Sars 1900

INTRODUCTION.

Of the zoological collections brought home from the Norwegian North Polar Expedition, those relating to the marine invertebrate animals have been placed in my hands for examination and description, and I now propose to report on the results of my investigations as far as the *Crustacea* are concerned. Indeed, by far the greater number of the animals collected belongs to this extensive class, and there is comparatively little to report of other animals. As, however, all knowledge of the fauna in this far remote, and hitherto unexplored part of the North Polar Sea may be of considerable interest, it is my intention in a subsequent paper also to give a short account of the other marine invertebrates found during the Expedition.

The collection in question consists of several tubes and bottles from different localities, each, as a rule, labelled with date, depth and mode of preservation. I have carefully gone through the contents of all the samples, in order to gain both a general view of the character of the fauna, and more special information about the several species. Only one of the bottles contained true bottom-animals taken up by the aid of the trawl; all the other samples have been procured by the aid of the tow-net, and of course contain exclusively pelagic animals, chiefly *Crustacea*. Of these again *Copepoda*, chiefly belonging to the *Calanoid* group, are predominant, having been taken in nearly every haul and in considerable numbers along the whole route of the "Fram". This peculiar character of the collections is due to the unexpected physical conditions found in the Polar Sea traversed. As is well known, it has until recently been the general assumption of geographers, that the Polar basin, north of Siberia and Franz Josef Land,

SARS, G.O. (1900) CRUSTACEA. IN: THE NORWEGIAN NORTH POLE EXPEDITION 1893-1896, Scientific Research (Ed. F. NANSEN), 1, 1-137 (Auszug)

could only be quite a shallow sea, with depths scarcely exceeding some hundred fathoms, and the zoological equipment of the 'Fram' Expedition was arranged in accordance therewith. But in direct contradiction to this generally adopted view, that part of the Polar Sea through which the 'Fram' drifted with the ice, proved to be everywhere of enormous depth, exceeding in this respect even the Norwegian Sea. The quantity of hemp-rope at hand was quite insufficient for dredging or trawling in such depths, and, indeed, it was a matter of no little trouble to find a means of ascertaining the depth with exactness. For this purpose it was necessary to make up from the wire-ropes of the 'Fram' a provisional sounding-line of sufficient length and consisting of thin steel-wire. To the end of this line, which of course was far from being strong enough for dredging operations, was appended in some instances a heavy water-bottle, in others an ordinary lead, and in the latter case a sample of the bottom was always brought up together with the lead. But on a preliminary examination, scarcely any traces of organisms could ever be detected in this material, and it must be concluded from this that there is at least very little animal life on the bottom in this part of the ocean. On the other hand, it is a very remarkable fact, that the more superficial strata of the sea, though almost perpetually covered with a layer of ice, through which comparatively small, temporary openings occur in the shape of channels and lanes, were found to abound with life at all times of the year, and even to the most northerly latitudes reached. It is very probable, too, that the pelagic animals observed are not strictly confined to the more superficial strata of the sea, but that they also at times descend to considerable depths, perhaps even to the strata immediately covering the bottom. In many cases the tow-net was lowered to depths exceeding 200 or 300 metres, and, as a rule, the draught was considerably richer in such instances, than when it was working in smaller depths. Moreover, the peculiar Amphipode described below as *Cyclocaris Guilelmi* Chevreux, was found several times clinging to the sounding-line at only a short distance above the water-bottle, which was hauled up from depths between 500 and 1000 metres. The imperfect development of the visual organs in this form, and likewise in some of the other pelagic animals observed, would also seem to point to abyssal habits.

As to the general character of the pelagic fauna in the North Polar Basin explored by the Expedition, it exhibits, on the whole, a pronounced resemblance to that of the North Atlantic Basin, the greater number of species having, indeed, proved to be common to both. In considering the *Calanoida* in particular, it was not a little surprising to find rather abundantly represented in the samples, some characteristic forms well known to me from the deep fjord-basins of the south and west coasts of Norway, but hardly ever recorded by any foreign zoologists, though they must doubtless also occur in the North Atlantic Basin. These forms, which have occasionally been mentioned by me as deep-water Calanoida, are, indeed, at least off our coasts, only met with in depths of more than 100 fathoms, whereas in the North Polar Basin they often ascend to the very surface of the sea. Intermingled with them were some well-known surface-Calanoids, such as the widely distributed *Calanus finmarchicus, Pseudocalanus elongatus,* etc. There are, moreover, a number of hitherto unknown forms, to be presently described in detail, which accordingly might be regarded as peculiar to the Polar basin; but it is not improbable that on a closer investigation, these forms will also be found to occur in the northern part of the Atlantic basin. Indeed, strictly speaking, the most westerly part of the 'Fram's' route lies on the border between the two basins; and yet the character of the fauna here did not differ in any essential manner from that in the eastern part. As, however, the superficial current in the North Polar Sea has been clearly shown to flow in a westerly direction, it is possible to suppose that some forms at least might have their centre of distribution far east, perhaps even in the Bering Sea. But as the pelagic fauna of that part of the ocean is still very imperfectly known, it is as yet impossible to decide with certainty which forms in such cases ought to be regarded as immigrants from the east. At any rate, though the existence of the western current has been demonstrated in a most convincing manner by the drift of the 'Fram', there is also full evidence of the existence of a current in quite the opposite direction, but confined to the deeper strata of the sea; for both the comparatively high temperature of the water found down to the lowest depths and its great salinity clearly show it to be derived from the Atlantic Basin. An immigration of animals to the North Polar Sea may accordingly be possible from both the west and the east; but, as the more superficial strata flowing in a westerly direction, together with the ice covering

them, are largely mingled with fresh water, and constantly subjected to a rather low temperature, they seem in reality to offer less favourable conditions for the well-being of higher organisms. I am therefore of opinion, that the bulk of the pelagic animals found in the North Polar Basin are in fact derived from the west through the Atlantic current flowing in beneath the superficial Siberian current. On the other hand, I think that the latter is of great importance in conveying a constant supply of nourishment to the pelagic animals of the North Polar Basin. This nourishment consists of microscopic algæ, chiefly *Diatomeæ*, which are found to abound in the superficial polar water of the Siberian Sea, though gradually diminishing in quantity westwards, apparently owing to their being largely fed upon by the various pelagic animals. Indeed, without such a constant conveyance of nourishing matter, there could be no such rich animal life in the Polar Sea.

It is a very remarkable fact, that forms which have hitherto been regarded as quite southern in distribution, are also represented in the Polar Sea. I have several instances of this remarkable occurrence to report on, as regards the pelagic Copepoda. Thus, in a sample taken at about the centre of the Polar basin traversed, I found a well preserved specimen of a Calanoid, differing conspicuously in its external appearance from all the other forms, and easily recognizable as a species of the genus *Hemicalanus* Claus. This genus has as yet only been known from the Mediterranean and the tropical parts of the Atlantic and Pacific Oceans, never having been met with either off the Norwegian coast or off the Atlantic coast of Europe. Furthermore, in the sea north of the New Siberian Islands, two species of the genus *Oncæa* Phillipi are found in great abundance, and both these species I have been enabled to identify with perfect certainty with species recently recorded by Dr. Giesbrecht from the Bay of Naples. One of the species, *O. conifera* Giesbr., was certainly observed by the present author many years ago off the south coast of Norway; but the other species, *O. notopoda* Giesbr., is as yet only known from the Mediterranean. In about the same tracts, in which the two above-mentioned species of *Oncæa* occurred, another very peculiar Copepod, belonging to the same group, was met with. It is a species of the genus *Lubbockia* Claus, hitherto only known from the Mediterranean and the tropical parts of the oceans. Finally, in the very same sample in which the last-named Copepod was found, I succeeded in picking up some specimens of

a small, perfectly hyaline Copepod of a still more peculiar appearance, and at once recognizable as a species of the highly remarkable genus *Mormonilla* of Giesbrecht, the systematic position of which is still rather doubtful. Only two species of this genus have hitherto been recorded, and both of them were found in the tropical part of the Pacific, south of the equator. The polar form so closely resembles one of the two species described by Dr. Giesbrecht, that I should have been much inclined to identify the two forms, were it not that the great distance between the occurrences seems to forbid such an identification. The very close, and apparently genetic relationship between the two polar species of the amphipodous genus *Pseudalibrotus* to be described below, and those occurring in the Caspian Sea, is another remarkable instance, which seems fully to corroborate the correctness of the assumption of geologists as to a direct connexion in olden times between this isolated basin and the North Polar Sea.

In order to show the general character of the pelagic fauna in the Polar Sea, I subjoin lists of the species found in 5 widely-separated tracts of the region traversed by the "Fram".

No. 1.

12th to 24th October, 1893.

Sea north of New Siberia (beginning of the drift).

In about 78° N. Lat., 136° E. Long.

Sabinea septemcarinata (Sab.). Myto-stage.

Parathemisto oblivia Krøyer.
Metopa longicornis Boeck.
Gammarus locusta, var. *mutata*, Lilljeb.

