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ОГЛАВЛЕНІЕ. — SOMMAIRE.

The Cladocera, Copepoda and Ostracoda of the Jana Expedition.

By

G. O. Sars.

Professor of Zoology at the University of Christiania.

[Plates VI—XI.]

(Présenté le 2 décembre 1898).

INTRODUCTION.

In a previous paper inserted in this Journal, I have treated of the *Phyllopoda* collected during the Russian Expedition to the Jana territory and the New Siberian Islands, and I now propose to publish the results of my examination of the other *Entomostraca* secured during that Expedition. The material which has lain before me, is very vast, comprising, as it does, a great number of tubes and bottles from different localities; and it has indeed been a work involving much expenditure of time and trouble to go through the contents of all these samples, and to separate the species to be more closely examined. Although by far the greater number of the species have turned out to be identical with well-known European forms, a complete enumeration of all the species will, I believe, be of considerable interest on account of the remote situation of the territory explored. Indeed, in these desolated northern regions, it can only be for a very short time that the rays of the sun suffice for removing the large masses of snow and ice cover-

ing the surface of the earth, and in no instance probably, at some depth, does the ice become wholly melted. Notwithstanding these apparently very unfavourable biological conditions, an abundant animal life has been found to develope during the midsummer in all the small ponds and ditches formed by the melting of the snow, disappearing again gradually in the course of the succeding months by the setting in of the cold season. By far the greater number of these animals are small crustaceans belonging to the great division *Entomostraca.* These rapidly grow to maturity, and soon begin to deposit their ova, which, in most cases, do not develope immediately, but are destined to repose until the next summer, then giving origin to a new generation. It is especially a species of *Daphnia* (*D. pulex* de Geer), and several species of *Cyclops,* which literally swarm in such situations, and these forms were found in great abundance, even in the most northern latitudes which the Expedition has reached. Also a species of *Heterocope* (*H. borealis* Fischer) and a species of *Diaptomus* (*D. bacillifer* Koebel) seem to be widely distributed throughout the territory explored. Among the *Copepoda* here recorded, a number of forms are evidently of marine origin, though they have been found in situations where the water must be assumed to have been fresh, or nearly so. This could, indeed, be directly demonstrated for some of them, by their occurrence also in the sea surrounding the New Siberian Islands.

The plates accompanying the present paper have been prepared by the autographic method, as was the case with those belonging to my former paper relating to this Expedition. Owing to some want of care on the part of the lithographer in the transfer of my drawings, the finer shadows in the figures have been to some extent lost in the stone. This was especially the case with the 1st plate illustrating the *Cladocera,* and I therefore found it necessary to reject this plate altogether, and to draw it over again more coarsely, in order to secure the reproduction of all the details. This is the reason why this plate now exhibits a somewhat different aspect from the others; but I hope that the latter are also sufficiently distinct to allow of an easy recognition the species, the more so, as in every instance I have given both habitus and detail figures. Indeed, in my opinion the representation of a new species cannot be said to be satisfactory

unless all such figures are given; but unfortunately this rule is not always followed, and it is a rather common custom of certain authors to illustrate their new species only by some detailfigures, whereby the identification is often rather difficult.

Order: **Branchiopoda.**

Suborder: **Cladocera.**

Fam. *DAPHNIDÆ.*

1. **Daphnia pulex** (de Geer).

(Pl. VI, figs. 1—6).

Syn.: *Daphnia middendorffiana*, Fischer: in Middendorff's Sibirische Reise, Zool. p. 157, Pl. VII, figs. 38, 39.

In the above-quoted work Seb. Fischer has briefly described a supposed new species of *Daphnia*, which he dedicates to the gentleman by whom the voyage was conducted. The figure he gives seems, indeed, to present some strange anomalies, the shape of the shell in particular being rather different from that usually met with in this genus, approximating, as it does, somewhat to that characteristic of the genus *Cariodaphnia*, for which reason the species has also generally been admitted by other authors. It is, however, worthy of notice, that the specimen figured by Fischer is evidently a gamogenetic female with strongly developed ephippium, and it is well known that in such specimens the form of the shell often becomes greatly altered. On going through the vast material of *Daphnia pulex* collected during the Jana Expedition, I have found some specimens very nearly agreeing in shape with that figured by Fischer (see fig. 2 on the accompanying plate), for which reason I feel justified in withdrawing Fischer's species as only founded on gamogenetic females of the ordinary *Daphnia pulex*. In order to show this more clearly, I have, besides the above-named specimen, also figured a parthenogenetic female (fig. 1) and a male specimen (fig. 4), which both exhibit all the leading

features of the typical *D. pulex*. The detail figures (figs. 3, 5, 6) here given will serve still better for proving the identity of the 2 forms.

Occurrence. — This form was taken in great numbers during the month of August, 1886, from small ponds and ditches on the New Siberian Islands. The exact localities are as follows:

1. Ponds at the river Sachar Urjach (Great Ljachof Island), 22. VII (3. VIII) 86 (chiefly parthenogenetic specimens).
2. Island Kotelnyi, 31. VII (12. VIII) 86 (both parthenogenetic and gamogenetic specimens).
3. Maloje Simowje (Great Ljachof Island), 22. VIII (3. IX) 86 (chiefly gamogenetic specimens).

The specimens examined by Seb. Fischer were taken by v. Middendorff at the river Boganida.

2. **Daphnia pulex**, de Geer.

var. **tenebrosa** n. G. O. Sars.

(Pl. VI, figs. 7—10).

