intermedius</i> rr,	» <i>Sternhaarstatoblast</i> » Hensen rr,
<i>Acanthochiasma fusiforme</i> r,	<i>Ceratium longipes</i> +,
<i>Acanthonia Mülleri</i> r,	<i>Peridinium depressum</i> +,
<i>Halosphera viridis</i> +,	<i>Pterosphaera Möbii</i> rr,
<i>Ceratium bucephalum</i> e,	<i>Xanthidium multispinosum</i> r.
<i>Peridinium Michaëlis</i> rr.	

Water of 33—28 p. m. salinity contained, besides such forms as occurred as frequently in the 34 p. m. water, the following species:

Forms of southern origin.	Forms of northern origin.
<i>Oikopleura dioica</i> r,	<i>Fritillaria borealis</i> rr,
<i>Corycaeus anglicus</i> +,	<i>Plectophora arachnoides</i> rr,
<i>Eutерpe acutifrons</i> r,	<i>Dinophysis Vanhöffenii</i> rr,
(<i>Amphorella subulata</i> rr),	<i>Peridinium ocatum</i> r,
<i>Codonella Jörgenseni</i> rr,	(<i>Xanthidium brachiolatum</i> r),
<i>Cyttarocylis serrata</i> r,	<i>Phaeocystis Pouchetii</i> rr,
(<i>Tintinnopsis beroidea</i> +),	<i>Chatoceros borealis</i> r,
<i>T. campanula</i> +,	var. <i>Brightwellii</i> rr,
<i>Noctiluca miliaris</i> r,	<i>C. constrictus</i> rr,
<i>Ceratium lineatum</i> rr,	<i>C. debilis</i> c.
<i>Diplopsalis lenticula</i> +,	<i>C. diadema</i> r,
<i>Peridinium pedunculatum</i> r,	<i>C. lacinosus</i> r,
<i>Prorocentrum micans</i> r,	<i>Coscinodiscus concinnus</i> +,
<i>Bacteriastrum varians</i> r,	(<i>C. excentricus</i> +),
<i>Bellerophon malleus</i> rr.	<i>Rhizosolenia setigera</i> r,
<i>Biddulphia mobilensis</i> c,	<i>Skeletonema costatum</i> rr,
<i>Cerataulina Bergonii</i> r,	<i>Thalassiosira gelatinosa</i> r,
(<i>Chatoceros contortus</i> c),	<i>T. gravida</i> rr.
<i>C. curvisetus</i> c,	<i>Thalassiothrix Frauenfeldii</i> r,
<i>C. densus</i> +,	
<i>C. didymus</i> c,	
<i>Ditylum Brightwellii</i> c,	

Eucampia zodiacus c,
Guinardia flaccida c,
Lauderia annulata rr,
Lithodesmium undulatum rr,
Rhizosolenia calcar avis +,
R. gracillima +,
R. Shrubsolei r.
R. Stolterfothii +,
R. styliiformis c,
Stephanopyxis turris c.

The names of species, about which it is at present uncertain whether they are southern or northern, have been enclosed in brackets.

The prevailing number of species belong to the *didymus*-plankton and are chiefly of southern origin. Among these forms there occurred abundantly in the southern North Sea the diatom *Rhizosolenia styliiformis*, which is in my opinion an oceanic species of the temperate Atlantic. That proves that the bank-water off the continental coast had been mixed with Atlantic water, entering through the English Channel.

B. The Skagerak at Viuga. The Government steamer »Svensksund» collected on the 21th of November at Viuga two samples of plankton, one from the surface and one at the depth of 30 m. The surface water had the temperature 6,02 and the salinity 21,01 and belonged thus to the Baltic Current. The water at 30 m. was warmer (temperature 9,5) and had the salinity 32,75. The latter kind must thus be classified as *bank-water*. The microscopical examination of the plankton proved that the Baltic Current contained *tripos*-, but the bank-water *didymus*-plankton. The water of the Baltic Current derived consequently in part from the Baltic and fresh water from the coast and in part from the North Sea, above the 100 m. plateau of the bottom. The bank-water on the contrary, originated from the southern North Sea, above the 50-metre plateau of the bottom.

C. The Skagerak at Måseskär and Väderö. Samples collected at the stations Måseskär and Väderöboda were taken in water of the temperature 8,3 to 5,9 and of the salinity 20,61 to 28,82. The plankton was, on both places, essentially of the same kind, very rich in forms, not less than 73 different species belonging partly to the *tripos*- and partly to *southern* and *northern neritic plankton*, the two latter constituting together what I have called *didymusplankton*.

December 1900.

The Skagerak. Samples were collected at the stations Måseskär and Väderöboda in water of the temperature 6,0 to 3,0 and the salinity 21,33 to 30,94. The plankton was less abundant than in November but rich in species, 78 different forms having been noted. The plankton belonged to *tripos*- and *didymus*-plankton, as in the preceding month, but the relative abundance of the species seemed to have been somewhat altered.

Additional notes to the report on the plankton of the North Sea in 1899.

Since my paper »The plankton of the North Sea, the English Channel and the Skagerak in 1899»¹ was published I received a series of 5 samples, collected in December 1899 on the route Göteborg—Hamburg. The results of the microscopical analysis have been registered in the following list:

December 13th and 14th 1899.

Latitude N	57° 48'	57° 27'	57° 4'	55° 4'	55° 7'	Latitude N.	57° 48'	57° 27'	57° 4'	55° 4'	55° 7'
Longitude E.	10° 36'	9° 25'	8° 25'	7° 34'	7° 51'	Longitude E.	10° 36'	9° 25'	8° 25'	7° 34'	7° 51'
Temperature	4,0	7,25	5,0	4,5	5,0	Temperature	4,0	7,25	5,0	4,5	5,0
Salinity	31,00	34,79	34,33	32,62	32,04	Salinity	31,00	34,79	34,33	32,62	32,04
Calanus finmarchicus	r	.	.	.	r	Chaetoceros brevis	r	.	.	.	.
Corycaeus anglicus . . . . .	.	.	.	.	r	C. contortus . . . . .	+	.	.	.	.
Metridia lucens . . . . .	.	r	.	.	.	C. curvisetus . . . . .	+	.	.	.	.
Oithona similis . . . . .	.	r	.	.	.	C. danicus	r	.	.	.	.
Pseudocalanus elongatus . . . . .	.	r	.	.	.	C. debilis	+	rr	.	.	.
Sagitta bipunctata . . . . .	.	+	.	.	.	C. decipiens	r	rr	rr	.	.
Amphorella Steenstrupii . . . . .	.	.	rr	r	.	C. didymus . . . . .	+	.	.	.	.
Codonella ventricosa . . . . .	.	.	.	.	r	C. laciniosus	r	.	.	.	.
Cyttarocylis denticulata . . . . .	.	.	rr	.	.	C. similis	r	.	.	.	.
Tintinnopsis beroidea . . . . .	.	.	r	.	.	C. teres	r	.	.	.	.
T. campanula . . . . .	.	.	.	.	r	Coccolodiscus concinnus	r	.	.	.	.
Tintinnus acuminatus	rr	.	.	.	.	C. excentricus . . . . .	.	r	.	.	+
Halosphæra viridis . . . . .	.	r	.	.	.	C. polychordus . . . . .	+	.	.	.	.
Ceratium bucephalum	r	r	r	.	.	C. radiatus . . . . .	.	r	+	.	+
C. furca . . . . .	.	+	c	r	+	C. stellaris	c	r	.	.	.
C. fuscus . . . . .	.	r	r	.	r	Ditylum Brightwellii	cc	+	+	r	.
C. lineatum . . . . .	.	r	.	.	.	Eucampia zodiacus	rr	rr	.	.	.
C. longipes . . . . .	.	r	.	.	.	Guinardia flaccida	+	.	r	.	c
C. macroceros . . . . .	.	+	r	r	+	Lauderia annulata	r	.	.	.	.
C. tripos . . . . .	.	c	+	r	c	Leptocylindrus danicus	r	.	.	.	.
Dinophysis acuta	r	r	rr	.	r	Rhizosolenia calcar avis . . . . .	.	.	.	.	r
Diplopsalis lenticula . . . . .	.	r	.	r	.	R. gracillima . . . . .	.	rr	.	.	.
Gonyaulax spinifera . . . . .	.	.	rr	.	.	R. setigera	r	.	.	.	.
Peridinium Michaëlis . . . . .	.	r	.	.	.	R. Shrubsolei . . . . .	.	.	.	.	r
P. ovatum . . . . .	.	r	r	.	.	R. Stolterfothii . . . . .	.	rr	.	.	.
P. pallidum . . . . .	.	.	r	.	.	R. styliformis . . . . .	.	rr	.	.	.
Pyrophaeus horologium . . . . .	.	r	.	.	.	Skeletonema costatum	c	rr	.	.	.
Pterosphæra Moebii . . . . .	.	r	r	.	.	Stephanopyxis turris . . . . .	+	.	.	.	.
Phæocystis Poueheti . . . . .	.	r	.	.	.	Thalassiosira gelatinosa	+	rr	r	r	.
Asterionella japonica	rr	.	.	.	.	T. gravida	r	.	.	.	.
Biddulphia aurita . . . . .	+	.	.	.	.	Thalassiothrix Frauenfeldii	+	r	.	.	.
B. mobilensis	r	.	.	.	.	Plankton-type	{	Nm	Tp	Tp	Tp
Cerataulina Bergonii	r	.	.	.	.	}	Ns	Nm	(Nm)	Nm	Nm

¹ K. Svenska Vet. Akad. Handl. Volume XXXIV. N:o 2. 1900.

It is of interest to note how different the two first samples are, although they had been collected at a distance of about one degree. The first sample consists of *didymus*-plankton, or of forms from the southern North Sea, and the second of *tripos*-plankton or from the northern North Sea. Both are comparatively richer than the following three, which come from a mixture of water from the southern and northern North Sea.

Seasonal distribution of the Plankton-organisms.¹

Appendicularia.

Fritillaria borealis LOHM. — *March*: M. *rr.* *April*: Sk. *r.*; W. of the Danish Peninsula to Sk. and V. *r.* M. *r.* *November*: Sk. *rr.*

Oikopleura dioica FOL. — *April*: between Dogger Bank and Sk. *r.* *May*: N. E. of Scotland +. *June*: M. *r.* *July, August*: Scotland to Sk. *r.*; S. of Dogger Bank; W. of Jutland. M. *c.* V. *r.* *September*: M. +, V. *r.* *October*: M. and V. +. *November*: M. *r.*, V. +. Vinga (30 m.), W. of Jutland, Sk. *r.* *December*: V. *rr.*

Pteropoda.

Cleodora pyramidata LIN. — *June*: Shetlands *cc.*

Spirialis retroversa FLEM. — *November*: W. om Limfjord, *r.* Vinga (30 m.) *r.*

Amphipoda.

Amathilla angulosa RATHKE. — *November*: V. *cc.*

Caprella septentrionalis KRÖYER. — *March*: V. *r.*

Parathemisto oblivia KRÖYER. — *February* and *March* *r.*

Proto pedata LEACH. — *February*: Mouth of Scheldt *rr.* *July—August*: W. of Limfjord *r.* *December*: V. +.

Cladocera.

Evadne Nordmani LOVÉN. — *April*: W. of Jutland *r.* *May*: M. *cc.*, V. *r.* *June*: Shetlands +, M. *ccc.*, V. *ccc.* *July—August*: Orkneys and Firth of Tay to southern Norway; M. *c.*, V. *c.* *September*: M. *c.*, V. +. *October*: M. *r.* *November*: M. and V. *r.*

¹ I use the abbreviation M. for Måseskär, V. for Väderöboda and Sk. for Skagen.

Evadne spinifera P. E. MÜLL. — *July—August*: from the Dutch coast to Skagerak; central North Sea *r*; M. +, V. +. *September*: M. +, V. +. *October*: V. *r*. *November*: sparingly in the central North Sea and W. of Jutland.

Podon intermedius LILLJEB. — *July—August*: North of Scotland to Dogger Bank (max.) and the Skagerak, as a rule not common; V. +. *September*: M. *r*. *October*: V. *rr*. *November*: sparingly from 57° N. 4° E. to Sk. *December*: V. *rr*.

P. Leuckartii G. O. SÆRS. — *June*: M. *c*, V. *r*. *July—August*: 57° N. 1° E.

P. polyphemoides LEUCK. — *July*: M. *c*.

Copepoda.

Acartia Clausii GIESBR. — *January*: central Skagerak *rr*. *February*: from Holland to Sk.; at about 58° N. 3° E. *April*: from Holland to Sk. +. *May*: M. *c*, V. *c*. *June*: the Shetlands *c*, M. +, V. *c*. *July—August*: from the Orkneys to Skagerak, S. and E. of Dogger Bank; M. *r*, V. +. *September*: M. *c*, V. *r*. *October*: M. and V. *r*. *November*: sparingly W. and E. of Scotland and thence to Jutland; M. *rr*.

A. longiremis LILLJEB. — *January*: as a rule common in the Baltic Current. *February*: M. +. *March*: M. +. *April*: Skagerak, more or less common. *May*: M. +, V. *c*. *June*: M. and V. *r*. *July—August*: N. and E. of Scotland, S. W. of Norway; M. *r*, V. +. *September*: M. +, V. *r*. *October*: V. *rr*. *November*: from about 57° N. 1° E. to S. Norway. *December*: M. and V. *r*.

Anomalocera Patersonii TEMPL. — *January*: M. *rr*. *June*: M. *rr*. *July—August*: *r* N. of Scotland, off the Dutch coast and between Jutland and Norway.

Calanus finmarchicus GUNN. — *January*: Dröbak (30 m.), V. *r*. *February*: Firth of Tay to Dogger Bank and Skagen, as a rule *r*. *April*: N. and W. of Jutland rare to common. *May*: N. E. of Scotland, V. +. *June*: the Shetlands *c*, M. *r*. *July—August*: the Shetlands *r*; N. of Scotland to the Skagerak, more or less common; N. of the Dogger Bank; S. of the depression of the bottom south of Dogger Bank; M. *r*, V. *r*. *September*: M. *r*, V. *c*. *October*: M. *rr*, V. *r* +. *November*: not rare round Scotland and thence to Norway and Jutland; S. E. of the Dogger Bank. *December*: M. *rr*, V. + *r*.

Calanus hyperboreus KRÖYER. — *April*: W. of Limfjord *rr* (surface!).

Centropages hamatus LILLJEB. — *January*: as a rule common in the Baltic Current. *February*: M. *r*. *March*: rare at 56° 33' N. 12° 16' E.; M. +. *April*: E. of the depression of the bottom S. of Dogger Bank, off the Dutch coast; N. of Denmark; V. +. *May*: N. E. of Scotland; M. *c*, V. *c*. *June*: M. +, V. *c*. *July—August*: common between north Scotland, Firth of Tay and the Skagerak; M. *r*, V. *r*. *October*: M. *c*. *November*: N. of the Dogger Bank *rr*; M. and Vinga +. *December*: M. and V. +.