Calanus finmarchicus, Gun.
— *hyperboreus*, Krøyer.
Pseudocalanus elongatus, Boeck.
— *major*, G. O. Sars.
— *pygmæus*, G. O. Sars.
Euchæta norvegica, Boeck.

Metridia longa, (Lubb.).
Acartia longiremis, Lilljeb.
Oithona similis, Claus.
Oncæa conifera, Giesbr.
— *notopoda*, Giesbr.
Conchœcia maxima, Brady & Norm.
Cirripedia-larva in Cypris-stage.
Clione papilionacea Pall. *(larva)*.
Appendicularia.
Sagitta (Spadella).
Young of Ophiura?
Medusoid.
Number of *Diatomeæ (Chætoceras)*.

No. 2.

March—April, 1894.

In about 80° N. Lat., 134° E. Long.

Hymenodora glacialis, (Buchh.)
Thysanoëssa longicaudata, Kr.

Euthemisto libellula (Mandt).
Parathemisto oblivia, (Krøyer).
Lanceola Clausi, Bovallius.
Scina borealis, G. O. Sars.
Cyclocaris Guilelmi, Chevreux.
Pseudalibrotus glacialis, G. O. Sars.
— *Nanseni*, G. O. Sars.
Eusirus cuspidatus, Krøyer.
Amphithopsis glacialis, Hansen.
Gammarus locusta Lin., var. *mutata*.
Amathilla pingvis (Krøyer).

Dajus mysidis Krøyer, (larvæ in 1st and last stages).
Cryptoniscid-larvæ.

Calanus finmarchicus, Gunn.
— *hyperboreus*, Krøyer.
Scaphocalanus acrocephalus, G. O. Sars.
Undinella oblonga, G. O. Sars.
Euchæta norvegica, Boeck.
Chiridius armatus, (Boeck).
— *tenuispinus*, G. O. Sars.
Pseudocalanus major, G. O. Sars.
Spinocalanus longicornis, G. O. Sars.
Drepanopus Bungei, G. O. Sars.
Heterochæta norvegica, Boeck.
— *compacta*, G. O. Sars.
Augaptilus glacialis, G. O. Sars.
Metridia longa, (Lubbock).
Temorites brevis, G. O. Sars.

Conchoecia maxima, Brady & Norm.
Sagitta (Spadella).
Only slight traces of algæ.

No. 3.

April—August, 1895.

Between 84° 15′ and 84° 42′ N. Lat., and between 96° and 72° E. Long.

Thysanoëssa longicaudata (Kr.).

Parathemisto oblivia, (Krøyer).
Lanceola Clausi, Bovallius.
Eusirus Holmi, Hansen.
Amphithopsis glacialis, Hansen.

Calanus finmarchicus, (Gunn.).
— *hyperboreus*, Krøyer.
Scaphocalanus acrocephalus, G. O. Sars.
Scolecithrix brevicornis, G. O. Sars.
Undinella oblonga, G. O. Sars.

Euchæta norvegica, Boeck.
Undeuchæta spectabilis, G. O. Sars.
Chiridius armatus, (Boeck).
— *tenuispinus,* G. O. Sars.
— *brevispinus,* G. O. Sars.
Heterochæta norvegica, Boeck.
— *compacta,* G. O. Sars.
Augaptilus glacialis, G. O. Sars.
Hemicalanus spinifrons, G. O. Sars,
Metridia longa, (Lubb.).
Temorites brevis, G. O. Sars.

Conchoecia maxima, Brady & Norm.
Sagitta (Spadella).
No algæ.

No. 4.

October 12th, 1895.

85° 13′ N. Lat., 79° E. Long.

Amphithopsis glacialis, Hansen.

Calanus finmarchicus, (Gunn.).
— *hyperboreus,* Kr.
Scaphocalanus acrocephalus, G. O. Sars.
Undinella oblonga, G. O. Sars.
Chiridius brevispinus, G. O. Sars.
Heterochæta norvegica, Boeck.
— *compacta,* G. O. Sars.
Augaptilus glacialis, G. O. Sars.
Metridia longa, (Lubb.).
Temorites brevis, G. O. Sars.
No algæ.

No. 5.

February—May, 1896.

The most westerly part of the 'Fram's' route.

Between 84° 47′ and 83° 57′ N. Lat., and between 25° and 11° E. Long.

Thysanoëssa longicaudata, (Kr.).

Euthemisto libellula, (Mandt).
Parathemisto oblivia (Krøyer).
Lanceola Clausi, Bovallius.
Cyclocaris Guilelmi, Chevreux.
Pseudalibratus glacialis, G. O. Sars.
— *Nanseni*, G. O. Sars.
Paramphithoë brevicornis, G. O. Sars.
Metopa longicornis, Boeck.
Eusirus Holmi, Hansen.
Amphithopsis glacialis, Hansen.
Gammarus locusta L. var. *mutata*.

Calanus finmarchicus, (Gunn.).
— *hyperboreus*, Kr.
Scaphocalanus acrocephalus, G. O. Sars.
Euchæta norvegica, Boeck.
Chiridius armatus, (Boeck).
Heterochæta norvegica, Boeck.
Metridia longa, (Lubb.).
Conchoecia maxima, Brady & Norm.
Clione papilionacea, Pall. jun.
Sagitta (Spadella).
No algæ.

I further add here a list of species from a single locality, because in this instance it has been expressly stated that the sample was taken from the very surface of the sea, whereas in all other cases the tow-net was lowered to some considerable depth below the ice.

28th June, 1895.
84° 32′ N. Lat., 76° E. Long.
About midway in the route of the 'Fram'.
Sample taken by towing from a boat in a large open lane in the ice.

Parathemisto oblivia, (Krøyer).

Calanus finmarchicus, (Gunn.).
— *hyperboreus*, Kr.
Scaphocalanus acrocephalus, G. O. Sars.
Undinella oblonga, G. O. Sars.
Euchœta norvegica, Boeck.
Chiridius armatus, (Boeck).
— *tenuispinus*, G. O. Sars.
Heterochœta norvegica, Boeck.
— *compacta*, G. O. Sars.
Metridia longa, (Lubb.).
Temorites brevis, G. O. Sars.

Conchoecia maxima, Brady & Norm.
Sagitta (Spadella).
No algæ.

Of the 11 species of Copepoda enumerated from the above-named sample, 6 also occur off the Norwegian coast; but it is worthy of note, that all of them, except *Calanus finmarchicus*, are here confined to great depths, more than 100 fathoms. The above-named Hyperiid, *Parathemisto oblivia*, is also a pronounced deep-water form off our coasts, and the same is also the case with the 3 Norwegian species of *Conchoecia*, one of which, *C. borealis* G. O. Sars, is very closely allied to the arctic form here named.

In the following pages, I shall try to give an account of all the species of Crustacea found in the collections of the 'Fram', with notes on their occurrence and distribution, and with descriptions and figures of the new or less familiar forms.

The plates accompanying this account have been prepared by the autographic method employed by the present author in most of his recent publications, and will, I hope, serve for an immediate recognition of the species.

ACCOUNT OF THE SPECIES.

PODOPHTHALMIA.

Fam. CRANGONIDÆ.

1. *Sabinea septemcarinata* (Sab.).

A well-preserved larva in the last stage of this form (= *Myto Gaimardii*, Krøyer) is in the collection, having been taken by means of the tow-net on the 13th October, 1893, from a depth of about 50 metres.

Distribution. Coast of Norway, Atlantic coast of North America, Greenland, Spitsbergen, the Murman coast, the Kara Sea, the Bering Sea.

Fam. EPHYRIDÆ.

2. *Hymenodora glacialis* (Buchholtz).

Of this peculiar form, described and figured in detail by the present author in his account of the Crustacea of the Norwegian North Atlantic Expedition, a solitary young specimen was found in a sample taken on the 24th March, 1894, the tow-net having been lowered to a depth of 300 metres.[1]

Distribution. Greenland, several stations of the Norwegian North Atlantic Expedition (cold area), the Faröe Channel, east coast of North America (Albatross Expedition).

Fam. EUPHAUSIIDÆ.

3. *Nyctiphanes norvegicus* (M. Sars).

A well-preserved specimen of this beautiful form was taken on the 22nd May, 1894, from a depth of 100 metres.

[1] That this form must have occurred rather plentifully in about the same tract, and in the very surface of the sea, is proved from the fact that easily recognizable remains of it were found in the stomachs of 8 specimens of the roseate gull (*Rhodostethia rosea*) shot between the 3rd and 8th August same year,

Distribution. Coast of Norway, Scotland, the Murman coast, Greenland, east coast of North America.

4. *Thysanoëssa longicaudata* (Krøyer).

Syn: *Thysanoëssa tenera*, G. O. Sars.