By the above name, I propose to designate a *Daphnia*, which I at first believed to be rather a variety of *D. longispina*, exhibiting, as it does, in its external appearance a close resemblance to some of the varieties of that polymorphous species. On a closer examination, however, the structure of the tail and especially the armature of the caudal claws (see figs. 8, 10) was found to be essentially the same as in *D. pulex*, and I am therefore now induced to regard it as more properly a variety of the latter species. By far the greater number of the specimens are gamogenetic females with well-developed ephippia, and in all these specimens, not only the ephippium, but also the whole adjacent dorsal face of the cephalic shield, exhibits a very dark brownish hue: hence the name of the variety here proposed. There are two forms, one with comparatively short shell-spine (fig. 7), the other (fig. 9) with that spine unusually long and slender, in this respect very much resembling *D. longispina*. These two forms in other respects agree exactly with each other, both having the very same characteristic shape of the head, when seen laterally, with the front rather prominent and narrowly

rounded, the ventral edge evenly concaved, and the rostral prominence straight. Also the structure of the tail was exactly the same in both forms.

Occurrence. — The short-spined form of this variety was taken by Dr. Bunge, in 1885, from the Tundra Lakes off Sagastyr (mouth of Lena). It was here assosiated with several *Phyllopoda*, viz., *Lepidurus arcticus*, *Artemiopsis bungei*, *Branchinecta paludosa* and *Polyartemia forcipata*. All the specimens secured were adult gamogenetic females.

Of the long-spined form, some young (parthenogenetic) females were taken on the 8th August, 1885 in the lower territory of Jana, and a few adult (gamogenetic) specimens on the 6th September same year in the Jana delta.

3. **Simocephalus vetuloides**, G. O. Sars, n. sp.

(Pl. VI, figs. 11, 12).

Specific Characters. — ♀. Shell, seen laterally, broadly oval, widening behind, and terminating in a well-marked obtuse prominence occurring about in the axis of the body; dorsal margin strongly curved posteriorly, and slightly sinuated just above the terminal prominence, ventral margin joining the oblique posterior edge by an abrupt curvature. Posterior half of dorsal edge coarsely serrate, the serrations continuing partly round the terminal prominence, but absent on the posterior edge, except for a short distance at its junction with the ventral edges. Head of moderate size, not very procumbent, front almost rectangular, lower edge straight, rostral projection very small. Eye not very large. Ocellus forming a long ascending stripe, as in *S. vetulus*. Tail rather broad, with the postanal projection somewhat prominent; caudal claws perfectly smooth; anal denticles on each side about 10 in number. Length 2.20 mm.

Remarks. — This new species is nearly related to *S. vetulus* Müll., having a very similar form of ocellus; but it differs essentially in the shape and armature of the shell, in which respect it more resembles the Australian species *S. elizabethæ* King, both having a very distinct median prominence of the shell behind, whereas this prominence is absent in *S. vetulus*. In the form of the head, the present species more nearly resembles the last-named species.

Occurrence. — This form was taken in the 3 following localities:

1. Ponds at the river Dolgulach, 16.—18. VI. 85, Dr. Bunge & Bar. Toll (some few specimens).
2. Middle territory of Jana. Orgonjach, 27. VII. (7. VIII.) 85, Dr. Bunge & Bar. Toll (numerous specimens).
3. Jana territory, 27. VII. 85, Bar. Toll (1 specimen).

All the specimens were parthenogenetic females.

4. **Simocephalus sibiricus,** G. O. Sars, n. sp.

(Pl. VI, figs. 13—15).

Specific Characters. — ♀. Shell, seen laterally, obliquely oval, scarcely widening at all behind, and terminating in a blunt prominence occurring rather above the axis of the body; dorsal margin evenly curved and not sinuated above the terminal prominence, posterior margin rather oblique, and joining the ventral margin by a gentle curve. Hindmost part only of dorsal edge denticulate, the denticles not continuing round the posterior prominence. Head comparatively small and rather procumbent, front rounded, lower edge straight or very slightly convex, rostral prominence extremely small, almost obsolete. Eye comparatively small. Ocellus like-wise small, rhomboidal in form. Tail with the post-anal projection not very prominent; caudal claws fringed in their proximal part with a dense series of delicate denticles; anal denticles on each side about 14 in number. Length nearly 3 mm.

Remarks. — This is another form which I am unable to identify with any of the previously known species, and which I therefore regard as new. In its general appearance, it somewhat resembles *S. exspinosus* de Geer, and, as in this species, the ocellus is very small and rhomboidal in form; but the shape of the head is essentially different, and the armature of the caudal claws very characteristic, resembling that in *S. australiensis* Dana.

Occurrence. — Some few specimens of this form, all parthenogenetic females, were taken in the year 1885, near the town of Werchojansk.

5. **Scapholebaris macronata,** Müll.

var. **cornuta.**

Occurrence. — 3 specimens of this well-known form were found in a sample from the middle territory of Jana, Orgonjach; collected 27. VII. (7. VIII.) 85.

Fam. *BOSMINIDÆ.*

6. **Bosmina obtusirostris,** G. O. Sars.

var. **arctica.**

Occurrence. — A solitary, but well-preserved specimen of this form occurred in a sample taken on the 8th August, 1885, in the Jana territory. Another specimen (badly preserved) was found in a sample from the Island Kotelnyi, collected 26. VI. (8. VII.) 86.

Fam. *LYNCEIDÆ.*

7. **Eurycercus lamellatus,** Müll.

Occurrence. — This form was collected in the following localities:

1. River Dolgulach, 16. VI. 85 (some few specimens).
2. Middle territory of Jana, Orgonjach, 27. VII. (7. VIII.) 85 (numerous specimens).
3. Tundra-takes off Sagastyr (mouth of Lena), 1885 (2 specimens).
4. Jana territory, 27. VII. 85 (1 young specimen).

8. **Alona affinis,** Leydig.

Syn: *Alona oblonga,* P. E. Müller.

Occurrence.— Of this easily recognizable form, 2 specimens, both females, were found in the collection; the one from the middle territory of Jana, Orgonjach, the other from the lower Jana territory, taken 8. VIII. 85.

9. **Chydorus sphæricus,** Müll.

Occurrence. — Numerous specimens of this cosmopolitic species, chiefly gamogenetic females, are in the collection, having been taken in the 2 following localities:

1. Island Kotelnyi, in 2 places: 26. VI. (8. VII.) and 31. VII. (12. VIII.) 86.
2. Maloje Simowje (Great Ljachof Island), likewise in 2 places: 22. VIII. (3. IX.) and 23. VIII. 86.