U. typicus KRÖYER. — *January*: central Skagerak *rr.* *February*: rare at 55° N. 6°—7° E.; M. *r.* *April*: N. of Jutland *r.* *July—August*: common from N. Scotland to S. Norway, rare from Holland to Sk.; M. +, V. *r.* *September*: M. and V. +. *October*: M. *c.*, V. + *r.* *November*: more or less common round Scotland and thence to S. Norway and W. Jutland; M. and V. *r.* *December*: M. *r.*

Corycaeus anglicus LUBB. — *February*: from the N. of the Dogger Bank to Sk. *July—August*: rare from Holland to Sk.; at 58° N. 4° E. *October*: M. *r.* *November*: W. of Jutland more or less common; M. and V. *rr.*, Vinga (30 m.).

Euterpe acutifrons DANA. — *November*: from the coast of Holland to the Limfjord, most common W. of Schleswig; M. and V. *r.* *December*: V. *rr.*

Isias clavipes BOECK. — *July—August*: off the Dutch coast; M. +. *September*: M. +, V. *r.*

Labidocera Wollastonii LUBB. — *July—August*: off the Dutch Coast. *November*: from about 56°—57° N. 4°—5° E. to Sk.; V. *rr.*

Metridia lucens BOECK (*M. hibernica* BRADY & ROBTS). — *January*: central Skagerak *rr.* *February*: W. of Sk. *r.* *June*: the Shetlands +. *July—August*: the Shetlands (200—50 metres) and S.W. of Norway. *November*: W. of Scotland, central North Sea and S.W. of Norway. *December*: V. *rr.*

Microsetella atlantica BRADY & ROBTS. — *January*: Dröbak (30 m.). *February*: above the Fisher Bank. *July*: the Shetlands (200—10 metres).

Oithona plumifera BAIRD. — *January*: central Skagerak *rr.* *February*: from the Dogger Bank to Sk. *r.* *June* and *July* the Shetlands. *November*: at 57° N. 4° E. and 58° N. 8° E. rare.

O. similis CLAUS. — *January*: not rare in the Baltic Current. *February*: off the Dutch coast *r.*; from 56°—58° N. 0° E. to Sk. *r.*; M. *rr.*, V. *r.* *April*: very rare at some spots in the North Sea; V. *r.* *May*: N.E. of Scotland; M. *c.*, V. +. *June*: the Shetlands +, M. *c.*, V. *c.* *July—August*: common from the north of Scotland to Dogger Bank and the Skagerak, also S. of the Dogger Bank to the Scheldt; the Shetlands; M. and V. *c.* *September*: M. and V. *c.* *October*: M. *c.*, V. *r.* +. *November*: round Scotland, thence to S. Norway and W. Jutland. Vinga +, M. *c.*, V. + *r.* *December*: M. and V. +.

Oncaea minuta GIESBR. — *January*: Dröbak (30 m. *rr.*). *February*: E. of the Firth of Forth *rr.*; 58° N. 3° E. *r.* *June*: the Shetlands *rr.* *July*: the Shetlands (200—50 m. *rr.*).

Paracalanus parvus CLAUS. — *February*: rare off the Dutch coast and W. of Jutland. *April*: very rare north of Jutland. *July—August*: not rare from Holland to Sk. and from the north of Scotland to the central North Sea. In July not rare, but in August very common along the Swedish west coast. *September*: *cc* at M. and V. *October*: M. *c.* *November*: not rare round Scotland and thence to the west of Jutland and Skagerak; M. *r.*, V. +. *December*: M. *r.* +.

Pseudocalanus elongatus BOECK. — *January*: more or less common in the Baltic Current along the west coast of Sweden. *February*: the northern slope of the Dogger Bank, thence to the Dutch coast and to Denmark. *March*: M. +. *April*: between the south of the Dogger Bank and the Dutch coast and W. of the Danish peninsula, not rare; the Skagerak, not rare. *May*: N.E. of Scotland; M. c, V. +. *June*: rather rare along the Swedish coast. *July—August*: the Shetlands (200—50 metres), N. of Dogger Bank, S. of Dogger Bank to the Dutch coast, Sk., M. and V. rather common. *September*: M. rr. *October*: M. c, V. +. *November*: not rare round Scotland and thence to S. Norway and W. Jutland, also N. of Holland, not rare along the Swedish coast. *December*: V. + r.

Temora longicornis O. F. MÜLL. — *January*: common in the Baltic Current along the Swedish coast. *February*: N. of the 50-metre plateau of the bottom of the North Sea to the Dutch coast; M. c. *March*: M. r. *April*: common from 56° N. 4° E. to 55° N. 7° E. and Skagen, M. r. *May*: M. c, V. +. *June*: V. rr. *July—August*: rare in the area between Scotland, 55° N. 6° E. and Skagen, rather rare at M. and V. *September*: r at M. and V. *October*: M. r, V. r +. *November*: common between Scotland, S. Norway and W. Jutland; Vinga r (not rare at 30 m.), M. rather common; V. +. *December*: M. rather common, V. not rare.

Temorella affinis POPPE. — *January*: Lysekil rr. *June*: M. r, V. +.

Chaetognata.

Sagitta bipunctata QUOI & GAIM. — *January*: V. not rare. *February*: from the East of Scotland to Skagen, common in some spots. *April*: N. of Jutland r. *May*: N.E. of Scotland +; V. r. *July—August*: N.E. of Scotland and from the Dogger Bank to the Skagerak, where not rare along the Swedish coast. *September*: r at M. and V. *October*: M. r, V. +. *November*: from the N. of Holland and 57° N. 1° E. to Sk., M. and V. + r. *December*: M. rr, V. + r.

Ctenophora.

Pleurobrachia pileus FABR. — *January*: V. r. *September*: M. r. *December*: M. rr.

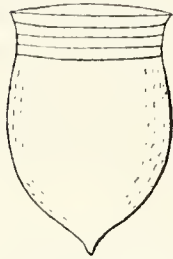
Ciliata.

Amphorella norvegica v. DAD. — *June*: the Shetlands rr.

A. Steenstrupii CLAP. & LACHM. — *July—August*: rare from the E. of Scotland to Dogger Bank and Sk. *October*: M. rr. *November*: rare E. of Scotland, in the central North Sea and N. of Jutland.

A. subulata EHB. — *July—August*: W. of Jutland and at M. rr. *November*: N. of Holland, W. of Jutland, Sk., V. and M. always sparingly.

Codonella Jörgensenii CL. N. Sp. — *November*: very rare N. of Holland and at Skagen.



Codonella Jörgensenii CL.
450 t. m.

Descr.: House as long as broad, with a short apical spine; its wall indistinctly malleate. Proboscis short, nearly as broad as the house, with some few rings. Length and breadth of house 0,05 mm.; length of the proboscis 0,01, diameter of the opening 0,044 mm.

This species reminds one of *Codonella orthoceros* MÖBIUS (non HKL.) in the Fifth Ber. der Commission zu Kiel (1887, fig. 33), for which form BRANDT has proposed the name *Tintinnopsis baltica*, but which seems to me to represent a young specimen of *Tintinnus fistularis* MÖB., the latter probably the same as *Tintinnus helix* CLAP. & LACHM.

C. (Tintinnopsis) ventricosa CLAP. & LACHM. — *January*: Dröbak (30 metres). *February*: W. of Scotland and of Jutland. *April*: *r.* E. of Firth of Tay. *July—August*: W. of Jutland. *October*: M and V. *rr.* *November*: common W. and N. of Scotland, thence to the W. of Jutland and the Sk.; at Dogger Bank; off the Dutch coast; Vinga (30 m. +), M. *r.*, V. *r.* *December*: M. *r.*, V. *r.*

Cyttarocyclus denticulata EHB. — *January*: M. *r.* *February*: from E. Scotland to the W. of Jutland. *March*: M. *rr.* *May*: not rare N.E. of Scotland and at M. *June*: the Shetlands more or less common. *July—August*: the Shetlands, Skagerak and Måseskär; not common. *November*: N. of Scotland, the central North Sea, Sk. as a rule rare, Vinga *r* (30 m. +); M. and V. + *r.* *December*: M. *rr.*, V. *r.*

Cyttarocyclus serrata MÖB. — *July—August*: *c* E. of the Firth of Tay; *r* off the Dutch coast and in the Skagerak. *October*: M. *rr.* *November*: N. of Jutland *r.* *December*: V. *r.*

Dietyocysta elegans EHB. — *November*: N. of Scotland *r.*

Fungella arctica CL. — *February*: Firth of Forth *r.* *April*: at Skagen *r.*

Ptychocyclus acuta BRANDT. — *January*: M. *c.*, Vinga *r.*, V. *r.* *February*: W. of Sk. *rr.*; M. *r.* *March*: M. *rr.* *April*: from the depression of the bottom E. of Dogger Bank to W. Jutland and Skagen; Skagerak not rare. *May*: M. *r.* *November*: rare at 57° N. 4° E. *December*: M. and V. *rr.*

Tintinnopsis beroidea STEIN. — *January*: central Skagerak, M. and Gullmarefjord *r.* *February*: W. of Jutland. *November*: common off the Dutch coast, more or less rare W. and N. of Jutland.

T. campanula EHB. — *June*: V. *r.* *July—August*: Mouth of the Scheldt, Skagerak, M. and V. *r.* *September*: M. and V. not common. *October*: M. *r.*, V. *rr.* *November*: N. of Holland, W. and N. of Jutland, sparingly; V. *r.*

T. fistularis MÖB. (*Tintinnus helix* CLAP. & LACHM.?) — *July—August*: sparingly in the Skagerak and less rare along the Swedish west coast. *September*: M. *r.* *October*: M. *rr.*

Tintinnus acuminatus CLAP. & LACHM. — *January*: central North Sea *r.* *February*: *r.* W. of Sk. *November*: *r.* S.W. of Norway. *December*: M. *rr.*

T. bottnicus NORDQUIST. — *April*: Sk. *r.* *May*: M. *r.* V. *r.*

»Sternhaarstatoblast» HENSEN. — *November*: N. of Scotland *r.*

Cystoflagellata.

Noctiluca miliaris SURIR. — *July—August*: very common W. of Jutland. *October*: V. *rr.* *November*: *r.* W. of Jutland; M. *rr.*

Silicoflagellata.

Dictyocha fibula EHB. — *October*: V. *rr.* *November*: rare N. of the Dogger Bank, W. and N. of Jutland.

Distephanus speculum EHB. — *October*: M. and V. *rr.* *November*: W. of Scotland, from Holland to Sk., Vinga, M. everywhere rare. *December*: M. and V. *rr.*

Radiolaria.

Acanthochiasma fusiforme HKL. — *Februari*: 57° N. 6° W. *r.* *November*: round Scotland.

Acanthometron catervatum HKL. (*A. quadrifolium*). — *June* and *July*: not rare at the Shetlands. *September*: V. *r.* *October*: V. *rr.* *November*: rare east of Scotland, 58°—59° N. 0° E.

A. pellucidum J. MÜLL. — *January*: Dröbak *rr.* (30 m.). *February*: rare in the northern North Sea.

Acanthonia Mülleri HKL. — *February*: common N. of the Dogger Bank. *July*: the Shetlands (200—50 m.). *November*: N. of Scotland *r.*

Challengeria xiphodon HKL. — *July*: rare at the Shetlands (200—50 m.).

Collozoum inerme J. MÜLL. — *July*: Shetlands (200—50 m.) *r.*

Hexalonche hexacantha J. MÜLL. — *July*: Shetlands (200—50 m.) *rr.*

Plectophora arachnoides CLAP. & LACHM. — *January*: central North Sea, Dröbak (30 m.) and V. always rare. *February*: not rare above the limits between the 50- and 100-metre plateau of the bottom, V. *r.* *November*: S. of Norway *r.*, Vinga *r.*

Chlorophyllaceæ.

Halosphæra viridis SCHMITZ. — *January*: central Skagerak to the west coast of Sweden, rare to common. Dröbak *r.* (30 m.). *February*: round Scotland to Sk., most

abundant at 58° N. 7°—3° E.; M. *r.* April: E. of Skagen and W. of Jutland *rr.* October: V. *rr.* November: round Scotland to the mouth of the Skagerak; M. and V. *rr.* December: M. +, V. *r.*

Dinoflagellatæ.

Ceratium bucephalum CL. — *January:* M. *r.* *February:* W. of Scotland; more or less rare from Newcastle to Sk.; M. *r.* *April:* N. of the Dogger Bank. *June:* the Shetlands, not rare. *July—August:* N. of Scotland *r.*, S.W. of Norway *r.* *September:* M. and V. *r.* *October:* V. *rr.* *November:* from E. Scotland to S. Norway and Jutland, most abundant W. of Limfjord. Vinga (30 m.) *r.* *December:* M. *rr.*, V. + *r.*

C. furca DUJ. — *January:* central Skagerak *r.* *February:* W. of Scotland, from Scotland and Newcastle to Sk., V. *r.* *April:* from the Dogger Bank to Sk. *r.* *May:* N.E. of Scotland *r.* *June:* the Shetlands *c.* *July—August:* the Shetlands *c.*, between Scotland, Newcastle and Sk. as a rule *r.* *September:* V. +. *October:* M. and V. *rr.* *November:* W. and N. of Scotland, from Newcastle to S. Norway and W. of Jutland (maximum); M. and V. *r.* *December:* M. +, V. + *r.*

C. fusus DUJ. — *January:* central North Sea *r.*, V. *r.* *February:* W. and E. of Scotland; area between Newcastle, the mouth of the Scheldt and S. Norway, everywhere sparingly. *April:* sparingly W. of the Danish Peninsula. *May:* V. *r.* *June:* the Shetlands *r.*; V. *r.* *July—August:* the Shetlands (200—10 m.), M. *r.*, V. *r.* *September:* M. *r.*, V. *r.* *October:* M. and V. *rr.* *November:* sparingly round Scotland, thence to the Dogger Bank (where common), sparingly from Holland to Sk.; Vinga (30 m.) *r.*, V. *rr.* *December:* M. *rr.*, V. + *rr.*

C. lineatum EHB. — *April:* *rr.* off the Dutch coast. *October:* V. *rr.* *November:* N. of Jutland *r.*, V. *rr.* *December:* M. and V. *r.*

C. longipes BAIL. — *January:* central Skagerak to M. and V., as a rule rare. *February:* central North Sea *r.*; V. *r.* *March:* M. *rr.* *April:* not rare from 56° N. 0° E. to the Danish Peninsula; Skagerak *r.*, M. *rr.*, V. *cc.* *May:* M. *cc.*, V. *ccc.* *June:* the Shetlands *cc.*, M. *r.*, V. *r.* *July—August:* the Shetlands (200—50 m.); E. of the Firth of Tay +; Dogger Bank and Fisher Bank *r.* *October:* M. and V. +. *November:* W. of Scotland; N. of the Dogger Bank to Sk.; coast of Holland to Sk. everywhere rare, Vinga (30 m.) not rare; M. and V. *r.* +. *December:* M. and V. *c.*

C. macroceros EHB. — *January:* rare in the central Skagerak and at Vinga. *February:* as *C. Tripos*; M. *r.* *April:* very rare in some spots S. and S.W. of Norway. *June:* the Shetlands *r.*; V. not rare. *July—August:* N. of Scotland to Norway (where common) and Sk. (where not rare); sparingly from the mouth of the Scheldt to Sk.; M. *c.*, V. *c.* *September:* M. and V. *c.* *October:* M. and V. *c.* *November:* sparingly W. of Scotland and between Scotland and S. Norway, common N. of the Dogger Bank and W. of Jutland; Vinga + (30 m.); M. *rr.*, V. + *r.* *December:* M. and V. *r.* +.

C. tripos NITZSCH. — *January*: whole Skagerak, rare to common. *February*: from Newcastle to Sk. (max. N. of the Dogger Bank), M. *r* to *c*, V. *r*. *May*: M. *rr*. *April*: from 56°—57° N. 4° E. to the West coast of Jutland, as a rule rare; the Skagerak very rare; M. *rr*. *June*: the Shetlands, more or less common; M. and V. *cc*. *July—August*: the Shetlands *c* and common in the whole North Sea, from Scotland to S. Norway and from the Scheldt to Sk.; M. and V. *c*. *September*: M. and V. *cc*. *October*: M. and V. *cc*. *November*: round Scotland *r*; from the N. of the Dogger Bank to Skagerak *c*; Vinga *cc*; M. and V. *cc*. *December*: M. and V. *cc*.

Dinophysis acuta EBB. — *January*: central Skagerak *r*; west coast of Sweden *r*, Gullmarsfjord *c*. *February*: from 58°—59° N. 0° 30' E. to S. Norway; M. *rr*. *March*: Kattegatt *r*. *April*: not rare from 56° N. 3° E. and 55° N. 6° E. to Sk. *May*: M. *r*. *June*: the Shetlands *r*, M. *r*. *July—August*: the Shetlands (50—10 m.); E. of Scotland *r*; Sk. *r*; M. *r*. *October*: M. *rr*. *November*: sparingly in the area between 56° N. 1° E., Holland, Sk. and S. Norway; V. *r*. *December*: M. and V. *rr*.

D. homuncululus STEIN. — *July*: the Shetlands (200—50 m.) *rr*.

D. rotundata STEIN. (*D. Michaëlis* AURIV.) — *April*: N. of Jutland *r*. *May*: M. *r*. *July—August*: W. of Jutland †, M. *r*. *November*: rare in some spots between Holland and Sk.; V. *rr*.

D. Vanhöffenii OSTF. (*D. granulata* CL., *D. acuminata* and *D. norvegica* CLAP. & LACHM. JÖRGENSEN). — *January*: Lysekil *r*. *April*: W. of Jutland *r*. *July—August*: rare at the N.W. end of the Dogger Bank and at 56°—57° N. 5° E.; M. *r*. *October*: V. *rr*. *November*: N.W. of Jutland *r*; V. *r*. *December*: V. *rr*.

Diplopsalis lenticula BERGH. — *June*: the Shetlands *r*. *July—August*: the Shetlands (50—10 m.); E. of Newcastle; W. of Jutland; M. *r*. *October*: M. *rr*. *November*: sparingly from the coast of Holland and from the Dogger Bank to Sk.; Vinga (30 m.) *r*; V. *rr*.

Gonyaulax spinifera CLAP. & LACHM. — *January*: Dröbak (30 m.) *r*. *April*: between Firth of Tay, Holland and Skagen. *July—August*: E. of Newcastle and W. of Jutland *r*. *October*: V. *rr*. *November*: rare N. of the Dogger Bank and N. of Jutland. *December*: V. *r*.

Peridinium depressum BOIL. — *January*: central Skagerak *r*, Dröbak (30 m.) *r*. *February*: rare in some spots above the 100-metre plateau of the North Sea. *April*: area between 57° N. 3° E., Sk. and 56° N. 7° E., most common N.W. of Jutland; sparingly off the Dutch coast; Skagerak *r*, M. *rr*, V. *c*. *May*: M. and V. †. *June*: the Shetlands *r*; M. *r*. *July—August*: rather common W. of Scotland; rare off the Dutch coast. *October*: V. and M. *rr*. *November*: W. of Scotland *r*; area between 56° N. 1° E., S. Norway and W. Jutland; Vinga (30 m.) *rr*; V. *r*. *December*: M. *rr*; V. † *r*.

Peridinium divergens EHB. — *January*: Dröbak (30 m. *r*). *February*: very rare at 58° N. 3° E. and W. of Sk.; M. *rr*. *May*: V. *c*. *July—August*: N. of the Dogger Bank; W. of Jutland to S. Norway, Skagerak *r*; The Shetlands (50—10 m.); M. and V. *r*. *Sep-*

tember: M. +, V. r. October: M. +, V. r. November: more or less sparingly N. of Scotland and from 55°—56° N. 1° E. to S. Norway and W. of Jutland; Vinga (30 m.) not rare; V. r. December: V. rr.

P. globulus STEIN. — July—August: rare above the Fisher Bank. November: N. of Scotland rr; Sk. r.

P. Michaëlis EIB. — July—August: W. and N. of Jutland r. November: N. of Scotland rr; W. of the southern Norway r, Vinga (30 m.) rr; V. rr.

P. oceanicum VANH. — May: M. not rare. July—August: the Shetlands (200—50 m.) r, W. of Jutland; M. r. December: V. rr.

P. ovatum POUCHET. — April: from 57° N. 4° E. to Sk. common, but sparingly from the first named spot to the Dogger Bank and the Dutch coast; rare W. of the Danish Peninsula. June: the Shetlands, not rare. July—August: the Shetlands r, rather common E. of the Firth of Tay. October: M. r. November: rare N. of Scotland and N. of Jutland; Vinga (30 m.) rr.

P. pallidum OSTF. — February: 57° N. 6° E. rr. March: M. r. April: sparingly from the Firth of Tay to Sk. and the W. of Schleswig; M. rr. May: M. r. June: V. r. July—August: E. of Firth of Tay; M. r. September: M. r. October: M. r. November: W. and N. of Scotland; from Holland to Skagen, always rare.

P. pedunculatum SCHÜTT. — November: sparingly from Holland to Sk. and at 56°—57° N. 4°—5° E.

P. pellucidum BERGH. — January: M. r. February: very rare at 58° N. 7° E. and 59° N. 1° E. March: from 56° 33' N. 12° 16' E. to Måseskär r. April: from 57° N. 4° E. to Sk. r; Skagerak and M. r. June: the Shetlands r. October: M. rr. November: very rare at 57° N. 1°—2° E. and N. of Jutland; Skagerak r. December: V. rr.

Protoceratium reticulatum (*Peridinium ret.* CLAP. & LACHM. *Protoc. aceros* BERGH, non *P. reticulatum* SCHÜTT) — May: M. rr.

Pyrophacus horologium STEIN. — February: at 58° N. 3° and 10° E. rr. July—August: W. of Jutland +, M. r. September: M. r. October: M. and V. rr. November: sparingly from S.W. Norway to the N. of Dogger Bank; rare N. of Holland.

Prorocentrum nicaus STEIN. — October: V. rr. November: N. of Scotland and N. of Jutland.

Cystæ.

Pterosphaera Möbii JÖRGENS. (*Pterosperma M.* OSTENF.) — January: M. r. February: rare in the area between 58° N. 3° E., 56° N. 4° E. and Sk.; M. rr. March: Vinga r. April: from the Dogger Bank to Sk. r; V. rr. May: M. r, V. r. June: M. r. July

—*August*: N. of Scotland *r*; sparingly in the area between 57°—58° N. 4° E., 55° N. 6° E. and 58° N. 11° E.; M. *r*, V. *r*. *November*: central North Sea *r*, Vinga (30 m.) *r*, M. *rr*. *December*: *r*.

Xanthidium brachiolatum MÖB. — *November*: Sk. *r*.

X. hystrix CL. — *January*: Vinga *r*. *February*: 57° N. 7° E. *rr*. *May* and *June*: M. *r*. *July*: V. *r*. *October*: V. *rr*. *November*: 57° N. 7° E. and Sk. *r*. *December*: V. *rr*.

X. multispinosum MÖB. — *January*: Vinga *r*. *March*: 56° 33' N. 12° 16' E. *r*. *April*: W. of Jutland. *July—August*: *r* in some spots N. of Scotland and W. of the mouth of the Scheldt. *November*: rare in the central North Sea and on the banks W. of Jutland.

Flagellata.

Dinobryum pellucidum LEVANDER. — *April*: *r* in the Skagerak and at M. and V. *May*: V. *r*. *June*: the Shetlands *r*.

Phaeocystis Pouchetii LAGH. — *March*: *r* at 56° 33' N. 12° 16' E., not rare at M. *April*: *r* above the 50-metre plateau of the bottom of the North Sea, in the Skagerak and at M. *November*: Sk. *r*, Vinga (30 m.) *rr*.

Cyanophyceae.

Aphanizomenon flos aquæ (L) RLFS. — *January*: Vinga +.

Diatomaceae.

Actinocyclus Ralfsii W. SM. — *October*: V. *rr*.

Asterionella japonica CL. — *April*: rare at 55° N. 8° E. *November*: off the Dutch coast *rr*; N. of Jutland *rr*.

Bacteriastrum varians LAUDER. — *October*: V. *rr*. *November*: from Holland to Sk.

Bellerochea malleus BTW. — *February*: mouth of the Scheldt *rr*. *July—August*: W. of the Limfjord. *November*: Sk. *rr*.

Biddulphia aurita LYNGB. — *January*: the central Skagerak, Vinga and V. *r*. *February*: W. of the Danish Peninsula *r*; M. *r*. *March*: Vinga; M. not rare. *April*: sparingly along the western coast of Denmark. *November*: M. *rr*; V. + *r*. *December*: V. *r*.

B. mobilensis BAIL. — *January*: central Skagerak *r*. *February*: W. of Scotland; E. of Scotland; above the edge of the Fisher Bank. *October*: M. *r*, V + *r*. *November*: from Holland to Sk.; Vinga (30 m.) *r*; M. *rr*; V. + *r*. *December*: V. *rr*.

Cerataulina Bergonii H. PER. — *April*: 57° N. 6° E. *r.* *July* to *October*: M. *r.*, V. + *r.* *November*: sparingly from the coast of Holland to Sk.; Vinga (30 m.) *r.*; M. and V. *r.* *December*: M. *r.*, V. *cr.*

Chaetoceros atlanticus CL. — *February*: 58° N. 3° E.; 56° N. 4° E.; Skagen, everywhere rare. *April*: 58° N. 10° E. *r.* *November*: E. of Scotland *rr.*

C. borealis BRTW. — *January*: the central North Sea *c.*, along the west-coast of Sweden, from Vinga to Väderö *r.* *February*: *r.* at 57° N. 7° E. and 58° N. 3° E.; M. *rr.* *March*: from 56° 33' N. 12° 26' E. to Måseskär not rare. *April*: E. of Scotland *r.*; area between 55° N. 6° E., 57° N. 5° E. and Sk. (common along the Danish coast); Skagerak *c.* to *r.*; M. and V. +. *May*: M. and V. not rare. *June*: the Shetlands *r.*; M. and V. *r.* *October*: M. and V. *r.* +. *November*: N. of Jutland, common to rare; Vinga not rare; M. very common; V. *c.* *December*: M. +, V. *c.*

Var. Brightwellii CL. — *January*: the central Skagerak *r.*, Vinga +, M. and V. *r.* *February*: M. *rr.* *March*: from 56° 33' N. 12° 16' E. to M. *r.* *April*: Sk. and M. not common. *May*: M. not rare. *October*: V. *rr.* *November*: Sk. *r.*; M. and V. *r.* *December*: V. +.

C. bottnicus CL. — *March*: Vinga *r.*

C. brevis SCHÜTT. (*C. hiemalis* CL.) — *February*: M. +, V. *c.* *March*: from 56° 33' N. 12° 16' E. to M. *r.* *April*: 56°—57° N. 4°—5° E. *r.*; Sk. *r.* *June*: V. *r.* *October*: M. *rr.* *November*: N. of Jutland and at Vinga not rare; M. and V. rather common. *December*: M. and V. *c.*

C. constrictus GRAN. — *January*: M. *r.* *February*: V. very common. *October*: M. *rr.*, V. + *r.* *November*: N. of Jutland and at Vinga *r.*; M. not rare, V. rather common. *December*: M. not rare, V. rather common.

C. contortus SCHÜTT. — *February*: V. *r.* *March*: from 56° 33' N. 12° 15' E. to M. *c.* *April*: N.W. of Jutland *r.*, very common in the Skagerak and at M. *May*: M. *c.*, V. *r.* *June*: V. *r.* *July—August*: M. *r.*, V. *r.* *September*: M. *c.* *October*: M. *c.*, V. *r.* +. *November*: N. of Jutland *c.*, M. and V. *c.*, Vinga *r.* *December*: M. +, V. *c.*

C. criophilus CASTR. — *February*: V. *r.*

C. curvisetus CL. — *January*: central Skagerak *r.* *April*: at 56°—57° N. 4°—3° E. common to rare. *July—August*: M. *c.*, V. *r.* *September*: M. *ccc.* *October*: M. *c.*, V. +. *November*: N. of Jutland, more or less common to rare; Vinga *c.*, M. and V. *cc.* *December*: M. rather common, V. common.

C. danicus CL. — *January*: the central Skagerak *r.*, Vinga *c.*, M. +, V. *r.* *February*: V. *r.* *March*: Vinga *r.* *July*: M. *r.* *November*: Vinga *r.* *December*: V. *r.*

C. debilis CL. — *January*: central Skagerak *c*; Vinga to Väderö *r* to *c*. *February*: M. *ccc*. *March*: from 56° 33' N. 12° 16' E. to M. *ccc*. *April*: more or less abundant in the area 57° N. 3°—5° E. 55° N. 6°—7° E.; Skagerak *r*, M. *r*. *October*: M. *c*, V. + *r*. *November*: more or less common N. of Holland and N. of Jutland; Vinga *r*, M. and V. *c*. *December*: M. and V. *c*.

C. decipiens CL. — *January*: west coast of Sweden from Vinga to Väderö, more or less sparingly. *February*: sparingly in the area between 58° N. 3° E., 56° N. 3° E. and Sk.; M. not rare. *March*: 56° 33' N. 12° 16' E., Vinga, M. not common. *April*: in the area between Firth of Tay, 55° N. 6° E. and Sk., rare in the west, more abundant in the east; Skagerak *cr*, M. and V. not rare. *May*: N.E. of Scotland +; M. *c*, V. +. *June*: the Shetlands *r*, M. *r*, V. *c*. *October*: M. *rr*, V. +. *November*: E. and W. of Scotland *r*; off the Dutch coast; W. and N. of Jutland, rare to common; M. *r*, Vinga (30 m.) +, V. +. *December*: M. *rr*, V. + *c*.

C. densus CL. — *April*: off the Dutch coast *rr*. *July—August*: E. of Firth of Tay; W. of Limfjord, not rare. *October*: M. *r*, V. +. *November*: off the Dutch coast *c*; N. of Jutland *r*; M. *r* +, V. +. *December*: V. + *r*.

C. diadema EHB. — *January*: central Skagerak *c*; not rare along the Swedish coast. *February*: M. *cc*. *March*: W. of Schleswig; from 56° 33' N. 12° 16' E. to M. *c*. *April*: 56°—57° N. 5°—6° E.; W. of Schleswig *r*. *October*: M. *r*. *November*: N. of Jutland; Vinga *r*, M. *c*, V. *r*. *December*: M. +, V. *r*.

C. didymus EHB. — *January*: central North Sea *r*. *July—August*: M. *r*, V. *r*. *September*: M. +, V. *r*. *October*: M. *c*, V. *r* +. *November*: off the Dutch coast *c*, N. of Jutland *c*, Vinga (30 m.) *r*, V. + *c*. *December*: M. and V. +.

C. Granii CL. (the same as *C. balticus* CL. according to OSTENFELD). — *March*: Vinga *c*. *April*: *c* in one spot in the Skagerak; M. *c*.

C. laciniosus SCHÜTT. — *February*: M. +. *March*: Vinga *r*, M. +. *October*: V. + *r*. *November*: N. of Jutland *r*, M. *r*, V. + *r*. *December*: M. +, V. *r*.

C. Lorenzianus GRUN. — *June* and *July*: the Shetlands *r*.

C. peruvianus BTAR. — *June*: the Shetlands *r*.

C. Schüttii CL. — *January*: central Skagerak *rr*, V. *r*. *February*: at 56° N. 4° E. and Hanstholm *rr*. *April*: 57° N. 5° E. *rr*. *May*: M. *r*. *July—August*: M. *c*, V. *r*. *September*: M. *cc*. *October*: M. *c*, V. *r*. *November*: off the Dutch coast and N. of Jutland, more or less sparingly; M. *r*, V. *r*. *December*: V. *r*.

C. scolopendra CL. — *January*: central Skagerak *r*. *March*: Kattegatt (Middelgrundet) *rr*. *April*: *r* at 57° N. 5° E. and at Sk. *October*: M. *rr*, V. +. *November*: Vinga (30 m.) *r*, V. *rr*. *December*: M. *r*, V. *r* +.

- C. septentrionalis** OSTR. — *December*: V. r.
- C. similis** CL. — *January*: central Skagerak r. *February*: M. +, V. c. *March*: V. r.
- C. socialis** LANDER. — *February*: V. c. *March*: common at 56° 33' N. 12° 16' E., Middelgrundet; Vinga; M. +, V. cc. *November*: N. of Jutland rr.
- C. teres** CL. — *January*: central Skagerak r, V. r. *February*: M. rr. *March*: from 56° 33' N. 12° 16' E. to M. not rare. *April*: W. of Schleswig +; Skagerak r, M. r. *May*: M. r. *December*: M. and V. rr.
- Coscinodiscus centralis** EHB. — *November*: W. of Scotland r, Skagerak r.
- C. concinnus** W. SM. — *January*: central Skagerak and from Vinga to Väderö r. *February*: W. of Scotland +; area between 58° N. 3° E., 56° N. 2° E. and Sk., more or less rare; M. r. *March*: Vinga, M. r. *April*: area between 55° N. 6° E., 56°—57° N. 2°—3° E. and Sk. most common along the Danish coast; Skagerak r, V. cc. *May* and *June*: M. and V. cc. *October*: M. and V. +. *November*: off the Dutch coast r; W. and N. of Jutland r; M. r, V. + r. *December*: V. +.
- C. excentricus** EHB. — *February*: common W. of Scotland; not common from 59° N. 0° E. to Sk. *October*: V. +. *November*: W. and N. of Scotland r; Holland to Sk. r; Vinga (30 m.) +, M. rr, V. + r. *December*: V. +.
- C. lacustris** W. SM. — *March*: Vinga r.
- C. lineatus** EHB. — *December*: V. r.
- C. oculus iridis** EHB. — *January*: Vinga and M. r. *February*: sparingly along the 50 metre plateau of the bottom of the North Sea; M. r. *March*: M. r. *April*: E. of Scotland; N.W. of Jutland r. *June* and *July*: the Shetlands r. *November*: central North Sea rr, N. of Jutland rr, V. r. *December*: V. r.
- C. (Coscosira) polychordus** GRAN. — *January*: central Skagerak r, M. r, Gullmarsfjord r. *February*: 57° N. 8° E. r, M. c. *March*: Kattegatt (Middelgrundet) +; 56° 33' N. 12° 16' E. r, M. r. *October*: M. r. *November*: N. of Jutland r, M. and V. r. *December*: M. and V. r.
- C. radiatus** EHB. — *January*: central Skagerak r. *February*: as *C. excentricus*. *April*: E. of Scotland c, thence rarer to the west coast of Jutland. *October*: M. and V. r. *November*: W. of Scotland and from Holland to Sk.; N. of the Fisher Bank, M. and V. r. *December*: M. and V. rr.
- C. stellaris** ROPER. — *January*: Dröbak (30 m.) +. *February*: 58° N. 3° E. r. *March*: Vinga r. *October*: V. r. *November*: V. and M. rr. *December*: V. rr.

Dactyliosolen antarcticus CASTR. — *June* and *July*: the Shetlands. *November*: 58°—59° N. 0° E. *rr*.

Ditylum Brightwellii WEST. — *January*: central Skagerak *r*. *April*: 57° N. 5° E. *r*. *October*: M. *r*, V. + *r*. *November*: more or less common from Holland to Sk.; Vinga (30 m.) *r*; M. *r*, V. + *r*. *December*: M. and V. *r*.

Encampia zodiacus EHB. — *April*: sparingly in the area 56°—57° N. 4° E. and 54°—55° N. 5°—6° E.; North of Jutland *r*. *October*: M. and V. *c*. *November*: more or less common from Holland to Sk.; S. of Norway *r*, Vinga (30 m.) *c*, M. *c*, V. + *r*. *December*: V. *r* +.

Guinardia flaccida CASTR. — *January*: V. *r*. *February*: 57° N. 8° E. *r*; M. *rr*. *April*: more or less common in the area 56°—57° N. 5°—7° E.; N. of Holland *r*. *June*: the Shetlands *r*, V. *r*. *July—August*: W. of Jutland, M. *c* to *r*, V. *r*. *October*: M. and V. +. *November*: more or less common from Holland to the W. of Jutland, M. *r*, V. + *r*. *December*: M. *r*, V. + *r*.

Lauderia annulata CL. (*L. borealis* GRAN.) — *April*: central North Sea, 56°—57° N. 2°—6° E. *June*: the Shetlands *r*. *October*: V. +. *November*: N. of Jutland *r*, V. *r*. *December*: V. *r*.

Leptocylindrus danicus CL. — *February*: V. +. *April*: 57° N. 3° E. *rr*, Sk. *rr*. *May*: M. +. *June*: V. *r*. *July—August*: W. of Limfjord *r*. *November*: W. of Limfjord. *December*: V. *r*.

Nitzschia lineola CL. — *July*: the Shetlands *r*.

N. seriata CL. (*N. fraudulenta* CL.). — *March*: M. *r*, V. +.

Rhizosolenia alata BRTW. — *June*: the Shetlands *r*. *November*: W. and E. of Scotland *r*.

R. calcar avis SCHULZE. — *January*: Vinga *r*. *July—August*: W. of Limfjord *r*. *September*: M. +. *October*: M. and V. +. *November*: N. of Jutland, Vinga (30 m.) *c*, M. *r*, V. *c*. *December*: M. *r*, V. + *r*.

R. delicatula CL. — *November*: Väderöboda *rr*.

R. (alata var.) gracillima CL. — *April*: 57° N. 4° E. *r*. *May*: M. *c*. *June*: the Shetlands *c*, M. and V. *c*. *July—August*: *cc* in the western Skagerak; M. and V. *ccc* to +. *September*: M. +. *October*: M. *r*, V. +. *November*: W. of Scotland and N. of Jutland *r*, Vinga (30 m.) *r*, V. +.

R. semispina HENSEN. — *January*: V. *r*. *February*: M. and V. +. *March*: at 56° 33' N. 12° 16' E. *c*. Vinga and M. + *c*. *April*: in the area between 56°—57° N. 2° E.

and Sk. common in some spots; 55° N. 6° E.; Sk. and M. very common. *May*: M. c. *June*: the Shetlands +. *October*: V. r. *November*: Sk. rr, Vinga r, V. and M. +. *December*: M. and V. r +.

R. setigera BRTW. — *January*: Vinga, M. and V. r. *February*: M. c. *March*: 56° 55' N. 12° 16' E., Middelgrundet, Vinga, M. +. *April*: Sk. not rare, M. r. *September*: M. r. *October*: V. r. *November*: off the Dutch coast and N. of Jutland r, Vinga (30 m.) r, M. r, V. r +. *December*: M. and V. r.

R. Shrubsolei CL. — *June*: the Shetlands r. *July—August*: W. of Jutland +, M. +, V. r. *October*: M. r, V. +. *November*: Sk. r. *December*: V. rr.

R. Stolterfothii H. PER. — *April*: off the Dutch coast +; at 57° N. 4° E. r. *July—August*: W. of Jutland +. *September*: M. r. *October*: M. and V. r. *November*: off the Dutch coast; N. of Jutland, V. +.

R. styliformis BRTW. — *February*: r at 58° N. 3° E. *April*: E. of Scotland and W. of Schleswig rr. *May*: N.E. of Scotland c. *June*: the Shetlands c. *July—August*: common along the Dutch coast, thence more sparingly to Limfjord, the Shetlands +, M. c. *October*: V. r. *November*: W. of Scotland r, more or less common from Holland to Sk., Vinga (30 m.) +, M. r.

Roperia tessellata ROPER. — *November*: N. of Scotland, N. of the Dogger Bank and at Sk. rr.

Skeletonema costatum GREX. — *February*: M. c. *April*: 57° N. 9° E. r, Sk. r, M. r. *September*: M. cc. *October*: M. cc, V. +. *November*: N. of Jutland rr, Vinga (30 m.) r, M. and V. r. *December*: M. and V. r.

Stephanopyxis turris GREV. (*St. turgida* GREV.). — *January*: central Skagerak rr. *October*: M. and V. rr. *November*: N. of Jutland r, S. of Norway r, Vinga (30 m.) +, M. rr, V. r.

Thalassiosira gelatinosa HENSEN. — *January*: central Skagerak r. *March*: Vinga r. *November*: W. of Scotland, N. of Holland and N. of Jutland, everywhere r. *December*: V. r.

T. gravida CL. — *March*: M. r. *April*: area between 56°—57° N. 2°—5° E. *November*: N. of Jutland rr. *December*: V. r.

T. Nordenskiöldii CL. — *January*: central Skagerak rr, Vinga rr, V. rr. *February*: M. c. *March*: from 56° 33' N. 12° 16' E. to M. very common. *April*: area between 56°—57° N. 2°—5° E. and 55° N. 6°—7° E.; Sk. c, M. r. *June*: the Shetlands +. *December*: V. r.

Thalassiothrix Frauenfeldii GRUN. — *January*: central Skagerak and Vinga c, M. and V. r. *February*: M. c. *April*: 57° N. 5° E. r, Sk. +, M. +. *October*: M. c. *November*: N. of Jutland r, Vinga (30 m.) +, M. and V. +. *December*: M. and V. c.

T. longissima CL. & GRUN. — *July*: the Shetlands r.

Species excluded from table I.

The North Sea in February 1900.

- Proto pedata* LEACH. — $3/2$ 52° 32' N. 3° 59' E. *r.*
Centropages typicus KRÖYER. — $4/2$ 55° 16' N. 6° 30' E. +.
Metridia lucens BOECK. — $4/2$ 57° 42' N. 9° 50' E. *r.*
 $5/2$ 57° 38' N. 9° 31' E. *r.*
Microsetella atlantica BRADY & ROBERTS. — $4/2$ 56° 57' N. 6° 46' E. *r.*; $5/2$ 57° 38' N. 9° 31' E. *r.*
Oithona plumifera BAIRD. — $3/2$ 56° 27' N. 4° 28' E. *r.*
 $5/2$ 57° 38' N. 9° 31' E. *r.*
Oncæa minuta GIESBR. — $2/2$ 56° 5' N. 3° 3' W. *rr.*
 $2/2$ 56° 26' N. 0° 8' E. *rr.*; $1/2$ 58° 17' N. 3° 14' E. *rr.*
Paracalanus parvus CLAUS. — $4/2$ 56° 57' N. 6° 46' E. *r.*; $3/2$ 53° 26' N. 4° 49' E. +.
Codonella ventricosa CLAP. & LACHM. — $4/2$ 56° 57' N. 6° 46' E. *r.*; $3/2$ 57° 9' N. 5° 43' W. *r.*
Fungella arctica CL. — $2/2$ 56° 5' N. 3° 3' W. *rr.*
Ptychocyclus acuta BRANDT. — $5/2$ 57° 27' N. 9° 1' E. *rr.*
Tintinnopsis beroidea STEIN. — $4/2$ 56° 49' N. 7° 56' E. *rr.*; $17/2$ 55° 28' N. 8° E. *r.*
Tintinnus acuminatus CLAP. & LACHM. — $5/2$ 57° 38' N. 9° 31' E. *r.*
Acanthochiasma fusiforme HKL. — $3/2$ 57° 9' N. 5° 43' W. *r.*
Xanthidium hystrix CL. — $4/2$ 56° 57' N. 6° 46' E. *r.*
Dinophysis acuta EHB. — $1/2$ 47° 40' N. 7° 10' E. *r.*
58° 17' N. 3° 14' E. *r.*; $2/2$ 58° 22' N. 2° 23' E. *r.*
58° 35' N. 0° 30' E. *r.*
Peridinium depressum BAIL. — $4/2$ 57° 42' N. 9° 50' E. *rr.*; $3/2$ 56° 12' N. 3° 25' E. *r.*; $1/2$ 58° 17' N. 3° 14' E. +.
P. divergens EHB. — $4/2$ 57° 42' N. 9° 50' E. *rr.*; $5/2$ 57° 38' N. 9° 31' E. *r.*; $1/2$ 58° 17' N. 3° 14' E. *r.*
P. pallidum OSTENF. — $4/2$ 56° 44' N. 5° 47' E. *rr.*
P. pellucidum. — $1/2$ 57° 40' N. 7° 10' E. *rr.*; $2/2$ 58° 35' N. 0° 30' E. *r.*
Pyrophacus horologium STEIN. — $5/2$ 57° 38' N. 9° 31' E. *r.*; $1/2$ 58° 17' N. 3° 14' E. *rr.*
Bellerochea malleus WEST. — $3/2$ 52° 32' N. 3° 59' E. *r.*
Biddulphia aurita LYNGB. — $4/2$ 56° 49' N. 7° 56' E. *r.*
 $17/2$ 54° 11' N. 7° 59' E. *r.*
Chaetoceros atlanticus CL. — $4/2$ 57° 42' N. 9° 50' E. *rr.*; $3/2$ 56° 27' N. 4° 28' E. *r.*; $1/2$ 58° 17' N. 3° 14' E. *rr.*
C. borealis BTW. — $4/2$ 56° 57' N. 6° 46' E. *r.*; $1/2$ 58° 17' N. 3° 14' E. *rr.*
C. Schüttii CL. — $3/2$ 56° 27' N. 4° 28' E. *r.*; $5/2$ 57° 27' N. 9° 1' E. *r.*
Coscinodiscus polychordus GRAN. — $4/2$ 56° 49' N. 7° 56' E. *r.*
C. stellaris ROPER. — $1/2$ 58° 17' N. 3° 14' E. +.
Guinardia flaccida CASTR. — $4/2$ 57° 14' N. 8° 14' E. *r.*

Species excluded from table II.

The North Sea in April 1900.

- Oikopleura dioica* FOL. — 54° 35' N. 5° 39' E. +.
Calanus hyperboreus KRÖYER. — 56° 54' N. 7° 26' E. *rr.*
Centropages typicus KRÖYER. — 57° 32' N. 9° 29' E. *r.*
57° 16' N. 8° 42' E. *r.*
Oithona similis CLAUS. — 56° 26' N. 0° 29' E. *rr.*
57° 41' N. 11° 17' E. *r.*; 57° 5' N. 8° 26' E. *r.*
57° 39' N. 9° 45' E. *r.*
Paracalanus parvus CLAUS. — 57° 45' N. 10° 54' E. *rr.*
56° 54' N. 7° 26' E. *rr.*; 54° 35' N. 5° 39' E. *r.*
Evadne Nordmani LOVÉN. — 56° 13' N. 7° 47' E. *r.*
Sagitta bipunctata QUOI & GAIM. — 57° 45' N. 10° 49' E. +; 57° 32' N. 9° 39' E. *r.*; 57° 46' N. 10° 39' E. *rr.*
Codonella ventricosa CLAP. & LACHM. — 56° 26' N. 0° 29' E. *r.*; 56° 16' N. 1° 35' W. +.
Fungella arctica CL. — 57° 45' N. 10° 49' E. *rr.*
Tintinnus bottnicus NORDQ. — 57° 45' N. 10° 53' E. *r.*
Halosphaera viridis SCHMITZ. — 56° 26' N. 0° 29' E. *r.*
56° 16' N. 1° 35' W. *r.*; 55° 4' N. 7° 37' E. *rr.*

- Pterosphaera Möbii* JÖRGENS. — 57° 28' N. 7° 28' E. *r*;
57° 21' N. 6° 22' E. *r*; 57° 16' N. 8° 42' E. *r*;
55° 56' N. 2° 34' E. *r*.
- Xanthidium multispinosum* MÖB. — 56° 13' N. 7° 47' E. *rr*.
- Phaeocystis Ponchetii* LAGU — 56° 53' N. 2° 44' E. *r*;
55° 11' N. 6° 26' E. *rr*; 54° 35' N. 5° 39' E. +.
- Ceratium bucephalum* CL. — 56° 26' N. 0° 29' E. *rr*;
56° 17' N. 4° 18' E. *r*.
- C. fusus* DUJ. — 57° 28' N. 7° 28' E. *r*; 53° 30' N. 4° 43' E. +.
- C. lineatum* EHB. — 53° 30' N. 4° 43' E. *r*.
- C. macroceros* EHB. — 57° 2' N. 3° 58' E. *r*; 56° 54' N. 7° 26' E. *r*.
- Dinophysis rotundata* STEIN. — 57° 45' N. 10° 54' E. *r*;
57° 32' N. 9° 39' E. *r*.
- D. Vanhöffeni* OSTF. — 57° 45' N. 10° 54' E. *r*; 57° 45' N. 10° 49' E.; 56° 36' N. 5° 42' E. *r*; 56° 13' N. 7° 47' E. *rr*.
- Asterionella japonica* CL. — 55° 4' N. 7° 37' E. +.
- Biddulphia aurita* LYNGB. — 57° 5' N. 8° 26' E. *r*; 56° 13' N. 7° 47' E. *r*; 55° 41' N. 7° 26' E. *r*; 55° 4' N. 7° 37' E. *r*.
- Cerataulina Bergoni* H. PER. — 56° 36' N. 5° 42' E. *r*.
- Chaetoceros atlanticus* CL. — 57° 32' N. 9° 39' E. *r*.
- C. borealis* var. *Brightwellii* CL. — 57° 45' N. 10° 49' E. *r*.
- C. brevis* SCHÜTT. — 57° 10' N. 4° 58' E. *r*; 56° 17' N. 4° 18' E. *r*.
- C. curvisetus* CL. — 57° 10' N. 4° 58' E. *c*; 56° 36' N. 5° 42' E. *r*; 56° 17' N. 4° 18' E. *cc*; 55° 56' N. 2° 34' E. *r*.
- C. densus* CL. — 53° 30' N. 4° 43' E. *r*.
- C. diadema* EHB. — 57° 10' N. 4° 58' E. +; 36° 36' N. 5° 42' E. *r*; 55° 4' N. 7° 37' E. +.
- C. Schüttii* CL. — 57° 10' N. 4° 58' E. *rr*.
- C. scolopendra* CL. — 57° 10' N. 4° 58' E. +; 57° 41' N. 11° 17' E. *r*.
- C. teres* CL. — 55° 4' N. 7° 37' E. +; 55° 11' N. 6° 26' E. *r*.
- Ditylum Brightwelli* WEST. — 57° 10' N. 4° 58' E. *r*.
- Guinardia flaccida* CASTR. — 57° 10' N. 4° 58' E. +; 56° 54' N. 7° 26' E. *r*; 56° 36' N. 5° 42' E. *c*; 53° 30' N. 4° 43' E. *r*.
- Lauderia annulata* CL. — 57° 10' N. 4° 58' E. +; 56° 53' N. 2° 44' E. *r*; 56° 36' N. 5° 42' E. *r*; 56° 17' N. 4° 18' E. *c*.
- Leptocylindrus danicus* CL. — 57° 45' N. 10° 54' E. *rr*;
56° 53' N. 2° 44' E. *r*.
- Rhizosolenia gracillima* CL. — 57° 2' N. 3° 58' E. *r*.
- R. Stolterfothii* H. PER. — 57° 2' N. 3° 58' E. *rr*; 53° 30' N. 4° 43' E. +.
- R. styliformis* BTW. — 56° 26' N. 0° 29' E. *rr*; 55° 4' N. 7° 37' E. *rr*.
- Skeletonema costatum* GREV. — 57° 16' N. 8° 42' E. *r*.
- Thalassiothrix Frauenfeldii* GRUN. — 57° 10' N. 4° 58' E. *r*.

Species excluded from table III.

The North Sea in July—August 1900.

- Proto pedata* LEACH. — 57° 03' N. 8° 20' E. *rr*.
- Acartia longiremis* LILLJEB. — 56° 20' N. 0° 51' W. *c*;
56° 12' N. 1° 58' W. *c*; 58° 8' N. 5° 10' E. +; 58° 49' N. 4° 3' W.
- Isias clavipes* BOECK. — 51° 55' N. 3° 28' E. *r*.
- Labidocera Wollastoni* LUBB. — 53° 38' N. 4° 52' E. *r*.
- Metridia lucens* BOECK. — 58° 20' N. 4° 44' E. *r*.
- Podon Leuckarti* G. O. S. — 56° 42' N. 1° 13' E. *r*.
- Amphorella subulata* EHB. — 56° 59' N. 8° 15' E. *r*;
56° 27' N. 8° E. *r*.
- Codonella ventricosa* CLAP. & LACHM. — 56° 35' N. 5° 4' E. *r*.
- Cyttarocylis denticulata* EHB. — 57° 29' N. 9° 33' E. *r*.
- C. serrata* MÖB. — 57° 29' N. 9° 33' E. *rr*; 56° 12' N. 1° 58' W. *c*; 53° 05' N. 4° 20' E.
- Tintinnopsis campanula* EHB. — 57° 41' N. 11° 19' E. *r*;
51° 55' N. 3° 28' E. *r*.
- T. fistularis* MÖB. — 57° 41' N. 11° 19' E. *r*; 57° 29' N. 9° 33' E. *r*.
- Noctiluca miliaris* SURIR. — 55° 4' N. 7° 37' E. *ccc*;
55° 52' N. 6° 55' E. *cc*.
- Ceratium bucephalum* CL. — 58° 20' N. 4° 44' E. *r*;
58° 8' N. 5° 10' E. *r*; 58° 49' N. 4° 3' W.
- Dinophysis acuta* EHB. — 55° 4' N. 0° 51' W. *r*; 57° 47' N. 10° 36' E. *rr*; 56° 20' N. 0° 51' W. *r*.
- D. Vanhöffeni* OSTF. — 55° 28' N. 0° 40' E. *r*; 56° 35' N. 5° 4' E. *r*; 55° 4' N. 0° 51' W. +.
- Gonyaulax spinifera* CLAP. & LACHM. — 56° 35' N. 5° 4' E. *r*; 55° 4' N. 0° 51' W. +; 57° 10' N. 8° 1' E. *r*; 56° 27' N. 8° E. *r*; 56° 20' N. 0° 51' W. *r*.
- Peridinium globulus* STEIN. — 57° 47' N. 10° 36' E. *rr*;
55° 50' N. 7° 35' E. *c*.
- P. Michaëlis* EHB. — 57° 11' N. 8° 5' E. *r*; 57° 47' N. 10° 36' E. *r*; 56° 27' N. 8° E. *r*.

- P. oceanicum* VANH. — 57° 41' N. 11° 19' E. *r*; 57° 29' N. 9° 33' E. *r*; 56° 59' N. 8° 15' E. *r*; 56° 27' N. 8° E. *r*.
- P. ovatum* POUCHET. — 56° 27' N. 8° E. *r*; 56° 42' N. 1° 13' E. +; 56° 20' N. 0° 51' W. *c*; 56° 12' N. 1° 58' W. +.
- P. pallidum* OSTR. — 56° 35' N. 5° 4' E. *r*; 55° 4' N. 0° 51' W. *r*; 56° 12' N. 1° 58' W. *r*.
- Xanthidium multispinosum* MÖB. — 56° 59' N. 8° 15' E. *r*; 51° 55' N. 3° 28' E. *r*; 58° 42' N. 1° 15' W. *rr*.
- Bellerochea malleus* BTW. — 57° 3' N. 8° 20' E. *r*.
- Chaetoceros densus* CL. — 56° 12' N. 1° 58' W. +; 55° 52' N. 6° 55' E. +.
- Guinardia flaccida* CASTR. — 55° 50' N. 7° 35' E. *c*; 55° 52' N. 6° 55' E. *cc*.
- Leptocylindrus danicus* CL. — 56° 27' N. 8° E. *r*.
- Rhizosolenia calcar avis* SCHULZE. — 56° 59' N. 8° 15' E. *r*.
- R. Stolterfothii* H. PER. — 55° 50' N. 7° 35' E. +.

Species excluded from table IV.

The North Sea in November 1900.

- Fritillaria borealis* LOHM. — 57° 44' N. 10° 23' E. *r*; 57° 45' N. 10° 18' E. *r*.
- Limacina retroversa* FLEM. — 57° 25' N. 8° 1' E. *r*.
- Metridia lucens* BOECK. — 57° 44' N. 10° 23' E. *r*; 58° 2' N. 5° 45' E. +; 55° 53' N. 6° 55' W. +; 56° 56' N. 2° 41' E. *r*.
- Oithona plumifera* BAIRD. — 57° 46' N. 8° 5' E. *r*; 57° 7' N. 3° 57' E. *r*.
- Podon intermedius* LILLJEB. — 57° 42' N. 10° 53' E. *r*; 57° 25' N. 8° 1' E. *r*; 57° 7' N. 3° 57' E. *r*.
- Amphorella subulata* EHB. — 57° 44' N. 10° 23' E. *r*; 56° 18' N. 7° 13' E. *r*; 52° 57' N. 4° 17' E. *r*.
- Codonella Jörgensenii* CL. — 57° 43' N. 11° E. *r*; 52° 57' N. 4° 17' E. *r*.
- Cyttarocylis serrata* MÖB. — 56° 34' N. 8° 3' E. *r*; 55° 58' N. 7° 43' E. *r*.
- Dictyocysta elegans* EHB. — 58° 44' N. 4° 8' W. *r*.
- Ptychocylis acuta* BRANDT. — 57° 7' N. 3° 57' E. *r*.
- Tintinnus acuminatus* CLAP. & LACHM. — 58° 2' N. 5° 45' E. *r*; 56° 26' N. 4° 25' E. *r*.
- »*Sternhaarstatoblast*» HENSEN. — 58° 44' N. 4° 8' W. *r*.
- Acanthochiasma fusiforme* HKL. — 58° 44' N. 4° 8' W. *rr*; 58° 15' N. 5° 50' W. *c*; 56° 48' N. 7° 12' W. *r*.
- Acanthometron catervatum* HKL. — 58° 36' N. 0° 5' E. *r*.
- Acanthonia Mülleri* HKL. — 58° 44' N. 4° 8' W. *rr*.
- Plectophora arachnoides* CLAP. & LACHM. — 57° 46' N. 8° 5' E. *rr*.
- Noctiluca miliaris* SURIR. — 57° 43' N. 11° E. *r*; 57° 44' N. 10° 23' E. *r*; 57° 24' N. 9° 17' E. *r*.
- Dinophysis rotundata* CL. & LACHM. — 57° 44' N. 10° 23' E. *r*; 56° 32' N. 7° 28' E. *r*; 52° 57' N. 4° 17' E. *r*; 57° 32' N. 9° 24' E. *r*; 56° 37' N. 5° 13' E. *r*.
- D. Vanhöffeni* OSTENF. — 57° 44' N. 10° 23' E.; 56° 32' N. 7° 28' E. *r*.
- Gonyaulax spinifera* CLAP. & LACHM. — 57° 24' N. 9° 17' E.; 55° 37' N. 1° 4' E. *r*.
- Peridinium globulus* STEIN. — 57° 43' N. 11° E. *r*; 58° 44' N. 4° 8' W. *rr*.
- P. Michaëlis* EHB. — 58° 11' N. 3° 58' E. *r*; 58° 44' N. 4° 8' W. *r*.
- P. pellucidum* BERGH. — 57° 43' N. 11° E. *r*; 57° 25' N. 8° 1' E. *r*.
- Pterosphaera Möbii* JÖRGENS. — 58° 11' N. 3° 58' E. *r*; 56° 45' N. 1° 27' E. *rr*; 56° 7' N. 2° 37' E. *rr*.
- Xanthidium brachiolatum* MÖB. — 57° 43' N. 11° E. *r*; 57° 32' N. 9° 24' E. *rr*.
- X. hystrix* CL. — 57° 44' N. 10° 23' E. *r*; 57° 42' N. 10° 53' E. *rr*; 57° 17' N. 6° 37' E. *r*.
- Phaeocystis Pouchetii* LAGH. — 57° 43' N. 11° E. *r*; 57° 42' N. 10° 53' E.
- Asterionella japonica* CL. — 57° 24' N. 9° 17' E. *rr*; 52° 57' N. 4° 17' E. *rr*.
- Bacteriastrium varians* LAUDER. — 56° 32' N. 7° 28' E. *r*; 56° 18' N. 7° 13' E. *r*; 54° 29' N. 5° 32' E. *r*; 52° 57' N. 4° 17' E. +; 57° 32' N. 9° 24' E. *rr*.
- Bellerochea malleus* BRTW. — 57° 44' N. 10° 23' E. *rr*.
- Chaetoceros atlanticus* CL. — 58° 36' N. 0° 5' E. *r*.
- C. borealis* var. *Brighwellii* CL. — 57° 43' N. 11° E. *r*; 57° 44' N. 10° 23' E. *r*.
- C. brevis* SCHÜTT. — 57° 43' N. 11° E. *r*; 57° 32' N. 10° 53' E. +; 57° 42' N. 10° 53' E. +.
- C. constrictus* GRAN. — 57° 46' N. 8° 5' E. *r*; 57° 32' N. 10° 53' E. *r*.
- C. diadema* EHB. — 57° 43' N. 11° E. +; 57° 42' N. 10° 23' E. +; 57° 32' N. 9° 24' E. *r*.

- C. lacinosus* SCHÜTT. — 57° 43' N. 11° E' r; 57° 44' N. 10° 23' E. r; 57° 46' N. 8° 5' E. r; 57° 42' N. 10° 53' E. r.
C. socialis LAUDER. — 57° 32' N. 9° 24' E. rr.
Coscinodiscus centralis EHB. — 58° 44' N. 4° 8' W. r; 56° 48' N. 7° 12' W. r; 57° 42' N. 10° 53' E. r.
C. oculus iridis EHB. — 55° 31' N. 7° 23' E. r; 57° 25' N. 8° 1' E. r; 57° 7' N. 3° 57' E. r.
Dactyliosolen antarcticus CASTR. — 58° 36' N. 0° 5' E. rr.
Lauderia annulata CL. — 56° 18' N. 7° 13' E. r.
- Lithodesmium undulatum* EHB. — 56° 34' N. 8° 3' E. r.
Rhizosolenia alata BTW. — 58° 36' N. 0° 5' E. rr; 55° 53' N. 6° 55' E. r.
R. semispina HENSEN. — 57° 42' N. 10° 53' E. r.
R. Shrubsolei CL. — 57° 43' N. 11° E. r; 57° 44' N. 10° 23' E. r; 57° 46' N. 10° 31' E. +.
Roperia tessellata ROPER. — 57° 43' N. 11° E. rr; 58° 44' N. 4° 8' W. rr; 56° 7' N. 2° 37' E. rr.
Skeletonema costatum GREV. — 57° 24' N. 9° 17' E. r.
Thalassiosira gravida CL. — 57° 44' N. 10° 23' E. r; 57° 24' N. 9° 17' E. rr; 56° 18' N. 7° 13' E. r.

Species excluded from table V.

Måseskär 1900.

- Fritillaria borealis* LOHM. — 30/3 rr.
Acartia biflosa GIESBR. — 23/6 +.
Anomalocera Patersoni TEMPL. — 27/1 rr; 2/6 rr.
Corycaeus anglicus LUBE. — 19/10 r; 29/10 r; 6/11 r.
Isias clavipes BOECK. — 17/8 +; 3/9 +; 11/9 r; 29/9 r.
Temorella affinis POPPE. — 9/6 c; 23/6 c.
Podon intermedius LILLJEB. — 3/9 r; 11/9 r.
P. Leuckarti G. O. S. 9/6 c; 23/6 c.
P. polyphemoides LEUCK. — 7/7 r.
Limacina retroversa FLEM. — 28/11 r.
Pleurobrachia pileus FABR. — 3/9 r; 28/11 r; 5/12 r.
Amphorella Steenstrupii CLAP. & LACHM. — 8/10 rr; 29/10 rr.
A. subulata EHB. — 3/7 r; 20/11 rr.
Codonella ventricosa CLAP. & LACHM. — 8/10 rr; 19/10 rr.
Cyttarocylis serrata MÖB. — 8/10 rr.
Tintinnopsis beroidea STEIN. — 27/1 r; 12/5 r.
Tintinnus acuminatus CLAP. & LACHM. — 27/12 rr.
T. (bottnicus var.) pellucidus CL. — 5/5 rr; 12/5 r.
Noctiluca miliaris SURIR. — 6/11 r.
Distephanus speculum EHB. — 19/10 rr; 20/11 rr; 27/11 rr.
Halosphæra viridis SCHMITZ. — 27/1 c; 2/2 r; 20/11 rr; 27/12 +.
Ceratium bucephalum CL. — 27/1 r; 2/2 r; 7/9 r; 27/12 r.
C. furca DUJ. — 8/10 r; 20/11 rr; 27/12 c.
C. lineatum EHB. — 5/12 r; 27/12 rr.
Dinophysis rotundata STEIN. — 12/5 r; 26/5 r; 20/7 r.
D. Vanhöffeni OSTF. — 24/8 r.
Diplopsalis lenticula BERGH. — 29/10 r.
Gonyaulax spinifera CLAP. & LACHM. — 24/8 rr.
Peridinium oceanicum VANIL. 20/7 r; 17/8 r; 24/8 r.
- P. pellucidum* BERGH. — 30/3 r; 6/4 r; 17/4 rr; 5/5 rr; 29/10 r.
Protoceratium reticulatum POUCHET. — 26/5 r.
Pyrophacus horologium STEIN. — 20/7 r; 29/9 rr; 8/10 rr.
Xanthidium hystrix CL. — 2/6 r; 23/6 rr.
Phaeocystis Poucheti LAGH. — 17/3 r; 22/3 +; 17/4 r.
Dinobryum pellucidum LEVANDER. — 6/4 r; 17/4 r.
Biddulphia mobilensis BAIL. — 8/10 rr; 19/10 rr; 29/10 rr; 20/11 rr.
Chaetoceros constrictus GRAN. — 27/1 r; 29/10 r; 20/11 +; 28/11 r; 5/12 +.
C. danicus CL. — 26/6 r; 20/7 r; 27/7 r.
C. densus CL. — 8/10 r; 19/10 r; 29/10 r; 6/11 +; 20/11 r.
C. Grani CL. — 17/4 c.
C. scolopendra CL. — 19/10 rr; 29/10 rr; 5/12 r.
C. similis CL. — 23/2 +.
C. socialis LAUDER. — 5/3 +; 17/3 +; 22/3 c.
C. teres CL. — 7/2 rr; 22/3 r; 17/4 r; 12/5 r; 5/12 r.
Coscinodiscus excentricus EHB. — 28/11 r.
C. oculus iridis EHB. — 27/1 r; 7/2 r; 30/3 r.
C. radiatus EHB. — 2/2 r; 19/10 r; 20/11 r; 28/11 r; 5/12 r.
C. stellaris ROPER. — 20/11 r.
Leptocylindrus danicus CL. — 17/4 r; 26/5 +.
Nitzschia seriata CL. — 23/3 r.
Rhizosolenia Shrubsolei CL. — 3/7 r; 7/7 c; 19/10 r; 29/10 r.
R. Stolterfothii H. PER. — 29/9 r; 8/10 +; 19/10 c; 29/10 c.
R. styliiformis BTW. 7/7 c; 6/11 r.
Stephanopyxis turgida GREV. — 19/10 rr; 29/10 rr; 20/11 rr.
Thalassiosira gravida CL. — 17/3 r.

Species excluded from table VI.

Väderöboda.

- Fritillaria borealis* LOHM. — $29/3$ r; $4/1$ r; $19/5$ r.
Amathilla angulosa RATHKE. — $17/11$ cc.
Caprella septentrionalis KRÖYER. — $29/3$ r.
Parathemisto oblivia KRÖYER. — $6/2$ rr; $6/3$ r.
Proto pedata LEACH. — $24/12$ +.
Podon intermedius LILLJEB. — 27 s +; $20/10$ r; $2/12$ rr.
P. Leuckartii G. O. S. $2/6$ r; $9/6$ r; $3/7$ r; $9/7$ r; $18/7$ r.
Corycaeus anglicus LUEB. $6/2$ r; $7/11$ r.
Euterpe acutifrons DANA. — $24/12$ r.
Isias clavipes BOECK. — $3/9$ r; $17/9$ r.
Labidocera Wollastonii LUEB. — $17/11$ rr.
Metridia lucens BOECK. — $24/12$ r.
Temorella affinis POPPE. — $16/6$ +.
Pleurobrachia pileus FABR. — $8/1$ r.
Amphorella subulata EHB. — $17/11$ r.
Codonella ventricosa CLAP. & LACHM. — $20/10$ r; $28/10$ r; $7/11$ r; $24/11$ r; $8/12$ r.
Cyttarocyclus serrata MÖB. — $24/12$.
Ptychocyclus acuta BRANDT. — $25/1$ rr; $29/3$ +; $4/4$ r.
Tintinnopsis fistularis MÖB. — $27/7$ r; $12/8$ r.
Tintinnus bottnicus NORDQUIST. — $19/5$ r.
Noctiluca miliaris SURIR. — $28/10$ r.
Dictyocha fibula EHB. — $28/10$ r.
Acanthometron catervatum HKL. — $10/9$ r; $17/9$ r; $28/10$ r.
Plectophora arachnoides CLAP. & LACHM. — $25/1$ rr.
Dinophysis rotundata STEIN. — $24/11$ r.
D. Vanhöffenii OSTF. — $28/10$ r; $17/11$ r; $24/12$ r.
Diplopsalis lenticula BERGH. — $7/11$ r; $8/12$ r.
Gonyaulax spinifera CLAP. & LACHM. — $28/10$ r; $8/12$ r.
Peridinium Michaëlis EHB. — $17/11$ r.
P. oceanicum VANH. — $8/12$ r.
P. pallidum OSTF. — $19/3$ r; $2/6$ rr; $2/12$ rr; $24/12$ r.
P. pellucidum BERGH. — $8/12$ r.
Pyrophacus horologium STEIN. — $28/10$ r.
Prorocentrum micans STEIN. — $28/10$ r.
Pterocysta Möbii JÖRGENS. — $6/2$ rr; $26/4$ rr; $1/5$ rr; $12/8$ rr; $2/12$ rr.
Xanthidium hystrix CL. — $23/6$ r; $3/7$ rr; $28/10$ r; $2/12$ rr.
Dinobryum pellucidum LEVANDER. — $1/1$ r; $26/4$ r; $12/5$ r.
Actinocyclus Ralfsii W. SM. — $20/10$ r; $28/10$ r.
Bacteriastrum varians LAUDER. — $20/10$ r.
Chaetoceros criophilus CASTR. — $13/2$ r.
C. danicus CL. — $17/1$ r; $13/2$ r; $2/12$ r.
C. septentrionalis ØSTR. — $2/12$ r.
C. similis CL. — $25/2$ c; $6/3$ r.
C. socialis LAUDER. — $25/2$ c; $6/3$ cc; $19/3$ cc.
Coscinodiscus lineatus EHB. — $2/12$ r.
C. oculus iridis EHB. — $6/3$ r; $17/11$ r; $24/11$ r; $24/12$ r.
Nitzschia fraudulenta CL. — $29/3$ +.
Rhizosolenia delicatula CL. — $7/11$ r.
R. Shrubsolei CL. — $9/7$ r; $20/10$ +; $28/10$ +; $8/12$ rr.
R. Stelterfothii H. PER. — $20/10$ r; $28/10$ +; $17/11$ r; $24/11$ +.
R. styliformis BRTW. — $20/10$ r; $28/10$ r.
Stephanopyxis turris GREV. — $20/10$ r; $28/10$ r; $24/11$ r.
Thalassiosira gelatinosa HENSEN. — $2/12$ r.
T. gravida CL. — $2/12$ r.

Sea in February 1900.

4	4	5	3	3	3	4	4	4	3	5	17	17	1	1	2	2	3	3
56° 57'	57° 14'	57° 38'	51° 37'	52° 32'	53° 26'	54° 20'	55° 16'	56° 10'	56° 49'	57° 27'	55° 28'	54° 11'	57° 40'	58° 17'	58° 22'	58° 35'	57° 9'	56° 16'
6° 46'	8° 14'	9° 31'	3° 16'	3° 59'	4° 49'	5° 38'	6° 30'	7° 20'	7° 56'	9° 1'	8° 0'	7° 59'	7° 10'	3° 14'	2° 23'	0° 30'	5° 43'	5° 49'
E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	W.	W.
4,5	3,1	2,6	4,2	5,2	5,0	5,4	4,4	3,4	2,6	3,6	2,5	2,5	4,5	6,0	6,5	7,0	8,0	8,5
34,93	33,85	34,83	30,51	34,41	34,24	35,08	34,84	34,05	33,58	34,29	31,82	31,27	35,00	35,13	35,22	35,29	33,80	33,59
rr	.	.	.	.	+	.	c	.	rr	.	.	.	.	rr	.	.	.	.
.
.	r	r	.	.	.	.	.	.	r	rr	.	.	.	.	.	.	.	.
r	+	r	r	r	.	.	.	rr	r	rr	.	.	+	+	.	.	.	.
r	.	+	.	.	c	c	.	+	+	.	.	r	.	+	.	.	.	.
r	.	+	cc	c	.	r	.	+	+	.	.	+	.	.	.	.	.	.
c	r	.	r	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	rr	rr	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	rr	r	.	rr
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.
r	.	.	.	.	.	.	.	.	.	rr	.	.	.	.	.	.	.	.
r	+	r	.	.	.	.	.	.	.	rr	.	.	c	c	+	r	.	+
.	r	+	.	.	.	.	.	.	.	r	.	.	r	r	.	.	.	.
r	+	r	.	.	.	.	.	.	r	rr	.	.	rr	.	.	.	.	r
r	.	r	.	.	.	rr	.	.	.	.	.	.	rr	+	r	.	rr	.
.	.	r	.	.	.	.	.	.	.	.	r	.	rr	r	.	.	rr	r
.	.	.	.	.	.	.	+	rr	.	.	.	.	.	rr	.	.	.	.
r	+	r	.	r	.	.	.	.	.	.	.	r	r	r	.	.	rr	r
+	c	+	.	.	.	.	.	r	+	r	.	.	.	r	+	.	r	r
.	r	r	.	.	.	.	.	.	.	.	.	.	r	r	.	.	+	r
r	.	.	.	.	.	.	.	.	.	.	.	.	.	rr	.	.	.	.
r	.	.	.	.	.	.	.	r	r	rr	.	.	+	+	.	.	+	.
.	r	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	c	+
r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	r	r	.	.	.	.	.	.	r	.	+	.	c	c	e	+	e	c
.	rr	.	.	.	.	.	.	.	.	.	.	.	.	rr	.	.	.	.
<i>Tp</i>	<i>Tp</i>	<i>Tp</i>	<i>Ns</i>	<i>Ns</i>	<i>NsS</i>	<i>Ns</i>	<i>NsS</i>	<i>Ns</i>	<i>Ns</i>	<i>Ns</i>	<i>?</i>	<i>?</i>	<i>Ns</i>	<i>Nh</i>	<i>Nh</i>	<i>Nh</i>	<i>Nc</i>	<i>Nc</i>

Table II. The North

Date	27	28	28	28	28	28	29	29	28
Latitude N.	57° 45'	57° 28'	57° 21'	57° 10'	57° 2'	56° 53'	56° 26'	56° 16'	57° 45'
Longitude	10° 54'	7° 28'	6° 22'	4° 58'	3° 58'	2° 44'	0° 29'	1° 35'	10° 49'
	E.	E.	E.	E.	E.	E.	E.	W.	E.
Temperature	7,0	5,0	6,2	5,8	6,2	6,7	7,0	6,7	5,2
Salinity	29,41	31,65	33,83	34,81	34,98	35,03	35,24	34,86	29,81
<i>Fritillaria borealis</i> LOHM.	r	.	.	.	.	.	.	.	.
<i>Acartia Clausii</i> GIESBR. . . . .	.	.	.	.	.	.	.	.	.
<i>A. longiremis</i> LILLJEB. . . . .	+	.	.	.	.	.	.	.	+
<i>Calanus finmarchicus</i> GUNN. . . . .	.	c	c	.	.	.	r	.	+
<i>Centropages hamatus</i> LILLJEB.	r	.	.	.	.	.	.	.	.
<i>Pseudocalanus elongatus</i> BOECK.	c	+	.	.	.	.	.	.	+
<i>Temora longicornis</i> O. F. MÜLL.	cc	r	.	.	.	.	r	.	r
<i>Ptychocylis acuta</i> BRANDT.	+	+	r	+	.	.	.	.	r
<i>Ceratium furca</i> DUJ. . . . .	.	r	r	.	r	.	.	.	.
<i>C. longipes</i> BAIL.	r	+	+	+	.	.	+	.	.
<i>C. tripos</i> NITZSCH. . . . .	.	+	r	.	r	.	.	.	.
<i>Dinophysis acuta</i> EHB.	c	.	+	.	r	.	.	.	+
<i>Gonyaulax spinifera</i> STEIN. . . . .	.	.	.	.	+	r	c	+	+
<i>Peridinium depressum</i> BAIL.	c	c	+	.	.	+	.	.	c
<i>P. ovatum</i> POUCHET.	c	r	c	.	c	.	.	.	c
<i>P. pallidum</i> OSTENF.	r	.	+	.	.	.	r	r	+
<i>P. pellucidum</i> BERGH.	r	.	r	.	r	.	.	.	.
<i>Chatoceros borealis</i> BTW.	+	.	.	r	.	.	.	r	c
<i>C. contortus</i> SCHÜTT. . . . .	+	.	.	.	.	.	.	.	r
<i>C. debilis</i> CL. . . . .	.	.	.	cc	.	+	.	.	.
<i>C. decipiens</i> CL. . . . .	.	.	.	+	.	r	.	r	r
<i>Coscinodiscus concinnus</i> W. SM.	r	.	.	r	.	r	.	.	c
<i>C. oculus iridis</i> EHB. . . . .	.	.	.	.	.	.	r	r	.
<i>C. radiatus</i> EHB. . . . .	.	.	.	.	.	r	c	c	.
<i>Eucampia zodiacus</i> EHB. . . . .	.	.	.	r	.	.	.	.	.
<i>Rhizosolenia semispiua</i> HENSEN.	+	.	.	c	+	r	.	.	+
<i>Thalassiosira gravida</i> CL. . . . .	.	.	.	r	+	c	.	.	.
<i>T. Nordenskiöldii</i> CL. . . . .	.	.	.	r	+	ccc	.	.	.
Plankton-type	Ns	NsTp	Ns	Ns	Ns	Si	Ns	Ns	Ns Nc

Sea in April 1900.

28	28	29	29	30	30	28	28	29	29	29	29	30	27	28	28	28	29	29
57° 32'	57° 16'	56° 54'	56° 36'	56° 17'	55° 56'	57° 41'	57° 46'	57° 30'	57° 5'	56° 13'	55° 41'	55° 4'	57° 39'	56° 53'	56° 17'	55° 11'	54° 35'	53° 30'
9° 39'	8° 42'	7° 26'	5° 42'	4° 18'	2° 34'	11° 17'	10° 39'	9° 38'	8° 26'	7° 47'	7° 26'	7° 37'	9° 45'	8° 5'	7° 28'	6° 26'	5° 39'	4° 43'
E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.
6,0	5,5	5,2	4,6	5,4	6,2	5,5	6,0	5,5	6,0	6,0	6,0	6,0	6,0	6,5	6,5	7,0	9,0	10,0
32,24	33,87	34,64	34,91	35,06	34,96	29,77	32,39	33,54	32,73	32,70	32,70	32,58	33,49	33,78	33,71	34,76	34,57	34,62
.	r	.	.	.	.	.	r	.	.	.	r	r	.	.	.	.	.	.
r	.	.	+	.	.	.	.	.	.	.	.	+	.	.	c	.	+	+
r	+	.	+	+	r	+	.	.	.	.	.	r	.	.	.	.	.	.
+	+	r	.	.	.	r	.	r	.	.	.	r	.	.	+	.	.	.
.	+	.	.	.	r	+	.	.	.	.	.	.	r	.	.	.	+	r
+	+	+	.	+	r	.	.	c	c	c	+	c	.	r	+	.	.	+
+	.	+	c	c	.	cc	.	c	c	c	+	c	r	.	.	.	.	.
.	+	.	+	+	r	r	.	.	.	.	.	.	.	.	r	.	.	.
r	r	r	.	r	r	.	.	.	.	.	.	.	.	.	r	.	.	.
r	+	+	r	r	r	+	c	.	.	r	.	r	.	r	.	r	.	.
r	.	.	.	+	.	.	.	.	.	.	.	.	.	.	r	.	.	.
+	+	+	+	r	r	.	.	.	.	.	.	.	.	.	r	.	.	.
r	.	r	r	r	r	.	.	.	.	.	.	.	.	.	r	r	r	r
c	c	c	+	.	.	+	c	r	.	.	.	.	.	.	+	.	.	r
c	+	+	.	r	+	r	r	.	.	rr	.	r	.	.	.	.	.	r
r	.	r	.	.	r	.	r	.	.	.	.	r	.	.	.	.	.	.
+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
cc	c	.	.	.	.	+	+	+	r	c	c	+	+	r	+	+	+	.
.	r	r	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	r	cc	ccc	+	.	.	.	.	cc	+	.	.	.	c	.	.
+	r	.	r	+	r	c	.	.	.	.	cc	+	r	r	.	.	.	.
cc	+	.	+	+	r	+	c	ccc	cc	+	cc	.	+	r	+	r	.	.
.	.	r	.	.	.	r	+	r	.	.	.	.	.	.	.	.	.	.
.	.	.	.	r	.	.	.	r	.	.	.	r	.	.	.	.	r	.
.	r	r	ccc	+	c	r	.	.	.	.	.	.	.	.	.	.	r	cc
.	.	.	.	+	+	+	.	.
.	.	.	.	r	r	.	.	.	.	.	.	rr	.	.	.	rr	.	.
Ns	Ns	Ns	TNs	Ns	Ns	Ns	Ns	Nc	Nc	Ns	CT	Ns	Ns	Ns	NsS	Ns	Ns	Nm
Nc						Nc				Nc	Nc		Nc				Nm	

Table III. The North

Month	VII	VII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VII	VII	VII	VII	VII	VII	VIII	
Day	28	29	11	11	12	12	25	26	28	28	28	29	29	29	29	5	
Latitude N.	56°56'	55°28'	57°11'	56°35'	55°47'	55°4'	57°10'	56°11'	57°41'	57°47'	57°29'	56°59'	56°27'	55°50'	55°4'	57°51'	
Longitude	{ 6°45' E.	{ 0°40' E.	{ 8°5' E.	{ 5°4' E.	{ 2°7' E.	{ 0°51' W.	{ 8°1' E.	{ 3°16' E.	{ 11°19' E.	{ 10°36' E.	{ 9°33' E.	{ 8°15' E.	{ 8°1' F.	{ 7°35' E.	{ 7°37' E.	{ 8°24' E.	
Temperature	16,0	16,0	15,0	14,6	—	—	—	—	20,0	19,0	19,0	18,7	19,0	19,0	18,0	18,0	
Salinity	31,98	31,72	31,02	31,69	—	—	—	—	24,60	31,29	32,05	32,75	32,4	32,79	31,81	27,81	
<i>Oikopleura dioica</i> FOL.																	
<i>Acartia Clausii</i> GIESBR.				r	+											+	
<i>Anomalocera Patersonii</i> TEMPLT.			rr														
<i>Calanus finmarchiens</i> GUNN.					+												
<i>Centropages hamatus</i> LILLJEB.																c	
<i>C. typicus</i> KRÖYER.	rr		+								+	+	r			r	
<i>Corycaeus anglicus</i> LUBB.					r						rr	r					
<i>Oithona similis</i> CLAUS	r		c	r	c	r		c		+						+	
<i>Paracalanus parvus</i> CLAUS			+		c						r	r	r			+	
<i>Pseudocalanus elongatus</i> BOECK.					c			c	r		r						
<i>Temora longicornis</i> O. F. MÜLL.					r			r	r	r					r		
<i>Evadne Nordmani</i> LOVÉN.																r	
<i>E. spinifera</i> P. E. MÜLL.			+					r								+	
<i>Podon intermedius</i> LILLJEB.					c			c									
<i>Sagitta bipunctata</i> QUOI & GAIM.								+									
<i>Amphorella Steenstrupi</i> CLAP. & LACHM.					+							+	r	rr			
<i>Ceratium furca</i> DUJ.			r	r	r	r					r		r	r		r	
<i>C. fusus</i> DUJ.			r					r				r					
<i>C. longipes</i> BAIL.	r				r	r											
<i>C. macroceros</i> EHB.	+		+	r		r	r		r	+	+	+			+	+	
<i>C. tripos</i> NITZSCH.	c		c	+	r		+	+	+	+	c	+	r	+	+	c	
<i>Dinophysis rotundata</i> CLAP. & LACHM.	r	r	r							+	+	r	+	+	+	r	
<i>Diplopsalis lenticula</i> BERGH.	r		r	+		+			r	r	+	r		r	c		
<i>Peridinium depressum</i> BAIL.				+		+						r	r				
<i>P. divergens</i> EHB.	+				r	r	c	c	c	c	c	+		c			
<i>Pyrophaeus horologium</i> STEIN.			r	r		r					r	+	+	+	r		
<i>Pterosphaera Moebii</i> JÖRGEN.									rr		r						
<i>Rhizosolenia gracillima</i> CL.			r	r					ccc			+	r			c	
<i>R. Shrubsolei</i> CL.				r								r	+	c	r		
<i>R. styliformis</i> BRW.												r	+				
Plankton-type	{ Tp	{ O	{ Tp	{ Tp	{ Tp	{ ?	{ Tp	{ Tp	{ Nma	{ Tp	{ Tp	{ Nma	{ Tp	{ Nma	{ Nm	{ Nm	{ Tp

Table IV. The North

Mouth	XI	XI	XI	XI	XI	XI	XI	XI	X	X	XI	XI	XI	XI	XI
Day	2	2	3	3	3	3	3	4	31	31	1	1	1	1	9
Longitude N.	57°43'	57°44'	57°24'	56°32'	56°18'	55°33'	54°29'	52°57'	57°46'	57°29'	57°9'	56°34'	55°58'	55°31'	57°46'
Latitude	11°	10°23'	9°17'	7°28'	7°13'	6°43'	5°32'	4°17'	10°31'	9°27'	8°31'	8°3'	7°43'	7°23'	8°5'
Temperature	12	12	11	10,5	12	12	10	12	8,7	10,6	10,6	10,4	11,2	11,0	10,0
Salinity	32,15	32,20	33,39	33,51	33,88	34,11	34,31	33,81	32,29	33,28	32,53	31,74	33,16	32,89	31,57
<i>Oikopleura dioica</i> FOL.	r	.	.	.	r	.	.	.	r	.	.	.	.	.	.
<i>Acartia Clansii</i> GIESBR. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
<i>A. longiremis</i> LILLJEB. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
<i>Calanus finmarchicus</i> GUNN. . . . .	.	.	rr	r	.	.	+	.	.	r	.	r	.	.	r
<i>Centropages typicus</i> KRÖYER. . . . .	.	r	.	r	.	.	.	.	.	r	.	.	.	.	+
<i>Corycaeus anglicus</i> LUBB. . . . .	.	.	.	.	r	.	.	.	r	.	r	.	.	.	+
<i>Eutерpe acutifrons</i> DANA . . . . .	.	.	.	.	.	r	r	rr	.	.	.	.	.	.	cc
<i>Labidocera Wollastoni</i> LUBB.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Oithona similis</i> CLAUS.	r	+	r	r	r	.	.	.	.	+	.	+	c	c	r
<i>Paracalanus parvus</i> CLAUS.	+	+	r	.	.	.	.	.	.	.	.	.	.	.	+
<i>Pseudocalanus elongatus</i> BOECK.	r	+	.	.	.	.	.	r	+	.	r	.	.	.	.
<i>Temora longicornis</i> O. F. MÜLL.	+	+	.	r	.	.	.	.	.	.	.	r	c	r	.
<i>Evadne spinifera</i> P. E. MÜLL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Sagitta bipunctata</i> QUOI & GAIM.	r	+	r	.	.	.	.	.	+	.	.	r	c	r	+
<i>Amphorella Steeustrupii</i> CLAP. & LACHM. . . . .	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Codonella ventricosa</i> CLAP. & LACHM.	r	.	.	.	.	.	.	.	r	r	r	r	.	.	.
<i>Cyttarocyclus denticulata</i> EHB.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Tintinnopsis beroidea</i> STEIN.	r	r	.	.	+	r	.	c	.	.	.	.	.	.	.
<i>T. campanula</i> EHB.	r	.	.	.	r	.	.	.	+	.	r	.	.	rr	.
<i>Dietyocha fibula</i> EHB. . . . .	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Distephanus speculum</i> EHB.	r	r	.	.	r	r	r	r	.	.	.	.	.	.	.
<i>Halosphera viridis</i> SCHMITZ. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Ceratium bucephalum</i> CL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>C. furca</i> DUJ.	r	+	r	c	+	+	+	r	.	r	+	+	c	c	r
<i>C. fusus</i> DUJ.	r	r	.	r	r	r	r	+	.	r	.	.	r	.	r
<i>C. lineatum</i> EHB. . . . .	.	r	r	.	.	.	.	.	.	.	.	.	.	.	rr
<i>C. longipes</i> BAIL. . . . .	+	.	.	.	.	r	.	r	.	.	.	.	.	.	.
<i>C. macroceros</i> EHB.	r	r	+	r	+	.	r	.	c	cc	c	c	cc	c	+
<i>C. tripos</i> NITZSCH.	+	+	+	c	+	.	r	.	.	c	c	c	cc	c	+
<i>Diuophysis acuta</i> EHB.	r	r	.	r	r	.	r	r	.	.	.	.	.	.	.
<i>Diplopsalis lenticula</i> BERGH. . . . .	.	r	+	.	+	.	.	+	.	.	r	.	rr	.	+
<i>Peridinium depressum</i> BAIL.	r	r	r	r	.	.	r	.	.	.	.	r	.	.	.
<i>P. divergens</i> EHB.	r	r	.	r	+	.	.	.	.	.	+	.	r	+	+
<i>P. ovatum</i> POUCH.	r	.	.	r	.	.	.	.	.	.	.	.	rr	rr	.
<i>P. pallidum</i> OSTF. . . . .	.	r	.	r	r	r	r	r	.	.	r	.	.	.	.
<i>P. pedunculatum</i> SCHÜTT. . . . .	.	r	r	r	r	rr	.	r	.	.	.	.	.	.	.
<i>Proocentrum micans</i> STEIN.	r	r	r	r	.	r	.	.	.	.	.	.	.	.	.
<i>Pyrophacus horologium</i> EHB. . . . .	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.
<i>Xanthidium multispinosum</i> MÖB. . . . .	.	.	.	.	rr	.	r	.	.	.	.	.	.	.	.
<i>Biddulphia mobilensis</i> BAIL.	+	r	r	r	r	r	r	+	.	r	.	.	.	+	r
<i>Cerataulina Bergonii</i> H. PER.	r	+	.	.	.	r	.	rr	.	.	.	.	.	.	.
<i>Chaetoceros borealis</i> BRW. . . . .	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>C. contortus</i> SCHÜTT.	c	c	.	.	.	.	.	.	.	.	.	.	.	.	c
<i>C. curvisetus</i> CL.	+	c	r	.	.	.	.	.	.	r	.	.	.	.	c
<i>C. debilis</i> CL.	c	c	.	.	.	.	.	+	.	.	.	.	.	.	c
<i>C. decipiens</i> CL.	r	.	r	r	.	rr	.	r	.	.	.	.	.	.	r
<i>C. densus</i> CL.	r	+	.	.	.	.	.	c	.	r	.	.	.	.	+
<i>C. didymus</i> EHB.	+	c	r	.	.	.	.	c	.	+	.	.	.	.	+
<i>C. Schüttii</i> CL. . . . .	.	.	r	.	.	.	.	r	.	.	.	.	.	.	.
<i>Coscinodiscus concinnus</i> W. SM. . . . .	.	r	r	r	r	r	r	r	.	r	.	.	.	.	r
<i>C. excentricus</i> EHB.	r	r	.	r	r	r	r	r	.	.	r	.	.	.	.
<i>C. polychordus</i> GRAN. . . . .	.	r	r	.	.	.	.	.	r	.	.	.	.	.	r
<i>C. radiatus</i> EHB.	r	.	r	+	+	r	r	r	r	+	+	r	.	.	r
<i>Ditylum Brightwellii</i> WEST.	+	+	r	.	r	.	r	c	.	r	r	.	.	.	+
<i>Eucampia zodiacus</i> EHB.	c	cc	.	.	.	r	.	c	.	r	.	.	.	.	c
<i>Guinardia faecida</i> CASTR.	+	r	r	+	+	r	r	+	.	r	.	.	.	.	r
<i>Rhizosolenia calcar avis</i> SCHULZE.	r	r	.	.	+	.	.	.	.	.	r	.	.	.	r
<i>R. gracillima</i> CL.	r	+	.	r	r	.	.	.	.	r	.	.	.	.	rr
<i>R. setigera</i> BRW.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>R. Stolterfothii</i> H. PER.	r	+	r	.	.	.	.	c	r	r	.	.	.	.	.
<i>R. styliformis</i> BRW.	+	+	+	c	+	.	.	.	ccc	cc	+	+	c	c	r
<i>Stephanopyxis turris</i> GREV.	r	+	r	r	+	.	.	.	r	r	.	.	r	.	.
<i>Thalassiosira gelatinosa</i> HENSEN.	r	r	r	.	.	.	.	.	r	.	r	.	.	.	.
<i>Thalassiothrix Frauefeldi</i> GRUN.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	+
Plankton-type	Nm Ns S	Nm Ns S	Nm S	Nm Tp S	Nm S	Nm	Nm	Nm	Nm	S	STp	TpS	Tp Nm S	STp Nm	STp Nm Ns

Table V.

Month	1	2	2	2	3	3	3	3	4	4	4	5	5	5	5			
Day	27	2	7	23	5	17	22	30	6	17	24	5	12	19	26			
Temperature	1,1	2,1	-0,3	-0,8	3,0	2,1	1,9	1,2	1,6	3,6	5,4	6,4	7,3	7,6	9,6			
Salinity	21,92	32,70	22,72	21,39	33,63	32,10	29,58	25,97	25,31	23,84	26,28	24,34	23,87	30,13	23,40			
Oikopleura dioica FOL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acartia Clausii GIESBR. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	c	
A. longiremis LILLJEB.	r	r	c	.	.	.	.	.	+	.	.	.	.	.	.	.
Calanus finmarchicus GUNN. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centropages hamatus LILLJEB. . . . .	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	c	
C. typicus KRÖYER.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Oithoua similis CLAUS.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.	e	+
Paracalanus parvus CLAUS. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pseudocalanus elongatus BOECK. . . . .	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Temora longicornis O. F. MÜLL.	r	.	c	.	.	.	.	.	r	.	r	.	.	.	.	c	.
Evadne Nordmani LOVÉN. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.
E. spinifera P. E. MÜLL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sagitta bipunctata QUOI & GAIM. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cyrtocylis dentienlata EHB.	r	.	.	.	.	.	.	.	rr	.	.	.	.	.	.	.	.
Ptycho cylis acuta BRANDT.	c	.	r	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Tintinnopsis campanula EHB. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
T. fistularis MÖB. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ceratium fusus DUB. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. longipes BAIL. . . . .	+	.	.	.	.	rr	.	.	rr	.	rr	rr	c	cc	cc	cc	cc
C. macroceros EHB. . . . .	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. tripos NITZSCH.	+	c	rr	rr	.	rr	.	.	rr	.	rr	.	.	.	.	.	.
Diuophysis acuta EHB.	r	.	.	rr	.	.	.	.	.	.	.	.	.	.	.	.	.
Peridinium depressum BAIL. . . . .	.	.	.	.	.	.	.	.	.	.	r	rr	+	c	c	c	c
P. divergens EHB. . . . .	.	rr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
P. ovatum POUCH. . . . .	.	.	.	.	.	.	.	.	.	.	r	.	+	c	r	r	r
P. pallidum OSTF.	r	.	.	.	.	.	.	.	r	rr	.	.	.	.	.	.	.
Pterosphæra Möbii JÖRGS.	r	.	rr	.	.	.	.	.	.	.	.	.	.	.	.	r	r
Biddulphia aurita LYNGB. . . . .	.	r	+	r	+	r	r	.	.	.	.	.	.	.	.	.	.
B. mobilensis BAIL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerataulina Bergoni H. PER. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chaetoceros borealis BRTW.	r	.	+	.	r	r	rr	e	+	r	+	r	+	r	+	r	+	
C. var. Brightwellii CL. . . . .	.	.	.	r	r	.	.	e	+	r	+	r	r	.	.	.	.
C. brevis SCHÜTT. . . . .	.	.	.	+	r	.	.	+	.	.	.	.	.	.	.	.	.
C. contortus SCHÜTT. . . . .	.	.	.	.	.	r	cc	ccc	ccc	cc	ccc	ccc	ccc	c	.	.	+
C. curvisetus CL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. debilis CL.	+	.	ccc	cc	ccc	ccc	ccc	.	r	.	.	.	.	.	.	.	.
C. decipiens CL.	+	.	+	r	.	.	.	+	r	c	r	+	cc	.	.	.	c	
C. diadema EHB.	+	.	ccc	cc	ccc	ccc	c	.	.	.	.	.	.	.	.	.	.
C. didymus EHB. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. laevis SCHÜTT. . . . .	.	.	r	+	.	+	+	.	.	.	.	.	.	.	.	.	.
C. Schüttii CL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Coscinodiscus concinnus W. SM.	r	.	r	.	r	r	+	cc	cc
C. polychordus GRAN.	r	.	c	c	r	r	r	.	.	.	.	.	.	.	.	.	.
Ditylum Brightwellii WEST. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Encampia zodiacus EHB. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Guinardia laccida CASTR. . . . .	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhizosolenia calcar avis SCHULZE. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
R. gracillima CL. . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
R. semispina HENSEN. . . . .	.	.	+	.	r	r	+	ccc	ccc	ccc	ccc	cc	+	.	.	.	.
R. setigera BRTW.	r	.	c	+	r	r	r	c	r	.	r	.	.	.	.	.	.
Skeletonema costatum GREV. . . . .	.	.	+	c	+	r	r	.	.	.	.	.	.	.	.	.	.
Thalassiosira Nordenskiöldii CL. . . . .	.	.	.	c	r	cc	ccc	+	r	.	.	.	.	.	.	.	.
Thalassiothrix Frauenfeldii GRUN.	r	.	c	c	+	+	r	+	+	r	c	.	.	.	.	.	.
Plankton-type	Ns	TP	Ns	Ns	Ns	Ns	Si	Si	NsT	NsT	TNs	TNs	NsT	NsC	Ns	Ns	Ns	Ns
															Ne	Ne	Ne	TP

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	6	6	6	7	7	7	7	8	8	8	9	9	9	9	10	10	10	11	11	11	12	12
	9	16	23	3	7	20	27	10	17	24	3	11	18	29	8	19	29	6	20	28	5	27
	12,7	16,3	16,8	15,7	13,3	17,9	18,8	17,2	17,8	19,2	15,3	14,5	15,9	13,2	12,6	10,6	9,9	8,3	5,7	5,9	4,0	5,2
	17,01	19,48	18,57	—	32,27	19,73	18,70	22,01	22,04	20,79	29,61	26,35	22,16	23,69	—	29,16	27,38	25,75	—	20,61	21,33	25,16
+				r	.	c	r	+	.	c	+	r	+	.	+	+	+	+	r	r	.	.
+	+			r	r	.	.	+	.	.	cc	.	r	.	+	r	+	+	.	.	.	.
+	+			r	r	.	.	+	r	r	+	r	r	.	.	.	.	.	.	.	.	rr
e	cc			.	.	.	.	+	+	+	.	.	+	r	cc	+	c	c	r	+	+	+
.	+			ccc	cc	ccc	cc	ccc	c	r	c	+	c	c	+	.	.	+
cc	cc	ccc	ccc	.	+	r	c	.	.	c	+	cc	r	.	.	.	+	r	r	.	.	.
.	.	.	.	r	.	.	.	.	+	c	+	r	.	.	.	.	.	.	rr	r	.	.
.	.	.	.	r	c	.	.	.	.	.	+	r	.	.	.	.	.	.	r	+	r	rr
.	.	.	.	r	r	r	r	.	.	.	.	rr	+	+	+	.	rr	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.	.
.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	r	.	.	.	r	.	.</	

Table VI.

Month	1	1	1	2	2	2	3	3	3	4	4	5	5
Day	8	17	25	6	13	25	6	19	29	4	26	4	12
Temperature	0,0	0,0	2,0	3,0	5,1	-1,0	2,5	2,5	1,0	1,5	4,0	6,0	7,0
Salinity	19,34	19,17	25,10	33,69	—	26,96	32,65	32,20	27,43	28,57	30,67	29,83	28,60
Oikopleura dioica FOL.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acartia Clausii GIESBR.	.	.	.	r	.	.	.	.	rr	.	.	.	.
A. longiremis LILLJEB.	.	.	r	.	.	.	.	.	.	.	c	c	.
Calanus finmarchicus GUNN.	.	.	r	.	.	.	.	.	.	.	.	.	+
Centropages hamatus LILLJEB.	.	r	r	.	.	.	.	.	r	.	+	c	r
C. typicus KRÖYER.	.	.	+	.	.	.	.	.	.	.	.	.	.
Oithona similis CLAUS.	+	+	c	+	r	.	.	.	.	.	r	.	.
Paracalanus parvus CLAUS.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pseudocalanus elongatus BOECK.	+	r	+	r	.	.	.	.	.	.	.	.	+
Temora longicornis O. F. MÜLL.	c	c	+	r	.	.	.	.	.	.	.	+	+
Evadni Nordmani LOVÉN.	.	.	.	.	.	.	.	.	.	.	.	.	.
E. spinifera P. E. MÜLL.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sagitta bipunctata QUOI & GAIM.	.	r	c	.	.	.	.	.	.	.	.	.	r
Cyrtarocyclus denticulata EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tintinnopsis campanula EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
Distephanus speculum EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
Halosphæra viridis SCHMITZ.	+	.	+	+	.	.	.	r	r	.	.	.	.
Ceratium bucephalum CL.	.	.	.	r	.	.	.	.	.	.	.	.	.
C. furca DUJ.	.	.	.	r	r	.	.	.	.	.	.	.	.
C. fusus DUJ.	.	.	r	r	.	.	.	.	.	.	.	r	.
C. lineatum EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. longipes BAIL.	r	r	+	.	r	.	.	r	.	.	cc	cc	ccc
C. macroceros EHB.	.	.	.	c	.	.	.	.	.	.	.	.	.
C. tripos NITZSCH.	+	+	+	c	r	.	.	r	.	.	.	.	.
Dinophysis acuta EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
Peridinium depressum BAIL.	.	.	.	r	.	.	.	r	.	.	c	.	+
P. divergens EHB.	.	.	.	.	.	.	.	.	.	.	.	c	.
Biddulphia aurita LYNGB.	.	.	r	.	.	c	+	+	+	.	.	.	.
B. mobilensis BAIL.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerataulina Bergonii H. PER.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chaetoceros borealis BRW.	r	.	.	.	.	+	r	r	+	c	+	+	r
C. v. Brightwellii CL.	r	r	r	.	.	.	.	r	+	.	.	.	.
C. brevis SCHÜTT.	.	.	.	.	c	+	r	r	+	r	.	.	.
C. constrictus GRAN.	.	.	.	.	ccc	.	.	.	.	.	.	.	.
C. contortus SCHÜTT.	.	.	.	.	c	+	r	r	c	c	.	r	.
C. curvisetus CL.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. debilis CL.	.	.	r	.	.	cc	ccc	cc	.	.	.	.	.
C. decipiens CL.	r	r	r	r	r	+	r	.	c	c	+	+	r
C. densus CL.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. diadema EHB.	r	+	r	.	.	cc	cc	+	+	.	.	.	.
C. didymus EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. laciniosus SCHÜTT.	.	.	.	.	.	r	r	.	.	.	.	.	.
C. Schüttii CL.	.	.	r	.	.	.	.	.	.	.	.	.	.
C. scolopendra CL.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. teres CL.	.	r	.	.	.	r	.	r	r	.	.	.	.
Coscinodiscus coneinnus W. SM.	r	r	+	r	.	.	.	.	r	r	cc	c	ccc
C. excentricus EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. polychordus GRAN.	.	.	.	.	.	+	+	+	.	.	.	.	.
C. radiatus EHB.	.	.	.	.	.	.	.	.	.	.	.	.	.
C. stellaris ROPER.	.	.	.	.	.	r	r	r	.	.	.	.	.
Ditylum Brightwellii WEST.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eucampia zodiacus EHB.	.	.	.	.	.	.	.	rr	.	.	.	.	.
Guinardia flaccida CASTR.	.	r	.	r	.	.	.	.	.	.	.	.	.
Lauderia annulata CL.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leptocylindrus danicus CL.	.	.	.	.	+	.	.	rr	+	.	.	.	.
Rhizosolenia calcar avis SCHULZE.	.	.	.	.	.	.	.	.	.	.	.	.	.
R. gracillima CL.	.	.	.	.	.	.	.	.	.	.	.	.	.
R. semispina HENSEN.	r	.	.	.	+	+	+	+	ccc	cc	.	.	.
R. setigera BRW.	r	.	r	.	.	+	r	+	+	.	.	.	.
Skeletonema costatum GREV.	.	.	.	.	.	c	c	c	c	.	.	.	.
Thalassiosira Nordenskiöldii CL.	rr	.	.	.	.	c	cc	cc	cc	c	.	.	.
Thalassiothrix Franzenfeldii GRAN.	.	.	r	.	.	+	.	.	.	.	.	.	.
Plankton-type	(Tp Ns)	(Tp Ns)	Tp Ns	Tp	Ns	Si	Si	Si	Si	Si T	Nc Ns	Nc Ns	Nc Ns