Solitary specimens of this form, in a more or less perfect state, were found in 4 different samples taken in places lying widely apart from each other (March 24th, 1894, July 30th, 1895, Feb. 4th, 1896, Feb. 13th, 1896), the tow-net having been lowered to a depth of between 50 and 300 metres

Distribution. Varanger Fjord, sea between Norway and Jan Mayen (Norw. North Atl. Exp.), Greenland.

AMPHIPODA.

Fam. HYPERIIDÆ.

1. *Euthemisto libellula* (Mandt).

This well-known arctic form was taken both at the beginning and close of the cruise, partly young, partly fully grown specimens. The greater number of the specimens are, however, from the western part of the region traversed.

Distribution. Coast of Finmark, the Murman coast, Novaja Semlja, Siberian Polar Sea, Beeren Eiland, Spitsbergen, Jan Mayen, Greenland.

2. *Parathemisto oblivia* (Krøyer).

This form also seems to be widely distributed throughout the Polar basin, having been taken along the whole route of the 'Fram' in no less than 12 different places.

Distribution. Coast of Norway, British Isles, Greenland, numerous stations of the Norwegian North Atlantic Expedition.

Fam. LANCEOLIDÆ.

Gen. *Lanceola*, Say.

Remarks. This genus was established by the American zoologist, Th. Say, as early as the year 1818, to include a peculiar Amphipod belonging to the Hyperiid group. But the genus was not recognized by subsequent authors, some of whom regarded it as synonymous with *Hyperia*, others

with *Vibilia*. It is to Dr. Bovallius that we owe the restoration of Say's genus, as he pointed out its difference from both *Hyperia* and *Vibilia*. Indeed, Dr. Bovallius even regards it as the type of a distinct family, *Lanceolidæ*, at the same time adding no less than 5 new species to that originally described by Say. Of these species, one has been found during the 'Fram' Expedition, and, as only a short diagnosis, accompanied by 4 figures in outline, has been given of it by Dr. Bovallius, I find it appropriate here to describe and figure this remarkable form more in detail.

3. *Lanceola Clausi*, Bovallius.

(Pl. I).

Lanceola Clausi, Bovallius, 'On some forgotten genera of Amphipoda'. Bihang till Kgl. Svenska Vet. Akad. Handl. Part 10, p. 8.

The *Same:* 'Arctic and Antarctic Hyperids'. Vega-Expeditionens vetensk. arbeten, vol. IV, p. 553, Pl. 41, figs. 11—14.

Description.

The largest specimen in the collection, the one here figured, has a length of about 10 mm.; but, as Dr. Bovallius gives the length as 16 mm., it cannot be fully grown.

True, at first sight, the specimen here figured (see Pl. I. fig. 1) has the appearance of being an adult gravid female, with largely protuberant marsupium; but, on a closer examination, it is easily seen that this impression is merely due to a delusion. For the fact is that no marsupium at all is formed, and the protruding part that has this appearance, is nothing but the ventral walls of the body itself, along the middle of which, immediately beneath the skin, the ganglionic chain may be very distinctly traced. Indeed, the anterior part of the body-cavity is enormously dilated, in order to give room for the exceedingly capacious stomachal part of the intestine.

The integuments are remarkably soft and supple, and the whole body thereby acquires a peculiar vagueness in its contours, not observed in other Amphipods. As the metasome generally is bent in against the greatly swollen mesosome, the whole body looks like an irregular, soft ball.

The cephalon, unlike what is the case in the true *Hyperiids*, is very small, and abruptly truncated in front, with the anterior face somewhat concave, and bounded above by a projecting, rostrum-like angle. Between the

insertion of the 2 pairs of antennæ, it forms, on each side, a slight rounded lobe, within which the very small eyes have their place, and below, it terminates on each side in another obtuse lobe, with which the buccal mass is connected.

The segments of the mesosome are well defined in their dorsal part, exhibiting laterally an even horizontal margin, with which the extremely small coxal plates are connected; but the protruding ventral part of the 2nd to 5th segments seems to form a continuous whole. The 1st segment is rather short, scarcely exceeding in length the cephalon, whereas the 3 succeeding segments are of considerable size, the 3rd and 4th each exhibiting in front an elevated transversal eminence defined behind by a distinct depression. The 3 posterior segments rapidly diminish in size; the last 2 do not exhibit any protuberant ventral part, and on the whole are very similar in appearance to the 3 succeeding segments belonging to the metasome. The epimeral plates of the latter are comparatively small and evenly rounded.

The urosome (see also fig. 16), as in the true *Hyperiids*, is depressed, and composed of 2 segments only, the last 2 being wholly fused together. The whole posterior division of the body, comprising the metasome and urosome, scarcely attains half the length of the anterior, and this is regarded by Dr. Bovallius as a distinctive character, separating the present species from some of the others. It is very probable, however, that in the male this division is much more fully developed than in the female.

The eyes, contrary to what is the case in the true *Hyperiids*, are extremely small, rounded, and composed of a restricted number of visual elements, imbedded in a light red pigment.

The superior antennæ (see figs. 2, 3) issue at rather a long distance from the upper angle of the head, and widely apart from each other. They are apparently composed of only 3 joints, the first 2 constituting the peduncle, the 3rd the flagellum. Of the peduncular joints, the 1st is the larger, and is defined from the 2nd by a deep constriction. It may be that, as indicated by Dr. Bovallius for the type species, there is a very short intermediate joint in the peduncle; but I have not been able to see such a joint with any distinctness in the specimens I have examined. The terminal joint, or flagellum, is somewhat longer than the peduncle, compressed, lanceolate, and edged with very small sensory bristles. Any apical joints, I have failed to distinguish.

The inferior antennæ (see figs. 2 & 4) are a little longer and more slender than the superior, and have the peduncle composed of 4 joints, the last of which is the largest. The flagellum, as in the superior antennæ, is uniarticulate, forming a somewhat flattened, narrow, lanceolate joint, terminating in a straight, slender spine.

The buccal mass (see figs. 1 & 2) is rather protuberant, and composed of the usual number of oral parts mutually covering each other.

The anterior lip (see figs. 2 & 5) forms a comparatively small, deeply bilobate flap, covering the masticatory parts of the mandibles, and having the edge quite smooth.

The posterior lip (fig. 6) is much larger, with the lateral lobes greatly divergent, and each terminating in an oval, somewhat recurved lappet.

The mandibles (see figs. 2 & 7) are in the form of 2 flattened, almost horizontally arranged pieces meeting in front, below the anterior lip. They do not exhibit any trace of a true molar prominence; but the inner face is rough owing to the presence of numerous small hair-like spinules. The cutting edge is simple, with the upper corner acutely produced, the lower more obtuse, and exhibiting a very small tooth-like projection. On the left mandible, just within the upper corner of the cutting edge, there is an extremely small bidentate prominence, constituting a rudiment of a secondary cutting plate. The palp is well developed, being considerably longer than the body of the mandible, and is composed of 3 well-defined joints. Of these the 1st is rather short, whereas the 2nd is elongated and somewhat compressed, exhibiting inside 4 short spiniform bristles, outside in the outer part, several slender setæ. The terminal joint is shorter than the 2nd, and conically tapered, with a delicate ciliation along the inner edge.

The anterior maxillæ (see figs. 2 & 8) exhibit all the chief parts found in typical Amphipoda. The masticatory lobe is densely hairy and divided at the somewhat oblique end into 4 strong teeth. The basal lobe is rather short, and likewise densely hairy, but without any true spines or setæ. The palp consists of only a single lamellar joint of oblong oval form, and partly covering the masticatory lobe outside. It is edged with short spinules, those on the inner margin being extremely small and densely crowded together. From the outer side of the basal part, moreover, several strong bristles are seen to originate.

The posterior maxillæ (see figs. 2 & 9) are likewise quite normal in their construction. The basal part is rather voluminous and muscular, and the 2 terminal lobes are comparatively narrow and strongly incurved. Both lobes are densely hairy, and the somewhat larger outer lobe is, moreover, armed at the tip with several strong spines.

The maxillipeds (see figs. 2 & 10), as in other *Hyperiida*, are quite destitute of palps. The broad, flattened basal part consists of a short common root-joint, and 2 juxtaposed lamellar pieces, each carrying outside a single seta, and projecting at the end inside in a short triangular lappet. These lappets, which lie in close juxtaposition, and are fringed with short bristles, undoubtedly answer to the basal lobes in other Amphipoda. It is likewise indubitable that the large lamellæ appended to the end of the basal part, represent the masticatory lobes in other Amphipoda, exhibiting, as they do, a very similar appearance. They are oblong oval in form, and, being movably articulated to the basal part, they may either be extended straight in front, or be spread out, so as to diverge more or less widely. Along the straight inner edge, there is a double row of strong spiniform bristles, and each of the lobes also carries outside, at some distance from the tip, 2 similar bristles springing from a distinct ledge.

The 2 pairs of gnathopoda (figs. 11, 12) are of essentially similar structure, being considerably shorter and thicker than the pereiopoda, and also more abundantly supplied with bristles. They are quite simple, without any trace of a cheliform structure, the propodal joint being conically tapered, and carrying at the tip the small dactylus. This joint is rather more produced in the posterior than in the anterior pair; but in none of them is there any distinctly defined palm.

The 2 anterior pairs of pereiopoda (fig. 13) are of quite normal appearance, and moderately slender. Of the joints, the carpal and propodal ones are somewhat compressed, and are both provided along the posterior edge with a row of short spinules. The dactylus is comparatively small and quite simple.

The 3 posterior pairs of pereiopoda (figs. 14, 15) gradually diminish somewhat in length, and are all distinguished by the peculiar arrangement of the dactylus. The latter is strongly curved, finely denticulated along the concave edge, and exserted in a very acute point. It is, moreover, retractile, and capable of being received into a hollow formed by a cup-like projection of

the propodal joint (see figs. 14 a, 15 a). Otherwise, these legs are remarkably smooth, and have the basal joint scarcely broader than on the 2 anterior pairs.

The branchial lamellæ are comparatively small, and are present on the posterior gnathopoda and the 4 anterior pairs of pereiopoda (see figs 1, 12, 13, 14). In the specimen examined, slight rudiments of incubatory plates were present inside the branchial lamellæ (see figs. 12, 13).

The pleopoda are rather powerfully developed, and of normal structure.

The uropoda (see fig. 16) exhibit the structure usually met with in *Hyperiids*, the terminal rami being lanceolate in form, with the edges finely serrulate (see fig. 17). The last pair do not differ from the 2 preceding ones, except in the somewhat greater breadth of the basal part.

The telson (ibid.) is oblong triangular in form, and quite simple, without any armature. It does not reach to the end of the basal part of the last pair of uropoda.

Occurrence. This peculiar Amphipod occurred in 6 different samples, 5 of which were taken along the eastern part of the route of the "Fram", between latitudes 80° and 85°, the 6th much farther west, at about the 30th degree of longitude, and near the 85th degree of latitude. In all the places, the tow-net had been lowered to depths of between 100 and 300 metres. By far the greater number of the specimens found are very small, and evidently quite young. Only in one place were 2 larger specimens caught, one of which is that here described.

Distribution. Davis Straits, in lat. 72° N. (Bovallius).

Fam. SCINIDÆ.

4. *Scina borealis*, G. O. Sars.

Some specimens of this easily recognizable form were found in 3 samples collected towards the end of March and in the beginning of April, 1894, in about the 80th degree of latitude, the tow-net having been lowered, in all 3 places, to a depth of 300 metres.

Fam. LYSIANASSIDÆ.

Gen. *Cyclocaris*, Stebbing.

Remarks. This genus was established in the year 1888 by the Rev. Mr. Stebbing, to include a peculiar Amphipod from the Challenger Expedition,

the solitary specimen procured having been taken in the Pacific, at some distance from Tahiti. The genus was justly placed in the extensive family *Lysianassidæ*, though in some characters it differs rather markedly from the other known genera. It was, indeed, very surprising to find this genus represented in the Polar Sea by a well-marked and very beautiful species; and I had intended to dedicate it to our celebrated explorer, Prof. Nansen. The same species, however, has been quite recently recorded by M. E. Chevreux from the Expedition of the Prince of Monaco, and, as nothing has as yet been published about the Crustacea of the Nansen Expedition, the name proposed by M. Chevreux for this species ought of course to be retained. The species will be described in detail below.

5. *Cyclocaris Guilelmi*, Chevreux.
(Pl. II & III).

Cyclocaris Guilelmi, E. Chevreux, Bulletin de la société zoologique de France, T. XXIV, 1899, p. 148.

Remarks. The present species is nearly related to the Pacific form described by the Rev. Mr. Stebbing as *C. tahitensis*, though evidently specifically distinct, being not only of considerably larger size, but also differing in some of the structural details, as will be seen by comparing the figures here given with those reproduced in Mr. Stebbing's work. On the other hand, no doubt can arise as to the identity of the Polar form with that recorded by M. Chevreux under the above name.

Description of the Female.

The length of the largest specimens in the collection is about 18 mm. Those examined by M. Chevreux were somewhat smaller, measuring from 11 to 12 mm.

The general form of the body (see Pl. II, fig. 1) is moderately slender and somewhat compressed, with the mesosome slightly exceeding in length the metasome and urosome combined. The back is quite smooth throughout, and generally slightly curved.

The cephalon (see also fig. 2) is rather thick and massive, and, from a lateral point of view, quadrangular in form, being transversely truncated

in front. Its lateral faces are perfectly smooth, and almost wholly occupied by the unusually large, but very imperfectly developed eyes, which extend above, so as to meet along the dorsal line. The upper angle of the head forms a very small rostral projection, curved down between the bases of the superior antennæ; the lower corners are somewhat more prominent, and between them and the rostral projection, the anterior edges of the head appear very slightly curved. The inferior boundary of the lateral faces is not, as usual, emarginated or incised, but forms on each side an uninterrupted, gently curving line.

Of the segments of the mesosome, the 1st is considerably longer than the 2nd, which is comparatively very short, both together about equal in length to the cephalon. The succeeding segments gradually increase somewhat both in length and depth, the last, however, being scarcely larger than the penultimate one. The 2 anterior pairs of coxal plates are very small, and partly concealed by the 3rd pair, which are much deeper than the corresponding segment, gradually expanded distally, and extended obliquely in front, so as to reach the hind edge of the cephalon (see fig. 1). The 4th pair of coxal plates are still larger, and, as usual, emarginated behind, projecting below the emargination in an obtuse lobe. The 3 posterior pairs of coxal plates are not nearly so deep as the 2 preceding pairs, and are transversally oval in form, slightly decreasing in size posteriorly.

The epimeral plates of the metasome (see figs. 1 & 3) are of moderate size, the anterior pair being obtusely rounded, whereas the 2 posterior pairs are acutely produced behind, with the inferior edge fringed with delicate bristles.

The 3 segments of the urosome are well defined, and combined are about half as long as the metasome. The 1st segment exhibits a slight dorsal depression, and the 2nd is very short. In none of the segments could any spines or bristles be detected.

The eyes (see figs. 1 & 2), as above stated, are of quite enormous size, not only occupying the greater part of the lateral faces of the cephalon, but also extending dorsally, so as to meet in the middle. Their structure, however, is very imperfect, there being no trace of any refracting elements, but only simple, rod-like fibres, imbedded in a dark red pigment. In specimens that have been a long time in strong alcohol, the ocular pigment very soon disappears, as is also often the case in other *Lysianassidæ*. In such

specimens, the eyes appear to be altogether wanting, as indicated by M. Chevreux; but in some of the specimens from the Nansen Expedition, that have been preserved in a weaker solution of alcohol, the ocular pigment was still easily observable, though it had somewhat changed its original colour; and in these specimens the actual presence of eyes, and their enormous size could be proved with full certainty.

The superior antennæ (fig. 4) are comparatively short, about as long as the cephalon and the 2 anterior segments of the mesosome combined, and they exhibit the structure generally met with in the *Lysianassidæ*. The peduncle is short and thick, with the 2 outer joints very small. The flagellum is about twice the length of the peduncle, and is composed of 12 articulations, the 1st of which is rather large, sublaminar, and densely clothed inside with delicate sensory filaments. At the tip, this articulation, like the 3 succeeding ones, carries a rigid bristle. The accessory appendage is fully half the length of the flagellum, and is composed of 6 articulations, the 1st of which is much the largest.

The inferior antennæ (fig. 5), which issue at some distance below the superior, are about twice as long as the latter, and have the first 2 joints of the peduncle quite concealed by the antero-lateral corners of the cephalon (see fig. 2). The 2 outer joints of the peduncle are of about equal length, and are both clothed anteriorly with short bristles. The flagellum is rather slender, being fully twice as long as the peduncle, and composed of about 30 short articulations.

The buccal mass (see figs. 1 & 2) is greatly protuberant, and wholly uncovered laterally, protruding in front somewhat beyond the anterior edge of the cephalon. The peculiar structure of the mandibles and maxillipeds is easily observable, even without dissection.

The anterior lip (fig. 6) is comparatively small, exhibiting a median convex part, and 2 rounded lateral expansions.

The posterior lip (fig. 7) is much larger, with the lateral lobes widely apart, and each projecting behind in a narrow process pointing straight posteriorly.

The mandibles (fig. 8) are pronouncedly laminar, and without any trace of a molar process[1]. The cutting edge is quite simple, straight, and sharp,

[1] Such a process is certainly described by M. Chevreux; but I believe that in this case he has fallen into an error, by mistaking the chitinous tendon of the rotatory muscle of the mandible for a process of this kind.

with only a very small dentiform projection at each corner. Inside the masticatory part, there is a row of thick ciliated spines extending from the lower corner of the cutting edge to about the end of the inner third part of the mandible, and at some distance from its posterior edge (see fig. 9). Anteriorly, at some distance from the cutting edge, each mandible forms an angular projection, outside which the palp is articulated. The latter is rather slender, but scarcely longer than the body of the mandible, and has the terminal joint narrow lanceolate, and shorter than the medial one, both being fringed inside with a row of delicate bristles.