Fam. *POLYPHEMIDÆ.*

10. **Polyphemus pediculus,** de Geer.

Occurrence. — Some few specimens of this form occurred in a sample from the middle territory of Jana, collected 8. VIII. 85.

Copepoda.

Tribe: Calanoidea.

Fam. *DIAPTOMIDÆ.*

1. **Heterocope borealis,** Fischer.

(Pl. VII, figs. 1—5).

Cyclopsine borealis, Fischer, in Middendorff's Sib. Reise, Zool. p. 158, Pl. VII, figs. 40—46.

Syn.: *Heterocope Weismanni*, Imhof.

Remarks. — The identity of the form here figured with *Cyclopsine borealis* of Fischer seems to me to be beyond doubt, since it is the only species of *Heterocope* in the collection and seems to be widely distributed throughout the territory explored. The *H. Weismanni* Imhof from the Boden Sea is unquestionably the very same species, and may here be regarded as a relict arctic form, not having been met with in any other place in middle Europe, whereas in the arctic region of Norway (Finmark) it occurs rather abundantly. In order to show the ident-

ity of both forms, I here give figures of both sexes of Siberian specimens, together with some details.

Occurrence. — This species has been collected in the following localities:

1. Werchojansk, V.—VI. 85 (some few specimens).
2. Middle territory of Jana, in the neighbourhood of Werchojansk (3 specimens).
3. Middle territory of Jana, Orgonjach, 27. VII. (7. VIII) 85 (several specimens).
4. Jana Delta, 6. IX. 85 (numerous specimens).
5. Lower territory of Jana, 12. IX. 85 (1 male specimen).
6. Island Kotelnyi, 28. IV. 86 (some few specimens).
7. Lake at the mouth of Sachar-Urjach (Great Ljachof Island), 2. VIII 86 (numerous not yet sexually mature specimens).

The specimens examined by Seb. Fischer were collected from the rivers Taimyr and Boganida.

2. **Diaptomus bacillifer,** Koebel.

(Pl. VII, figs. 6—11).

Diaptomus bacillifer, Koebel, Sitzungsber. d. K. Akad. d. Wissensch. Wien, 1885, p. 312, Pl. 1, figs. 1—5.

Syn: *D. montanus*, Wierzejski.
„ *D. retusus*, Lilljeb. Ms.

Remarks. — This is one of the most characteristic *Copepoda* of the territory, occurring in great abundance as far north as the Expedition has reached. It was at first recorded by M. Wierzejski as merely a variety of *D. gracilis* G. O. Sars; but subsequently he recognized its specific difference, and named it *D. montanus.* Some years before, however, the same form was recorded by Mr. Koebel as *D. bacillifer*, which name therefore, according to the rules of priority, ought to be retained for the species. Its distribution is rather peculiar. Besides occurring in northern latitudes, where it seems to have its true home, it is found in Central Europe; but it is there confined to the high mountains (Tatras, Balaton, Hautes Alpes), whereby its character as a relict arctic form may be demonstrated, as in the case of *Heterocope borealis*, occurring in the Boden Sea. As the species has

not been sufficiently figured, I give here some figures, both habitus and detail, of Siberian specimens. It may be noted, that the latter are of considerably larger size than those found in Central Europe. According to MM. de Guerne and Richard, the average length is from 1 mm. to 1.50 mm., whereas Siberian specimens attain a length of 2.20 mm. Moreover the root-like projection issuing from the ante-penultimate joint of the prehensile antenna of the male, which has given rise to the specific name, is considerably stronger in the Siberian form, and reaches almost to the end of the last joint (see fig. 10).

Occurrence. — All the specimens in the collection are from the New Siberian Islands, and were collected in the 3 following localities:

1. Island Kotelnyi, 8. IV. 86 (4 specimens).
2. Ponds near the river Sachar-Urjach (Great Ljachof Island), 22. VII. 86 (numerous specimens).
3. Maloje Simowje (ibid.), 22. VIII. 86 (in great abundance).

The species is also recorded by Prof. Lilljeborg from Nordenskjölds Expedition, as occurring at Inserowa on the Siberian continent.

3. **Diaptomus theeli,** Lilljeborg.

(Pl. VII, figs. 12—17).

Diaptomus Theeli, Lilljeborg, in Jules de Guerne & Jules Richard, Revision des Calanides d'eau douce, p. 57, Pl. I, figs. 9, 10, 11, Pl. IV, fig. 18.

Remarks. — This form somewhat resembles the preceding species in outward appearance, and is also of about the same size. On a closer examination, however, it may be easily distinguished in both sexes. In the female, the lobes of the last pedigerous segment are somewhat narrower, and the penultimate segment forms on each side a distinct, though rather small projecting lappet, whereby this form approaches somewhat *D. laciniatus* Lilljeborg. Moreover the genital segment is comparatively shorter, not exceeding half the length of the tail. In the male the antepenultimate joint of the right prehensile antenna (see fig. 16) does not exhibit any trace of the root-like projection characteristic of the preceding species. Finally,

the structure of the last pair of legs in both sexes exhibits well-marked differences from those in the above-mentioned species, as shown by a comparison of the figures 14 and 17 with 8 and 11. Nor has this form hitherto been sufficiently illustrated, only some detail figures having been published in the work of MM. de Guerne & Richard.

Occurrence. — Some few specimens of this form were found in a sample taken on the 8th August, 1885 in the Jana territory.

According to Prof. Lilljeborg, this species has a rather wide distribution on the Siberian continent, having been met with during Nordenskjöld's Expedition in 3 different, and rather remote localities, viz., at Artamonovoj near the river Tobol, at Dudinka on the river Jenisei, and in the Island Wajgatsch.

4. **Diaptomus angustilobus,** G. O. Sars, n. sp.

(Pl. VIII, figs. 1—6).

Specific Characters. — Body very slender, somewhat resembling that of *D. gracilis* G. O. Sars. Anterior division in female oblong, almost 3 times as long as it is broad, front narrowly rounded, lateral lobes of last segment unusually produced, and narrowly quadrangular in shape, extending behind and somewhat upwards. Genital segment about half the length of the tail, but slightly dilated in front, and having the lateral projections small. Caudal rami comparatively short. Anterior antenna very much elongated, in female, considerably exceeding the body; right prehensile antenna of male with the portion preceding the geniculation but slightly tumefied, antepenultimate joint without any projection. Last pair of legs in female with the inner ramus elongated, reaching to the end of the proximal joint of the outer ramus, uniarticulate, and carrying outside the tip 2 juxtaposed spines, terminal joint of outer ramus wanting, and replaced by 2 small spines. Last pair of legs in male with the inner ramus conical in form and on the right leg very small, only reaching to the middle of the penultimate joint of the outer ramus, last joint of the latter with the outer spine small, setiform, terminal claw long and slender, but slightly curved; last joint of left leg simple oval, minutely ciliated inside, and carrying at the tip 2 small denticles. Length of adult female 1.30 mm., of male 1.20 mm.

Remarks. — This form, which I am unable to identify with any of the previously described species, somewhat resembles, in size and outward appearance, *D. gracilis* G. O. Sars, and, like that species, has the anterior antennæ very much elongated; but it differs very markedly in the peculiar development of the lateral lobes of the last pedigerous segment in the female, and likewise in the structure of the last pair of legs in both sexes, as shown by the figures 4 and 6 on the accompanying plate. Moreover the antepenultimate joint of the right prehensile antenna of the male (see fig. 5) does not exhibit any trace of a projection, whereas in *D. gracilis* this joint terminates in a small, but distinct hamiform process.

Occurrence. — Several specimens of this form were collected on the 10th August, 1885, from some pond near the town of Werchojansk, middle territory of Jana.

5. **Limnocalanus grimaldii,** de Guerne.

(Pl. VIII, fig. 7).

Remarks. — Some specimens of this form, which by most authors has been confounded with *L. macrurus* G. O. Sars, but whose specific distinctness has been stated by the present author in his paper on the pelagic *Entomostraca* of the Caspian Sea, are in the collection, one of which, a fully grown female, is figured on the accompanying plate. The length of this specimen is no less than 3.30 mm., and thus the Siberian form grows to a much larger size than that of the Caspian Sea, which never exceeds a length of 2.80 mm.; and in this respect, it also exceeds the largest specimens observed by Dr. Nordqvist in the Baltic (3.15 mm.). This seems to prove the correctness of the assumption set forth at an earlier date, that this species is a true arctic form, most probably of marine origin, and that its occurrence in the Baltic and in the Caspian Sea must be explained by a direct connection in former times of these basins with the glacial Sea.

Occurrence. — All the specimens in the collection were taken by Dr. Bunge during the time from the 11th to the 14th September 1885 in the lower part of the river Jana, where it occurred in a pelagic manner together with another Calanoid *(Drepanopus bungei)* to be described farther below, and whose marine character could be directly demonstrated.

6. **Temorella gracilis,** G. O. Sars, n. sp.

(Pl. VIII, figs. 8—18).

Specific Characters. — Body in both sexes extremely slender, with the anterior division narrow oblong in form, and having the cephalic segment slightly raised dorsally at the hind edge. Lateral lobes of last pedigerous segment in female greatly produced, forming narrow linguiform or lanceolate lappets pointing almost straight outwards. Tail slender, exceeding $^2/_3$ of the length of the anterior division, genital segment in female slightly asymmetrical, but without any lateral expansions, last segment perfectly smooth, caudal rami slightly exceeding half the length of the tail, and finely ciliated inside, otherwise smooth, caudal setæ well developed, being scarcely shorter than the caudal rami. Anterior antennæ about the length of the anterior division of the body, and of the usual structure. Natatory legs with the rami comparatively slender, terminal spine of the outer ramus in the 2nd to 4th pair cultriform, dilated in the middle. Last pair of legs in female resembling in structure those in *T. affinis*, but not nearly so robust; those of male likewise of a very similar structure, though exhibiting some minor differences in their details. Length of adult female 1.40 mm., of male, 1.25 mm.

Remarks. — In its general appearance this form somewhat resembles *T. hirundoides* of Giesbrecht[1]), exhibiting a similar slender form of the body; but the lateral lobes of the last pedigerous segment of the female in the present form are considerably more produced and more prominent, and the genital segment is of a different shape. Moreover the last caudal segment is perfectly smooth, without any trace of the densely crowded spikes clothing the dorsal face of this segment in *T. hirundoides;* on the caudal rami, these spikes are also altogether absent. Finally, the legs exhibit some minor differences, as will appear on a comparison of the detail figures here given with those reproduced by Dr. Giesbrecht.

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1) This form has been adduced by Dr. Nordqvist, as also by MM. de Guerne & Richard, to *T. affinis* Poppe as merely a variety. In my opinion, however, it should be kept apart as a distinct species.

Occurrence. — This form occurred, though not very abundantly, in the same locality as *Limnocalanus grimaldii*, viz., in the lower part of the river Jana, and it is very probable that the water here was not perfectly fresh, but mingled with salt water flowing in from the Sea.

7. **Temorella** sp.?

Remarks. — Some specimens of a 2nd species of *Temorella* are in the collection; but as none of them are fully grown, the determination of the species is impossible. They cannot, however, be adduced to the preceding species, as they exhibit a much more robust form of body.

Occurrence. — The specimens were collected on the 2nd August, 1886, from a lake at the mouth of the river Sachar-Urjach (Great Ljachof Island).

Fam. *CALANIDÆ.*

8. **Drepanopus bungei,** G. O. Sars, n. sp.

(Pl. IX).

Specific Characters. — Anterior division of body in both sexes regularly oblong oval in form, cephalic segment well defined, at least in the male, last segment very small, with the lateral corners rounded off. Tail in female about half as long as the anterior division, in (young) male rather shorter, genital segment in female about the length of the 2 succeeding segments combined, and slightly dilated in front. Caudal rami sublinear, not divergent, somewhat exceeding the length of the last segment, and each provided at the end outside with a short spine, inside, at some distance from the tip, with a very small denticle, apical setæ about 3 times as long as the rami. Anterior antennæ with 23 articulations, and somewhat shorter than the body. 1st pair of legs comparatively short, the 3 succeeding ones rather slender, and rapidly increasing in length, with the outer ramus long and narrow, its last joint linear, with the terminal spine very much elongated, and coarsely denticulate outside; inner ramus of 1st and 2nd pair uniarticulate, of 3rd pair biarticulate, of 4th pair triarticulate. Last pair of legs in female

with the terminal joint nearly twice as long as the other 2 combined, falciform, with a distinct notch at about the middle of the outer edge, apical part finely denticulate outside, and terminating in a fine point. Length of adult female 1.30 mm., of young male 1.10 mm.

Remarks. — This form evidently belongs to the exclusively marine division of the *Calanoidea* named by Dr. Giesbrecht *Amphascandria*, and represented by the extensive family *Calanidæ* (sens. strict.). Though it apparently differs in some characters which are regarded by Dr. Giesbrecht as of generic value, I am inclined to refer the present form to the genus *Drepanopus* of Brady, which is a member of the subfamily *Clausocalaninæ* of Giesbrecht. From the 2 previously known species it is prominently distinguished by the rather different structure of the natatory legs; the last pair of legs too, though built upon the same type as in the other 2 species, exhibit some well-marked differences. The species is named in honour of the distinguished Russian naturalist, Dr. Alexander Bunge, who was one of the conductors of the Expedition, and by whom also this interesting form was taken.

Description of the female. The length of the body in fully adult specimens scarcely exceeds 1.30 mm., and this form is accordingly rather inferior in size to the 2 previously known species.

The body (see figs. 1, 2) is moderately slender in form, with the anterior division, as usual, very sharply defined from the posterior. The former division is regularly oblong oval in form, and gradually narrowed both in front and behind. It consists of 6 segments, of which, however, the first 2 and last 2 generally appear less distinctly defined. Indeed, in fully adult specimens there is scarcely such a distinct boundary between the cephalic and the 1st pedigerous segments as is indicated in the 2 figures here given, though in younger specimens, as also in the males, the line of demarcation is easily observable. The anterior, or cephalic segment is about as large as all the other 5 combined, and narrowly rounded in front. The rostral projection is very slight, and is tipped by 2 delicate tentacular filaments. The last segment is very small, and has the lateral corners rounded off. The posterior division of the body, or tail, is about half as long as the anterior and very slender

being composed of 4 segments besides the caudal rami. Of these segments the 1st, or genital segment, is much the largest, being fully as long as the 2 succeeding ones combined, and somewhat dilated in front. Below, it forms a rounded tuberosity containing the genital opening.

The caudal rami (see figs. 13, 14) slightly exceed in length the last caudal segment, and are linear in form, pointing straight behind. They each carry 4 long, very finely ciliated apical setæ and moreover 2 short spines, the one at the outer corner, the other, which is very small, inside, at some distance from the tip.

The eye, as usual in alcoholic specimens, is very difficult to observe, but seems to have been of the usual structure.

The anterior antennæ (see figs. 1, 2 & 16) are slender and elongated, reaching, when reflexed, about to the end of the penultimate caudal segment. They are each composed of 23 articulations, the 7th and 8th being fused together, and carry on the anterior edge scattered slender bristles of somewhat unequal length. As usual, the 3 outer joints, preceding the terminal one, also carry each a bristle on the posterior edge (see fig. 16). The terminal joint is well defined, and about half as long as the preceding joint, and carries a fascicle of unequal bristles at the tip.

The posterior antennæ (fig. 3) have the outer ramus considerably longer than the inner, and composed of 7 well defined joints, of which the 2nd and last are much the largest. The structure of these appendages is otherwise quite normal.

The mandibles (fig. 4) have the cutting edge divided into about 8 teeth, the outermost of which is rather strong and simple, whereas the succeeding ones are minutely bifid at the tip. The palp is about the length of the mandible, and has the proximal joint of the inner ramus fused together with the basal part. The outer ramus is comparatively short, and attached at about the middle of the outer edge of the basal part.

The maxillæ (fig. 5), like the other oral parts, exhibit quite a normal structure. The masticatory part is rather large, forming inside a projecting rounded lobe, armed at the tip with a number of strong, denticulated spines, the proximal ones being longer and more setiform than the distal. The palp is membranous, and divided into 4 setiferous lobes, the 2 outer of which may answer to the 2 rami of the mandibular palp. Of

the basal lobes, the outer one represents the so-called vibratory plate. It is rather broad, and carries on the edge 8 very long and densely plumous setæ extending outwards. The inner basal lobe is rather small and rounded, and is tipped with 3 small bristles.

The anterior maxillipeds (fig. 6) are comparatively short and thick, each apparently consisting of 5 joints rapidly decreasing in size. The 1st joint is rather large, and exhibits anteriorly 4 short digitiform lobes tipped with a restricted number of coarsely ciliated setæ. The 2nd joint projects anteriorly as a similar lobe, whereas each of the 2 succeeding joints is only provided with a single curved seta. The very small, knob-like terminal joint carries 4 somewhat smaller setæ.

The posterior maxillipeds (fig. 7), as usual, are much more slender than the anterior, and are each composed of a biarticulate basal part, and a 5-arcticulate terminal part, which admits of being moved upon the basal part at any angle. Of the basal joints the 1st is the larger, and projects at the end anteriorly in the form of a rounded lobe carrying 3 small bristles. The 2nd joint is somewhat fusiform in shape, and is narrower, but scarcely shorter than the 1st. It carries anteriorly 2 small reflexed bristles, and at the end, 2 somewhat longer setæ issuing from a small lobule. The terminal part is about the length of the 2nd basal joint, and rather narrow. Its joints successively decrease in size, and carry anteriorly slender, curved setæ.

The natatory legs (figs. 8—11) rapidly increase in length posteriorly, so that the last pair are about twice as long as the first. The outer ramus in all the pairs is tri-arcticulate; but this ramus in the 1st pair differs not only in size, but also in structure, from that in the succeeding pairs. In this pair (fig. 8), it is scarcely longer than the basal part, and its 1st joint is without the natatory seta present in the other pairs. The outer spine in this and the 2nd joint is setiform, terminating in a flexible point. The last joint scarcely exceeds the 1st joint in length, and carries inside 3 natatory setæ. The terminal spine is quite setiform, and outside it only a single spine of the same structure as those on the 2 preceding joints is fixed. The inner ramus scarcely reaches beyond the 2nd joint of the outer, and forms a single oblong oval joint carrying 5 natatory setæ, 2 of which issue from the tip, the other 3 from the inner edge. This pair,

moreover, differs from the others in the total absence of the plumous seta inside the 1st basal joint. In the 3 succeeding pairs (figs. 9—11), the outer ramus is very much elongated, with the last joint linear in form, and fully as long as the other 2 combined. In all these pairs, this joint carries outside, 3 stout spines, and inside, 4 natatory setæ. The terminal spine is very slender and elongated, with the outer edge coarsely serrated. The inner ramus on the 2nd pair (fig. 9), as on the 1st, is uniarticulate, but somewhat more elongated, and provided with 6 natatory setæ, one of which issues from the outer edge. In the 3rd pair (fig. 10), this ramus is distinctly biarticulate, with the 1st joint rather short, and in the 4th pair (fig. 11), it is tri-articulate, and provided with an additional natatory seta. It may be noted, that in the 2 previously known species, the inner ramus is only uniarticulate in the 1st pair, whereas in the 2nd pair it is biarticulate, and in the 3rd and 4th pairs tri-articulate, and the same is also the case with all the previously known forms referred to the subfamily *Clausocalaninæ* of Giesbrecht.

The 5th pair of legs (fig. 12) are very different from the others, forming each a simple, tri-articulate stem. The 2 first joints of this stem are rather thick and muscular, and represent more properly the basal part, whereas the last joint apparently answers to the inner ramus on the other pairs. This joint is very narrow and elongated, almost twice as long as the basal part, and falciform in shape, being generally extended outwards, so as to project laterally on each side of the genital segment (see fig. 1). It has a distinct notch at about the middle of the outer edge, and terminates in a sharp point, from which a series of minute denticles extends for some distance along the outer edge.

The **male** (fig. 15) resembles the female in its outward appearance, but is somewhat smaller, scarcely exceeding a length of 1.10 mm., and is moreover, on a closer examination, easily recognizable by the structure of the tail and of the last pair of legs. The anterior antennæ, on the other hand, which generally exhibit some sexual peculiarities, either in the prehensile character of the right one, or in a more abundant supply of sensory filaments in both, do not show any perceptible difference from those in the female. It is, however, very probable, that none of the male specimens observed are as yet sexually mature.

The anterior division of the body exhibits the same regularly oblong oval form as in the female, and in all the specimens the line of demarcation between the cephalic and the 1st pedigerous segments could be distinctly traced.

The tail, on the other hand, is much narrower and also somewhat shorter than in the female. It apparently consists of the same number of segments as in the female; but the 1st segment here is very short, and without any tuberosity below.

The last pair of legs (fig. 17) are much larger than in the female, and somewhat asymmetrical, the right leg terminating in a long styliform claw, whereas the left one is simple conical in form. Both legs are extended straight behind, and exhibit but slight traces of muscles, whereas they contain an opaque cellular matter. This would seem to indicate that they are not yet functionally developed, and they may, indeed, have a rather different appearance in sexually developed specimens.

Occurrence. — Numerous specimens of this form were collected by Dr. Bunge from the 11th to 13th September, 1885, in the lower part of the river Jana. It occurred here in a pelagic manner (near the surface) together with *Limnocalanus grimaldii* and *Temorella gracilis*, and accordingly seems to be able to live in comparatively fresh water. It is, however, very probable, that at times an influx of salt water from the sea takes place in this part of the river, and perhaps it is only under such circumstances that this form occurs in these places. Its true marine character is directly proved by the fact that a single well preserved specimen was found in a sample taken by Dr. Bunge from the sea, off the shore near Maloje Simowje on the Great Ljachow Island. Moreover, I have found the same form occasionally in the samples taken during Nansen's Polar Expedition in the glacial sea, at a great distance from the Siberian continent.

9. **Pseudocalanus elongatus**, Boeck.

Occurrence. — This well-known marine form occurred in the above-mentioned sample taken by Dr. Bunge off the shores of Maloje Simowje. I have also found it in the samples taken during Nansen's Polar Expedition in the glacial sea north of Siberia.

Tribe: **Harpactoidea.**

Fam. *CANTHOCAMPTIDÆ.*

10. **Canthocamptus minutus,** Jur.

Occurrence. — Some few specimens of this form were found in 2 samples, the one taken on the 31st August, 1886, in small ponds of the Island Kotelnyi, the other in similar situations on the 16th July of the same year, at Maloje Simowje (Great Ljachow Island).

Fam. *STENHELIIDÆ.*

11. **Danielssenia sibirica,** G. O. Sars, n. sp.

(Pl. X, fig. 1—20).

Specific Characters. — Body of female sublinear, slightly depressed in front, that of male much narrowed behind. Rostrum less broad than in the type species, and narrowly rounded at the tip. Anterior antennæ in female rather robust, with 3 remarkably strong, ciliated spines on the terminal part; those in male still more robust, with the 4th joint greatly swollen, globular, terminal part unguiform. Posterior antennæ and oral parts about as in *D. typica.* 1st pair of legs with the inner ramus scarcely longer than the outer. Inner ramus of 2nd pair in male very unlike that in female, 1st joint large, with a spiniform projection inside, 2nd joint produced at the end to a strong mucroniform process, inside which the very small 3rd joint is affixed. 5th pair of legs in female with the inner expansion of the proximal joint of moderate size, linguiform, and edged with 5 ciliated spines, distal joint short and broad, obliquely cordiform, and provided with 5 setæ, the inner most somewhat remote from the others. Same pair in male much smaller, with the inner expansion sub-obsolete. Caudal rami in both sexes longer than they are broad at the base, and somewhat divergent. Length of adult female 1.20 mm., of male 1.10 mm.

Remarks. — This form is nearly allied to *Danielssenia typica* Boeck (= *Jonesiella spinulosa* Brady), but is of larger size, and differs, moreover, in some anatomical details, especially in the considerably greater length of the caudal rami in proportion to

their breadth. The genus *Danielssenia* was established by Boeck as early as in the year 1872, and ought to replace the much later name *Jonesiella* proposed by Brady.

Description of the female. — The average length of adult specimens is 1.20 mm., and this form is accordingly of considerably larger size than the type species, which only reaches a length of 0.85 mm.

The form of the body (see figs. 1, 2) is not very slender, and is somewhat depressed in the anterior part, with the posterior division much shorter than the anterior. The latter is composed of 5 segments, the last of which, however, is more firmly connected with the succeeding than with the preceding segment, so that at first sight it has more the appearance of belonging to the posterior than to the anterior division. The 1st segment is rather large, equalling in length the 3 succeeding ones combined, and includes the cephalon and the 1st pedigerous segment, which are wholly coalesced. It is gradually somewhat narrowed in front, and terminates in a slightly downward curved lamellar rostrum, narrowly rounded at the tip. The 3 succeeding segments are of about equal size, and have the epimeral plates somewhat prominent, and terminating behind in an obtuse point. The 5th segment is abruptly narrower than the preceding one, and has much smaller epimeral plates.

The posterior division, or tail, is rather broad in front, but tapers slightly behind. It consists of 5 segments, besides the caudal rami, and somewhat exceeds half the length of the anterior division. Of the segments, the 1st, or genital segment, is much the largest, equalling in length the 2 succeeding ones combined, and exhibits on each side, at about the middle, a slight indentation, indicating a subdivision into 2 imperfectly separated segments. Near the posterior edge, this and the succeeding segments exhibit a circlet of delicate, appressed spinules, which, however, appears interrupted in the middle of the dorsal face. The last segment (see fig. 3) is rather small and deeply insinuated in the middle between the caudal rami, where the anal opening occurs.

The caudal rami (see fig. 3) somewhat exceed the last segment in length, and are considerably longer than they are broad at the base. They are slightly divergent, and taper somewhat towards the tip, which is transversely truncated. Of the

4 apical setæ, the outermost and innermost are very small, whereas the 2 median ones are more produced, and very finely denticulate on the edges. The inner of the two is much the longer, being fully twice as long as the outer. Moreover, the caudal rami exhibit both outside and inside several fascicles of small spinules.

The eye could not be distinctly traced in the preserved specimens. In the type species it is of very large size.

The anterior antennæ (see fig. 4) are comparatively short and robust, and are densely clothed with bristles, the greater number of which are coarsely ciliated. They are each composed of 5 joints, the last of which, constituting the terminal part, is apparently formed by 3 coalesced joints. The 2nd of the joints is the largest, and carries 7 unusually strong and densely ciliated setæ, 3 of which issue from the upper face. From the 4th joint originates in front the usual sensory filament, which is accompanied by several slender bristles. The terminal part is conical in form, and is armed with 3 very strong ciliated spines pointing in different directions, the longest of them issuing from the tip.

The posterior antennæ (fig. 5) are sub-pediform, consisting each of a strong curved stem divided into 3 joints, the first 2 of which are firmly connected, and represent the basal part. From the front of the 2nd joint issues a strong curved seta, and outside this joint, at about the middle, a slender appendicular ramus is attached, curving posteriorly. This ramus is composed of 3 joints, the middle of which is very small, and carries a single spiniform bristle, whereas the 1st has 2, and the last 3 such bristles. The terminal joint of the stem is very movably connected with the basal part, and is oval in form, being constricted at the base. It is armed with several spiniform setæ, 3 of which, issuing from the tip, are rather elongated and geniculate.

The mandibles (fig. 6) are rather strong, with the cutting edge divided into 5 strongly chitinized teeth, the outermost of which is the largest. The palp is well developed, and distinctly biramous, the basal part being rather broad, and produced inside to a conical prominence carrying 5 curved bristles. The rami are rather short, and of about equal size, the inner one being uniarticulate, whereas the outer one seems to be composed of 3 im-

perfectly defined joints. Both rami carry several delicate bristles, both at the tip and inside. On the inner ramus there are 4 apical bristles and 2 lateral, the latter being attached to a distinctly marked ledge at about the middle of the inner edge.

The maxillæ (fig. 7) are rather complicated in structure, exhibiting the same chief parts as in the *Calanoidea*. The masticatory lobe is well developed, and clothed at the truncated end with numerous spines. The palp is comparatively short and divided into 4 setiferous lobes, the outermost of which, representing the vibratory plate, is remarkable for its triangular form and the 3 very strong and densely plumous setæ issuing from it, and pointing in different directions.

The anterior maxillipeds (fig. 8) likewise somewhat recall those in the *Calanoidea*. They each consist of a thick muscular stem bent at the end almost in a right angle, and carrying in front 4 closely set digitiform lobes, each tipped by 2 short and thick setæ. On the outermost of these lobes, one of the setæ is replaced by a strong, claw-like spine. The terminal joint is very small and knob-like, and carries 2 capillary bristles.

The posterior maxillipeds (fig. 9) are pronouncedly prehensile, each terminating in an uncinate hand, which is very movably articulated to the basal part. The latter is uniarticulate, and carries at the end 2 ciliated setæ, one of which is very strong, and points straight down. The hand is oblong oval in form, and has the proximal part of the inner edge finely ciliated, and provided, somewhat beyond the middle, with a single short seta. The dactylus is long and slender, terminating in a very acute point, and admits of being bent in against the inner edge of the hand.

The natatory legs (figs. 10, 11, 12) are rather slender, and have the outer edge of both rami densely fringed with short spinules. The 1st pair (fig. 10) are shorter than the others and not prehensile, though they differ somewhat in structure from the succeeding ones. The basal part is rather broad, especially its 1st joint, which projects outside to a rounded prominence clothed with delicate hairs. From the outer corner of the 2nd basal joint issues a slender spiniform seta pointing outwards, and to the inner corner a strong deflexed spine is attached, not found in the other pairs. The rami are of about equal length, but rather different in structure. The outer ramus, as in the other

pairs, is tri-articulate, the middle joint having, inside, a natatory seta, whereas the 1st and last are without setæ inside. The 2 first joints are each armed outside with a slender, denticulated spine, and the last joint has 5 such spines, one on the outer edge, and 4 on the obliquely truncated end, the innermost, however, having more properly the character of a seta. The inner ramus is only composed of 2 joints, the outer of which is somewhat longer and narrower than the other, both having inside a single seta. From the tip of the distal joint, moreover, issue 2 setæ, and outside them a slender spine.

On the 3 succeeding pairs (figs. 11, 12) both rami are tri-articulate, the inner one especially, on the 2 posterior pairs, being considerably shorter than the outer. In the 2nd pair (fig. 11) the terminal joint of the outer ramus has outside 3 spines, inside 2 setæ, and at the tip a long spine and a seta. The same joint on the inner ramus has 4 setæ, 2 inside and 2 at the tip, and moreover a spine outside the apical setæ. In the 2 succeeding pairs (fig. 12) the terminal joint of each ramus has an additional seta inside.

The 5th pair of legs (fig. 13), as usual, are very different from the others, and opercular in character, arching over the genital region. They each consist of 2 lamellar joints, the first having, at the outer, conically produced corner, a slender bristle, and forming inside a large linguiform expansion produced beyond the limits of the distal joint. This expansion carries 5 spiniform setæ, 3 of which issue from the tip, the other 2 from the inner edge. Of the setæ, which are all finely denticulate at the edges, the middle apical one is the longest. The distal joint is short and broad, obliquely cordiform, and is likewise provided with 5 setæ, the innermost being placed at some distance from the others.

The ovisac (see fig. 2) is rather short, oval in form, and contains a comparatively restricted number of rather large ova.

The **adult male** (fig. 14) is somewhat smaller than the female, scarcely exceeding a length of 1.10 mm., and is easily recognisable by its more slender form, and by the structure of the anterior antennæ.

The body, when seen from above (fig. 14), is considerably narrowed behind, with the tail scarcely more than half as broad as the anterior segment, the latter being of about the

same dimensions as in the female. The genital segment is divided into two well-defined segments, and the tail accordingly consists of 5 segments, besides the caudal rami.

The anterior antennæ (fig. 15) are considerably larger and more robust than in the female, and pronouncedly prehensile, the 4th joint being globularly dilated, and containing a very strong muscle, which acts upon the unguiform terminal part.

The posterior antennæ and oral parts do not differ in their structure from those parts in the female.

The 1st pair of natatory legs likewise exhibit an appearance very similar to that in the female.

In the 2nd pair (fig. 16), however, the inner ramus is peculiarly modified, and much stronger than the outer. Its 1-st joint is rather large, and exhibits inside a spiniform deflexed projection. The 2nd joint is without any seta inside, but projects at the end to a very strong mucroniform process reaching far beyond the tip of the outer ramus. Inside the base of this process, the very small 3rd joint is affixed. This joint, which does not even reach to the middle of the above-mentioned process, is oblong oval in form, and carries 3 short setæ, and a similarly short apical spine.

In the 2 succeeding pairs of legs, some minor differences from those in the female may also be found to exist. Thus in the 3rd pair (fig. 17), the 2nd joint of the inner ramus is somewhat expanded, and distinctly bilobular at the end, the outer lobe being the more prominent. In the 4th pair (fig. 18), the inner ramus is rather smaller than in the female, and scarcely reaches beyond the 2nd joint of the outer ramus; and its terminal joint has only 2 natatory setæ inside.

The 5th pair of legs (fig. 19) are much smaller than in the female, the inner lamellar expansion in particular being much reduced in size, and only provided with 2 marginal setæ.

Occurrence. — Several specimens of this form are in the collection, having been taken in 3 different localities, viz.,:

1. Lower part of the river Jana, 12. IX. 85.
2. Great Ljachof Island, at the mouth of the river Wankin-Urjach, 1. VIII. 86.
3. Maloje Simowje. Taken from the sea. 25. VIII. 86.

The marine nature of this form is sufficiently proved by its occurrence in the last-named place.

Fam. *ECTINOSOMIDÆ.*

12. **Ectinosoma curticornis,** Boeck.

(Pl. X, figs. 22—25).

Occurrence. — Of this species, which is likewise a true marine form, a solitary specimen was found among *Danielsscnia sibirica* from the lower part of the Jana river. Another specimen occurred in the above-mentioned sample taken from the Sea at Maloje Simowje. For want of sufficient material, I have been unable to institute a more detailed comparison with the Norwegian species; but the drawings here given would seem to prove that it is at any rate very closely allied to that species, and in all probability is the very same.

Tribe: **Cyclopoidea.**

Fam. *CYCLOPIDÆ.*

13. **Cyclops viridis,** Jurine.

Occurrence. — This well-known species occurred rather abundantly in several samples taken during the months of August and September, 1886, from small ponds in the Island Kotelnyi and in the Great Ljachof Island, at Maloje Simowje and Sachar Urjach.

14. **Cyclops strenuus,** Fischer.

Occurrence. — Collected in great abundance from the same places as the preceding species.

15. **Cyclops scutifer,** G. O. Sars.

(Pl. XI, figs. 1—5).

Remarks. — This species has been withdrawn by Dr. