KONGL. SVENSKA VETENSKAPS-AKADEMIENS HANDLINGAR. Bandet 34. N:o 1.

NOTES

ON SOME

ATLANTIC PLANKTON-ORGANISMS

BY

P. T. CLEVE

WITH VIII PLATES

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During the years 1898 and 1899 a large number of samples of plankton have been collected from all parts of the Atlantic Ocean by Dutch, English and French ocean liners, by some wessels of the Dutch and Swedish navy, by whalers in the Arctic Sea and besides, at some stations, viz. at Vestmanna ö (S. Iceland), the Färöes and the Azores. Most samples of plankton were collected at the same time as the temperature of the sea was determined and samples of water for the determination of the salinity preserved. Professor S. O. Pettersson and M. Gust. Ekman have charged themselves with the purely hydrographical work and left to me the examination of the plankton. In examining these samples I found a number of forms, which seem to me to be new to science, and some, the determination of which seems to me to be uncertain for the want of figures in the litterature. As I intend to publish in a future work my notes on the seasonal distribution of the Atlantic plankton-organisms as well as an account of the mean and extreme temperature and salinity for every species, I wish here to publish my drawings of some new or doubtful forms.

Although the officers on many of the ocean liners and government wessels have assisted us in a most liberal way for this extensive hydrographical and biological survey of the Atlantic, still considerable expenses have been necessary. For covering these we have obtained from the fund »Lars Hiertas Minne» the sum of 7,000 kronor.

I. COPEPODA.

Acartia macropus. N. Sp.

Plate I. Fig. 1—7.

Male. Length of cephalothorax 0,88, of abdomen 0,3, of furca 0,05, of the longest seta of the furca 0,4. Breadth of cephalothorax 0,24 millim.

Lateral angles of the last segment of the thorax rounded; margin of the last segment smooth, without small spines.

Rostral filaments present.

R. e. 2 of the right fifth foot longer than broad; *R. e 3* elongate, with a very small terminal claw.

Female. Length of cephalothorax 0,88, of abdomen 0,25, of furca 0,05, of the longest seta of the furca 0,4 millim. Breadth of cephalothorax 0,25 millim.

Last segment of the thorax with two small finger-like processes. Its margin not spinous.

The genital-segment of abdomen three times longer than the second segment, which is as long as the third one. The longest seta of the furca exceeds the abdomen in length. All setæ of equal thickness. Furca nearly twice as long as broad.

Rostral filaments present.

Cephalothorax three times longer than broad.

Fifth pair of feet: *R. e* very short, uniting with *B. 2;* its interior margin denticulate.

This fine species is most akin to *A. verrucosa* THOMPS., but is easily distinguished by the fifth pair of feet both of the male and the female.

Habitat. The Azores, rare in August and September 1898. *Temperature:* 21,2 to 21,4. *Salinity:* 36,25 to 36,28 p. m.

Corycæus longicaudis DANA.

Plate I. Fig. 8—11.

Male. Abdomen one-jointed, twice as long as the furca. Branches of the furca at least 7 times as long as broad.

Dimensions: total length 0,8, length of cephalothorax 0,5, of abdomen 0,3, of furca 0,1 millim.

The male of this species has not been described in GIESBRECHT's »*Systematik und Faunistik der Pelagischen Copepoden*». It is common in the whole tropical Atlantic.

Euchirella rostrata CLAUS.

Plate II. Fig. 1—12.

Male. Head without crista, but with a subulate rostrum. Fifth foot six times as long as its *B. 2.* Margin of its *R. e. 2* not denticulate and of the *R. e. 3* smooth. *R. e.* of the posterior antennæ twice as long as *R. i.* No triangular scales on the inside of *B. 1* of the 4th foot.

Length of cephalothorax 2, of abdomen 0,5, of furca 0,08 millim.

The male has not been described by GIESBRECHT's in the *Systematik und Faunistik der Pelagischen Copepoden,* but he mentions as questionable synonyme *Euchæta Hessei* BRADY (Chall. Rep. Vol. VIII pag. 63). A comparison af my fig. of the fifth foot with the drawing of BRADY proves that *Euchæta Hessei* is exactly the same as *Euchirella rostrata.*

Some few specimens of the male were found together with several females in December 1898 off the Canaries.

Oncæa subtilis GIESBR.

Plate III. Fig. 1—11.

Male. Branches of the furca $^5/_7$ as long as broad, closely approximate; anal-joint as long as broad. *R. i.* of the feet not ending in conical processes.

Total length: 0,4 (of the female 0,6); length of cephalothorax 0,29, of abdomen 0,1, of furca 0,02; breadth of cephalothorax 0,1 millim.

This species has been found in the eastern Atlantic from 32° S. to 52° N. The male was found together with numerous females in a collection from the vicinity of Uschant.

II. RADIOLARIA.

Acanthosphæra trichophora. N Sp.

Plate V. Fig. 3.

Shell thin-walled, with irregular, polygonal meshes, 4 on the radius. Bars thin, thread-like. Spines few, hair-like, flexuose, twice as long as the radius.

Diameter of the shell 0,06. Meshes 0,004 to 0,012 millim.

Atlantic, November 1898, 50° N. 33° W.

Actinomma(?) Sol N. Sp.

Plate V. Fig. 2.

Radial proportion of the three shells 1 : 2,5 : 9. Cortical shell thick-walled, with circular, regular, six-lobed pores, as broad as the bars. At each nodal-point is a bristle-like spine, half as long as the radius, thus every pore surrounded by a corona of six bristles.

Diameter of the outer shell 0,09, of the cellules 0,001 millim.

Found in *January* 1899 at 45° N. 49° W. in styli- and tricho-plankton intermingled. *Temperature* 12. *Salinity* 35,54 p. m.

Owing to the thickness of the cortical shell, the interior shells were visible merely as faint shadows, so I am not quite convinced whether the shells are 3 or 2. If the latter be the case, the species belongs to *Haliomma* and is then nearest akin to *H. horrida.*

Amphihymenium elegans. N. Sp.

Plate. V. Fig. 1.

Arms equal, more than twice as long as broad, 5—6-jointed; joints increasing in breadth towards the blunt ends. Their axis a straight line. Patagium enveloping the arms with the exception of the distal ends.

Length 0,24; breadth 0,09 millim.

Found at 25° N. 52° W. *December* 1898. *Temperature* 24,2. *Salinity* 37,17. *Desmoplankton.*

Anthocyrtium anthemis HKL.?

Plate III. Fig. 12.

As there exists no figure of this species, I am somewhat uncertain about the identification. I have seen a single specimen only, which was found alive at 63° N. 2° E. (March 1898), where it occurred together with some species of the tricho-type. The description in HÆCKEL's Monograph (Chall. Rep. pag. 1273) agrees well with my specimen, but the dimensions are somewhat dissimilar. On my specimen the cephalis was 0,02 millim. long and broad and thorax 0,05 long, 0,1 broad.

HÆCKEL's species was found in the abysmal depths of the nothern Pacific. If my specimen really belongs to HÆCKEL's species, the occurrence above the deep »Norske Rende» is a fact of considerable interest.

Challengeron brevispina. N. Sp.

Plate III. Fig. 14, 15.

Shell ovate, scarcely compressed, with a single, very short conical spine on the aboral pole. Peristome with a single truncate tooth of the same length as the aboral spine. Structure: quincuncially disposed alveoli, about 4 in 0,01 millim.

Length 0,06; breadth 0,04 millim.

I found a single specimen only in a sample from 63° N. 2° E. (March 1898). *Temperature* 6,7. *Salinity* 35,10.

Clathrocanium minutum. N. Sp.

Plate IV. Fig. 9.

Horn of the cephalis fenestrated. Cephalis hemispherical with small subquadrate pores and a horn of $1^1/_2$ the length, surrounded by an irregular network. Length of the two joints 3 : 5; breadth 1 : 2. Thorax with an irregular network; its ribs united by a circular, irregulary latticed ring. Peristome smooth.

Dimensions: cephalis 0,024 long, 0,04 broad; thorax 0,05 long and 0,08 millim. broad.

Found at 21° S. 36° W. (1898 October). *Temperature* 22. *Salinity* 37,21. *Desmo-plankton.*

Dictyocephalus cylindricus. N. Sp.

Plate IV. Fig. 10.

Mouth not constricted, without peristome. Shell thick-walled, with distinct collar stricture. Length of the two joints 4 : 7, breadth 9 : 11. Cephalis nearly spherical, large, with unequal, circular pores, and rough of numerous, short spines. Thorax cylindrical, with rounded, unequal pores.

Length of the shell 0,1 millim.

Found at 15° N. 71° W. (February 1898). *Temperature* 27. *Desmo-plankton.*

This species differs from *D. hispidus* EHB. in the cylindrical, not funnel-shaped, thorax and from *D. obtusus* by the spiny cephalis and the unequal pores.

Dictyoceras neglectum. N. Sp.

Plate IV. Fig. 5.

Shell with two distinct strictures. Length of the three joints 1 : 3,5 : 1,5, breadth 1 : 3 : 4. Cephalis almost spherical, with a strong horn, nearly twice as long, and small irregular circular pores. Thorax campanulate, with three small triangular lattice wings. Cellules subregular, hexagonal, quincuncially disposed, 2,5 in 0,01 millim., similar on the thorax and abdomen.

Length of the three joints: 0,02 : 0,05 : 0,03; breadth 0,02 : 0,06 : 0,08 millim.

Tropical Atlantic 11°—33° N. 32°—76° W. Mean *temperature* 25,1. Mean *salinity* 36,04. *Desmo-plankton.*

Euphysetta pusilla. N. Sp.

Plate III. Fig. 16.

Shell egg-shaped, without apical horn; structure double: longitudinal lines 11 in 0,01 millim., and very small alveoli, quincuncially arranged, 19 in 0,01 millim. Small feet subulate; odd foot half as long as the shell, not branched.

Length 0,06; breadth 0,04 millim.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Haliomma echinosphæra. N. Sp.

Plate V. Fig. 5.

Cortical shell thick-walled, $2^1/2$ times broader than the medullary shell, with regular, circular, hexagonally framed pores as broad as the bars. The outer openings of the pores are sixlobed, lobes ending in short, conical spines.

Diameter of the outer shell 0,1, of the interior 0,04, of the meshes 0,01 millim.

Very rare at 45° N. 49° W. (1899 January). *Temperature* 12. *Salinity* 35,54.

Similar to *H. melitomma*, but smaller, with thicker bars and smaller meshes. The thickness of the cortical shell prevented all examination of the medullary shell.

Haliomma irregulare. N. Sp.

Plate V. Fig. 4.

Pores of the cortical shell irregular, rounded, of different size and form. Spines stouter main-spines and smaller by-spines, the former 1/6 of the radius. By-spines scattered at intervals. Cortical shell thin-walled, 3 times as broad as the medullary shell. Pores irregular rounded, 3 to 9 times as broad as the bars. Medullary shell with rounded, smaller pores.

Diameter of the outer shell 0,22, of the medullary shell 0,07, of the meshes 0,01 to 0,03 millim.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Haliomma spinulosum var. *)

Plate V. Fig. 7.

I have met with specimens having *two* concentric, exterior shells with very wide irregular meshes and thread-like bars. The interior shell had, as usually, very regular hexagonal meshes. There is thus no other difference between this form and the normal, than that the variety has *three*, in stead of *two*, shells and should therefore be classified as *Echinomma*. It seems as were the number of exterior shells variable, and it may be possible that *Arachnosphæra* comprises forms with an increased number of shells, especially as the interior shell of *Haliomma spinulosum* is similar to those of *Arachnosphæra myriacantha* and *A. oligacantha*.

Heliosphæra minuta Cl.

Plate VI. Fig. 2.

Thick-walled, 5 to 6 times as broad as the meshes. Pores regular, all equal, hexagonally framed. Main-spines three sided pyramidal, few, 1 1/2 times as long as the radius. By-spines short, acute, arising from the nodal points of the meshes.

Diameter 0,05 to 0,07; pores 0,006; bars 0,006, main-spines 0,02 to 0,06 millim.

Rare at 41° N. 21°—23° W., 49° N. 18° W., 62° N. 11° W. (March 1898) and 17° N. 71° W. (August 1898). *Temperature* 11,7, mean of 4 observations, max. 14,9, min. 8, exceptionally 27,2. *Salinity* 35,63, mean of 3 obs., max. 35,87, min. 35,37.

*) The same form has been figured by JØRGENSEN (Bergens Museums Aarbog 1899, N. 6, Pl. III, fig. 18) as *Arachnosphæra dichotoma*.

Hexacontium armatum. N. Sp.

Plate VI. Fig. 5.

Cortical shell thick-walled, with regular, honeycomb-like network. Meshes funnel-shaped, with circular inner and hexagonal outer aperture, as broad as the bars, about 7 on the radius. Main spines strong, three-sided prismatic, as long as the radius of the outer shell. By-spines at every nodal point, short, bristle-like. Radial proportion of the three shells 1 : 3 : 8.

Diameter 0,11; length of the main spines 0,06; basal breadth of the main spines 0,02; diameter of the meshes 0,01 millim.

Rare at 56° N. 17°. W. (November 1898). *Temperature* 11,6. *Salinity* 35,27. *Styli-plankton.*

Nearest akin to *H. favosum*, from which it differs by the smaller meshes and the stronger main spines.

Hexacontium hostile. N. Sp.

Plate VI. Fig. 4.

Radial proportion of the three shells 1 : 3 : 9. Outer shell thick-walled, with irregular, rounded pores, 1 to 5 times as broad as the bars. Main spines strong, three-sided prismatic, slightly spirally twisted, twice as long as the radius. By-spines bristle-like as long as the diameter of the pores.

Diameter of the outer shell 0,09, of the middle 0,03, of the inner 0,009; diameter of the pores 0,006 to 0,016; length of the main spines 0,08, their basal breadth 0,024 millim.

Rare at 56° N. 23° W. (November 1898). *Temperature* 10,8. *Salinity* 35,32.

Hexacontium setosum HKL.?

Plate V. Fig. 6.

This species (Chall. Rep. Radiol. pag. 198) has not been figured, of which reason the identification is doubtful. The radial proportion of the three shells 1 : 4 : 7. Diameter of the outer shell 0,14, of the middle 0,04, of the inner 0,02; diameter of the cortical pores 0,01 to 0,03; breadth of the bars 0,004; length of the main spines 0,06 millim.

Rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

My specimen occurred in styli- and trichoplankton intermingled.

Hexastylus nobilis. N. Sp.

Plate VI. Fig 1.

Shell thick-walled. Pores regular circular, hexagonally framed, 10 on the radius. Six main spines triangular pyramidal, with straight edges, as long as the radius; their

bases as broad as two meshes. By-spines bristle-shaped, arising from all nodal points of the meshes, half as long as the main spines.

Diameter of the shell 0,16; length of the main spines 0,06 millim. Meshes 9 in 0,01 millim.

Very rare at 19° N. 60° W. (1898 November). *Temperature* 27,5. *Salinity* 35,22.

Lampromitra erosa. N. Sp.

Plate IV. Fig 2—3.

Shell flat conical, with slight collar stricture. Length of the two joints 1 : 4; their breadth 1 : 3. Cephalis hemispherical, with a horn of $1^1/_2$ the length and with irregular rounded pores of unequal size. Thorax with large rounded pores of unequal size. Its margin with distant, frequently double teeth.

Cephalis 0,02 long, 0,03 broad; thorax 0,06 long, 0,16 millim. broad.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Psilomelissa longispina. N. Sp.

Plate IV. Fig. 4.

Shell smooth, with strong collar structure. Length of the two joints 4 : 3, breadth 1 : 1. Cephalis large ovate, with numerous scattered circular pores of unequal size, larger and more crowded towards the collar stricture. Thorax short cylindrical, with scattered circular pores. From the collar stricture there arise three divergent spines of equal thickness throughout their whole length, as long as the cephalis.

Cephalis 0,04 long, 0,03 broad; thorax 0,028 long, 0,03 millim. broad.

Western tropical Atlantic (1898 January at 32° N. 74° W.; May at 41° N. 51° W.; December at 18° N. 67° W. *Temperature* 19 to 26,8. *Salinity* 34,88 to 36,01.

Quadrilonche crux. N. Sp.

Plate IV. Fig. 1.

Four equatorial spines with apophyses, the other neadle-shaped. Equatorial spines with conical ends, gradually narrowed towards the centre, winged along their whole length, except at the conical end.

Length of the cross 0,16 millim.

Western tropical Atlantic, sparingly from 26° S. to 36° N. *Temperature* 25,4, mean of 13 obs., max. 28, min. 21,7. *Salinity* 36,40, mean of 8 obs., max. 37,43, min. 34,88.

Sethoconus crinitus. N. Sp.

Plate III. Fig. 13.

Cephalis subspherical large, with numerous bristle-shaped horns and close polygonal meshes of different size. Collar constriction deep. Thorax conical, with straight outline, gradually increasing in breadth towards the wide open mouth. Pores of the thorax similar to those of the cephalis, polygonal and of different size, much broader than the thread-like bars.

Cephalis 0,03 long and broad. Thorax 0,06 long and broad. Collar constriction 0,02 millim.

Sparingly along the N. coast of S. America and in the Florida current, 7°—41° N. 53°—75° W. *Temperature* 22,4 to 28. *Salinity* 33,88 to 36,56.

Sethocyrtis pyrum. N. Sp.

Plate IV. Fig. 6.

Shell thick-walled, pear-shaped, with slight collar stricture. Length of the two joints 1 : 6, breadth 1 : 4. Cephalis hemispherical, with a small horn of half the length and unequal small pores. Thorax inflated, with circular, regular pores, quincuncially arranged and as broad as the bars. On the nodal points short spines arise. Mouth flat, half as broad as the thorax.

Cephalis 0,012 long, 0,02 broad. Thorax 0,072 long and 0,08 millim. broad.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Spermatogonia antiqua Leud. Fortm.

Plate III. Fig. 17, 18.

Dr. Leuduger Fortmorel described in 1892 (Diatomées de la Malaisie. Annales du Jardin botan. de Buitenzorg. Vol. XI pag. 49. Pl. IV, fig. 8) under the above name an organism from the Malay Archipelago, which he considered as a diatom. The figure has been reproduced in Van Heurck's Treatise on the diatomacee (1896) pag. 541 with the remark »is it a diatom?». This form is by no means rare in the tropical Atlantic and cannot be a diatom. It is a part of an organism, of which I have however seen only alcohol-preserved specimens. The neadles, called *Spermatogonia*, are by their arrow-head like ends fastened in groups on a hyaline sack, which encloses, besides a number of smaller granules, a larger cucumber-like body. This body, which treated with soda shows a peculiar structure of longitudinal and transverse lines, reminds of the central capsule of the radiolarians. If so, the hyaline sack should correspond to the calymna. But, on the other hand, there is no radiolaria known, wich offers any distant relation to *Spermatogonia*. From the *phæodarian* it differs by the entirely different central capsule. In all cases this form is no diatom, and, if a radiolaria, it belongs to a quite new type.

The range of distribution in the Atlantic is from Rio Janeiro to 56° N., chiefly in the west. *Temperature* 24,5, mean of 26 obs., max. 28,4, min. 9,6. *Salinity* 35,39, mean of 23 obs., max. 36,40, min. 33,93.

Theoconus junonis Hkl. aff.

Plate IV. Fig. 8.

I have reproduced in Fig. 8 a drawing of the only specimen I have seen, as it is of considerable interest for its occurrence W. of Norway. It is doubtless akin to *T. jovis* or to *T. junonis*, but does not sufficiently agree with any. It was found in March 1898 at 62° N. 2° E. (temperature 7,4. Salinity 35,12). The water was very poor in plankton, as the tow-net catched in half an hour some few plankton-specimens only, such as *Coscinodiscus oculus iridis* and several radiolarians, not found at other spots in the Atlantic. *T. junonis* was taken by the Challenger Expedition from great depths east of Japan. *Theoconus jovis* has been found in the abysmal depths of the central Pacific.

Length of the three joints 1 : 3,5 : 2, breadth 1 : 4 : 5. Cephalis 0,016 long, 0,02 broad. Thorax 0,05 long, 0,08 broad. Abdomen (incomplete) 0,03 long, 0,1 millim. broad.

Theocyrtis aculeata. N. Sp.

Plate IV. Fig 11.

Shell thick-walled. Length of the three joints 1 : 2 : 4; breadth 1 : 3 : 3. Cephalis hemispherical, with a strong horn, longer than the cephalis. Thorax slightly inflated. Abdomen cylindrical, with several rows of strong aculei towards the mouth. Pores of the thorax and abdomen of nearly equal form and size, circular, regular, quincuncially disposed, 3 to 4 times as broad as the bars.

Length of the three joints: *a* 0,025, *b* 0,06, *c* 0,11; breadth: *a* 0,03, *b* 0,076, *c* 0,09. Horn 0,04 millim. long.

Found in November 1898 between 56° N. 17° W. and 48° N. 29° W. *Temperature* 10,8 to 15. *Salinity* 35,27 to 35,44.

Theocyrtis turris. N. Sp.

Plate IV. Fig. 7.

Length of the three joints 1 : 3 : 4, breadth 1 : 3 : 3. Pores of the thorax and abdomen of the same form and size. Cephalis small, hemispherical, with some scattered pores and a horn of the same length. Thorax conical; abdomen cylindrical. Pores rounded, or rather subhexagonal, broader than the bars, quincuncially arranged. Length and breadth of the cephalis 0,01, of thorax 0,03. Abdomen 0,045 long, 0,05 millim. broad.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Trypanosphæra brachysiphon. N. Sp.

Plate VI. Fig. 3.

Shell a regular sphere. Pores of unequal size; the larger prolonged in a very short tube, with two or three teeth.

Diameter: 0,15, of the larger pores 0,017 millim.

Found very rarely at 56° N. 17° W. (November 1898) and at 41° N. 66° W. (December 1898). *Temperature* 11,6 to 12. *Salinity* 34,60 to 35,25.

III. DINOFLAGELLATÆ.

Ceratium (tripos var.) arcuatum GOURRET.

Plate VII. Fig. 11.

GOURRET has described (Ann. du Musée d'Hist. Naturelle de Marseille; zool., Vol. I 1883 n:o 8, pag. 25, Pl. II, fig. 42) a form of *C. tripos*, which I consider, although with a some hesitation, to be identical with the Atlantic form.

It is rather common in the tropical Atlantic from 29° S. to 48° N.

Ceratium (tripos var.) arietinum. N. Sp. *)

Plate VII. Fig. 3.

This form, which belongs to the tripos-type, is very constant and could be considered as a distinct species. I have seen it in samples from the Indian Ocean and the Atlantic, chiefly on the area between the Azores, the Engl. Channel and New York. It occurs besides, but sparingly, in the N. Equatorial current, the Antilles current and in the Caribbean Sea. It belongs to the *styli-plankton.*

Ceratium (tripos var.) azoricum. N. Sp.

Plate VII. Fig. 6, 7.

This form is nearly related to the typical *C. tripos*, but differs by smaller size and short apical horn. It occurs round the Azores and W. of the Spanish Peninsula. I have also met with this form in plankton from 25° S. 7° E.

Ceratium (furca var.?) belone. N. Sp.

Plate VII. Fig. 13.

This form, which is evidently nearly akin to *C. furca*, is very rare in the Atlantic and has been found in samples from 10° N. 53° W. and 33°—34° N. 15°—12° W., thus in the western and eastern tropical Atlantic.

*) JØRGENSEN (Bergens Museums Aarbog 1899, N. VI, Pl. II, fig. 11) names this form *Ceratium tripos arcuatum* forma *heterocampta*. JØRGENSENS work was not published when this paper was written.

Ceratium contortum GOURRET.

Plate VII. Fig 10.

This species, akin to *C. tripos*, is too constant for being considered as a mere variety. It has been described by GOURRET in Annales du Mus. d'Hist. Nat. de Marseille; zool. vol. I n:o 8, 1883, Pl. II, fig. 33. SCHÜTT has figured it in Pflanzenleben d. Hochsee, pag. 268, VII b., but not named it. It occurs in the Mediterranean, Indian and Pacific. In the Atlantic it is rather common in the tropical parts, E. of S. America and W. of Africa. If a line be traced on the northern hemisphere from the Cape Verde to the Newfoundland Banks the space on the left of this line represents the area of distribution of this species.

Ceratium curvicorne v. DADAY.

Plate VII. Fig. 2.

This constant and characteristic form described by v. DADAY (Termezetrajri füzetek a mus. Hung. Budapestense vulgata 1887—88, Pl. III, fig. 4, 8, 12, 14) as a variety of *Cer. tripos*, has been figured (without name) in SCHÜTT Pflanzenleben der Hochsee, pag. 268, VII a.

I have met with this species in samples from the Red Sea, the Indian ocean and the tropical Atlantic, where it occurs rather common in ths Equatorial currents, the Brazil current, the Florida current towards the Newfoundland Banks as well as east thereof between 40°—45° N., in the Sargasso Sea, at the Azores and the Canaries.

Ceratium flagelliferum CL.

Plate VII. Fig 12.

I have proposed this name in 1899 (Kongl. Sv. Vetensk.-Akad. Handl., Vol. XXXII, n:o 3, pag. 1, nomen nudum) for a characteristic form of the tropical Atlantic. It has been figured by SCHÜTT (Pflanzenleben der Hochsee, pag. 267, fig. 77, V. b, without name) as a form of *Ceratium tripos*. It may possibly be the same as *C. tripos var. inflexum* GOURRET, but I dare not identify them. This species is remarkable for the small size of the body and the very long horns, the posterior of wich have a characteristic flexure. This species is very common in *desmo-plankton* of the whole tropical Atlantic, from 29° S. to 45° N.

Ceratium(?) hyperboreum. N. Sp.

Plate VIII. Fig. 14.

By the above name I denote a very small, but characteristic dinoflagellate, of which I have not been able to distinguish the tabulation and which possibly may belong to *Peridinium*. The longitudinal axis measures 0,07 and the transverse 0,05 millim. The membrane has a coarse and irregular areolation.

I found this species in samples from Spitzbergen, collected in August 1898 (80° 31′ N. 18° 50′ E.) and the same month 1899 (80° N. 16° E.). *Temperature* — 0,30 to + 2,42. *Salinity* 25,36 to 33,93. It is thus to be considered as an arctic neritic form.

Ceratium paradoxides. N. Sp.

Plate VII. Fig. 14.

I propose this name for a form, nearly akin to *C. limulus*. It is characterized by the cellular reticulation of the membrane. I have seen it, but very rarely, in samples from the Newfoundland Banks, the Azores and the Canaries.

Ceratium ranipes. N. Sp.

Plate VII. Fig. 1.

This rare and remarkable form has been figured by SCHÜTT in Pflanzenleben der Hochsee, pag. 267, fig. 79, VIII b. but without name. LEMMERMANN (Abh. Nat. Verein. Bremens. Vol. XVI, Part 2, pag. 346) names it *C. tripos var. digitatum*, but as Schütt has already used the name *digitatum* for another different species, a new name becomes necessary.

This form occurs in the tropical Atlantic, in the Equatorial, Antilles and Florida currents, also round the Azores, or between 12° and 49° N.

Ceratium reflexum. N. Sp.

Plate VII. Fig. 8, 9.

This form, characterized by the divergency of the posterior horns, of which one is nearly parallel to the apical horn, is very rare and has been seen twice only, viz. at 19° S. 31° W. and 38° N. 47° W.

Ceratium (tripos var.?) volans. N. Sp.

Plate VII. Fig. 4.

This form is characterized by the straight and very long posterior horns, which proceed in a right angle to the apical horn. They become first towards the distal end somewhat bent towards the apical horn.

This species is common in the tropical Atlantic, and it may be possible that it is the same as *Ceratium carriense* GOURRET, which I dare not decide without comparing original specimens.

Ceratium (tripos var.?) vultur. N. Sp.

Plate VII. Fig. 5.

This species, which is characterized by the angular flexure of the posterior horns, occurs frequently in chains. I have found it in samples from the Indian ocean and from the tropical Atlantic between 21° S. and 45° N.

Dinophysis Vanhöffenii Ostenf. *)

Plate VIII. Fig. 3.

Under the name *D. granulata* I have described a small form (Kongl. Sv. Vet.-Akad. Handl., Vol. XXXII, n:o 3, pag. 39, Pl. IV, fig. 7) from Spitzbergen, where it was found among drift-ice. This form seems to me to be a small variety of a widely distributed arctic species, named by Vanhöffen »*D. ovata* Clap & Lachm.» (Grönl. Exp. 1891—93. Vol. II, 1 part, 1897, Pl. V, fig. 7). Ostenfeld (Iagttagelser over overfladvandets temperatur, saltholdighet og plankton, 1898, pag. 58) proposed the name *D. Vanhöffenii*, which I accept as it denotes the typical form, and my name a dwarf-form only. This species, which seems to have been confounded with *D. Michaëlis* (Ehb.) Auriv. or *D. rotundata*, is well characterized by its thick, coarsely areolated membrane, the upper part of which scarcely proceeds beyond the girdle. The apical part has frequently some short spines.

I have seen this species in a collection from Jeddo Bay (Japan) and very frequently in specimens from the northern Atlantic, between 81° and 52° N. *Temperature* 5,9, mean of 21 obs., max. 9,8, min. — 0,9. *Salinity* 34,35, mean of 21 obs., max. 35,41, min. 32,03.

Peridinium diabolus. N. Sp.

Plate VII. Fig. 19, 20.

This species has been figured by Murray and Whitting (Trans. Lin. Soc. of London, 2 Ser. Bot., Vol. V, Part 9, Pl. XXIX, fig. 4 b) as a variety of *P. divergens*. It is such a characteristic form that it merits to be considered as a species, remarkable for its small size and the very strong posterior horns. I have found it in samples from the Indian ocean and the Atlantic, where it has been observed from the region of Cape Verde to the coasts of Portugal and near the Azores, besides S. of the Newfoundland Banks and E. of Cape Hatteras. *Temperature* 14,8 to 24. *Salinity* 36 to 36,40. Belongs to the *styli-plankton*.

Peridinium elegans. N. Sp.

Plate VII. Fig. 15, 16.

This species is nearly related to *P. divergens* and has been figured by Murray & Whitting (Trans. Linn. Soc. of London, Ser. 2, Vol. V, part 9, Pl. XXIX, fig. 4 a) as a variety of the named species. It differs from *P. divergens* by larger size (length 0,2, breadth 0,1 millim.), by the absence of teeth at the basis of the posterior horns and by the ends of the girdle not being oblique. The longitudinal axis is slightly oblique to the plane of the girdle.

*) *Dinophysis norvegica* (Clap. et Lachm.) Jørgensen (Bergens Museums Aarbog 1899, N. VI., Pl. I, fig. 3—6) and *D. acuminata* Jørg. *l. c.* fig. 7—9.

This species has been found in samples from the Indian ocean as well as from the Atlantic, where it occurs in the tropical part, at least from 21° S. to 47° N. *Temperature* 23,8, mean of 43 obs., max. 28,3, min. 10. *Salinity* 35,84, mean of 40 obs., max. 37,28, min. 32,87. It belongs to *desmo-plankton.*

Peridinium exiguum. N. Sp.

Plate VIII. Fig 5.

This species is also nearly akin to *P. divergens*, but differs in the small size (length 0,05—0,06, breadth 0,04 millim.), the coarse areolation, the serrated posterior horns without basal teeth and in the oblique girdle.

I have found it in samples from the Azores (August 1898) and from the coast of Portugal (June 1898). *Temperature* 21,2. *Salinity* 36,25. It belongs probably to *styli-plankton.*

Peridinium oceanicum VANHÖFFEN.

Plate VII. Fig. 17, 18.

In the »Peridineen der Planktonexpedition» (Pl. XIII, fig. 44) SCHÜTT has figured, as a variety of *P. divergens*, a common atlantic form, which VANHÖFFEN (Grönl. Exp., Vol. II, 2 part, Pl. V, fig. 2) names *P. oceanicum.* The same form was, also in 1898, named by AURIVILLIUS (Kongl. Sv. Vet.-Akad. Handl., Vol. XXX, n:o 3, pag. 96) *Perid. div. var. obliqua.*

It is a very constant, easily recognised form, which I have seen in samples from the Red Sea and the Indian ocean. It occurs in the Atlantic chiefly in the region of the Azores and N. thereof, in the spring across the whole Atlantic, between 40° and 50° N., whence it spreads, during the summer, towards Greenland, into the Irminger Sea and across the Färöe Channel into the North Sea and the Skagerak. *Temperature* 12,9, mean of 32 obs., max. 22, min. 3. *Salinity* 35,45, mean of 28 obs., max. 36,25, min. 34,16. (For the calculation of the means only such samples have been used as contained this form in any abundance) It is a typical *styli-plankton* form.

Peridinium pallidum OSTENF.

Plate VII. Fig. 21, 22.

Under the above name OSTENFELD (Iagttagelser over overfladvandets temperatur, saltholdighed og plankton in 1898, pag. 60, 1899) has distinguished a form nearly related to *P. pellucidum*, but with oblique posterior horns.

It is an *arctic* form, that ranges between 39° and 79° N. *Temperature* 8,5, mean of 45 obs., max. 19,4, min. 0. *Salinity* 34,87, mean of 45 obs., max. 35,97, min. 32,43. It belongs to *tricho-plankton* and to the *northern neritic plankton.*

Phalocroma minutum. N. Sp.

Plate VIII. Fig 10, 11.

Longitudinal axis 0,05, sagittal axis 0,04, transverse axis 0,025 millim. Areolation coarse, 3 to 4 areoles in 0,01 millim.

I have found this small form twice only, viz. at 41° N, 57° W. (July 1899) and at 41° N., 62° W. (August 1899). *Temperature* 22 to 24,4. *Salinity* 33,88 to 36,13.

Steiniella(?) punctata. N. Sp.

Plate VIII. Fig. 4.

This species is characterized by its biconical form, solid membrane and coarse areolation. Longitudinal axis 0,11, sagittal and transverse axis 0,06 millim. A nearly related form has been described by MURRAY & WHITTING (Trans. Linnean Soc. of London, ser. 2, Bot., Vol. V, Pl. XXVI, fig. 4) as *Ceratium biconicum*, which also probably belongs to the genus *Steiniella*.

I have found this form once only in a sample from 48° N., 24° W. (August 1899). *Temperature* 19,4. *Salinity* 35,63. *Styli-plankton.*

IV. CYSTÆ.

Cysta limbata CL. *)

Plate VIII. Fig. 15.

By this name I propose to denote an organism, that has already been observed by HENSEN (»Welliger Statoblast» 5te Ber. d. Kieler kommission, Pl. IV, fig. 28, 29), but has not got a name. It represents probably a stage in the development of some other organisms, perhaps some dinoflagellate, still, as it is of a certain importance to have a name for it, I propose the above one. It is a cellule of nearly spherical shape, in diameter about 0,05 millim., filled by a granular, probably green, mass. The membrane is somewhat thick and surrounded by a hyaline, plicate girdle, twice as broad as the enclosed cellule. This form is not very rare in the northern Atlantic, the North Sea and the Skagerak.

Hyalosphysa delicatula. N. Sp.

Plate VIII. Fig. 22.

By this name I denote an unknown unicellular alga, which was found in samples from the Azores (August 1898). It is remarkable for the very thin membrane and small scarce chromatophores scattered on the inside of the wall. The form of the cellules is

*) Since the above was written JØRGENSEN (Bergens Museums Aarbog 1899, p. 48) has named this organism *Pterosphæra Möbii*, which name has priority.

slightly cylindrical or almost globular. Diameter 0,06 to 0,08 millim. As I have seen alcohol-preserved specimens only, I am unable to decide whether the chromatophores are green or yellow.

Pyrocystis hamulus. N. Sp.

Plate VII. Fig. 23.

This characteristic cysta, perhaps a stage in the development of some dinoflagellate, seems to be akin to *Pyroc. lunula.* It is remarkable for the small body, that suddenly goes over in two long, towards the distal part bent horns. I have found it in samples from the Indian ocean and in the Atlantic between 12°—32° N., 47°—74° W., in *desmoplankton.*

Xanthidium paucispinosum. N. Sp.

Plate VII. Fig. 24.

This cysta is probably the same as has been figured by HENSEN (5te Ber. d. Kieler kommission, Pl. IV, fig. 31) as »dornige cyste». I have met with it both off the N. coast of South America and at the Azores.

V. DIATOMACEÆ.

Asterionella notata GRUN.

Plate VII. Fig. 32.

GRUNOW has figured a valve and two frustules of this species (Van HEURCK Synopsis, Pl. LII, fig. 3), which I have found in samples from the Azores. The frustules are connected by their basal part to comb-like colonies, which are twisted in different ways. Besides, the frustules in one colony are frequently directed in various directions.

Asteromphalus atlanticus CL. and **As. heptactis** RLFS.

Plate VIII. Fig. 6—9.

In the year 1873 I published a figure of an *Asteromphalus* (Bih. till Kongl. Sv. Vet.-Akad. Handl., I, n:o 13, Pl. IV, fig. 19), found in bottom-mud from Davis Strait, which I supposed to be *A. Brookei* Bail. Later, in 1896 (Bih. till Kongl. Sv. Vet.-Akad. Handl., Vol. XXII 3, n:o 4, pag. 5) I proposed to name this form, which occurs in the northern Atlantic, *A. atlanticus.* GRAN (Den Norske Nordhavs Expedition 1876—78. Protophyta 1897, Pl. IV, fig. 63) has given a good figure of the same form. In a recent publication (Iagttagelser over overfladvandets temperatur, saltholdighed og plankton fra Islandske og Grönlandske skibsrouter in 1898, pag. 52) OSTENFELD means, that *A. atlanticus* is a small form only of *A. heptactis.* This opinion seems to me to be erroneous,

as will be seen from the figures, Pl. VIII, fig. 6—9. Of these the fig. 6 represents a specimen of *A. heptactis* (23d of May 1898 58° 48′ N., 18° 45′ W., OSTENFELD's collection), the fig. 9 a very small specimen of *A. atlanticus* from the same gathering. The fig. 8 represents a specimen of ordinary size from Davis Strait and the fig. 7 a specimen from the coast of Portugal, the largest I have seen.

The specific difference may be seen from the following comparison:

	A. heptactis.	*A. atlanticus.*
Size	0,05 to 0,1 millim.	0,025 to 0,05 millim.
Radial proportion of the umbilical space and the limbus	1 : 3.	1 : 2.
Alveoli in 0,01 millim.	6.	12.
Geographical distribution	26° S.—63° N.	46° N.—78° N.
Plankton-type	*Styli-plankton.*	*Cheto- and tricho-plankton.*

That *A. heptactis* and *A. atlanticus* are different species cannot be doubted, but the question whether *A. atlanticus* and *A. Brookei* are identical or not, is more difficult to decide without comparison of original specimens. GREVILLE's figure of *A. Brookei* from Kamtchatka (Trans. Mic. Soc., Vol. VIII, Pl. IV, fig. 18) has 10 alveolate fields, else it seems to agree well, but as the minute structure has not been accurately described, the identification is impossible. It would be of a great interest to settle that question. *)

Chætoceros difficilis. N. Sp.

Plate VIII. Fig. 16—18.

Chains loose, of quadrate cellules, separate by large rectangular or subhexagonal foramina, half as long as the cellules. Cellules thin-walled, in sagittal-longit. position quadrate with flat valves. Cell-contents (as far as could be ascertained on alcohol-preserved specimens) with only one chromatophore. All awns very delicate. Endocysts in the middle of the cellules, biconvex, smooth, but with a peripherical row of small puncta.

Longitudinal axis 0,005 to 0,008. Sagittal axis 0,008 to 0,01. Endocysts 0,007 to 0,01 millim. Sterile specimens resemble *C. balticus* CL. (Bih. till Kongl. Sv. Vet.-Akad. Handl., Vol. XXI 3, n:o 5, pag. 25), but the endocysts are different.

This species was found in September 1899 at 59° N., 1° 2′ W. (temperature 11,8, salinity 35,37) together with forms that belong to *tripos-* and *sira-plankton.*

Chætoceros longisetus. N. Sp.

Plate VII. Fig. 25—29.

Chains composed of numerous cellules, straight, thin-walled, without foramina. Cellules in longitudinal-sagittal position quadrate, with flat valves. Awns arising from

*) When this paper was in the press, I received samples from the southern Atlantic, which contained abundantly *A. Hookeri* EHB. This antarctic form agrees perfectly with the boreal *A. atlanticus*, which name consequently must be exchanged for *A. Hookeri.*

the angles, all turned in an angle of 15°—20° towards the longitudinal axis, thinner and stronger intermingled. Terminal awns very long, stronger than the others, angular, with spirally arranged small spines, which become stronger towards the distal end. Endocysts in the middle of the cellules, biconvex, covered with numerous, long bristles.

Longitudinal axis 0,012 to 0,028. Sagittal axis 0,02 to 0,025. Endocysts 0,009 to 0,012 long. Their sagittal axis 0,02 to 0,025 millim. This species was found in March 1898 at 7° N., 55° W. (Temperature 25,9.)

This species is well distinguished from all known forms by the absence of foramina, by the direction of the awns by the endocysts and the size. In the absence of foramina and the direction of the awns it reminds of the very small form, which I have named *C. subtilis* (Bih. till. Kongl. Sv. Vet.-Akad. Handl., Vol. XXIII 3, n:o 5, fig. 8). Another form without foramina I found in plankton from the Caspian Sea.

Chætoceros Ostenfeldii. N. Sp.

Plate VIII. Fig. 19.

Chains flexible, with large oval foramina, as large as the cellules. Cellules thin-walled, with concave valves, somewhat longer than broad. Awns thread-like, short. Terminal setæ stronger than the others. Cell-contents (as far as could be ascertained on alcohol-preserved specimens) with one chromatophore along the wall of the zone.

Longitudinal axis of the cellules 0,01. Sagittal axis 0,007 millim.

This form has a considerable resemblance to *C. laciniosus* SCHÜTT, but is much more delicate and has a single chromatophore. It has been distinguished by OSTENFELD (Iagttagelser over overfladsvandets temperatur, saltholdighed og plankton, in 1898) as »*C. laciniosus off.*»

It was observed in April 1898 abundantly at 49°—48° N., 19°—29° W., rarer in the Irminger Sea and the Färöe Channel, but became there common in May. Later it was seen only rarely, but in August it was found abundantly between Iceland and Greenland.

Dactyliosolen hyalinus. N. Sp.

Plate VIII. Fig. 33.

Cellules cylindrical, $1^1/_2$ to 2 times longer than broad, firmly united into confervoid threads. Valves circular flat, without any visible structure and with simple, not crenulate margins. Zone with numerous transverse rings, 2 in 0,01 millim., not distinctly punctate. Chromatophores small. Length of the cellules 0,06 to 0,08, their diameter 0,04 millim.

This species was found from February to June 1898 in the region of the Newfoundland Banks, associated with species belonging to *styli-plankton.* It reappeared on the same area in November. *Temperature* 14,4, mean of 32 obs., max. 20, min 8. *Salinity* 35, mean of 27 obs., max. 36,49, min. 32,62.

Skeletonema tropicum. N. Sp.

Plate VIII. Fig. 30, 31.

This species differs from *S. costatum* in its larger size and numerous, closer peripherical processes. Sagittal axis 0,015 to 0,038, longitudinal axis 0,01 millim. Processes 7 to 9 in 0,01 millim., their length 0,01 to 0,02 millim. I found this species in samples from the coasts of S. America, 29° S. and 6°—10° N. *Temperature* 23,8 to 27,2. *Salinity* from 34,53 to 36,01. Evidently a *tropical neritic* form.

Thalassiosira condensata. N. Sp.

Plate VIII. Fig. 12, 13.

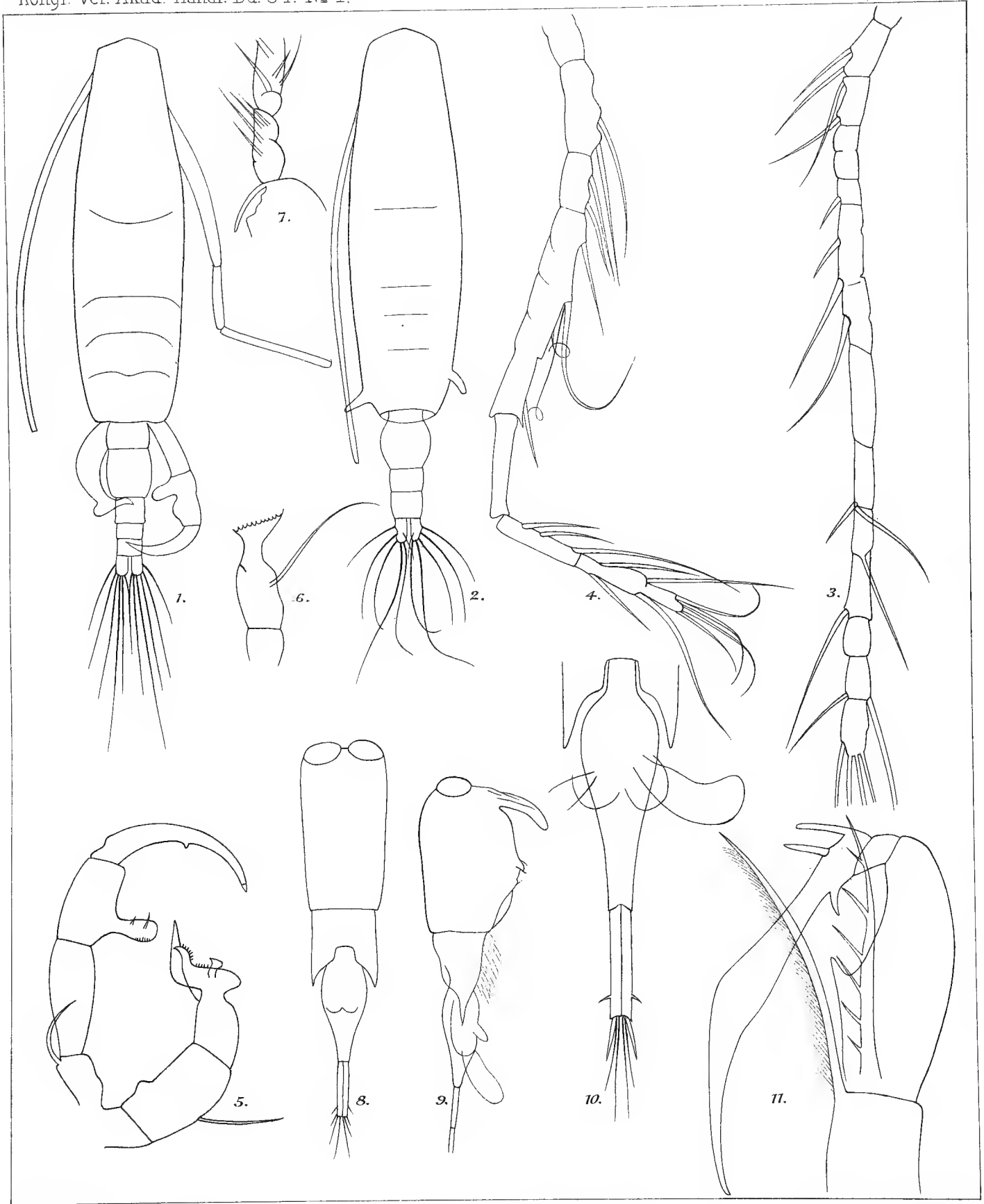
Cellules very thin-walled, short, cylindrical, united by a single central short slim-thread to somewhat rigid chains. Valve orbicular with a central pore and a marginal circlet of close small protuberances, about 7 in 0,01 millim., but else without any visible structure (on ignited specimens). Zone with numerous rings. Chromatophores small and rounded, along tho interior wall of the cellule. Length 0,02 to 0,03, diameter 0,025 to 0,03 millim.

The membrane is so little silicious that it, on drying, becomes deformed.

This species was found in October 1899 at Plymouth together with several *arctic* forms.

Plate I.

Fig. 1—7. *Acartia macropus* CL.
» 1. Outline of the male, dorsal . . . . . × 85.
» 2. Outline of the female, dorsal . . . . . × 85.
» 3. Left anterior antenna of the male . . . . . × 170.
» 4. Right anterior antenna of the male . . . . . × 170.
» 5. Fifth foot-pair of the male . . . . . × 170.
» 6. Fifth foot of the female . . . . . × 300.
» 7. Head of the male, lateral . . . . . × 170.
» 8—11. *Corycæus longicaudis* DANA, *male.*
» 8. Outline, dorsal . . . . . × 85.
» 9. Outline, lateral . . . . . × 85.
» 10. Abdomen and furca, dorsal . . . . . × 170.
» 11. Posterior antenna . . . . . × 500.



Del. P. T. Cleve.

Lith. W. Schlachter Stockholm.

Plate II.

Euchirella rostrata CLAUS.; *male.*

Fig. 1. Outline, lateral . . . . . × 40.
» 2. Fifth foot-pair . . . . . × 85.
» 3. The same from a young specimen . . . . . × 85.
» 4. Abdomen, dorsal . . . . . × 85.
» 5. Mandible . . . . . × 170.
» 6. Second maxillipede . . . . . × 170.
» 7. Posterior antenna . . . . . × 170.
» 8. First foot . . . . . × 170.
» 9. Second foot . . . . . × 170.
» 10. Third foot . . . . . × 170.
» 11. Fourth foot, *B. 1* and *B. 2*, *Ri.* . . . . . × 170.
» 12. End of the left first antenna . . . . . × 85.

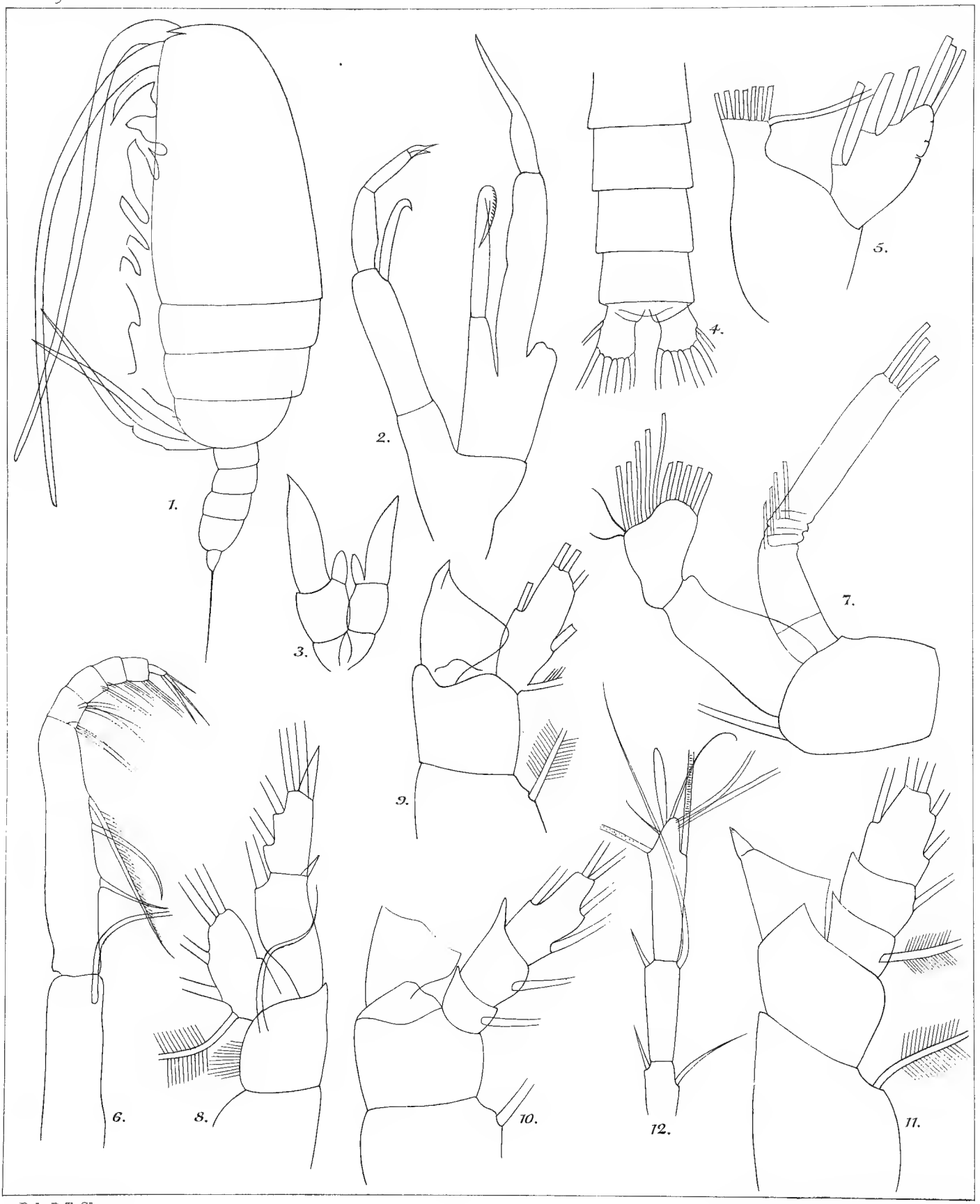

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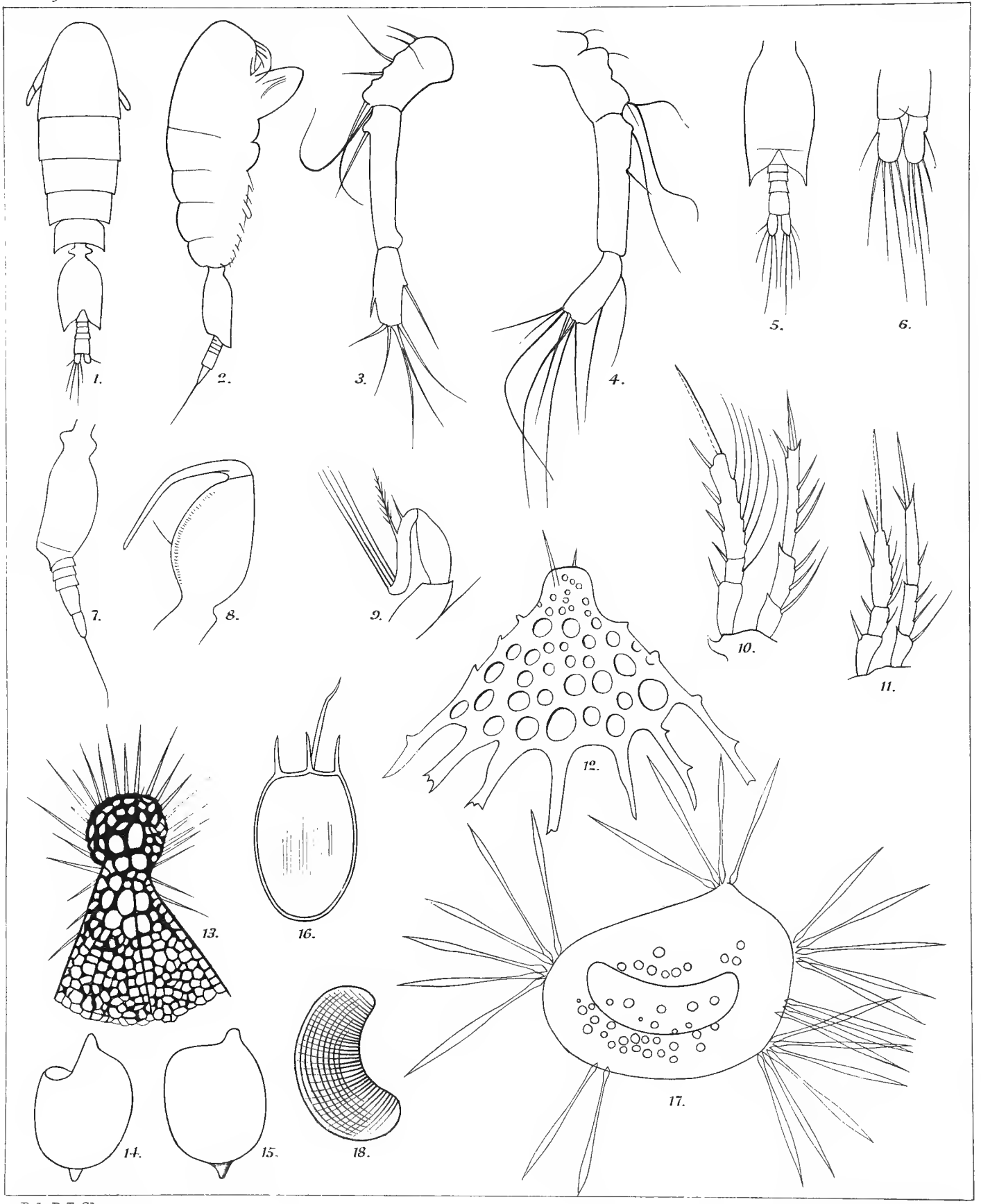
Plate III.

Fig. 1—11. *Oncœa subtilis* GIESBR. *Male.*

» 1. Outline, dorsal . . . . . × 170.
» 2. Outline, lateral . . . . . × 170.
» 3. Left anterior antenna . . . . . × 500.
» 4. Right anterior antenna . . . . . × 500.
» 5. Abdomen and furca, dorsal . . . . . × 300.
» 6. Furca, dorsal . . . . . × 500.
» 7. Abdomen and furca, lateral . . . . . × 300.
» 8. Posterior maxillipede . . . . . × 500.
» 9. Posterior antenna . . . . . × 500.
» 10. Second foot . . . . . × 500.
» 11. Fourth foot . . . . . × 500.
» 12. *Anthocyrtium anthemis* HKL.? . . . . . × 500.
» 13. *Sethoconus crinitus* CL. . . . . × 500.
» 14, 15. *Challengeron brevispina* CL. . . . . × 500.
» 16. *Euphysetta pusilla* CL. . . . . × 500.
» 17. *Spermatogonia antiqua* LEUD. FORTM. . . . . × 500.
» 18. *Sperm. ant.* central capsule(?), treated with soda . . . . . × 500.

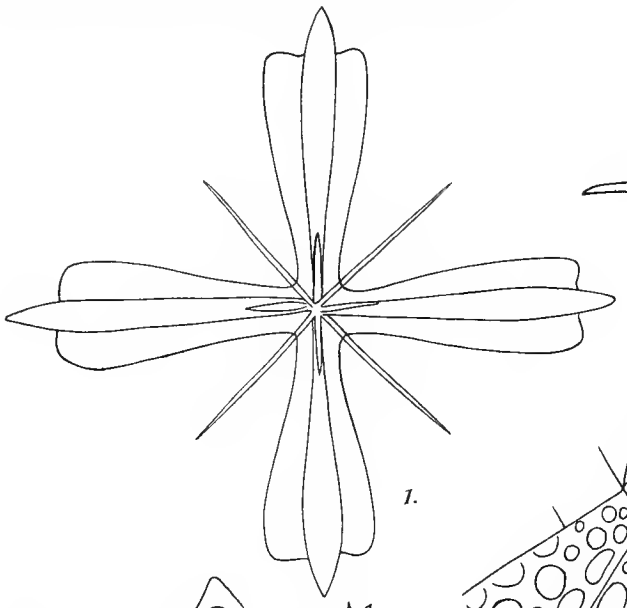


Del P. T. Cleve.

Lith W. Schlachter Stockholm.

Plate IV.

Fig. 1. *Quadrilonche crux* CL. . . . . × 500.
» 2, 3. *Lampromitra erosa* CL. . . . . × 500.
» 4. *Psilomelissa longispina* CL. . . . . × 500.
» 5. *Dictyoceras neglectum* CL. . . . . × 500.
» 6. *Sethocyrtis pyrum* CL. . . . . × 500.
» 7. *Theocyrtis turris* CL. . . . . × 500.
» 8. *Theoconus junonis* HKL. affin. . . . . × 500.
» 9. *Clathrocanium minutum* CL. . . . . × 500.
» 10. *Dictyocephalus cylindricus* CL. . . . . × 500.
» 11. *Theocyrtis aculeata* CL. . . . . × 500.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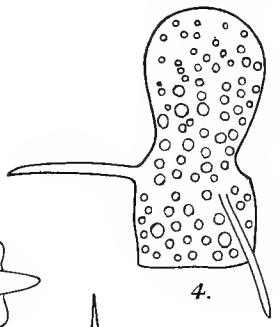
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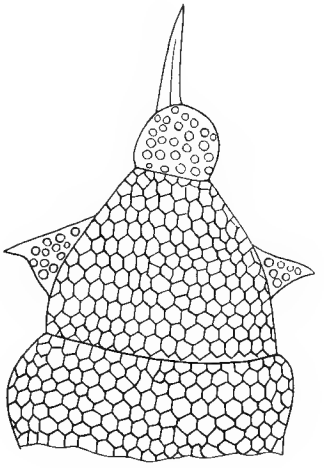
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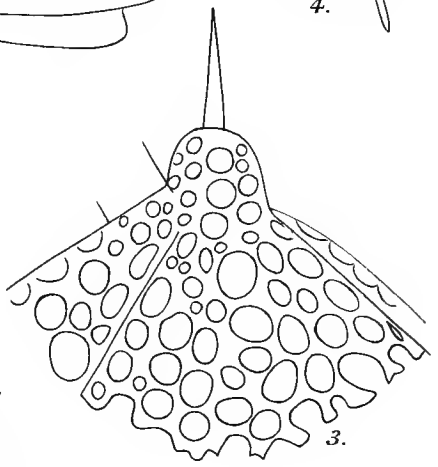
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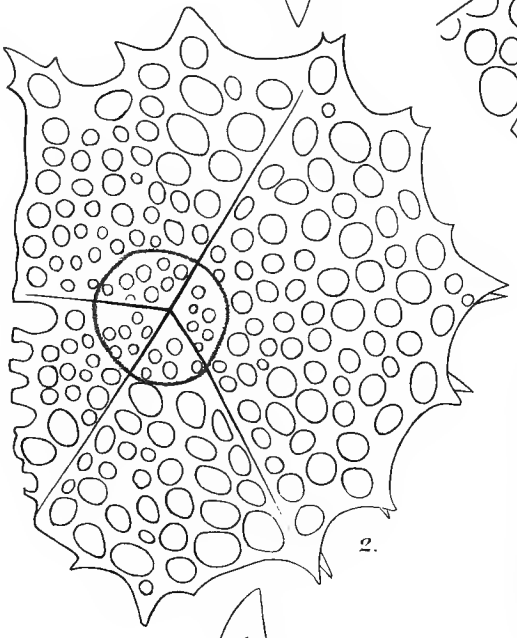
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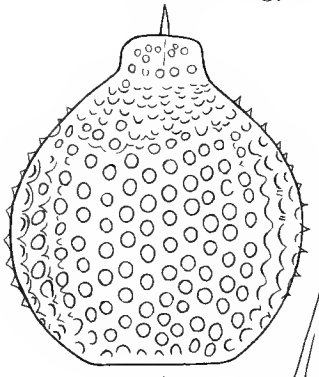
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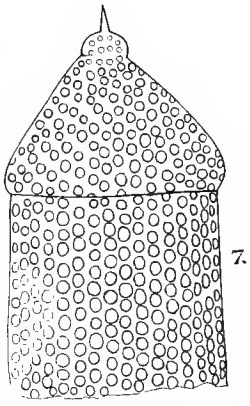
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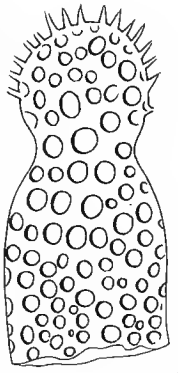
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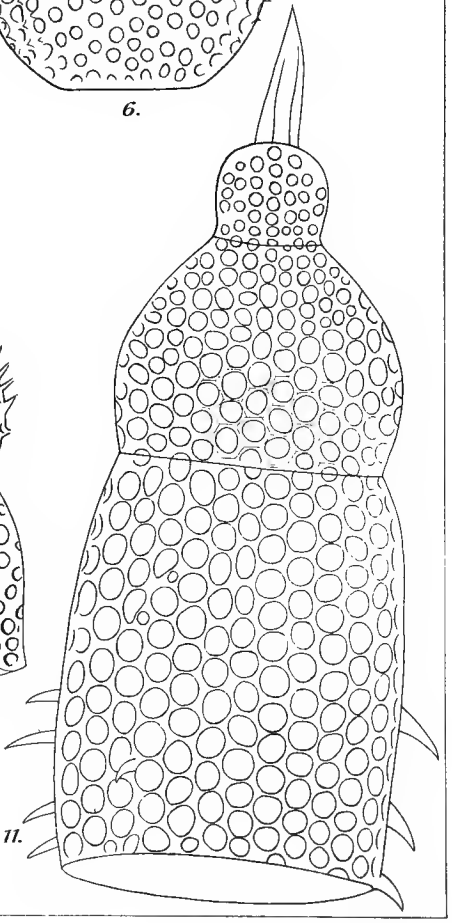
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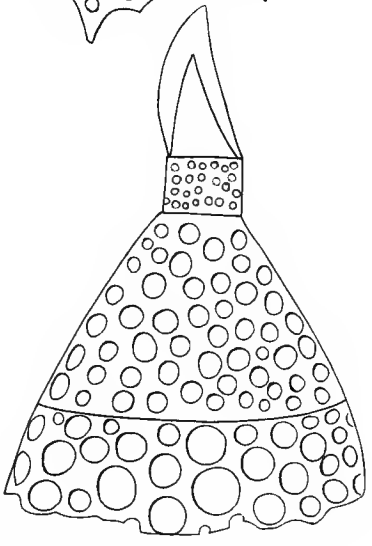
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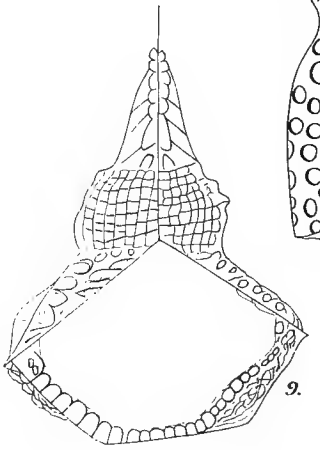
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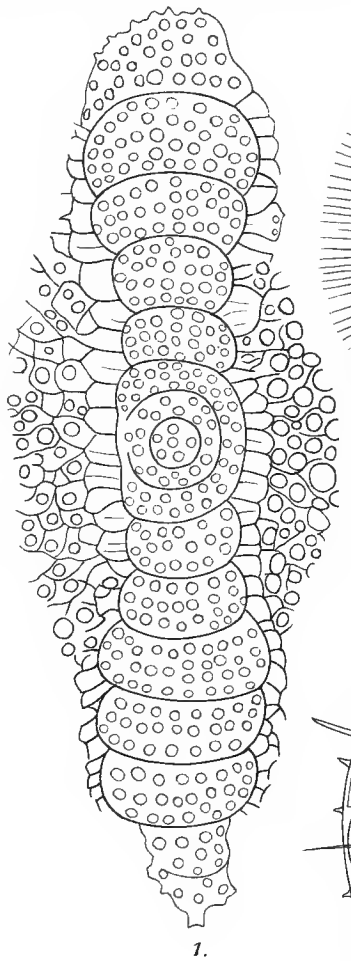
Plate V.

Fig. 1. *Amphihymenium elegans* CL. . . . . × 500.
» 2. *Actinomma(?) sol.* CL. . . . . × 500.
» 3. *Actinosphæra trichophora* CL. . . . . × 500.
» 4. *Haliomma irregulare* CL. . . . . × 300.
» 5. *Haliomma echinosphæra* CL. . . . . × 500.
» 6. *Hexacontium setosum* HKL.? . . . . . × 500.
» 7. *Haliomma spinulosum*, with two exterior shells . . . . . × 300.



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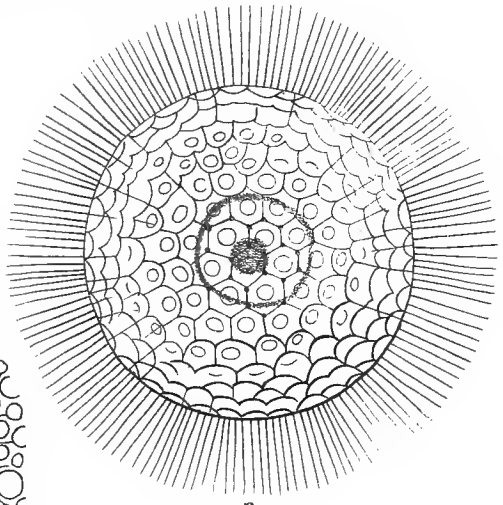

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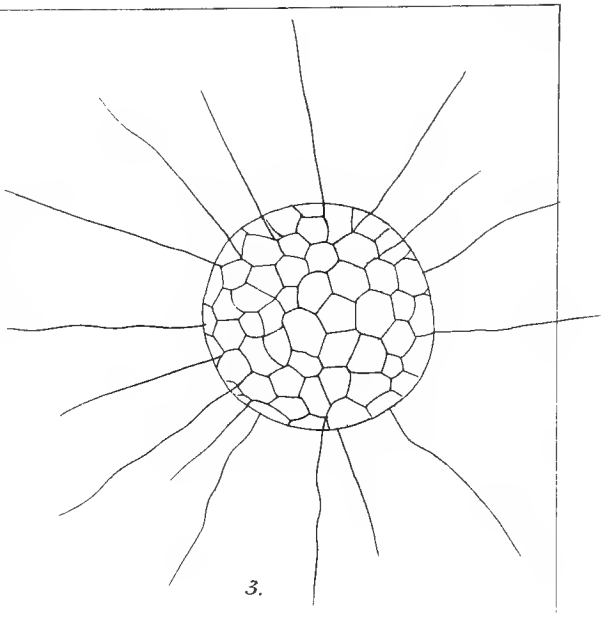

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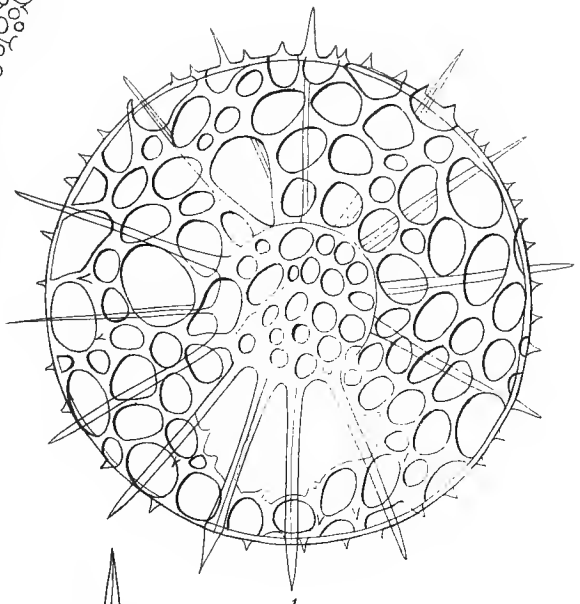

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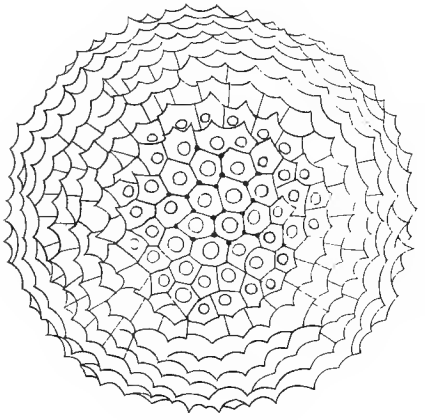

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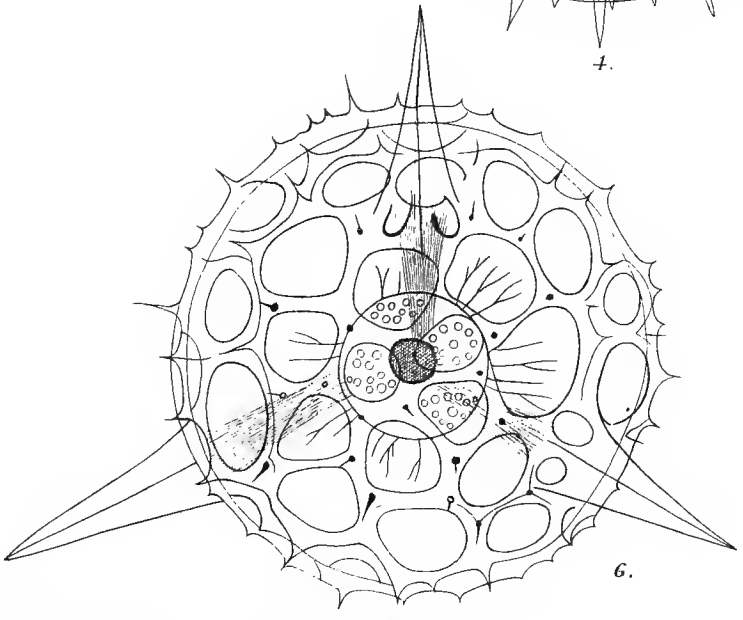

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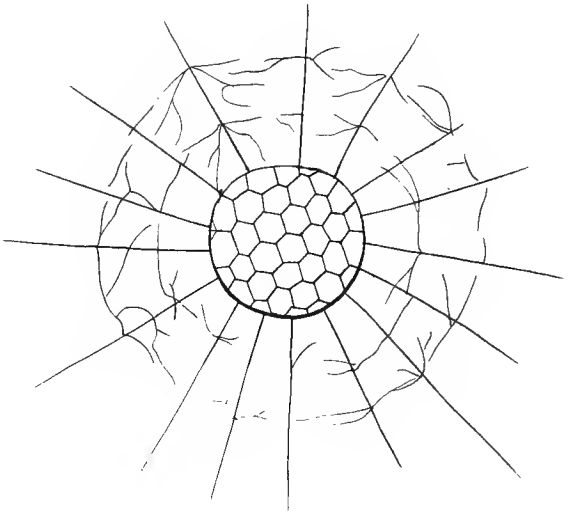

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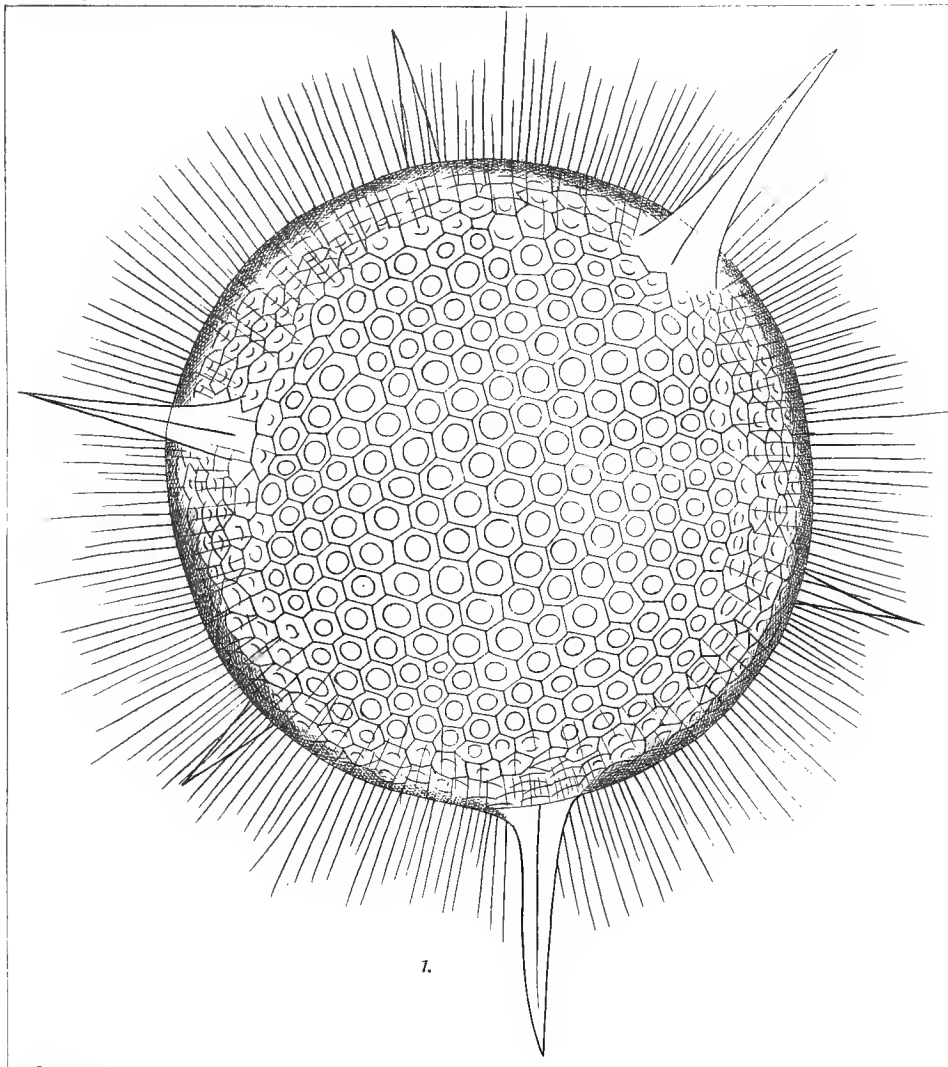
Plate VI.

Fig. 1. *Hexastylus nobilis* Cl. . . . . × 500.
» 2. *Heliosphæra minuta* Cl. . . . . × 500.
» 3. *Trypanosphæra brachysiphon* Cl. . . . . × 300.
» 4. *Hexacontium hostile* Cl. . . . . × 500.
» 5. *Hexacontium armatum* Cl. . . . . × 500.



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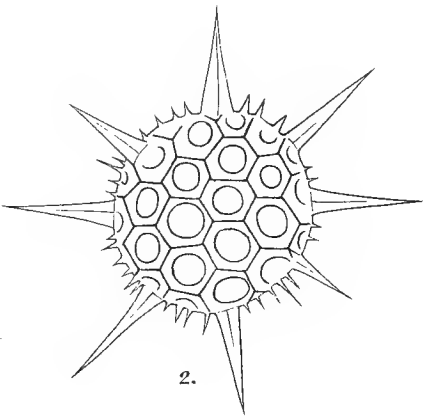

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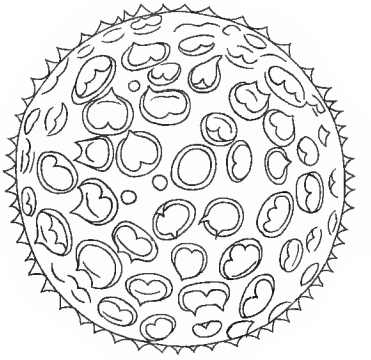

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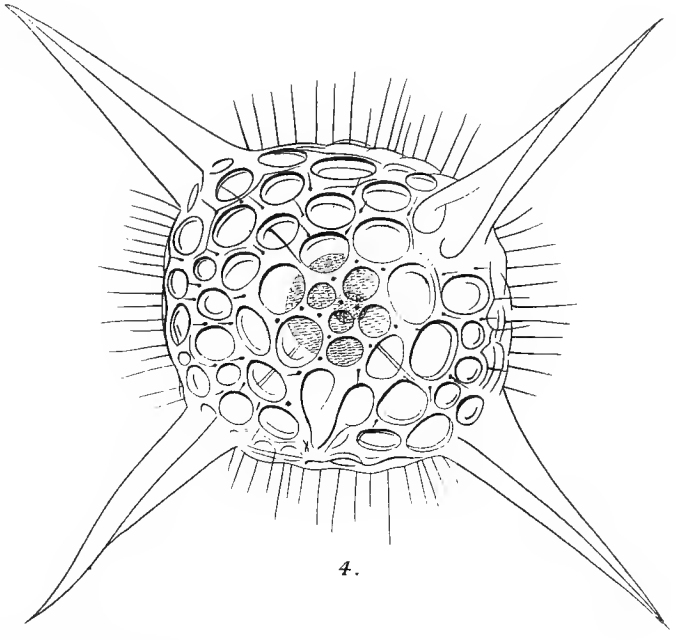

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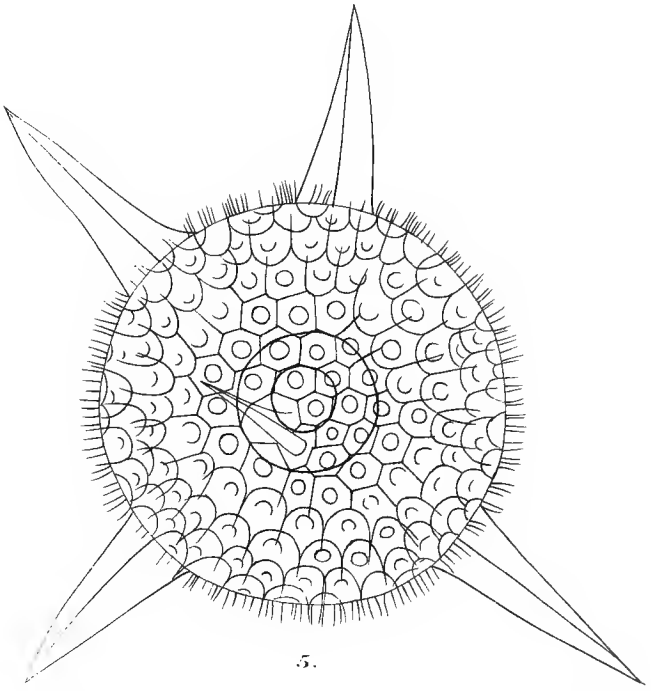

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Del. P. T. Cleve.

Lith. W. Schlachter Stockholm.

Plate VII.

Fig.	1.	*Ceratium ranipes* Cl.	× 250.
»	2.	*C. curvicorne* v. Daday	× 250.
»	3.	*C. (tripos var.?) arietinum* Cl.	× 250.
»	4.	*C. (tripos var.?) volans* Cl.	× 250.
»	5.	*C. (tripos var.?) vultur* Cl.	× 250.
»	6, 7.	*C. (tripos var.?) azoricum* Cl.	× 250.
»	8, 9.	*C. reflexum* Cl.	× 250.
»	10.	*C. contortum* Gourret	× 250.
»	11.	*C. (tripos var.?) arcuatum* Gourret	× 250.
»	12.	*C. (tripos var.?) flagelliferum* Cl.	× 250.
»	13.	*C. belone* Cl.	× 250.
»	14.	*C. paradoxides* Cl.	× 250.
»	15, 16.	*Peridinium elegans* Cl.	× 250.
»	17, 18.	*P. oceanicum* Vanhöffen	× 250.
»	19, 20.	*P. diabolus* Cl.	× 250.
»	21, 22.	*P pallidum* Ostenf.	× 250.
»	23.	*Pyrocystis hamulus* Cl.	× 250.
»	24.	*Xanthidium paucispinosum* Cl.	× 150.
»	25.	*Chætoceros longisetus* Cl., sterile chain	× 500.
»	26, 27.	*C. longisetus* Cl.; with endocysts	× 500.
»	28, 29.	*C. longisetus* Cl.; terminal setæ	× 1000.
»	30, 31.	*Skeletonema tropicum* Cl.	× 500.
»	32.	*Asterionella notata* Grun	× 250.
»	33.	*Dactyliosolen hyalinus* Cl.	× 250.

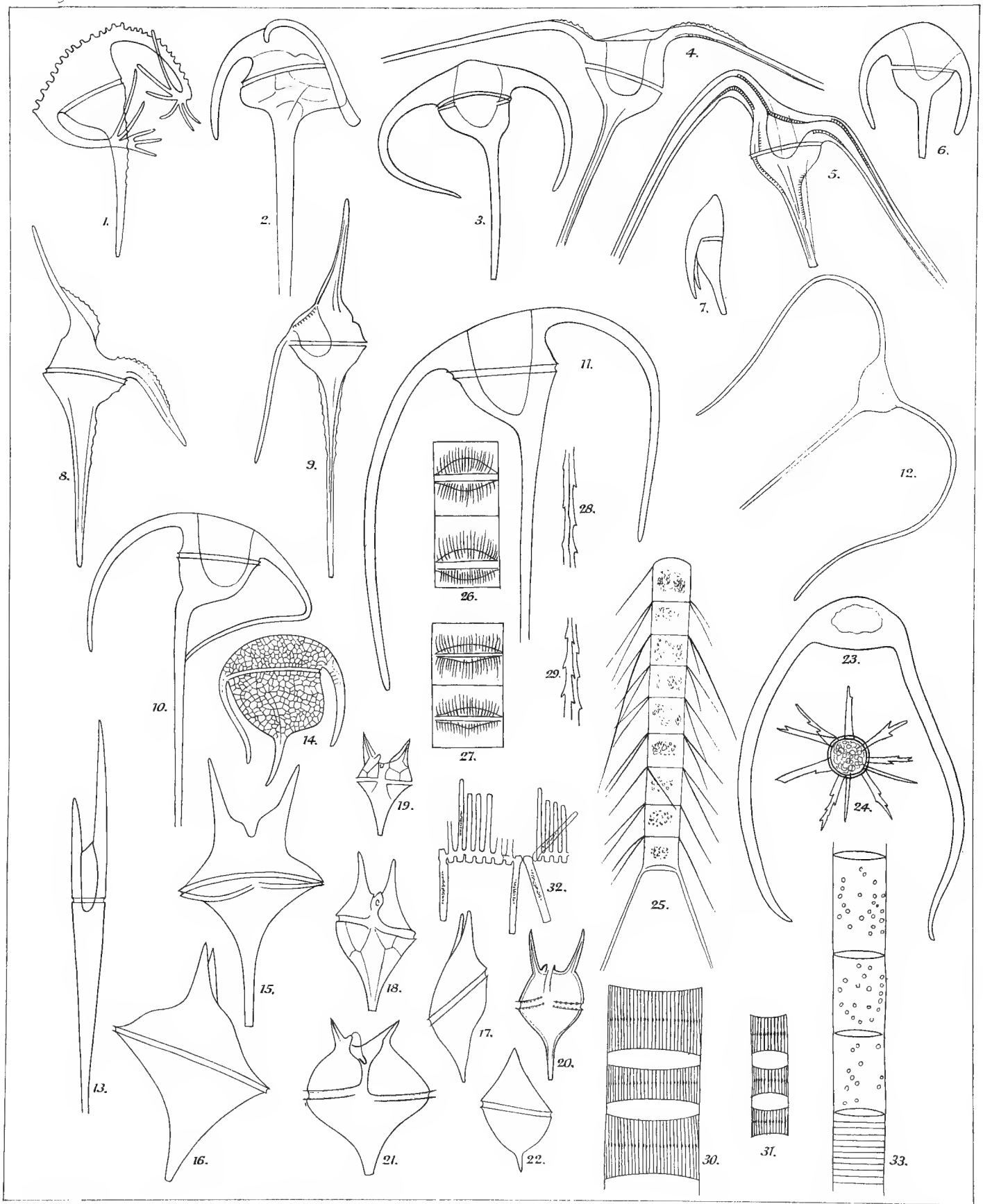
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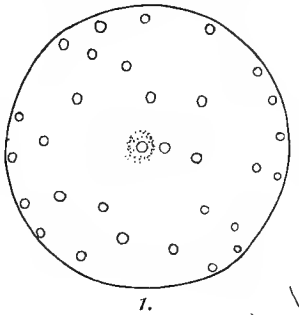
Plate VIII.

Fig.	1, 2.	*Hyalophysa delicatula* CL.	× 500.
»	3.	*Dinophysis Vanhöffenii* OSTENF.	× 500.
»	4.	*Steiniella(?) punctata* CL.	× 500.
»	5.	*Peridinium exiguum* CL.	× 500.
»	6.	*Asteromphalus heptactis* RALFS.	× 1000.
»	7.	*A. atlanticus* CL. from Portugal	× 1000.
»	8, 9.	*A. atlanticus* CL. from N. Atlantic	× 1000.
»	10, 11.	*Phalacroma minutum* CL.	× 500.
»	12.	*Thalassiosira condensata* CL.; a chain	× 500.
»	13.	*Th. condensata* CL.; a valve, ignited	× 1000.
»	14.	*Ceratium(?) hyperboreum* CL.	× 500.
»	15.	*Pterosphæra Möbii* JØRGENSEN	× 500.
»	16.	*Chætoceros difficilis* CL., sterile chain	× 1000.
»	17.	The same, with endocysts	× 1000.
»	18.	The same, endocysts, from above and from the side	× 1000.
»	19.	*Chætoceros Ostenfeldii* CL.	× 1000.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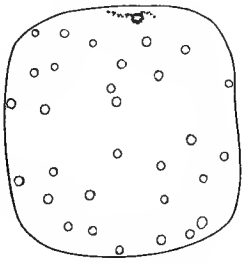
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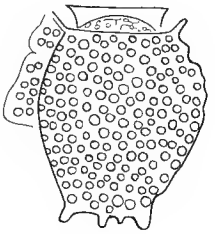
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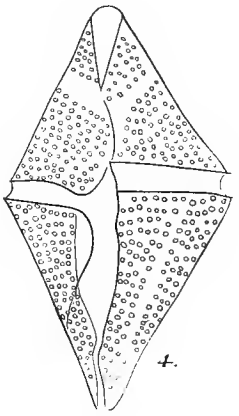
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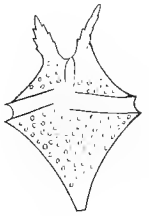
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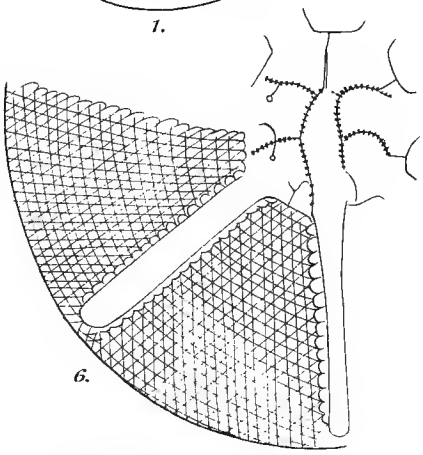
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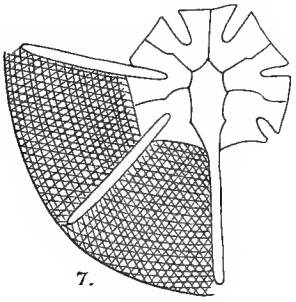
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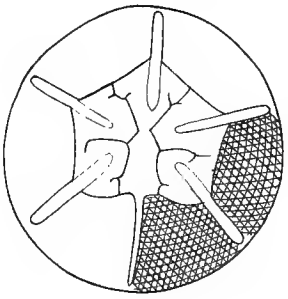
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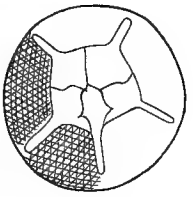
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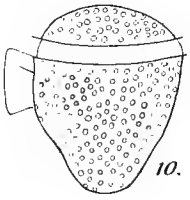
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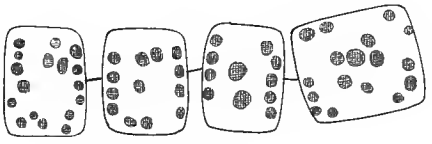
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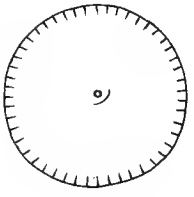
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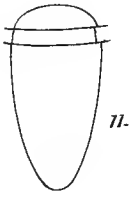
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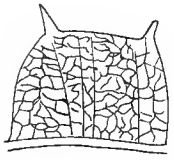

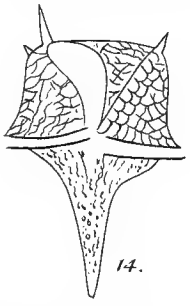
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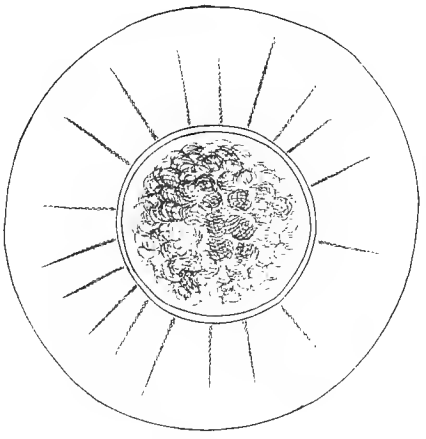
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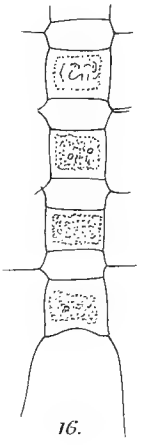
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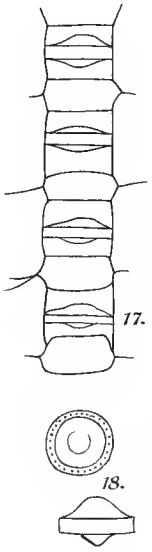
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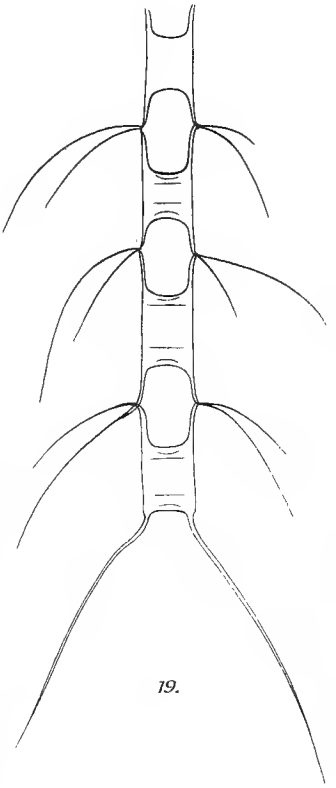
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KONGL. SVENSKA VETENSKAPS-AKADEMIENS HANDLINGAR. Bandet 32. N:o 8

THE PLANKTON

OF

THE NORTH SEA, THE ENGLISH CHANNEL, AND THE SKAGERAK

IN

1898

BY

P. T. CLEVE

COMMUNICATED TO THE R. SWEDISH ACADEMY OF SCIENCES OCTOBER 11, 1899

STOCKHOLM
KUNGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER
1900

For the hydrographical researches of PETTERSSON and EKMAN,[1] the North Sea was explored four times during the year 1898, viz.: in March, June, July—August and November. At the same time samples of water were taken for chemical analysis and of plankton for microscopical examination. At the biological stations at Plymouth and Helder samples were collected almost every week during the whole year and also at S:t Vaast la Hogue from June onwards. For this valuable assistance I beg to tender the directors of the said stations, Mr. E. J. ALLEN, Dr. P. P. C. HOEK and Mr. EUGÈNE MALARD my best thanks. Again, at the expense of the Fishery Association of Gothenburg, samples of plankton were collected almost every week at Måseskär, off the west coast of Sweden, and, though with less regularity, both in the open Skagerak and along the Swedish west coast from Vinga to Väderö.

1. The North Sea in March 1898.

The prevailing plankton type is the *chæto-plankton*, which extends from the British east coast, between the Firth of Tay and Newcastle, to the south-west of Norway and the west of the Danish Peninsula, to about 55° 30′ N., i. e. above the 100 metre plateau. It also occurred south of the Dogger Bank, above the depression of the bottom at this place.

The chæto-plankton region approximately coincides with the southern part of the region of the water with 35 p. mille salinity, as marked on the hydrographical map of PETTERSSON and EKMAN.[1] The northern part of the North Sea, or above the 200 metre plateau, was poor in plankton or almost sterile, containing *Calanus finmarchicus* sparingly. Above the great depth between the 200 metre plateau and the west coast of Norway the water was extremely poor in plankton, containing however some rare specimens of a number of interesting radiolarians, *Ceratium arcticum* and *Coscinodiscus oculus iridis*.

In the spring of 1897, when chæto-plankton also prevailed above the 100 metre plateau, the area of this plankton type was bordered by a band containing arctic and northern forms. This was not the case in 1898. The southern part of the chæto-region, from Newcastle to Skagen, in 1898 contained *Coscinodiscus concinnus* more or less abundantly; and above the edge of the 50 metre plateau as well as above the Fisher Bank *Rhizosolenia styliformis* was met with, more or less sparingly to about 1° 30′ E. and also above the depression south of the Dogger Bank.

[1] Bih. till K. Sv. Vet.-Akad. Handl. Vol. XXV, II, N:o 1. 1899.

As no samples of plankton have been collected above the 50 metre plateau nothing is known about the plankton of the southern North Sea.

The *tripos-plankton*, prevalent during the past summer, autumn, and winter above the 100 metre plateau, occurred in March 1898 chiefly in the eastern part of the North Sea and west of the Danish Peninsula, and there more or less intermingled with chæto and northern neritic plankton: the last-named was present during the winter in the Skagerak.

Origin of the chæto-plankton. I propose in another paper to treat of the origin of the chæto-plankton, and it will there be shown that the diatom, *Chætoceros decipiens*, which constitutes the principal mass of the chæto-plankton, belongs to the west Atlantic area, or to the cold southwards current along the American coast, and that it is thence conveyed by under-currents across the Atlantic towards the Azores and the European coast. In the month of November, when the superficial strata of the Atlantic are driven away — or rather become mixed with those beneath — the species above-mentioned appears at many points between the Newfoundland Banks, the Azores and the mouth of the English Channel. It multiplies during the winter and is conveyed in the spring towards Iceland, the Färöe Channel and into the North Sea, whence it spreads towards Spitzbergen. Other species of the west Atlantic area, which accompany *Chætoceros decipiens* across the Atlantic, such as *Calanus finmarchicus*, *Thalassiothrix longissima* and *Ceratium arcticum*, die sooner or later in water of so high a salinity as 35 p. m.

Some species of the temperate Atlantic, such as *Oncæa minuta*, *O. conifera*, *Oithona plumifera*, *O. similis*, *Collozoum inerme*, frequently follow the chæto-plankton on its way towards the north.

Species which accompany the Chætoceros decipiens into the North Sea. The following species occurred in the North Sea over the whole chæto area or at least in its western parts. Some of them are of southern origin, or belong essentially to the *styli* and *desmo types*, others come from northern regions and from Scotland.

Species of southern origin	Species of northern origin
Acartia Clausii,	*Calanus finmarchicus*,
Microsetella atlantica,	*Metridia hibernica*,
Oithona similis,	*Pseudocalanus elongatus*,
Sagitta bipunctata,	*Temora longicornis*,
Globigerina bulloides,	*Cyttarocylis denticulata*,
Acanthometron quadrifolium,	*Gonyaulax spinifera*,
Halosphæra viridis.	*Chætoceros borealis var. Brightwellii*,
	Coscinodiscus oculus iridis,
	C. polychordus,
	Rhizosolenia semispina.

Biddulphia mobilensis and *Streptotheca Thamesis* come in all probability from the coasts of Scotland.

Among the species mentioned above, *Halosphæra* is not equally distributed over the whole chæto area. It could be traced from the south west of Norway to Newcastle and as far to the north as beyond the 63rd degree of latitude and 0° long.; also from the south of Norway to Skagen and into Skagerak.

2. The North Sea in June 1898.

The chæto-plankton of the spring has almost completely disappeared, some few remnants lingering west of the Danish Peninsula (at 56° N.) and west of Norway (61° N. 2° 30′ E.). Its place is now occupied by *tripos-plankton*, which is the ruling type at this time of the year. It is more richly represented in the eastern than in the western parts of the area.

To the east of the British coast the tripos-plankton is mixed with northern neritic forms, such as *Ceratium tripos v. longipes*, and at the west of the Danish Peninsula and north of the German coast with *Peridinium depressum*.

The southern part of the North Sea contains, north of the continental coast, southern neritic plankton, mixed with styli-plankton.

The hydrographical map for June 1898 by EKMAN and PETTERSSON shows in the north between Norway and Scotland a tongue of 35 p. m. water, temp. 9° to 10°. No samples of plankton from this area have been examined by me. One sample from 61° 50′ N. 2° 30′ E., which may be assumed to be from that kind of water, contained tripos-plankton, but not abundantly.

The bulk of tripos-plankton in my samples had come from the northern or eastern part of the region coloured as containing 34 p. m. water.

The hydrographical map in its south western corner shows an area of 35 p. m. water, indicating that a flow of Atlantic water enters into the North Sea from the south. This fact accounts for the considerable development of the southern neritic plankton above the 50 metre plateau.

Species which seem to come into the North Sea round the north of Scotland. As stated above there are among the plankton, some northern species east of the Scotch coast to Newcastle, such as *Ceratium longipes*. But, on the other hand, there are also in the western region of the North Sea some southern species. I name the following:

Northern forms	Southern forms
Calanus finmarchicus,	*Acartia Clausii*,
Evadne Nordmannii,	*Labidocera Wollastonii*,
Cyttarocylis gigantea.	*Evadne spinifera*,
	Ceratium macroceros,
	Lauderia annulata,
	Peridinium divergens.

In fact the tripos-plankton seems among the prevailing mass of southern origin to contain a certain amount of northern species.

Two remarkable species, *Halosphæra* and *Microsetella*, have disappeared from the North Sea since the spring.

Species in the southern neritic plankton. The flow of Atlantic water through the English Channel into the North Sea had already taken place before the month of June. This becomes apparent if we consider the plankton collected at Helder. *Phæocystis Pouchetii* was very abundant there in April and the beginning of May. It was seen in the beginning of April at Plymouth. When that species disappeared from Helder (before the 12th of May) a number of southern forms, such as *Noctiluca*, *Ceratulina Bergonii*, *Eucampia zodiacus*, *Guinardia flaccida* and *Rhizosolenia Stolterfothii* began to develop.

In June we find that the typical Atlantic species *Rhizosolenia styliformis* had spread over the whole area from Holland to Skagen, thus indicating that Atlantic water had arrived from the E. Channel before June and that its plankton had been dispersed through the water with low salinity off the continental coast. The following species of the southern neritic plankton occur normally in the open Atlantic:

Acurtia Clausii,
Paracalanus parvus,
Diplopsalis lenticula,
Rhizosolenia styliformis.

The following species live, as a rule, above the coast banks, or only occur exceptionally in the ocean:

Animals.	Plants.
Acartia longiremis,	*Chætoceros densus*,
Centropages hamatus,	*C. didymus*,
Temora longicornis,	*C. Villei*,
Podon Leuckartii,	*Eucampia zodiacus*,
Noctiluca miliaris.	*Guinardia flaccida*,
	Lauderia annulata,
	Rhizosolenia Shrubsolei,
	Rh. Stolterfothii,
	Stephanopyxis turgida.

Of these species the *Noctiluca* is the most important. It seems to be confined to the English Channel and the continental coasts of the North Sea. I have not seen a single specimen in any of the thousand plankton-samples from the Atlantic, which I have examined.

3. The North Sea in July—August 1898.

But few plankton-samples were collected at this period and those only from the eastern and southern parts of the North Sea, so that they cannot afford us a complete insight into the state of the North Sea.

The plankton-type which prevails in the east, i. e. from Skagen to 4° E. and 55° N., is the *tripos-plankton.* From the 55th degree to the English Channel southern neritic plankton is the ruling kind. The areas of the water with 33 to 34 p. m. salinity on the hydrographical map by PETTERSSON and EKMAN contain chiefly tripos-plankton, as far at least as the 55th degree of latitude, but south of it there is *southern neritic plankton*, which is also the case with the area with 34 to 35 p. m. salinity, north of the coast of Belgium.

Some species from the preceding period, such as *Oithona similis, Paracalanus parvus, Pseudocalanus elongatus, Ceratium macroceros* and *Guinardia flaccida* have evidently increased in abundancy, others, such as *Evadne Nordmannii, E. spinifera* and especially *Rhizosolenia styliformis* have decreased. *Podon intermedius* and *Oikopleura dioica* begin to develop.

4. The North Sea, November—December 1898.

The prevailing plankton type is the *tripos-plankton,* which extends from the north-east of Scotland to the south west of Norway and to Newcastle. From there the limit can be traced to 53° N. 4° E. and from this point to Skagen. The tripos area corresponds thus on the whole with the area of 35 p. m. water on the hydrographical map by EKMAN and PETTERSSON. As the salinity of the tripos region is higher now than it was in July—August, it is evident that a considerable amount of Atlantic water has entered the North Sea, which also becomes apparent when the composition of the plankton is considered in details.

We note first that the Atlantic organism *Halosphæra,* not seen since the spring, occurs now round Scotland, across the North Sea to Norway and Skagen, i. e. above the 100 metre plateau. The purely Atlantic species *Rhizosolenia styliformis* has about the same distribution. Another remarkable feature in the plankton is the abundance of *Coscinodiscus concinnus* and *Biddulphia mobilensis,* which occur in the E. Channel and spread thence to Skagen, i. e. above the 50 metre plateau.

Species of the tripos region in November. The tripos plankton contains the usual forms, such as *Ceratium tripos, C. macroceros* (which has considerably increased in frequency), *C. furca* and *C. fusus;* but there are besides a number of other forms, partly from the southern and partly from the northern Atlantic, as follows:

Southern species.

Centropages typicus c,
Microsetella atlantica,
Oithona plumifera rr,
Paracalanus parvus cc,
Acanthochiasma fusiforme,
Acanthometron quadrifolium,
Gazelletta hexanema (*r* south of the Orkneys),
Pyrophacus horologium.

Northern species.

Parathemisto oblivia,
Calanus finmarchicus,
Metridia hibernica r,
Pseudocalanus elongatus,
Limacina balea,
Plectophora arachnoides.

The *Evadne Nordmannii*, *E. spinifera*, *Podon intermedius* and *P. Leuckarti* abundant in the preceding periods, have now disappeared.

The southern neritic plankton. As characterizing the plankton above the 50 metre plateau we note now *Coscinodiscus concinnus* and *Biddulphia mobilensis*, but also a considerable number of other species, most of which have been found from the English Channel to Skagen. Among these species we note the following:

Animals.

Proto pedata, in the E. Channel in August, at Skagen in November.
Acartia bifilosa.
Corycæus anglicus.
Euterpe acutifrons, at Plymouth and Helder in September, from the E. Channel to Skagen in November.
Temora longicornis.
Sagitta bipunctata, very common above the whole 50 metre plateau.
Tintinnopsis campanula, from the English Channel to Skagen.

Plants.

Bellerochea malleus.
Chætoceros anastomosans.
Ditylum Brightwellii, abundant from the E. Channel to Skagen.
Guinardia flaccida.
Lithodesmium undulatum, observed from the end of September onwards.
Rhizosolenia robusta, from the English Channel to the mouth of the Schelde.
R. Stolterfothii, from the E. Channel to Skagen, where it appeared in the first few days of October.
Streptotheca Thamesis, from the E. Channel to 55° N. 5° 30′ E.

The Skagerak in 1898.

The seasonal changes in the plankton will be examined for certain periods with reference to the prevailing plankton-types.

Period I. January—February.

The prevailing plankton is tripos-plankton, but is partly mixed with remnants of southern neritic plankton, which disappear, and more or less rarely so with forms which belong to the northern neritic plankton and increase in frequency in the next period.

Besides the most common dinoflagellates of the tripos type, we note some more remarkable species such as *Halosphæra*, which was more or less common in the whole of the Skagerak, and *Arachnactis albida*, not formerly found in the Skagerak. The last-named species was seen during the last few days of January and the first few days of February both in the open Skagerak and along the coast from Vinga to Måseskär. This pelagic actinia is known from

Florö in Norway (winter-time), from 56° 35′ N. 20° 19′ W. (25th of September, C. VOGT), and from 60° N. 7° W. (the 29th of March 1893, VANHÖFFEN). In the year 1898 it was found by OSTENFELD in a sample from 60° 12′ N. 3° 53′ W. (21th of August) and from 59° 59′ N 5° 56′ W. (14th of September). I found it in a collection from 60° 10′ N. 3° 12′ W. (the 6th of September 1898) and from 62° 12′ N. 0° 37′ E. (the 8th of September 1899). The abundancy and sudden appearance of this species over a wide area of the Skagerak in 1898 proves better than anything else that the plankton of the Skagerak is of foreign origin. It is worthy of note that another species, not formerly observed in the Skagerak, was found at the same time viz. *Dictyocysta elegans*, a species that is not rare in the temperate Atlantic nor in the Färöe Channel.

Period II. February—March and April.

This period is characterized by the abundance of arctic and northern species (*Si*, *T*, *Ns*). They had already appeared in the previous period, but did not reach such a considerable development as now. In connection with these northern forms *Chætoceros decipiens* also appears, a species which, as stated above, was the dominant one in the North Sea in March.

The organisms which characterize this period are principally *diatoms*, animals and dinoflagellates being as a rule rare. The diatoms belong to the boreal and arctic regions of the Atlantic. Most of the southern species, which were abundant in the autumn, have disappeared or are scarce, among them *Halosphæra*.

The most decided arctic species, such as *Thalassiosira Nordenskiöldii*, *Chætoceros socialis*, continue during February only and have already disappeared by the middle of March. Others, such as *Chætoceros debilis*, *C. diadema*, *Nitzschia seriata*, continue during April. The most long-lived ones, such as *Thalassiothrix Frauenfeldii*, *Leptocylindrus danicus*, *Rhizosolenia semispina*, *Chætoceros constrictus*, *C. contortus*, *C. hiemalis* do not disappear before the end of May or in June, by which time a number of southern species have become frequent.

The most common diatoms during this period are the following:

Chætoceros constrictus,
C. contortus,
C. debilis,
C. decipiens,
C. diadema,
Chætoceros socialis,
Coscinodiscus oculus iridis,
Thalassiosira gravida,
T. Nordenskiöldii,
T. Frauenfeldii.

Period III. May and June.

This period is remarkable for the abundance of euryhaline species, such as the following:

Animals.	Plants.
* *Acartia longiremis*,	*Cerataulina Bergonii*,
* *Centropages hamatus*,	* *Chætoceros danicus*,

* *Temora longicornis,*
* *Evadne Nordmannii,*
* *Podon Leuckartii.*
Rhizosolenia delicatula,
R. gracillima.

The sign * denotes that species marked thus occur as far into the Baltic as at least to Åland.

Whether these forms are indigenous in the Baltic or enter there from the Cattegatt by means of undercurrents, cannot as yet be decided, as they usually appear simultaneously in the Baltic and along the west coast of Sweden. *Cerataulina Bergonii* comes no doubt through the E. Channel, but *Rhizosolenia gracillima*, although common in the styli-plankton of the Atlantic, does not occur to any extent in the North Sea. The new species *Rh. delicatula* occurs in the southern part of the North Sea.

In the Skagerak, at some distance from the coast, *tripos-plankton* occurs from the middle of May onwards, associated with some more saline or Atlantic species such as *Acartia Clausii, Calanus finmarchicus* and *Oithona similis* or euryhaline ones such as *Pseudocalanus elongatus* and *Evadne spinifera;* these become abundant along the coast during the next period.

Period IV. July to the end of August.

The prevailing plankton type is now *tripos-plankton*, but with an admixture of species remaining from the last period, and of *southern neritic plankton.*

Among the organisms we note the following:

Animals.
Oikopleura dioica,
Acartia Clausii,
Calanus finmarchicus,
Oithona similis.
Paracalanus parvus,
Evadne spinifera,
Sagitta bipunctata.

Plants.
Ceratium tripos,
C. macroceros,
Rhizosolenia gracillima.

Period V. From the end of August to the end of October.

The *tripos-plankton* continues as before, but now the *didymus-plankton* appears with the three species *Chætoceros curvisetus, C. didymus* and *C. Schüttii*, all at the same time and abundantly. From the beginning of September *Centropages typicus* was common and together with this copepod appeared also *Anomalocera Patersonii, Labidocera Wollastonii, Acanthometron quadrifolium* and *Limacina balea*, all probably, with the exception perhaps of Labidocera, from the North of Scotland.

Period VI. From the end of October to the end of December.

The *tripos-plankton* remains throughout, but in this period *Halosphæra* appears. A number of *northern forms* begin to develöp, and the southern species, formerly so abundant, decrease in frequency and die sooner or later. The currents from the south still continue

to convey into the Skagerak such forms as *Chætoceros danicus, Ditylum Brightwellii, Guinardia flaccida* and *Proto pedata,* which latter is not rare in December.

The northern forms are principally diatoms, such as:

Chætoceros borealis,	*Chætoceros similis,*
C. constrictus,	*C. teres,*
C. contortus,	*Coscinodiscus polychordus,*
C. debilis,	*Rhizosolenia setigera,*
C. diadema,	*Skeletonema costatum,*
C. laciniosus,	*Thalassiosira gelatinosa,*
C. scolopendra,	*Thalassiothrix Frauenfeldii.*

The seasonal changes in the plankton of the Skagerak were in 1898 *on the whole* similar to those in 1895, 1896 and 1897.

January	*Tp, Ns, Nh,*
February—April	*Si, Ns, (T), C,*
May, June	*Nm α,*[1]
July, August	*Tp, Nm α,*
September, October . . .	*Tp, Nm,*
November, December . .	*Tp, Ns, Nm.*

Seasonal distribution of the plankton-organisms in the North Sea and the Skagerak.

Ascidiacea.

Fritillaria borealis LOHM. — *January:* rare in the Skagerak. *March:* rare at Måseskär.

Oikopleura dioica FOL. — *January:* rare in the Skagerak and at Måseskär. *March:* in the North Sea at 57° 18′ N. 8° 27′ E. and 55° 43′ N. 7° 29′ E. *June:* sparingly in the Skagerak. *July, August:* from the E. Channel to west of Skagen, common in the Skagerak and along the coast, remains more or less abundant to *November.*

Amphipoda.

Parathemisto oblivia KRÖYER. — *September:* rare in the Skagerak. *November:* rare SW. of Norway (58° 12′ N. 5° 30′ E.).

[1] I propose to designate as *Nm α* the plankton in which *Rhizosolenia gracillima* occurs abundantly.

Proto pedata LEACH. — *January* and *February* (31. I and 1. II): rare in the Skagerak. *August:* from the E. Channel to Helder. *November:* north of Holland and west of the Danish Peninsula, west coast of Sweden, where it was abundant in *December*.

Cladocera.

Evadne Nordmannii LOVÉN. — *May:* at Måseskär. *June:* common in the North Sea, between 56° and 58° N., from W. Norway to 0° 38′ E. and to Skagen, common in the Skagerak, where it remains until *August*. Along the coast it remains in *October*. Rare at Plymouth from July to September.

E. spinifera P. E. MÜLLER. — Appears in *June* abundantly in the region between Firth of Tay and W. Norway (Stadt) and Skagen, in the Skagerack and along the coast. In *July*, *August* it was found from Skagen to the west of the Danish peninsula. In the Skagerak it remains until *October* and along the coast until the middle of *November*. At Plymouth rare in August.

Podon Leuckarti G. O. SARS. — *June:* rare west of the Danish Peninsula and in the Skagerak. *July:* rare at the entrance to the Skagerak.

P. intermedius LILLJEB. — *July*, *August:* more or less abundant west of the Danish Peninsula, from the mouth of Elbe to Skagen, rare at Plymouth, more or less rare in the Skagerak, where it remains until *October*, or along the coast to the end of that month.

P. polyphemoides LEACH. — Rare in August and September at Helder.

Copepoda.

Acartia bifilosa GIESBR. — *November:* from the E. Channel to Holland and the west of Skagen.

A. Clausii GIESBR. — The whole year in the North Sea, in the Skagerak and at Plymouth. *January to April or May:* rare at Plymouth and in the Skagerak. *March:* in the North Sea, together with *Halosphæra*, common between the Shetlands and Norway. West and south of Norway. South of the Dogger bank. East of Newcastle. *June:* British east coast from Firth of Tay to Newcastle, common. From Holland to Heligoland. Plymouth (maximum from the middle of May to the beginning of September). St. Vaast la Hogue not rare. In the Skagerak not rare from the end of May or beginning of June to October, November (maximum from the middle of August to the end of that month). *July*, *August:* from the Channel to Skagen and above the Fisher Bank. *November:* the E. Channel, Helder, Skagen to the south of Norway. South of the Orkneys.

A. longiremis LILLJEB. — In the North Sea in *March* SW. of Norway and E. of Newcastle, in *June* abundantly in the middle of the North Sea, 57° N. 3° E. and at

54° N. 5° E. *July:* Dutch coast and along the Danish coast to Skagen, not common. *November:* not seen. In Skagerak common in the beginning of June, more or less common in July, along the coast the whole year (maximum June, July).

Anomalocera Patersonii TEMPL. — *March:* Sparingly west of the Clyde. — Skagerak: more or less rare in *July* and in the beginning of *October*. Along the coast: rare the 30. I at Måseskär; from *July* to the beginning of *November*, rare to common.

Calanus finmarchicus GUNN. — A. North Sea: *March* scattered on the space between Stavanger and the Fisher Bank, Firth of Tay and Newcastle, also above the depression S. of the Dogger Bank. *June:* sparingly between Norway and the Shetlands, W. of Firth of Tay and Newcastle, N. of the Dutch coast, S. of Norway. *July, August:* sparingly N. of Holland and at Skagen. *November:* more or less abundant from the Hebrides and the Orkneys to the south of Norway, in the company of *Halosphæra*. Very rare off the continental coast.

B. Plymouth: rare from the end of *May* to the middle of *July* and from the end of *September* to the middle of *November*.

C. Skagerak: common in the middle of *June*, more or less rare until the middle of *November*. Along the coast: rare in *January* and *February*, more or less common from *August* to *December*.

Candace pectinata BRADY. — North Sea: rare in *March* east of Firth of Tay; very rare at Skagen in *November*.

Centropages hamatus LILLJEB. — North Sea: *March* sparingly SW. of Norway and W. of Hanstholm. *June:* not rare on the Dutch coast, together with *Noctiluca*, not rare on the north of the Dogger and Fisher Banks. *July:* not rare N. of the Dutch coast and above the Fisher Bank. *November:* the Channel. — Helder: rare in April and from *August* to *October*. — St. Vaast la Hogue: rare in June. — Skagerak: from *March* to *November;* along the coast from *March* to *November, December*, maximum in June and November.

C. typicus KRÖYER. — A. North Sea: *March:* rare at 57° 21′ N. 2° 27′ E. *June:* rare at 61° 50′ N. 2° 30′ E. *July:* rare at 57° 21′ N. 4° 9′ E. and 57° 40′ N. 10° E. *November:* abundant from the NE. end of Scotland to southern Norway, following *Calanus finmarchicus*, very rare in the E. Channel, rare at Helder in December.

B. Plymouth: the whole year, maximum from May to November.

C. Skagerak: rare in *January* (30. I), more or less abundant from *October* to the middle of *November*. Along the coast: rare in *January* and *June*, more or less abundant from the middle of *July* to *December*, maximum in September and October.

Corycæus anglicus LUBBOCK. — A. North Sea: *March:* rare in the E. Channel and at Hanstholm. *June:* not seen. *July:* very rare W. of the Danish Peninsula. *November:* from the E. Channel along the south coast of the North Sea to Skagen.

B. Plymouth: almost the whole year, maximum from the end of September to the middle of December.

C. Skagerak: rare in January, February, from June to December.

Euterpe acutifrons GIESBR. — The E. Channel: rare at Plymouth in January to March; common in September—December at Plymouth, St Vaast and Helder.

Labidocera Wollastonii LUBB. — Rare in the North Sea, *June*, at 56° N. 2° E. Skagerak: rare in *June;* along the coast not rare in *September*, *October*.

Metridia hibernica BRADY & ROBTS. — North Sea: *March:* rare from Firth of Tay to 57° 21′ N. 2° 27′ E. *June:* rare at 56° 26′ N. 4° 13′ E. *November:* not rare SW. of Hanstholm. Skagerak: rare in January and in July. Along the coast rare in January, June, not rare in *November*, *December*.

Microsetella atlantica BRADY & ROBTS. — North Sea: *March:* abundant east of Firth of Tay, more or less sparingly scattered through the chæto-region to Skagen. Also above the depression S. of the Dogger Bank. *August:* rare SW. of Norway and W. of Jutland. *November:* rare W. of the Danish Peninsula to Skagen. E. of Newcastle. — Plymouth rare in February. Skagerak: rare in July and in October.

Oithona plumifera BAIRD. — *March:* rare N. of the Shetlands. At 61° 32′ N. 2° 31′ E. *November:* at 56° 11′ N. 2° 31′ E. Skagerak: very rare in January.

O. similis CLAUS. — A. North Sea: *March:* abundant between the Shetlands and Norway, E. of Firth of Tay, more or less sparingly scattered in the whole chæto-region. Not rare W. of Denmark at 55° N. *June:* common between the Shetlands and Norway, more or less common from the Firth of Tay to Skagen. Common at 54° 25′ N. 5° 37′ E. *July*, *August:* more or less abundant above the Fisher Bank and from the E. Channel to Skagen. *November:* the same distribution, but rarer. — B. The E. Channel: Plymouth the whole year. St Vaast in November. — Helder from August to November. — C. Skagerak: the whole year, rare June, very common from July to December.

Paracalanus parvus CLAUS. — A. North Sea: *March:* not seen. *June:* rare from the E. Channel to the north of Holland. *July*, *August:* abundant from the E. Channel along the south coast to the Fisher Bank and Skagen. *November:* as before, but also from the north of Scotland to the south of Norway. — B. Plymouth: the whole year, maximum from August to December. C. Skagerak: very rare in January, February, abundant from July to October, November.

Pseudocalanus elongatus BOECK. — A. North Sea: *March:* more or less abundant through the *chæto-region*, from Firth of Tay and Newcastle to Skagen, also above the depression S. of the Dogger Bank. *June:* decidedly rarer, chiefly on the 50 metre plateau, common near the E. Channel. *July*, *August:* above the Fisher Bank, common above the depression S. of the Dogger Bank. *November:* continues above the 50 metre plateau. From

Scotland to the south of Norway and Skagen, in the company of *Halosphæra*. — B. The E. Channel: at Plymouth from January to August, as a rule rare, at St Vaast in June. — C. Skagerak: the whole year, maximum from June to October.

Temora longicornis O. F. Müll. — A. North Sea. *March:* more or less abundant through the *chæto-region*, from Scotland to the Skagerak, above the Fisher Bank and the depression S. of the Dogger Bank. *June, July, August:* from 0° 38′ E. along 56°—57° to Skagerak. South part of the North Sea to the E. Channel. *November:* abundant from the S. of Norway to the Fisher Bank. Southern North Sea. — B. The E. Channel: at Plymouth from February to November, maximum from April to the middle of May. St. Vaast in June and rare in November, December. — C. Skagerak: the whole year, maximum from June to October.

Temorella affinis Poppe. — At Måseskär rare at the end of May, common in November.

Chætognata.

Sagitta bipunctata Quoi & Gaim. — A. North Sea. *March:* through the *chæto-region*, between Firth of Tay, Newcastle and the Fisher Bank. *June:* rare above the Fisher Bank. *July:* rare above the Fisher Bank and in the E. Channel. *November:* very abundant above the Fisher Bank, on the edge of which it seems to have its optimum; thence to the south of Norway. Above the whole 50 metre plateau. B. The E. Channel: more or less common at Plymouth from September to November. — C. The Skagerak: the whole year, abundant from June to November, or, along the coast, to the end of the year.

Pteropoda.

Limacina balea Möller. — A. North Sea: *November:* W. of Hanstholm to 57° N. 3° E. — B. The Skagerak: very common in September, rare in October, common in November (30. XI.).

Zoantharia.

Arachnachtis albida M. Sars. — See page 8.

Ciliata.

Cyttarocylis denticulata Ehb. *s. l.* — The difficulty of distinguishing between the new, nearly related, species of Brandt and Ostenfeld has induced me to retain the old name. All the new species are nearly connected and have the same distribution, or belong exclusively to the western and northern Atlantic and to the Arctic Sea.

North Sea: *March:* rare on some spots in the chæto-region. *June:* common between the Shetlands and Norway. — The Skagerak: rare from January to May; rare in December.

Cyttarocylis Claparedii v. DADAY. — As constituting this species I consider the form given in fig. 1. — Rare in September at Plymouth and Helder.

Dictyocysta elegans EHB. — Rare in *March* at 61° 32′ N. 2° 13′ E. and the 31. 1. in the Skagerak.

Ptychocylis acuta BRANDT (or *Tintinnus urnula* AUCT.). — North Sea: *March:* between the south of Norway and Skagen, rare. *November:* rare E. of Newcastle. — Skagerak: rare from January to March, not rare in *November* and *December*.

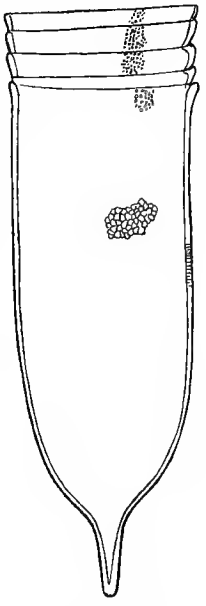

Fig. 1. *Cyttarocylis Claparèdii* v. DAD. 225 t. m.

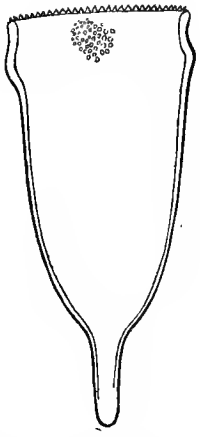

Fig. 2. *Ptychocylis Ehrenbergii* CLAP. & LACHM. 225 t. m.

P. Ehrenbergii CL. & LACHM.? — I am unable to decide what form is represented by the published figures. I believe the annexed fig. 2 represents what is understood as *Tintinnus Ehrenbergii*, but it may perhaps also represent what some authors name *Tint. serratus*. In all cases what I here name P. Ehrenbergii is an easily recognized neritic species. It occurs abundantly in August and September at Plymouth, and from September to December sparingly at Helder.

T. beroidea var. acuminata v. DADAY. — North Sea: rare in March at 55° N. 6° W. Helder: rare in June, more or less scarce from September to December. The E. Channel: Plymouth: rare in February to April, less rare in November, December. S:t Vaast: not rare in August, rare in December. The Skagerak: rare in January, April and May, November and December.

Tintinnopsis campanula EHB., in which species I include *T. campanella* v. DADAY and *T. cinctus* CL. & LACHM., which seem to me to be the young states only. *T. campanella* HKL. is perhaps another species.

North Sea. *July:* rare west of the Danish Peninsula. *November:* not rare on the coast, north of Holland and Germany. — The E. Channel. Plymouth: more or less scarce in August and September. S:t Vaast: rare in August, common in September, rare in November. — Helder: rare in July, not rare in September, rare in October and November. — The Skagerak: from July increasing in abundancy until November.

T. fistularis Moebius (= *T. Helix* Clap. & Lachm.?), — As representing this species I consider the annexed (fig. 3). The membrane is finely and irregularly punctate and the rings variable in height and number. It occurs at the end of October in the Skagerak and at Måseskär.

T. ventricosa Clap. & Lachm. — The E. Channel in November. Plymouth: rare in January and March. S:t Vaast la Hogue from August to December, maximum in September. — Helder: August to November, maximum in September. — The Skagerak: rare in January and in March, maximum in October, November.

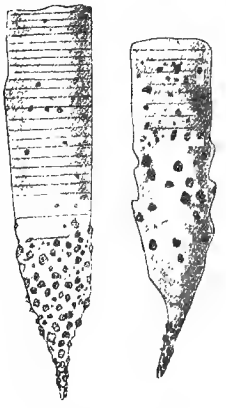

Fig. 3. *Tintinnopsis fistularis* Moeb. 225 t. m.

Fig. 4. *Tintinnopsis Lobiancoi* v. Dad. 225 t. m.

T. Lobiancoi v. Dad. — I suppose the annexed fig. (4) may represent this species, but have some doubts whether it may not be *T. Karajacensis* Brandt. It was found rarely at Helder in August and September, both in 1897 and 1898.

Tintinnus minutus Brandt. — This arctic form was seen sparingly in June, east of Stadt in Norway.

T. secatus Brandt. — The Skagerak: very rare in January and in November, December.

T. Steenstrupii Cl. & Lachm. — The Skagerak from October to December.

T. subulatus Ehrb. — The Skagerak from August to November.

Radiolaria.

Acanthochiasma fusiforme Hkl. — Rare in *November:* NE. of Scotland and E. of Newcastle. In the SW. of Norway. — Plymouth: rare in January, common in August, rare in October. — The Skagerak: very rare in December.

Acanthonia Mülleri Hkl. — North Sea very rare in November between Scotland and the Orkneys.

Acanthometron fuscum Müll. — Very rare in the Skagerak, January (31st) and February (1st).

A. elasticum Hkl. — Very rare in June W. of Stadt in Norway.

A. quadrifolium Hkl. (incl. *A. catervatum* and *Acanthostauros pallidus*). — North Sea: *March:* in the company of *Halosphæra* not rare in several spots from the N. and E. of Scotland to the W. of Norway (63° 1′ N. 1° 36′ E.) and in the chæto region to the Skagerak. Also above the depression south of Dogger bank. November: rare, together with Halosphæra, from the N. of Scotland to the S. of Norway and the Skagerak. — The Skagerak: rare in September, October.

Dictyocha fibula Ehb. — Plymouth: rare in August. In November rare W. of Jutland. The Skagerak: rare in January and in November, December.

Gazelletta hexanema Hkl. — In November very rare S. of the Orkneys.

Litholophus ligurinus Hkl. — Very rare W. of Stadt (Norway) in June.

Plectophora arachnoides (Clap & Lachm.). — *March:* rare at Skagen. *November:* rare N. of Scotland and above the Fisher Bank. — The Skagerak, very rare in January, February.

Rhizopoda.

Globigerina bulloides d'Orb. — Rare in March at 58° 21′ N. 1° 40′ E. and at 58° 40′ N. 4° 18′ E.

Cystoflagellata.

Noctiluca miliaris Surir. — The E. Channel: at Plymouth common from the end of June to the end of July, rare in September, common from October to December. Southern North Sea: abundant in *June* from the E. Channel to the NW. of Heligoland. *July* to *September:* common from the E. Channel to the coast of Holland, rare from September to November. The Skagerak, rare in December.

Silicoflagellata.

Distephanus speculum (EHB). — Rare in *March* at the Fisher Bank, in *August* at Plymouth and in *November* in the E. Channel, at Helder and west of the Danish Peninsula. Rare in the Skagerak in *October* and *November*.

Chlorophyllaceæ.

Halosphæra viridis SCHMITZ. — A. The North Sea: abundant in *March* from 63° N. 1° 30′ E. to Stavanger, sparingly from Stavanger to Skagen and to Newcastle. *November:* at the Hebrides. Between the N. of Scotland, Newcastle and Skagen. — B. The E. Channel: rare in August and September at Plymouth. — C. The Skagerak: in *January, February* and *November, December*.

Dinoflagellatæ.

Ceratium furca DUJ. — North Sea: follows as a rule C. tripos, but rarer. The Skagerak: common in *January*, more or less rare the whole year.

C. fusus DUJ. — North Sea: follows C. tripos but rarer. The Skagerak: the whole year, seems to be more abundant from August to the end of the year. — Plymouth: the whole year, maximum in *April*.

C. lineatum EHB. The Skagerak: rare almost the whole year, maximum probably from *August* to *November*.

C. macroceros EHB. — A. The North Sea. *March:* more or less rare in the chæto region from Scotland to Norway and Skagen. *June:* common W. of Skagen to half way between Skagen and Newcastle. Not rare E. of Firth of Tay. *July, August:* very common W. of Skagen and the Danish Peninsula. *November:* very rare W. of Scotland, common from the S. of the Orkneys towards Newcastle and to 53° N. 4′ E., thence to Skagen and S. Norway. — B. The Skagerak: more or less rare until July, later common until the end of the year.

C. tripos NITZSCH. — A. The North Sea. *March:* common in the eastern part, SW. of Norway, W. of Skagen and the Danish Peninsula towards 55° N. Common also at 53° 26′ N. 3° 57′ E. *June:* from Skagen to 1° E., between 56° 30′ and 57° 30′ N. *July, August:* from Skagen to 57° N. 4° E. and to 55° 30′ N. 7° 30′ E. (no observations from the western North Sea). *November:* the whole North Sea from Scotland to Norway, Skagen and to 53° N. 4° E. — B. The E. Channel: the whole year at Plymouth, maximum from *July* to *December*. — C. The Skagerak: common in *January*, then rare to *June*, common from *July* to the end of the year.

C. tripos var. longipes BAIL. — A. The North Sea. *March:* more or less scattered over the *chæto region*, from Scotland to Norway, Skagen and the W. of the Danish Peninsula. *June:* abundant W. of the Hebrides, E. of Firth of Tay (56° 30′ N. 0° 38′ E.) and at 55° 25′ N. 0° 8′ E., less abundant W. of Skagen and above the Fisher Bank. *July, August:* sparingly W. of the Danish Peninsula (observations incomplete). *November:* almost absent from the North Sea, but common at Helder in November and December. — B. In the E. Channel: at Plymouth rare in March, April, not rare in June, July and in December. — C. In the Skagerak: as a rule rare from January to June and from September to the end of the year.

C. tripos v. bucephala CL. A. In the North Sea: rare in *March* on some spots (at 57° N. 6° E., 56° N. 1° E. and 55° N. 1° E.), not seen in June and August. In *November* not rare, sometimes common, round Scotland and between Scotland, Norway and Skagen, rare at 53° N. 4° E. and 55° N. 5° 30′ E. — In the Skagerak rare in January and from *August* to *December*.

C. platycorne v. DADAY (= *C. trip. v. aurita* CL.). — Very rare in November at Plymouth (drifted from the region of the Azores).

Dinophysis acuta EHRB. — In the North Sea as a rule rare, in *March* and *June* at some spots in the eastern region, in *November* at several points between Newcastle and Skagen. In the Skagerak rare from January to March, in June and July and from October to the end of the year.

Diplopsalis lenticula BERGH. — In *June* rare N. of Holland, in November E. of Scotland. At Plymouth rare from January to August. In the Skagerak rare in July and in October.

Gonyaulax spinifera CLAP. & LACHM. — Rare in March in the North Sea (at 56° N. 0° and 55° N. 1° W.). In the Skagerak common in January, not rare in November, December.

Peridinium depressum BAIL. — A. In the North Sea more or less rare in *June* in the eastern part, common NW. of Heligoland and W. of Skagen. In *July, August*, more or less common N. of Holland and on the Fisher Bank. In *November* more or less rare at several points between the N. of Scotland, S. Norway and Skagen. In the Skagerak more or less rare from January to June, less rare in October, December.

P. divergens EHB. — In the North Sea as a rule rare among the tripos-plankton. In the Skagerak rare in January, less rare from July to October.

P. Michaëlis EHB. — Rare in April at Plymouth, in June W. of Schleswig, in October at Måseskär.

P. oblongum AURIV. (= *P. diverg. v. obl.* AUR. and *P. div. v. oceanica* VANH. OSTENF.). Rare in June in the E. Channel at S:t Vaast, in July at Helder, in the Skagerak and at Måseskär.

P. ovatum POUCHET. — Rare in January off the Swedish west coast, in June W. of Cape Stadt and in the E. Channel, in July in the Skagerak, in August at Plymouth, September to November at Helder.

Pyrophacus horologium STEIN. — In *March* at 53° N. 4° E., in *April* very rare at Plymouth, in *June* NW. of Hanstholm, in *November* S. of the Orkneys, ENE. of Newcastle (55° 35′ N. 0° 34′ E.) and at 56° N. 9° E.

Pyrophacus horologium belongs to the tropical Atlantic (also the Indian Ocean) or to the desmo- and styli-plankton, where it has considerably greater size than in the North Sea, when among the tripos-plankton.

Flagellatæ.

Phæocystis Pouchetii LAGERH. — At Helder very abundant in April and May, rare in June, common in August and not rare in October. — At S:t Vaast la Hogue common in June, also in December. — At Plymouth common from the beginning of April to the beginning of June, rare in September.

Cystæ.

Xanthidium Hystrix CL. — Rare in the Skagerak in March, October and November.

By the above name I denote an organism, which belongs to the tripos-plankton and seems to be nearly akin to *X. brachiolatum* MOEBIUS, from which it differs by longer, usually not divided, spines. Probably a stage in the development of some dinoflagellate.

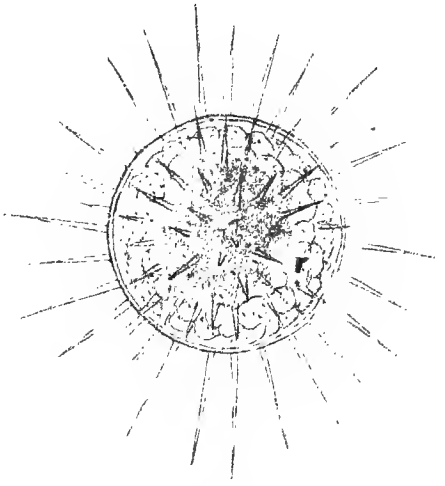

Fig. 5. *Xanthidium hystrix* CL. 500 t m.

X. multispinosum MOEBIUS. — In April at Måseskär, in June at Plymouth, in July at Måseskär, September, October in the Skagerak, always rare.

Hexasterias problematica Cl. — By this name I denote provisionally a unicellular alga, which I have found in several collections. It is a flat disc, diameter 0,04 mm., with six, at the ends truncate and denticulate empty processes, twice as long as the radius of the disc. Having seen only specimens preserved in spirit I am unable to decide whether the chromatophores are yellow or green.

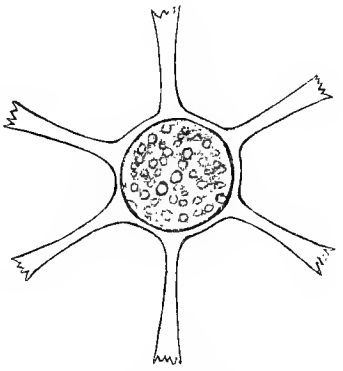

Fig. 6. *Hexasterias problematica* Cl. 500 t. m.

Habitat: Helder, rare in December. Outside the North Sea at the following points: Iceland (Westmannaö 26. X. 98), the Färöes (23. VII. 98), at 51° N. 2° 5′ W. (14. XI. 98), at 66° 30′ N. 22° 30′ W. (29. V. 99) and at 61° 37′ N. 6° 40′ W. (20. V. 99).

Diatomaceæ.

Asterionella japonica Cl. (in Cl. & Möll. Diat. N:o 307, 1882. *A. glacialis* Ostenf. probably Castrac. 1886 *A. spathulifera* Cl.). — At Plymouth in March and April, rather rare in September. Very rare in the Skagerak on the 31st of January.

Asteromphalus heptactis Ralfs. — Very rare in March at 63° 1′ N. 1° 36′ E.

Bacteriastrum delicatulum Cl. — Very rare in June W. of Stadt in Norway.

B. varians Lauder. — In March at Plymouth, in July, August NW. of Heligoland. At Helder common in August, September, rare in October. At S:t Vaast la Hogue more or less sparingly in November, December.

Bellerochea malleus Btw. — In March very rare W. of Jutland (55° 43′ N. 7° 29′ E.). In November at S:t Vaast la Hogue, from the Channel to the coasts of Holland, at Helder and in the Skagerak.

Biddulphia aurita Lyngb. — In *March* on the whole sparingly round the south coast of Norway, at Skagen, on the Fisher Bank and above the depression S. of the Dogger Bank. — At Helder rare in February. In the Skagerak from January to March. In November common at Helder, rarer in the Skagerak and at S:t Vaast la Hogue.

B. mobilensis BAIL. — A. In the North Sea, in *March* more or less abundant round Scotland, between the Shetlands and Cape Stadt, above the Fisher Bank. Common above the depression S. of Dogger Bank. In *November* common from the E. Channel to the W. of Jutland. — B. In the E. Channel at Plymouth more or less abundant from January to April, rarer in October—December, at S:t Vaast la Hogue rare in November. — C. In the Skagerak in January and in October—December.

Cerataulina Bergonii H. PER. — A. In the North Sea rare in March about 57° N. 6° E., rare in June at about 62° N. 2° 30′ E. and 57° N. 9° E. — B. In the E. Channel rare at Plymouth in March, less rare in April and June, rare in November at; S:t Vaast la Hogue rare from June to August. — C. At Helder more or less common from the end of April to the beginning of June, rare in November. — D. In the Skagerak rare in January, more or less common from June to the end of the year, maximum in June and in October.

Chætoceros anastomosans GRUN. — Very rare in August at Helder, in the Skagerak in October.

C. atlanticus CL. — In *March* rare at some spots SW. of Norway and W. of Jutland, in *June* rare W. of Cape Stadt and mid-way between Scotland and Norway.

C. borealis BTW. — A. In the North Sea rare and scattered in *March* through the chæto region, maximum at 57° N. 6° E. In *June* E. of Firth of Tay abundant; less common W. of Jütland. — B. In the Skagerak more or less rare from January to June, more abundant from October to December.

Var. Brightwellii CL. — In the North Sea rare in *March* at some spots in the chæto region from 56° N. 4° E. to Skagen. In the Skagerak rare from January to March and in November.

C. constrictus GRAN. — In *March* common at Skagen and on some points S. of Norway, rare at Plymouth. — In the Skagerak from January to June, maximum in *March*, at Måseskär from March to the middle of June. More or less common in *October, November.*

C. contortus SCHÜTT. — More or less sparingly in July, August at S:t Vaast la Hogue, in September at Helder, in the Skagerak from the end of August to December, and from January to June, maximum in *March* and *June.*

C. coronatus GRAN. — Rare in August at Helder, in the Skagerak in October and November.

C. criophilus CASTR. — Rare in March on some spots SW. of Norway, in January in the Skagerak.

C. curvisetus Cl. — In the North Sea: more or less sparingly in *March* SW. of Norway, at Skagen and W. of Jutland, in *November* rare W. of Jutland. — In the E. Channel at Plymouth more or less common in *March*, very abundant in August, September, at S:t Vaast la Hogue very abundant in October, November, at Helder rare in September. — In the Skagerak more or less rare from January to April, very common from August to November.

C. densus Cl. (= *C. borealis v. densa* Cl.). — In *March* not rare on the Fisher Bank. In *June* E. of Firth of Tay and more or less abundant from the mouth of the Schelde to Schleswig. At Helder rare in June and not rare from August to December. In the E. Channel at Plymouth more or less abundant from the end of March to the end of April, common in July, August, rarer in September. S:t Vaast la Hogue in June and from October to December. In the Skagerak rare in the beginning of October.

C. danicus Cl. — In the E. Channel at S:t Vaast la Hogue rare in July, at Plymouth not rare in September. At Helder in November and December. In the Skagerak from March to June, maximum in *June*, and from the end of *October* to *December*.

C. debilis Cl. — In the North Sea in *March* SW. and S. of Norway, common at Skagen, in *June* E. of Firth of Tay. — At Plymouth rare in April, at Helder common from October to December. — In the Skagerak in *January* to *June* (maximum in *March*), rarer in October, November.

C. decipiens Cl. — A. In the North Sea. In *March* from Skagen to the W. of Stavanger and 58° N. 1° 30′ E., along 55°—56° N. from the Danish Peninsula to the E. of Firth of Tay and Newcastle. At the spot 53° 30′ N. 3° 40′ E. In *June* at one spot between Norway and the Shetlands. West of Jutland 66° N., in *November* very sparingly from the E. Channel to Jutland. — B. In the E. Channel at Plymouth more or less sparingly from January to March, common in October, November, later rare. At S:t Vaast la Hogue very abundant in June, rare in October and December. — In the Skagerak January to June (very abundant in *March*), more or less rare in October, November.

C. diadema Ehb. — Rare in *March* SW. of Norway. At Plymouth rare at the end of September, at Helder rare in December. In the Skagerak from January to May (abundant in *March*) and very common in *November*.

C. didymus Ehb. — A. In the North Sea in *March* rare along the SW. and S. coast of Norway, at Skagen and W. of Jutland. In *June* NW. of Heligoland. In *November* very rare from the E. Channel to the W. of Jutland. At Helder rare from August to the end of November. — B. In the E. Channel: at Plymouth rare in March and in October, common in November. At S:t Vaast la Hogue common in June and July, rare in August, more or less sparingly from the end of October to the end of December. — In the Skagerak rare from January to March, more or less abundant from the end of August to December, maximum *September*, *October*.

[**C. Granii** CL., mentioned in my paper »Plankton Researches in 1897», was not seen in 1898. This species, represented in the annexed figg. 7 and 8, forms loose chains of rectangular, thin-walled cellules (longit.: sagittal axis = 1 : 2). Foramina large, elongate hexagonal, smaller than the cellules. Awns arising from the angles of the cellules, sagittal and obliquely transverse. Their basal part $^1/_3$ as long as the longitudinal axis. The cellcontents seem to contain one parietal plate. Endocysts biconvex, in transverse sagittal section elliptical, covered with numerous simple spines. Sagittal axis 0,013 to 0,015 mm. — Måseskär in March 1897.]

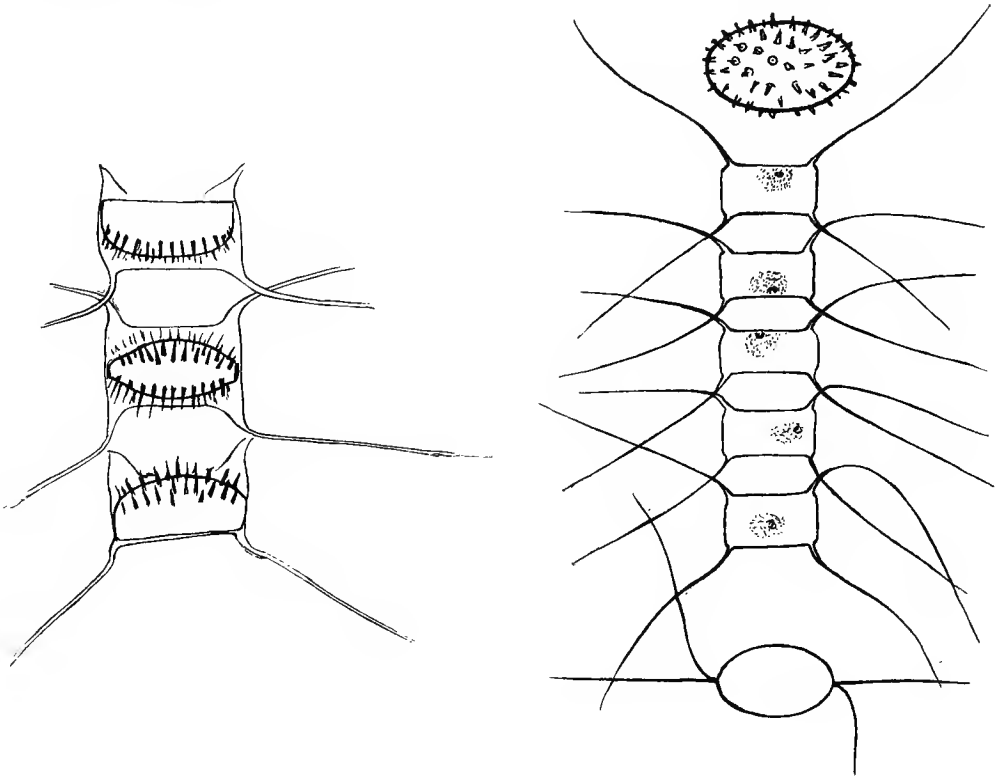

Fig. 7, 8. *Chætoceros Granii* CL. 1000 t. m.

C. hiemalis CL. — In June rare E. of Firth of Tay and common W. of Skagen. In the Skagerak from the end of March to June more or less abundant, and in October, November.

The annexed fig. 9 represents the endocysts 500 t. magnified. They resemble those of *C. laciniosus.*

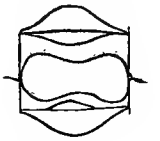

Fig. 9.

C. laciniosus SCHÜTT. — Rare in the Skagerak, January—March, less rare in *November.*

C. Schüttii CL. follows as a rule *C. curvisetus* and *C. didymus.* — A. In the North Sea rare in *March* at the Fisher Bank, in *June* W. of Cape Stadt, in *November*

W. of Jutland. — B. In the E. Channel at Plymouth rare in February, March, abundant in *July*, *August* and in *November*. At S:t Vaast la Hogue rare in August. — C. At Helder rare from the end of September to the end of October. — D. In the Skagerak rare in January, common from October to the middle of *November* (maximum in the beginning of November) or along the coast from the end of August (maximum in *September*).

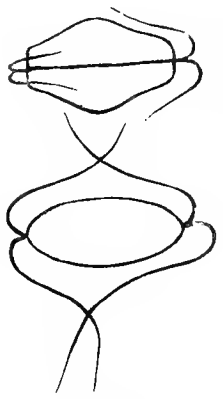

Fig. 10.

C. scolopendra Cl. — In *March* rare SW. of Norway and midway between Skagen and Scotland. — At Helder rare at the end of September. In the Skagerak rare from January to April and in November.

The annexed fig. 10 represents the endocyst, 1000 t. m.

C. seiracanthus Gran. — Rare in the Skagerak, at the end of October.

C. septentrionalis Oestr. — Rare in the Skagerak in March.

C. similis Cl. — Rare in the Skagerak in March and in November.

C. socialis Lauder. — Rare from January to March in the Skagerak, in March on the Fisher Bank.

C. subtilis Cl. — Rare in March in the Skagerak.

C. teres Cl. — In the North Sea rare in March SW. of Norway, at Skagen, on the Fisher Bank and at 56° 34′ N. 2° 20′ E. — At S:t Vaast la Hogue rare in June (appeared again in January 1899). — In the Skagerak from January to March and in *November*, usually rare.

C. Weissflogii Schütt. — In the Skagerak in September, on the 3rd of that month common at Måseskär.

C. Villei Gran. — Rare in June at Helder.

Corethron hystrix Hensen. — Rare in June W. of Cape Stadt.

Coscinodiscus concinnus W. Sm. — A. In the North Sea found abundantly in *March* from Skagen along the Danish coast to 55° N. More or less sparingly from the Danish Peninsula, along 56° N., towards Edinburgh and Newcastle. *June* to *August* rare in some spots. In *November* common from the E. Channel to Skagen and from Skagen along 56°—57° N. to 4° E. — B. In the E. Channel at Plymouth common from January to May and from the end of September to the middle of December. — C. At Helder rare in January, February, more or less common from the end of September to the end of December. — D. In the Skagerak more or less sparingly from January to March and from the end of August to December (maximum in *December*).

C. excentricus EHB. — In *November* more or less rare in the SE. region. At Helder rare in January, not rare in November, December. At Plymouth in January, February and in November. In the Skagerak in November and December.

C. oculus iridis EHB. — In the North Sea in March, as a rule in the company of *Halosphæra*, W. of Norway and sparingly scattered through the *chæto region*. In November rare W. of Jutland. At S:t Vaast la Hogue rare in November, at Helder in November, December. In the Skagerak rare from January to March and in November.

C. polychordus GRAN. — Rare in March E. of Newcastle and W. of the Fisher Bank. In the Skagerak rare from January to April and in November.

C. stellaris ROPER. — In the Skagerak rare from January to March.

Dactyliosolen antarcticus CASTR. — Rare in June W. of Cape Stadt.

Ditylum Brightwellii WEST. — A. In the North Sea in *March* common W. of Jutland at 55° 30′ N. 6° 10′ E., rare above the northern edge of the 50 metre plateau. — B. In the E. Channel at Plymouth rare in January, February, very common in September; at S:t Vaast la Hogue rare in December. — C. At Helder more or less rare in November, December. — D. In the Skagerak rare from January to March and from October to the end of November.

Eucampia zodiacus EHB. — A. In the North Sea rare in *March* at 55° 30′ N. 6° 10′ E. In *June* not rare N. of Holland and W. of Schleswig. In *November* sparingly from the E. Channel to the W. of Jutland. — B. In the E. Channel at Plymouth common in April, rare from the end of *September* to the beginning of *December*. At S:t Vaast la Hogue rare in July, August, October and December. — C. At Helder more or less abundant from the beginning of May to the middle of June and from the end of September (very common) to the end of November (rare). — D. In the Skagerak rare in January and in October, November.

Guinardia flaccida CASTR. — In the North Sea in *March* rare at Skagen and not rare above the Fisher Bank, in *June* from the E. Channel to Skagen, most abundant W. of Holland, in *July* not common W. of the Danish Peninsula, in *November* not rare from the E. Channel to Skagen. — B. In the E. Channel, at Plymouth rare in March, not rare in August, September and October, at S:t Vaast la Hogue rare in June, very common from July to August. — C. At Helder common from the end of May to the end of September. — D. In the Skagerak from *July* to *December* (maximum in *November*).

Lauderia annulata CL. — A. In the North Sea rare in *March* on the Fisher Bank, in *June* E. of Firth of Tay and more or less rare from the N. of Holland to Skagen, in *November* rare near the E. Channel. — B. In the E. Channel at Plymouth rare in January, more or less common in March, April and rare in September. — C. At Helder rare from the end of October to December. — D. In the Skagerak rare in January, March and November.

Leptocylindrus danicus Cl. — A. In the North Sea in *March* rare S. and SW. of Norway and at Skagen, in June rare at Skagen. — B. In the E. Channel at Plymouth not rare in August, September and at S:t Vaast in July, August. — C. In the Skagerak more or less scarce from the middle of February to the beginning of June, rare in November.

Lithodesmium undulatum Ehb. — At Helder more or less rare from the end of October to the end of December, east of the E. Channel in November.

Navicula membranacea Cl. — Rare in the E. Channel in November.

Nitzschia seriata Cl. (including *N. fraudulenta* Cl.). — In *March* more or less rare S. and SW. of Norway, in June W. of Skagen. — In the Skagerak more or less rare from February to the middle of June and very rare in November.

Rhizosolenia alata Btw. — Not rare in November W. of Hanstholm. At Plymouth in September and November.

Var. corpulenta Cl. — Rare at Plymouth from August to December.

Var. gracillima Cl. — A. In the North Sea. *June* W. of Skagen, abundant. *July, August* W. of Skagen and on the Fisher Bank. *November* rare N. of Skagen. — B. In the E. Channel at Plymouth more or less sparingly from the end of March to July, very common in July and August. — C. In the Skagerak enormously abundant from June to the end of July, then rarer until December. Appears at Måseskär as early as the end of April.

R. calcar avis Schultze. — From July to November rare W. of the Danish Peninsula. At Helder from the end of September to the end of November. In the Skagerak rare in October and December.

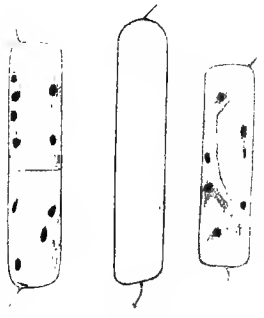

Fig. 11.

R. delicatula Cl. N. sp. — At S:t Vaast la Hogue rare in April and in November, at Helder in August and September, in the Skagerak common in the first half of June, rare in September and November.

The annexed figures (11) represent three specimens in different positions, 500 times magnified. Cells cylindrical, straight, 4 to 5 times longer than broad, extremely thin-walled, without distinct transverse rings. Their ends slightly and irregularly convex with a short, excentric spine. Length 0,05 to 0,07 mm. Breadth 0,0014 mm.

R. obtusa Hensen. — Rare in February at Måseskär.

R. robusta Btw. — Rare at Plymouth in March, April and September, more or less common in *October, November, December*. — In November from the E. Channel to the mouth of Schelde.

R. semispina HENSEN. — A. In the North Sea in *March* rare E. of Firth of Tay and SW. and S. of Norway, in *June* rare between the Shetlands and Cape Stadt, W. of Skagen, E. of Firth of Tay — In the E. Channel rare at Plymouth in April, May. — In the Skagerak more or less rare from January to June, rare in November.

R. setigera BTW. — At Helder rare in June and from September to the end of December, in the Skagerak rare from January to April and from October to the end of the year.

R. Shrubsolei CL. — A. In the North Sea in *June* rare E. of Firth of Tay, more or less rare N. of Holland. In *July, August* rare off the coast of Holland. — B. In the E. Channel at Plymouth rare in January and March, common in April, rare in August. At S:t Vaast la Hogue, very abundant from the middle of June to the middle of August, rare from October to December. — C. At Helder more or less common from the middle of May to November. — D. In the Skagerak more or less rare in July and in the first days of October.

R. Stolterfothii H. PER. — A. In the North Sea in *March* rare at the border of the Fisher Bank. *June:* rare to the north of the Dutch coast. *November:* common near the E. Channel. — B. In the E. Channel at Plymouth rare in March, common from April to the end of June, rare in August, September. At S:t Vaast la Hogue rare from June to August, very common from the end of October to the end of December. — C. At Helder rare in May, June and in November, December. — D. In the Skagerak in September and October, rare.

R. styliformis BTW. — A. In the North Sea in *March* as a rule sparingly from Hanstholm along the Danish coast to about 60° N. and above the Fisher Bank; along the northern border of the Dogger Bank as well as SE. of the Dogger Bank or, practically, along the border of the 50 metre plateau. In *June* from Holland along the Danish coast to Hirthals. In *July* and *August* sparingly at 54°—54° 30′ N. 5° 40′—8° E. In *November* from Skagen along the Danish coast to 55° 30′ N. and above the Fisher Bank. — B. In the E. Channel at Plymouth more or less rare from the end of March to the end of November. — C. At Helder very rare at the end of October and in the middle of November. — D. In the Skagerak rare in January, June and from the middle of September to December.

Skeletonema costatum GREV. — At Plymouth common in March and very common at the beginning of August, later rare. In the Skagerak rare from January to May, common from the beginning of *November*.

Stephanopyxis turgida GREV. — In the North Sea in *June* together with *Rhizosolenia styliformis* between the German and Danish coasts, in *November* very rare W. of Skagen. — At Plymouth rare in April. — In the Skagerak rare in January, September and October.

Streptotheca thamesis Shrubs. — From January to March rare at Plymouth, in *March* W. of Scotland and midway between Scotland and Norway, in *November* common in the E. Channel and sparingly along the Dutch coast to about 56° N. 6° E.

Thalassiosira gelatinosa Hensen. — In the Skagerak rare from January to the beginning of April and in November. Rare in December at Helder.

T. gravida Cl. — In the Skagerak rare from February to the end of April and in December. At S:t Vaast la Hogue in December. — In the North Sea rare in March on the Fisher Bank.

T. Nordenskiöldii Cl. — From January to March rare (at Måseskär common from 9. II. to 21. III.) in the Skagerak. In March rare S. and SW. of Norway and at Skagen. In November rare in the Skagerak.

Thalassiothrix Frauenfeldii Grun. — A. In the North Sea in *March* abundant S. and SW. of Norway and at Skagen, in *June* not rare at Hanstholm. — B. In the Skagerak from January to June, very abundant in March, and very common in November, December.

T. longissima Cl. & Grun. — A. In the North Sea in *March* rare S. and SW. of Norway and at Skagen, in *November* rare at 58° 12′ N. 5° 30′ E. — B. In the Skagerak rare from January to April (common at Måseskär from the 9th to the 15th of February).

An Attempt to classify the Plankton-organisms according to their Geographical and Seasonal Distribution.

Although the exploration of the North Sea in 1898 has been carried out four times only and the data are by no means complete, I venture to classify the plankton-organisms according to their distribution at different seasons. This classification may be in some cases erroneous, for want of sufficient data, but as a rule I consider it correct and in all cases useful as a starting point and basis for future researches. The organisms may be classified as follows.

A. **Forms that, as a rule, are confined to the space above the 50 metre plateau on the bottom.**

1. The whole year: *Corycæus anglicus.*
2. From March to June: *Cerataulina Bergonii*, *Ditylum Brightwellii* (also in November and December).

3. From April to October: *Phæocystis Pouchetii.*

4. From May to November, December: *Eucampia zodiacus, Guinardia flaccida, Rhizosolenia Shrubsolei* and *R. Stolterfothii.*

5. In June: *Chætoceros Villei, Stephanopyxis turgida.*

6. From June to November, December: *Centropages hamatus, Tintinnopsis beroidea var. acuminata, Chætoceros densus, Lauderia annulata, Rhizosolenia setigera, R. styliformis.*

7. From July, August: *Oikopleura dioica, Proto pedata, Paracalanus parvus, Tintinnopsis campanula, T. ventricosa, Noctiluca miliaris, Bacteriastrum varians, Chætoceros anastomosans, C. coronatus, C. didymus, C. curvisetus, Rhizosolenia delicatula.*

8. From September: *Ptychocylis Claparèdii, P. Ehrenbergii.*

9. From October, November: *Acartia bifilosa, Euterpe acutifrons, Bellerochea malleus, Chætoceros danicus, C. Schüttii, Lithodesmium undulatum, Rhizosolenia calcar avis, R. robusta.*

All these forms are, with the exception of *Phæocystis Pouchetii*, of southern habitat.

B. **Forms that, as a rule, are confined to the space above the 100 metre plateau.**

1. Spring-forms, or such as occur in March:

Southern forms:	Northern forms:
Microsetella atlantica,	*Metridia hibernica,*
Oithona similis,	*Ceratium longipes,*
Acanthometron quadrifolium,	*Chætoceros borealis,*
Halosphæra viridis.	*v. Brightwellii.*

2. Summer-forms, or such as occur in June, July, August:

Southern:	Northern:
Evadne spinifera,	*Evadne Nordmannii,*
Ceratium tripos,	*Acartia longiremis,*
C. macroceros.	(*Metridia hibernica*).

3. Autumn-forms, or such as occur in October:
Centropages typicus (southern).

4. Winter-forms, or such as occur in November:

Southern:	Northern:
(*Acanthometron quadrifolium*),	(*Calanus finmarchicus*),
(*Halosphæra viridis*),	*Limacina balea,*
Ceratium tripos v. bucephala.	*Dinophysis acuta.*

The parentheses denote that the enclosed species also occur in the spring.

C. **Forms that occur in the spring above the 100 metre plateau and in the summer or autumn above the 50 metre plateau.**

1. Occurring in the summer above the 50 metre plateau:

Southern:	Northern:
Acartia Clausii,	*Acartia longiremis,*
Oithona similis,	*Pseudocalanus elongatus,*
Sagitta bipunctata.	*Temora longicornis.*

2. Occurring in the winter above the 50 metre plateau:

Southern:	Northern:
Biddulphia mobilensis,	*Chætoceros decipiens,*
Coscinodiscus concinnus,	*C. diadema.*
Streptotheca thamesis.	

Those of the 1st group have probably migrated from the north towards the south. The forms of the 2nd group arrived probably through the E. Channel.

D. **Forms, which occur chiefly in the eastern part of the North Sea.**

1. Winter and spring:

Fritillaria borealis,
Parathemisto oblivia,
Biddulphia aurita,
Chætoceros atlanticus,
C. constrictus,
C. criophilus,
C. curvisetus,
C. scolopendra,
C. socialis,
C. teres.
Coscinodiscus oculus iridis,
Leptocylindrus danicus,
Nitzschia seriata,
Thalassiosira Nordenskiöldii,
Thalassiothrix Frauenfeldii,
T. longissima.

All, with the exception of *Chætoceros curvisetus*, are northern species and it may be assumed that they arrived in the winter through the deep Norwegian fissure or in the spring from the Skagerak.

2. Summer:

Acanthometron elasticum,
Litholophus ligurinus,
Bacteriastrum delicatulum.

All are southern. There was found also *Tintinnus minutus*, which belongs to arctic regions.

Remarks to the tables.

In order to reduce the size of the tables the rarer forms have been excluded. The tables are thus to be completed by the following additional notes.

Table I.[1]

The North Sea in March.

Anomalocera Patersonii TEMPL. — 11. III. 56°10′N. 6°56′E. *r*.

Candace pectinata BRADY.— 6. III. 56°17′N. 0°20′W. *r*.

Centropages typicus KRÖYER. — 8. III. 57°21′N. 2°27′E. *r*.

Corycæus anglicus LUBBOCK. — 6. III. 54°53′N. 7°40′E. *r* 11. III. 56°52′N. 8°9′E. *r*.

Oithona plumifera BAIRD. — 6. III. 61°32′N. 2°13′E. *r*.

Oncæa minuta GIESBR. — 7. III. 63°1′N. 1°36′E. *rr*.

Cyttarocylis gigantea BRANDT. — 6. III. 56°17′N. 0°20′W. *r*.

Dictyocysta elegans EHB. — 5. III. 61°32′N. 2°13′E. *r*.

Plectophora arachnoides CLAP. & LACHM. — 4. III. 57°46′N. 10°29′E. *r*.

Distephanus speculum EHB. — 5. III. 56°58′ N. 5°44′ E. *r*.

Globigerina bulloides D'ORB. — 11. III. 58°21′N. 1°40′E. *r*, 12. III. 58°40′N. 4°18′W. *r*.

Oikopleura dioica FOL. — 4. III. 57°18′N. 8°27′E. + 6. III. 55°43′N. 7°29′E. *r*.

Ceratium lineatum EHB. — 8. III. 58.51′N. 5°9′E. *r*.

Ceratium tripos var. arctica EHB. — 7. III. 63°1′N. 1°36′E. *r*.

var. bucephala CL. — 5. III. 56°58′N. 5°44′E. *r*, 6. III. 55°42′N. 1°5′E. *r*, 6. III. 55°13′N. 0°48′E. *r*.

var. horrida CL. — 6. III. 61°32′N. 2°13′E. *r*, 4. III. 57°18′N. 8°27′E. *r*.

Dinophysis acuta EHB. — 11. III. 55°30′N. 6°10′E. *r*.

Gonyaulax spinifera CLAP. & LACHM. — 9. III. 55°44′N. 0°23′E. *r*, 9. III. 55°12′N. 1°18′W. *r*.

Pyrophacus horologium STEIN. — 10. III. 53°26′N. 3°57′E. *r*.

Asterionella japonica CL. — 12. III. 55° 15′ N. 5°45′ E. *r*.

Asteromphalus heptactis RALFS. — 7. III. 63°1′N. 1°36′E. *r*.

Bellerochea malleus BTW. — 6. III. 53°26′N. 3°57′E. *r*.

Cerataulina Bergonii H. PER. — 5. III. 56°58′N. 5°44′E. *r*.

Chætoceros contortus SCHÜTT. — 9 III. 57°47′N. 10°37′E. +, 4. III. 57°46′N. 10°29′E. +.

C. criophilus CASTR. — 8. III. 58°28′N. 4°27′E. *r*, 8. III. 57°54′N. 3°26′E. *r*, 11. III. 58°21′N. 1°40′E. *r*.

C. densus CL. — 4. III. 57°18′N. 8°27′E. +.

C. diadema EHB. — 8. III. 58°51′N. 5°9′E. *r*, 11. III. 58°21′N. 1. 40′E. *r*.

C. scolopendra CL. — 8. III. 58°51′N. 5°9′E. *r*, 8. III. 57°21′N. 2°27′E. *r*

C. socialis LAUDER. — 10. III. 57°51′N. 7°47′E. *r*.

Coscinodiscus polychordus GRAN. — 9. III. 55°12′N. 1°18′W. *r*, 5. III. 56°58′N. 5°44′E. *r*.

Eucampia zodiacus EHB. — 11. III. 55°30′N. 6°10′E. *r*.

Guinardia flaccida CASTR. — 9. III. 57°47′N. 10°37′E. *r*, 5. III. 56°58′N. 5°44′E. +, 11. III. 55°30′N. 6°10′E. *r*.

Leptocylindrus danicus CL. — 8. III. 58°51′N. 5°9′E. *r*, 10. III. 57°51′N. 7°47′E. *r*, 4. III. 57°46′N. 10°29′E. *r*.

Nitzschia seriata CL. — 9. III. 57°47′N. 10°37′E. +, 10. III. 57°51′N. 7°47′E. *r*, 4. III. 57°46′N. 10°29′E. *r*.

Rhizosolenia Stolterfothii H. PER. — 4. III. 56°58′N. 5°44′E. *r*.

Streptotheca thamesis SHRUBS. — 11. III. 58°21′N. 1°40′E. *r*, 12. III. 55°15′N. 5°45′E. *rr*.

Thalassiosira gravida CL. — 5. III. 56°58′N. 5°44′E. *r*.

The *Peridinium divergens* and *P. depressum* have been omitted, as probably confounded.

[1] The samples from the line Stavanger to Newcastle have been examined by E. JÖRGENSEN.

Table II.

The North Sea in June 1898.

Centropages typicus KRÖYER. — 9—16. 61°50′ N. 2°30′ E. *r.*
Labidocera Wollastonii LUBBOCK. — 5. 56°1′ N. 1°51′ E. *r.*
Metridia hibernica BRADY & ROBTS. — 4. 56°26′N. 4°1′ E. *r.*
Paracalanus parvus CLAUS. — 5. 53°51′ N. 5°1′ E. *r.* 12. 49°31′ N. 3°29′ E. *r.*
Podon Leuckarti G. O. SARS. — 4. 57°27′N. 7°32′E. *r*, 5. 54°14′ N. 8°2′ E. *r.* 4. 55°46′ N. 7° E. *r.*
Sagitta bipunctata QUOI & GAIM. — 4. 57°9′ N. 5°20′ E. *r.* 4. 56°49′ N. 6°5′ E. *r.*
Cyttarocylis gigantea BRANDT. — 9—16. 61°50′ N. 2°30′ E. *c.* 4. 57°20′ N. 9°10′ E. *rr.*
C. media BRANDT. — 9—16. 61°50′ N. 2°30′ E. *rr.*
Tintinnus minutus BRANDT. — 9—16. 61°50′ N. 2°30′ E. *rr.*
Acanthomethron elasticum HKL. — 9—16. 61°50′ N. 2°30′ E. *rr.*
Litholophus ligurinus HKL. — 9—16. 61°50′ N. 2°30′ E. *rr.*
Ceratium lineatum EHB. — 9—16. 61°50′N. 2°30′E. *rr.* 5. 56°12′ N. 1°51′ W. *rr.*
C. tripos var. arctica EHB. — 9—16. 61°50′ N. 2°30′ E. *rr.*
C. tripos var. horrida CL. — 9—16. 61°50′ N. 2°30′ E. *c.* 5. 56°12′ N. 1°51′ W. *r.*
Dinophysis acuta EHB. — 9—16. 61°50′N. 2°30′E. *r.* 5. 54°54′ N. 7°39′ E. *r.*
Diplopsalis lenticula BERGH. — 5. 54°25′N. 5°37′E. +.
Peridinium Michaëlis EHB. — 5. 54°54′ N. 7°39′ E. *r.*
P. ovatum POUCHET. — 9—16. 61°50′ N. 2°30′ E. *r.*
Pyrophacus horologium STEIN. — 5. 56°26 N. 7°55′ E. *r.*
Bacteriastrum delicatulum CL. — 9—16. 61°50′ N. 2°30′ E. *r.*
B. elongatum CL. — 9—16. 61°50′ N. 2°30′ E. *r.*
Chætoceros atlanticus CL. — 9—16. 61°50′N. 2°30′E. *r.* 4. 56°50′ N. 3° E. *r.*
C. danicus CL. — 4. 57°20′ N. 9°10′ E. +.
C. debilis CL. — 5. 56°12′ N. 1°51′ W. *r.*
C. didymus EHB. — 5. 54°14′ N. 8°2′E. *r.*
C. Schüttii CL. — 9—16. 61°50′ N. 2°30′ E. *r.*
Corethron hystrix CASTR. — 9—16. 61°50′N. 2°30′E. *r.*
Coscinodiscus oculus iridis EHB. — 9—16. 61°50′ N. 2°30′ E. *r.*
Dactyliosolen antarcticus CASTR. — 9—16. 61°50′ N. 2°30′ E. *r.*
Leptocylindrus danicus CL. — 4. 57°20′N. 9°10′E. *r.*
Nitzschia seriata CL. — » » » »
Rhizosolenia gracillima CL. — » » » »
R. Shrubsolei CL. — 5. 56°12′ N. 1°51′ W. *r.* 5. 54°25′N. 5°37′E. *r.* 9. 53°16′N. 4°37′E. +.
Thalassiothrix Frauenfeldii GRUN. — 4. 57°20′ N. 9°10′ E. +.

Table III.

The North Sea in July, August.

Corycæus anglicus LUBBOCK. — 2. VIII. 55°28′ N. 6°46′ E. *rr.*
Microsetella atlantica BRADY & ROBTS. — 30. VII. 57°21′N. 4°9′E. *r.* 7. VIII. 56°15′N. 7°50′E. *r.*
Podon Leuckartii G. O. SARS. — 30. VII. 57°32′ N. 7°3′ E. *r.* 30. VII. 57°21′ N. 4°9′ E. *r.*
Bacteriastrum varians LAUDER. — 6. VIII. 54°8′ N. 8°2′ E. *r.*
Coscinodiscus concinnus W. SM. — 6. VIII 54°8′ N. 8°2′ E. *r.* 7. VIII. 56°15′ N. 7°50′ E. *rr.*
Rhizosolenia calcar avis SCHULZE. — 8. VIII. 55°30′N. 7°25′ E. *r.*
R. gracillima CL. — 29. VII. 57°44′ N. 9°37′ E. +. 30. VII. 57°32′ N. 7°3′ E. *r.*
R. styliformis BTW. — 3. VIII. 54°26′ N. 5°43′ E. *r.* 6. VIII. 54°8′ N. 8°2′ E. *r.*

Table IV.

The North Sea in November 1898.

Parathemisto oblivia KRÖYER. — 7. 58°12′N. 5°30′E. *rr.*
Acartia bifilosa LILLJEB. — 13. 50°58′ N. 1°10′ E. *r.* 14. 52°32′N. 13°11′E. *r.* 15. 57°2′N. 8°E. +.
Centropages hamatus LILLJEB. — 13. 51°N. 1°W. *r.*
Metridia hibernica BRADY & ROBTS. — 12. 56°59′N. 5°58′E. +. 13. 57°3′N. 7°16′E. +.
Oithona plumifera BAIRD. — 6. 56°11′N. 2°31′E. +.
Oikopleura dioica FOL. — 14. 52°32′N. 3°11′E. +. 15. 57°2′N. 8°E. +.
Ptychocylis acuta BRANDT. — 7. 55°1′N. 1°10′W. *r.*
Tintinnopsis ventricosa CLAP. & LACHM. — 13. 51°N. 1°W. *r.* 14. 51°N. 2°5′W. *r.*
Tintinnus Steenstrupii CLAP. & LACHM. — 13. 57°38′N. 9°40′E. *rr.*
Acanthochiasma fusiforme HKL. — 7. 58°12′N. 5°30′E. *rr.* 8. 58°40′N. 1°4′W. *r.* 7. 55°1′N. 1°10′W. *r.*

Acanthonia Mülleri HKL. — 8. 58°53′N. 3°5′W. *rr*. 7. 55°1′N. 1°10′W. +.
Gazelletta hexanema HKL. — 8. 58°53′N. 3°5′W. *rr*.
Dictyocha fibula EHB. — 26. 55°30′N. 7°20′E. *r*. 6. 56°42′N. 4°22′E. *rr*.
Distephanus speculum EHB. — 26. 55°30′N. 7°20′E. *r*. 13. 51°N. 1°W. *r*.
Noctiluca miliaris SUR. — 14. 51°45′N. 2°14′E. +. 15. 54°51′N. 5°36′E. +.
Ceratium tripos var. longipes BAIL. — 8. 58°40′N. 1°4′W. *r*. 8. 58°53′N. 3°5′W. *r*. 26. 56°14′N. 7°39′E. +.
Diplopsalis lenticula BERGH. — 8. 58°40′N. 1°4′W. *rr*.
Chætoceros densus CL. — 13. 50°15′N. 0°30′E. +.
C. didymus EHB. — 14. 51°45′N. 2°14′E. *r*. 15. 55°50′N. 6°47′E. *rr*.
C. Schüttii CL. — 13. 57°3′N. 7°16′E. *r*. 6. 56°42′N. 4°22′E. *r*.
Coscinodiscus oculus iridis EHB. — 15. 56°28′N. 7°46′E. *r*.
Eucampia zodiacus EHB. — 14. 51°45′N. 2°14′E. *r*. 15. 56°28′N. 7°46′E. *rr*.
Lauderia annulata CL. — 14. 51°45 N. 2°14′E. +.
Lithodesmium undulatum EHB. — 14. 51°45′N. 2°14′E. +.
Navicula membranacea CL. — 13. 51°N. 1°W. *r*.
Rhizosolenia alata BTW. — 5. 57°22′N. 8°21′E. +
R. gracillima CL. — 15. 56°28′N. 7°46′E. *r*.
R. robusta BTW. — 14. 51°45′N. 2°14′E. *r*. 14. 52°32′N. 3°11′E. *r*.
R. Shrubsolei CL. — 14. 51°45′N. 2°14′E. +. 13. 51°N. 1°W. *r*.
R. Stolterfothii H. PER. — 14. 51°45′N. 2°14′E. *c*
Stephanopyxis turgida GREV. — 5. 57°22′N. 8°21′E. *rr*.
Thalassiothrix longissima CL. & GRUN. — 7. 58°12′N. 5°30′E. *rr*.

Table V.

Helder 1898.

Proto pedata LEACH. — 11. VIII. *rr*.
Acartia bifilosa GIESBR. — 24. XI. *r*.
A. Clausii GIESBR. — 3. XII. *r*.
Pseudocalanus elongatus BOECK. — 10. XII. *r*.
Sagitta bipunctata QUOI & GAIM. — 29. IX. *r*.
Distephanus speculum EHB. — 23. IX. *r*, 11. XI. *r*,
Cyttarocylis Claparedii V. DAD. — 29. IX. *r*.
Tintinnopsis Labiancoi V. DAD. — 11. VIII. *rr*. 29. IX. *rr*.
Ceratium macroceros EHB. — 8. X. *r*.
Peridinium oblongum AUR. — 22. VII. *r*.
Bellerochea malleus BTW. — 29. XI. *r*, 17. XII. *r*.
Chætoceros anastomosans GRUN. — 24. VIII. *r*.
C. contortus SCHÜTT. — 29. IX. *r*.
C. coronatus GRAN. — 11. VIII. *r*.
C. curvisetus CL. — 29. IX. *r*.
C. danicus CL. — 24. XI. *rr*, 21. XII. *r*.
C. diadema EHB. — 17. XII. *rr*, 21. XII. *r*.
C. scolopendra CL. — 29. IX. *rr*.
C. Villei GRAN. — 8, 14. VI. *rr*.
Rhizosolenia styliformis BTW. — 28. X. *rr*, 18. XI. *r*.
Thalassiosira gelatinosa HENSEN. — 21. XII. *r*.

Table VI.

Plymouth 1898.

Microsetella atlantica BRADY & ROBTS. — 16. II. *r*.
Oncæa subtilis GIESBR. — 9. XI. *r*.
Evadne Nordmannii LOVÉN. — 5. VII, 16. VIII, 22. IX. *r*.
E. spinifera P. E. MÜLL. — 23. VI. *r*, 24. VIII. *r*.
Podon intermedius LILLJEB. — 23. VI. *r*, 24. VIII. *r*.
Distephanus speculum EHB. — 16. VIII. *r*.
Dictyocha fibula EHB. — 16. VIII. *r*.
Cyttarocylis Claparèdii V. DAD. — 2. IX. *r*.
Tintinnopsis ventricosa CLAP. & LACHM. — 27. I. *r*, 5. IV. *r*.
Ceratium furca DUJ. — 22. XI. *r*.
C. platycorne V. DAD. — 22. XI. *r*.
Peridinium Michaëlis EHB. — 22. XI. *r*.
P. ovatum POUCH. — 16. VIII. *r*.
Pyrophacus horologium STEIN. — 28. IV. *rr*.
Bacteriastrum varians LAUDER. — 23. III. *r*.
Chætoceros constrictus GRAN. — 23. III. *r*.
C. danicus CL. — 2. IX. *r*.
C. debilis CL. — 14. IV. *r*.
C. diadema EHB. — 22. IX. +.
C. didymus var. longicruris CL. — 2. IX. *r*.
Leptocylindrus danicus. — 16. VIII. +, 2. IX. *r*, 22. IX. +.

Table VII.

Måseskär 1898.

Fritillaria borealis LOHM. — 25. IV. *r*.
Anomalocera Patersonii TEMPL. — 30. I. *r*, 3. IX. +, 1. X. *r*.
Corycæus anglicus LUBB. — 7. IX. *r*.

Metridia hibernica BRADY & ROBTS. — 30. I. *r*.
Temorella affinis POPPE. — 27. V. *r*, 14. XI. *c*.
Podon Leuckartii G. O. SARS. — 27. V. *r*, 4. VI. *r*.
Limacina balea MÖLL. — 3. IX. *r*.
Arachnactis albida M. SARS. — 31. I. *c*.
Tintinnopsis fistularis MOEB. — 26. VII. *r*.
T. ventricosa CLAP. & LACHM. — 1. IV. *r*, 7. XI. *r*.
Tintinnus Steenstrupii CLAP. & LACHM. — 10. X. *rr*.
T. subulatus EHB. — 28. X. *r*.
Acanthometron quadrifolium HKL. — 3. IX. *c*, 21. IX. *r*, 1. X. *r*.
Plectophora arachnoidea CLAP. & LACHM. — 9. II. *r*.
Ceratium tripos var. bucephala CL. — 8. VIII. *r*.
Diplopsalis lenticula BERGH. — 26. VII. *r*.
Gonyaulax spinifera CL. & LACHM. — 30. I. *r*, 3. IX. *r*.
Peridinium Michaëlis EHB. — 21. X. *r*.
Peridinium oblongum AUR. — 26. VII. *r*.
Xanthidium hystrix CL. — 28. X. *r*.
Biddulphia mobilensis BAIL. — 30. I. *r*, 28. X. *rr*, 7. XI. *rr*.
Chætoceros densus CL. — I. X. +, 10. X. *r*.
C. coronatus GRAN. — 10. X. *r*.
C. laciniosus SCHÜTT. — 14. XI. *r*, 27. XI. +.
C. similis CL. — 14. XI. *rr*, 27. XI. *r*.
C. Weissflogii SCHÜTT. — 3. IX. *c*, 21. IX. *rr*.
Coscinodiscus excentricus. — 28. X. *r*, 7. XI. *r*, 27 XI. *r*.
C. stellaris ROPER. — 1. III. *r*.
Rhizosolenia obtusa HENSEN. — 9. II. *r*., 15. II. *r*.
R. Shrubsolei CL. — 3. IX. *r*.
R. Stolterfothii H. PER. — 3. IX. *rr*.
R. styliformis BTW. — 1. X. *rr*, 7. XI. *rr*.
Stephanopyxis turgida GREV. — 21. IX. *rr*.

Table I. The North

Date	5	6	7	8	8	8	8	9	9	9	9	9	10	10	11	11	12
Lat. N.	59°32′	61°32′	63° 1′	58°51′	58°28′	57°54′	57°21′	56°49′	56°16′	55°44′	55°12′	57°47′	57°51′	58° 5′	58°21′	58°30′	58°40′
Long.	4° 15′ E.	2° 13′ E.	1° 36′ E.	5° 9′ E.	4° 27′ E.	3° 26′ E.	2° 27′ E.	1° 31′ E.	0° 33′ E.	0° 23′ E.	1° 18′ W.	10°37′ E.	7° 47′ E.	4° 45′ E.	1° 40′ E.	1° 30′ W.	4° 18′ W.
Temp.	5,1	7,4	6,7	3,8	4,4	6,4	7	6.8	7,2	6,1	6,4	2,0	2,0	3,5	6	7	7
Salinity	34,11	35,12	35,10	32,48	32,85	35,19	35,03	35,03	34,90	34,60	34,66	29,38	27,31	35,17	35,05	35,12	34,71
Acartia Clausii Giesbr.	+	*c*	*r*					.	.			.	.	*r*	.	.	.
A. longiremis Lilljeb.	.	.	.	*r*	*c*		*r*	.	.	.	*c*						.
Calanus finmarchicus Gunn.	.			.	.	*r*	+	*r*	*r*		*r*				*r*		.
Centropages hamatus Lilljeb.	.	.		*r*	*r*									*r*		.	.
Metridia hibernica Brady & Robts.	.	.			.	.	*r*	*r*	*r*					.	.	.	
Microsetella atlantica Brady & Robts.			.			.	*r*		*r*			*r*		.		.	
Oithona similis Claus.	*r*	*c*	+		.	*r*	+	*r*	*r*	*r*	+			.	+	.	
Pseudocalanus elongatus Boeck	.	.		.	.	*r*	*c*	*r*	*r*	*r*	*r*	+		*c*	.	.	.
Temora longicornis O. F. Müll.					.	.	+	*r*	.		.	.		*c*	.	.	.
Cyttarocylis media Brandt			.	.	.	*r*	*r*		.	.	.	*r*	*r*	.		.	.
Ptychocylis acuta Brandt	.		.	*r*		*r*	.	.		.	.	.	*r*	.		.	.
Sagitta hipunctata Quoi & Gaim.	.		.	.	.	.	.	.		.	.			.	.		
Acanthometron quadrifolium Hkl.	*r*	*r*	*r*			.	.		.		.		.		+	*r*	*r*
Halosphæra viridis Schmitz	*c*	+	+	*c*	+	*r*	+	*r*	*r*	+	*r*	*r*	*r*	*r*	*r*		
Ceratium furca Duj.	.		.	*r*	*r*	*r*	*r*	.	*r*	.	*r*	+	.	*r*			.
C. fusus Duj.	.	.		*r*	.	*r*	*r*	.	.	.	*r*		.	*r*	*r*		
C. tripos Nitzsch.	+			+	*r*	*r*	*r*	.	*r*	*r*	*r*	*r*	.	*cc*	+	*r*	.
v. longipes Bail.	.	.		*r*	*r*	.	*r*	.	.	*r*	*r*	+	*r*	.	+	.	
v. macroceros Ehb.	+	+		+	*r*	*r*	.	.	*r*	*r*	*r*	.	.	.		.	
Biddulphia aurita Lyngb.			.	+	*r*	.	.	.	.	.	.	+	*r*		.	.	.
B. mobilensis Bail.	.	*r*		.	.		.	.	.	*r*	.	.	.	.		.	+
Chætoceros atlanticus Cl.				.		*r*	.	.			.	.	.	.	*r*	.	
C. borealis Btw.				*r*	*r*	.	*r*	.	*r*	*r*	*r*	.	*r*	*r*	*r*	.	
v. Brightwellii Cl.			.	.				.	.	.	.	*r*	.		.	.	.
C. constrictus Grev.	.			*r*			.	.			.	+	*c*	.	.	.	
C. curvisetus Cl.	.						.	.	.	.	.	+	+	.	.	.	.
C. debilis Cl.				.	*r*				.	.	.	*c*	*c*	.	.	.	.
C. decipiens Cl.				*r*	*r*		*r*	*r*	+	+	+	+	+	*r*	*c*	.	.
C. didymus Ehb.				*r*	.	.	.	.	.	.	*r*	*r*	*r*	.	.	.	.
C. Schüttii Cl.					.	.		.	.	.	.	.	.	.	.	.	.
C. teres Cl.	.	.	.	.	.	*r*			.	.			.	.	.	.	.
Coscinodiscus concinnus W. Sm.		*r*		.	.	.			*r*	+	+	.	.	.	+	.	*r*
C. excentricus Ehb.	.	.			.	+	*r*		.	*r*	.	.		.	.	.	.
C. oculus iridis Ehb.	+		*c*	*r*	*r*	*r*		.	.		.	.	+	.	.	.	
Ditylum Brightwellii West.	.	.		*r*			.	.	.	.	.	*r*	.		.	.	
Lauderia annulata Cl.	.		.	.	.	.				.	.	.	*r*	.			
Rhizosolenia semispina Hensen	.		.	.	.	.	*r*	*r*	*r*	.	.		*r*		.	.	
R. styliformis Btw.	.			.	.	.	.	.	.	.	.	.	.	.	.		
Thalassiosira Nordenskiöldii Cl.	.		.	*r*	*r*	.	.		.	.		*r*	+	.	.	.	
Thalassiothrix Frauenfeldii Grun.	.	.	.	*cc*	*c*	*c*	*r*	*r*	*r*		*r*	*c*	*cc*	*r*		.	
T. longissima Cl. & Grun.	.			*r*	.	*r*	.	.		.	.	*r*	.	.	.	.	
Plankton-type	*S* *Tp*	*S*	*ST*	*Ns* *Tp* *Nh*	*Ns*	*Ns*	*Ns*	*Ns*	*C*	*CNc*	*CNc*	*Ns*	*Ns*	*Tp*	*C Tp* *Nc*	*O*	*Nc*

Sea in March 1898.

12	4	5	4	5	6	6	4	5	5	6	6	6	5	6	6	6	6	10	11	11	11
55°15′	57°46′	56°58′	57°18′	56°34′	56°17′	56°	57°45′	57° 4′	56°35′	56°08′	55°42′	55°13′	57°40′	57°15′	56°36′	55°43′	54°53′	53°26′	55°30′	56°10′	56°52′
5° 45′	10°29′	5° 44′	8° 27′	2° 20′	0° 20′	2°	10°22′	7° 51′	5° 40′	3° 8′	1° 5′	0° 48′	10°10′	8° 49′	8° 4′	7° 29′	7° 40′	3° 57′	6° 10′	6° 56′	8° 9′
W.	E.	E.	E.	E.	W.	W.	E.	E.	E.	E.	E.	W.	E.	E.	E.	E.	E.	E.	E.	E.	E.
5,5	3	5,3	4,3	6,4	6,2	5,1	— 1	+ 1	2,2	3,6	5,2	6,4	2,8	3	2,8	3,6	3,6	4,4	5,8	4,2	3,6
34,36	33,73	35,13	34,50	35,13	34,96	34,53	32,07	34,60	35,0	35,13	35,06	34,84	33,64	32,79	30,87	32,56	32,15	34,67	34,22	33,23	34,53
		.	.		.	.	.	r	.	.	.	r	.		r	r	+	.	.		r
		.			.	.			.	.	.	.	.				.			.	
	.	+	.		+	r		.	.	.	.	r	.	.	.	.	.	r			
		.	.				.	.	.	.		.		r	r			.	.		
		r			r		.		.	.	.	.					.	.	.		
		+	+		c	c		+	+	r	r	r	r		r	.		r			.
	.	.	+		c	r	.	+	+	.	r	r	r	r	r	.	+	.	.	.	.
		+	.		c	+	.	+	+		r	+	+	c	c	.	.	r	.		.
		.	+	.			.	r	+			.	+		c	c	+	.	.	.	r
			.	.	.	.	.	.	.	.	.	.	.	.		.	.		.			
		.	.		.		.		.	.	.	.	.		r		.			.	
.		c		.	+	+	.		+	+	r	+	.			.	.		.			.
.			.	r	.	+	.		r				.	.					r	r	.	.
		.	.	.		.			.	.	r	.	.	.							
.			+	.		.			.	.	.	.		.		.		r	+		.
r	r		+			.		.	.	r	.	.	.			r	r	+	+	r	r
.	r	+	c			.	c	+	c	+	r	+	r	r	.	r		c	c	c	+
.		r	.	.		.	+	+		.		.	.	r	+	c	r	.	.	c	.
	.		+	.			c	+	r	+		+	r	.	.	.		.		+	+
.	+	.						.	.	.			.	.	.	+	.	r	.	.	r
r	.	+	.			+	.	.	r					r	.	r	.	c	+	r	+
.	.	+	.				.	.			.								r	.	
.	+	c		r		.	.	.		r	.	.	.		r	.	.		.	.	.
.	.	r		.			.	.		r	.	.	.	.	.	.	.		.	.	.
.	c	.	.			.	.		.		.	.			.	.	.	.	.	.	.
	r	r		.	.	.	.		r	.		.			.		.		r		.
	+	.	.		.	.	.		.	.	.			.		.	.		.	.	.
rr	c	cc	.	cc	cc	+	.			r	r	r	r	r	.	.	.		c		.
.	r		.			.		.	.	.							.	.	r		.
.		r	.	.		.			r		.	.			.		.	.	+		.
.	r	r	.	r		.				.	.	.			.		.		.	.	.
.	.	+	+	c		+		r		r	c	r	cc	r	cc	cc	+	c	+	r	c
.		.	r			.				.		.			.	.	.			.	.
	.	r	.	r	+	.	.		r	rr	.	r	.		.	.	.	r		r	.
.	r	.	r	r				.	.	.	.	.		.	.	.	.	.	c		.
	r	r	.						.	.		.		.		.	.	.	r		.
.	.	.	.	.	.						.	.	.			.	.	.		.	.
.	.	r	r	+	+	.			r	r	+	.		r	.	.		+	+	r	+
.	+	.	.	.				.	.	.	.					.		.		.	
	cc	.	r			.		.	.	.	.							.	.		.
.			.					.	r	.	.	.	.	.	.			.	.		.
Nc	Ns C	C (Nc)	Tp Nc	C Nc S	C S	C Nc	Tp	?	Tp	Tp	Nc S	(Tp)	Nc	Nc	Nc	Nc	Nc	Nc Tp	C Tp Nm	Tp	Nc Tp

Tab. II. The North

Date	9—16	3	4	4	4	5	5	4	4	4	4	5
Lat. N.	61° 50′	57° 43′	57° 27′	57° 9′	56° 50′	56° 30′	56° 12′	57° 30′	56° 59′	56° 49′	56° 26′	56° 1′
Long.	2° 30′ E.	9° 50′ E.	7° 32′ E.	5° 20′ E.	3° E.	0° 38′ E.	1° 51′ W.	9° 22′ E.	7° 40′ E.	6° 5′ E.	4° 1′ E.	1° 51′ E.
Temp.	10	9,8	9,0	8,7	9	8,7	9,2	9,7	9,1	9,2	8,9	9,4
Salinity	35,36	33,04	33,59	34,98	35,05	34,96	34,48	33,18	—	34,96	35,04	35,00
Acartia Clausii Giesbr.	*r*			*rr*			+		*r*	*r*		
A. longiremis Lilljeb.	.	*r*	*r*	*r*	*cc*		.	*rr*	.			
Calanus finmarchicus Gunn.	+		.	.	.	+	+		*r*	.	*r*	
Centropages hamatus Lilljeb.	.	.	+	*r*	+	*r*			.	.	*c*	*c*
Oithona similis Claus.	*c*	.	*r*	*rr*	*c*	*r*	*c*	*rr*	.	+		
Pseudocalanus elongatus Boeck.			.				.				*c*	
Temora longicornis O. F. Müll.	.	.	.	*r*	*c*	+					*cc*	.
Evadne Nordmannii Lovén	*c*	+	+	*r*	*c*	*cc*		*rr*			*c*	*c*
E. spinifera P. E. Müll.	*c*		*ccc*	.	*c*	+	+	.		*r*		*cc*
Noctiluca miliaris Surir.	.		.		.		.		.		.	.
Ceratium furca Duj.	+	*r*	*r*	*r*		*r*	.	*r*	*r*	*r*		
C. fusus Duj.	*r*	*r*	*r*	*r*	+	*r*		*r*	*r*	*r*	*r*	*r*
C. tripos Nitzsch.	+	+	*cc*	*ccc*	*cc*	*c*		*c*	*cc*	*cc*	*cc*	+
var. longipes Bail.		+		*r*		*c*	*r*	*c*		+		.
var. macroceros Ehb.	.	*r*	*r*	*r*			.		*c*		*c*	+
Peridinium depressum Bail.	*r*	+	.			+		*c*		*r*		
P. divergens Ehb.	*r*		*r*	*r*	*cc*		*r*	.	+			
Cerataulina Bergonii H. P.	*rr*							.			.	.
Chætoceras borealis Btw.	*rr*						*c*					.
C. densus Cl.				.			*r*					.
C. decipiens Cl.	+						*r*					
C. hiemalis Cl.	.			.			*r*		.		.	
Coscinodiscus concinnus W. Sm.		*r*						*rr*		.	.	*r*
Eucampia zodiacus Ehb.		.								.	.	
Guinardia flaccida H. Per.			.				.	.	.		.	
Lauderia annulata Cl.	.	.	.				+					
Rhizosolenia semispina Hensen	*rr*	.	.				+	.				
R. styliformis Btw.	*rr*	.			*rr*		*rr*	*rr*		.		
Stephanopyxis turgida Grev.	.				.		.	.	.	.	.	
Plankton-type	*S T C*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*S T*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*

Sea in June 1898.

5	5	4	5	5	5	5	4	4	5	5	5	5	5	9	9	11	12	12
55° 25′	55° 44′	57° 20′	57°	56° 26′	54° 54′	54° 14′	57° 6′	55° 46′	54° 25′	53° 51′	53° 26′	53° 8′	51° 43′	53° 49′	53° 16′	52°	50° 33′	49° 31′
0° 8′	7° 29′	9° 10′	8° 21′	7° 55′	7° 39′	8° 2′	8° 26′	7°	5° 37′	5° 1′	4° 36′	4° 22′	3° 20′	6° 18′	4° 37′	3° 23′	0° 2′	3° 29′
E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	W.
10	11,2	10,08	10,5	11	10,6	12	10,36	10,24	9,48	10,48	11,24	11,48	12,48	12,4	14,1	13,4	11,8	11,8
35,15	32,36	32,20	31,57	31,86	31,57	30,19	32,48	34,21	34,41	34,45	34,33	34,40	30,93	—	—	—	—	—
c	.		.	.	.	+		*r*	+			+					.	*c*
.	.	.	.			.	.		.	*c*				.	.			.
.		.	.					.		*r*	.	.		*r*	.	.	.	
c		.			.	.	.	.	.	+		+	+	*cc*	*r*		+	+
					.		.	.	*c*				.	.				
			.	.	.	.		*r*	+		.			+	.		.	*c*
		.			.	.			*c*			.	+	*c*	.	.	*c*	*c*
.		*rr*	*r*	*rr*			*r*	*r*	.	.		.	.			.		.
.	.		*rr*		.	.			.	.	.	.	.	.			.	.
		.			.	*c*			.		*ccc*	*ccc*	*ccc*	*ccc*	*cc*		.	.
.	*r*			*r*	*r*	*r*		*r*	*r*				.				.	.
r	*r*			*r*	*r*	*r*		*r*	+	*r*	.	*r*	.		*r*	.	.	.
c	.	*r*		+	*r*	*r*		*r*	*r*						*r*		.	
ccc	.	*r*		*r*	*r*	*r*				*r*								.
	.	*r*		+				.	*r*	.		.	.					.
		.		+	*cc*	*r*		+	*cc*	+		.	.					
			r				*r*					.				.		
	.	*r*		.											*r*			
	+	+	*r*	*r*		.	.		.			.				.		
.		.	.		.	+	.	*r*	+	*c*		*r*			+	+		
	c		*r*			.	.		.									
.	.	*c*	.	.			.		.			.			.			
.		*r*							*rr*	.								
.					*rr*	*r*	.	.	+	+	.					.	.	
.				*r*	*rr*	+	*r*	*r*	*r*	.	.		+	.	*cc*	*cc*	.	.
.	.	+		.		*c*		*r*		*r*			.				.	
.	.	+		.	.	.				.	.			.				.
.	*r*	*r*	+	*rr*	*r*	*c*	*r*	*c*	+	*c*		.						
.		.			*r*	.	.	*c*	*r*									
Ns	*C*	*Ns*	(*S*)	(*Tp*)	*Ns?*	*Nm*	*O*	*S*	*Nm*	*Nm*	*Nm*	*Nm*	*Nm*	*Nm*	*Nm*	*Nm*	?	?
Tp		(*Nm*)				(*S*)		*Nm*	(*Ns*)	*S*								

Table III. The North Sea in July, August 1898.

Month	VII	VII	VII	VII	VII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII	VIII
Day	29	30	30	30	30	2	2	2	3	3	3	4	6	8	6	7	7	7	7
Lat. N.	57°44′	57°32′	57°29′	57°27′	57°21′	57°42′	56°38′	55°28′	54°26′	53°18′	52°39′	51°42′	54°8′	55°30′	56°	56°15′	56°40′	57°20′	57°40′
Long.	9° 37′ E.	7° 3′ E.	6° 15′ E.	5° 23′ E.	4° 9′ E.	10° 2′ E.	7° 54′ E.	6° 46′ E.	5° 45′ E.	4° 38′ E.	3° 50′ E.	2° 34′ E.	8° 2′ E.	7° 25′ E.	7° 35′ E.	7° 50′ E.	8° 3′ E.	9° E.	10° E.
Temp.	15	12	10	11,5	12	13	13	14	14	16	16	15,5	16	14,5	13,9	14	13,5	13,5	13,8
Salinity	31,24	—	33,69	33,39	33,08	32,29	32,17	32,29	33,69	32,72	34,59	34,45	29,95	32,56	32,29	32,29	31,94	32,12	31,50
Proto pedata LEACH.				.	.	.		.	.		+	*r*		.	.			.	.
Acartia Clausii GIESBR.	*r*		*r*	+	.		.	+	.			+	.	*r*	.	*r*	.	+	
A. longiremis LILLJEB.			.	.		+	+	.			+	.	.	.	.	.	*r*	+	.
Calanus finmarchicus GUNN.	.	.			.	*r*			+	.	.	.	.		.	.		.	*r*
Centropages hamatus LILLJEB.		.	.	.	*r*	*c*	+		+	.	*c*	.	.	.	.	.	.	.	+
C. typicus KRÖYER		.	.	.	*r*	.	.		.	.	.	.	.	.	.		.	.	*r*
Oithona similis CLAUS	*c*	+	+	+	+	*c*	*c*	+	*c*	.	*r*	+	+	.			*c*	*c*	*c*
Paracalanus parvus CLAUS	*c*	.		+		+	+	+	.		*c*	+	+		.	.	.	*c*	*c*
Pseudocalanus elongatus BOECK.	*c*	*c*	*r*	+	*c*		*c*	*c*	.	+	*c*	.	.		.	*r*	+		.
Temora longicornis O. F. MÜLL.	.	*c*	.		+	+	+	.	*c*	+	.	.	+		*r*	+	*r*	+	
Evadne spinifera P. E. MÜLL.	.	+	.			+	*r*	+	+		.	.	.		.		.	*c*	+
Podon intermedius LILLJEB.	*r*	.	.	.	.	.	.	*r*	*c*		.	+	+			+	.	+	*c*
Oikoplenra dioica FOL.		.	.	.			+		.	.	+	+		.	.	.	.	.	.
Sagitta bipunctata QUOI & GAIM.			.	.		*r*		.		.	.	*r*	.	.	.	.	.	.	+
Tintinnopsis campanula EHB.				.	.	.		.	.	.				*r*	*r*	.	*r*	.	.
Noctiluca miliaris SURIR.	.			.	.		.	.		*ccc*	*c*	*ccc*	.	.	.	.		.	.
Ceratium furca DUJ.		.			.	.		*r*		.		.	+	+	.	.	+	.	
C. fusus DUJ.	.	*r*	*r*	*r*	*r*	.	*r*	*r*	.		.			+	.	*r*	.	+	*r*
C. tripos NITZSCH	+	*c*	*c*	*c*	+	*c*	*c*	*c*		.	.	.	*c*	*cc*	*ccc*	+	*c*	*c*	*c*
var. longipes BAIL.			.		*r*			*r*					.	*r*		.	.	.	.
var. macroceros EHB.	*c*	+	*c*	*c*		*c*	*cc*	*c*	+				*c*	+	*c*	+	*c*	*c*	+
Peridinium divergens EHB.	.	*r*	+	*r*		.	.	*r*	.		.	.		*r*	+	.	*r*	*r*	*r*
Guinardia flaccida CASTR.	.				.		.	*rr*	.	*r*	+	+		*c*	+	*r*	+	.	
Rhizosolenia Shrubsolei CL.							.	.	*r*	*r*	+			.			.	.	.
Plankton-type	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	(*Tp*)	*Nm*	*Nm*	*Nm*	*Tp*	*Tp* *Nm*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*

Table IV. The North

Date	6	6	7	7	8	8	9	12	12	12	12	13	13	13	26
Lat. N.	57°48.	57°51′	58°12′	58°15′	58°40′	58°53′	57°18′	56°47′	56°51′	56°55′	56°59′	57° 3′	57°38′	56°55′	56°14′
Long.	10°35′ E.	8° 36′ E.	5° 30′ E.	3° 50′ E.	1° 4′ W.	3° 5′ W.	5° 49′ W.	2° 46′ E.	3° 32′ E.	4° 40′ E.	5° 58′ E.	7° 16′ E.	9° 40′ E.	7° 30′ E.	7° 39′ E.
Temp.	10	10	10	10,5	11	11	11	9,4	9,7	9,7	9,1	—	9,1	—	8,4
Salinity	31,94	32,44	33,40	35,44	35,65	35,32	33,08	35,03	34,83	34,86	34,86	—	32,25	—	32,91
Proto pedata LEACH.	.	.						.			.				*c*
Acartia Clausii GIESBR.	.	+	+	.	.	*c*			*r*				.	.	.
Calanus finmarchicus GUNN.	*c*		*c*	*c*	+	+	*c*	.		*r*	+	*c*		.	.
Centropages typicus KRÖYER	*c*	*c*	*c*	*c*		*r*	.	+	*c*	*c*	+	*c*		*r*	.
Corycæus anglicus LUBB.	.	.		.	.	.	.		.			.	.		+
Euterpe acutifrons GIESBR.	.				.	.	.				.				.
Microsetella atlantica BRADY & ROBTS		.		.				.			.	*r*	.	.	.
Oithona similis CLAUS	+	.	+				*r*	.	.		.	.		*r*	
Paracalanus parvus CLAUS	*c*	+	.	+		+			+	*c*	+	*c*			*c*
Pseudocalanus elongatus BOECK.	*c*	.	*c*	+	.	+		*c*	.				.	.	.
Temora longicornis O. F. MÜLL.	*c*		+	+		.	.	*c*	*c*	*c*	+	*c*	*r*	*r*	
Limacina balea MÖLLER			.		.			*r*		*c*	*c*	*c*	*r*	.	
Sagitta bipunctata QUOI & GAIM.	*c*	*cc*	*c*	*c*				*c*	.	+	.		.		+
Tintinnopsis campanula EHB.						.	.	.	.			.	.		.
Acanthometron quadrifolium HKL.	.	*rr*	*rr*		*rr*	*r*	.								.
Plectophora arachnoides CLAP. & LACHM.	*rr*	*rr*	*rr*		.	*rr*		.	.		.			*r*	.
Halosphæra viridis SCHMITZ.	+	*c*		+	+	*c*	*c*	*r*	+		*r*	+			.
Ceratium furca DUJ.	*r*		*r*			*r*	.	+		.	.	+	*c*	*rr*	.
C. fusus DUJ.	+	*c*	*r*	*c*	.	*r*	.	+	+	+	*r*	+	*r*	*rr*	.
C. tripos NITZSCH	*c*	*ccc*	*cc*	*cc*	+	*ccc*	*r*	*cc*	*c*	+	*cc*	*c*	*c*	*cc*	+
var. bucephala CL.	*r*	*c*	+	+	+	.	*r*	+	*r*	*r*	+	+	.		.
var. macroceros EHB.	*cc*	*cc*	*ccc*	*ccc*	*cc*	*cc*	*r*	*cc*	*c*	+	*cc*		*c*	*rr*	.
Dinophysis acuta EHB.					.		.	*r*	*r*		*r*		*r*	.	.
Peridinium depressum BAIL.	*r*		*r*	*r*	*r*	+	.	.	.		*r*		*r*		
P. divergens EHB.						.	.			.	.	*r*			
Pyrophacus horologium STEIN				.		*rr*	.	.		.	.			.	
Bellerochea malleus BTW.							.	.	.	.	.			.	
Biddulphia mobilensis BAIL.	.		.	.			.	.		.	.		.	.	.
Chatoceros curvisetus CL.	.	.	.		.	.		.	.	.	.	*r*	.	.	.
C. decipiens CL.		.					.	.		.	.			.	.
Coscinodiscus concinnus W. SM.	.		*rr*	*r*		.	.	.	.		.			+	+
C. excentricus EHB.	.		.		.	.	.	.	.	.	.	.		.	.
Ditylum Brightwellii WEST.	.	.	.			.	.	.		.	.	.		*rr*	.
Guinardia flaccida H. PER.	.	.	.			.	.		.	.		.		*r*	
Rhizosolenia calcar avis SCHULZE	.	.				.			.	.	.			*rr*	.
R. styliformis BTW.		.	*rr*	.	.	*rr*		.	.	.		*rr*	.	*rr*	.
Streptotheca thamesis SHRUBS.	.	.	.	.		.				.		.	.	.	.
Plankton-type	*Tp* (*Nh*)	*Tp* *Nh*	*Tp*	*Tp* (*Nh*)	*Tp* (*Nh*)	*Tp* *Nh*	*Nh*	*Tp*	*Tp*	(*Tp*)	*Tp*	*Tp* (*Nh*)	*Tp*	*Tp*	*Nm* *Nc*

Sea in November 1898.

26	5	5	6	6	6	7	7	13	13	14	14	14	14	15	15	15	15	13	14
55°30′	57°41′	57°22°	57°1′	56°42′	56°11′	55°35′	55° 1′	50°15′	50°58′	51°45′	52°32′	53°19′	54°15′	54°51′	55°50′	56°28′	57°2′	51°	51°
7° 20′	9° 55′	8° 21′	6° 17′	4° 22′	2° 31′	0° 34′	1° 10′	0° 30′	1° 10′	2° 14′	3° 11′	4° E.	4° 47′	5° 36′	6° 47′	7° 46′	8° E.	1° W.	2° 5′
E.	E.	E.	E.	E.	E.	E.	W.	E.	E.	E.	E.		E.	E.	E.	E.			W.
9,2	9,5	11,2	10,7	10,1	10,0	9,8	9,4	14	13,2	14	13	12,2	12	12	11,2	10	9	14,5	14
34,12	32,56	33,93	34,86	34,94	35,10	35,29	34,21	35,37	35,46	35,37	35,56	35,08	35,17	35,01	35,01	32,79	31,74	34,55	35,60
rr	.	.					.	.	.	.		.	+		+	.	+		.
.	+	.	.	.	+	+		*c*		*c*	*r*	.	.		.	.	.	*r*	*r*
rr		.			+	.			.	*rr*		*r*	.	.			.	.	.
.	.		.	+		*r*				.	.						.	.	*r*
.	*r*	*r*		.		.	.	*r*	.	*r*		+	.	*r*	*r*	+	.	.	.
.	.	.	.	.			.	+	*r*	+		.		.	.	.		*r*	
+	*r*			.			+					.					*r*		
r	.	+	.	+	+	+			.	*r*		.		*r*		*r*	*r*	*r*	
.	+	*c*		+	*c*	.		+	+	*c*	.	+		*r*	+			*r*	*r*
rr		+	.	*c*	*r*	*r*		.	.	.	*r*	+	.	*c*		*r*	*r*		
	.	.	.	.	*r*	*r*		*r*	+	+	+	*r*	.			+	*c*		.
	.	.	.					.	.	.		.	.				.		
.	+	*c*	*ccc*	*ccc*	*c*	*r*	.	+		+	+		+	+	*c*	+	*c*		
.	.	.	.					.		*r*	*r*	+	*r*	.	+	.		*r*	
	.	.	.	*r*	+		.	.			.	.	.	.		.	.	.	.
.	.	.		.		.	.	.	.		.	.	.	.	.	*rr*			.
				r	*r*	+		.			.		.	.			.		.
.	.			.	+			.		.	.		*r*	*r*	.			.	
	.	*r*	.	*c*	+		+				.		*r*	*r*		*r*	*r*		
.	+	+	*c*	*c*	*c*	*cc*	+	.		.	.	+	*c*	*c*	+	*c*	*c*		
.	.	.		+	+		.	.	.	.		*r*	.	*r*	.	.			
.	+	+	*c*	*c*	*c*	*cc*	+	.				*c*	+	+		*cc*	*c*	.	.
.	.		.	.	*r*	*r*	*r*	.	.	.	.			.					
r	.	.	.		*r*	.	.	.	.	.	*r*	.		.		*r*	*r*		
.	.	.	.		*r*	.		.		.	.	.	*r*			*r*	.	.	
.	.	.	.	*r*	*r*	*r*	.	.	.		.	.		.	.	.	.		
.	.			.	.	.	.	+	.	*r*	*r*	+	.	.		.	.	*r*	
r		.	*r*		.			*c*	+	*c*	*c*	*c*	*c*	*r*	*r*	.	.	*r*	
r	.	.		*r*	.	.		.	.	.	.					.		.	
.	.	.		*r*	.	.	.		.		*r*			*r*	.	.	.	.	*rr*
	+	+	*r*	*c*		.		*c*	.	+	+	+	*r*	+	*r*	*r*	*r*		.
		.	.		.		.		.		*r*	.	+	*r*	*c*	*r*			*r*
.					.					*c*	.	*r*	*c*	+	.	*r*		*r*	
.		.		.						*r*	.		+	+	+	+	+	*r*	
r		*r*		.				.	.		.	.	.	.	.	+	*r*	.	
+	*ccc*	*c*	*c*	+		*r*	.	.	.		.			.	.	*r*	*r*		
.	.		.	.	.		.	*r*		*r*	.	.		*r*	.	.		*c*	
S	*S* (*Tp*)	*S* (*Tp*)	*S* *Tp*	*Tp* (*S*)	*Tp*	*Tp*	(*Tp*)	*Nm* *Nc*	*Nm*	*Nm* *Nc*	*Nc* *Nm*	*Nc* *Nm* *Tp*	*Nc* *Tp*	*Nc* *Tp* *Nm*	*Nc* *Tp* *Nm*	*Tp* (*Nm*)	*Tp* *Nm*	*Nm*	*O*

Table V.

Month	1	2	4	5	5	5	5	6	6	6	6	7
Day	4	9	26	3	12	17	27	3	8	14	23	22
Temp.	5,7	4,4	8,7	10,3	9,9	10,6	11,9	12,4	14,6	15,0	14,6	—
Areom. Density	1,0242	1,0210	1,0235	1,0240	1,0244	1,0234	1,0247	1,0205	1,0225	1,0217	1,0247	—
Wind	SW.	NE.	NE.	SE.	NNW.	E.	NW.	W.	ENE.	NE.	W.	—
Tide	Ebb.	Ebb.	Ebb.	Flood.	Ebb.	Flood.	Ebb.	Flood.	Ebb.	Flood.	Ebb.	—
Oikopleura dioica Fol.			.				.	.	.	.		
Centropages hamatus Lilljeb.		.	*r*	.	.	.	.		.	.		
C. typicus Kröyer	.		.	.	.	.	.	.	.	.		
Corycæus anglicus Lubbock	.		.					.	.			
Euterpe acutifrons Dana					.	.	.		.			
Oithona similis Claus.			.			.			.	.		
Paracalanus parvus Claus.		.				.	.	.	.	.		
Temora longicornis O. F. Müll.			*r*	.	*r*	.	.		.	.		
Podon polyphemoides Leuck.	.	.	.				.			.	.	
Noctiluca miliaris Suriray	.		.		.	*c*		.	+	*c*	*c*	.
Ptychocylis Ehrenbergii Clap. & Lachm.	.	.	.		.	.	.					
Tintinnopsis beroidea v. acuminata Dad.		.			.	.			*r*	.	.	
T. campanula Ehb.			.		.	.					.	*r*
T. ventricosa Clap. & Lachm.			.			.	.			.		.
Phæocystis Pouchetii Lagh.		.	*ccc*	*c*	.			.		.	.	*r*
Ceratium fusus Duj.		.	.	*r*	.	+	*r*	*r*	*r*	*r*	*r*	.
C. trip. v. longipes Bail.	.				.		.	.		.		.
Peridinium ovatum Pouchet.						.		.				
Bacteriastrum varians Lauder		.					.	.	.	.	.	
Biddulphia aurita Lyngb.		*rr*			.	.	.	.	.		.	.
B. mobilensis Bail.							.	.	.	.	.	.
Cerataulina Bergonii H. Per.	.	.	*r*	+	*c*		+	+	.		.	.
Chætoceros debilis Cl.	.	.		.	.		.	.		.	.	.
C. decipiens Cl.		.		+	*r*	*r*	.	.	.	.	.	.
C. (borealis v.?) densus Cl.				.			.	.		*r*	.	.
C. didymus Ehb.		.			.	.		.	.		.	.
C. Schüttii Cl.	.	.	.	.	.	.	.			.	.	
Coscinodiscus concinnus W. Sm.	*r*	*r*	.	.		.	.					
C. excentricus Ehb.	*r*		.	.	.	.	.	.		.	.	
C. oculus iridis Ehb.			.	.				.	.	.	.	
Ditylum Brightwellii West.			.	.		.	.	.	.	.	.	.
Eucampia zodiacus Ehb.		.	.	+	*cc*	*c*	*c*	+	+	+	.	.
Guinardia flaccida Castr.				+	*c*	*c*	+	*cc*	*cc*	*cc*	*cc*	*c*
Lauderia annulata Cl.			.	.	.	.	.	.		.	.	.
Lithodesmium undulatum Ehb.	.	.	.		.	.	.	.		.		
Rhizosolenia calcar avis Schulze	.	.		.	.	.	.		.		.	.

Helder 1898.

7	8	8	8	9	9	9	9	10	10	11	11	11	11	12	12	12	12	12
25	1	11	24	8	16	23	29	8	28	4	11	18	24	3	10	17	21	28
16,4	17,2	17,7	19,3	19,2	19,0	16,2	15,2	12,8	12,3	11,8	10,2	9,0	5,4	8,6	8,4	7,4	6,2	6,6
1,0325	1,0224	1,0234	1,0228	1,0232	1,0221	1,0237	1,0248	1,0235	1,0245	1,0240	1,0247	1,0238	1,0233	1,0256	1,0253	1,0247	1,0251	1,0250
NW.	NW.	WSW.	NNW.	—	ESE.	N.	WSW.	ENE.	SSW.	WSW.	E.	ESE.	ESE.	—	—	W.	—	SW.
Ebb.	Flood	Ebb.	Ebb.	Ebb.	Ebb.	Ebb.	Flood.	Ebb.	Ebb.	Ebb.	Flood.	Ebb.	Flood	Ebb.	Flood.	Ebb.	Ebb.	Flood.
		r	.	*r*	.	.	*r*										.	
.		*r*	*r*	+	.			*r*	.									.
.						.		.		.						*r*	+	
.	.			.	.		.	.			*r*			*r*	*r*		*r*	
.					.	*r*	+	*c*	*r*	.	*c*	+	*r*	*r*	.	.	+	.
.		*r*	*r*		*r*	*r*	+	+	*r*	*r*	+	*r*	.	.		.	*c*	*r*
.		*r*		*r*	.	.	*r*	.		*r*	.	.		*r*	*r*			*r*
	.	*r*			*r*		*r*	*r*		.	.				+	*r*	+	*r*
	.	*rr*		.	.	.	*r*	.		.				.	.		.	
c	+	*ccc*	*c*	*cc*	+			*r*	*r*	*r*	*r*			.	.	.		.
.	.	.	.	.	.	.	*r*	*r*	.		.	.	*rr*		.	*rr*	.	.
.				.	.	+	+	*r*		.	*r*	.				+	*c*	*r*
r	*r*	*r*	*r*	+	.	+	+	*r*	*r*	.	.	*r*		.		.		
.	*r*	*r*	*rr*	*r*	+	.	*r*	.		.	*r*	.			.	.	.	
r	+	.	*c*	.	.		.	.	+	.				.	.	.	.	
.	.		.	.	.	.	.	.	.	*r*		.	*r*	*r*		.	*c*	*r*
	.			.	.	.		.		.		.		+	+	+	*c*	*r*
	.			.	.	.	*r*	*r*		*r*	.	*rr*			.			.
		c	+	.	+	+	*c*	*r*	*r*	.	.							.
			.		.	.	.	.	.		.		.			*rr*	*c*	
.		.		.	.	+	*c*	+	+	+	*c*	+		+	+	+	+	*r*
.	.	.		.		.	.		.	.	*r*							.
.	.	.	.	.	.		+	*r*	*cc*		*cc*	*c*	*cc*	.	.	*r*	*c*	.
.		.			.						.				.			
.	.	*r*	*r*	.	*r*		*r*	*r*	+	*r*	+	*r*	*r*	*r*	.	.	.	.
.	*rr*		*rr*	.	.		*r*	*r*	*r*		*r*	*r*	*r*				.	
	.	.	.	.		.	*rr*	.	.	*r*	*r*	*r*	*r*					.
.	.	.	.	.	.	+	*c*	+	*r*	+	*r*			*cc*	+	+	+	*r*
	.		.	.				.	.	+	+		.				+	
.		.			.		.	.	.	.	*r*	.	.	+		*r*	.	
.		.	.	.	.	.		.	+	+	*r*	*r*	*r*	*r*		*r*	*r*	.
	.	.	.		.	.	*cc*	.	*r*	*r*	.	+	*r*			.	.	.
cc	*c*	+	.	*c*	*c*	.	*c*	.	*r*	.	*r*		.					.
.	.	.	.	.	.	.	.	.	*r*	.		*r*			.	.	*rr*	
.	.		.	.	.	.	+	*r*	*r*		*r*	+	*r*			*r*	*r*	*r*
.	.	.	.	.		.	*r*	.		.	*r*		*r*	.		.	.	.
.	.	*rr*	.		*rr*	.	.	.	.		.		.			.		
.	.	.	.	*r*			*rr*	.	*r*		*r*	*r*	*r*				*r*	
+	*c*	+	.	.	.	.	.	.		.	.				.		.	
.	.	.	.	.	.	.	.	.	.	.	*r*	+	*r*	.	.	.	*r*	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.		.		*r*	.

Table VI.

Month	1	1	1	2	2	2	2	3	3	3	3	3	4	4	4	4	5	5	5	6
Day	12	18	27	4	11	16	23	3	8	15	23	31	5	14	21	28	11	20	26	7
Acartia Clausii GIESBR.	r	r				r	r	r	r		+	+			r		cc		+	
Calanus finmarchicus GUNN.		.							.					.					r	r
Centropages typicus KRÖYER	r	r	.							r			.	.	r		+	+	+	.
Corycæus anglicus LUBB.	r	+	r		r	r	r		r			r		.					.	
Euterpe acutifrons DANA.	r	r		r	r	.	r		+			+							.	
Oithona similis CLAUS	r	+	.	r	r	+	r	r	+	c	+	+	r	r		rr		+	.	.
Paracalanus parvus CLAUS	r	c			r					+	r	.		.			.	+	.	.
Pseudocalanus elongatus BOECK.		+				r	r		r	+	r	.			.	.			.	.
Temora longicornis O. F. MÜLL.		.				.	r					c		.	r	.	c		.	.
Sagitta hipunctata QUOI & GAIM.		+											.	.		.			.	
Noctiluca miliaris SURIRAY		.						.											.	
Acanthochiasma fusiforme HKL.	r	r									.	.	.	.	.		.		.	.
Dictyocylis Ehrenbergii CLAP. & LACHM.	.												.	.	.			.	.	
Lintinnopsis beroidea v. acuminata DAD.						r						r	.	.	.	r			.	.
L. campanula EHB.											.				.			.		
Phæocystis Pouchetii LAGH.									.	.	r		+	c	c	cc	ccc	ccc	cc	cc
Ceratium fusus DUJ.			r				.	r		+		r	+	.	+	c		.	.	.
C. tripos NITZSCH	.	+	+	r			r	r	r	+				.	.	r		.	.	
v. longipes BAIL.			.			.	.	rr		r					r	rr	.			
Diplopsalis lenticula BERGH.	.	r						r		r		.	.	.	.	r			.	
Peridinium divergens EHB.		r	r		.	.		.	.	+		+	r		.	r			.	.
Halosphæra viridis SCHMITZ					.	.		.	.		.			.				.	.	.
Asterionella japonica CL.		.	.				.	.	.	.	rr		r	r		rr			.	.
Biddulphia mobilensis BAIL.	c	c	c	c	c	c	c	+	+	+	+	.		.	.		.		.	
Cerataulina Bergonii H. P.			.			.		rr	.				r		+	+				.
Chætoceros curvisetus CL.	.					.	.		r		c	.	+		.			.		.
C. decipiens CL.	r	r	r			r		.		+	+	r	+		.		.		.	.
C. (borealis var.) densus CL.											+	r	c	c	+	r	.	.		.
C. didymus EHB.	.						.	.	.	rr	.	.	.	.	.	.	.	.	.	.
C. Lorenzianus GRUN.	.		.				.	.			.		.	.	.	.			.	.
C. Schüttii CL.						rr				rr	.	.	.	.	.	.		.	.	
Coscinodiscus concinnus W. SM.	c	c	c	c	c	c	c	r	r	+	+	c	+	c	+			+	.	+
C. excentricus EHB.		+	+	+	+	+		.				.	.		.		.	.		.
Dictylum Brightwellii WEST.	.	r	r		.	.	r	.	.						.		.	.		
Encampia zodiacus EHB.			.					.			r		c	+	c	c		.	.	
Guinardia flaccida CASTR.		.	.	.		.	.	.			r	r	.	.	.		.	.		.
Lauderia annulata CL.	r		.			.		r	r	c	c		.	.	+	.	.	.	.	
Rhizosolenia alata BTW.			.								.	.	.			.	.	.	.	
v. corpulenta CL.					.	.		.			.	.			rr				.	
R. gracillima CL.			.	.		.	.					r	r	r	.	r		.	+	r
R. robusta NORM.		.		.	.	.	.			.	.		r	r	r	.	r	.	.	
R. semispina HENSEN	.		.		.	.		.	.		.			r	.	+	.		+	r
R. Shrubsolei CL.	.		r				.	.		r		.	.		+	c				
R. Stolterfothii H. P.			.			.		.			r	.	c	c	c	cc	.	+	cc	c
R. styliformis BTW.			.	.				.			r	r	r		r	.	.	.	r	r

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6 15	6 23	7 5	7 14	7 22	7 30	8 5	8 12	8 16	8 24	9 2	9 9	9 22	9 27	10 4	10 11	10 20	10 31	11 3	11 9	11 12	11 17	11 22	12 1	12 3	12 7	12 14	12 19	12 31
r	*r*		+		*c*	.	*c*	*r*		.	*c*	*r*	+	.	*r*	*r*				*r*		*r*		+	*r*			
		+	*r*				*r*				.	*r*	+	*r*	*r*	*r*			*r*	+	+							.
r		*r*	.		.	.	+		*r*		+	*r*	+	+	+	*r*	.		.		+	.	.					
r	*r*	.	*r*	.	.	.	.			*r*	.	*r*	*c*	+	+	+	+		+	*r*	+	+	*r*	+	.	*c*	+	.
r	.							.	.	*r*			*r*	+	*c*	*cc*	*c*	+	*c*	*r*	.			*r*				
	r		.		+			+	*c*	*r*		+		+				*r*	*c*	+		*r*		+		*c*		
	.				*c*	.		+	+	.	*c*	*c*	*c*	*c*	*c*	*cc*	+	*r*	*r*	*c*	+	*r*	.			.	*c*	
.	+						.		*r*	.																		.
.	+	.	.		*r*			.	+		.				*r*		*r*	.	+	.	*r*		.					
	.			.	.		.			+	*r*	.		*r*	+	*r*		.	*c*	+								
	ccc		.	*ccc*	*c*					*r*	+	*r*	*r*	*cc*	*ccc*	*cc*	*c*	+	+	*r*	*c*		*c*				*rr*	
					.	.	*c*	*r*	.	.				*r*									.			.		
						c		*r*		+	*r*				.					.						.	.	
						.		.	.			.			.		.	.					*r*			+	.	.
			.	.		.	.	+		+	*r*	.	+		.	.		.	.									
.				.							.		*r*					.	.		.						.	
r				.	+			*r*			.									.			*r*	.				
+	.		.		*c*	*c*		*r*	.		+	*r*				*r*	+		*r*	*r*	+	*c*	*r*	*r*	*r*	+	*c*	
.	+	.		+	*c*	*c*				*rr*	.	.						.	.		.				.	+	
+								*r*				.					.		.							.		
											.	.				.	.				.	*rr*						
.	.		.			*r*		*r*	.			.	*r*	.		.	.	.				.						
				.		.		.			*rr*	.		.		.	.	.					.					
		.	.				.	.					*r*	.		*r*	*r*			.			*r*		*r*		*r*	*r*
+		.								*rr*			.	.	.	.												
						r	*c*	*c*	*r*	*cc*	*c*	*c*	*r*			.					.		.					
		.	.	.	.					.		*c*	+	*r*					,	*r*	*c*	+	+		*r*		*r*	
r		.	.	.		*c*	+	.	.		*r*	.	*r*	.			.									.	.	
			.			.							.	*rr*			.				*c*	*r*	*r*	*r*		*r*	.	
		.		.	.	+	+	+			*r*				.		.	.			.	.					.	.
			c	*r*	*c*	*c*	*c*	*c*	.	*r*		.		.	.		.	.	.	.	*c*	.				.	.	
		.		.	.			.				.	*c*	*cc*	.	+	*c*	+	*cc*	*cc*	*c*	*c*	*c*	*r*	*r*	*c*	*cc*	.
														.				.			.	+						
					.	.		.	.	*c*	*ccc*	+	+	.		.		.		.		.	.						
.							.	.	.	.		*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*			.		
+		*cc*	*ccc*	*cc*	*ccc*	*c*	*cc*	*cc*		*c*					.			.						.				
.		.	.	.	.			.		*rr*		*r*	*r*	*c*	*r*	*r*	+	+	*r*	*r*	*cc*	*r*	*r*	*r*		*r*	*r*	
		.			.	.	.	.			*rr*				.		.		.	.	.							
							r			.										.								
c	+					+	*r*	*r*			*r*	.									.					.		
+	*rr*				*r*	*r*				*r*	*r*	*r*	.		*r*		+		.		*r*	*r*						
					c	*c*		+	*r*	*r*		.							.									
		.						.		.																		
		.						.	.	.		.																
Nm *S*	*Nm*	***Nm***	*Nm*	*Nm*	*Nm* *Ns*	*Nm* ***Ns***	*Nm*	*Nm*	*Nm*	*Nm*	*Nm*	*Nm* *C*	*Nm* *Nc*	*Nm* *Nc* *S*	*Nm*	*Nm*	*Nm* *Nc* *S*	*Nm* *Nc* *S*	*Nc*	*Nc*	*Nc* *Nm* *S C*	*Nc* *Tp* *C*	*Nc* *Nm*	(*Nm*)	(?)	*Nm* *Nc*	*Nc* *Nm* *Tp*	*O*

Table VII.

Month	I	I	I	II	II	II	III	III	III	III	III	IV	IV	IV
Date	2	10	30	9	15	22	1	8	11	21	29	1	7	13
Temp.	3,70	3,65	—	—	2,10	2,45	1,95	1,80	—	—	2,10	—	3,95	3,40
Sal.	23,58	25,95	—	—	26,27	27,34	22,62	26,94	—	—	22,48	—	27,22	24,04
Oikopleura dioica Fol.	.		r	.	.		.							.
Acartia Clausii Giesbr.	.	.	.			.	.	.				.		
A. longiremis Lilljeb.	+	.		r	r	.	r	r	r	.		rr	r	
Calanus finmarchicus Gunn.	.		r	r	.	.			.	.		.		
Centropages hamatus Lilljeb.	+		+	.		.			r		.	rr		
C. typicus Kröyer	r		r	.		.		.		.			.	
Oithona similis Claus	c	+	.		r		r	r			.	rr		
Paracalanus parvus Claus			.		.	.					.			
Pseudocalanus elongatus Boeck.	.	.		+	r	.	r	r	r			r		
Temora longicornis O. F. Müll.	+	.	.	+			rr		r		.	.	.	.
Evadne Nordmannii Lovén	.							.					.	
E. spinifera P. E. Müll.												.		.
Podon intermedius Lilljeb.		.	.					.			.	.		
Sagitta bipunctata Quoi & Gaim.	+	.		r				.	.					
Cyttarocylis denticulata Ehb.	r		r		r		r	.	.				r	
Ptychocylis acuta Brandt	r		r	r	r	r	r	.		.				
Tintinnopsis beroidea v. acuminata v. Dad.	.		r											rr
T. campanula Ehb.	.	.			.			.						
Distephanus speculum Ehb.		.	.		.			.		.				
Halosphæra viridis Schmitz	r	+	cc	c	+	r				rr		.	.	
Ceratium furca Duj.			+	r				.		rr	.	.	r	.
C. fusus Duj.		.		.		.		.		rr		.	r	.
C. lineatum Ehb.	r	.	.		.		.			rr				.
C. tripos Nitzsch	ccc	+	cc	c	+	+	r	r		rr	rr		r	
v. longipes Bail.	r	r	r	+	+	+	r	+		rr		r	r	rr
v. macroceros Ehb.			r	.		+						.		.
Dinophysis acuta Ehb.	r	.	r	.	.		r	.						.
Peridinium depressum Bail.	r				r	+	r	r		r		r	.	.
P. divergens Ehb.			.	.	.					.		.		.
Xanthidium multispinosum Moeb.			.	.	.	.				.	.	r	.	
Biddulphia aurita Lyngb.	rr	.	r	r	r	c	r	r	.	r	.	r		
Cerataulina Bergonii H. Per.	rr			.	.	.			.				r	r
Chætoceros borealis Btw.		+	r	r	r	+	.	r	.		r	r	+	

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IV	IV	V	V	V	V	VI	VI	VII	VII	VIII	VIII	VIII	IX	IX	X	X	X	X	XI	XI	XI
20	25	1	10	16	27	4	10	6	26	8	15	24	3	21	1	10	21	28	7	14	27
3,25	—	5,95	8,30	8,45	10,10	11,45	16,5	15,55	14,80	14,65	15,30	17,10	14,70	14,10	—	—	8,10	8,65	8,35	7,10	4,85
25,28	—	19,78	18,61	22,22	20,29	20,43	19,56	18,83	24,32	24,58	23,59	19,66	30,10	27,01	—	—	22,60	22,56	25,83	18,78	23,05
	.	.				.		c	+	+	+	+	c	+	c	.	+	+	+	+	
	rr	.		.	+				r	+	c	c	+	.	r		r		.	r	rr
	r	r	r	.	+	r				.	.		r		.	.		r	r	+	.
	.			.			.		r		+	r		+	+	+					.
.	rr	r	r		+	r	r	r	.	r	.		r		r		.	r		c	.
		.				.				+	.		+		c	c	c	+	.		
.		r	r	rr	.	r	+	c	+	c	c	c	c	c	c	+	+	c	+		
.	.	.			.	.	.	c	+	c	cc	c	cc	c	c	c	c	+			rr
.		r		.	+	.	.	.	.	+	.	r	+		+		r		.		rr
.		.	.	.	+	r	+	.		r	r		r				r	r	.	r	rr
		rr	r	rr	+	r	+		r	c				+	+	.	.	.	.	.	.
			.				.		.	c	cc		c		c	c	r				rr
	.								rr	rr	rr		r	rr	r		r	r		.	.
.	.		.				r	.			+	c	c	+	+	+	.	+		+	.
.	r	r	r	r	r	r			.			.			.	.			.	.	.
.	.										.				.		.				
.	r	rr	.	r	.	.								.				.			
	.		.	.				.	r		.	rr	r	.	r	rr		r	.	rr	.
			.	.					.	.	.			.	rr	rr	.	.	rr	rr	rr
	.		.							.	.			.	.	.			r		r
	.	.	.	.				r		.	.		r			r	r		r		.
				.	r			.		+		+		.	.	r	r	r	r	r	.
	.			.	.	.		.		r	.			.		.	r	.	r	r	.
	rr	r	r	r	r	r	+	+	c	ccc	cc	cc	+	+	.	+	c	c	+	cc	+
r	rr		r	r	r	r	.	.		.	.	.	r	.	.	r	r			r	r
	.		.	.	.			.	r	+	r		c	+	c				r	.	rr
	.	.		.	.			.	r			r		r	.	.			rr		
.	.	.		.					r		.	.	.			.			r	r	.
.		.	.	.	.		.	r	r	r	r	r	.	r		r	r	.			.
.	rr		.			.	.	.	r			.	.		r	rr	.				
	.		.	.			.		.		.		.	.	.						
.	r	rr	rr	+	c	c	c	r				+	r			.		r		r	.
r	c	+	r	r	r	r						.			.		.	c	r	r	+
.	.	rr	.	.	.	.	.							.		.	.	.		.	r
cc	ccc	ccc	ccc	cc	+	+	.				.					.	.	+	+	.	.
+	.	+		c	+		.					r	r	r	.	+	.		r	+	c
r	.	.	.	.		.	.					c	c	+	c	cc	cc	cc	cc	c	c
r		cc	ccc	ccc	cc	c	cc				.	.	.	.	.			c	c	r	+

Month	I	I	I	II	II	II	III	III	III	III	III	IV	IV	IV
Date	2	10	30	9	15	22	1	8	11	21	29	1	7	13
Temp.	3,70	3,65	—	—	2,10	2,45	1,95	1,80	—	—	2,10	—	3,95	3,40
Sal.	23,58	25,95	—	—	26,27	27,34	22,62	26,94	—	—	22,48	—	27,22	24,04
C. debilis Cl.					*c*	*c*	*c*	+	*c*	*c*	*c*	+	*r*	*r*
C. decipiens Cl.		*r*	*r*	+	+	*c*	.	+	*c*	+	+	+	+	.
C. diadema Ehb.	*r*			*r*			+	*r*	+	+	+	+	*r*	*r*
C. didymus Ehb.		.	*r*				*r*	+	.		.	.		
C. hiemalis Cl.									.		+	*r*	*c*	*r*
C. Schüttii Cl.								.		.			.	.
C. scolopendra Cl.		.		*r*	*r*	*r*		*r*		*r*		*r*		
C. socialis Lauder				+	*c*	+	+	+	+					
C. teres Cl.			*r*				*r*		*r*		*r*		*r*	
Coscinodiscus concinnus W. Sm.	+	+	*r*		*r*			*r*						
C. oculus iridis Ehb.			+	*c*		+	*r*	*r*		.	.		.	
C. polychordus Gran.					*r*	*r*	+				*r*	.	*r*	
Ditylum Brightwellii West.				.			.						*r*	
Guinardia flaccida Castr.					.									
Leptocylindrus danicus Cl.				.	*r*		*r*	*r*	*c*	*r*	+		*r*	*r*
Nitzschia seriata Cl.					*r*	*r*	*r*	*r*	*r*	+	+	*r*	+	*r*
Rhizosolenia delicatula Cl.											.			
R. gracillima Cl.										.		.		
R. semispina Hensen	*rr*		*r*							*r*		*r*	*r*	*r*
R. setigera Btw.		.			.						*r*	*r*	*r*	
Skeletonema costatum Grev.	*rr*	*r*	*r*	*r*	*r*	*r*	*r*			*r*	*r*	*r*		.
Thalassiosira gelatinosa Hensen				*r*	*r*	*r*	*r*				*r*	*r*	*r*	
T. gravida Cl.			.	*r*	*r*	+	.	*r*		*r*	*r*		*r*	.
T. Nordenskiöldii Cl.	.	.	*r*	*c*	*cc*	*cc*	*c*	+	+	+	*r*			
Thalassiothrix Frauenfeldii Grun.	*r*	.	.	+	*c*	*cc*	*cc*	*ccc*	*cc*	*ccc*	*cc*	*cc*	*c*	+
T. longissima Cl. & Grun.	*rr*	*r*		*c*	*c*		*r*	*r*		*r*	*r*		*r*	
Plankton-type	*Tp*	(*Tp*)	*Tp* *Nh*	*Tp* *T* *Si*	(*Tp*) *T Ns* *Si*	*Si* *Ns* (*C*)	*Si* *Ns*	*Ns*	*Ns*	*Ns*	*Ns*	*Ns*	*Ns* (*Nm*)	*Ns* (*Nm*)

IV	IV	V	V	V	V	VI	VI	VII	VII	VIII	VIII	VIII	IX	IX	X	X	X	X	XI	XI	XI
20	25	1	10	16	27	4	10	6	26	8	15	24	3	21	1	10	21	28	7	14	27
3,25	—	5,95	8,30	8,45	10,10	11,45	16,5	15,55	14,80	14,65	15,30	17,10	14,70	14,10	—	—	8,10	8,65	8,35	7,10	4,85
25,28	—	19,78	18,61	22,22	20,29	20,43	19,56	18,83	24,32	24,58	23,59	19,66	30 10	27,01	—	—	22,60	22,56	25,83	18,78	23,05
+	r																				
c		+	+	r	+		.								r						
+		r																+	c	+	c
.												c	r	ccc	+	cc	c	+			
+	+	+	+	c	+		r					r				r	r	r	r		r
												c	c		+	c	c	c		+	
																					r
		rr																			
													r		r			r	r		r
r																					r
																		r	r	r	r
	.					r		r					r	r				+	r	r	r
r	c	c	+	c	+	+	+														
r	r			r		+															
	.		r			r	c														
	+	r	r	r	c	c	cc	ccc	ccc			c	r	+		+	+	+	c	r	c
r	c	+	+	r	c		r									.					
																		r	+	rr	r
r		r																		+	cc
																			rr	r	r
	r																				
r																					rr
cc	cc	c	c	c	cc	c	c						.						c	+	c.
	.																				
Ns C	Ns (Nm)	Ns Nm	Nm Ns	Nm Ns	Ns Nm	Ns Nm	Nm (Ns) (Tp)	Nm (Tp)	Nm (Tp)	Tp	Tp	Nm (Tp)	Nm (Tp)	Nm (Tp)	Nm (Tp)	Nm (Tp)	Nm (Tp)	Nm (Tp)	Nm Tp (Ns)	Nm (Tp) Ns	Ns Tp	Ns

KONGL. SVENSKA VETENSKAPS-AKADEMIENS HANDLINGAR. Bandet 34. N:o 2.

THE PLANKTON

OF

THE NORTH SEA, THE ENGLISH CHANNEL AND THE SKAGERAK

IN 1899

BY

P. T. CLEVE.

COMMUNICATED 1900, APRIL 11.

STOCKHOLM
KUNGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER
1900

For the hydrographical researches of PETTERSSON and EKMAN the North Sea was explored four times during the year 1899, viz: in February, April—May, July—August and November. At the same time samples of water were taken for chemical analysis and of plankton for microscopical examination. Some other samples have been taken in March at 59°—60° N. 4°—5° W. by a steamer Thyra, in May by the Swedish expedition to Greenland under Prof. A. G. NATHORST, in June by the steamer Rurik on the way to Spitzbergen, in July by the Swedish corvette Freya and in September by the returning Greenland expedition. At the biological stations at Plymouth, S:t Vaast la Hogue and Helder samples were collected almost every week, during the whole year at Plymouth, from January to March at S:t Vaast and from January to September at Helder. For this valuable assistance I beg to tender the directors of the said stations, Mr. E. J. ALLEN, Dr. P. P. C. HOEK and Mr. EUGÈNE MALARD my best thanks. Again, at the expenses of the Fishery Association of Gothenburg, samples of plankton were collected almost every week at Måseskär and Väderöboda, off the west coast of Sweden, and, though with less regularity, in the open Skagerak.

I. The North Sea in February 1899.

The hydrographical map of the North Sea, February 1899, has already been published by PETTERSSON and EKMAN (Bih. till K. Sv. Vetensk. Akad. Handl. Vol. XXV. Part. II. N:o 1.) It is seen from that map, that water with the salinity 35 p. m. extends north of a line from Newcastle towards the Skagerak, S. W. of Norway, where it encounters water of lower salinity. South of the said line water of 34 p. m. salinity prevails to the continental coast region.

The microscopical examination proved that the water of 34 p. m. salinity was practically *sterile*. The water of 35 p. m. salinity was poor in plankton, which contained as most characteristic forms *Halosphæra* and *Coscinodiscus concinnus*. On the space, where the two kinds of water meet, the plankton was not so scarce and increased steadily in quantity towards the Skagerak. This plankton contained, besides the above species, chiefly *tripos-plankton*, that was the prevailing kind N. W. of the Danish Peninsula. There entered also in the composition of the plankton a certain amount of *Ceratium longipes*. The intermixture of tripos- and concinnus-plankton ruled in the bank water, west of the

Danish Peninsula, but towards Norway the tripos-plankton was intermingled with *Halosphæra*.

The *Coscinodiscus concinnus* occurred round Scotland and from Firth of Tay across the North Sea towards the Danish Peninsula, where the route became forked. One branch went to Skagen, another followed the Danish coast towards Heligoland.

Of *Chæto-plankton* mere traces were found midway between Scotland and Norway.

The changes, that arrived since December 1898, consisted thus therein, that the *concinnus-plankton*, which then prevailed in the southern North Sea, had been forced towards the Danish Peninsula and to the boundary between the 34 and 35 p. m. water, and that the *tripos-plankton*, that in December prevailed between Scotland and Scandinavia, had decreased and been partly replaced by *Halosphæra-plankton*. The latter kind appeared already in December.

II. The North Sea in April—May 1899.

The state had since February been changed completely. If a line be traced on a map between Newcastle and Skagen, there were found north thereof, to about 58°—59° N. a number of arctic or boreal, partly neritic forms. The *cheto-plankton*, that usually prevails at this season between Scotland and Scandinavia, appeared first at 58° N. midway between Scotland and Norway. South of the said line there occurred *southern neritic plankton*, frequently intermingled with *styli-plankton*. This area was interrupted from about 56° N. 4°—5° E. towards the mouth of Elbe by a band, that contained northern neritic species which seem to have spread from the depression of the bottom between the Fisher and Dogger Banks.

III. The North Sea in July—August 1899.

The plankton, that prevailed in the greatest part of the North Sea, at least between 54° and 61° N., was the *tripos-plankton*. East and west of Scotland there occurred *northern neritic plankton*, probably a remnant from the spring, but intermingled with some styli-plankton. The plankton in the water, that occurred from the mouth of the Schelde to the middle of the Danish Peninsula, belonged to the *southern neritic* type, but contained some traces of northern neritic plankton. From Skagen to the entrance of the Limfjord *Rhizosolenia gracillima* was met with.

IV. The North Sea in November 1899.

Above the 100-metre plateau of the bottom there prevailed *tripos-plankton*, which was more richly represented in the eastern parts than along the English coasts. In the southern North Sea, above the 50 metre plateau, there occurred from Schelde to Skagen *southern neritic plankton*.

V. The Skagerak in 1899.

The seasonal changes in the plankton will be examined for certain periods with reference to the prevailing plankton types.

Period I. *January.* The prevailing types are the *tripos-* and *concinnus-plankton. Halosphæra* occurred in the north at Väderö, where also *Clione limacina* and *Thalassiothrix longissima* were seen once, the last named abundantly. Some southern forms, which are to be considered as remnants from the last period of 1898, for instance *Proto pedata, Paracalanus parvus, Sagitta, Ceratium bucephalum, Ditylum Brightwellii* a. o. disappeared, and arctic or boreal forms increased in frequency towards the next period.

Period II. *February—March.* This period is characterized by the abundance of arctic and northern species. The *Coscinodiscus concinnus* continued to be common during February. Animals were on the whole rare, but diatoms exceedingly abundant, during March in the whole Skagerak and Cattegat to Öresund. The most important forms were the following:

Biddulphia aurita.
Chætoceros constrictus.
C. contortus.
C. debilis.
C. diadema.
C. socialis.
C. scolopendra.
C. teres.
Coscinodiscus oculus iridis.
C. polychordus.
Nitzschia seriata.
Rhizosolenia semispina.
Skeletonema costatum.
Thalassiosira gravida.
T. Nordenskiöldii.

Most of these forms disappeared before the end of March, *Chæt. debilis* and *C. diadema* before the middle of April; *C. constrictus* remained to the end of May and *C. contortus* was more or less common to the end of the year. *C. decipiens* occurred among these boreal forms more or less sparingly, but it increased in abundance during the next period.

The area of distribution of these species is from Iceland to the Färöes and the Shetlands, and, as they were not seen in the North Sea between Scotland and Scandinavia, it may be assumed, that they arrived into the Skagerak from the deep »Norske Rende».

Period III. *April.* This period is remarkable for the abundance of *chæto-plankton.* Connected with this kind seemed to be *Dinobryum pellucidum* and *Rhizosolenia semispina. Chætoceros constrictus* continued to be common, but other northern forms became scarce. At the end of the month *Rhizosolenia styliformis* appeared suddenly at Måseskär in great abundance and in its company a number of southern forms.

Period IV. *May—June.* This period commenced, as stated above, with the appearance of *Rhizosolenia styliformis.* In its company a number of southern forms arrived as:

Oithona similis.
Chætoceros curvisetus.
Chætoceros danicus.
C. Schüttii.

Eucampia zodiacus.
Guinardia flaccida.
Ditylum Brightwellii.
Lauderia annulata.
Rhizolenia Shrubsolei.
Stephanopyxis turgida.

At this season the euryhaline *Centropages hamatus*, *Acartia longiremis* and *A. bifilosa* reach their maximum.

On the other hand, also *tripos-plankton* sets in having in its company *Calanus finmarchicus*, *Pseudocalanus elongatus*, *Evadne Nordmannii*, *Podon Leuckarti* and *Chætoceros hiemalis.*

Period V. *July—August.* The *tripos-plankton* became now the prevailing kind, but was intermingled with a certain amount of southern neritic plankton, for some time also with *Coscinodiscus concinnus.* *Rhizosolenia gracillima* also appeared, but this species was remarkably scarce in the year 1899.

Characteristic species are *Oikopleura dioica*, *Acartia Clausii*, *Paracalanus parvus*, *Evadne spinifera* and *Sagitta.*

Period VI. *From the end of August to the end of October.* The *tripos-plankton* continues to predominate. *Oikopleura*, *Sagitta*, *Oithona similis* and *Paracalanus parvus* from the last period are still abundant. New are *Centropages typicus*, *Podon intermedius* and *Rhizosolenia Stolterfothii.* Also *Anomalocera Patersonii* and *Labidocera Wollastonii* were seen, but rarely. *Limacina balea* was for a short time visible, and then abundantly. *Amphorella Steenstrupii* occurred sparingly. The period VI is chiefly characterized by the development of *didymus-plankton*, containing *Chætoceros didymus*, *C. curvisetus* and *C. Schüttii.* The last named species appeared already at the end of June and in the beginning of July, but for a short time only. It reappeared now abundantly.

Period VII. *November—December.* The *tripos-plankton* (now containing *Ceratium bucephalum*) and the *didymus-plankton* continue as before, but the last named kind became scarce or disappeared in December. *Halosphæra* appeared, but rarely, also *Plectophora arachnoides.* The southern *Ditylum Brightwellii*, *Eucampia zodiacus* and *Guinardia flaccida*, which were seen in the spring, reappear.

The period VII. is characterized chiefly by a number of arctic or boreal forms most of which occurred sparingly. Such forms were the following:

Biddulphia aurita.
Chætoceros borealis.
C. constrictus.
C. debilis.
C. diadema.
C. laciniosus.
C. scolopendra.
C. teres.
Coscinodiscus oculus iridis,
C. polychordus.
C. stellaris.
Rhizosolenia setigera.
Skeletonema costatum.
Thalassiosira gelatinosa.
T. Nordenskiöldii.
Thalassiothrix Frauenfeldii.

VI. Plymouth in 1899.

The seasonal changes in the plankton will be examined for certain periods with reference to the prevailing plankton types.

Period I. *January 17th to March 14th (30th).* Characteristic species are *Biddulphia mobilensis*, *Halosphæra viridis*, *Coscinodiscus concinnus* and *C. excentricus.* Besides these forms, which probably derive from the northern coasts of the British islands and from Scotland, there occurred a number of both boreal and southern forms.

Among the northern forms we note:

Fritillaria borealis.
Oncæa minuta.
Chætoceros decipiens.
Chætoceros teres.
Thalassiosira gelatinosa.

These forms do not continue during the next period or occurred then sparingly only. The following northern species continue for the next period: *Pseudocalanus elongatus*, *Peridinium ovatum* and *Thalassiosira gravida.*

Among southern forms, besides such as remained for the whole year, we note:

Centropages typicus.
Corycæus anglicus.
Euterpe acutifrous
Oncæa subtilis.
Paracalanus parvus.
Parapontella brevicornis.
Chætoceros Schüttii.
Corethron hystrix.
Ditylum Brightwellii.
Rhizosolenia robusta (*rr*).

Most of these species appeared towards the end of February, or later, and continued during the following period.

Period II. *April 4th to May 12th.* This period is remarkable for the abundance of the arctic *Phæocystis Pouchetii.* In its company a number of other *arctic or boreal species* appeared, most of which did not survive during the next period. Among these boreal forms we note:

Pseudocalanus elongatus.
Temora longicornis.
Peridinium ovatum.
P. pellucidum.
Asterionella japonica.
Chætoceros debilis.
Chætoceros furcellatus.
Leptocylindrus danicus.
Skeletonema costatum.
Thalassiosira gravida.
T. Nordenskiöldii.

Calanus finmarchicus is the only boreal specied that survived this period.

The flows of boreal water, that commenced during the period I., continued to the middle of March, and took during this period a more decided arctic character.

During the period II. also a certain number of southern forms occurred, but among them several seemed to die out or to be driven away by the water containing *Phæocystis.* Such forms were:

Corycæus anglicus.
Euterpe acutifrons.
Chætoceros curvisetus.
C. didymus.

Evadne Nordmannii.
Paracalanus parvus.
Parapontella brevicornis.
C. Schüttii.
Ditylum Brightwellii.

These southern forms cannot thus be assumed to have come in the company of such forms as characterize the period III., and it seems probable that they were swept down from the British coast by the northern flows.

Period III. *May 24th to July 19th.* The arctic species had disappeared, almost completely, but became replaced by southern forms, e. g. *Guinardia flaccida*, which appeared already before this period, but decreased during the period II. Among such forms we note:

Acartia Clausii.
Centropages typicus.
Oithona similis.
Paracalanus parvus.
Chætoceros densus.
Guinardia flaccida.
Rhizosolenia Shrubsolei.

And, besides, the following new ones: *Isias clavipes, Ceratium fusus* and *Rhizosolenia Stolterfothii.*

It seems most probable that these forms came with water from the coast banks of the temperate Atlantic.

Period IV. *July 24th to August 18th.* Characteristic species is *Rhizosolenia gracillima.* In its company arrived a number of southern neritic species, among which some continued during the next period. Such forms were:

Corycæus anglicus.
Euterpe acutifrons.
Cyttarocylis serratus.
Tintinnopsis campanula.
Chætoceros curvisetus.
C. didymus.
C. Schüttii.
Ditylum Brightwellii.
Rhizosolenia corpulenta.

Several of these species are the same as appeared in the spring together with boreal forms. I presume therefore that the specimens in the period IV represent a fresh set, that arrived from the south, probably from the Bay of Biscay or the French coasts. The rare occurrence of *Peridinium exiguum* and of *Dinophysis homunculus* corroborates such an opinion.

Period V. *August 24th—31st.* This short period is remarkable for the sudden reappearance of *boreal* forms as *Asterionella japonica, Chætoceros debilis* and *Skeletonema costatum.* Together with them also *Streptotheca thamesis* appeared, but sparingly. They seem to be the first signs of the presence of the boreal flows, that characterize the next period.

Period VI. *September 10th to December 28th.* The most characteristic species is *Coscinodiscus concinnus.* In its company a number of boreal forms appeared viz.:

Fritillaria borealis.
Oncæa minuta.
Peridinium depressum.
P. ovatum.
Chætoceros decipiens.
Coscinodiscus oculus iridis.
Thalassiosira gravida.

During this period also the following, non-arctic, species appeared:

Halosphæra viridis. *Guinardia flaccida.*
Biddulphia mobilensis. *Lauderia annulata.*
Eucampia zodiacus. *Stephanopyxis turgida.*

All these species had probably been swept down from the northern British coasts.

The following southern forms increased in abundance or reached their maximum during the period VI.:

Corycæus anglicus. *Rhizosolenia corpulenta.*
Euterpe acutifrons. *R. robusta.*
Noctiluca miliaris.

On the other hand the following decreased:

Acartia Clausii. *Chætoceros curvisetus.*
Centropages typicus. *C. densus.*
Paracalanus parvus. *Ditylum Brightwellii.*
Ceratium tripos.

VII. St Vaast la Hogue in 1898—1899.

The collecting of samples at this station commenced in June 1898, but became interrupted in March 1899, so there is no complete series; still, the collection is of no little interest. Also at this place the influence of arctic water is apparent at certain times of the year, and if the plankton from St Vaast be compared with that from Plymouth we note striking differences. As in the preceding cases we may consider the changes in the nature of the plankton by periods.

Period I. *June 4th 1898.* The prevailing plankton was the *chæto-plankton*, represented by a great abundance of *Chætoceros decipiens. Phæocystis Pouchetii* was also common. As other boreal forms we note *Centropages hamatus, Pseudocalanus elongatus, Temora longicornis* and *Chætoceros teres.* All these boreal forms had disappeared already by the 12th in the same month. Other species are of comparatively little importance and of southern origin, as *Chætoceros didymus, C. densus* and *Acartia Clausii.*

Period II. *June 12th to August 12th 1898.* The plankton consists chiefly of the southern neritic species *Rhizosolenia Shrubsolei* and *Guinardia flaccida.* Other southern forms also occurred, but more or less sparingly, as:

Cerataulina Bergonii. *Chætoceros Schüttii.*
Chætoceros danicus. *Eucampia zodiacus.*
C. didymus. *Rhizosolenia Stolterfothii.*

The only boreal form is *Leptocylindrus danicus.* Whether *Chætoceros contortus* be of northern or southern origin is at present doubtful.

Period III. *Between September 6th and October 6th 1898.* This period is remarkable for the *sterility* of the water, *Tintinnopsis ventricosa* being the only species of any importance.

Period IV. *From October 20th to December 24th 1898.* Some species from the period I I. reappeared, as *Chætoceros densus, C. didymus, Eucampia zodiacus*, but as a new and important constituent of the plankton *Rhizosolenia Stolterfothii* occurred, and, in its company, a number of southern forms, such as *Euterpe acutifrons, Bacteriastrum varians, Bellerochea malleus* and, in very great abundance, *Chætoceros curvisetus.*

Some *boreal* forms occurred rarely, as *Biddulphia aurita, Chætoceros decipiens, Coscinodiscus oculus iridis* and *Thalassiosira gravida*, showing a slight influence of water from arctic regions.

Period V. *From January 1st to March 15th 1899. Chætoceros curvisetus* and *C. didymus* continued to be common, and some other southern forms also remained, although more or less scarce, as *Chætoceros densus, Eucampia zodiacus, Rhizosolenia Shrubsolei* and *R. Stolterfothii.* On the contrary *Bacteriastrum varians* and *Bellerochea* had disappeared. The following new, non-arctic, species appeared:

Biddulphia mobilensis.
Chætoceros danicus.
Ditylum Brightwellii.
Streptotheca thamesis.

Besides, there occurred also *Coscinodiscus centralis* (probably a variety of *C. concinnus*).

This period is particularly characterized by a number of *arctic* or *boreal* forms, some of which appeared already in the preceding period, but very rarely. Such northern forms are:

Centropages hamatus.
Temora longicornis.
Pseudocalanus elongatus.
Phæocystis Pouchetii.
Asterionella japonica.
Biddulphia aurita.
Chætoceros borealis.
C. decipiens.
Chætoceros teres.
Coscinodiscus oculus iridis.
C. radiatus.
Rhizosolenia setigera.
Skeletonema costatum.
Thalassiosira gelatinosa.
T. gravida.
Thalassiothrix Frauenfeldii.

VIII. Helder 1899.

According to the variation in the composition of the plankton I distinguish the following periods.

Period I. *From January 5th to March 3rd.* The most important species is the boreal *Biddulphia aurita.* In its company there occurred, although sparingly, some other northern forms, as *Chætoceros debilis, C. diadema* and *C. teres.* The following derive probably from Scotland: *Biddulphia mobilensis, Coscinodiscus concinnus* and *Streptotheca thamesis.*

This period at Helder corresponds to the period I. at Plymouth, but the arctic character of the plankton was more decided at Plymouth than at Helder. It also corresponds to period V. of St Vaast, where the boreal species were more numerous.

Period II. *From March 17th to April 13th.* This period is a transitional one, as both nothern and southern forms appeared intermingled. I consider the following species to have been conveyed by *nothern* currents:

Asterionella japonica.
Chætoceros debilis.
C. diadema.
Chætoceros teres.
Skeletonema costatum.
Thalassiosira gelatinosa.

The following species are of southern origin:

Cerataulina Bergonii.
Ditylum Brightwellii.
Eucampia zodiacus.
Guinardia flaccida.
Rhizosolenia Stolterfothii.

These southern species appeared at Plymouth much later, i. e. between the 24th of May and 19th of July.

Period III. *From April 20th to June 2nd.* During this period *Phæocystis Pouchetii* appeared in enormous abundance. Beside this species all others diminish, just as at Plymouth, where the same flagellate was predominant from the 4th of April to the 12th of May, thus somewhat earlier than at Helder, so that there is reason for believing it arrived through the Engl. Channel.

Period IV. *From June 9th to August 25th.* The most characteristic feature in the plankton are the considerable development of *Noctiluca miliaris* and the return of *Guinardia flaccida* and *Rhizosolenia Stolterfothii*, driven away last period by the water containing *Phæocystis*. Other southern forms, that appeared during this period are: *Oithona similis, Tintinnopsis campanula, Cyttarocylis serrata, Chætoceros densus, C. didymus, C. Schüttii* and *Rhizosolenia Shrubsolei.*

This period corresponds to the period IV at Plymouth (24 VII to 18 VIII), although the latter is characterized by the abandance of *Rhizosolenia gracillima*, not seen at Helder. On the other hand *Noctiluca* occurred only sparingly at Plymouth.

Period V. *September 1th to 28th.* During this period *Biddulphia mobilensis* and *Coscinodiscus concinnus* appear, and in their company *boreal* forms, such as *Ceratium longipes, Chætoceros debilis* and *Phæocystis.* Also new *southern* species arrive, as *Pyrophacus horologium, Bacteriastrum varians* and *Lithodesmium undulatum.*

This period evidently corresponds to the periods V and VI at Plymouth.

Seasonal distribution of the Plankton-organisms.

Appendicularia.

Fritillaria borealis LOHM. — *February:* off S. Norway and W. of Jutland *r*. *March:* Plym.*) *r*; Väderö *c*. *April:* 55° N. 6° E. *r*; Måseskär *r*. It reappeared at Plym. in October and November.

This arctic species was found in March to May from the Färöes to 61° N. 1° E. and 59° N. 2° E.

Oikopleura dioica FOL. — *February:* W. of Jutland *r*. *May:* 60° N. 1. E. and 58° N. 4° E. *c*; 58° N. 9° E. *r*. *July, August:* Helder *r*; E. of Newcastle *r*; central North Sea *r*; the W. coast of Denmark to Skagen and into the Skagerack *r* to *c*. It remained in the Skagerak to the end of the year, but decreased in frequency in *November* and *December*.

Pteropoda.

Clione limacina PHIPPS. Arctic species.
January: Väderö *rr*.

Limacina balea MÖLLER. Arctic species, which was seen in December 1898 from 64° N. 21° W. to 61° N. 6° W.

January: Väderö *rr*; Måseskär *cc*. *July:* 57° N. 1° E. +. *August:* Skagerak *r*. *September:* Skagerak *r*. *October:* Väderö +. *November:* 56° 24′—57° 10′ N. 4° 25′—7° 40′ E. *c*; Skagerak *r*.

Amphipoda.

Bathyporeia pelagica BATE. — *February:* W. of Denmark *rr*.

Parathemisto oblivia KRÖYER. — *January:* Måseskär *rr*. *July:* 57° N. 1°—2° E. *r*. This species occurred in October 1898 at the Färöes.

Proto pedata LEACH. — *January, February:* W. of Denmark *r*; Måseskär *r*; Väderö +. *November:* from the Engl. Channel to the W. of Jutland *r*; Skagerak *r*. *December:* Måseskär *r*; Väderö +.

*) Abbreviation for Plymouth.

Cladocera.

Evadne Nordmannii LOVÉN. — This species belongs in the Atlantic to styli-plankton and advances in the spring, somewhat later than *Chætoceros decipiens*, towards Iceland and the Färöe Channel.

February: off the Dutch coast *r*. *April:* Plym. *r*; Väderö *c*, *r*. *May:* Plym. *c*; sparingly in the eastern North Sea, but as a rule common from 60° N. 3° W. and 61° N. 1° E. towards the Skagerak, where *cc*, *r*. *June:* 62°—59° N. 5° E. more or less common; Skagerak *c*. *July-August:* E. of the Shetlands and of Scotland +; Firth of Tay to Jutland *c* +; Plym. *r*; off the Dutch coast to Skagen +; Skagerak *c r*. *September to November:* Väderö *c*, +; as a rule very rare in the Skagerak.

Evadne spinifera P. E. MÜLL. — Occurs in the southern or tropical Atlantic, was in 1898, September, seen abundantly at the Azores, where it occurred also in June 1899.

June: Måseskär *rr*. *July-August:* from the Dutch coast to Skagen, more or less common; Skagerak *rr* +. *September:* Skagerak *rr*.

Podon intermedius LILLJEB. — Neritic species of the eastern temperate Atlantic.

July-August: between Firth of Tay, Newcastle and the Skagerak, not common; Skagerak *rr*. *September:* Skagerak *r*. *November:* central North Sea *r*.

P. Leuckartii G. O. SARS. — *May:* rare at 60° N. 1° E., 59° N. 2° E., SW. of Norway; Måseskär +. *June:* Skagerak + *r*.

P. polyphemoides LEACH. — Neritic species of the eastern temperate Atlantic.

June: Helder *r*. *July-August:* Skagerak + *r*.

Copepoda.

Acartia bifilosa GIESBR. — *April:* Måseskär *r*. *June:* Skagerak *r*. *August:* 53°—54° N. 4°—5° E.

A. Clausii GIESBR. — *January:* Plym., Helder and Väderö *r*. *February:* the whole North Sea, increasing in abundance towards the mouth of the Skagerak. *March* and *April:* more or less abundant at Plym., but very rare in the Skagerak. *May:* Irish Sea *c*; more or less rare round Scotland and on several points in the North Sea, as at 58° N. 3°—4° E., common in the western, but rare in the eastern Skagerak. *June:* Plym. *c*, Helder and the Skagerak + *r*. *July-August:* Hebrides *c*; round Scotland *r*; E. of Firth of Tay and Newcastle *cc*; thence rarer towards the Skagerak; Plym. *c*; Helder *r*; off Heligoland *c*, thence more or less *r* to Skagen and into the Skagerak, where in August it was sometimes found abundantly. *September:* Plym. +; Skagerak *r*. *October:* Plym. +;

Väderö and Måseskär *c*. *November:* round the British Islands and from Firth of Tay across the North Sea to S. Norway and the Skagerak; Plym. *rr*; Helder +; Skagerak *r*. *December:* Plym., Väderö and Måseskär *rr*.

A. longiremis LILLJEB. — This species is stationary the whole year at the Färöes. *January* to *March:* Skagerak *rr*. *April:* Väderö and Måseskär *c r*. *May:* some points in the North Sea *r*; Skagerak *r* to +. *June:* Skagerak + to *c*. *July-August:* central North Sea +; W. Skagerak + *c*. *November:* E. of Firth of Tay and Newcastle *r* to *c*; Skagerak *rr*. *December:* Måseskär *r* to +.

Anomalocera Patersonii TEMPL. — *April:* once at Måseskär *r*. *May:* 54° N. 5° W. *r*; from 57°—58° N. 3° E. to 58° N. 5° E. *July-August:* from 62° N. 0° E. to 58° N. 6° E. +; 56°—57° N. 1° E. *r*; along the W. coast of Jutland *r*; Skagerak + to *r*. *September:* Skagerak *rr*. *October:* Väderö +.

Calanus finmarchicus GUNN. — *January:* Skagerak *rr*. *February:* above the 100 metre plateau +. *March:* N. of Scotland *r*; Skagerak *rr*. *April:* Plym. *c*; Skagerak *rr*. *May:* Plym. +; from the Irish Channel round Scotland, thence and from 60° N. 1° E. across the North Sea to the SW. of Norway, where it occurred abundantly. *June:* Plym. +; 59° N. 5° E. *r*; Skagerak + to *r*; Väderö *c*. *July-August:* Plym. + *c*; from the Irish Sea to the Orkneys *c*; from Firth of Tay to Skagen + *c*; Skagerak *c*, *r*; from the Dutch coast to Skagen *r*. *September:* Skagerak +. *October:* Plym. + *r*; Skagerak + *r*. *November:* round Scotland +; from Scotland to Skagen *r*; Skagerak *rr*.

This species occurred in January—April from the N. of Iceland to the Färöes and was met with in March and April as far south as 37° N. 9° and 26° W., where it was more or less rare. It was enormously abundant in May above the eastern slope of the submarine ridge from Iceland to E. Scotland, but rare on the western slope. In June it occurred in great abundance in the deeper layers from 74° N. 14° W. to 62° N. 1° E.

Centropages hamatus LILLJEB. — *January:* Färöes; Helder *r*; Skagerak + *c*. *February:* off the Dutch coast *r*; Väderö +. *March:* St Vaast +; Väderö *rr*. *April:* Skagerak *c*, *rr*. *May:* 58° N. 2° W.—4° E. + *r*; SE. North Sea *r*; Skagerak *c*, *r*. *June*: Helder *r*; Skagerak + *c*. *July-August:* 58° N. 0° W. *c*; E. of Newcastle +; Helder + *r*; W. coast of Denmark *r c*; Skagerak *c*, *r*. *September:* Väderö *r* +. *November:* Dogger Bank *r*; Skagerak *rr*. *December:* Skagerak + *c*.

This species occurred as a rule more abundantly at Väderö than at Måseskär.

Centropages typicus KRÖYER. — *January-February:* Plym. *r*, W. of Denmark to Skagerak *r*, Väderö *rr*. *March:* Plym. +, Väderö *rr*. *April:* Plym. +. *May:* Plym. *r*; 58° N. 4° E. +. *June:* Plym. + *r*. *July-August:* Plym. *r*; Hebrides +; area between 61° N. 2° E., 55° 34′ N. 0° 59′ E., 56° N. 7° E. and Skagen more or less common; Skagerak *r* to *c*. *September:* Plym. *rr*; 59° N. 5° E. +; Skagerak *r* to *c*. *October, November:* Måseskär and Väderö *c*.

Corycæus anglicus LUBB. — *January-February:* Plym. *r* +, W. of Denmark *r*, Väderö *rr*. *March-April:* Plym. *r cc*. *July:* Plym. *c*, some points in the central North Sea *r*; W. of Denmark + *r*. *October:* Plym. *c r*; Väderö *c, r*; Måseskär + *r*. *November:* Plym. +; area between 58° N. 2° E., Skagen and 55° N. 6° E.; Skagerak *r*. *December:* Plym. *c r*; Skagerak *r*.

C. venustus DANA. — *November:* Plym. *rr* (drifted from the tropical Atlantic).

Enterpe acutifrous DANA. — *January-February:* rare at Plym., St Vaast, Helder, W. of Denmark to Skagen; Måseskär *rr*. *March* to *May:* Plym. *r* +. *July:* Plym. + *August:* Plym. and Helder *r*. *September:* Plym. + *c*; Helder *cc*. *October:* Plym. *r*. *November:* Plym. + *r*; from the Dutch coast to Hanstholm, above the 50 m. plateau, *c*. *December:* Plym. *r*; Måseskär *rr*.

Isias clavipes BOECK. — *June:* Plym. *r*; *July:* W. of Denmark (55°—56° N. 7° E.) +; Skagerak + *r*; Gullmarfjord *r*.

Labidocera Wollastonii LUBB. — *September:* Måseskär *r*. *November:* above the Fisher Bank *r*; Skagerak *r*.

Metridia hibernica BRADY & ROBTS. — *January:* Måseskär *r*. *February:* E. of Firth of Tay; 57° N. 5° 35′—8° 7′ E. + *r*. *March*: 60° N. 5° W. *r*. *November:* W. Skagerak *r*. *December:* Väderö *rr*.

This species occurred in December 1898 at 50° N. 20°—9° W.

Microsetella atlantica BRADY & ROBTS. — *January, February: r* at Plym., E. of Firth of Tay and at 57° N. 7° E. *June:* at 62°—59° N. 5° E. *c* +; Skagerak *r*. *July:* W. Skagerak +; Gullmarfjord *r*. *August:* Gullmarfjord *r*. *November:* E. of Scotland *r*; Måseskär *r*.

This species occurred in January at the Canaries and Madeira (also the Färöes), in March at 44°—46° N. 16°—11° W., in June at 62°—65° N. 1° E.—1° W. (rare in depths below 200 m.), in August at 56° N. 38°—23° W. *r* to *c*.

Oithona plumifera BAIRD. — *January, February:* rare midway between Scotland and Jutland, at Väderö and Måseskär. *May, June:* in deeper layers, very sparingly from 61° N. 1° E. to 67° N. 3° W. *July, August:* rare at 58° N. 0° W. and 56° N. 2° E.; Skagerak *rr*. *November:* central North Sea *rr*.

O. similis CLAUS. — *January, February:* Plym. *r* +; E. of Firth of Tay *r*; at 56° N. 2° E. +; W. of Denmark to Skagerak and Norway, as a rule *r*; W. coast of Sweden *c* to *r*. *March:* Plym. *r, cc*; N. of Scotland *r*; Skagerak *rr*. *April:* Plym. *c, r*; Skagerak *r*. *May:* Plym. *c* +; from Scotland to the Skagerak, as a rule *r*, 60° N. 1° E. *c*; SE. North Sea *r*, S. of Norway *c*. *June:* Plym. *c* +; 58° N. 7° E. +; Skagerak + *c*. *July, August:* Plym. and Helder +; Hebrides *cc*; 56°—57° N. 0° 30′ W.—1° 30′ E. *ccc*; also in the whole

North Sea from Scotland and England to Jutland and Skagen; Skagerak *r, cc. September:* Plym. and Helder *c*; 59° N. 5° E. +; Skagerak *c, r. October:* Plym. *c r*; Måseskär and Väderö *c* +. *November:* Plym. *c r*; above the whole 100-metre plateau *r c*; Skagerak + *r*. *December:* Plym. + *r*; Måseskär *c*; Väderö +.

Oncæa media Giesbr. — *December:* Plym. *rr* (drifted from the tropical Atlantic).

O. minuta Giesbr. — *January* to *March:* Plym. *rr*. *December:* Plym. *r*.

O. subtilis Giesbr. — *March:* Plym. *rr*. (This species occurred the same month abundantly at 46° N. 11° W.)

Paracalanus parvus Claus. — *January:* Helder *r*; Skagerak *c r*. *February:* from the Dutch coast to Skagen, as a rule *r*, but *c* at 53° N. 8° E.; Plym. +; Helder *r*; Väderö +. *March, April:* Plym. +. *June:* Plym. *cc*; Helder *r*; Skagerak *rr*. *July, August:* Plym. + *r*; Hebrides *c*; 56°—57° N. 0° 30′ W.—4° E. +. Area between the mouth of Scheldt, Newcastle, Skagen and Heligoland, very abundant. Skagerak *cc*. *September:* Plym. + *cc*; 59° N. 5° E. +; Skagerak *c r*. *October:* Plym. *cc, r*; Väderö *c*. *November:* Plym. *r*; from N. Scotland to S. Norway and W. Jutland more or less abundant; off the Dutch coast and Heligoland *c*; Skagerak *c r*. *December:* Plym. + *r*; Måseskär and Väderö *c* +.

This species was seen in March at 33°—37° N. 32°—26° W., in April at 37° N. 9° W. and 48°—50° N. 9°—5° W.

Parapontella brevicornis Brady. — *March, April:* Plym. *r*.

Pseudocalanus elongatus Boeck. — This species occurs along the coasts of the Arctic Sea, at Iceland, the whole year at the Färöes, whence it spreads to the Shetlands and Scotland.

January: St Vaast and Helder *r*; Skagerak + *c*. *February:* Plym. +; Helder *r*; off the Dutch coast +; round Scotland *r*; area Newcastle, Skagen and 55° N. 8° E. *c*; Väderö *rr*. *March:* Plym. *r*; St Vaast +; Skagerak *rr*. *April:* Plym. *r* +; Måseskär and Väderö + *r*. *May:* Irish Sea +; at 60° N. 1° E. +; between Scotland and Skagerak, more or less abundant; W. of Denmark *r*; W. Skagerak *c*; S. of Norway +. *June:* 59° N. 5° E. *c*; Skagerak + *c*. *July-August:* Irish Channel *cc*; between the Shetlands and Norway +; E. of Firth of Tay and Newcastle *c*, but scarce in the central North Sea; W. of Denmark *r c*; Skagerak *c r*. *September, October:* Skagerak *c* +. *November:* more or less common round Scotland and thence above the 100 m. plateau to Skagerak, where + *r*; Väderö + *c*. *December:* Måseskär and Väderö *c*, +.

This species occurred more abundantly at Väderö than at Måseskär.

Temora longicornis O. F. Müll. — Arctic species, which occurs from Iceland to the Färöes, the Shetlands and Scotland.

January: St Vaast *r*; Helder *r*; Skagerak + *c*. *February:* more or less common from Firth of Tay and Newcastle to Skagen and the Danish Peninsula, most abundant

along the British and Danish coasts; Helder *r*; Skagerak + *r*. *March:* Plym. + *r*; Skagerak *r*. *April:* Plym. *cc*; Helder *r*; Måseskär + *r*. *May:* 60° N. 1° E. *r*; W. of Scotland +; between Newcastle and the Skagerak *r*; SW. of Norway +; Väderö *c*, *r*. *June:* 62°—59° N. 5° E. *c*; Plym. *r*; Helder *r*; Skagerak *cr*. *July-August:* between the Shetlands and Norway *c*; area between the Orkneys, Newcastle and Skagen *c*; Plym. *r*; Irish Sea *r*; Helder *r*; more or less common from Scheldt to Skagen; Skagerak *c r*. *September:* Plym. *r*; 59° N. 5° E.; Skagerak *r*, *c*. *October:* Plym. *r*; Väderö and Måseskär *cc* +. *November:* area between the Orkneys, Newcastle and Skagerak, more or less common; Skagerak *c r*; off the Dutch coast *c*. *December:* Väderö and Måseskär *c*, *r*.

This species was more abundant at Väderö than at Måseskär.

Temorella affinis Poppe. — Baltic species.
March: Skagerak *rr*. *May:* Väderö *r*. *June:* 57° N. 9° E. *r*. *July:* Måseskär *r*.

Annelida.

Tomopteris helgolandica Greff. — *March:* Skagerak (58° 29′ N. 9° 44′ W.) *rr*. *July-August:* 58° N. 0° W. *rr*. *December:* Väderö *rr*.

Chætognata.

Sagitta arctica Auriv. — E. of the Scotch coast between Firth of Tay and Newcastle *rr*. — Arctic species.

Sagitta bipunctata Quoi & Gaim. — This species was seen in March at the Azores and at 44° N. 16° W., in August at 55°—56° N. 23°—26° W.

January: Skagerak *c r*. *February:* Plym. *r*; more or less common from Newcastle to Skagerak and W. of Denmark; Väderö *rr*. *March:* Skagerak *r*. *April:* Plym. *r*; Skagerak *r*. *May:* 58° N. 4° E. +; SW. of Norway *r*; W. Skagerak *r*. *June:* Plym. *r*; 59° N. 5° E. *r*; Skagerak *rr*. *July-August:* Plym. *c*; mouth of Scheldt *c*; W. coast of Jutland *c*, thence less common to Newcastle; 57° N. 1° 30′ E. *cc*; Skagerak *c r*. *September:* Plym. *r*; Skagerak *c*, *r*. *October:* Plym. *c*; Måseskär + *c*. *November:* Plym. *r*; common from Scotland to Skagerak, where + *r*. *December:* Plym. *r*; Väderö +.

Ctenophora.

Pleurobrachia pileus Fabr. — Arctic species.
January: Väderö and Måseskär *r*. *April:* Måseskär *r*. *July:* 58° N. 0° W. *r*. *August:* Irish Channel and Måseskär *r*. *October* and *December:* Väderö *rr*.

Ciliata.

Amphorella Steenstrupii Clap. & Lachm. — This species was seen in January at 35° N. 9° W., in March at 37° N. 26° W. and 44° N. 16° W., in May at 50° N. 33° W.

February: centre of the North Sea and S. of Norway *r*. *July-August:* between the Shetlands and Norway *r*; at 5° N. 4° E. *r*; along the W. coast of Jutland *r*; Gullmarfjord *r*. *September:* 59° N. 5° E. *r*; Skagerak *r*. *Oktober-November:* Skagerak *rr*.

Amphorella subulata Ehb. — Neritic species, which occurs from the Mediterranean and the Spanish coast to the White Sea and in the Baltic.

June: 62° N. 5° E. *r*. *July-August:* Plym. *r*; off Heligoland +; Gullmarfjord *r*. *September* and *November:* Skagerak *rr*.

Cyttarocylis Claparedii v. Dad. — *August:* Plym. *r*.

C. denticulata Ehb. Arctic species.

May: 58° N. 5° E. *r*. *June:* 62°—58° N. 5°—7° E. + *r*; Skagerak *r* +. *July-August:* rare at some points between Scotland and Skagen; W. Skagerak *r*; Gullmarfjord *c*, *rr*. *November:* E. of Scotland *r*; Måseskär *r*. *December:* Väderö *rr*.

C. serrata Möb. (*Ptychocylis Ehrenbergii* Cl., Kongl. Sv. Vet.-Akad. Handl., XXXII, n:o 8, pag. 16, fig. 2). — *July-August:* Plym. *c*, *r*; Irish Channel *r*; near the Orkneys *r*; Helder *r*; off Heligoland and W. of Schleswig *r*; Gullmarfjord *r*. *September:* Helder *r*.

Fungella arctica Cl. (Kongl. Sv. Vet.-Akad. Handl., XXXII, n:o 3, Pl. I, fig. 1). — *February:* 57° N. 5° E. *r*; off the Dutch coast *r*; NW. of Skagen *r*. *April:* E. of Firth of Tay and the centre of the North Sea *rr*.

Ptychocylis acuta Brandt. — *January*, *February:* S. of Norway, Väderö, Måseskär *r*. *March:* Skagerak *r*. *July:* Gullmarfjord *c* +.

Tintinnopsis beroidea Stein. — *January*, *February:* Plym. *r*; St Vaast +; Helder + *r*; W. of Denmark, W. Skagerak and Måseskär *r*. *March:* Plym. +; Helder *r*. *April*, *May:* Irish Sea *r*; Hebrides *r*; Helder *r*; Måseskär *r*. *November:* W. of Scotland *r*; Skagerak *rr*.

T. campanula Ehb. — *January:* St Vaast *rr*; Helder *rr*. *July*, *August:* Plym. *r c*; Helder +; off Heligoland +; Skagerak *r*; Gullmarfjord + *r*. *September:* Plym. +; Helder *r*; Skagerak *c*; Måseskär *r*. *October:* Skagerak *r* +. *November:* Irish Sea *r*; Skagerak *rr*.

T. Davidoffii v. Dad. — *September:* Skagerak +.

T. fistularis Möb. — *July*, *August:* Gullmarfjord *r*. *September:* Skagerak *r*.

T. Lobiancoi v. Dad. — *September:* Skagerak *rr*.

T. ventricosa CLAP. & LACHM. — *February:* S. of Norway and above the Fisher Bank *r*. *March:* Plym. +. *April-May:* Plym. +; central North Sea *r*; Måseskär *r*. *August:* Plym. *r*; Helder *c*. *September:* Helder *r*. *November:* more or less common W. of England to the N. of Scotland; 56° N. 5° E. +; Skagerak *r*. *December:* Måseskär *r*.

Tintinnus acuminatus CLAP. & LACHM. (*T. secatus* BRANDT). — *July:* Gullmarfjord *r*. *November:* SW. of Norway *rr*. *December:* Måseskär and Väderö *rr*.

Radiolaria.

Acanthochiasma fusiforme HKL. — *February:* 58° N. 2° E. +. *November:* common E. of Newcastle, whence it became rarer towards the Firth of Tay and to about 57° N. 2° E.

Acanthometron quadrifolium HKL. — *February:* 58° N. 4° E. *rr*. *July, August:* midway between the Shetlands and Norway *r* and between Scotland and Norway +; W. of Jutland to Skagen *r*; Skagerak *r*. *September* and *November:* Skagerak *r*.

Acanthonia Mülleri HKL. — *July-August:* 55° N. 6° W. *rr*. Gullmarfjord *r*.

Plectophora arachnoides CLAP. & LACHM. — *January:* Måseskär *r*. *February:* W. of Jutland and in the W. Skagerak *rr*. *July:* Gullmarfjord *r*. *September:* Väderö *r*. *October:* Måseskär and Väderö *r*. *November:* SW. and S. of Norway, Skagerak, Väderö and Måseskär *r*. *December:* Väderö *r*.

Rhizopoda.

Globigerina bulloides D'ORB. — *May:* 60° N. 1° E. *r*.

Cystoflagellata.

Noctiluca miliaris SURIR. — *April:* 56° N. 6° E. *r*. *June:* Helder *r*. *July, August:* Plym. *r*; off the Dutch coast *ccc*; W. of Jutland (56° N. 8° E.) *c*. *September:* Helder + *r*. *October:* Plym. *c*. *November:* Plym. *r*; N. of Jutland *r*. *December:* Plym. *r*.

Silicoflagellata.

Dictyocha fibula EHB. — *February:* 57° N. 5° E. *r*. *April, May:* 57° N. 1° E. *r*; Måseskär *r*. *July:* Gullmarfjord *rr*. *November:* *r* at some spots above the 50-metre plateau of the North Sea, in the Skagerak and SW. of Norway. *December:* Måseskär *r*.

Distephanus speculum EHB. — *February:* *r* at some spots between Newcastle and S. Norway. *April:* Måseskär +. *September* to *November:* Skagerak *r*.

Chlorophyllaceæ.

Halosphæra viridis Schmitz. — *January:* Väderö and Måseskär *c r*. *February:* Plym. *r c*; between Scotland, SW. Norway and Skagen more or less common; Skagerak + *r*. *March:* Plym. + *r*; N. of Scotland *r*; Skagerak *cc r*. *April, May:* between Scotland, SW. Norway and Skagen, as a rule rare; Måseskär + *r*; Väderö *c*. *July, August:* Hebrides +. E. of Scotland *r*. *September:* Plym. *r*. *October:* Plym. *r* +; Skagerak *r*. *November:* Plym. *r*; Hebrides *r*; round Scotland and across the North Sea to SW. Norway and Skagen; Skagerak *r*. *December:* Plym. *r*; Måseskär *r*; Väderö +.

Dinoflagellatæ.

Ceratium (tripos var.) bucephalum Cl. — *January:* Väderö and Måseskär + *r*. *February:* area between S. Norway, Skagen, 56° N. 3° E. and 58° N. 2° E. as a rule not rare; Väderö *r*. *April, May:* 56°—57° N. 4° E. *rr*; 58° N. 4° E. and 59° N. 2° E. *r*. *July, August:* 57° N. 4°—6° E. and 56° N. 2° E. *r*; Skagerak + *r*. *September:* Skagerak *r*. *November:* more or less common on the area between S. Norway, Skagen, 56° N. 1° E. and 58° N. 2° E. Skagerak *r*. *December:* Väderö + *r*.

C. furca Duj. — *January:* Måseskär + *r*. *February:* area between Newcastle, S. Norway and Skagen *cc*; N. of the Dutch coast *r*; W. of Jutland +. *March:* Plym. *r*; N. of Scotland *r*; Skagerak *r*. *April, May:* from 61° N. 1° E. to the Skagerak *r*, at 58° —59° N. 3°—2° E. *c*; area between 58° N. 5° E, 57° N. 2° E. and 56° N. 7° E., rare or dead. *June:* S. and W. of Norway *c*; Skagerak *c r*. *July, August:* Plym. + *r*; off Heligoland *c*; between the Shetlands, Scotland and Norway *cc*; Skagerak + *r*. *September:* 58°—59° N. 7°—5° E. + *r*; Skagerak *r*. *October:* Plym. *r*; Väderö *r*. *November:* Irish Sea *c*; area between Newcastle, 58° N. 2° E., Skagen and 55° N. 6° E.; Skagerak +. *December:* Skagerak + *r*.

C. fusus Duj. — *January:* Helder *r*; Väderö and Måseskär + *r*. *February:* Plym. *r*; Helder +; between Firth of Tay, S. Norway and Skagen, as a rule *r*; along the W. coast of Denmark *c* +. *March:* Plym. *r*; Väderö *r*. *April, May:* Plym. *c r*; area between 60° N. 2° E., 57° N. 1° E. and Jutland, as a rule rare, but common at 59° N. 2° E.; Måseskär + *rr*. *June:* Plym. *r c*; Helder *r*; 59° N. 5° E. +; Måseskär + *r*. *July, August:* Plym. *r*; N. of Scotland *r*; 58° N. 0° W. to 61° N. 2° E. *c* +; W. Skagerak to 56° N. 3° E., as a rule rare; Skagerak *r c*. *September:* 59° N. 5° E. *c*; 58° N. 7° E. *r*; Skagerak *c r*. *October:* Väderö *c r*. *November:* Irish Sea; from E. Scotland and N. England to Skagerak and the W. of Jutland; Skagerak *c r*. *December:* Väderö *r*.

C. lineatum Ehb. — *February:* off S. Norway and on a spot in the centre of the North Sea. *May:* 58° N. 5° E. *r*. *July:* 58° N. 6° E. *r*. *September* to *December:* Skagerak *r*.

C. (tripos var.) longipes BAIL. — *January:* Helder *rr*; Skagerak *r c*. *February:* area between Skagen, 58° N. 2° E., 56° N. 5° E., as a rule scarce; W. of Schleswig *c*; Skagerak + *r*. *March:* Skagerak *r*. *April, May:* from 61° N. 1° E. to S. Norway *c*; area between 58° N. 5° E., 57° N. 2° E. and 56° N. 3° E., on the whole rare; 55° N. 6° E. *cc*; Skagerak +. *June:* S. and W. of Norway to 62° N. *c*; Skagerak *c r*. *July, August:* Plym. +; Irish Channel *r*; E. of Scotland *r*; 56° N. 0° W. *cc*; 57° N. 4° E. *r*; 58° N. 6° E. +; Helder *r*; off Heligoland *r*; N. of Skagen *r*; Skagerak *r*. *September:* Helder +; Skagerak + *r*. *October:* Skagerak +. *November:* rare on some points W. and E. of Scotland and off the Dutch coast; Skagerak + *r*. *December:* Plym. *r*; Måseskär *c*; Väderö + *r*.

C. (tripos var.) macroceros EHB. — *January:* Väderö *r*. *February:* area between 58° N. 0° W., Newcastle, West Jutland and S. Norway, as a rule abundant; Väderö and Skagerak *r*. *April, May:* rare or dead on some spots in the western North Sea (at 58° N. 5° E. common in May). *June:* Plym. *r*; 58°—59° N. 7°—5° E. *cc*; Skagerak *cc*. *July-August:* Plym. *r*; W. of Skagerak and Jutland to about 3° E. *ccc*; Skagerak *ccc*. *September:* Plym. +; 58°—59° N. 7°—5° E. *ccc*; Skagerak *cc*. *October:* Plym. *r*; Skagerak + *c*. *November:* very common over the whole 100 metre plateau, especially in the central and eastern parts; Skagerak *cc r*. *December:* Skagerak *cc* +.

C. tripos NITZSCH. — *January:* Väderö and Måseskär *cc*. *February:* Plym. +; between Newcastle, S. Norway and Skagerak, sparingly in the west, abundant in the east as well as W. of Jutland; Väderö *c*; Måseskär + *r*. *March:* Väderö *c r*. *April, May:* area between 58° N. 5° E., 57° N. 2° E., 56° N. 3°—7° E., more or less common, but frequently dead; from 60° N. 1° E. to S. Norway (May) as a rule very common; Måseskär *c*; Väderö +. *June:* S. and W. of Norway to 62° N.; Skagerak very common. *July, August:* Plym. *r* +; between 54° and 61° N. from Scandinavia towards Scotland and England, where it becomes rare; whole Skagerak *ccc*. *September:* Plym. *cc*; 58°—59° N. 7°—5° E. *ccc*; Skagerak *ccc*. *October:* Väderö *cc*. *November:* Plym. *r*; above the whole 100 metre plateau very abundant; Skagerak *ccc*. *December:* Plym. *r* +; Skagerak *cc*.

Dinophysis acuta EHB. — *February:* between Newcastle, Skagen and 58° N. 2° E., as a rule *r*. *March:* Skagerak *r*. *April, May:* above the 100 metre plateau *r*. *June:* S. and W. of Norway *r*; Skagerak *r*. *July, August:* Plym. *rr*; on some spots in the northern North Sea and in Skagerak *r*. *September:* 59° N. 5° E. +; 58° N. 7° E. *r*; Skagerak *c r* (maximum). *November:* Irish Sea *r*; between Scotland, N. England and Skagerak *r*; Skagerak *r*. *December:* Skagerak *r*.

Dinophysis homunculus STEIN. — *February:* 57° N. 8° E. *rr*. *August:* Plym. *rr*.

D. Michaëlis (EHB.?) AURIV. — *April, May:* 57° N. 7° E. *r*. *June:* 59° N. 5° E. *r*; Skagerak *r*. *July:* Skagerak *r*. *September:* 58°—59° N. 7°—5° E. *r*; Skagerak *r* + (max.). *November:* at some points W. of Jutland *r*.

D. Vanhöffenii Ostenf. — *July, August:* E. of Scotland *r*; Skagerak *r*. *September:* Skagerak *r*.

Diplopsalis lenticula Bergh. — *February:* 58° N. 4° E. *r*; some spots between Newcastle and Skagen *r*. *July, August:* Plym. *r*; E. and W. of Scotland *r*; W. Skagerak *r*. *September:* Skagerak *rr*. *October:* Måseskär *rr*. *November:* Plym. *r*; off the Dutch coast *r*; Skagerak *rr*. *December:* Plym. *r*.

Gonyaulax polyedra Stein. — *September:* Skagerak *rr*.

G. spinifera Clap. & Lachm. *February:* W. of Schleswig *r*; between Skagen and S. Norway *r*. *March:* Väderö *rr*. *April, May:* between Scotland, Newcastle and the Skagerak *r*; 55° N. 6° E. *r*. *July, August:* W. of Schleswig *r*; Skagerak *rr*. *November:* Måseskär *rr*.

Peridinium depressum Bail. — *January:* Väderö and Måseskär *r*. *February:* E. of Scotland *r*; W. of Jutland *r*. *March:* Skagerak *cc r*. *April, May:* W. of Scotland; from 60° N. 1° E. to 58° N. 4° E. *c*; between Newcastle, S. Norway and Jutland +; 55° N. 6° E. *c*; Väderö and Måseskär *cc r*. *June:* 62° N. 5° E. *r*; Väderö +. *July, August:* 56° N. 0° 30′ W. *c*; between Firth of Tay and Skagerak *r*; W. Skagerak + *r*. *September:* Väderö *r*. *October:* Plym. + *r*. *November:* Plym. + *r*; Irish Sea *r*; between Scotland and Skagerak *r*; Måseskär and Väderö *r*. *December:* Plym. *r*; Måseskär *r*.

P. divergens Ehb. — *January:* Skagerak *rr*. *February:* between Newcastle and Skagerak, as a rule *r*. *April, May:* 58° N. 5° E. and 59° N. 2° E. *rr*. *June:* 60° N. 5° E. *r*; 58° N. 7° E. *r*; Skagerak *r*. *July, August:* Plym. + *r*; Irish Channel *r*; E. of the Shetlands and at 57° N. 1°—6° E. *r*; Skagerak *r*. *September:* Skagerak *c r* (maxim.). *November:* Irish Sea *r*; between Scotland and the Skagerak *r*; Skagerak *r*.

P. exiguum Cl. (K. Sv. Vet. Akad. Handl., XXXIV, N:o 1, p. 17, Pl. VIII, f. 5). — *August:* Plym. *rr*.

P. Michaëlis Ehb. — *April, May:* 57° N. 8° E. *r*. *August:* Plym. *rr*. *September:* 58° N. 7° E. *r*; Skagerak *rr*.

P. oceanicum Vanhöffen. — *July:* off Heligoland *c*; E. of Scotland *r*; N. of Jutland *r*.

P. ovatum Pouchet. — *February:* S. of Norway *r*; W. of Schleswig *r*. *March:* Plym. *r*; N. of Scotland *r*. *April, May:* Plym. *r*; Helder *r*; W. of Scotland *r*; between Firth of Tay, Newcastle and Skagerak *c*. *September:* S. of Norway *r*. *October:* Plym. *r*. *November:* Plym. *r*.

P. pallidum Ostf. — *July:* 58° N. 0° E. *r*. *September:* Skagerak *rr*. *November:* Irish Sea *r*; E. of Jutland *r*.

P. pellucidum BERGH. — *April, May:* follows *P. ovatum* in the North Sea, but rarer; Plym. *rr*; Måseskär *r*. *July:* Gullmarfjord *r*. *August:* Orkneys *r*.

P. vexans MURRAY & WHITTING. — *June, August:* Plym. *rr*.

Pyrophacus horologium STEIN. — *February:* North Sea, rare among tripos-plankton. *July, August:* Shetlands *r*; E. of Scotland *r*; Skagerak *r*. *September:* Helder *r*; Skagerak *r*. *November:* at some spots between Scotland and the Skagerak.

Cystæ.

Hexasterias problematica CL. — *March:* Helder *r*.

Xanthidium brachiolatum MÖB. — *July* to *September:* Skagerak *rr*.

X. hystrix CL. — *January:* Måseskär *rr*. *May:* Plym. *r*; S. of Norway *rr*. *June:* Plym. *rr*; Skagerak *rr*. *July, August:* Plym. *rr*; W. Skagerak *r*.

X. multispinosum MÖB. — *May:* 55° N. 6° E. *r*; Måseskär *r*. *August:* W. and E. Skagerak *r*. *November:* off the Dutch coast and in the centre of the North Sea *r*.

Flagellatæ.

Phæocystis Pouchetii LAGH. — *January* and *February:* St Vaast *r* +. *April, May:* 61° N. 1° E. to 58° N. 3° E. *ccc*; 58° N. 2° E. *r*; 56° N. 4° E. *r*; 56° N. 6° E. *c*; Helder *ccc*; Plym. *ccc* +. *June:* Helder *ccc*. *September:* Helder + *c*.

Dinobryum pellucidum LEVANDER. — *April:* Väderö *cc*; Måseskär +. *May:* Måseskär *r*.

Diatomaceæ.

Achnanthes tæniata GRUN. — *February:* Väderö *rr*.
Actinocyclus Ehrenbergii RALF. — *March:* N. of Scotland *r*. *June:* Skagerak *r*.

Asterionella japonica CL. — *February:* St Vaast *r*. *March:* Helder *rr*; St Vaast *c* +; Plym. *rr*. *April, May:* NE. of Scotland *r*; Plym. *cc*; W. of Denmark, common between 55°—56° N., thence rarer to Skagen and into the Skagerak. *August:* Plym. *cc*. *October:* Skagerak *rr*.

Bacteriastrum varians LAUDER. — *July:* off Heligoland *cc*. *September:* Helder *r*. *November:* W. of Jutland *r*.

Biddulphia aurita LYNGB. — *January:* St Vaast *r*; Helder *r*; Väderö and Måseskär *r*. *February:* St Vaast *r*; Helder +; W. of Schleswig *c*; at Skagen *r*; Måseskär and Väderö *c*. *March:* St Vaast *r*; Helder *cc r*; Skagerak + *r*. *April:* Skagerak *rr*. *December:* Måseskär *r*.

B. mobilensis BAIL. — *January:* Plym. *r*; St Vaast +; Helder *r*; Väderö and Måseskär *r*. *February:* Plym. *c*; St Vaast *c* +; off the Dutch coast and W. of Danmark *c r*; round Scotland *r*. *March:* Plym. *cc*; S:t Vaast *r*; Helder *r*; N. of Scotland *r*. *April, May:* Plym. *c*; Helder *r*; W. of Denmark *r*; Måseskär *r*; E. and W. of Scotland. *September:* Helder *r cc*; Skagerak *r*. *October:* Skagerak *r*. *November:* Irish Sea +; W. of Denmark *r* +; Skagerak *r*. *December:* Plym. *r*; Väderö *rr*.

Cerataulina Bergonii H. PER. — *March:* Helder *ccc r*. *April, May:* Irish Sea *r*; some points between Firth of Tay, S. Norway and the Skagerak *r*; Måseskär *r*; Helder *c*. *June:* Plym. *r*; Helder *rr*; Skagerak *r*. *July:* Plym. +; Måseskär *r*; Väderö *rr*. *August:* Plym. +; Skagerak *r*. *September:* S. of Norway and Skagerak *r*. *October:* Skagerak + *r*. *November:* off the Dutch coast *r*; SW. of Norway, Skagerak and Måseskär + *r*.

Chætoceros atlanticus CL. — *February:* area between 58° N. 2° E., 56° N. 3° E. and Skagen *r*. *March:* N. of Scotland *r*; Skagerak *rr*. *April, May:* S. of Norway *r*; some points in the central North Sea *r*.

C. borealis BTW. — *January:* St Vaast *rr*; Väderö and Måseskär *rr*. *February:* S. of Norway and Måseskär *r*. *March:* Måseskär *r*. *April, May:* 60°—61° N. 1°—2° E. *r*; the North Sea between 58° and 54° N., not rare, most common in the central part; Måseskär *r*; Väderö *r*. *June:* Skagerak *r*. *July:* Gullmarfjord *r*. *October:* Väderö and Måseskär *r*. *November:* SW. of Norway *r*; Skagerak *rr*; Måseskär +. *December:* Väderö and Måseskär + *r*.

Var. Brightwellii CL. — *February:* 57° N. 5° E. *r*; at Skagen and in the Skagerak *r*. *March:* Måseskär *r*. *April, May:* 61° N. 1° E. *r*; 56° N. 1° E. *r*; 55° N. 6° E. *r*; Måseskär *rr*. *June:* Skagerak, Väderö and Måseskär *r*. *July:* Gullmarfjord *r*. *October:* Måseskär *r*. *November, December:* Skagerak + *r*.

Chætoceros constrictus GRAN. — This arctic species occurred in September 1898 at Vestmanna ö, in October the same year at the Färöes. It was seen in 1899, April and May, at the Färöes, in May at 61° N. 6° W.

January: Måseskär *r*; *February:* S. of Norway *r*; Väderö and Måseskär + *c*. *March:* whole Skagerak *cc*. *April, May:* 58° N. 4° E. +; 58° N. 7° E. *cc*; 57°—58° N. 9°—11° E. *c*; 55° N. 6° E. *r*; Skagerak *cc*. *June:* Skagerak *r*. *October, November:* Skagerak +; Väderö *c r*. *December:* Väderö +.

C. contortus SCHÜTT. — *January, February:* Väderö and Måseskär *r*. *March:* Skagerak *c* +; Väderö *c* +; Måseskär *r*. *April, May:* 58° N. 4°—7° E.; 55°—56° N. 6°—7° E. *r*;

Skagerak *c*; Måseskär *c r*. *June:* Skagerak +. *July:* Gullmarfjord. *August—October:* Skagerak and Måseskär *c r*. *November:* SW. of Norway *r*; Skagerak *cc*. *December:* Väderö *r*.

This species appeared in August 1898 at the Färöes and in September at the Azores, in April 1899 abundantly at 48° N. 9° W., in May at Vestmanna ö and the Färöes.

C. criophilus Castr. — *March* and *April:* Skagerak *r*. *November:* Måseskär *r*.

C. curvisetus Cl. — *January:* St Vaast *cc*; Måseskär *r*; *February:* St Vaast *c*; Väderö and Måseskär *r*; S. of Norway *r*. *March:* St Vaast *ccc*; Väderö *r*. *April, May:* Plym. + *r*; Irish Sea *r*; W. of Scotland *r*; E. of Scotland +; 55°—56° N. 6° E. *r*; Väderö +. *June:* Skagerak *c* +. *July:* at Skagen *r*; Gullmarfjord *r*; Väderö *c r*. *August:* Plym. *cc* +; Skagerak *c r*. *September:* Skagerak *c r*. *October:* Plym. +; Skagerak *c*. *November:* SW. of Norway +; Skagerak *cc*. *December:* Plym. *r*; Väderö *c*.

C. danicus Cl. — *March:* St Vaast *r*; Helder *r*. *April, May:* 58° N. 4° E. *cc*; Skagerak, Väderö and Måseskär *cc*; N. of Jutland *c*. *June:* Skagerak and Måseskär *c*. *July:* Måseskär +. *September, November:* Skagerak and Måseskär *r*.

This species was seen in March 1898 at 21° N. 18° W. and 41° N. 21° W. It is common in the Baltic to Åland.

C. debilis Cl. — Arctic species. It was seen in November 1898 from the S. of Iceland to the Färöes, where common, in 1899, April and May, abundantly at the Färöes.

February: Väderö and Måseskär *c r*; Helder *r*. *March:* Skagerak and Måseskär *c*; Helder *cc r*. *April. May:* 61° N. 1° E. *r*; round Scotland *c*; W. of Denmark *r*; Helder *rr*; Plym. + *r*; Måseskär *c* +. *September:* Helder *c*. *October* to *December:* Skagerak *cc* +; S. of Norway + (Nov.).

C. decipiens Cl. — Arctic species of wide distribution. It occurred in December 1898 from S. Iceland to Scotland, in March 1899 from 65° N. 24° W. to 62° N. 8° W. (rare), in April at 48° N. 9° W. *r* and 44° N. 15° W. *r*, but abundantly S. of Iceland and at the Färöes.

January: Plym. *r*; St Vaast *r*; Skagerak *r*. *February:* St Vaast *r*; E. of Scotland *r*; S. of Norway *r*; Skagerak + *r*. *March:* Plym. *c r*; St Vaast *c*; N. of Scotland *rr*; Skagerak *cc r*. *April, May:* 61° N. 1° E. *r*; 58°—59° N. 1°—2° E. *ccc*; 58° N. 4°—7° E. + *r*; 56° N. 6° E. *r*; 55°—56° N. 7° W. *c*; Skagerak *cc r*; Plym. *c r*. *June:* Helder *rr*; Skagerak *rr*. *August:* Irish Channel *r*. *September:* Måseskär *r*. *October:* Plym. *r cc*; Måseskär *rr*; Väderö *r*. *November:* Plym. *r*; W. of England, round Scotland; Skagerak *r*. *December:* Plym. +; Måseskär *rr*; Väderö + *r*.

C. densus Cl. — *January* to *March:* St Vaast + *r*; Plym. (March) *r*. *April, May:* Plym. *r*; 55° N. 6° E. *c*, thence rarer along the Danish coast into the Skagerak, where at Måseskär and Väderö +; between 56°—57° N. 1° E. and 57° N. 4° E., more or less rare; 58°—59° N. 1°—2° E. *r*. *July, August:* Plym. + *r*; Helder *r*; off Heligoland *r*;

E. of Scotland *r*. *September:* Helder *r*. *October:* Plym. +; Måseskär *rr*; Väderö +. *November:* 56° N. 4° E. to Skagerak; SW. of Norway *rr*; Måseskär *r*; Väderö +. *December:* Måseskär and Väderö *r*.

This species was seen in December 1898 at the Azores and in March 1899 at 47° N. 8° W..

Chætoceros diadema Ehb. — *January:* Måseskär *r*. *February:* Helder *r*; W. of Schleswig *r*; Måseskär and Väderö *c* +; S. of Norway *r*. *March:* Helder *cc*; Skagerak *ccc*. *April, May:* N. of Scotland *r*; Måseskär +; 55° N. 7° E. *r*. *June:* Måseskär *rr*. *October:* Måseskär *r*. *November:* Skagerak *c r*.

Arctic species, which was seen in November 1898 sparingly at 51° N. 20° W., in April 1899 at 48° N. 9° W. and not rare at the Färöes.

C. didymus Ehb. — *January:* Plym. *r*; St Vaast *c*. *February:* St Vaast +; some points E. of Scotland *r*. *March:* St Vaast + *c*. *April:* Plym. + *r*; 56° N. 6° E. *r*. *June:* Måseskär *r*. *July:* Helder *r*; Gullmarfjord *rr*. *August:* Plym. *r* +; Skagerak *r*. *September:* Skagerak *c*; Måseskär *cc*; Väderö *r*. *October:* Skagerak, Väderö and Måseskär + *c*. *November:* Irish Sea *r*; Skagerak *cc r*; SW. of Norway *rr*. *December:* Måseskär +; Väderö *r*.

C. furcellatus Bail. — *April:* Plym. *r*.

This is a characteristic arctic, neritic species.

C. hiemalis Cl. — *February:* S. of Norway and at Måseskär *r*. *March:* Skagerak + *c*. *April, May:* W. of Scotland *r*, Skagerak *cc r*; SW. of Norway *c*; 55° N. 6° E. *r*. *June:* Skagerak *rr*; Måseskär +. *September:* Måseskär +. *October* to *December:* Skagerak + *c*.

C. laciniosus Schütt. — *April, May:* NW. of Scotland *r*. *November, December:* Skagerak, Väderö and Måseskär *c r*.

C. Lorenzianus Grun. — *August:* Plymouth *r*.

C. Schüttii Cl. — *February:* central North Sea *r*; Skagerak *r*. *March:* Plym. *r*. *April:* Plym. + *r*; 56° N. 6° E. *r*. *June:* Måseskär *r c*. *July:* Helder +; Gullmarfjord *r*; Väderö +. *August:* Plym. + *c*; Skagerak and Måseskär *cc*. *September:* Skagerak and Måseskär *cc*; Väderö *r*. *October:* Måseskär *cc*; Väderö *r* +. *November:* W. of Denmark *r*; 57° N. 1° E. *r*; Väderö *c*.

C. scolopendra Cl. — *January:* Måseskär *r*. *February:* Väderö, Måseskär and S. of Norway + *rr*. *March:* Skagerak *c r*. *April, May:* Hebrides +; Shetlands *r*; N. of Scotland *r*; central North Sea *r*; N. of Jutland *r*; Måseskär *r*. *July:* Gullmarfjord. *September —November:* Skagerak, Väderö, Måseskär and S. of Norway *c r*.

C. seiracanthus Gran. — *March:* Väderö *rr*. *November:* Skagerak *rr*. *December:* Väderö *rr*.

C. similis CL. — *March:* Skagerak *rr*. *November:* *r*.

C. socialis LAUDER. — Arctic species, which was found in June 1898 abundantly S. of Iceland.

February: Väderö and Måseskär *c r*. *March:* very common in the whole Skagerak. *August:* Måseskär *r*. *September:* once very common at Måseskär. *October:* Plym. +. *November:* Skagerak *c r*.

C. subtilis CL. — *August:* Måseskär *r*.

C. teres CL. — Arctic species, found in August 1898 at the Färöes, in March 1899 N. of Iceland, in April at 49° N. 7° W., in May at Vestmannaö (*c*), the Färöes (*r*) and at 61° N. 1° E. (*r*).

February: St Vaast +; Helder *rr*; Väderö and Måseskär *rr*. *March:* Plym. + *c*; St Vaast *r*: Helder *r*; Skagerak *c r*. *April, May:* 58° N. 2° E. *r*; 56° N. 1° E. *r*; Plym. +. *November:* Skagerak, Väderö and Måseskär *r*.

Corethron hystrix HENSEN. — *March:* Plym. *r*. *April, May:* N. of Scotland *r*.

Coscinodiscus concinnus W. SM. — This species occurred abundantly at the Färöes from September 1898 to May 1899.

January: Plym. *r*; St Vaast + *r*; Helder *r*; Väderö and Måseskär + *c*. *February:* round Scotland *r*, thence more or less common to the Skagerak; St Vaast +; along the W. coast of Denmark; Väderö and Måseskär *cc*. *March:* N. of Scotland *r*; Plym. *c*; Skagerak *rr*; Måseskär *c*. *April, May:* rare at some points in the North Sea; Måseskär +. *July:* off Heligoland *r*; Väderö, Måseskär and Gullmarfjord *r c*. *September:* Plym. *c*; Helder *c r*; Skagerak *r*. *October:* Plym. *c*; Väderö +. *November:* Plym. *c*; Irish Sea *r*; some points on the central North Sea *r*; round Jutland *r*; Skagerak *r* +. *December:* Plym. *c*; Väderö +.

C. excentricus EHB. — This species occurred in November 1898 from 62° N. 8° W. to 60° N. 4° W.

January: St Vaast *c*. *February:* Plym. *r c*; St Vaast *c*; in the North Sea together with *C. concinnus*. *March:* N. of Scotland *r*; Plym. *cc* +; Helder *r*. *April:* Helder *r*. *September:* Skagerak *r*. *November:* Irish Sea *c*; W. of Schleswig *c*; Skagerak *r*. *December:* Måseskär *r*.

C. oculus iridis EHB. — Arctic species, which was seen abundantly in November 1898 at Vestmanna ö and in February 1899 at the Färöes.

January: Måseskär +. *February:* E. of Firth of Tay +; St Vaast *rr*; W. of Jutland *c*; S. of Norway *r*; Måseskär *c*. *March:* N. of Scotland *r*; Skagerak and Måseskär + *r*. *April, May:* central North Sea *r*; Skagerak *r*. *November:* Plym. +; Skagerak *r*. *December:* Plym. +.

C. polychordus Gran. — Arctic species, which was found in July 1898 S. of Iceland and in October at the Färöes.

February: W. of Schleswig *r*; Skagerak and Måseskär *r*; S. of Norway *r*. *March:* Skagerak and Måseskär + *r*. *April, May:* NE. of Scotland *c*; 56° N. 6° E. *r*. *November, December:* Skagerak, Väderö and Måseskär *r*.

C. radiatus Ehb. — *January:* Väderö and Måseskär *r*. *February:* round Scotland, thence to S. Norway, Skagen and the Danish W. coast; Väderö *rr*; St Vaast *r*. *March:* N. of Scotland *r*; Plym. +. *April, May:* British E. and W. coasts; Danish coast; Måseskär *r*. *June:* Skagerak *rr*. *August:* Irish Sea *r*. *September:* Skagerak *rr*. *November:* Irish Sea + *c*; round Scotland; off the Dutch coast; W. of Jutland; Skagerak *r*.

C. stellaris Roper. — *February:* W. of Jutland *r*. *March:* Skagerak *r*. *June:* 59° N. 5° E. *r*. *November:* rare above the Fisher Bank; Måseskär *r*. *December:* Måseskär *r*.

Ditylum Brightwellii West. — *January:* St Vaast + *c*; Helder *r*; Måseskär +. *February:* St Vaast + *r*; Helder *rr*; along the W. coast of Denmark to Skagen *r*; S. Norway *r*. *March:* Plym. *r* +; St Vaast *r*; Helder +. *April, May:* N. and E. of Scotland *r*; Plym. + *r*; Helder *r*; along the W. coast of Jutland to Skagen *cc*. *July:* Plym. *r*; Skagen *r*. *August:* Plym. *r*. *September:* Skagerak *r*. *October:* Skagerak, Väderö and Måseskär *r*. *November:* Plym. *r*; Irish Sea *r*; banks W. of Denmark *c*; Skagerak + *c r*; SW. of Norway *r*. *December:* Väderö and Måseskär *r*.

Eucampia zodiacus Ehb. — *January, February:* St Vaast *r*. *March:* St Vaast *r*; Helder *r* +. *April:* Helder *c*; 56° N. 6° E. *cc*; Måseskär +. *September:* Helder *r*. *October:* Plym. *r c*. *November:* W. of Jutland *rr*; Skagerak + *r*.

Guinardia flaccida Castr. — *February:* off the Dutch coast *rr*. *March:* Plym. +; Helder *c*. *April, May:* Plym. *cc r*; Helder *c*; W. of Denmark *r*; from 56° N. 1° and 6° E. to Skagen *cc*. *June:* Plym. *r*; Helder +; Skagerak + *r*. *July:* Helder *c*. *August:* E. of Scotland *r*. *September:* Plym. +; Skagerak + *r*. *October:* Plym. *c r*; Skagerak +. *November:* Irish Sea +; E. of Newcastle and in the central North Sea *r*; rather common above the whole 50-metre plateau of the North Sea; Skagerak + *r*; Måseskär *r*. *December:* Väderö and Måseskär *r*.

Lauderia annulata Cl. — *March:* Skagerak *rr*. *April, May:* Plym. +; more or less common round Scotland and thence to the Danish Peninsula; Måseskär *c*; Väderö *r*. *October:* Plym. *r*. *November:* Irish Sea *r*; Skagerak *r*. *December:* Måseskär *r*.

Leptocylindrus danicus Cl. — *February:* Måseskär *r*. *March:* Skagerak and Måseskär *r*. *April, May:* Plym. *r*; sparingly N. of Scotland; common S. of Norway (58° N. 4°—7° E.), but rare at 59° N. 2° E.; common at 55° N. 6° E.; rare above the Fisher Bank; Måseskär *r*. *June:* Väderö *r*.

This species was found in May and June 1898 abundantly at the Färöes, less common there in July.

Lithodesmium undulatum Ehb. — *July:* Helder *r*. *August:* Plym. *r*. *September:* Helder *c*.

Navicula membranacea Cl. — *February:* St Vaast *rr*. *April, May:* E. of Scotland *rr*.

Nitzschia delicatissima Cl. — *April, May:* 56° N. 7° E. +.

N. seriata Cl. — *February:* Måseskär +. *March:* Skagerak and Väderö *r*. *April, May:* N. and E. of Scotland; S. of Norway *r*; W. Skagerak *r*; 55° N. 6° E. *r*.
This species was seen in 1898 October at 61°—63° N. 5°—10° W. (*r*).

Rhizosolenia alata Btw. — *April, May:* 57°—60° N. 1° E. *r*. *August:* Skagerak *rr*. *October:* Plym. *r*.

R. atlantica H. Per. — *November:* W. of Jutland and in the Skagerak *rr*.

R. calcar avis Schulze. — *April, May:* Skagerak and Måseskär *r*. *July:* off Heligoland and W. of Denmark *r*. *August* to *December:* Skagerak, Väderö and Måseskär *r*.

R. (alata var.) corpulenta Cl. — *July* to *October:* Plym. + *c*.

R. delicatula Cl. — *February:* St Vaast *rr*.

R. (alata var.) gracillima Cl. — *May:* 58° N. 3° E. +. *June:* Skagerak *rr*; Måseskär + *c*. *July, August:* Plym. *ccc r*; Irish Channel *c*; N. of Jutland *c*; Skagerak *rr*; Väderö + *r*; Måseskär + *cc*. *September* to *December:* Skagerak, Väderö and Måseskär + *r*.

R. robusta Norm. — *January:* Plym. *r*. *March:* Plym. *r*. *August:* Plym. *r*. *September:* Plym. *c*. *November:* 55° N. 6° E. *r*.

R. obtusa Hensen. — *March:* Måseskär *rr*. *May:* 61° N. 1° E. *r*.

R. semispina Hensen. — *January, February:* Väderö and Måseskär *r*. *March:* Skagerak, Väderö, Måseskär *c r*. *April, May:* 61° N. 1° E. *r*; round Scotland *r*; 58° N. 4° E. *c*; N. of Jutland *c*; Väderö and Måseskär *c* +. *June:* Måseskär *r*. *July:* W. of Denmark +.
This arctic species was seen in October 1898 S. of Iceland, in March 1899 abundantly at 49° N. 9° W. and in April at 49° N. 7° W.

R. setigera Btw. — *February:* St Vaast *rr*. *March:* Helder *r*; Skagerak *r*. *April, May:* E. of Scotland *r*; Skagerak *r*; Helder *r*. *September* to *December:* Skagerak + *r*.

R. Shrubsolei Cl. — *January* to *March:* St Vaast *r* +. *April, May:* Plym. + *c*; Helder *r*; 56° N. 6° E. *r*; central North Sea, at some points *r*; Skagerak and Måseskär + *r*; some points E. of Scotland *r*. *June:* Plym. + *r*; Måseskär + *r*. *July:* Helder *c*; W. of Schleswig *c*. *October* to *December:* Plym. + *r*; Väderö *r*.

R. Stolterfothii H. Per. — *January:* St Vaast +. *February:* St Vaast +; Helder *rr*. *March:* Helder +. *April, May:* Plym. *rr*; Helder *r*; 56° N. 6° E. *r*; sparingly from Firth of Tay to the Skagerak. *June:* Plym. *r*; Helder *r cc*. *July:* Plym. *r c*; Helder *cc*. *September:* Skagerak *rr*. *October:* Plym. *r c*; Skagerak *r*; Måseskär and Väderö +. *November:* Irish Sea +; off the Dutch coast *c*; Skagerak *rr*; SW. of Norway *r*.

This species was seen in January to March 1898 W. of Africa, 12°—21° N. 19°—18° W., in April the same year at the Azores and the Engl. Channel, in September at the Shetlands (abundantly). Thus a southern neritic species, which goes both W. of England to the Shetlands and through the Engl. Channel along the continental coast of the North Sea to the Skagerak.

R. styliformis Btw. — *February:* along the W. coast of Denmark *r*. *April, May:* from 61° N. 1° E. to 58° N. 4° E. *r*; area between Firth of Tay, Skagen and 55° N. 6° E., rare in the NW., abundantly in the S. and E.; Väderö +; Måseskär *cc r*. *June:* Måseskär *r*. *July:* W. of Denmark +. *August:* Plym. *r*. *September:* Skagerak *c*. *October:* Plym. *r*; Väderö *r*. *November:* above the 50-metre plateau of the North Sea, as a rule *r*; Skagerak + *r*; SW. Norway *r*.

This species occurred in March at the Azores and from 41° N. 21° W. to 49° N. 9° W.

Skeletonema costatum Grev. — *January:* Måseskär *r*. *February:* St Vaast *r* +; Väderö +; Måseskär *r*. *March:* Plym. *r*; Helder + *r*; Skagerak + *r*; Måseskär *r*. *April, May:* Plym. *cc*; N. of Scotland *r*; 56° N. 7° E. *r*. *July:* Måseskär *r*. *August:* Plym. *cc*; Måseskär *r*. *September* to *December:* Skagerak, Väderö and Måseskär *c r*.

This species was seen in August 1898 at Vestmanna ö and the Shetlands.

Stephanopyxis turgida Grev. — *April, May:* 56° N. 6° E. +; W. of Denmark *c*; N. of Jutland *r*; Måseskär *r*; E. of Scotland *rr*. *October* to *December:* Plym.; Skagerak, Väderö and Måseskär *r*. (In *November:* Irish Sea *rr*; E. of Newcastle *r*.)

This species was found in November 1898 at 51° N. 20° W. and in January 1899 at the Canaries.

Streptotheca thamesis Shrubs. — *January:* St Vaast +. *February:* St Vaast +; Helder and N. of the Dutch coast + *r*. *March:* St Vaast +; Helder *r*; N. of Scotland *r*. *August* and *October:* Plym. *r*. *November:* off the Dutch coast *rr*; Irish Sea and Irish Channel *r*.

This species was seen in March and April 1899 at 48°—50° N. 6° W., in March 1898 at 45° N. 36° W.

Thalassiosira gelatinosa HENSEN. — *January:* St Vaast *r*. *February:* St Vaast *r*; Måseskär *r*. *March:* Plym. *r*; St Vaast *r*; Helder *rr*; Skagerak *rr*. *April, May:* 56° N. 7°—8° E. *r*. *November, December:* Skagerak, Väderö and Måseskär *rr*.

Arctic species, which occurred in April 1898 abundantly S. of Iceland, in June 1899 at 69° N. 13° W. and in deep-sea collections from 65° N. 1° W.

T. gravida CL. — *January:* St Vaast *rr*. *February:* St Vaast *rr*; Väderö and Måseskär *c r*; S. of Norway +. *March:* Plym. + *r*; Skagerak *cr*; Väderö and Måseskär + *r*. *April, May:* E. of Scotland to Newcastle *r*; 56°—57° N. 0°—1° E. *c*; 56° N. 6° E. +; W. of Denmark *r*; Plym. + *c*. *October:* Plym. *c r*.

Arctic species, that occurred from March to October 1898 at the Färöes, in 1899 March sparingly at 66° N. 20°—24° W. and more abundant at 65° N. 24° W., in April abundantly at the Färöes and in May at 61° N. 1° W. *c*.

T. Nordenskiöldii CL. — *January:* Måseskär *rr*. *February:* Väderö and Måseskär *cc*; S. of Norway *r*. *March:* whole Skagerak *cc*. *April, May:* W. and N. of Scotland *c*; E. of Scotland, *r* at some points; 56° N. 6° E. +; N. of Jutland *r*; Väderö and Måseskär *rr*; Plym. *c*. *November* and *December:* Skagerak and Måseskär *rr*.

Arctic species, which occurred in May and June 1898 abundantly N. of Iceland, in May abundantly at the Färöes. In April 1899 it was seen at the Färöes (*r c*).

Thalassiothrix Frauenfeldii GRUN. — *January:* Väderö and Måseskär + *c*. *February:* St Vaast + *c*; Skagen *r*; Väderö and Måseskär + *c*; S. of Norway *c*. *March:* Skagerak and Måseskär *r*. *April, May:* S. of Norway *c*; Måseskär *rr*; 56° N. 7°—8° E. *r*. *June:* Skagerak and Måseskär *r* +. *July:* Måseskär *rr*. *September* to *December:* Skagerak and Måseskär *r*. (In December *c* at Väderö and Måseskär.)

Northern species, which occurred in November 1898 from S. Iceland to the Shetlands, as a rule sparingly.

T. longissima CL. & GRUN. — *January:* Väderö *c*; Måseskär *rr*. *February:* 58° N. 2° E. *r*; S. of Norway *r*; Måseskär *r*. *March:* Väderö and Måseskär *r*. *April, May:* 58° N. 4° E. *r*; 57° N. 1° E. *c*, thence rare towards Skagen; Måseskär *rr*.

Arctic species, which in November 1898 occurred as far to the south as between 50° N. 10° W. and 47° N. 42° W., in April 1899 at 44° N. 15° W. It has about the same seasonal distribution as *Calanus finmarchicus*.

Geographical and Seasonal Distribution of the plankton organisms of the North Sea in 1899.

A. Forms that, as a rule, are confined to the space above the 50-metre plateau on the bottom.

1. From **January:** *Euterpe acutifrons* (to February, but reappeared in November), *Tintinnopsis beroidea* (to May, but reappeared in November), (*Chætoceros curvisetus* and *C. didymus* in the Engl. Channel to March), *Biddulphia mobilensis* (to May, reappeared in September).

2. From **February:** *Biddulphia aurita* (to March), *Rhizosolenia Stolterfothii* (to July, reappeared in November), *Streptotheca thamesis* (to March, reappeared in November).

3. From **March:** *Asterionella japonica* (to May), *Cerataulina Bergonii* (to June reappeared in November), *Chætoceros danicus* (to May), *Eucampia zodiacus* (April, reappeared in September), *Rhizosolenia setigera* (to May).

4. From **April:** *Phæocystis Pouchetii* (to June, also above the 200-metre plateau), *Chætoceros densus* (to September), *Ditylum Brightwellii* (reappeared in November), *Guinardia flaccida* (to July, reappeared in November), *Rhizosolenia Shrubsolei* (to July), *Stephanopyxis turgida* (to May).

5. From **June:** *Podon polyphemoides.*

6. From **July-August:** *Oikopleura dioica, Evadne spinifera Acartia bifilosa, Isias clavipes, Cyttarocylis serratus, Tintinnopsis campanula, T. ventricosa, Noctiluca miliaris, Lithodesmium undulatum, Rhizosolenia calcar avis, Bacteriastrum varians.*

7. From **November:** *Labidocera Wollastonii, Rhizosolenia robusta.*

B. Forms that, as a rule, are confined to the space above the 100-metre plateau.

1. Spring-forms, or such as occur in April-May.

Southern forms:	Northern forms:
Ceratium tripos.	*Gonyaulax spinifera.*
Lauderia annulata.	*Peridinium depressum.*
	P. ovatum.
	Chætoceros borealis.
	var. Brightwellii.
	C. decipiens.

2. Summer-forms, or such as occur in July-August.

Southern:

Podon intermedius.
Anomalocera Patersonii.
Centropages typicus.
Oithona plumifera.
Amphorella Steenstrupii.
Acanthometron quadrifolium.
Ceratium furca.
C. macroceros.

Northern:

Acartia longiremis.
Cyttarocylis denticulata.

3. Winter-forms, or such as occur in November (February).

Southern:

Acanthochiasma fusiforme.
Distephanus speculum.
Halosphæra viridis.
Ceratium bucephalus.

Northern:

Limacina balea.
(*Acartia longiremis.*)
Dinophysis acuta.

C. Forms that occur in the spring above the 100-metre plateau, in the summer or winter above the 50-metre plateau.

1. Occurring in the summer above the 50-metre plateau:

Southern:

Evadne Nordmannii.
Acartia Clausii.
Oithona similis.

Northern:

Calanus finmarchicus.
Centropages hamatus.
Temora longicornis.
Ceratium longipes.

2. Occurring in the autumn or spring above the 50-metre plateau:

Southern:

Paracalanus parvus (November).
Ceratium fusus (Jan., Febr.).
Diplopsalis lenticula (Nov.).
Rhizosolenia styliformis (Nov.).

Northern:

Pseudocalanus elongatus (Winter).
Fungella arctica (Febr.).
Chætoceros debilis (Spring).
Coscinodiscus concinnus (Sept.).
C. radiatus (Nov.).
C. excentricus (Nov.).

D. Forms, which occur chiefly in the eastern part of the North Sea.

Fritillaria borealis. — Febr.
Clione limacina. — Jan.
Podon Leuckarti. — May.
Metridia hibernica. — Febr.
Pleurobrachia pileus. — Jan., April.
Ptychocylis acuta. — Jan., March.

Tintinnus acuminatus. — Nov.
Plectophora arachnoides. — Nov.
Dinobryum pellucidum. — April.
Achnanthes seriata. — Febr.
Chætoceros constrictus. — Febr., April, May.
C. contortus. — April, May.
C. diadema. — Febr.; Sept.—Dec.
C. hiemalis. — Febr., May.
C. scolopendra. — Jan. to May; Sept., Nov.
C. seiracantha. — March; Nov.
C. socialis. — Febr., March; Nov.
Coscinodiscus polychordus. — Febr., April; Nov.
C. stellaris. — Febr. March; Nov.
Leptocylindrus danicus. — April, May.
Nitzschia seriata. — Febr., May.
Rhizosolenia semispina. — Jan., May.
Thalassiosira gravida. — Febr., May.
T. Nordenskiöldii. — Jan. to May.
Thalassiothrix Frauenfeldii. — Jan. to May.
T. longissima. — Jan. to May.

All are arctic or northern species.

The following are of southern origin:

Microsetella atlantica. — June.
Ceratium lineatum. — Febr., July.
Rhizosolenia gracillima. — May to December.

Species excluded from the Table I.

The North Sea in February 1899.

Fritillaria borealis LOHM. 5/2 57° 53′ N. 3° 8′ E. *r*; 18/2 56° 44′ N. 7° 22′ E. *r*.
Bathyporeia pelagica BATE. 2/2 57° 5′ N. 8° 33′ E. *rr*.
Proto pedata LEACH. 4/2 56° 31′ N. 7° 44′ E. *rr*; 4/2 55° 32′ N. 6° 45′ E. *r*; 3/2 55° 48′ N. 7° 29′ E. *rr*.
Centropages hamatus LILLJEB. 5/2 53° N. 4° 30′ E. and 52° 30′ N. 3° 57′ E. *r*.
Euterpe acutifrons DANA. 10/2 52° 52′ N. 4° 19′ E; 2/2 57° 31′ N. 9° 26′ E.; 2/2 56° 27′ N. 7° 53′ E., everywhere *r*.
Metridia hibernica BRADY & ROBTS. 4/2 56° 17′ N. 1° 11′ W. *r*; 2/2 57° 1′ N. 5° 35′ E +; 5/2 57° 10′ N. 6° 46′ E. *rr*; 5/2 57° 19′ N. 8° 7′ E. +.
Microsetella atlantica BRADY & ROBTS. 4/2 56° 17′ N. 1° 11′ W. *r*; 4/2 56° 26′ N. 0° 10′ E. *r*; 5/2 57° 10′ N. 6° 46′ E. *r*.
Oithona plumifera BAIRD. 3/2 56° 26′ N. 4° E. *rr*; 4/2 56° 39′ N. 5° E. +.
Evadne Nordmannii LOVÉN. 5/2 52° 30′ N. 3° 57′ E. *rr*.
Sagitta arctica AURIV. 3/2 56° 8′ N. 2° 32′ W. *rr*; 4/2 56° 17′ N. 1° 11′ W. *r*; 3/2 55° 19′ N. 0° 44′ W. *rr*.
Fungella arctica CL. 4/2 56° 39′ N. 5° E. *rr*; 10/2 52° 52′ N. 4° 19′ E. *rr*; 19/2 57° 40′ N. 9° 57′ E. *rr*; 2/10 57° 31′ N. 9° 26′ E. *r*.
Ptychocylis acuta BRANDT. 5/2 57° 53′ N. 8° 8′ E. +; 58° 12′ N. 4° 4′ E. *rr*.
Tintinnopsis beroidea STEIN. 5/2 57° 53′ N. 8° 8′ E. *r*; 4/2 57° 14′ N. 8° 32′ E. *r*; 3/2 55° 48′ N. 7° 29′ E. *rr*.
Tintinnus Steenstrupii CLAP. & LACHM. 5/2 57° 53′ N. 8° 8′ E. *rr*; 3/2 56° 13′ N. 3° 3′ E. *rr*; 4/2 56° 39′ N. 5° E. *rr*.
Acanthochiasma fusiforme HKL. 6/2 58° 25′ N. 1° 51′ E. +.
Acanthometron quadrifolium HKL. 6/2 58° 12′ N. 4° 4′ E. *rr*.
Dictyocha fibula EHB. 4/2 56° 39′ N. 5° E. *r*.
Ceratium lineatum EHB. 5/2 57° 53′ N. 8° 8′ E. *r*; 3/2 56° 26′ N. 4° E. +.
Dinophysis homunculus STEIN. 5/2 57° 19′ N. 8° 7′ E. *rr*.
Peridinium ovatum POUCHET. 5/2 57° 53′ N. 8° 8′ E. *r*; 18/2 54° 57′ N. 7° 43′ E. *r*.
Actinocyclus Ehrenbergii RALFS. 5/2 57° 51′ N. 9° 50′ E. +; 6/2 58° 12′ N. 4° 4′ E. +; 5/2 57° 34′ N. 9° 41′ E. *r*.
Biddulphia aurita LYNGB. 19/2 57° 40′ N. 9° 57′ E. *r*; 3/2 54° 35′ N. 8° 5′ E. *c*.
Chætoceros borealis BTW. 5/2 57° 53′ N. 8° 8′ E. *r*.
var. *Brightwellii* CL. 5/2 57° 51′ N. 9° 50′ E. *rr*; 4/2 56° 39′ N. 5° E. *r*.
C. constrictus GRAN. 5/2 57° 53′ N. 8° 8′ E. *r*.
C. curvisetus CL. 5/2 57° 53′ N. 8° 8′ E. *r*.
C. diadema EHB. 5/2 57° 53′ N. 8° 8′ E. *r*; 3/2 55° 8′ N. 7° 33′ E. *r*.
C. hiemalis CL. 5/2 57° 53′ N. 8° 8′ E *r*.
C. Schüttii CL. 5/2 57° 34′ N. 9° 41′ E. *rr*; 3/2 56° 13′ N. 3° 3′ E. *rr*; 4/2 56° 39′ N. 5° E. *r*; 2/2 57° 31′ N. 9° 26′ E. *r*.
C. scolopendra CL. 5/2 57° 53′ N. 8° 8′ E. *r*.
Coscinodiscus polychordus GRAN. 5/2 57° 53′ N. 8° 8′ E. *r*; 19/2 57° 40′ N. 9° 57′ E. *r*; 2/2 56° 27′ N. 7° 53′ E. *r*; 3/2 55° 48′ N. 7° 29′ E. *rr*.
C. stellaris ROPER. 5/2 57° 19′ N 8° 7′ E. *rr*.
Guinardia flaccida CASTR. 4/2 54° 25′ N. 5° 40′ E. *rr*.
Streptotheca thamesis SHRUBS. 10/2 52° 52′ N. 4° 19′ E. *rr*.
Thalassiosira gravida CL. 5/2 57° 53′ N. 8° 8′ E. +.
T. Nordenskiöldii CL. 5/2 57° 53′ N. 8° 8′ E. *r*.
Thalassiothrix Frauenfeldii GRUN. 5/2 57° 51′ N. 9° 50′ E. *r*; 5/2 57° 53′ N. 8° 8′ E. *c*.
T. longissima CL. & GRUN. 5/2 57° 53′ N. 8° 8′ E. *rr*; 58° 25′ N. 1° 51′ E. *rr*.

Species excluded from the Table II.

The North Sea in April-May 1899.

Fritillaria borealis LOHM. $^{30}/_{4}$ 54° 45′ N. 5° 57′ E. *r*.
Anomalocera Patersonii TEMPT. $^{1}/_{5}$ 54° 15° N. 5° 11′ W. *rr*.
Paracalanus parvus CLAUS. $^{30}/_{4}$ 57° 14′ N. 7° 6′ W. *r*.
Temorella affinis POPPE. $^{7}/_{5}$ 57° 12′ N. 9° 20′ E. *r*.
Sagitta bipunctata QUOI & GAIM. $^{28}/_{4}$ 57° 45′ N. 8° 37′ E. *r*; $^{28}/_{4}$ 56° 30′ N. 0° E. +.
Cyttarocylis denticulata EHB. $^{28}/_{4}$ 58° 9′ N. 4° 50′ E. *r*.
Fungella arctica CL. $^{28}/_{4}$ 56° 17′ N. 1° 43′ W. *rr*; $^{28}/_{4}$ 56° 30′ N. 0° E. *rr*.
Tintinnopsis beroidea STEIN. $^{1}/_{5}$ 55° 37′ N. 6° 49′ W. *r*; $^{1}/_{5}$ 54° 15′ N. 5° 11′ W. *r*; $^{29}/_{4}$ 57° 39′ N. 11° 26′ E. *r*.
T. ventricosa CLAP. & LACHM. $^{30}/_{4}$ 56° 30′ N. 4° 30′ E. *r*.
Dictyocha fibula EHB. $^{29}/_{4}$ 56° 37′ N. 1° 15′ E. *r*.
Ceratium bucephalum CL. $^{29}/_{4}$ 56° 49′ N. 3° 45′ E. *rr*; $^{30}/_{4}$ 56° 30′ N. 4° 30′ E. *r*.
Dinophysis Michaëlis EHB. $^{29}/_{4}$ 57° 8′ N. 7° 28′ E. *r*.
Peridinium divergens EHB. $^{28}/_{4}$ 58° 9′ N. 4° 50′ E. *r*.
P. Michaëlis EHB. $^{30}/_{4}$ 57° 8′ N. 8° 30′ E. *r*.
Xanthidium multispinosum MOEB. $^{20}/_{5}$ 54° 34′ N. 5° 48′ E. *r*.
Phœocystis Pouchetii LAGH. $^{29}/_{4}$ 58° 27′ N. 1° 39° E. *r*; $^{30}/_{4}$ 56° 30′ N. 4° 30′ E. *r*.
Chætoceros borealis var. Brightwellii CL. $^{30}/_{4}$ 55° 39′ N. 1° 10′ E. *r*; $^{30}/_{4}$ 54° 45′ N. 5° 57′ E. *r*.
C. constrictus GRAN. $^{29}/_{4}$ 57° 39′ N. 11° 26′ E. *c*; $^{30}/_{4}$ 54° 45′ N. 5° 57′ E. *r*; $^{7}/_{5}$ 57° 12° N. 9° 20′ E. *c*.
C. contortus SCHÜTT. $^{29}/_{4}$ 57° 39′ N. 11° 26′ E. *c*; $^{30}/_{4}$ 55° 54′ N. 7° 30′ E. *r*; $^{30}/_{4}$ 54° 45′ N. 5° 57′ E. *r*.
C. criophilus CASTR. $^{29}/_{4}$ 57° 47′ N. 10° 33′ E. *r*.
C. danicus CL. $^{29}/_{4}$ 57° 39′ N. 11° 26′ E. *c*; $^{30}/_{4}$ 54° 45′ N. 5° 57′ E. *r*; $^{7}/_{5}$ 57° 12′ N. 9° 20′ E. *ccc*.
C. diadema EHB. $^{29}/_{4}$ 58° 48′ N. 2° 3′ W. *r*; $^{30}/_{4}$ 58° 40′ N. 4° 37′ W. *r*; $^{30}/_{4}$ 55° 14′ N. 7° 29′ E. *r*.
C. laciniosus SCHÜTT. $^{30}/_{4}$ 58° 40′ N. 4° 37′ W. *rr*.
C. teres CL. $^{29}/_{4}$ 58° 27′ N. 1° 39′ E. *r*; $^{30}/_{4}$ 55° 39′ N. 1° 10′ E. *r*.
Corethron hystrix HENSEN. $^{29}/_{4}$ 58° 48′ N. 2° 3′ W. *rr*.
Coscinodiscus polychordus GRAN. $^{29}/_{4}$ 58° 48′ N. 2° 3′ W. *c*.
Leptocylindrus danicus CL. $^{29}/_{4}$ 58° 48′ N. 2° 3′ W. +; $^{30}/_{4}$ 57° 14′ N. 7° 6′ W. *r*; $^{30}/_{4}$ 54° 45′ N. 5° 57′ E. *c*.
Navicula membranacea CL. $^{28}/_{4}$ 56° 17′ N. 1° 43′ W. *rr*; $^{29}/_{4}$ 56° 37′ N. 1° 15′ E. *rr*.
Nitzschia delicatissima CL. $^{30}/_{4}$ 55° 54′ N. 7° 30′ E. +.
Rhizosolenia alata BTW. $^{29}/_{4}$ 56° 37′ N. 1° 15′ E. *r*.
R. calcar avis SCHULZE. $^{29}/_{4}$ 57° 34′ N. 9° 24′ E. *r*.
R. setigera BTW. $^{28}/_{4}$ 56° 17′ N. 1° 43′ W. *rr*; $^{29}/_{4}$ 56° 37′ N. 1° 15′ E. *r*; $^{29}/_{4}$ 57° 39′ N. 11° 26′ E. *r*.
Skeletonema costatum GREV. $^{30}/_{4}$ 58° 40′ N. 4° 37′ W. *r*; $^{30}/_{4}$ 55° 54′ N. 7° 30′ E. *r*.
Thalassiosira gelatinosa HENSEN. $^{30}/_{4}$ 55° 54′ N. 7° 30′ E. *r*.
Thalassiothrix Frauenfeldii GRUN. $^{7}/_{5}$ 57° 12′ N. 9° 20′ E. *r*.

Species excluded from the Table III.

The North Sea in July-August 1899.

Acartia bifilosa GIESBR. $^{2}/_{8}$ 53° 28′ N. 4° 39′ E. *r*.
A. longiremis LILLJEB. $^{29}/_{7}$ 57° 11′ N. 8° E. *r*; $^{29}/_{7}$ 56° 15′ N. 4° 9′ E. +; $^{31}/_{7}$ 57° 44′ N. 10° 52′ E. *r*; $^{30}/_{7}$ 57° 7′ N. 8° 28′ E. *c*.
Isias clavipes BOECK. $^{29}/_{7}$ 55 7′ N. 7° 35′ E. +; $^{29}/_{7}$ 55° 59′ N. 7° 37′ E. +; $^{3}/_{8}$ 55° 6′ N. 6° 26′ E. *r*.
Oithona plumifera BAIRD. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *rr*; $^{29}/_{7}$ 55° 54′ N. 2° 23′ E. *r*.

Tomopteris helgolandica GREFF. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *rr.*
Pleurobrachia pileus FABRIC. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *r*; $^{20}/_{8}$ 55° 15′ N. 5° 47′ W. +.
Cyttarocylis serrata MŒB. $^{20}/_{8}$ 55° 15′ N. 5° 47′ W. *rr*; $^{22}/_{8}$ 58° 42′ N. 2° 48′ W. *r*; $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. *c*; $^{29}/_{7}$ 55° 7′ N. 7° 35′ E. +.
Tintinnopsis campanula EHB. $^{31}/_{7}$ 57° 44′ N. 10° 52′ E. *r*; $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. +.
Tintinnus subulatus EHB. $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. +.
Acanthonia Mülleri HKL. $^{20}/_{8}$ 55° 15′ N. 5° 47′ W. *rr.*
Noctiluca miliaris SURIR. $^{29}/_{7}$ 55° 59′ N. 7° 37′ E. *c*; $^{2}/_{8}$ 53° 28′ N. 4° 39′ E. *ccc.*
Halosphæra viridis SCHMITZ. $^{21}/_{8}$ 58° 14′ N. 5° 54′ W. +.
Ceratium tripos var. bucephala CL. $^{29}/_{7}$ 55° 54′ N. 2° 23′ E. *r.*
Dinophysis Michaëlis (EHB.) AURIV. $^{30}/_{7}$ 57° 25′ N. 9° 6′ W. *r.*
D. Vanhöffenii OSTENF. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *rr*; $^{30}/_{7}$ 57° 25′ N. 9° 6′ E. *r.*
Gonyaulax spinifera CLAP. & LACHM. $^{29}/_{7}$ 55° 7′ N. 7° 35′ E. *rr.*
Peridinium Michaëlis EHB. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *r*; $^{30}/_{7}$ 57° 25′ N. 9° 6′ E. *r.*
P. oceanicum VANHÖFFEN. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *rr*; $^{30}/_{7}$ 56° 57′ N. 7° 37′ E. *rr*; $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. *c.*
P. pallidum OSTENF. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *r.*
P. pellucidum BERGH. $^{22}/_{8}$ 58° 42′ N. 2° 48′ W. *r.*
Pyrophacus horologium STEIN. $^{24}/_{7}$ 57° 53′ N. 0° 6′ W. *rr*; $^{25}/_{7}$ 60° N. 1° E. *rr*; $^{22}/_{8}$ 58° 25′ N. 0° 28′ E. *rr.*
Xanthidium hystrix CL. $^{30}/_{7}$ 57° 25′ N. 9° 6′ E. *rr*; $^{31}/_{7}$ 57° 44′ N. 10° 52′ E. *rr.*
X. multispinosum MŒB. $^{23}/_{8}$ 57° 38′ N. 7° 2′ E. *r.*
Bacteriastrum varians LAUDER. $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. *ccc.*
Chætoceros curvisetus CL. $^{31}/_{7}$ 57° 44′ N. 10° 52′ E. *rr.*
C. decipiens CL. $^{20}/_{8}$ 55° 15′ N. 5° 47′ W. *rr.*
C. densus CL. $^{22}/_{8}$ 58° 42′ N. 2° 48′ W. *r*; $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. +.
Coscinodiscus concinnus W. SM. $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. *r.*
C. radiatus EHB. $^{20}/_{8}$ 55° 15′ N. 5° 47′ W. *rr.*
Ditylum Brightwellii WEST. $^{31}/_{7}$ 57° 44′ N. 15° 52′ E. *rr.*
Guinardia flaccida CASTR. $^{22}/_{8}$ 58° 42′ N. 2° 48′ W. +.
Rhizosolenia calcar avis SCHULZE. $^{29}/_{7}$ 54° 13′ N. 8° 4′ E. *r*; $^{29}/_{7}$ 55° 59′ N. 7° 37′ E. +.
R. semispina HENSEN. $^{29}/_{7}$ 55° 7′ N. 7° 35′ E. +.
R. Shrubsolei CL. $^{29}/_{7}$ 55° 7′ N. 7° 35′ E. *c.*
R. Styliformis BTW. $^{29}/_{7}$ 55° 7° N. 7° 35′ E. +; $^{29}/_{7}$ 55° 59′ N. 7° 37′ E. +.

Species excluded from the Table IV.

The North Sea in November 1899.

Centropages hamatus LILLJEB. $^{6}/_{11}$ 55° 40′ N. 4° 48′ E. *r.*
Labidocera Wollastonii LUBB. $^{5}/_{11}$ 56° 48′ N. 6° 1′ E. *r.*
Metridia hibernica BRADY & ROBERTS. $^{5}/_{11}$ 57° 34′ N. 9° 21′ E. *r.*
Oithona plumifera BAIRD. $^{4}/_{11}$ 57° 10′ N. 3° 48′ E. *rr*; $^{5}/_{11}$ 56° 48′ N. 6° 1′ E. *rr.*
Podon intermedius LILLJEB. $^{4}/_{11}$ 57° 10′ N. 3° 48′ E. *r.*
Limacina balea MÖLLER. $^{4}/_{11}$ 56° 24′ N. 4° 25′ E. +; $^{5}/_{11}$ 57° 48′ N. 6° 1′ E. *c*; $^{5}/_{11}$ 57° 10′ N. 7° 40′ E. *c.*
Amphorella Steenstrupii CLAP. & LACHM. $^{3}/_{11}$ 57° 54′ N. 6° 51′ E. *rr*; $^{4}/_{11}$ 56° 24′ N. 4° 25′ E. *rr*; $^{5}/_{11}$ 55° 58′ N. 7° 2′ E. *rr.*
Cyttarocylis denticulata EHB. $^{5}/_{11}$ 58° 19′ N. 0° 55′ W. +.
Tintinnopsis beroidea STEIN. $^{9}/_{11}$ 54°14′ N. 5° 6′ W. *r.*
T. campanula EHB. $^{9}/_{11}$ 54° 14′ N. 5° 6′ W. *r.*
Tintinnus acuminatus CLAP. & LACHM. $^{3}/_{11}$ 57° 54′ N. 6° 51′ E. *rr.*

Plectophora arachnoides CLAP. & LACHM. 5/11 58° 19′ N. 0° 55′ W. *rr*; 5/11 57° 34′ N. 9° 21′ E. *rr*.
Noctiluca miliaris SUR. 5/11 57° 2′ N. 8° 9′ E. *r*.
Dictyocha fibula EHB. 3/11 57° 54′ N. 6° 51′ E. *r*; 4/11 54° 14′ N. 5° 6′ W.; 5/11 57° 2′ N. 8° 9′ E. *r*.
Ceratium lineatum EHB. 1/11 55° 13′ N. 0° 35′ W. +; 5/11 57° 10′ N. 7° 40′ E. *r*.
Dinophysis Michaëlis (EHB.) AURIV. 4/11 57° 31′ N. 8° E. *rr*; 5/11 55° 27′ N. 6° 22′ E. *rr*.
Peridinium pallidum OSTENF. 9/11 54° 14′ N. 5° 6′ W. *r*; 5/11 55° 58′ N. 7° 2′ E. *rr*.
Xanthidium multispinosum MŒB. 4/11 56° 48′ N. 2° 24′ E. *rr*; 6/11 52° 58′ N. 4° 25′ E. *rr*.
Bacteriastrum varians LAUDER. 5/11 57° 2′ N. 8° 9′ E. *rr*.
Cerataulina Bergonii H. PER. 3/11 57° 54′ N. 6° 51′ E. *r*; 6/11 52° 58′ N. 4° 25′ E. *r*.
Chætoceros borealis BTW. 3/11 57° 54′ N. 6° 51′ E. *r*.
C. contortus SCHÜTT. 3/11 57° 54′ N. 6° 51′ E. +.
C. curvisetus CL. 3/11 57° 54′ N. 6° 51′ E. +; 5/11 57° 34′ N. 9° 21′ E. *r*; 4/11 57° 30′ N. 9° 20′ E. *rr*.
C. debilis CL. 3/11 57° 54′ N. 6° 51′ E. +.
C. didymus EHB. 3/11 57° 54′ N. 6° 51′ E. *rr*; 9/11 54° 14′ N. 5° 6′ W. *r*.
C. Schüttii CL. 4/11 56° 35′ N. 1° 7′ E. *rr*; 5/11 57° 34′ N. 9° 21′ E. *r*; 5/11 55° 27′ N. 6° 22′ E. *r*; 6/11 54° 32′ N. 5° 38′ E. *rr*.
C. scolopendra CL. 3/11 57° 54′ N. 6° 51′ E. *rr*.
Coscinodiscus stelllaris ROPER. 5/11 55° 27′ N. 6° 22′ E. *r*.
Eucampia zodiacus EKB. 5/11 57° 2′ N. 8° 9′ E. *rr*.
Lauderia annulata CL. 9/11 54° 14′ N. 5° 6′ W. *r*.
Rhizosolenia atlantica H. PER. 5/11 57° 2′ N. 8° 9′ E. *r*; 5/11 55° 58′ N. 7° 2′ E. *r*.
R. gracillima CL. 3/11 57° 54′ N. 6° 51′ E. *r*.
R. robusta NORM. 5/11 55° 27′ N. 6° 22′ E. *r*.
R. Shrubsolei CL. 3/11 57° 54′ N. 6° 51′ E. *r*.
Stephanopyxis turgida GREV. 9/11 54° 14′ N. 5° 6′ W. *r*; 55° 13′ N. 0° 35′ W. *r*.

Species excluded from the Table V.

Måseskär 1899.

Fritillaria borealis LOHM. 24/3 *r*; 23/4 *r*.
Parathemisto oblivia KRÖYER. 4/1 *rr*.
Proto pedata LEACH. 4/1 +; 17/11 *rr*.
Acartia bifilosa GIESBR. 23/4 *r*.
Anomalocera Patersonii TEMPL. 25/4 *r*; 21/8 +.
Euterpe acutifrons DANA. 18/1 *r*; 8/9 *r*.
Labidocera Wollastonii LUBB. 8/9 *r*.
Metridia hibernica BRADY & ROBTS. 4/1 *r*.
Microsetella atlantica BRADY & ROBTS. 17/11 *r*.
Oithona plumifera BAIRD. 4/1; 24/1.
Temorella affinis POPPE. 5/7 *r*.
Podon polyphemoides LEACH. 15/7 +.
Limacina balea MÖLLER. 4/1 *cc*.
Ptychocylis acuta BRANDT. 24/1; 10/2 *r*.
Tintinnopsis beroidea STEIN. 4/1 *r*; 4/4 *r*.
T. fistularis MŒB. 28/7 *r*; 21/8 *r*.
T. ventricosa CLAP. & LACHM. 25/4 *r*; 18/12 *r*.
Tintinnus acuminatus CLAP. & LACHM. 6/12 *rr*.
Acanthometron quadrifolium HKL. 31/7 *r*.
Plectophora arachnoides CLAP. & LACHM. 24/1 *r*; 21/10 *r*; 7/11 *r*.
Dictyocha fibula EHB. 20/5 *r*; 18/12 *r*.
Ceratium lineatum EHB. 18/12 *r*.
Diplopsalis lenticula BERGH. 21/10 *rr*.
Gonyaulax spinifera CLAP. & LACHM. 7/11 *rr*.
Peridinium pellucidum BERGH. 4/4 *r*.
Protoceratium reticulatum CLAP. & LACHM. 30/8 *rr*.
Pyrophacus horologium STEIN. 30/8 *rr*.
Dinobryum pellucidum LEVANDER. 4/4 +; 14/4 +; 29/5 *r*.
Xanthidium brachiolatum MŒB. 26/6 *r*; 5/7 *r*.
X. hystrix CL. 18/1 *r*; 8/6 *r*.
X. multispinosum MŒB. 29/5 *rr*; 31/7 *r*; 30/8 *rr*.
Chætoceros criophilus CASTR. 23/4 *r*; 7/11 *rr*.
C. laciniosus SCHÜTT. 7/11 *c*; 17/11 *r*.
C. similis CL. 17/11 *r*; 18/12 *r*.
C. subtilis CL. 10/8 *r*.
C. teres CL. 10/2 *r*; 17/2 *r*; 7/11 *r*.
Coscinodiscus excentricus EHB. 6/12; 18/12, 28/12 *r*.

Coscinodiscus radiatus EHB. $^{4}/_{1}$ *r*; $^{18}/_{1}$ +; $^{20}/_{5}$ *r*; $^{7}/_{11}$ *r*; $^{17}/_{11}$ *r*.
C. stellaris ROPER. $^{7}/_{11}$ *r*; $^{17}/_{11}$ *r*; $^{18}/_{12}$ *r*; $^{28}/_{12}$ *r*.
Eucampia zodiacus EHB. $^{23}/_{4}$ +; $^{25}/_{4}$ +; $^{29}/_{5}$ *rr*.
Lauderia annulata CL. $^{23}/_{4}$ *c*; $^{25}/_{4}$ *c*; $^{18}/_{12}$ *r*.
Leptocylindrus danicus CL. $^{17}/_{2}$ *rr*; $^{16}/_{3}$ *r*; $^{4}/_{4}$ *r*; $^{29}/_{5}$ *r*.
Nitzschia seriata CL. $^{23}/_{2}$ +; $^{1}/_{3}$ +; $^{16}/_{3}$ +; $^{4}/_{4}$ *r*.
Rhizosolenia obtusa HENSEN. $^{24}/_{3}$ *rr*.
R. Stolterfothii H. PER. $^{5}/_{10}$ +.
Thalassiosira gelatinosa HENSEN. $^{10}/_{2}$ *r*; $^{7}/_{11}$ *rr*; $^{18}/_{12}$ *r*; $^{28}/_{12}$ *r*.

Species excluded from the Table VI.

Plymouth 1899.

Corycæus venustus DANA. $^{14}/_{11}$ *rr*.
Isias clavipes BOECK. $^{14}/_{6}$ *r*.
Microsetella atlantica BRADY & ROBTS. $^{17}/_{1}$ *r*.
Oncæa media GIESBR. $^{8}/_{12}$ and $^{9}/_{12}$ *rr*.
O. minuta GIESBR. $^{17}/_{1}$ *r*; $^{3}/_{2}$ *r*; $^{3}/_{3}$ *rr*; $^{8}/_{12}$ *rr*.
O. subtilis GIESBR. $^{7}/_{3}$ *rr*.
Parapontella brevicornis BRADY. $^{20}/_{3}$ *rr*; $^{12}/_{4}$ *r*.
Amphorella subulata EHB. $^{28}/_{7}$ *r*.
Cyttarocylis Claparedii V. DAD. $^{4}/_{8}$ *r*.
Tintinnopsis beroidea STEIN. $^{20}/_{2}$ *r*; $^{3}/_{3}$ +.
T. ventricosa CLAP. & LACHM. $^{7}/_{3}$ +; $^{24}/_{5}$ +; $^{18}/_{8}$ *r*.
Dinophysis acuta EHB. $^{11}/_{8}$ *rr*.
D. homunculus STEIN. $^{24}/_{8}$ *rr*.
Peridinium exiguum CL. $^{4}/_{8}$ *rr*.
P. Michaëlis EHB. $^{4}/_{8}$ *rr*.
P. pellucidum BERGH. $^{27}/_{4}$ *rr*.
P. vexans MURRAY & WHITTING. $^{5}/_{6}$ *rr*; $^{4}/_{8}$ *r*.
Xanthidium hystrix CL. $^{1}/_{5}$ *r*; $^{29}/_{6}$ *rr*; $^{4}/_{8}$ *rr*; $^{18}/_{8}$ *r*.
Cerataulina Bergonii H. PER. $^{29}/_{6}$ *r*; $^{28}/_{7}$ +; $^{24}/_{8}$ +.
Chætoceros debilis CL. $^{12}/_{4}$ +; $^{27}/_{4}$ *r*; $^{31}/_{8}$ +.
C. furcellatus BAIL. $^{12}/_{4}$ *r*; $^{27}/_{4}$ *r*.
C. Lorenzianus GRUN. $^{24}/_{8}$ *r*.
C. socialis LAUDER. $^{25}/_{10}$ +.
Corethron hystrix HENSEN. $^{30}/_{3}$ *r*.
Coscinodiscus radiatus EHB. $^{14}/_{3}$ +.
Lauderia annulata CL. $^{4}/_{4}$ +; $^{13}/_{10}$ *r*.
Lithodesmium undulatum EHB. $^{31}/_{8}$ *r*.
Rhizosolenia alata BTW. $^{10}/_{10}$ *r*.
Streptotheca thamesis SHRUBS. $^{24}/_{8}$ *r*; $^{7}/_{10}$ *r*.
Thalassiosira gelatinosa HENSEN. $^{20}/_{3}$ *r*.
T. Nordenskiöldii CL. $^{12}/_{4}$ *c*; $^{27}/_{4}$ +; $^{1}/_{5}$ *rr*.

Species excluded from the Table VII.

St Vaast la Hogue 1898—1899.

Acartia Clausii GIESBR. $^{4}/_{6}$ +.
Centropages hamatus LILLJEB. $^{4}/_{6}$ *r*; $^{15}/_{3}$ +.
Oithona similis CLAUS. $^{8}/_{11}$ +.
Pseudocalanus elongatus BOECK. $^{4}/_{6}$ *r*; $^{21}/_{1}$ *r*; $^{15}/_{3}$ +.
Peridinium oceanicum VANHÖFF. $^{18}/_{6}$ *r*.
Bellerochea malleus BTW. $^{8}/_{11}$ *r*; $^{21}/_{11}$ *rr*.
Chætoceros borealis BTW. $^{21}/_{1}$ *rr*.
C. contortus SCHÜTT. $^{6}/_{6}$ *r*; $^{12}/_{8}$ +.
C. danicus CL. $^{6}/_{7}$ *r*; $^{8}/_{3}$ *r*.
C. Schüttii CL. $^{12}/_{8}$ *rr*.
Coscinodiscus radiatus EHB. $^{6}/_{2}$ *r*; $^{28}/_{2}$ *r*; $^{15}/_{3}$ *r*.
Leptocylindrus danicus CL. $^{6}/_{7}$ *r*; $^{9}/_{7}$ *r*; $^{12}/_{8}$ *r*.
Navicula membranacea CL. $^{6}/_{2}$ *rr*.
Rhizosolenia setigera BTW. $^{21}/_{1}$ *rr*; $^{6}/_{2}$ *r*.
Skeletonema costatum GREV. $^{6}/_{2}$ +; $^{28}/_{2}$ *r*; $^{8}/_{3}$ *r*.
Thalassiothrix Frauenfeldii GRUN. $^{6}/_{2}$ +; $^{28}/_{2}$ *c*.

Species excluded from the Table VIII.

Helder 1899.

Pseudocalanus elongatus BOECK. $^{5}/_{1}$ *r*; $^{4}/_{2}$ *r*.
Podon polyphemoides LEACH. $^{23}/_{6}$ *r*.
Tintinnopsis ventricosa CLAP. & LACHM. $^{4}/_{8}$ *c*; $^{15}/_{9}$ *r*.
Peridinium ovatum POUCHET. $^{13}/_{4}$ *r*.
Pyrophacus horologium STEIN. $^{25}/_{8}$ *r*; $^{7}/_{9}$ *r*; $^{15}/_{9}$ *r*.
Hexasterias problematica CL. $^{30}/_{3}$ *r*.

Xanthidium hystrix CL. $^{28}/_{9}$ *r.*
Asterionella japonica CL. $^{17}/_{3}$ *rr.*
Bacteriastrum varians LAUDER $^{28}/_{9}$ *rr.*
Chætoceros danicus CL. $^{17}/_{3}$ *r.*
C. decipiens CL. $^{2}/_{6}$ *rr.*
C. diadema EHB. $^{4}/_{2}$ *r*; $^{17}/_{3}$ *cc.*
C. didymus EHB. $^{6}/_{7}$ *r.*
C. Schüttii CL. $^{6}/_{7}$ +; $^{17}/_{7}$ +.
C. teres CL. $^{4}/_{2}$ *rr*; $^{17}/_{3}$ *r.*
Coscinodiscus excentricus EHB. $^{17}/_{3}$ *r*; $^{30}/_{3}$ *r*; $^{13}/_{4}$ *r.*
Lithodesmium undulatum EHB. $^{6}/_{7}$ *r*; $^{15}/_{9}$ *r*; $^{28}/_{9}$ *c.*
Rhizosolenia setigera BTW. $^{17}/_{3}$ *r*; $^{27}/_{5}$ *r.*
Skeletonema costatum GREV. $^{10}/_{3}$ *r*; $^{17}/_{3}$ +.
Thalassiosira gelatinosa HENSEN. $^{17}/_{3}$ *rr.*

Species excluded from the Table IX.

Väderöboda 1899.

Fritillaria borealis LOHM. $^{27}/_{3}$ *c.*
Clione limacina PHIPPS. $^{8}/_{1}$ *rr.*
Limacina balea MÖLL. $^{13}/_{1}$ *r*; $^{16}/_{10}$ +.
Metridia hibernica BRADY & ROBTS. $^{6}/_{12}$ *rr.*
Oithona plumifera BAIRD. $^{8}/_{1}$ *r*; $^{21}/_{2}$ *rr.*
Temorella affinis POPPE. $^{18}/_{5}$ *r.*
Podon intermedius LILLJEB. $^{11}/_{9}$ *r.*
Tomopteris helgolandica GREFF. $^{6}/_{12}$ *rr.*
Ptychocylis acuta BRANDT. $^{13}/_{1}$ *rr*; $^{21}/_{2}$ *rr*; $^{27}/_{3}$ *r.*
Tintinnopsis campanula EHB. $^{24}/_{7}$ *r*; $^{16}/_{10}$ *rr.*
Tintinnus acuminatus CLAP. & LACHM. $^{21}/_{12}$ *rr.*
Acanthometron quadrifolium HKL. $^{7}/_{8}$ *r.*
Ceratium lineatum EHB. $^{16}/_{10}$ *r*; $^{26}/_{10}$ *r.*
Dinophysis acuta EHB. $^{31}/_{7}$ *rr.*
Xanthidium hystrix CL. $^{24}/_{7}$ *r.*
Achnantes tæniata GRUN. $^{13}/_{2}$ *rr.*
Biddulphia mobilensis BAIL. $^{8}/_{1}$ *rr*; $^{16}/_{11}$ *rr*; $^{6}/_{12}$ *rr.*
Cerataulina Bergonii H. PER. $^{24}/_{7}$ *rr.*
Chætoceros danicus CL. $^{9}/_{5}$ *c*; $^{18}/_{5}$ *cc.*
C. laciniosus SCHÜTT. $^{7}/_{11}$ *rr*; $^{6}/_{11}$ +; $^{21}/_{12}$ *r.*
C. seiracanthus GRAN. $^{8}/_{3}$ *r*; $^{21}/_{12}$ *r.*
C. teres CL. $^{21}/_{2}$ *rr*; $^{28}/_{8}$ *r*; $^{7}/_{11}$ *r.*
Coscinodiscus oculus iridis EHB. $^{8}/_{1}$ *r*; $^{8}/_{3}$ *r.*
C. polychordus GRAN. $^{21}/_{2}$ +; $^{21}/_{12}$ +.
C. radiatus EHB. $^{8}/_{1}$ *r*; $^{3}/_{2}$ *r.*
Eucampia zodiacus. $^{26}/_{10}$ *r*; $^{6}/_{11}$ *rr.*
Lauderia annulata CL. $^{21}/_{4}$ *r.*
Leptocylindrus danicus CL. $^{27}/_{3}$ *r*; $^{12}/_{6}$ *r.*
Nitzschia seriata CL. $^{8}/_{3}$ *r*; $^{16}/_{3}$ *r*; $^{6}/_{11}$ *r.*
Rhizosolenia delicatula CL. $^{19}/_{6}$ *rr.*
R. setigera BTW. $^{7}/_{11}$ *r*; $^{21}/_{12}$ *r.*
R. Shrubsolei CL. $^{26}/_{10}$ *r*; $^{6}/_{11}$ *r.*
R. Stolterfothii H. PER. $^{16}/_{10}$ +.
Thalassiosira gelatinosa HENSEN. $^{21}/_{12}$ *r.*
T. gravida CL. $^{21}/_{2}$ *c*; $^{28}/_{2}$ *r*; $^{8}/_{3}$ +.
Thalassiothrix longissima CL. & GRUN. $^{13}/_{1}$ *c*; $^{16}/_{3}$ *r*; $^{12}/_{6}$ *rr.*

TABLES.

Table I. The North Se

Date	5	5	6	6	7	7	8	8	3
Lat. N. .	57° 51′	57° 53′	58° 12′	58° 25′	58° 47′	58° 37′	57° 6′	56° 14′	56° 8′
Long.	9° 50′ E.	8° 8′ E.	4° 4′ E.	1° 51′ E.	2° 37′ W.	5° 5′ W.	6° 13′ W.	6° 42′ W.	2° 32′ W
Temperature	5,2	3,5	5,0	7,0	6,4	7,2	7,6	7,9	6,4
Salinity	34,67	32,51	33,92	35,41	35,06	34,57	34,62	34,29	34,67
Acartia Clausii Giesbr.	—	c	+	—	rr	r	—	—	—
Calanus finmarchicus Gunn.	—	—	+	+	—	r	—	—	r
Centropages typicus Kröyer .	—	r	—	—	—	—	—	—	—
Corycæus anglicus Lubb. . .	—	—	—	—	—	—	—	—	—
Oithona similis Claus . .	+	+	—	—	r	r	—	—	—
Paracalanus parvus Claus . .	r	—	—	—	—	r	—	—	—
Pseudocalanus elongatus Boeck .	c	—	—	—	rr	+	—	—	—
Temora longicornis O. F. Müll. . . .	c	c	—	—	—	—	—	—	—
Sagitta bipunctata Quoi & Gaim.	+	+	—	—	—	—	—	—	—
Tintinnopsis ventricosa Clap. & Lachm. . .	—	r	—	—	—	r	—	—	—
Acanthomethron pellucidum J. Müll. . . .	—	rr	rr	—	r	—	rr	—	rr
Plectophora arachnoides Hkl. . .	rr	—	—	—	—	—	—	—	—
Distephanus speculum Ehb. .	—	r	—	—	—	—	—	—	—
Halosphæra viridis Schmitz	r	c	c	+	r	—	—	—	—
Ceratium furca Duj. . . .	c	c	c	r	—	—	—	—	—
C. fusus Duj.	r	c	r	—	—	—	rr	—	—
C. tripos Nitzsch	cc	c	cc	r	r	—	rr	—	r
var. hucephala Cl.	r	+	+	rr	—	—	—	—	—
var. longipes Bail.	+	r	+	+	—	—	—	—	r
var. macroceros Ehb. .	cc	r	c	r	—	—	—	—	—
Dinophysis acuta Ehb. . . .	—	+	r	r	—	—	—	—	—
Diplopsalis lenticula Bergh	—	—	r	—	—	—	—	—	—
Gonyaulax spinifera Clap. & Lachm. . .	—	+	rr	—	—	—	—	—	—
Peridinium depressum Bail.	—	+	—	+	—	—	—	—	—
P. divergens Ehb.	+	—	+	—	—	—	—	—	—
Pyrophacus horologium Stein .	rr	—	rr	—	—	—	—	—	—
Biddulphia mobilensis Bail. . . .	r	—	—	r	r	r	rr	—	—
Chætoceros atlanticus Cl.	r	r	—	r	—	—	—	—	—
C. decipiens Cl.	r	r	—	+	r	—	—	—	—
Coscinodiscus concinnus W. Sm.	r	+	—	r	r	+	rr	—	—
C. excentricus Ehb.	—	—	—	—	—	r	rr	r	—
C. oculus iridis Ehb. . . .	—	r	rr	—	—	—	—	—	—
C. radiatus Ehb.	+	r	r	+	—	—	—	r	—
Ditylum Brightwellii West. . .	r	r	—	—	—	—	—	—	—
Rhizosolenia styliformis Btw. .	—	—	—	—	—	—	—	—	—
Planktontype	Tp.	Tp. Nh.	Tp. Nh.	Nh. Ns.	O.	(Nc.)	O.	O.	O.

in February 1899.

4	4	4	4	4	4	5	5	5	3	3	3	3	3
56° 17′	56° 26′	56° 35	56° 43′	56° 52′	57° 1′	57° 10′	57° 19′	57° 34′	55° 19′	55° 33′	55° 46′	55° 59′	56° 13′
1° 11′ W.	0° 10′ E.	1° 32′ E.	2° 53′ E.	4° 14′ E.	5° 35′ E.	6° 46′ E.	8° 7′ E.	9° 41′ E.	0° 44′ W.	0° 8′ E.	1° 4′ E.	2° 4′ E.	3° 3′ E.
6,6	6,6	6,7	6,6	6,1	6,0	5,9	5,1	5,0	6,2	7,3	6,8	6,8	6,2
34,96	35,10	35,08	35,13	35,10	35,25	33,95	33,97	34,60	34,88	35,08	34,62	35,08	34,40
—	—	rr	—	—	r	—	+	—	—	—	—	r	—
c	—	r	—	+	+	+	+	—	+	r	c	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	r	—	—	—	—	—
r	—	—	—	—	—	—	r	r	—	—	—	+	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
+	—	+	—	c	+	c	c	r	c	c	c	c	—
—	—	+	—	—	—	—	+	r	c	c	—	+	—
—	—	—	—	+	+	—	—	r	+	c	c	c	—
—	—	—	—	—	—	rr	—	—	—	—	—	—	—
—	r	—	—	—	—	—	—	rr	rr	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	r	—	—	—
+	—	r	—	r	—	r	+	r	—	—	—	—	—
—	—	—	+	+	—	r	c	c	r	+	+	c	c
—	—	r	r	r	—	r	r	r	—	r	—	—	r
—	r	+	+	c	—	c	cc	c	r	+	+	c	c
—	—	—	r	+	—	+	+	+	r	—	—	—	+
—	—	—	—	—	—	+	r	—	—	—	—	—	—
—	—	+	r	c	—	c	+	c	r	+	+	cc	c
—	—	—	r	—	—	—	rr	—	r	c	r	rr	—
—	—	—	—	—	—	—	—	—	r	r	—	rr	—
—	—	—	—	—	—	—	—	r	—	—	—	—	—
—	r	r	—	—	—	r	r	r	—	—	—	r	—
—	—	—	r	—	r	r	r	r	r	+	+	r	—
—	—	—	r	—	—	—	—	—	—	—	—	r	—
r	—	—	—	—	—	—	—	r	—	—	—	—	—
—	—	—	—	—	—	—	—	rr	—	—	—	—	rr
rr	r	—	—	—	—	—	—	—	—	—	—	—	rr
r	r	+	—	+	—	r	—	r	—	—	—	c	—
r	—	—	—	—	—	—	—	—	—	—	—	—	+
+	—	—	—	r	—	r	r	—	—	—	—	—	—
—	r	r	—	—	—	—	—	r	+	+	—	—	+
—	—	—	—	—	—	r	—	r	—	—	—	—	—
—	—	—	—	—	—	—	—	r	—	—	—	—	—
(Nh. Ns.)	O.	(Tp. Nc.)	(Tp.)	Tp. (Nc.)	(Ns.)	Tp.	Tp.	Tp.	(Tp.)	(Tp.)	(Tp.)	Tp. Nc.	Tp.

Table I (continued). **The North Se**

Date	3	4	4	4	4	4	4	4
Lat. N.	56° 26′	56° 39′	56° 51′	57° 4′	57° 14′	57° 43′	56° 31′	56° 10′
Long.	4° E.	5° E.	6° E.	7° 3′ E.	8° 32′ E.	9° 58′ E.	7° 44′ E.	7° 13′ E
Temperature	6,2	6,2	5,6	5,4	—	5,8	6,0	6,0
Salinity	34,88	33,71	34,35	34,72	—	34,72	34,72	34,11
Acartia Clausii GIESBR.	—	—	—	—	—	+	+	—
Calanus finmarchicus GUNN.	—	—	—	+	—	r	—	—
Centropages typicus KRÖYER	—	—	—	—	—	—	r	—
Corycæus anglicus LUBB.	—	—	—	—	—	—	r	r
Oithona similis CLAUS	—	—	—	c	—	—	—	—
Paracalanus parvus CLAUS	—	—	—	—	—	—	—	—
Pseudocalanus elongatus BOECK	+	c	r	cc	c	c	+	rr
Temora longicornis O. F. MÜLL.	+	—	—	—	—	c	—	—
Sagitta bipunctata QUOI & GAIM.	—	c	—	—	c	+	r	—
Tintinnopsis ventricosa CLAP. & LACHM.	—	—	—	—	—	—	—	—
Acanthomethron pellucidum J. MÜLL.	—	—	—	—	—	—	—	—
Plectophora arachnoides HKL	—	—	—	rr	—	—	—	—
Distephanus speculum EHB.	—	r	—	r	—	—	—	—
Halosphæra viridis SCHMITZ	—	r	—	c	—	—	—	—
Ceratium furca DUJ.	cc	cc	cc	cc	c	+	r	—
C. fusus DUJ.	r	r	r	r	+	r	—	r
C. tripos NITZCH.	cc	cc	c	c	cc	c	r	r
var. bucephala CL.	—	+	+	r	+	r	—	—
var. longipes BAIL.	—	r	—	r	—	r	—	—
var. macroceros EHB.	cc	cc	cc	cc	ccc	c	—	r
Dinophysis acuta EHB.	—	r	+	r	r	—	—	—
Diplopsalis lenticula BERGH	r	—	—	—	—	—	—	—
Gonyaulax spinifera CLAP. & LACHM.	—	—	—	—	—	r	—	—
Peridinium depressum BAIL.	—	—	r	r	—	—	—	—
P. divergens EHB.	+	+	c	—	+	—	—	—
Pyrophagus horologium STEIN	—	r	r	rr	—	—	—	—
Biddulphia mobilensis BAIL.	—	—	—	—	—	r	—	—
Chætoceros atlanticus CL.	—	rr	—	rr	—	—	—	—
C. decipiens CL.	—	—	—	—	—	—	—	—
Coscinodiscus concinnus W. SM.	r	+	+	c	r	r	r	—
C. excentricus EHB.	r	+	r	—	r	r	—	r
C. oculus iridis EHB.	—	—	—	—	—	—	—	—
C. radiatus EHB.	—	—	r	+	—	—	+	—
Ditylum Brightwellii WEST.	—	—	—	—	—	—	—	—
Rhizosolenia styliformis BTW.	—	—	—	—	—	—	—	—
Planktontype	Tp.	Tp. (Nc.)	Tp. (Nc.)	Tp. Nc. Nh.	Tp.	Tp.	O.	O.

in February 1899.

4	4	5	5	10	18	18	19	2	2	2	3	3	3
55° 32′	54° 25′	53°	52° 30′	52° 52′	54° 57′	56° 44′	57° 40′	57° 31′	57° 5′	56° 27′	55° 48′	55° 8′	54° 35′
6° 45′ E.	5° 40′ E.	4° 30′ E.	3° 57′ E.	4° 19′ E.	7° 45′ E.	7° 22′ E.	9° 57′ E.	9° 26′ E.	8° 33′ E.	7° 53′ E.	7° 29′ E.	7° 33′ E.	8° 5′ E.
5,0	7,0	7,0	7,0	7,0	4,8	5,0	—	4,9	3,4	5,0	3,8	4,2	3,6
33,11	34,93	34,57	34,48	34,50	29,67	34,00	—	34,60	33,61	34,12	32,79	33,11	30,40
+	rr	+	r	—	c	c	—	—	—	—	—	—	—
—	—	—	—	—	—	rr	—	—	—	r	+	—	—
r	—	—	—	r	—	—	+	—	—	—	—	—	—
r	—	—	—	—	+	rr	—	—	—	—	—	r	—
—	—	—	—	r	—	—	+	—	—	—	+	+	—
—	rr	+	—	c	—	—	—	—	—	—	—	—	—
c	rr	—	—	+	+	cc	+	c	+	c	+	+	—
c	—	c	—	—	+	c	+	r	c	—	—	c	—
—	—	—	—	—	—	—	r	—	+	+	—	—	—
r	—	—	—	—	—	r	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
rr	—	—	—	—	—	—	—	—	—	r	—	rr	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
+	r	r	—	—	r	r	—	—	—	—	+	—	—
—	—	—	—	—	c	+	+	+	—	+	+	c	—
+	—	—	—	r	+	+	+	+	—	+	—	c	—
—	—	—	—	—	—	—	—	—	—	—	rr	—	—
—	—	—	—	—	c	rr	+	—	—	r	—	—	—
—	—	—	—	—	—	—	—	r	—	+	c	+	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
r	—	—	—	—	—	—	r	—	—	—	r	—	—
r	—	—	—	—	—	—	r	—	r	r	—	r	—
—	—	—	—	—	—	—	r	—	—	—	—	r	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	r	—	—	r	c	—	+	r	—	r	+	+	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	r	—	—	—	c	+	cc	r	+	+	+	c	+
—	—	r	—	—	—	—	—	—	—	—	r	—	—
—	—	—	—	—	—	—	—	—	—	—	c	—	—
—	r	—	—	—	r	+	+	+	c	+	+	—	c
—	—	—	—	—	—	—	r	—	—	—	r	r	—
—	—	—	—	—	—	—	r	—	r	—	r	—	r
Tp. (Nm.)	O.	O.	O.	O.	Nc. Ns.	Tp. Nc.	Nc.	(Tp. Nc.)	(Nc. Tp.)	(Nc. Tp.)	(Nc. Tp.)	Tp. Nc.	Nc.

Table II. The North Sea

Month	4	4	4	4	4	4	5
Date	28	28	29	29	30	30	1
Lat. N.	57° 45′	58° 9′	58° 27′	58° 48′	58° 40′	57° 14′	55° 37′
Long.	8° 37′ E.	4° 50′ E.	1° 39′ E.	2° 3′ W.	4° 37′ W.	7° 6′ W.	6° 49′ W.
Temperature	—	5,5	6,5	7,0	9,0	8,5	8
Salinity	—	31,50	35,18	35,00	34,57	34,79	34,38
Acartia Clausii Giesbr.	—	—	r	—	r	r	+
A. longiremis Lilljeb.	+	—	—	—	—	—	—
Calanus finmarchicus Gunn.	c	+	c	—	c	c	+
Centropages hamatus Lilljeb.	+	—	r	—	—	—	—
Oithona similis Claus	—	r	r	—	r	—	—
Pseudocalanus elongatus Boeck	—	r	c	—	+	—	—
Temora longicornis O. F. Müll.	+	—	—	—	—	c	—
Evadne Nordmanni Lovén	+	r	—	—	—	—	—
Halosphæra viridis Schmitz	r	r	—	—	—	—	—
Ceratium furca Duj.	r	r	—	—	—	r	—
C. fusus Duj.	r	r	—	—	—	—	—
C. longipes Bail.	c	cc	—	—	—	—	—
C. macroceros Ehb.	r	r	—	—	—	—	—
C. tripos Nitzsch	cc	cc	—	—	—	—	—
Dinophysis acuta Ehb.	+	r	—	—	—	—	—
Gonyaulax spinifera Clap. & Lachm.	—	—	—	—	rr	—	—
Peridinium depressum Bail.	c	+	—	—	—	r	+
P. ovatum Pouchet	—	—	—	—	—	+	r
P. pellucidum Bergh	—	—	—	—	—	+	r
Asterionella japonica Cl.	—	—	—	r	—	—	—
Biddulphia mobilensis Bail.	—	—	—	—	—	—	r
Cerataulina Bergonii H. Per.	—	—	—	—	—	—	—
Chætoceros atlanticus Cl.	—	—	—	—	—	—	—
C. borealis Brw.	—	—	+	—	—	—	—
C. curvisetus Cl.	—	—	+	—	—	—	r
C. debilis Cl.	—	—	c	c	ccc	—	c
C. decipiens Cl.	—	—	ccc	+	+	—	r
C. densus Cl.	—	—	rr	—	—	—	—
C. didymus Ehb.	—	—	—	—	—	—	—
C. hiemalis Cl.	—	—	—	—	—	—	r
C. scolopendra Cl.	—	—	—	—	r	—	+
Coscinodiscus concinnus W. Sm.	—	—	r	—	—	—	—
C. oculus iridis Ehb.	—	—	—	—	—	—	—
C. radiatus Ehb.	—	—	—	—	—	—	+
Ditylum Brightwellii Wert.	—	—	—	r	+	—	—

n April—May 1899.

5	4	4	4	4	4	4	4	4	4	4	4
1	28	28	29	29	29	29	29	29	29	29	29
54° 15′	56° 17′	56° 30′	56° 37′	56° 43′	56° 49′	56° 55′	57° 2′	57 8′	57° 34′	57° 3′	56° 53′
5° 11′ W.	1° 43′ W.	0° E.	1° 15′ E.	2° 30′ E.	3° 45′ E.	5° E.	6° 14′ E.	7° 28′ E.	9° 24′ E.	7° 45′ E.	6° 14′ E.
8,5	7	7	7	8	7	6	6	6	6	6,5	6,1
34,36	34,89	35,00	35,17	34,79	34,74	34,94	35,00	34,91	34,21	35,00	35,00
c	r	+	—	rr	r	—	—	r	+	—	—
—	—	—	—	r	—	—	—	r	—	r	r
c	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	—	+	—	—	—	—
—	—	—	+	ccc	c	r	+	+	—	c	c
—	—	—	r	—	rr	—	+	r	r	r	r
—	—	r	—	—	—	—	r	—	—	—	—
—	—	+	+	—	+	—	+	—	—	r	r
—	cc	c	c	c	c	—	c	—	—	r	—
—	r	+	r	—	—	—	+	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	+	—	—	—	—	—	—	r	—	—
rr	—	—	r	—	rr	—	—	—	—	r	—
—	—	—	—	—	r	—	—	—	—	—	—
—	—	—	r	—	+	—	—	—	—	r	—
—	—	+	c	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	r	—	+	—	+	—	—	—	—	—	—
—	—	—	r	—	+	—	—	—	+	—	—
—	r	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	rr	—		—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	r
—	—	—	—	+	r	r	—	+	—	—	—
+	r	—	—	r	—	—	r	r	r	—	—
—	r	+	rr	—	—	—	—	—	r	—	—

Table II (continued). **The North-Sea**

Month	4	4	4	4	4	4	5
Date	28	28	29	29	30	30	1
Eucampia zodiacus Ehb.	—	—	—	—	—	—	—
Guinardia flaccida Castr.	—	—	—	—	—	—	—
Lauderia annulata Cl.	—	—	+	+	+	r	r
Navicula membranacea Cl.	—	—	—	—	—	—	—
Nitzschia seriata Cl.	—	—	+	+	r	—	—
Rhizosolenia semispina Hensen	—	—	r	r	—	—	r
R. Shrubsolei Cl.	—	—	r	r	—	—	—
R. Stolterfothii H. Per.	—	—	—	—	—	—	—
R. styliformis Btw.	—	—	r	—	—	—	—
Stephanopyxis turgida Grev.	—	—	—	—	—	—	—
Thalassiosira gravida Cl.	—	—	—	r	—	—	—
T. Nordenskiöldii Cl.	—	—	—	c	+	cc	c
Thalassiothrix longissima Cl. & Gun.	—	—	—	—	—	—	—
Planktontype	Ns. Tp.	Tp. Ns.	C.	Ns. Si.	Ns. (Si.)	Si.	Si.

April—May 1899.

5	4	4	4	4	4	4	4	4	4	4	4
1	28	28	29	29	29	29	29	29	29	29	29
—	—	—	rr	—	—	—	rr	—	—	—	—
—	r	r	c	—	—	ccc	cc	ccc	cc	ccc	c
—	c	c	—	—	+	r	—	—	r	—	—
—	rr	—	rr	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	+	r	+	—	—	—	—	—	—	—	—
—	—	—	—	—	r	—	—	—	—	r	—
—	r	r	+	—	r	—	rr	—	—	r	—
—	r	+	r	—	r	r	rr	r	cc	r	r
—	—	—	rr	—	—	—	—	—	r	—	—
—	r	c	c	—	—	—	—	—	—	—	—
—	—	—	+	—	—	—	—	—	—	rr	—
—	—	—	c	—	+	—	rr	rr	—	rr	—
S. Ns.	Ns.	Ns. S.	T. Ns.	Tp. Ns.	Ns. Nh.	Nm.	Nm. Ns.	Nm. (Ns.)	S. Nm.	Nm.	Tp. Nm. Nh. Ns.

Table II (continued). **The North Sea**

Month	4	4	4	5	4	4	4
Date	30	30	30	1	29	29	30
Lat. N.	56° 30′	56° 7′	55° 39′	55°	57° 39′	57° 47′	57° 28′
Long.	4° 30′ E.	2° 48′ E.	1° 10′ E.	0° 29′ W.	11° 26′ E.	10° 33′ E.	9° 27′ E.
Temperature	6	7	7	6	6,5	6,3	6,3
Salinity	34,96	35,10	35,10	34,79	23,12	33,20	33,95
Acartia Clausii Giesbr.	r	r	—	r	—	—	—
A. longiremis Lilljeb.	—	—	—	r	—	—	—
Calanus finmarchicus Gunn.	—	—	—	—	—	—	—
Centropages hamatus Lilljeb.	—	—	—	—	—	—	—
Oithona similis Claus	—	r	r	r	—	—	—
Pseudocalanus elongatus Boeck	+	c	+	+	—	—	—
Temora longicornis O. F. Müll.	r	+	—	r	—	—	—
Evadne Nordmannii Lovén	—	—	—	—	—	—	—
Halosphæra viridis Schmitz	—	—	—	—	—	—	—
Ceratium furca Duj.	r	—	—	—	—	—	—
C. fusus Duj.	r	r	—	—	—	—	—
C. longipes Bail.	+	r	—	—	—	rr	—
C. macroceros Ehb.	r	—	—	—	—	—	—
C. tripos Nitzsch	+	c	—	—	r	—	—
Dinophysis acuta Ehb.	r	—	r	r	r	—	—
Gonyaulax spinifera Clap. & Lachm.	—	—	r	r	—	—	r
Peridinium depressum Bail.	r	—	—	r	—	—	—
P. ovatum Pouchet	r	—	r	c	—	—	—
P. pellucidum Bergh	—	—	—	—	—	rr	r
Asterionella japonica Cl.	—	—	—	—	—	rr	rr
Biddulphia mobilensis Bail.	—	—	—	—	—	—	—
Cerataulina Bergonii H. Per.	—	r	r	—	r	r	—
Chætoceros atlanticus Cl.	—	r	r	—	—	—	—
C. borealis Btw.	—	cc	ccc	—	—	—	—
C. curvisetus Cl.	—	—	r	+	—	—	—
C. debilis Cl.	—	—	c	—	—	—	—
C. decipiens Cl.	—	rr	c	—	+	rr	r
C. densus Cl.	—	+	r	—	—	r	r
C. didymus Ehb.	—	—	r	r	—	—	r
C. hiemalis Cl.	—	—	—	—	c	r	—
C. scolopendra Cl.	—	—	—	—	—	—	—
Coscinodiscus concinnus W. Sm.	—	—	r	—	—	—	—
C. oculus iridis Ehb.	—	—	—	—	—	—	—
C. radiatus Ehb.	—	—	r	r	—	—	+
Ditylum Brightwellii Wert.	—	—	—	rr	—	ccc	c

in April—May 1899.

4	4	4	4	4	4	4	4	5	5	5	5
30	30	30	30	30	29	29	30	7	13	20	21
57° 8′	56° 34′	55° 54′	55° 14′	54° 36′	57° 31′	56° 8′	54° 45′	57° 12′	56° 30′	54° 34′	57° 7′
8° 30′ E.	7° 50′ E.	7° 30′ E.	7° 29′ E.	7° 48′ E.	9° 20′ E.	7° 20′ E.	5° 57′ E.	9° 20′ E.	7° 25′ E.	5° 48′ E.	8° 20′ E.
6,5	6,8	7,3	7,3	7,5	9,5	9,5	9	11	—	10	8
32,73	32,73	33,28	33,46	31,36	35,12	34,91	33,83	—	—	—	34,98
—	—	—	—	—	rr	+	—	—	+	+	—
—	—	—	—	—	—	—	—	r	—	r	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	r	r	—	+	—
—	—	—	—	—	—	r	r	—	—	+	—
—	—	—	r	—	—	r	r	—	—	—	—
—	—	—	—	—	—	—	r	—	—	—	—
—	—	—	—	—	—	—	r	—	r	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	r	—	—	r	—	r
—	—	—	—	—	—	—	—	—	r	r	—
—	—	r	—	—	—	—	cc	—	—	—	—
—	—	—	—	—	—	r	—	—	—	—	—
—	—	—	—	—	—	c	—	—	—	+	+
—	—	r	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	rr	—
—	—	—	—	—	r	c	—	—	r	c	—
r	r	—	—	—	—	—	—	—	r	—	—
r	r	r	—	—	—	—	—	r	—	—	—
rr	rr	c	c	+	—	—	—	—	—	—	—
r	—	—	r	r	—	—	—	—	—	—	—
r	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	+	c	+	—	—	+	r
—	—	—	—	—	—	r	r	—	—	—	—
rr	—	—	—	r	—	—	r	—	—	—	—
r	r	c	c	r	—	—	r	+	—	rr	—
r	r	—	—	—	r	+	+	—	—	c	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	r	c	—	—	—
r	r	—	—	—	—	—	—	—	—	—	—
—	—	—	—	r	—	—	r	—	—	r	—
—	—	—	—	—	—	—	—	—	—	—	—
+	+	—	c	—	—	+	—	—	—	—	r
ccc	ccc	c	—	—	—	—	—	—	—	—	—

Table II (continued). **The North Sea**

Month	4	4	4	5	4	4	4
Date	30	30	30	1	29	29	30
Eucampia zodiacus Ehb.	—	—	rr	—	—	r	—
Guinardia flaccida Castr.	+	ccc	c	—	—	—	c
Lauderia annulata Cl.	—	—	c	—	—	c	+
Navicula membranacea Cl.	—	—	—	—	—	—	—
Nitzschia seriata Cl.	—	—	—	—	—	—	—
Rhizosolenia semispina Hensen	—	—	—	r	c	—	—
R. Shrubsolei Cl.	—	—	—	—	—	r	—
R. Stolterfothii H. Per.	r	—	—	r	—	—	—
R. styliformis Btw.	rr	c	—	—	—	+	c
Stephanopyxis turgida Grev.	—	—	—	—	—	—	r
Thelasssiosira gravida Cl.	—	—	—	+	—	—	—
T. Nordenskiöldii Cl.	—	—	—	rr	—	—	—
Thalsssiothrix longissima Cl. & Gun.	—	—	—	—	—	—	—
Planktontype	Tp. Ns.	Nm. Tp. S. Ns.	C. Ns. (Nm.)	Ns.	Ns. C.	Nm.	Nm. S.

n April—May 1899.

4	4	4	4	4	4	4	4	5	5	5	5
30	30	30	30	30	29	29	30	7	13	20	21
r	—	—	—	—	r	r	r	—	—	—	rr
r	—	—	—	—	r	r	+	—	—	+	+
—	c	+	—	—	—	r	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	r	—	r	—	—	—	—
—	—	—	—	—	+	—	—	r	—	r	—
r	—	—	—	—	r	—	—	—	r	—	r
—	—	—	—	—	—	—	—	—	—	—	rr
r	r	—	—	—	r	+	c	—	c	c	c
rr	—	—	—	—	—	c	c	—	—	—	—
rr	—	+	—	r	—	—	r	—	—	—	—
rr	rr	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Nm. (Ns.)	Nm. (Ns.)	Ns. C. Nm.	Ns. C.	(Ns.)	Ns. (Nm.)	Nm. S. Ns.	Ns. S.	Nm. Ns.	S.	S. (Ns.)	S.

in July—August 1899.

8	8	8	8	7	7	7	7	7	7	7	7	7	7
22	23	23	24	28	28	29	29	29	29	29	29	28	29
58° 25′	58° 6′	57° 38′	57° 53′	56° 14′	56° 22′	56° 31′	56° 40′	56° 49′	56° 58′	57° 4′	57° 11′	55° 10′	55° 34′
0° 28′ E.	3° 44′ E.	7° 2′ E.	10° 13′ E.	2° 2′ W.	0° 36′ W.	0° 50′ E.	2° 18′ E.	3° 44′ E.	5° 2′ E.	6° 33′ E.	8° E.	1° 16′ W.	0° 59′ E.
15,0	14,0	15,4	—	12	15	15	15,5	16	16,5	16	16	14,5	16
35,08	32,51	30,38	—	34,38	34,71	35,10	35,06	34,33	33,32	32,96	29,76	34,36	34,83
—	—	—	—	—	—	—	—	—	—	—	r	+	+
+	—	—	—	r	cc	+	r	r	+	r	—	c	cc
—	—	—	—	—	—	r	—	—	—	—	—	—	—
—	—	+	+	+	c	—	+	+	—	+	—	—	+
—	—	—	—	—	—	—	—	—	+	—	r	+	—
c	+	—	+	—	—	r	—	—	r	—	—	—	c
—	—	—	—	—	—	r	—	—	—	—	—	—	—
—	+	+	—	—	c	+	c	+	c	c	+	cc	cc
c	—	c	+	—	—	—	r	—	+	—	r	—	cc
—	—	—	+	+	c	—	+	—	+	—	+	ccc	—
c	c	c	c	+	+	+	c	+	—	—	c	ccc	c
—	—	—	—	—	+	c	c	+	—	r	+	—	—
—	—	—	—	—	—	—	—	—	—	—	+	—	—
—	—	—	—	—	+	+	+	—	+	—	—	r	+
r	—	r	r	—	—	—	—	r	—	r	—	r	+
—	—	—	—	—	+	—	—	—	+	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	cc	—	—	—	—	—	+	—	—	—	—	—	—
cc	cc	—	—	—	—	—	—	r	r	r	—	—	—
—	—	—	—	+	—	—	—	r	r	r	r	r	—
—	—	—	—	+	+	—	—	—	+	—	—	r	—
+	r	cc	ccc	—	—	r	—	+	+	r	c	—	—
c	—	ccc	cc	+	—	r	c	+	—	c	+	r	r
rr	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	r	c	—	—	—	+	—	—	—	—
—	r	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	+
Tp.	Tp.	Tp.	Tp.	Tp.	Ns. S.	Tp.?	Tp.	Tp.	(Tp.) (Ns.)	Tp.	Tp.	Ns. S.	S. Ns.

Table III (continued). **The North Sea**

Month	7	7	7	7	7	7
Day	29	29	30	30	30	31
Lat. N.	55° 54′	56° 15′	56° 31′	56° 57′	57° 25′	57° 44′
Long.	2° 23′ E.	4° 9′ E.	5° 52′ E.	7° 37′ E.	9° 6′ E.	10° 52′ E.
Temperature	16	16	16	16,5	15,8	16,5
Salinity	35,03	33,78	33,61	31,01	29,41	29,53
Oikopleura dioica Fol.	+	+	—	+	+	+
Acartia Clausii Giesbr.	+	+	+	+	—	+
Anomalocera Patersonii Brady & Robts.	—	—	—	rr	—	—
Calanus finmarchicus Gunn.	c	c	c	c	+	—
Centropages hamatus Lilljeb.	—	—	—	—	+	—
C. typicus Kröyer	c	+	c	+	—	+
Corycæus anglicus Lubbock	—	r	r	—	—	—
Oithona similis Claus	cc	c	c	cc	cc	c
Paracalanus parvus Claus	c	c	c	c	—	c
Pseudocalanus elongatus Boeck	—	—	c	c	c	—
Temora longicornis O. F. Müll.	+	cc	—	—	cc	+
Evadne Nordmannii Lovén	—	r	—	r	—	—
E. spinifera P. E. Müll.	—	r	—	—	r	—
Podon intermedius Lilljeb.	—	—	+	—	—	—
Sagitta bipunctata Quoi & Gaim.	r	+	+	+	+	—
Cyttarocylis denticulata Ehb.	—	—	—	—	r	—
Tintinnus Steenstrupii Clap. & Lachm.	—	—	—	r	r	r
Acanthometron quadrifolium Hkl.	—	—	—	+	rr	—
Ceratium furca Duj.	+	r	—	—	—	—
C. fusus Duj.	—	—	—	—	—	—
C. longipes Bail.	—	—	—	—	—	—
C. macroceros Ehb.	c	c	c	+	c	c
C. tripos Nitzsch	c	c	—	c	c	c
Dinophysis acuta Ehb.	—	—	—	r	+	+
Diplopsalis lenticula Bergh	—	—	—	r	r	—
Peridinium depressum Bail.	—	—	—	—	r	—
P. divergens Ehb.	—	r	—	r	r	+
Rhizosolenia gracillima Cl.	—	—	—	cc	cc	+
Planktontype	Tp.	Tp.	Tp.	Tp. Nm.	Tp. Nm.	Tp. (Nm.)

in July-August 1899.

7	7	7	7	7	7	8	8	8	8	8	8	8	8
29	29	29	30	30	30	2	2	2	2	3	3	3	3
54° 13′	55° 7′	55° 59′	57° 7′	57° 29′	57° 39′	51° 48′	52° 36′	53° 28′	54° 18′	55° 6′	55° 43′	56° 32′	57° 16′
8° 4′ E.	7° 35′ E.	7° 37′ E.	8° 28′ E.	9° 31′ E.	10° 26′ E.	3° 23′ E.	3° 57′ E.	4° 39′ E.	5° 36′ E.	6° 26′ E.	7° 4′ E.	7° 52′ E.	8° 31′ E.
17	17,3	17	17	16,8	16,5	—	18,2	18,2	16,5	16	16,8	15,3	15,0
31,19	32,82	33,97	30,91	29,65	29,17	—	35,27	33,46	34,40	33,87	31,65	31,13	31,70
—	c	c	+	—	—	—	—	—	—	+	+	+	—
c	+	+	—	—	+	—	—	+	—	—	—	—	+
—	—	rr	rr	—	—	—	—	—	—	—	r	—	—
—	r	—	—	—	r	—	—	r	r	+	—	+	—
+	r	+	c	c	+	+	—	—	—	—	r	+	—
—	—	—	r	—	c	—	—	—	—	—	c	c	—
r	+	—	—	—	—	—	—	—	—	r	—	rr	—
—	—	+	c	c	cc	—	—	+	+	—	c	c	c
c	c	c	c	—	c	c	—	c	c	c	cc	cc	c
—	+	—	r	+	—	—	—	—	—	+	—	+	—
c	+	+	c	cc	—	c	+	c	—	—	—	r	cc
—	—	—	r	+	c	—	—	+	+	r	—	c	+
—	—	—	+	—	+	—	—	—	c	+	c	c	c
—	—	—	—	—	—	—	—	—	r	—	—	—	r
—	—	c	r	c	r	c	—	—	—	+	—	+	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	rr	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	r	r	—	—	—	—	—	r	r	r
c	—	—	—	—	—	—	—	—	—	—	—	—	—
r	—	—	—	—	—	—	—	—	—	—	—	—	—
+	+	—	—	—	—	—	—	—	—	—	—	—	—
r	r	c	cc	c	cc	r	—	—	+	+	c	c	cc
+	—	+	+	cc	cc	r	—	—	+	r	+	+	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	r	—	—	—	—	—	—	—	—	—
+	—	—	—	—	—	—	—	—	—	—	—	—	—
Nm.	Nm. (Ns.)	Nm. Tp.	Tp. Ns.	Tp.	Tp.	Nm. Ns.	O.	Nm.	Tp.	(Tp.) Nm.	Tp.	Tp.	Tp.

Table IV. The North Sea

Date	3	4	4	5	6
Latitude N.	57° 54′	57° 46′	57° 55′	58° 19′	58° 42′
Longitude	6° 51′ E.	3° 41′ E.	2° 20′ E.	0° 55′ W.	4° 32′ W.
Temperature	10,5	9,5	9,5	10,5	11
Salinity	32,91	35,12	35,24	35,22	34,86
Proto pedata LEACH.	—	—	—	—	—
Acartia Clausii GIESBR.	—	—	+	r	+
A. longiremis LILLJEB.	—	—	—	—	—
Calanus finmarchicus GUNN.	—	—	+	r	+
Centropages typicus KRÖYER	+	+	c	—	—
Corycæus anglicus LUBB.	r	—	r	—	—
Euterpe acutifrons DANA	—	—	—	—	—
Microsetella atlantica BRADY & ROBS.	—	—	—	r	r
Oithona similis CLAUS	+	+	c	r	+
Paracalanus parvus CLAUS	+	+	c	—	+
Pseudocalanus elongatus BOECK	+	+	+	+	c
Temora longicornis O. F. MÜLL.	+	+	—	—	+
Sagitta hipunctata QUOI & GAIM.	—	—	c	r	—
Tintinnopsis ventricosa CLAP. & LACHM.	—	—	—	—	+
Acanthochiasma fusiforme HKL.	—	—	—	—	—
Halosphæra (small)	r	r	—	r	r
Ceratium (tripos var.) hucephala CL.	r	r	r	—	—
C. furca DUJ.	+	cc	c	—	—
C. fusus DUJ.	+	c	c	+	—
C. (trip. var.) longipes BAIL.	—	—	—	r	—
C. macroceros EHB.	ccc	cc	ccc	+	+
C. tripos NITZSCH	ccc	c	+	+	r
Dinophysis acuta EHB.	—	r	r	r	—
Diplopsalis lenticula BERGH	—	—	—	—	—
Peridinium depressum BAIL.	r	r	—	—	—
P. divergens EHB.	—	r	r	r	—
Pyrophacus horologium STEIN	—	—	rr	—	—
Biddulphia mobilensis BAIL.	—	—	—	—	—
Chætoceros decipiens CL.	rr	—	—	r	—
C. densus CL.	rr	—	—	—	—
Coscinodiscus concinnus W. SM.	—	—	—	—	—
C. excentricus EHB.	—	—	—	r	—
C. radiatus EHB.	—	r	—	c	+
Ditylum Brightwellii WEST.	r	—	—	—	—
Guinardia flaccida CASTR.	r	—	—	—	—
Rhizosolenia calcar avis SCHULZE	rr	—	—	—	—
R. Stolterfothii H. PER.	r	—	—	—	—
R. styliformis BTW.	r	—	—	—	—
Streptothera thamesis SHRUBS.	—	—	—	—	—
Planktontype	Tp.	Tp.	Tp.	(Tp.)	(Tp.) (Ns.)

in November 1899.

8	9	9	9	3	3	4	4	4	4	4	4
57° 54′	55° 50′	54° 14′	53° 52′	56° 13′	56° 22′	56° 35′	56° 48′	57° 10′	57° 17′	57° 24′	57° 31′
6° 30′ W.	6° 44′ W.	5° 6′ W.	4° 27′ W.	1° 28′ W.	0° 10′ E.	1° 7′ E.	2° 24′ E.	3° 48′ E.	5° 12′ E.	6° 36′ E.	8° E.
11	12	12	11	10	9,75	9,75	10	10,5	10	9,5	9,5
34,83	34,94	34,36	34,45	34,50	34,53	37,41	34,69	35,55	35,05	35,03	35,00
—	—	—	—	—	—	—	—	—	—	—	—
r	—	r	+	r	+	c	+	+	—	—	—
—	—	—	—	—	+	+	—	—	—	—	—
+	—	+	—	r	+	c	r	—	—	—	—
—	—	—	—	+	—	c	+	—	—	c	—
—	—	—	—	—	—	—	—	+	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	+	—	r	—	—	—	—	—	—	—
+	—	—	—	r	—	+	r	+	—	+	—
+	—	—	—	—	—	—	—	—	r	—	—
+	—	+	r	+	+	+	+	c	r	+	—
—	—	—	—	+	+	c	r	c	r	+	—
—	—	r	—	r	r	c	+	—	r	+	—
cc	+	+	r	—	—	—	—	—	—	—	—
—	—	—	—	r	r	+	r	—	—	—	—
r	—	—	—	—	—	—	—	r	—	r	—
—	—	—	—	—	—	—	—	+	c	—	—
—	—	c	r	r	+	r	+	r	+	c	+
—	—	+	—	r	—	—	—	r	+	+	+
—	r	r	—	r	r	—	—	—	—	—	r
—	—	—	—	—	+	+	c	c	c	cc	c
—	+	r	—	+	+	+	c	c	cc	c	c
—	—	r	—	—	—	—	—	—	—	rr	r
—	—	—	—	—	—	—	—	—	—	—	r
—	—	r	—	—	r	—	r	r	r	—	r
—	—	r	—	—	—	—	—	—	r	+	r
—	—	—	—	r	—	—	—	r	—	rr	—
—	—	+	r	—	—	—	—	—	—	—	—
—	rr	r	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	r	—	—	—	—	—	—	—	—
—	r	c	r	—	—	—	—	—	—	—	—
—	+	c	r	—	—	—	—	—	—	rr	—
—	—	+	r	—	—	—	—	—	—	—	—
—	—	+	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	+	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	r	r	r	—	—	—	—	—	—	—	—
Ns.	Ns.?	Nm.	(Nm.?)	Tp.?	(Tp.)	Tp.	Tp.	Tp.	Tp.	Tp.	Tp.

Table IV (continued). **The North Sea**

Date	1	4	4	4
Latitude N.	55° 13′	55° 35′	56°	56° 24′
Longitude	0° 35′ W.	1° 1′ E.	2° 44′ E.	4° 25′ E.
Temperature	10,5	10	10,5	11,25
Salinity	34,71	34,89	35,00	34,62
Proto pedata LEACH	—	—	—	—
Acartia Clausii GIESBR.	+	—	—	—
A. longiremis LILLJEB.	c	r	—	r
Calanus finmarchicus GUNN.	+	—	r	r
Centropages typicus KRÖYER	c	—	+	+
Corycæus anglicus LUBB.	—	rr	—	—
Euterpe acutifrons DANA	—	—	—	—
Microsetella atlantica BRADY & ROBTS.	—	—	—	—
Oithona similis CLAUS	+	r	r	r
Paracalanus parvus CLAUS	—	—	—	—
Pseudocalanus elongatus BOECK	c	—	+	+
Temora longicornis O. F. MÜLL.	+	+	+	+
Sagitta bipunctata QUOI & GAIM.	—	ccc	c	—
Tintinnopsis ventricosa CLAP. & LACHM.	—	—	—	—
Acanthochiasma fusiforme HKL.	cc	cc	—	—
Hlosphæra (small)	—	—	—	r
Ceratium (trip. var.) bucephala CL.	—	—	cc	c
C. furca DUJ.	c	c	r	—
C. fusus DUJ.	+	—	—	—
C. (trip. var.) longipes BAIL.	—	—	—	—
C. macroceros EHB.	c	c	cc	c
C. tripos NITZSCH	c	c	—	cc
Dinophysis acuta EHB.	—	r	r	r
Diplopsalis lenticula BERGH	—	r	—	—
Peridinium depressum BAIL.	—	r	—	—
P. divergens EHB.	—	r	+	+
Pyrophacus horologium STEIN	—	—	—	—
Biddulphia mobileosis BAIL.	—	—	—	—
Chætoceros decipiens CL.	—	—	—	—
C. densus CL.	—	—	—	+
Coscinodiscus concinnus W. SM.	—	—	r	—
C. excentricus EHB.	r	—	—	r
C. radiatus EHB.	—	—	—	—
Ditylum Brightwellii WEST.	—	—	—	—
Guinardia flaccida CASTR.	r	—	r	—
Rhizosolenia calcar avis SCHULZE	—	—	—	—
R. Stolterfothii H. PER.	—	—	—	—
R. styliformis BTW.	—	—	—	—
Streptotheca thamesis SHRUBS.	—	—	—	—
Planktontype	Tp.	Tp.	Tp.	Tp.

in November 1999.

5	5	5	4	5	5	5	5	6	6	6	6
56° 48′	57° 10′	57° 34′	57° 30′	57° 2′	56° 31′	55° 58′	55° 27′	54° 52′	55° 40′	52° 58′	52° 15′
6° 1′ E.	7° 40′ E.	9° 21′ A.	9° 20′ E.	8° 9′ E.	7° 35′ E.	7° 2° E.	6° 22′ E.	5° 38′ E.	4° 48′ E.	4° 25′ E.	3° 45′ E.
12,2	11,75	11,2	10,2	11,1	11,4	11,2	11,6	12,2	12,2	12	12,6
34,50	34,47	34,29	34,36	33,99	33,83	33,35	33,97	34,53	33,90	33,90	34,89
—	r	—	—	—	—	—	r	+	+	—	r
—	c	r	—	r	r	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
r	—	r	—	—	—	—	—	—	—	r	—
r	+	r	r	—	—	r	—	—	r	c	r
+	+	—	—	r	r	r	c	r	r	—	—
—	—	—	—	c	—	c	c	r	c	+	—
—	—	—	—	—	—	—	—	—	—	—	—
+	—	r	r	+	—	r	+	r	c	+	—
—	+	c	r	+	+	c	c	—	+	+	c
c	c	+	—	r	r	r	+	r	—	—	—
+	c	+	r	—	—	—	+	+	—	c	c
+	c	+	—	c	c	r	+	—	—	—	—
—	—	—	—	—	—	—	—	—	+	—	—
r	—	—	—	—	—	—	—	—	—	—	—
r	—	—	—	—	—	—	—	—	—	—	—
r	c	+	—	—	—	—	—	—	—	—	—
+	—	—	+	+	+	+	c	+	—	r	—
—	r	r	r	—	—	r	+	—	—	r	—
—	—	—	—	—	—	—	—	—	r	r	—
+	c	cc	c	—	—	+	c	r	—	—	—
c	c	cc	c	r	+	c	c	r	—	—	—
—	—	—	—	—	—	—	rr	—	—	—	—
—	—	—	—	—	—	—	—	—	r	r	—
—	—	—	—	—	—	—	—	—	—	—	—
r	r	—	r	—	—	r	—	—	—	—	—
—	—	—	—	r	—	—	—	—	r	—	—
—	r	—	—	r	—	+	r	+	—	—	—
—	—	r	rr	—	—	—	—	—	—	—	—
—	r	+	—	—	—	—	—	—	c	—	—
—	r	—	—	r	—	—	r	—	—	—	—
—	—	—	—	—	—	—	c	c	r	—	—
—	r	—	—	+	+	+	c	—	r	+	—
—	—	—	+	r	+	+	+	c	+	r	—
r	—	+	+	+	+	+	c	+	+	cc	c
—	—	—	—	r	r	r	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	cc	c
r	—	—	r	r	r	r	c	r	r	—	—
—	—	—	—	—	—	—	—	rr	—	—	—
Tp.	Tp.	Tp.	Tp.	Nm.	Nm. Tp.	Tp. Nm.	Tp. S. Nm.	Nm.	Nm.	Nm.	Nm.

Table V

Month	1	1	1	1	2	2	2	3	3	3	4	4	4	4	4
Day	4	13	18	24	10	17	23	1	16	24	4	13	21	23	25
Temperature	4,30	—	3,25	2,50	1,15	2,10	2,20	1,75	3,40	2,90	2,85	4,10	4,80	—	—
Salinity	31,27	—	35,15	25,16	25,45	24,84	24,03	23,09	27,45	32,73	24,18	26,58	22,14	—	—
Oikopleura dioica FOL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Acartia Clausii GIESBR.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A. longiremis LILLJEB.	—	—	+	—	—	—	r	—	—	—	—	r	—	cc	r
Calanus finmarchicus GUNN.	r	—	—	—	—	—	—	—	—	—	r	—	—	r	—
Centropages hamatus LILLJEB.	+	—	+	+	+	—	—	—	—	—	—	—	r	+	—
C. typicus KRÖYER	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Corycæus anglicus LUBB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Oithona similis CLAUS	c	r	+	+	r	—	—	—	—	—	r	—	r	r	—
Paracalanus parvus CLAUS	r	r	+	—	—	—	—	—	—	—	—	—	—	—	—
Pseudocalanus elongatus BOECK.	c	+	+	—	—	—	—	—	r	—	+	—	+	c	—
Temora longicornis O. F. MÜLL.	c	+	+	+	—	rr	r	—	—	—	+	—	+	r	—
Evadne Nordmannii LOVÉN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
E. spinifera P. E. MÜLL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Podon intermedius LILLJEB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
P. Leuckartii G. O. SARS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sagitta bipunctata QUOI & GAIM.	r	c	+	—	—	rr	—	—	—	—	—	—	—	—	—
Pleurobrachia pileus FABR.	—	—	—	r	—	—	—	—	—	—	—	—	—	r	—
Cyttarocylis denticulata EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tintinnopsis campanula EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Distephanus speculum EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	+	+
Halosphæra viridis SCHMITZ	—	—	+	—	+	r	—	—	+	—	r	—	—	+	r
Ceratium (trip. var.) bucephalum CL.	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C. furca DUJ.	+	—	r	—	—	—	—	—	—	—	—	—	—	—	—
C. fusus DUJ.	+	—	r	—	—	—	—	—	—	—	—	—	—	r	—
C. longipes BAIL.	+	c	+	r	+	r	r	—	r	—	—	—	r	r	—
C. macroceros EHB.	c	—	r	r	—	—	—	—	—	—	—	—	—	r	—
C. tripos NITZSCH	ccc	cc	cc	c	+	r	+	+	—	—	—	—	r	r	—
Dinophysis acuta EHB.	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—
Peridinium depressum BAIL.	—	r	r	—	r	—	—	—	—	r	+	r	r	—	—
P. divergens EHB.	—	—	r	—	—	—	—	—	—	—	—	—	—	r	—
Biddulphia aurita LYNGB.	—	r	r	—	+	c	c	c	+	—	—	—	—	—	—
B. mobilensis BAIL.	r	—	r	—	—	—	—	—	—	—	—	—	—	r	—
Cerataulina Bergonii H. PER.	—	—	—	—	—	—	—	—	—	—	r	—	—	r	r
Chætoceros borealis BTW.	r	—	r	r	r	—	r	—	—	r	—	—	—	—	r
v. Brightwelli CL.	—	—	—	—	—	rr	r	—	—	rr	—	—	rr	—	r
C. constrictus GRAN.	—	—	r	r	+	c	c	c	c	ccc	cc	cc	cc	c	—
C. contortus SCHÜTT.	—	—	r	r	—	r	—	r	+	+	c	—	+	r	—
C. curvisetus CL.	—	r	r	r	r	r	rr	—	—	—	—	—	—	—	—

Måseskär 1899.

5	5	5	6	6	6	7	7	7	7	8	8	8	9	9	9	10	10	11	11	12	12	12
8	20	29	8	15	26	5	15	22	31	10	21	30	8	16	25	5	21	7	17	6	18	28
8,05	9,80	8,85	11,75	13,00	15,80	18,10	22,20	20,20	16,20	18,20	15,90	16,55	15,45	14,60	13,15	12,10	10,80	9,50	8,04	7,20	3,15	1,20
20,81	19,08	32,53	30,01	26,54	19,55	17,17	14,59	17,59	29,72	21,24	30,70	20,10	23,54	22,81	24,48	25,71	27,86	27,51	28,98	32,62	28,10	19,36
—	—	—	+	—	—	—	—	c	c	—	—	r	c	r	c	c	+	c	r	—	+	—
—	r	—	+	—	—	r	—	—	+	—	—	—	—	—	—	—	cc	—	—	—	r	—
r	+	—	c	c	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	+
—	—	—	r	r	—	—	—	—	—	—	+	r	—	—	—	—	r	—	—	—	—	—
r	+	—	+	+	+	c	—	r	r	—	—	—	—	—	—	—	—	—	—	—	c	+
—	—	—	—	—	—	—	—	—	—	r	+	+	c	+	—	c	+	c	r	—	—	—
—	—	—	—	—	—	—	—	—	—	r	—	—	—	—	—	r	+	r	—	r	—	—
—	—	r	c	+	+	c	—	+	+	r	r	+	c	—	c	c	+	—	—	+	—	cc
—	—	—	—	--	—	c	c	cc	cc	c	cc	ccc	c	c	cc	cc	cc	c	+	+	c	—
—	—	—	+	—	—	—	—	—	+	—	+	—	—	+	—	—	+	—	+	r	c	—
—	—	—	r	r	r	—	—	r	—	r	+	—	—	—	—	cc	+	—	r	—	c	cc
—	cc	r	c	c	c	c	c	r	c	—	—	—	—	r	r	r	r	—	—	—	—	—
—	—	—	—	—	r	—	—	r	+	r	+	—	r	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	r	—	—	—	—	—	—	—
—	+	—	r	r	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	r	+	r	r	r	—	—	—	c	+	+	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	—	—	—	—	—	—	r	—
—	—	—	r	c	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	r	—
—	—	—	—	—	—	r	—	—	r	—	r	r	—	—	r	+	—	r	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	r	—	rr	—	—
—	—	+	c	+	r	—	—	—	—	—	—	—	—	—	—	—	—	—	r	+	—	rr
—	—	+	+	r	—	—	—	—	r	—	—	—	+	r	r	r	—	—	r	—	—	—
—	—	c	c	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	+	cc
—	—	—	+	+	—	—	—	—	ccc	—	ccc	r	c	r	c	c	cc	+	+	cc	+	—
—	—	c	c	c	ccc	c	ccc	c	ccc	c	c	r	c	+	cc	ccc	c	cc	+	cc	c	cc
r	—	rr	—	—	—	—	—	—	—	rr	—	—	—	—	—	—	—	r	—	r	—	rr
r	r	+	r	r	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	+	r
—	r	r	—	+	r	—	—	—	—	r	r	—	r	r	r	r	—	rr	—	r	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	r	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	—
—	r	—	—	r	—	+	—	r	—	r	—	—	—	r	—	—	—	rr	—	—	—	—
—	r	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	+	—	+	r
—	—	r	r	r	—	—	—	—	—	—	—	—	—	—	—	—	r	r	+	—	+	r
c	c	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	+	+	—	—	—
+	—	—	+	+	+	r	—	—	—	+	—	rr	cc	+	+	—	c	c	cc	—	r	—
—	—	cc	cc	c	c	c	—	—	—	+	—	c	cc	cc	cc	—	cc	cc	ccc	+	+	r

Table V (continued)

Month	1	1	1	1	2	2	2	3	3	3	4	4	4	4	4
Day	4	13	18	24	10	17	23	1	16	24	4	13	21	23	25
C. danicus Cl.	—	—	—	—	—	—	—	—	—	—	—	r	—	r	—
C. debilis Cl.	—	—	—	—	—	c	c	c	c	—	+	—	—	—	—
C. decipiens Cl.	—	r	r	r	+	r	+	+	+	—	cc	c	+	+	+
C. densus Cl.	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—
C. diadema Ehb.	—	—	—	r	+	+	c	c	c	c	+	+	—	—	—
C. didymus Ehb.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C. hiemalis Cl.	—	—	—	—	—	—	r	—	—	—	r	—	r	—	—
C. Schüttii Cl.	—	—	r	—	—	—	—	—	—	—	—	—	—	—	—
C. scolopendra Cl.	—	r	—	—	+	r	+	r	—	+	—	—	r	—	—
C. socialis Laud.	—	—	—	r	r	c	c	c	ccc	—	—	—	—	—	—
Coscinodiscus concinnus W. Sm.	c	cc	c	+	ccc	ccc	cc	—	—	—	—	+	—	+	—
C. oculus iridis Ehb.	—	+	+	—	c	c	—	+	r	—	—	—	—	—	—
C. polychordus Gran.	—	—	r	r	r	r	+	r	—	—	—	—	—	—	—
Ditylum Brightwellii West.	—	—	+	—	—	—	—	—	—	—	—	—	—	+	+
Guinardia flaccida H. Per.	—	—	—	—	—	—	—	—	—	—	—	—	—	+	+
Rhizosolenia calcar avis Schulze	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—
R. gracillima Cl.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R. semispina Hensen	—	r	r	—	r	r	r	r	c	c	c	c	+	—	—
R. setigera Btw.	—	—	—	—	—	—	—	—	—	—	r	—	r	—	—
R. Shrubsolei Cl.	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r
R. styliformis Btw.	—	—	—	—	—	—	—	—	—	—	—	—	—	cc	c
Skeletonema costatum Grev.	—	rr	r	—	—	r	—	—	r	—	—	—	—	—	—
Stephanopyxis turgida Grev.	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r
Thalassiosira gravida Cl.	—	—	—	—	—	r	+	r	r	+	—	—	—	—	—
T. Nordenskiöldii Cl.	—	rr	—	—	c	c	cc	cc	+	cc	—	—	—	rr	—
Thalassiothrix Frauenfeldii Grun.	—	+	c	c	c	r	—	r	r	—	—	—	r	—	—
T. longissima Cl. & Grun.	—	rr	—	—	rr	rr	—	—	—	rr	—	—	—	—	—
Planktontype	Tp. Ns. Nc.	Tp. Ns. Nc.	Tp. Ns. Nc.	Tp. Ns. (Nc.)	Nc. Ns. Si.	Nc. Si.	Si. Nc.	Si. Nc.	Si.	Si.	C. Ns.	C. Ns.	C. Ns.	S. Nm. Ns.	S. Nm Ns.

åseskär 1899.

5	5	5	6	6	6	7	7	7	7	8	8	8	9	9	9	10	10	11	11	12	12	12
8	20	29	8	15	26	5	15	22	31	10	21	30	8	16	25	5	21	7	17	6	18	28
cc	cc	r	c	—	c	+	—	—	—	—	—	—	—	r	—	—	—	—	—	r	r	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	cc	cc	cc	r	+	—
r	r	rr	r	r	—	—	—	—	—	—	—	—	—	rr	—	—	—	r	—	r	r	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	rr	—	r	rr	rr
—	—	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	—	—	—
—	—	—	—	r	—	—	—	—	—	r	—	rr	cc	cc	cc	—	cc	c	cc	+	+	—
+	cc	c	+	+	—	—	—	—	—	—	—	—	—	+	—	—	—	+	c	—	—	—
—	—	—	c	r	—	—	—	—	—	c	+	ccc	ccc	ccc	cc	—	cc	—	—	—	—	—
rr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	r	—	—	—
—	—	—	—	—	—	—	—	—	—	r	—	—	—	ccc	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	cc	cc	—	r	—	—	—	—	—	—	—	—	—	—	—	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	r	r	—
—	—	rr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	r	r	rr	r	rr
—	—	r	r	—	—	—	—	—	—	—	—	—	—	r	—	—	+	r	r	—	r	rr
—	r	—	r	—	—	—	—	—	—	—	rr	—	—	r	—	—	r	—	—	rr	—	—
—	—	—	—	+	c	+	—	—	cc	r	+	r	r	+	—	—	r	—	r	—	r	—
+	c	—	r	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	+	—	+	—
—	r	+	+	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	r	c	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	r	—	—	—	r	—	—	—	—	—	—	r	r	r	r	r	—
—	—	rr	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	—	—	r	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	—	—	rr	—
—	—	r	+	r	—	r	—	—	—	—	—	—	—	—	—	—	r	—	r	—	c	r
—	—	rr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nm. Ns.	Nm. Ns.	Nm. S. Ns.	Nm. Ns. Tp.	Ns. Nm. Tp.	Tp. Nm.	Tp. Nm.	Tp. Nc.	Tp. Nc.	Tp. Nm.	Tp. (Nm.)	Tp. (Nm.)	Nm.	Nm.	Nm. Si.	Nm.	Tp.	Nm. Tp. (Ns.)	Nm. Tp. (Ns.)	Nm. Ns.	Tp. (Nm.) (Ns.)	Tp. Nm. Ns.	—

Table V

Month	1	2	2	2	2	3	3	3	3	3	4	4	4	4	5	5	5	5	5
Day	17	3	15	20	24	3	7	14	20	30	4	12	17	27	1	6	12	24	30
Fritillaria borealis LOHM.	—	—	—	—	—	—	r	—	r	—	—	—	—	—	—	—	—	—	—
Acartia Clausii GIESBR.	r	—	—	—	—	—	—	+	cc	c	cc	r	r	r	—	—	r	r	+
Calanus finmarchicus GUNN.	—	—	—	—	—	—	—	—	—	—	—	—	c	—	—	—	—	+	—
Centropages typicus KRÖYER	—	r	—	—	—	—	—	+	+	—	+	—	—	—	—	—	r	—	—
Corycæus anglicus LUBBOCK	r	—	—	—	+	r	—	—	+	cc	c	+	r	—	—	—	—	—	—
Euterpe acutifrons DANA	r	—	—	—	—	—	—	—	—	+	+	r	—	—	—	—	—	—	r
Oithona similis CLAUS.	r	+	r	—	+	r	+	+	cc	—	+	c	—	r	—	r	—	—	+
Paracalanus parvus CLAUS.	—	—	—	—	+	+	+	+	+	—	—	—	+	—	—	—	—	—	—
Pseudocalanus elongatus BŒCK	—	+	—	—	—	—	—	—	r	—	—	r	+	—	—	—	—	—	—
Temora longicornis O. F. MÜLL.	—	—	—	—	—	—	—	—	+	r	—	c	cc	—	—	—	—	—	—
Evadne Nordmanoii LOVÉN	—	—	—	—	—	—	—	—	—	—	—	—	—	r	c	—	—	—	—
Sagitta bipunctata QUOI & GAIM.	—	r	—	—	—	—	—	—	—	—	—	—	r	—	—	—	—	—	—
Cyttarocylis serratus MŒB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tintinnopsis campanula EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Noctiluca miliaris SURIRAY	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Halosphæra viridis SCHMITZ	—	+	r	r	c	—	r	+	—	—	—	—	—	—	—	—	—	—	—
Ceratium furca DUJ.	—	—	—	—	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—
C. fusus DUJ.	—	—	—	—	—	r	—	—	r	—	—	—	—	—	—	r	—	c	+
C. longipes BAIL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C. macroceros EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C. tripos NITZSCH.	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Diplopsalis lenticula BERGH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Peridinium depressum BAIL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
P. divergens EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
P. ovatum POUCHET	—	—	—	—	—	—	r	—	—	—	r	r	—	rr	—	—	—	—	—
Phæocystis Pouchetii LAGH.	—	—	—	—	—	—	—	—	—	—	+	ccc	—	ccc	c	+	c	—	—
Asterionella japonica CL.	—	—	—	—	—	r	—	—	—	—	cc	c	—	+	—	—	—	—	—
Biddulphia mobilensis BAIL.	+	—	r	—	c	c	cc	cc	c	c	c	—	—	—	—	—	—	—	—
Chætoceros curvisetus CL.	—	—	—	—	—	—	—	—	—	—	+	—	—	r	—	—	—	—	—
C. decipiens CL.	r	—	—	—	—	rr	r	c	c	cc	c	—	—	r	r	—	—	—	—
C. densus CL.	—	—	—	—	—	—	—	—	r	—	—	r	—	r	r	—	—	—	—
C. didymus EHB.	r	—	—	—	—	—	—	—	—	—	+	r	—	r	—	—	—	—	—
C. Schüttii CL.	—	—	—	—	—	—	—	—	r	r	+	r	—	—	—	—	—	—	—
C. teres CL.	—	—	—	—	—	—	—	+	c	c	+	—	—	—	—	—	—	—	—
Coscinodiscus concinnus W. SM.	+	—	—	—	—	+	c	c	+	c	c	—	—	—	—	—	—	—	—
C. excentricus EHB.	—	+	r	—	c	cc	cc	+	—	—	—	—	—	—	—	—	—	—	—
C. oculus iridis EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ditylum Brightwelli WEST.	—	—	—	—	+	r	r	r	r	+	+	r	—	r	—	—	—	—	—
Eucampia zodiacus EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guinardia flaccida CASTR.	—	—	—	—	—	—	—	+	—	+	+	+	c	c	c	r	—	cc	cc
Leptocylindrus danicus CL.	—	—	—	—	—	—	—	—	—	—	—	rr	—	rr	r	—	—	r	—

Plymouth 1899.

5	6	6	6	7	7	7	7	8	8	8	8	8	9	9	10	10	10	10	10	11	11	11	12	12	12	12
5	14	27	29	12	19	24	28	4	11	18	24	31	10	25	7	10	13	19	25	14	23	28	8	14	28	19
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	—	rr	—	—	—	—
cc	—	r	—	+	—	cc	c	—	—	r	+	—	+	—	r	—	—	—	—	—	r	—	—	—	—	r
+	—	r	—	r	—	—	c	+	—	—	—	—	—	—	—	—	—	+	r	—	—	—	—	—	—	—
	+	r	—	—	—	r	r	—	—	—	—	r	r	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	c	—	—	r	r	—	—	—	—	—	r	c	r	r	—	+	+	c	r	—	+
	—	—	—	—	—	+	—	r	r	r	—	—	+	c	—	r	—	—	r	r	+	r	r	—	r	—
	c	c	+	+	—	+	—	r	—	—	c	—	c	c	c	r	+	+	r	+	c	r	+	r	r	+
—	cc	—	—	—	—	—	—	—	—	+	r	r	cc	+	+	+	cc	c	r	—	r	r	+	r	—	+
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	r	—	r	—	—	—	—	—	—	—	—	r	—	—	—	r	—	—	—	—	—	—	—	—	—
—	—	—	—	r	—	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	r	—	—	—	—	—	c	—	—	—	—	r	—	—	—	—	c	—	—	r	—	r	—	—	—
—	—	—	—	—	—	—	—	+	+	c	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	r	—	—	c	+	+	—	+	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	r	r	—	—	—	—	—	—	—	c	—	—	r	—	—	—	r
—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	+	r	—	—	—	r	—	—	r	—	—	r
—	—	—	—	—	—	—	—	r	—	+	—	—	—	—	—	—	—	—	r	—	—	—	—	—	—	—
—	—	r	c	—	—	—	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	+	—	+	+	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r
—	—	r	—	—	—	—	—	—	—	r	r	—	+	—	—	—	—	—	r	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	r	—	+	+	—	cc	—	—	—	—	r	+	—	r	r	—	r	r	+
—	—	—	—	—	—	—	—	r	—	r	—	—	—	—	—	—	—	—	—	—	—	r	—	—	—	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	+	+	—	r	—	—	r	r
—	—	—	—	—	—	—	—	r	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	—	r	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	r	cc	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r
—	—	—	—	—	—	—	—	+	—	—	cc	+	—	—	—	+	—	—	—	—	r	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	+	cc	—	r	—	+	—	—	+
	—	—	+	+	—	+	r	—	—	r	+	—	—	—	—	r	+	+	+	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	+	—	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	c	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	c	—	+	c	c	c	—	r	c	cc	+	—	c	—
-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	+	r	—	+	+
	—	—	—	—	—	r	r	+	—	r	—	r	—	—	—	—	—	—	r	—	r	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	c	c	r	—	—	—	—	—	—	—
	r	—	r	—	—	—	—	—	—	—	—	—	+	—	—	—	c	c	r	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table VI (continu

Month	1	2	2	2	2	3	3	3	3	3	4	4	4	4	5	5	5	5
Day	17	3	15	20	24	3	7	14	20	30	4	12	17	27	1	6	12	24
Rhizosolenia corpulenta Cl.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R. gracillima Cl.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R. robusta Btw.	r	—	—	—	—	—	—	r	—	—	—	—	—	—	—	—	—	—
R. Shrubsolei Cl.	—	—	—	—	—	—	—	—	—	—	+	—	—	+	c	—	—	c
R. Stolterfothii H. Per.	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	—	—	—	r
R. styliformis Btw.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Skeletonema costatum Gren.	—	—	—	—	—	r	—	—	—	r	cc	—	—	—	—	—	—	—
Stephanopyxis turgida Gren.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Thalassiosira gravida Cl.	—	—	—	—	—	r	+	r	—	—	+	c	—	—	—	—	—	—
Planktontype	Nm. / Nc.	Nh.	O.	O.	S. Nm. Nh.	Nm.	Nm. Ns.	Nm. Nh.	S. Nm. Ns.	Nm. Ns.	Ns. Nm.	C. Ns.	Ns.	C. Ns.	Nm.	O.	(C.)	Nm

Plymouth 1899.

6	6	6	6	7	7	7	7	8	8	8	8	8	9	9	10	10	10	10	10	11	11	11	12	12	12	12
5	14	26	29	12	19	24	28	4	11	18	24	31	10	25	7	10	13	19	25	14	23	28	8	14	28	19
—	—	—	—	—	—	+	+	r	r	r	+	r	c	+	+	cc	c	c	r	—	—	—	—	—	—	—
—	—	—	—	c	—	cc	cc	ccc	r	c	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	r	—	+	+	+	cc	c	c	r	—	—	—	—	—	—	—
—	r	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	r	—	r	—	—	r	—	—
r	r	r	—	r	—	+	c	r	—	—	—	—	—	—	—	—	c	—	+	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	r	—	—	—	—	r	—	—	—	r	—	—	—	—	—	r	—
—	—	—	—	—	—	—	—	—	—	—	—	cc	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	—	r	—	—	—	r	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	c	—	+	—	—	—	—	—	—	—
S. T.	S.	S.	Nm.	Nm.	O.	S. Nm.	S. Nm.	Nm.	(Nm.)	Nm.	Nm.	Ns.	Tp. Nm.	Nm.	(S.)	Nm.	Nm. Ns.	Nm. (Ns.) Nc.	C. Ns. Nm.	?	Nc.	Nc.	Nc. Nm. C.	O.	Nc.	C. Nm.

Table V

Month	1	1	1	2	2	2	2	3	3	3	3	4	4	4
Day	5	13	20	4	11	17	26	3	10	17	30	7	13	20
Temp.	5,7	5,7	6,1	4,2	5,4	5,7	3,6	5,0	4,9	6,0	6,4	7,6	7,3	8,7
Areom. Density	1,0248	1,0244	1,0247	1,0252	1,0258	1,0244	1,0239	1,0258	1,0254	1,0243	1,0253	1,0246	1,0241	1,0246
Wind	N.W.	S.W.	S.W.	S.W.	S.W.	S.E.	E.	W.	S.W.	W.	N.W.	S.W.	S.E.	S.W.
Tide	Ebb.	Ebb.	Flood.	Ebb.	Ebb.	Ebb.	Ebb.	Ebb.	Flood.	Ebb.	—	Flood.	Ebb.	Flood.
Oikopleura dioica FOL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Acartia Clausii GIESBR.	rr	—	—	—	—	—	—	—	—	—	—	—	—	—
Centropages hamatus LILLJEB.	rr	—	—	—	—	—	—	—	—	—	—	—	—	—
Euterpe acutifrons DANA	—	r	—	—	—	—	—	—	—	—	—	—	—	—
Oithona similis CLAUS.	r	—	—	r	—	—	—	—	—	—	—	—	—	—
Paracalanus parvus CLAUS.	rr	—	—	r	—	—	—	—	—	—	—	—	—	—
Temora longicornis O. F. MÜLL.	r	r	r	r	—	—	—	—	—	—	—	r	—	—
Cyttarocylis serrata MOEB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tintinnopsis beroidea STEIN.	r	r	r	+	—	—	r	—	—	—	r	r	—	r
T. campanula EHB.	r	—	—	—	—	—	—	—	—	—	—	—	—	—
Noctiluca miliaris SURIR.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ceratium fusus DUJ.	r	—	r	r	—	—	—	—	—	—	—	—	—	—
C. longipes BAIL.	r	—	—	—	—	—	—	—	—	—	—	—	—	—
Phæocystis Pouchetii LAGH.	—	—	—	—	—	—	—	—	—	—	—	—	—	cc
Biddulphia aurita LYNGB.	rr	—	rr	+	+	+	+	c	cc	+	r	rr	—	—
B. mobilensis BAIL.	r	—	r	+	r	—	—	r	r	r	r	r	—	—
Cerataulina Bergonii H. PER.	—	—	—	—	—	—	—	r	r	cc	ccc	—	—	c
Chætoceros debilis CL.	—	—	—	r	—	—	—	—	rr	cc	r	—	—	—
C. densus CL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Coscinodiscus concinnus W. SM.	r	—	r	—	—	—	—	—	—	—	—	—	—	—
Ditylum Brightwellii WEST.	—	r	—	—	—	rr	—	—	—	+	—	—	—	r
Eucampia zodiacus EHB.	—	—	—	—	—	—	—	—	—	+	r	cc	c	c
Guinardia flaccida CASTR.	—	—	—	—	—	—	—	—	—	c	r	cc	c	c
Rhizosolenia Shrubsolei CL.	—	—	—	—	—	—	—	—	—	—	—	—	—	r
R. Stolterfothii H. PER.	—	—	—	—	—	rr	—	—	—	+	+	+	+	+
Streptothera thamesis SHRUBS.	—	—	—	+	—	+	—	r	—	—	—	—	—	—
Planktontype	(Nc.)	(Nm.) (Ns.)	(Nc.) (Ns.)	(Ns.)	(Ns.)	(Ns.)	(Ns.)	Ns.	Ns.	Ns. Nm.	Nm. (Ns.)	Nm.	Nm.	Nm. C.

Helder 1899.

5	5	5	5	6	6	6	6	6	7	7	7	8	8	8	8	9	9	9	9
5	13	18	27	2	9	16	23	30	6	17	27	4	10	17	25	1	7	15	28
9,7	10,5	11,7	11,3	13,8	14	15	16,1	16,2	15,6	19,5	18	18,6	19,4	18,3	17,0	17,9	18,1	17,1	14
1,0232	1,0255	1,0230	1,0234	1,0232	1,0238	1,0240	1,0246	1,0245	1,0246	1,0226	1,0242	1,0240	1,0240	1,0252	1,0247	1,0248	1,0237	1,0224	1,0232
N.E.	S.W.	S.W.	N.	S.E.	N.W.	N.	N.E.	N.W.	N.W.	N.W.	N.W.	N.E.	N.	W.N.W.	E.	W.S.W.	E.N.E.	N.W.	W.S.W.
Flood.	Ebb.	Ebb.	Ebb.	Flood.	Ebb.	Ebb.	Flood.	Ebb.	Flood.	Ebb.	—	Flood.	Ebb.	Ebb.	Flood.	Flood.	Ebb.	Flood.	Flood.
—	—	—	—	—	—	—	—	—	—	—	r	—	r	—	—	+	—	—	—
—	—	—	—	—	—	—	r	—	—	—	r	—	—	—	r	+	—	—	—
—	—	—	—	—	r	—	r	—	r	—	—	—	—	—	+	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	r	r	—	—	cc
—	—	—	—	—	—	—	—	r	+	+	+	—	+	r	+	—	—	—	c
—	—	—	—	—	r	—	r	—	—	r	—	—	—	—	—	—	—	—	—
—	—	—	—	—	r	—	r	+	r	r	—	—	—	—	r	—	—	—	—
—	—	—	—	—	—	—	—	—	r	—	—	—	—	—	r	—	—	r	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	r	—	c	—	—
—	—	—	—	—	r	—	r	+	c	cc	ccc	c	c	ccc	+	+	+	r	—
—	—	—	rr	rr	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	+	—	—	—
ccc	ccc	ccc	ccc	ccc	—	—	r	—	—	—	—	—	—	—	—	c	+	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	cc
—	—	—	—	—	—	—	r	—	—	—	—	—	—	—	—	—	—	—	—
rr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	c	—	—
—	—	—	—	—	—	—	—	—	r	—	r	—	—	—	r	—	r	r	+
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	c
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—
r	—	—	r	r	—	r	+	+	—	cc	—	+	r	—	—	—	—	—	—
—	—	—	—	—	—	—	r	—	+	cc	—	r	r	—	—	—	—	—	—
r	—	—	—	—	r	r	+	cc	cc	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C.	C.	C.	C.	C.	(Nm.)	(Nm).	Nm.	Nm.	Nm.	Nm.	Nm.	Nm.	Nm.	Nm.	Nm.	Nm. C.	Nm. C. Ns.	(Nm.) (Nc.)	Nc.

Table

Month	1	1	1	2	2	2	2	3	3	3	4	4	5	5
Day	8	13	24	3	13	21	28	8	16	27	13	21	9	18
Temperature	4	3,5	3,4	2,5	1,8	2,8	2,0	3	4	3	4,4	4,8	8,2	9,5
Salinity	31,01	28,72	30,25	32,49	28,53	28,78	24,20	33,11	30,76	32,97	32,49	31,57	21,71	20,36
Oikopleura dioica FOL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Proto pedata LEACH.	+	r	r	—	—	—	—	—	—	—	—	—	—	—
Acartia Clausii GIESBR.	r	—	—	—	—	—	—	—	—	r	—	+	r	—
A. longiremis LILLJEB.	—	—	r	+	—	—	—	—	—	+	r	c	c	c
Anomalocera Patersonii TEMPLT.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Calanus finmarchicus GUNN.	+	r	—	—	—	—	—	—	r	—	+	c	—	—
Centropages hamatus LILLJEB.	—	c	+	r	+	—	+	—	—	—	r	c	c	c
C. typicus KRÖYER	—	—	r	—	—	—	—	rr	—	r	—	—	—	—
Corycæus anglicus LUBB.	—	rr	—	r	—	—	—	—	—	—	—	—	—	—
Oithona similis CLAUS	c	+	c	+	+	—	—	—	—	—	r	r	+	+
Paracalanus parvus CLAUS	c	—	+	+	—	—	—	—	—	—	—	—	—	—
Pseudocalanus elongatus BOECK	—	+	+	—	—	rr	—	—	—	+	+	+	+	+
Temora longicornis O. F. MÜLL.	+	+	c	+	+	rr	c	—	—	+	—	—	c	r
Evadne Nordmanni LOVÉN	—	—	—	—	—	—	—	—	—	—	c	r	—	r
E. spinifera P. E. MÜLL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
P. Leuckartii G. O. SARS	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sagitta bipunctata QUOI & GAIM.	c	+	+	—	+	—	—	—	—	—	—	—	—	—
Pleurobrachia pileus FABR.	—	+	—	—	—	—	—	—	—	—	—	—	—	—
Cyttarocylis denticulata EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Plectophora arachnoides CLAP. & LACHM.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Halosphæra viridis SCHMITZ	—	+	c	r	r	—	—	—	+	cc	c	c	—	—
Ceratium (trip. v.) bucephalum CL.	r	r	r	—	—	—	—	—	—	—	—	r	—	r
C. furca DUJ.	—	—	—	—	—	—	—	r	—	—	—	—	—	—
C. fusus DUJ.	r	r	r	+	—	—	—	—	—	—	—	—	—	—
C. longipes BAIL.	r	r	+	r	+	—	—	r	+	c	+	+	+	+
C. macroceros EHB.	+	—	—	r	—	—	—	—	—	—	—	—	—	—
C. tripos NITZSCH	cc	ccc	cc	c	c	—	c	r	—	cc	+	+	—	+
Peridinium depressum BAIL.	r	—	—	—	—	—	—	—	r	cc	cc	+	—	—
P. divergens EHB.	—	r	r	—	—	—	—	—	—	—	—	—	—	—
Biddulphia aurita LYNGB.	rr	—	—	rr	+	c	+	+	c	r	—	—	—	—
Chætoceros borealis BTW.	rr	r	—	—	—	—	—	—	—	—	—	—	—	r
v. Brightwellii CL.	—	—	—	—	r	—	—	—	—	—	—	—	—	—
C. constrictus GRAN	—	—	—	—	—	c	+	—	cc	r	—	c	c	c
C. contortus SCHÜTT	—	—	—	—	—	+	—	+	c	—	—	—	r	—
C. curvisetus CL.	—	—	—	—	—	r	—	+	—	—	—	—	—	+
C. debilis CL.	—	—	—	—	—	+	r	c	—	—	—	—	—	—
C. decipiens CL.	rr	—	—	—	r	rr	+	+	cc	+	—	+	+	—
C. densus CL.	—	—	—	—	—	—	—	—	—	—	—	+	—	—

Väderöboda.

6	6	6	7	7	7	7	7	8	8	8	8	9	9	9	10	10	10	11	11	12	12
12	19	26	3	10	18	24	31	7	14	22	28	4	11	25	2	16	26	7	16	6	21
11,8	15,2	15,4	17,0	18,0	21,0	20,0	17	17,8	17,8	15,5	16,0	15,8	14,6	13	12	11,4	10,0	10	8,2	6,5	3,0
30,22	28,14	24,23	19,89	26,32	17,11	17,89	25,44	30,08	28,19	31,32	24,17	22,41	30,13	28,45	26,93	30,83	30,10	30,38	30,01	33,01	27,76
—	—	—	—	—	—	cc	—	—	—	+	c	c	c	—	+	+	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	—	—	+	—
r	+	cc	—	+	—	+	+	c	—	+	—	—	—	—	—	c	—	—	r	r	—
+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	r	—	r	—	rr	—	—	—	—	+	—	—	—	—
c	c	c	—	+	—	—	+	c	+	c	—	r	+	r	—	—	+	r	+	+	r
—	+	+	r	c	cc	+	—	—	+	+	—	—	—	—	—	r	+	—	—	—	+
—	r	—	—	—	—	—	+	r	—	c	r	r	+	c	—	c	c	c	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	c	r	r	r	r	—
+	cc	cc	ccc	cc	c	+	—	cc	c	c	c	cc	+	cc	+	+	—	+	—	+	+
—	—	—	cc	+	cc	cc	ccc	cc	cc	cc	cc	cc	c	cc	c	cc	—	c	c	c	+
—	—	+	—	—	—	—	r	+	—	—	r	—	+	c	+	+	cc	c	+	c	+
—	—	c	+	—	c	—	r	c	+	c	—	r	cc	—	r	+	+	r	c	r	+
c	c	cc	c	cc	c	c	—	—	+	—	—	c	cc	—	—	+	—	—	+	—	—
—	—	—	—	—	r	—	—	+	+	r	—	r	—	r	—	—	—	—	—	—	—
r	r	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	r	+	r	—	r	+	—	c	+	c	+	r	c	c	—	+	+	r	—	+	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	—	—	r	—
r	—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr
—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	r	r	—	r	r
r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	—	r	r	+	+
—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	rr	—	+	+	r
r	—	—	—	—	—	—	—	—	—	—	—	r	—	r	r	r	—	+	r	r	—
r	—	—	—	—	—	—	—	—	—	r	—	—	r	r	c	+	r	+	r	r	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+
+	+	—	—	r	—	—	+	c	—	cc	c	—	ccc	ccc	c	ccc	cc	c	+	c	—
cc	ccc	cc	c	cc	c	c	c	c	c	cc	cc	c	cc	c	c	ccc	cc	c	c	c	c
+	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	—	r	r	r	—	—
—	—	—	—	—	—	—	rr	—	—	—	—	—	—	—	r	—	—	—	—	r	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
r	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	—	—	+
r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	+	—	c
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	c	r	+	—	+
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	r	+	—	r
+	+	r	—	r	—	c	—	—	—	—	—	—	—	r	—	+	cc	cc	cc	—	c
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	+	—	—	+
r	r	r	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	r	—	—	+
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	+	+	—	—	r

Table IX (continu

Month	1	1	1	2	2	2	2	3	3	3	4	4	5	5
Day	8	13	24	3	13	21	28	8	16	27	13	21	9	18
Chætoceros diadema EHB.	—	—	—	—	+	c	–	c	c	—	—	—	—	—
C. didymus EHB.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C. hiemalis CL.	—	—	—	—	—	—	—	—	—	—	—	—	—	+
C. Schüttii CL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C. scolopendra CL.	—	—	—	—	—	rr	—	+	—	—	—	—	—	rr
C. socialis LAUDER	—	—	—	—	—	c	+	c	r	—	—	—	—	—
Coscinodiscus concinnus W. SM.	c	c	c	c	ccc	cc	ccc	+	—	—	—	—	—	—
Ditylum Brightwellii WEST.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guinardia flaccida CASTR.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
Rhizosolenia calcar avis SCHULZE	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R. gracillima CL.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R. semispina HENSEN	—	—	r	—	—	+	—	+	+	c	—	—		—
R. styliformis BTW.	—	—	—	—	—	—	—	—	—	—	—	+	—	—
Skeletonema costatum GREV.	—	—	—	—	—	+	—	—	—	—	—	—	—	—
Stephanopyxis turgida GREV.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Thalassiosira Nordenskiöldii CL.	—	—	—	—	+	cc	+	ccc	c	c	—	—	—	—
Thalassiothrix Frauenfeldii GRUN.	+	—	+	—	+	c	—	+	+	—	—	—	—	—
Planktontype	Tp. Nc.	Tp. Nc. T.	Tp. Nc.	Nc.	Nc.	Si. Nc.	Nc. Si.	Si.	C. Si. Ns.	Nh. Tp. Ns. Si.	Nh. Ns. (Tp.)	Nh. Ns. (Tp.)	Ns. C. Balt.	Ns. Balt.

Väderöboda.

6	6	6	7	7	7	7	7	8	8	8	8	9	9	9	10	10	10	11	11	12	12
12	19	26	3	10	18	24	31	7	14	22	28	4	11	25	2	16	26	7	16	6	21
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	c	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	r	c	—	—	—	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	c	+	—	+
—	—	—	—	—	—	+	—	—	—	—	r	—	—	r	—	r	+	c	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	r	c	+	—	—	—	—	—	—	—	—	—	+	—	+	—	+	+
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	rr	r	r	r	r	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	—	r	—	r
—	—	—	—	—	—	—	—	rr	—	—	—	r	r	—	—	r	r	—	rr	r	r
—	r	—	—	r	—	+	+	—	—	—	+	—	—	r	—	—	r	—	r	—	c
—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	—	r	r	r	rr	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	+	—	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	r	r	r	r	r	r
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	c
Tp.	Tp.	Tp.	Tp.	Tp.	Tp. Nc.	Tp. Nm. Nc.	Tp. Nm.	Tp.	Tp.	Tp.	Tp. (Nm.)	Tp.	Tp.	Tp.	Tp.	Tp.	Tp. Nm. (Ns.)	Tp. Nm. (Ns.)	Ns. Nm. (Tp.)	Tp.	Tp. Nm. Ns.

KONGL. SVENSKA VETENSKAPS-AKADEMIENS HANDLINGAR. Bandet 35. N:o 7.

THE PLANKTON

OF

THE NORTH SEA AND THE SKAGERAK

IN

1900

BY

P. T. CLEVE

COMMUNICATED DECEMBER 11, 1901.
REVISED BY HJ. THEEL AND A. G. NATHORST.

STOCKHOLM
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During the year 1900 samples of plankton were collected ragularly, 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. Pettersson.

January 1900.

Samples were collected at Måseskär (1 sample), at Väderöboda (3 samples) and by the steamer Svenksund 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. 34,65. 90 m.	Dröbak (Christiania-fjord). Temp. 7,46. Sal. 34,26. 30 m.
Calanus finmarchicus	—	*r*	Gonyaulax spinifera	—	*rr*
Centropages hamatus	+	—	Biddulphia aurita	*r*	
Microsetella atlantica	—	*c*	B. mobiliensis	*r*	
Oithona similis	+	*r*	Chætoceros debilis	*c*	
Oncæa minuta	—	*r*	C. decipiens	*r*	—
Pseudocalanus elongatus	*c*	*r*	C. diadema	*c*	—
Temora longicornis	*c*	—	Coscinodiscus polychordus	*r*	*rr*
Acanthometron pellucidum	—	+	C. radiatus	—	*r*
Plectophora arachnoides	—	*rr*	C. stellaris	—	*r*
Codonella ventricosa	—	*r*	Ditylum Brigthwellii	*r*	—
Ceratium longipes	*r*	—	Rhizosolenia setigera	*r*	—
C. macroceros	—	*rr*	Thalassiosira gelatinosa	*r*	—
C. tripos	*c*	*r*	Thalassiothrix Frauenfeldii	+	—
Peridinium depressum	—	*r*	Halosphæra	—	*r*
P. divergens	—	*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.

Acartia longiremis
Centropages hamatus
Pseudocalanus elongatus
Temora longicornis
} boreal, euryhaline forms.

Oithona similis; temperate, euryhaline and eurytherm.

Ciliata.

Ptychocylis acuta; arctic, neritic.

Dinoflagellates.

Ceratium tripos; temperate, eurytherm, euryhaline.
Dinophysis acuta; boreal.

Chlorophyllaceæ.

Halosphæra; temperate.

Diatomaceæ.

Chætoceros 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 *Halosphœra*, *Acanthonia Mülleri*, *Acanthometron pellucidum*, *Plectophora arachnoides* and *Chætoceros 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 planktontype 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 Sehelt 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 *Halosphœra*, 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:

Biddulphia aurita,
Chætoceros debilis
C. diadema,
C. sociälis,
Coscinodiscus polychordus,
Skeletonema costatum,
Thalassiosira Nordenskiöldii,
Thalassiothrix Frauenfeldii.

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 *Chætoceros debilis*, *C. diadema* and *Thalassiosira Nordenskiöldii* were very common) the following recurred constantly in almost all samples:

Chætoceros borealis,
C. contortus,
C. teres.
Rhizosolenia semispina,
R. setigera,

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

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

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
Oikopleura dioica,	*Calanus hyperboreus,*
Paracalanus parvus,	*Phæocystis Pouchetii,*
Codonella ventricosa,	***Gonyaulax spinifera,***
Halosphæra,	*Chætoceros brevis,*
Ceratium bucephalum,	***C. debilis,***

C. lineatum,
C. macroceros,
Cerataulina Bergonii,
Chætoceros curvisetus,
C. densus,
C. Schüttii,
Ditylum Brightwellii,
Eucampia Zodiacus,
Guinardia flaccida,
Lauderia annulata,
Rhizosolenia Stolterfothii,
R. styliformis.

Rhizosolenia semispina,
Thalassiosira gravida,
T. Nordenskiöldii,
Thalassiothrix Frauenfeldi.

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 antumn-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,
Pterosphæra Möbii,
Dinophysis rotundata,
D. Vanhöffeni,
Peridinium depressum,
P. ovatum,
P. pellucidum,
Asterionella Japonica,
Biddulphia aurita,

Chætoceros 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

Acartia Clausii,
Centropages hamatus,
Paracalanus parvus,
Ceratium furca,
C. fusus,
C. longipes,
Dinophysis acuta,
Peridinium pallidum.
Chætoceros decipiens,
C. teres,
Leptocylindrus danicus.

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 *Chætoceros 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:

Oikopleura dioica +,
Calanus finmarchicus c,
Centropages hamatus r,
Oithona similis r,
Pseudocalanus elongatus c,
Sagitta bipunctata +,
Cyttarocylis denticulata +,
Ceratium furca r,
Chætoceros decipiens +,
Rhizosolenia styliformis 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. O° 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]

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

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 Boas [2] and Munthe [3] 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.

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[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.* 11,60 *s.* 35,46)	200—50 m. (at 200 m. *t.* 9,00 *s.* 35,42)
Calanus finmarchicus	—	*r*	+	C. longipes	—	—	+
Metridia lucens	—	—	*r*	C. tripos	*c*	+	+
Microsetella atlantica	—	*r*	*r*	Dinophysis acuta	—	*r*	—
Oithona plumifera	—	—	+	D. homunculus	—	—	*rr*
O. similis	*r*	+	+	Diplopsalis lenticula	—	*r*	—
Oncœa minuta	—	—	*rr*	Peridinium divergens	—	*r*	—
Pseudocalanus elongatus	—	—	*r*	P. oceanicum	—	—	*rr*
Salpa sp.	—	—	*r*	P. ovatum	*r*	—	—
Cyttarocylis denticulata	*r*	*r*	—	Chætoceros Lorenzianus	*rr*	—	—
Acanthometron catervatum	—	—	+	Coscinodiscus oculus iridis	—	—	*rr*
Acanthonia Mülleri	—	—	*r*	Dactyliosolen antarcticus	—	*r*	—
Challengeria xiphodon	—	—	*rr*	Nitzschia lineola	*r*	—	—
Collozoum inerme	—	*r*	*r*	Rhizosolenia gracillima	+	+	*c*
Hexalonche hexacantha	—	—	*rr*	R. styliformis	*r*	+	—
Ceratium furca	*c*	*c*	+	Thalassiothrix longissima	*r*	—	—
C. fusus	—	+	+				

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 *Chætoceros 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 occuring 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. styliformis (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 styliformis* 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),
Cyttarocylis denticulata (oceanic, boreal and arctic),
Tintinnopsis campanula (meridional, neritic),
T. fistularis (neritic, meridional),
Noctiluca miliaris (in common with the last kind of water),
Bellerochea 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 amont 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 α*). 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, Chætoceros 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 ocurred 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*, charaterized by *Chætoceros 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:

Chætoceros 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 *Chætoceros 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 triposplankton.

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 *Chætoceros 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.	Forms of northern origin.
Centropagus typicus +,	*Calanus finmarchicus* +,
Oithona plumifera rr,	*Metridia lucens rr*,
O. similis +,	*Pseudocalanus elongatus c*,
Paracalanus parvus +,	*Temora longicornis c*,
Sagitta bipunctata +,	*Cyttarocylis denticulata r.*
Amphorella Steenstrupi r,	*Tintinnus acuminatus, r*,
Codonella ventricosa +,	*Dinophysis acuta r*,
Dictyocysta elegans rr,	*Gonyaulax spinifera rr*,
Dictyocha fibula r,	*Peridinium pallidum r*,
Distephanus speculum r,	*P. pellucidum rr*,
Ceratium furca c,	*Xanthidium hystrix rr*,
C. fusus c,	*Asterionella japonica rr*,
C. macroceros cc,	*Chætoceros decipiens r*,
C. tripos cc,	*Coscinodiscus radiatus r.*

Peridinium divergens +,
Pyrophacus horologium r,
Chætoceros 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.
Acartia Clausii r,	*Spirialis retroversa r*,
Labidocera Wollastonii rr,	*Acartia longiremis r*.
Evadne spinifera r,	*Centropages hamatus rr*,
Podon intermedius rr,	»*Sternhaarstatoblast*» *Hensen rr*,
Acanthochiasma fusiforme r,	*Ceratium longipes* +,
Acanthonia Mülleri r,	*Peridinium depressum* +,
Halosphæra viridis +,	*Pterosphæra Möbii rr*,
Ceratium bucephalum c,	*Xanthidium multispinosum r*.
Peridinium Michaëlis 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.
Oikopleura dioica r,	*Fritillaria borealis rr*,
Corycæus anglicus +,	*Plectophora arachnoides rr*,
Euterpe acutifrons r,	*Dinophysis Vanhöffenii rr*,
(*Amphorella subulata rr*),	*Peridinium ovatum r*,
Codonella Jörgenseni rr,	(*Xanthidium brachiolatum r*),
Cyttarocylis serrata r,	*Phæocystis Pouchetii rr*,
(*Tintinnopsis beroidea* +),	*Chætoceros borealis r*,
T. campanula +,	var. *Brightwellii rr*,
Noctiluca miliaris r,	*C. constrictus rr*,
Ceratium lineatum rr,	*C. debilis c*.
Diplopsalis lenticula +,	*C. diadema r*,
Peridinium pedunculatum r,	*C. laciniosus r*,
Prorocentrum micans r,	*Coscinodiscus concinnus* +,
Bacteriastrum varians r,	(*C. excentricus* +),
Bellerochea malleus rr.	*Rhizosolenia setigera r*,
Biddulphia mobilensis c,	*Skeletonema costatum rr*,
Cerataulina Bergonii r,	*Thalassiosira gelatinosa r*,
(*Chætoceros contortus c*),	*T. gravida rr*.
C. curvisetus c,	*Thalassiothrix Frauenfeldii r*,
C. densus +,	
C. didymus c,	
Ditylum Brightwellii c,	

Eucampia zodiacus c,
Guinardia flaccida c,
Lauderia annulata rr,
Lithodesmium undulatum rr,
Rhizosolenia calcar avis +,
R. gracillima +,
R. Shrubsolei r.
R. Stolterfothii +,
R. styliformis 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 styliformis*, 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 Vinga.** The Government steamer »Svensksund» collected on the 21th of November at Vinga 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	Chætoceros brevis	r				
Corycæus 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	Coscinodiscus 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. fusus		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					c
P. ovatum		r	r			R. Stolterfothii		rr			
P. pallidum			r			R. styliformis		rr			
Pyrophacus horologium		r				Skeletonema costatum	c	rr			
Pterosphæra Moebii		r	r			Stephanopyxis turris	+				
Phæocystis Poucheti		r				Thalassiosira gelatinosa	+	rr	r	r	
Asterionella japonica	rr					T. gravida	r				
Biddulphia aurita	+					Thalassiothrix Frauenfeldii	+	r			
B. mobilensis	r					Plankton-type	Nm Ns	Tp	Tp Nm	(Tp) (Nm)	Tp Nm
Cerataulina Bergonii	r										

[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. SARS. — *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. +.

C. 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*.

Corycæus 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. +.

Oncæa 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. +.

Chætognata.

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*.

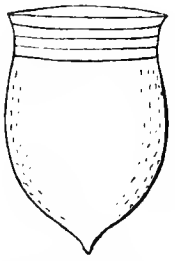
Ciliata.

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.*

Cyttarocylis 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.*

Cyttarocylis 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.*

Dictyocysta elegans Ehb. — *November:* N. of Scotland *r.*

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

Ptychocylis 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. homunculus 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 Ehb. — *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 micans Stein. — *October:* V. *rr. November:* N. of Scotland and N. of Jutland.

Cystæ.

Pterosphæra 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.

Flagellatæ.

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

Phæocystis 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*.

Cyanophyceæ.

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

Diatomaceæ.

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.*

Chætoceros 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 ØSTR. — *December:* V. *r.*

C. similis CL. — *January:* central Skagerak *r.* *February:* M. +, V. *c.* *March:* V. *r.*

C. socialis LAUDER. — *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. (Coscinosira) 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 tho 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.*

Eucampia 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 Gren. — *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 & ROBTS. — 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*.
Ptychocylis 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.; 17/2 54° 11′ N. 7° 59′ E. *r*.
Chætoceros 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*.
Halosphæra viridis SCHMITZ. — 56° 26′ N. 0° 29′ E. *r*; 56° 16′ N. 1° 35′ W. *r*; 55° 4′ N. 7° 37′ E. *rr*.

Pterosphæra 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*.

Phæocystis Pouchetii LAGH — 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*.

Chætoceros 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 OSTF. — 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*.

Chætoceros 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*.

Pterosphæra 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*.

Phæocystis Pouchetii LAGH. — 57° 43′ N. 11° E. *r*; 57° 42′ N. 10° 53′ E.

Asteriouella japonica CL. — 57° 24′ N. 9° 17′ E. *rr*; 52° 57′ N. 4° 17′ E. *rr*.

Bacteriastrum 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*.

Chætoceros atlanticus CL. — 58° 36′ N. 0° 5′ E. *r*.

C. borealis var. Brigthwellii 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. laciniosus 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 borcalis LOHM. — $^{30}/_{3}$ *rr*.
Acartia bifilosa GIESBR. — $^{23}/_{6}$ +.
Anomalocera Patersoni TEMPL. — $^{27}/_{1}$ *rr*; $^{2}/_{6}$ *rr*.
Corycæus anglicus LUBB. — $^{19}/_{10}$ *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 VANH. $^{20}/_{7}$ *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*.
Phæocystis 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*.
Chætoceros 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. styliformis 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*; $^{4}/_{4}$ *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. — $^{27}/_{8}$ +; $^{20}/_{10}$ *r*; $^{2}/_{12}$ *rr*.
P. Leuckartii G. O. S. $^{2}/_{6}$ *r*; $^{9}/_{6}$ *r*; $^{3}/_{7}$ *r*; $^{9}/_{7}$ *r*; $^{18}/_{7}$ *r*.
Corycæus anglicus LUBB. $^{6}/_{2}$ *r*; $^{7}/_{11}$ *r*.
Euterpe acutifrons DANA. — $^{24}/_{12}$ *r*.
Isias clavipes BOECK. — $^{3}/_{9}$ *r*; $^{17}/_{9}$ *r*.
Labidocera Wollastonii LUBB. — $^{17}/_{11}$ *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*.
Cyttarocylis serrata MÖB. — $^{24}/_{12}$.
Ptychocylis 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*; $^{4}/_{5}$ *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. — $^{4}/_{4}$ *r*; $^{26}/_{4}$ *r*; $^{12}/_{5}$ *r*.
Actinocyclus Ralfsii W. SM. — $^{20}/_{10}$ *r*; $^{28}/_{10}$ *r*.
Bacteriastrum varians LAUDER. — $^{20}/_{10}$ *r*.
Chætoceros 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 delicatuta CL. — $^{7}/_{11}$ *r*.
R. Shrubsolei CL. — $^{9}/_{7}$ *r*; $^{20}/_{10}$ +; $^{28}/_{10}$ +; $^{8}/_{12}$ *rr*.
R. Stolterfothii 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*.

Table I. The North

Date	2	2	2	3	3	4	4	3	3	3	3	4
Latitude N.	56° 5′	56° 16′	56° 26′	56° 40′	56° 53′	57° 9′	57° 42′	55° 24′	55° 49′	56° 12°	56° 27′	56° 44′
Longitude	3° 3′ W.	1° 27′ W.	0° 8′ E.	2° 6′ E.	4° 4′ E.	6° 32′ E.	9° 50′ E.	0° 14′ E.	1° 55′ E.	3° 25′ E.	4° 28′ E.	5° 47′ E.
Temperature	6,0	7,5	7,0	6,5	7,2	7,0	4,0	6,1	6,2	5,9	5,6	4,7
Salinity	33,28	34,91	34,76	35,17	35,05	35,12	33,40	34,76	35,03	35,12	35,00	34,81
Acartia Clausii Giesbr.		.									.	
Calanus finmarchicus Gunn.		*r*				*rr*		*r*	*r*			.
Corycæus anglicus Lubb.									.	+	*r*	.
Oithona similis Claus.			*rr*		*rr*	*rr*	*rr*		*r*	*r*	*r*	
Pseudocalanus elongatus Boeck.	*rr*	*r*	.	*r*	*rr*	*rr*		*c*	+	*c*	+	
Temora longicornis O. F. Müll.			.				*rr*	+		+	+	
Sagitta bipunctata Quoi & Gaim.	*rr*		*rr*	*r*	*r*			*ccc*		*cc*	+	*r*
Cyttarocylis denticulata Ehb.	*rr*					*rr*						
Acanthometron pellucidum J. Müll.	.										*r*	
Acanthonia Mülleri Hkl.								*r*	*r*	*c*		.
Plectophora arachnoides Clap. & Lachm.		.								*c*	*r*	.
Halosphæra viridis Schmitz.	*rr*	+	*rr*	*r*			*r*		+	*r*	+	*r*
Pterosphæra Möbii Jörgens.		.	.				.				*r*	
Ceratium bucephalum Cl.							+	.	*r*		*r*	*c*
C. furca Duj.	*rr*		.				*r*	*c*		*r*	+	*c*
C. fusus Duj.	*rr*	.	.		.		*r*	*r*		.	*r*	
C. longipes Bail.	*r*	.	*rr*					*r*	.		*r*	
C. macroceros Ehb.		.	.	*rr*	*rr*		+	*r*	+	*c*	*c*	
C. tripos Nitzsch.	.	.		*rr*		*r*	+	+	*r*	*cc*	*cc*	
Biddulphia mobilensis Bail.	*rr*						*rr*				*r*	*r*
Chætoceros decipiens Cl.	.	.		*rr*			*rr*			*rr*	*r*	
Coscinodiscus concinnus W. Sm.									*r*	+	*r*	.
C. excentricus Ehb.											*r*	*r*
C. oculus iridis Ehb.				.	*rr*	*r*		*r*		*r*	*r*	
C. radiatus Ehb.	*rr*		.	*rr*							*r*	*r*
Rhizosolenia styliformis Btw.							*rr*			*rr*		
Plankton-type	*?*	*?*	*?*	*?*	*?*	*?*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*

Sea in February 1900.

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

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′ E.	7° 28′ E.	6° 22′ E.	4° 58′ E.	3° 58′ E.	2° 44′ E.	0° 29′ E.	1° 35′ W.	10° 49′ 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
Fritillaria borealis Lohm.	*r*		.				.		
Acartia Clausii Giesbr.		.	.		.	.	.		.
A. longiremis Lilljeb.	+				.				+
Calanus finmarchicus Gunn.		*c*	*c*		.	.	*r*	.	+
Centropages hamatus Lilljeb.	*r*	.	.		.		.	.	.
Pseudocalanus elongatus Boeck.	*c*	+						.	+
Temora longicornis O. F. Müll.	*cc*	*r*					*r*		*r*
Ptychocylis acuta Brandt.	+	+	*r*	+	.			.	*r*
Ceratium furca Duj.	.	*r*	*r*		*r*			.	.
C. longipes Bail.	*r*	+	+	+			+	.	
C. tripos Nitzsch.		+	*r*		*r*	.	.		.
Dinophysis acuta Ehb.	*c*	.	+		*r*		.		+
Gonyaulax spinifera Stein.		.			+	*r*	*c*	+	+
Peridinium depressum Bail.	*c*	*c*	+			+	.	.	*c*
P. ovatum Pouchet.	*c*	*r*	*c*	.	*c*				*c*
P. pallidum Ostenf.	*r*		+			.	*r*	*r*	+
P. pellucidum Bergh.	*r*	.	*r*		*r*			.	.
Chætoceros borealis Btw.	+	.		*r*			.	*r*	*c*
C. contortus Schütt.	+	.						.	*r*
C. debilis Cl.				*cc*		+			
C. decipiens Cl.	.	.		+		*r*	.	*r*	*r*
Coscinodiscus concinnus W. Sm.	*r*			*r*		*r*			*c*
C. oculus iridis Ehb.	.	.	.				*r*	*r*	
C. radiatus Ehb.	.	.				*r*	*c*	*c*	
Eucampia zodiacus Ehb.	.	.		*r*					.
Rhizosolenia semispina Hensen.	+	.		*c*	+	*r*	.		+
Thalassiosira gravida Cl.	.	.		*r*	+	*c*	.		.
T. Nordenskiöldii Cl.	.		.	*r*	+	*ccc*			.
Pankton-type	*Ns*	*NsTp*	*Ns*	*Ns*	*Ns*	*Si*	*Ns*	*Ns*	*Ns Nc*

Sea in April 1900.

28 57° 32′ 9° 39′ E. 6,0 32,24	28 57° 16′ 8° 42′ E. 5,5 33,87	29 56° 54′ 7° 26′ E. 5,2 34,64	29 56° 36′ 5° 42′ E. 4,6 34,91	30 56° 17′ 4° 18′ E. 5,4 35,06	30 55° 56′ 2° 34′ E. 6,2 34,96	28 57′ 41′ 11° 17′ E. 5,5 29,77	28 57° 46′ 10° 39′ E. 6,0 32,39	29 57° 30′ 9° 38′ E. 5,5 33,54	29 57° 5′ 8° 26′ E. 6,0 32,73	29 56° 13′ 7° 47′ E. 6,0 32,70	29 55° 41′ 7° 26′ E. 6,0 32,70	30 55° 4′ 7° 37′ E. 6,0 32,58	27 57° 39′ 9° 45′ E. 6,0 33,49	28 56° 53′ 8° 5′ E. 6,5 33,78	28 56° 17′ 7° 28′ E. 6.5 33,71	28 55° 11′ 6° 26′ E. 7,0 34,76	29 54° 35′ 5° 39′ E. 9,0 34,57	29 53° 30′ 4° 43′ E. 10,0 34,62
.	r		.				r				r	r		.			.	
r	.	.	+		.					.		+	.		c		+	+
r	+	.	+	+	r	+			.	.		r					.	
+	+	r	.		.	r		r			.	r	.	.	+			
.	+	.	.	.	r	+	.			.			r				+	r
+	+	+		+	r	c		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	+	c			r		r		r	+	r	.	
r	.	.	.	+	.	.		.							r		.	
+	+	+	+	r	r	.	.	.							r		4	
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	+	r												.	r	cc
.	r	r	ccc	+	c	r		.				.				+		
	.	.	.	+	+			.										
	.		.	r	r			.				rr				rr		
Ns Nc	Ns	Ns	TNs	Ns	Ns	Ns	Ns Nc	Nc	Nc	Ns	CT Nc	Ns	Ns Nr	Ns	NsS	Ns	Ns Nm	Nm

Table III. The North

Month	VII	VII	VIII	VIII	VIII	VIII	VIII	VIII	VII	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′ E.	7°35′ E.	7°37′ E.	8°24′ E.
Temperature	16,0	16,0	15,0	14,6	—	—	—	—	20,0	19,0	19,0	18,5	19,0	19,0	20,0	18,3
Salinity	31,98	34.72	34,02	34,69	—	—	—	—	24,60	31,29	32,05	32,75	32,49	32,79	31,81	27,84
Oikopleura dioica Fol.			.		.	.			+	.		+		+	+	.
Acartia Clausii Giesbr.			.	r	+	.		c		r	+		.	.	+	+
Anomalocera Patersonii Templt.			rr									.				.
Calanus finmarchicus Gunn.					+			+	+	.	+	.				.
Centropages hamatus Lilljeb.					c					+	.				.	c
C. typicus Kröyer.	rr		+					r	r	+	+	r				r
Corycæus anglicus Lubb.					r		.			rr	r					.
Oithona similis Claus	r	.	c	r	c	r	.	c		+					+	c
Paracalanus parvus Claus	.	.	+		+					r	r	r			+	+
Pseudocalanus elongatus Boeck.					c			c	r	.	r			.		
Temora longicornis O. F. Müll.			.	.	r			r	r	r				r	.	
Evadne Nordmani Lovén															.	r
E. spinifera P. E. Müll.			+	.				r						.		+
Podon intermedius Lilljeb.		.			c		.	c							.	
Sagitta bipunctata Quoi & Gaim.								+						.		
Amphorella Steenstrupi Clap. & Lachm.					+			.			+	r	rr	.	.	
Ceratium furca Duj.			r	r	r	r				r		r	r	.	r	
C. fusus Duj.			r					r				r		.		
C. lougipes Bail.	r				r	r				.					.	
C. macroceros Ehb.	+		+	r		r	r		r	+	+	+		+	.	+
C. tripos Nitzsch.	c	.	c	+	r		+	+	+	+	c	+	r	+	+	c
Dinophysis rotundata Clap. & Lachm.	r	r	r			.	.		+	+	r	+	+	+	r	
Diplopsalis lenticula Bergh.	r		r	+		+			r	r	+	r		r	c	
Peridinium depressum Bail.	.			+		+						r	r			.
P. divergens Ehb.	+	.				r	r	c	c	c	c	+		c		.
Pyrophacus horologium Stein.			r	r		r					r	+	+	+	r	.
Pterosphæra Moebii Jörgen.									rr		r	.		.		
Rhizosolenia gracillima Cl.			r	r					ccc			+	r			c
R. Shrubsolei Cl.			.	r		.						r	+	c	r	.
R. styliformis Brtw.		.	.		.							r	+			
Plankton-type	Tp	O	Tp	Tp	Tp	?	Tp	Tp	Nmc	Tp	Tp	Tp Nmc	Tp Nm	Nm Tp	Nm	Tp Nmc

Sea in July—August.

VIII	VIII	VIII	VIII	VIII	VIII	VIII	VII	VII	VII	VII	VII	VII	VII	VII	VIII	VIII	VIII	VIII	VIII	VIII	VIII
5	4	4	4	4	3	3	29	29	29	28	28	28	28	28	2	2	14	3	3	13	12	4
57°54′	57°43′	57°10′	56°42′	56°28′	56°20′	56°12′	51°55′	53°15′	53°38′	54°14′	54°46′	55°52′	56°30′	57°3′	57°53′	58°8′	58°20′	58°28′	58°42′	58°45′	58°49′	58°43′
7° 2′	3°41′	1°34′	1°13′	0°19′	0°51′	1°58′	3°28′	4°20′	4°52′	5°21′	5°55′	6°55′	7°42′	8°20′	7°40′	5°10′	4°44′	1°32′	1°15′	1°31′	4° 3′	4°36′
E.	E.	E.	E.	E.	W.	W.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	E.	W.	W.	W.	W.
17,1	15,0	14,8	14,7	14,1	12,6	12,7	17,0	16,0	16,0	16,0	16,0	17,0	17,0	17,0	16,5	15,5	—	14,5	14,0	—	—	12,5
26,16	32,91	35,17	35,15	35,06	34,50	34,77	35,08	34,48	34,69	34,67	33,95	32,99	32,96	31,70	30,01	33,42	—	35,25	35,22	—	—	34,94
	r		*r*		*r*		.		+	.	.	+	+	+		.	+	+	.	+		.
c		+	*c*	+		*r*		.	+	*c*		*c*	*cc*	*cc*	+	*c*	.			.	+	.
+	.		.	.			*r*					.			.	*r*	.		*r*	*r*		*r*
r	*c*	+		.				*r*	*r*	.		.		*rr*	+	+	+	+	*c*	+	+	*r*
	c	*c*	*c*	*c*	*c*	*c*			*c*		.	*r*	*c*	.	.	+	+	.	.	+	+	.
r	.	*r*	.		.	.	*r*	*r*	*r*	*r*		*r*	.	.	*c*	*c*	*c*	*c*	*cc*	*c*	.	*c*
r	*r*	.			.	.		.	*r*	.	.	.			.	.						.
cc	*c*	*cc*	*c*	*c*	*r*		*c*	*c*	*c*	.	*r*		.		*c*	*cc*	*c*	*cc*	*cc*	*cc*	*cc*	*c*
r		+	.		.	.	+		+	+	.	.	+	.	+			+	.	+	+	
.		.	.		.	.	.	+	*r*	*cc*				*r*	*c*					.	.	
.	*c*	+	.			.				.	*r*	+	*r*	*r*	.	*r*					+	.
+	+		+	*c*	+	+	.		.	.		.	.			+	+	+	.	*r*	*c*	.
r	.	+	.	.	.		+			.	*c*		.	.	+		.	.	.	.	.	
.	*r*		*r*	*r*	*r*		.	*r*	*r*	+				.	+	.	.	.	+	*r*	.	.
.	*r*						.		+	.	*r*	+	.	.	*c*	+	+	.	+	+	+	*r*
.		*r*	*r*	.				.	.	.	.	.	.	.	.			.	.	*r*	.	.
	.	*r*	*c*						.		.	*r*				.	+	.	.	+	.	
								.	*r*	.	.	.	.				*r*		.			*r*
		.	.		+	+	.		.			.			.	.		.		.	.	.
+		*r*	+	+			+	*c*	+	+	*r*		.	.	+	*c*	.	*c*	*cc*	*cc*	*cc*	+
+		*r*	+	*r*		.	+	*c*	+	*c*	+				*cc*	*cc*	+	*cc*	+	*c*	*ccc*	+
r	.	.	.	.		.	.	.	.	.	.					.	.		.			
.			.	.		.		*r*		.	.	.	.				.		.	.		.
.		.	+	+	*c*	+	*r*	+		.	.			.	.		*r*	.		.	.	.
+	.	+	.			.	*r*	+		.		.		.	.	.		.	.	*r*		.
.	.	.	.	.	.	.	.					.	.	.	.	.			.	.	.	.
rr	*r*	.	.	.		.	.	.	.	.	*r*	*r*		.	.	.	.		.	.	*r*	.
.	.	.	.	.			.	*r*	.	.	.	.		.	.	.	.		.	.	.	.
		.									*r*	*cc*	.			.	.				.	.
						.	.	*c*	*cc*		*r*			.			.			.	.	.
Tp	*Tp?*	*Tp?*	*Tp*	*Tp?*	*Ns*	*Ns*	*Tp*	*TpS*	*STp*	*Tp*	*Tp*	*Nm*	*SNs*	*S*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*

Table IV. The North

Month	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° E.	10°23′ E.	9°17′ E.	7°28′ E.	7°13′ E.	6°43′ E.	5°32′ E.	4°17′ E.	10°31′ E.	9°27′ E.	8°31′ E.	8° 3′ E.	7°43′ E.	7°23′ E.	8° 5′ E.
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
Oikopleura dioica Fol.	r			.	r	.		.	r				.	:	.
Acartia Clausii Giesbr.								.				.		r	
A. longiremis Lilljeb.				.			.	.				.		.	r
Calanus finmarchicus Gunn.			rr	r			+			r		r	.	.	r
Centropages typicus Kröyer		r		r					.	r	r	.	+	.	+
Corycæus anglicus Lubb.		.			r				r		r	+	c	r	+
Euterpe acutifrons Dana	.	.				r	r	rr				+	r	cc	.
Labidocera Wollastoni Lubb.	r	.				.			.	.	.	.	.	.	.
Oithona similis Claus	r	+	r	r	r	.			+	+		+	c	c	r
Paracalanus parvus Claus	+	+	r		.			r	.	.	.	.	.	+	+
Pseudocalanus elongatus Boeck.	r	+			.			r	+	c	r	.	+	.	.
Temora longicornis O. F. Müll.	+	+		r	.			.	+	+	.	r	c	r	.
Evadne spinifera P. E. Müll.		.	.						.	.	.	.		.	
Sagitta bipunctata Quoi & Gaim.	r	+	r	r	r		r	r	+	+	.	r	c	r	+
Amphorella Steenstrupii Clap. & Lachm.		r	r		.	.					.			.	.
Codonella ventricosa Clap. & Lachm.	r	r	r		r	+		r	r	r	r	r	.	.	.
Cyttarocylis denticulata Ehb.	r	r			.			.						.	
Tintinnopsis beroidea Stein.	r	r	r	r	+	r		c		.			.		.
T. campanula Ehb.	r		r		r	.		+		r			rr	.	
Dictyocha fibula Ehb.		r	r		.	.		.						.	.
Distephanus speculum Ehb.	r	r	r	r	r	r	r	r		.		.		.	
Halosphæra viridis Schmitz.						.							.		
Ceratium bucephalum Cl.		.			.	.	.		.		.	.	.	.	.
C. furca Duj.	r	+	r	c	+	+	+	r		r	+	+	c	c	r
C. fusus Duj.	r	r		r	r	r	r	+		r		.	r	.	r
C. lineatum Ehb.	.	r	r									.	.		rr
C. longipes Bail.	+		.			r		r	.	.	.		.	.	.
C. macroceros Ehb.	r	r	+	r	+		r		c	cc	c	c	cc	c	+
C. tripos Nitzsch.	+	+	+	c	+	.	r	.		c	c	c	cc	c	+
Dinophysis acuta Ehb.	r	r	.	r	r		r	r	.		.	.	.	.	.
Diplopsalis lenticula Bergh.		r	+	.	+		.	+			r		rr	.	+
Peridinium depressum Bail.	r	r	r	r	.	.	r			.	.	r		.	.
P. divergens Ehb.	r	r		r	+	.	.				+		r	+	+
P. ovatum Pouch.	r	.		r		.					.		rr	rr	.
P. pallidum Ostf.		r		r	r	r	r	r			r			.	
P. pedunculatum Schütt.		r	r	r	r	rr		r						.	.
Prorocentrum micans Stein.	r	r	r	r		r			.					.	
Pyrophacus horologium Ehb.				.		.		r		r			.	r	.
Xanthidium multispinosum Möb.	.				rr	.	r	.	.	.			.		
Biddulphia mobilensis Bail.	+	r	r	r	r	r	r	+	.	r		.	+	r	r
Ceratanlina Bergonii H. Per.	r	+				r		rr	.			.		.	.
Chætoceros borealis Brtw.	+	+													+
C. contortus Schütt.	c	c	.			.							.	.	c
C. curvisetus Cl.	+	c	r		.	.	.	.		r		.	.	.	+
C. debilis Cl.	c	c			.	.	.	+		.	.	.	.	.	c
C. decipiens Cl.	r	.	r	r		rr		r		.			.	.	.
C. densus Cl.	r	+	.					c		r			.	.	r
D. didymus Ehb.	+	c	r	.				c	.	+		.	.	.	+
C. Schüttii Cl.			r			.		r		.	.		.	.	.
Coscinodiscus concinnus W. Sm.	.	r	r	r	r	r		r		r	.			r	r
C. excentricus Ehb.	r	r	.	r	r		r	r			r		.	.	
C. polychordus Gran.		r	r	.	.		.		r	.	.	.	.		r
C. radiatus Ehb.	r	.	r	+	+	r	r	r	r	+	+	r	.	r	.
Ditylum Brightwellii West.	+	+	r		r	.	r	c	.	r	r		.	.	+
Eucampia zodiacus Ehb.	c	cc		.	.	r		c	.	r	.		.		c
Guinardia flaccida Castr.	+	r	r	+	+	r	r	+	.	r	.		c	r	r
Rhizosolenia calcar avis Schulze.	r	r			r			.	.	.	r		.	.	r
R. gracillima Cl.	r	+		r	r		.	.		r	.		.	.	.
R. setigera Brtw.	r	r	r		.		.	+		.			r	.	rr
R. Stolterfothii H. Per.	r	+	r	.	.		.	c	r	r	.	.	.	.	.
R. styliformis Brtw.	+	+	+	c	+		.		ccc	cc	+	+	c	c	r
Stephanopyxis turris Grev.	r	+	r	r	+				r	r		.	r	.	+
Thalassiosira gelatinosa Hensen.	r	r	r		.			r	.	r			.		.
Thalassiothrix Frauenfeldi Grun.	r	r		r											+
Plankton-type	Nm Ns S	Nm Ns S	Nm S	Nm Tp S	Nm S	Nm	Nm	Nm	S	STp	TpS	Tp Nm S	STp Nm	STp Nm	Nm Ns

Sea in November 1900.

XI 10 58°11′ 3°58′ E. 9,2 34,67	XI 9 58°2′ 5°45′ E. 9,8 31,74	XI 11 58°36′ 0° 5′ E. 8,0 35,27	XI 12 58°44′ 4° 8′ W. 10,4 34,71	XI 12 58°15′ 5°50′ W. 10,6 34,71	XI 13 56°48′ 7°12′ W. 10,8 34,94	XI 13 55°53′ 6°55′ W. 10,6 35,29	XI 2 57°42′ 10°53′ E. 11,0 28,26	XI 2 57°32′ 8° 1′ E. 10,8 34,59	XI 2 57°32′ 9°24′ E. 10,5 28,34	XI 3 57°17′ 6°37′ E. 9,0 34,28	XI 3 57°9′ 5°11′ E. 9,2 34,29	XI 3 57°7′ 3°57′ E. 9,2 34,43	XI 3 56°56′ 2°41′ E. 9,8 34,62	XI 3 56°45′ 1°27′ E. 9,8 34,84	XI 2 57°45′ 10°18′ E. 9,8 33,34	XI 3 57°7′ 7°47′ E. 10,2 34,59	XI 3 56°48′ 6°6′ E. 11,2 34,65	XI 3 56°37′ 5°13′ E. 9,6 34,16	XI 4 56°26′ 4°25′ E. 9,8 34,28	XI 4 56°16′ 3°34′ E. 10,2 34,50	XI 4 56°7′ 2°37′ E. 9,8 34,91	XI 4 55°37′ 1°4′ E. 9,4 34,96
						.	r								.	.						
.		rr	.	r	.			.		r		+				r			r		.	
r	.	.	.	.	.			r	.	.		.	.	r		.			.	.		
	+	c	+	r	+	r		+	+	+	.	r	+		.		r		r			
r	+	c	r	.	r		r	r	+	r	+	.	c	r	+				r		.	
	.	.		.			r		+		.			.	r	r					.	
		.	.		.		.												.		.	
.		.					.	.	r	r	.	.	.		.	.	r		r			
.	r	.	r	r	+	r	+	+	+	+	.	+	r	.	+		.	.	.	.		rr
r	.	.	+	r	.	r	.	+	.	+	+	.		.	+		r	+	.	r	.	r
.	c	+	r	+	.	+	c	c	+	+	+	+	.	+	+		+	.	+	.		
r	c	+	.				.	.	+	c	c	c	c	c	r		r	.	r	r		
.	.		.	.		.	.	r	.			+		r					r	r	rr	
.	.		.			.	r	r	.	.	c	+	r	r	.		r	.	r	r		
.	.	.	.			.	.		r					rr	rr	rr		.	rr			
.	.	.	c	c	c	+	.		.			r		.	+	r		+	rr	r		
	.	.	+				r		r	.		r		.	.	.			r	.	.	
	.	.	.		.	.	.											.	.	.		
.	.	.	.		.		r	.	r		.				r	r	r			.		
.		.	.	.	.		.	r	r	r			.		rr					.	r	
.		.	.	.	r		r	r	r	.					rr		r			.	.	
.		+	+	+	r	c		r		r	.	r	r	c			.			.		r
.	r	r	.	.	.		.	cc	+	cc	c	c	r	+			r	c	c	+	r	r
+	+	c	+	r	r	.	r	+	+	+	+	c	+	cc	r		r	+	c	c	cc	c
+	.	+	r		r		r	c	r	c	+	c		+	r		r	c	c	c	c	c
.		.					.	r	r	.				.	rr	.		.	.	.	.	
.		.	.	rr	r		r	r	r	.		r				r		+	r	+		r
+	.	+	.		r		+	c	c	c	c	c	cc	c	cc	c	r	+	c	+	r	cc
+	+	+	r	r	r		c	cc	cc	c	c	cc	cc	cc	cc	.	+	c	cc	c	c	cc
.	+	.	.	.			r	r	r	r	rr	r	r			.		r	r		+	+
.	.		.	.	.	.		.	.	.		.				.			.		r	r
r	.		.	r	r		r	+	+	+		+	.	.	r		r	.	c	.	r	
	r	.	r		.			r	+	+		+	+				r	+	r	+	+	c
	.	.	r		.					.				.	.				.	.		
.	.	.	r	r	rr	.							.	.		rr			.	.	.	.
			.		.			.									.		r		.	
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r	.	.		.	.	.		.	.	r		r							r		r	r
	.	.	.	.	.	.	.	r	.		r	rr	.						+		.	
.	.	.	.	.	.	.	r		+	.		.	.		r		r		.	.	.	
.	.	.	.	.			+	.	r	.									.	.	.	
.	.		.	.	.		c	r	+	r		.	.			.			.	.	.	
.	.			.	.		c	.	+							.		.	.	.	.	
	.		.	.	.		c	.	+	.			.			+		.	.	.		
		.			.		c	r	+	r						.		.	.		.	.
.	.	rr		.	r		+		c	r						r					.	
.	r				.		rr	r	r		.							.			.	
.	.				.		c		+	.	.							.			.	.
.	.		r				r	r	+	r									rr	.	.	.
.		.				.			r			.				.			.			.
.	.		r		r		r		r		.				r	r	r				.	.
.			.		.		r			.												.
.		.	r	r	+	r	r	r		r	.	.				r	r		r		.	.
			.				c	.	c	r	.				.	c					.	.
.	r			.			c		+		.	.		.	.			.	.		.	.
	r		.	.		.	r	r	c	r					+	c	r	.	.	.	.	.
.		.	.	.	.		+	.	+	.		.			.	.		.	.	.	.	.
.	.	.		.	r	.	+	r	+	r	.	.			r		.		rr	.	.	
.	.	.	.	.	.		r	.	r							r			.	.		
.	.	.		.	.	.			.	.					r	+			.			
.	+	.	r	.	r	.	r		r	r	.			.	c	.	rr	.		.	rr	
.	r	.	.	.	.	.	r	.	.	.	.	.	.		r	.		.		.	.	.
.		.	rr	.	rr	.	.	.		.		.				.	.	.	.	.	.	.
.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Tp	Tp S	Tp	?	?	?	?	Nm Ns Tp	Tp	Tp Nm Ns	Tp	Tp	Tp	Tp	Tp	Tp Nm S	Nm Tp	Nm Tp	Tp	Tp	Tp	Tp	Tp

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					+		.	+		c	+	
Calanus finmarchicus Gunn.					.		.						.	.	.
Centropages hamatus Lilljeb.		r					.		.				c	.	c
C. typicus Kröyer.		r											.		.
Oithona similis Claus.	r	r		.		.		.			.			c	+
Paracalanus parvus Claus.				.	.		.				.	.	.		.
Pseudocalanus elongatus Boeck.		.			+		.	.			+		+	c	r
Temora longicornis O. F. Müll.	r		c					r			r		c		
Evadne Nordmani Lovén.						.			.				r		cc
E. spinifera P. E. Müll.						.			.				.		.
Sagitta bipunctata Quoi & Gaim.		.									.		.		.
Cyttarocylis denticulata Ehb.	r						.	rr			.				+
Ptychocylis acuta Brandt.	c		r					r					r	r	
Tintinnopsis campanula Ehb.								.							.
T. fistularis Möb.											.			.	.
Ceratium fusus Duj.	.								.					.	.
C. longipes Bail.	+	.				rr			rr		rr	rr	c	cc	cc
C. macroceros Ehb.	.	+	.										.	.	r
C. tripos Nitzsch.	+	c	rr	rr		rr			rr		rr		+		c
Dinophysis acuta Ehb.	r			rr							.	.	.	.	r
Peridinium depressum Bail.											r	rr	+	c	c
P. divergens Ehb.		rr			.								.	.	
P. ovatum Pouch.	.			.							r		+	c	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.			.						.		.	.	.	.	.
Chætoceros borealis Brtw.	r		+	.	r	r	rr	c	+	r	+	r	+	r	+
C. var. Brightwellii Cl.				r	r		.	c	+	r	+	r	r	.	+
C. brevis Schütt.				+	r		+			.					.
C. contortus Schütt.					.	r	cc	ccc	ccc	cc	ccc	ccc	c		+
C. curvisetus Cl.	.		.	.	.	.	.		.	.			.		
C. debilis Cl.	+		ccc	cc	ccc	ccc	ccc	.	r						
C. decipiens Cl.	+		+	r			r	+	r	c	r	+	cc		c
C. diadema Ehb.	+		ccc	cc	ccc	ccc	c			.	.				.
C. didymus Ehb.	.			.		.	.	.		.					.
C. laciniosus Schütt.			r	+		+	+	.	.	.		.			
C. Schüttii Cl.					.	.	.	.					.		r
Coscinodiscus concinnus W. Sm.	r		r		r	r	.			.			+	ce	cc
C. polychordus Gran.	r		c	c	r	r	r			.	.		.	.	.
Ditylum Brightwelli West.										.	.			.	.
Eucampia zodiacus Ehb.		.					.			.					
Guinardia flaccida Castr.		+		.			.	.							
Rhizosolenia calcar avis Schulze.			.				.				.				
R. gracillima Cl.			.				.	.		.			.		c
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	.	r						
Thalassiosira Nordenskiöldii Cl.			.	c	r	cc	ccc	+	r				.		
Thalassiothrix Frauenfeldi Grun.	r	.	c	c	+	+	r	+	+	r	c	c	+	.	r
Plankton-type	*Ns*	*Tp*	*Ns*	*Ns* *Si*	*Ns*	*Ns* *Si*	*Si*	*NsT*	*NsT*	*TNs*	*TNs*	*NsT*	*NsC*	*Ns* *Nc*	*Ns* *Nc* *Tp*

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6	6	6	6	7	7	7	7	8	8	8	9	9	9	9	10	10	10	11	11	11	12	12
2	9	16	23	3	7	20	27	10	17	24	3	11	18	29	8	19	29	6	20	28	5	27
11,8	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
21,73	21,01	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
Nc	*Tp*	*Tp*	*Tp*	*Nm* α	*TpS Nm*	*Nm* α	*Nm* α	*Nm*	*Tp Nm*	*Tp Nm*	*Tp Nm*	*Tp Nm*	*Nm Tp Ns*	*Ns Nm Tp*	*Ns Nm Tp*	*Nm Ns*	*Nm Ns Tp*	*Nm Ns Tp*	*Ns Nm*	*Tp Nm Ns*	*Ns Tp Nm*	*Tp*

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
Cyttarocylis denticulata Ehb.				.				.					
Tintinnopsis campanula Ehb.							.						.
Distephanus speculum Ehr.	.		.	.			.		.				.
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.	.					.	.	.	.	.	.	.	
Chætoceros borealis Brtw.	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 concinnus 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 Brtw.	r	.	r			+	r	+	+	+	.		
Skeletonema costatum Grev.	.	.				c	c	c	c	.		.	
Thalassiosira Nordenskiöldii Cl.	rr				.	c	cc	cc	cc	c	.		
Thalassiothrix Frauenfeldii Gran.	.	.	r		.	+	+	.	.	.	.	.	.
Plankton-type	(Tp Ns)	(Tp Ns)	Tp Ns	Tp	Ns	Si	Si	Si	Si	Si T	Nc Ns	Nc Ns	Nc Ns

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5	6	6	6	6	7	7	7	7	8	8	8	9	9	9	10	10	11	11	11	12	12	12
19	2	9	16	23	3	9	18	27	12	20	27	3	10	17	20	28	7	17	24	2	8	24
8,0	12,4	13,0	14,8	16,2	16,0	13,0	16,8	18,0	17,0	18,0	16,3	16,0	14,5	14,5	11,5	10,5	8,3	8,0	6,0	4,0	3,0	6,0
29,89	22,88	22,80	22,04	22,44	—	32,92	24,63	21,83	26,89	24,18	26,77	28,19	29,83	29,98	31,09	30,06	27,90	28,82	27,01	22,95	22,59	30,94
Ns	*Tp* *Nc* *Nmα*	(*Tp?*)	*Tp* *Nmα*	*Tp* *Nmα*	*Tp* *Nmα*	*Tp*	*Nmα*	*Nmα*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp*	*Tp* *Nm*	*Tp* *Nm* *Ns*	*Tp* *Nm* *Ns*	*Tp* *Nm* *Ns*	*Tp* *Nm* *Ns*	*Tp* *Nm* *Ns*	*Tp* *Nm* *Ns*	*Tp* *Nm* *Ns*

Tryckt den 12 april 1902.