The anterior maxillæ (fig. 10) exhibit quite a normal appearance. The terminal joint of the palp is divided at the tip into several strong teeth, which, as usual, slightly differ in the 2 maxillæ. The masticatory lobe is rather prominent, and is armed at the tip, and along the inner edge, with several strong spines. The basal lobe is of moderate size, and slightly curved, and carries inside 9 plumose setæ.

The posterior maxillæ (fig. 11) have both lobes rather narrow, the outer one being by far the larger. Both lobes are densely clothed along their inner edge with partly ciliated setæ.

The maxillipeds (fig. 12) are prominently characterised by the enormous development of the masticatory lobes, which form very large, broadly oval plates reaching beyond the penultimate joint of the palps, and easily observable on viewing the animal from the side (see figs. 1 & 2). They have the inner edge straight and minutely serrate, the tip obtusely truncate, and the outer edge slightly curved, with a row of delicate bristles. The basal lobes are obliquely truncated at the end, and each provided inside with a row of strong setæ. The palps are comparatively slender, and gradually taper distally, the last joint being rather narrow, oblong, and, like the other joints, clothed with scattered bristles.

The anterior gnathopoda (Pl. III, fig. 1) are very slender and but scantily setiferous. Of the joints, the ischial one is unusually prolonged, being of about the same length as the carpal one. The propodal joint is somewhat shorter than these joints, and gradually tapers distally, without exhibiting any distinctly defined palmar edge. The dactylus is comparatively small, and somewhat compressed (see fig. 1 a).

The posterior gnathopoda (fig. 2) exhibit the structure characteristic of the *Lysianassidæ*, being extremely slender and flexible, and very frequently bent in such a manner as not to be visible externally. The 2 outer joints are densely clothed with fine hairs, and carry, moreover, fascicles of slender bristles. The propodal joint is oblong oval in form, and exceeds half the length of the carpal one. It is narrowly truncated at the tip, and carries on the upper corner the very small curved dactylus (see fig. 3 a).

The 2 anterior pairs of pereiopoda (figs. 3, 4) are of moderate length, and quite normal in structure.

The 3 posterior pairs (figs. 5, 6, 7), on the other hand, are more elongated than in most other *Lysianassidæ*, and slightly increase in length posteriorly The basal joint is rather large and laminar, being obliquely rounded in the anterior pair (fig. 5), and in the 2 other pairs (figs. 6 & 7) more pyriform in outline. In all 3 pairs, the posterior edge is for some distance minutely serrate, and the infero-posteal corner drawn out to an obtusely rounded lobe. The outer part of the legs is fringed on both edges with fascicles of short spines, and has the propodal joint rather elongate and sublinear in form. The dactylus is of moderate length, and but slightly curved.

The branchial lamellæ are present at the base of all the legs, except the 1st pair (the anterior gnathopoda), and are of moderate size, with a small secondary lobe inside (see figs. 2—7). The incubatory plates (not fully developed in the specimen examined) are very narrow.

The pleopoda are of quite normal structure.

The uropoda, however, somewhat differ from those in other *Lysianassidæ*. The two anterior pairs (figs. 8, 9) have both rami lanceolate in form, terminating in a simple, naked point, and carying on the edges short scattered spinules, the outer ramus in both pairs being shorter, and also narrower, than the inner. The last pair (fig. 10), as usual, have the basal part shorter and thicker than in the 2 preceding pairs, whereas the rami are comparatively larger, so as to project beyond those of the above-mentioned pairs. The inner ramus is uniarticulate and lanceolate in form, with the inner edge densely setiferous; the outer ramus, on the other hand, is distinctly biarticulate, the distal joint being spiniform, and projecting a little beyond the inner ramus.

The telson (fig. 11) is remarkable from its large size, as it exceeds half the length of the urosome. It is narrow lanceolate in form, and cleft nearly to

the base by a very narrow fissure. Each of the lateral halves terminates in a very acute point, and exhibits a row of about 7 small sub-marginal denticles.

The colour in the living state of the animal, according to notes of Dr. Nansen, is bright red, with somewhat darker eyes.

Occurrence. Several specimens of this interesting Amphipod were taken on the 23rd and 24th April, 1894, at about the 80th degree of latitude, clinging to the sounding-line, the latter having been lowered to a depth of between 500 and 1000 metres. As in every instance the specimens were found on the lower part of the line, at only a short distance from the water-bottle, it must be assumed that they in reality occurred in the deepest strata, near the bottom.

A single specimen was also found in a sample taken a little farther south, on the 23rd March same year, the tow-net having been lowered to 300 meters. Finally, the same form occurred in a sample taken on the 4th February, 1896, in a place lying much farther west, and north of the 85th degree of latitude, the tow-net having in this instance been lowered to only 100—130 metres. By far the greater number of the specimens caught here were, however, of rather small size, only 2 of them being apparently fully grown. From its occurrence in this place, it must be inferred that this Amphipod is not strictly a bottom-form, but, like the species of the genus *Pseudalibrotus*, sub-pelagic in habits, though at times descending to very great depths.

Distribution. Off the Lofoten Islands, taken by the aid of the bow-net ('nasse'), in a depth of 1095 metres (Expédition du Prince de Monaco).

Gen. *Pseudalibrotus*, Della Valle.

Syn: *Alibrotus*, G. O. Sars (not M.-Edw.).

Remarks. This genus was proposed by Signor Della Valle in his great works on the Gammarids of the Gulf of Naples, to include the well-known arctic species *Anonyx littoralis* of Kröyer, which I had erroneously referred to the genus *Alibrotus* of Milne-Edwards. In addition to the above-named arctic form, 2 new species of this genus have been recently described by the present author from the Caspian Sea, both belonging to the collection of Dr. O. Grimm. I have now to report 2 additional species, found in the material collected during Nansen's North Polar Expedition, both of

which are quite distinct from the previously known arctic form, *P. littoralis*, but, on the other hand, are so closely related to the 2 Caspian species, that I am much inclined to regard them as the primitive forms from which the latter are descended.

6. *Pseudalibrotus Nanseni*, n. sp.
(Pl. IV, V).

Specific Characters. Body comparatively robust, with broadly rounded back. Cephalon with the lateral lobes rather prominent and angular at the tip; postantennal angle well marked. Eyes of moderate size, oval, somewhat contracted above. 1st pair of coxal plates but slightly expanded, and obtusely truncated at the tip. The 2 posterior pairs of epimeral plates of metasome acutely produced behind. 1st segment of urosome with a distinct saddle-like depression dorsally. Antennæ rather slender and elongated, especially in the male, flagellum of both pairs in the latter provided with well developed calceolæ, accessory appendage of the superior ones 4—5 articulate. Anterior gnathopoda somewhat smaller than in the type species; posterior ones with the propodal joint transversally truncated at the tip, carrying the small dactylus about in the middle of the terminal edge. The 3 posterior pairs of pereiopoda much less slender than in the type species, with the basal joint very large and lamellar, oblong oval in form, and coarsely serrate behind; last pair considerably shorter than the preceding pair, with the outer part scarcely more than half the length of the basal joint. Last pair of uropoda comparatively short, scarcely reaching beyond the others, structure about as in *P. littoralis*. Telson rather large, reaching to the end of the basal part of the last pair of uropoda, rounded quadrangular in form, tip slightly insinuated. Length of adult male about 20 mm.

Remarks. This species is easily distinguishable from *P. littoralis* by its more robust form, and more especially by the structure of the posterior pairs of pereiopoda, the outer part of which is remarkably short in proportion to the basal joint. It more resembles the Caspian species, *P. platyceras* (Grimm), to which, indeed, I believe it stands in direct genealogical relation, although, on a closer comparison, several differences may be found between them, which make it necessary to keep the two species apart. I propose to name

this form in honour of Dr. Nansen, who also took special notice of it during the Expedition.

Description.

The largest specimens in the collection have a length of about 20 mm., and this is accordingly a rather large-sized form, considerably exceeding in size the type species, and about equalling in this respect the Caspian species, *P. platyceras* (Grimm).

The form of the body (see Pl. IV, fig. 1), as compared with that of *P. littoralis*, is rather more robust and less compressed, the back being broadly rounded and perfectly smooth throughout. In the adult male, the posterior division of the body, comprising the metasome and urosome, is fully as long as the anterior; but this is scarcely the case in the female, in which the metasome is less powerfully developed.

The cephalon is comparatively short, not nearly as long as the first 2 segments of the mesosome combined, and has the lateral lobes rather prominent and distinctly angular at the tip (see also fig. 2). The lower edges are deeply emarginated, to encompass the globular basal joint of the inferior antennæ, and behind the latter they project in an acute angle, the postantennal corner.

The segments of the mesosome gradually increase in size posteriorly, none of them being, however, as large as the segments of the metasome. The 4 anterior pairs of coxal plates are considerably deeper than the corresponding segments, and not very different in size. The 1st pair, however, are a little broader than the 2 succeeding ones, and slightly expanded distally, with the tip transversely truncated (see also fig. 14). The 4th pairs, as in the other species of this genus, are narrower than in most other *Lysianassidæ*, and but very slightly emarginated behind. The 3 posterior pairs of coxal plates are rather large, though somewhat less deep than the anterior, and are rounded quadrangular in form, gradually diminishing somewhat in size posteriorly.

The epimeral plates of the metasome are well developed, the 1st pair being rounded, whereas the 2 posterior pairs are each drawn out behind to an acute point.

The urosome is scarcely half as long as the metasome, and exhibits dorsally, at the base of the 1st segment, a well-marked saddle-like depression.

The eyes (see figs. 1 & 2) are clearly distinguishable, though their pigment, which originally has undoubtedly been of a light red colour, has become absorbed in the specimens by the action of the alcohol. They are of moderate size, and irregularly oval in form, being somewhat contracted in their upper part. The visual elements seem to be normally developed.

The antennæ, as in the other species of this genus, have the flagella more produced than is usually the case in the present family. They are rather more slender in the male than in the female (*conf.* figs. 1 and 2); but the relative length of both pairs is approximately the same in the two sexes, the inferior one being a little longer than the superior. In the male, the latter (see figs. 1, 3) are about the length of the whole mesosome, and have the peduncle very thick and massive, with the 2 outer joints, as usual, very short. The flagellum is composed of numerous articulations, amounting to about 50 in all, the 1st being very large and tumid, and clothed inside with numerous sensory hairs, arranged in 2 sets. The succeeding articulations each carry at the hind edge a well developed calceola of exactly the same structure as those on the inferior antennæ (figs. 6, 7). The accessory appendage exceeds half the length of the peduncle, and is composed of 5 articulations, the 1st being much the largest.

The inferior antennæ (fig. 4) have the basal joint globular and wholly exposed (*conf.* fig. 2). Of the 4 remainings joints of the peduncle, the penultimate is the largest, and is clothed on both edges with short bristles. The flagellum in the male is extremely slender and fully 3 times as long as the peduncle, being composed of about 60 articulations, which are provided anteriorly with well developed calceolæ, arranged alternately (see fig. 5). When viewed under a high magnifying power, each calceola (see figs. 6, 7) is found to consist of a short peduncle carrying at the end an oboval, slightly concave sucking disc, which extends somewhat obliquely and terminates in a very thin and hyaline, spatulate rim.

In the female, as above stated, both pairs of antennæ (see fig. 2) are somewhat shorter, and no trace of calceolæ is found on the flagella, which, moreover, are composed of a smaller number of articulations.

The buccal mass is more or less completely concealed laterally by the anterior coxal plates, so that only the mandibular palps and the maxillipeds are partly exposed (see fig. 1).

The anterior lip is simple, rounded, and the epistome not projecting.

The posterior lip (fig. 8) has the lateral lobes narrowed in front, and slightly bilobular at the tip, each being produced behind to a conical process.

The mandibles (figs. 9, 10) are very strong, with the masticatory part somewhat incurved and divided into a narrowly truncated cutting part, and a short, but distinctly prominent molar expansion, exhibiting at the tip a finely fluted triturating surface. The palp (see fig. 9) is greatly developed, considerably exceeding the body of the mandible in length, and has the last joint falciformly curved.

The anterior maxillæ (fig. 11) exhibit the usual structure. The masticatory lobe is rather prominent, and carries at the tip several strong spines, the inner edge being covered with fine hairs, and moreover armed with from 3 to 4 somewhat smaller spines. The basal lobe is comparatively small, with only 2 plumose setæ at the tip. The last joint of the palp is but slightly dilated and is, as usual, denticulated at the tip.

The posterior maxillæ (fig. 12) have the inner lobe rather small, scarcely more than half as large as the outer, both exhibiting the usual dense clothing of setæ.

The maxillipeds (fig. 13) on the whole agree in structure with those in the other species of the genus. The masticatory lobes are not very large, scarcely reaching beyond the middle of the penultimate joint of the palp, and are oval in form, with the inner edge minutely serrate. The basal lobes are narrowly truncated at the tip, and carry the usual setæ. The palps are rather large, with the joints somewhat expanded and densely setiferous.

The anterior gnathopoda (fig. 14) are somewhat less strong than in the type species, with the outer part scarcely longer than the basal joint. The propodos is about the length of the 2 preceding joints combined, and is obliquely truncated at the tip, exhibiting a well defined palm, which is armed at the inferior corner with several strong denticles.

The posterior gnathopoda (Pl. V, fig. 1) differ from those in the type species chiefly in the propodos being somewhat broader and more transversely truncated at the tip, with the lower corner scarcely at all produced.

The 2 anterior pairs of pereiopoda (figs. 2, 3) are quite normal in structure.

The 3 posterior pairs (figs. 4, 5, 6) are, however, distinguished by the large size of the basal joint, as compared with the terminal part. The last pair (fig. 6) especially, look rather different from those in the other known species, being considerably shorter than the preceding pair, with the terminal part not exceeding even half the length of the basal joint. The latter is very large, laminar, and oblong quadrangular in form, with the infero-posteal corner produced to an obtusely rounded lobe. The posterior edge of this joint in all 3 pairs is coarsely serrate throughout.

The branchial lamellæ (see figs. 1—5) are rather large, but quite simple in structure, without any lateral lobes. They are wanting on the last pair of legs (fig. 6).

The 2 anterior pairs of uropoda (figs. 9, 10) have the rami quite simple, and mucronate, whereas in the type species, as shown by the present author, the inner ramus of the 2nd pair is peculiarly transformed.

The last pair of uropoda (see figs. 8, 11) are comparatively short, scarcely reaching beyond the others. In structure they resemble those in the type species, both rami, but especially the outer one, being fringed with ciliated setæ in addition to the spinules.

The telson (see figs. 8, 12) is rather large, laminar, and reaches to about the end of the basal part of the last pair of uropoda. It is rounded quadrangular in form, and slightly narrowed distally, with the terminal edge distinctly insinuated in the middle, and armed on each side with a minute denticle.

Occurrence. Some adult specimens of this form, chiefly of the male sex, were collected during the months March and April, 1894, in about 80° latitude, north of the New Siberian Islands. The specimens seem not to have been taken by the aid of the tow-net, but on bait hung down from the ship. Moreover, some young specimens of this species occurred in a sample taken on the 4th February, 1896, and much farther west, near the 85th degree of latitude.

7. *Pseudalibrotus glacialis*, n. sp.
(Pl. VI).

Specific Characters. Body somewhat less robust than in the preceding species, and more compressed, with the back evenly rounded. Cephalon with the lateral lobes distinctly angular at the tip; eyes oval, with the visual elements sometimes distinct, at others imperfectly developed. Anterior pairs of coxal plates deeper than the corresponding segments; 1st pair rather broad and expanded, with the antero-lateral corner rounded off; 5th pair more than twice as large as the last. The 2 posterior pairs of epimeral plates of metasome acut-angular behind. Urosome slightly depressed at the base dorsally. Antennæ comparatively shorter than in the preceding species, scarcely exceeding half the length of the mesosome, flagella of both pairs composed of a smaller number of articulations, accessory appendage of the superior ones 3-articulate. Anterior gnathopoda about as in the preceding species; posterior ones, however, differing in the propodos being obliquely truncated at the tip, with the lower corner produced, so as to form, with the extremely small dactylus, a minute chela. The 3 posterior pairs of pereiopoda somewhat less robust than in the preceding species, with the terminal part more produced; last pair scarcely shorter than the preceding pair, with the basal joint rather broad in proportion to its length, and but little longer than the terminal part. Last pair of uropoda comparatively short, not projecting beyond the others, inner ramus considerably shorter than the outer, with only a single denticle inside, both rami without any marginal setæ. Telson rounded quadrangular in form, and but very slightly narrowed distally, terminal edge scarcely at all insinuated. Length about 9 mm.

Remarks. This species is nearly related to the preceding one, but is of much smaller size, and moreover easily distinguished by the different form of the anterior pair of coxal plates, the much shorter antennæ, and the less shortened terminal part of the last pair of pereiopoda. The posterior gnathopoda, too, terminate in a somewhat different manner, and the structure of the last pair of uropoda and of the telson is also somewhat different. In all these characters, it approaches still nearer to the Caspian species, *P. caspius* (Grimm), and in my opinion, it ought, indeed, to be regarded as the primitive form, from which this species has descended. Yet on a closer comparison,

there are to be found some minor differences between these two forms, so that it will be advisable to keep them apart.

In the material collected during the Nansen Expedition, there are two distinct varieties, the one with the eyes normally developed and probably, in the fresh state, provided with light red pigment, the other with the visual elements imperfectly developed, and the pigment of a whitish colour. A specimen of the latter variety, which may be named *var. leucopis*, is represented on Pl. VI fig. 10. Both these forms agree in other respects completely, and were also found together in the same samples.

Any more detailed description of this species, I do not consider it necessary to give here.

Occurrence. Numerous specimens of this form occurred in two samples taken on the 4th and 13th February, 1896, near the 85th degree of latitude, the tow-net having been lowered from 50 to 130 metres. Moreover, two specimens were found in another sample taken on the 21st February, 1894, much farther east.

Fam. PARAMPHITHOIDÆ.

8. *Paramphithoë brevicornis*, G. O. Sars,

The anterior half of a specimen of this form was found in a sample taken on the 4th February, 1896, near the 85th degree of latitude.

Distribution. Coast of Finmark, Spitsbergen.

Fam. AMPELISCIDÆ.

9. *Hoploöps tubicola*, Lilljeborg.

Two specimens of this well-known form were found in a bottle containing different bottom-animals taken by the aid of the trawl on the 30th October, 1893, at some distance north of the New Siberian Islands, the depth being 90 metres.

Distribution. Coast of Norway, British Isles, coast of France, Kattegat, the Baltic, Greenland, Labrador, Iceland, Spitsbergen, the Barents Sea, the Kara Sea.

10. *Haploöps setosa*, Boeck.

A single specimen of this species was taken in the same haul as the preceding one.

Distribution. Coast of Norway, Greenland, the Kara Sea, Iceland, the Barents Sea, Beeren Eiland, Spitsbergen.

Fam. **STENOTHOIDÆ.**

11. *Metopa longicornis*, Boeck.

This species occurred in 4 samples, 2 of which were taken on the 13th and 24th October, 1893, at the beginning of the drifting of the 'Fram', the other 2 on the 4th and 13th February, 1896, much farther west, and near the 85th degree of latitude. The specimens were accordingly taken by the aid of the tow-net, which was lowered to a depth of from 20 to 100 metres.

Distribution. Coast of Norway, Greenland.

Fam. **EUSIRIDÆ.**

12. *Eusirus cuspidatus*, Krøyer.

A single young specimen of this arctic form was found in a sample taken on the 19th April, 1894, north of the New Siberian Islands, the tow-net having been lowered to a depth of 40 metres.

Distribution. Coast of Finmark, Greenland, Spitsbergen.

13. *Eusirus Holmi*, Hansen.

Of this species, recently described by Dr. Hansen from the Kara Sea, there are 3 specimens in the collection, 2 of them being found in a sample taken 26th March to 4th April, 1895, the 3rd in another sample taken on the 4th February, 1896, the tow-net having been lowered to a depth of from 100 to 130 metres.

Distribution. The Kara Sea, Stat. 18 and 124 of the Norw. North Atl. Exped. (recorded as *E. cuspidatus*).

Fam. **CALLIOPIIDÆ.**

14. *Amphithopsis glacialis*, Hansen.

This form, first described by Dr. Hansen from Greenland specimens, occurred in no less than 9 different samples, taken along nearly the whole

route of the 'Fram'. The specimens are all more or less mutilated, owing to the great fragility of the appendages, and this was also the case with the Greenland specimens examined by Dr. Hansen. It appears somewhat doubtful, whether this form should in reality be referred to the genus *Amphithopsis* of Boeck.

Distribution. Greenland, the Kara Sea.

Fam. **GAMMARIDÆ.**

15. *Gammarus locusta*, Lin.

var. *mutata*, Lilljeb.

Numerous specimens of this form, some of a very large size, were collected in several places along the eastern part of the route of the 'Fram'. It also occurred in 2 samples taken in the western part of the route, on the 4th and 13th February, 1896.

Distribution. Coast of Finmark, Greenland, Iceland, Spitsbergen, Franz Joseph Land, the Kara Sea, Labrador.

16. *Amathilla pingvis* (Krøyer).

A solitary specimen of this form was found in a sample taken on the 21st March, 1894, the tow-net having been lowered to a depth of 300 metres.

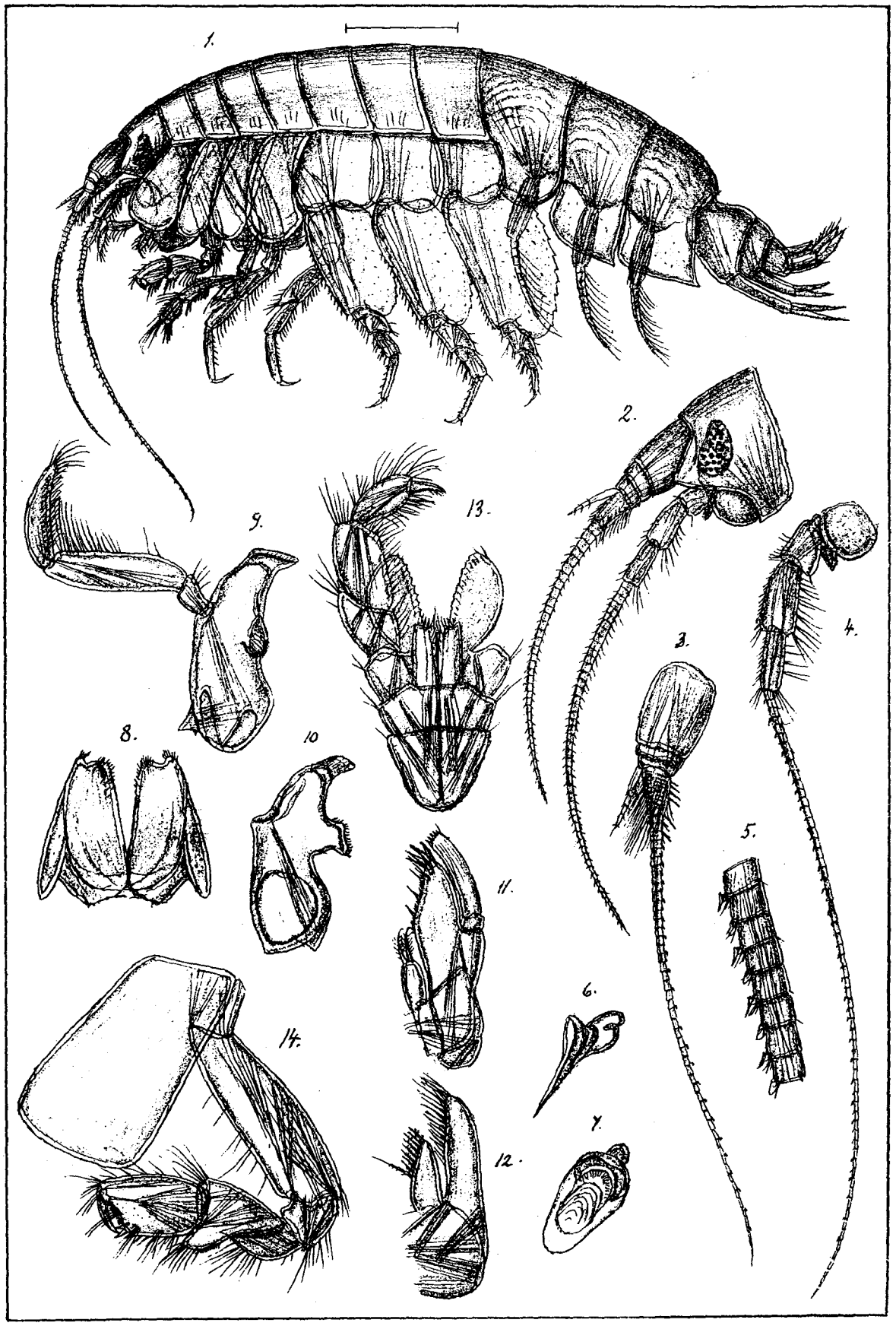
Distribution. Greenland, Spitsbergen, the Kara Sea.

ISOPODA.

Tribe: **EPICARIDA.**

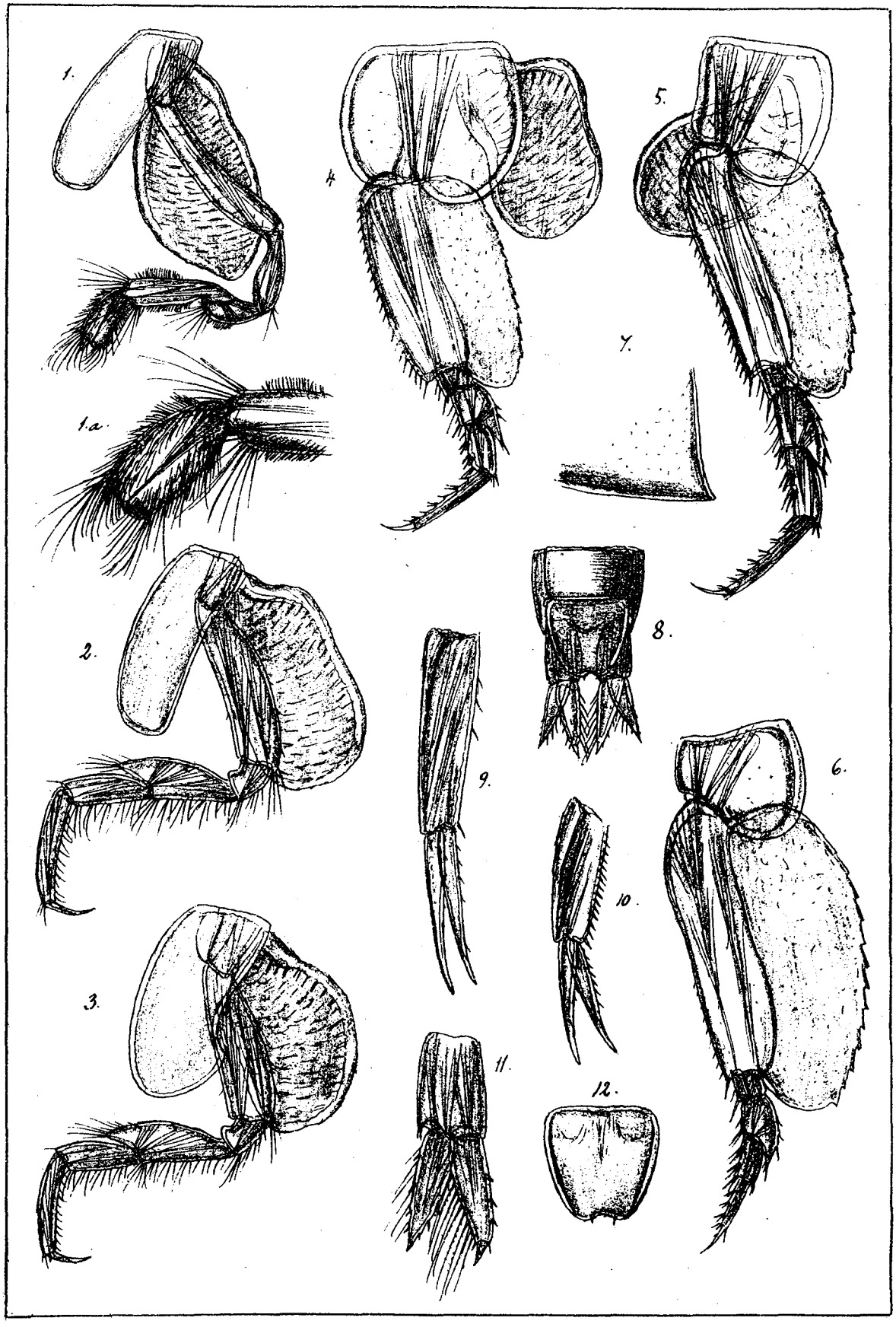
Several larvæ of *Epicarida*, chiefly in the last (Cryptoniscian) stage, were found in the samples taken north of the New Siberian Islands. Among them could be determined: 1) larvæ of *Dajus mysidis*, Kröyer, both in first and last stages, 2) the Cryptoniscian larva first described by the Rev. M. Stebbing from the marsupial pouch of an *Onesimus plautus* taken in the Barents Sea, and subsequently found under similar circumstances by the present author off the Norwegian coast, 3) another larva (in the Cryptoniscian stage) closely related to the larva of *Asconiscus simplex*, G. O. Sars.

PSEUDOLIBROTUS
(=ONISIMUS) NANSENI



G.O. Sars autogr. trykt i den priv. Opmaaling Chra.

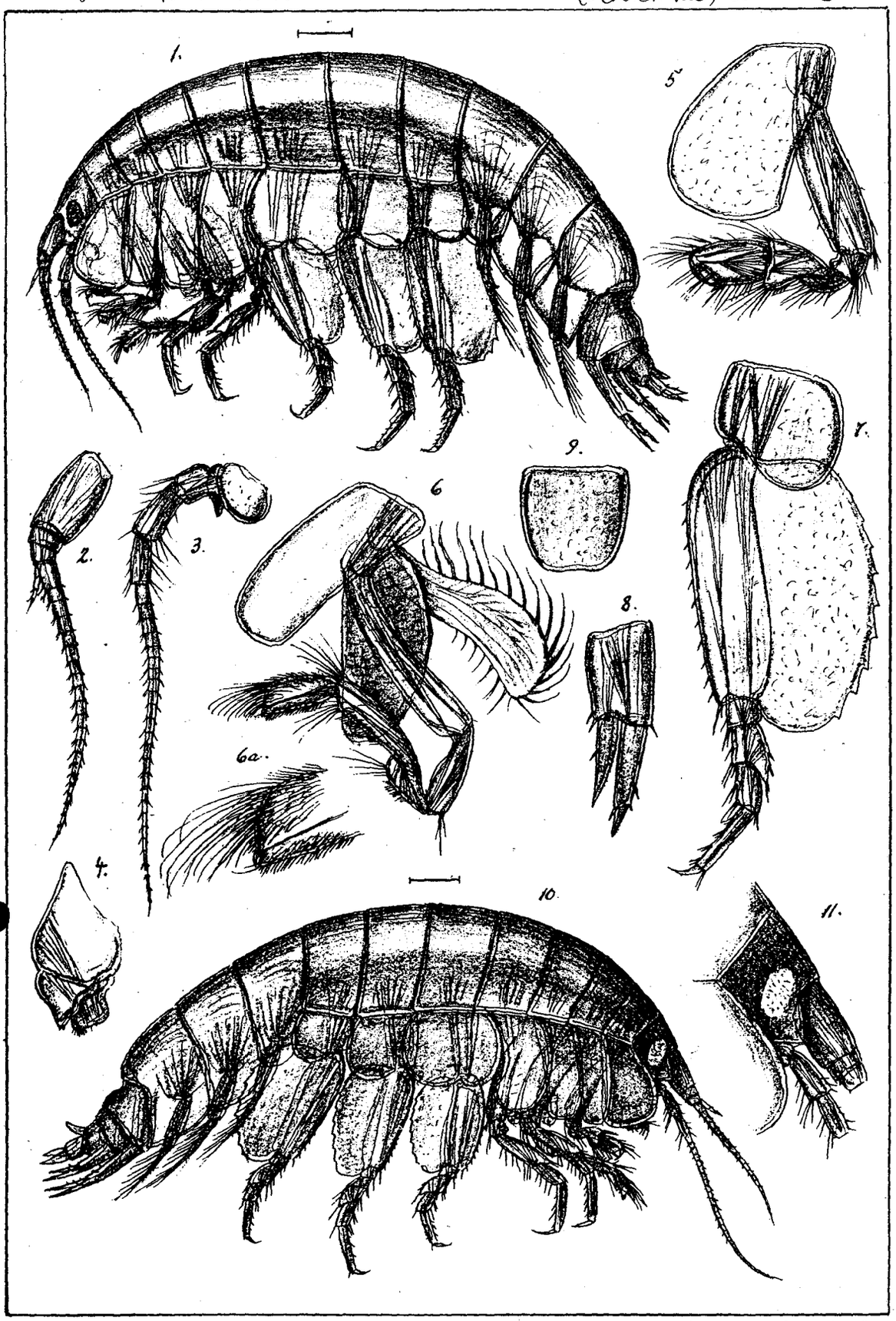
O. NANSENI



G.O.Sars autogr.

trykt i den priv.Opmaaling Chr.

PSEUDOLIBROTUS
(=ONISIMUS) GLACIALIS



G.O. Sars autogr. trykt i den priv. Opmaaling Chr.

1. Sars 1900

INTRODUCTION.

Of the zoological collections brought home from the Norwegian North Polar Expedition, those relating to the marine invertebrate animals have been placed in my hands for examination and description, and I now propose to report on the results of my investigations as far as the *Crustacea* are concerned. Indeed, by far the greater number of the animals collected belongs to this extensive class, and there is comparatively little to report of other animals. As, however, all knowledge of the fauna in this far remote, and hitherto unexplored part of the North Polar Sea may be of considerable interest, it is my intention in a subsequent paper also to give a short account of the other marine invertebrates found during the Expedition.

The collection in question consists of several tubes and bottles from different localities, each, as a rule, labelled with date, depth and mode of preservation. I have carefully gone through the contents of all the samples, in order to gain both a general view of the character of the fauna, and more special information about the several species. Only one of the bottles contained true bottom-animals taken up by the aid of the trawl; all the other samples have been procured by the aid of the tow-net, and of course contain exclusively pelagic animals, chiefly *Crustacea*. Of these again *Copepoda*, chiefly belonging to the *Calanoid* group, are predominant, having been taken in nearly every haul and in considerable numbers along the whole route of the "Fram". This peculiar character of the collections is due to the unexpected physical conditions found in the Polar Sea traversed. As is well known, it has until recently been the general assumption of geographers, that the Polar basin, north of Siberia and Franz Josef Land,

SARS, G.O. (1900) CRUSTACEA. IN: THE NORWEGIAN NORTH POLE EXPEDITION 1893-1896, Scientific Research (Ed. F. NANSEN), 1, 1-137 (Auszug)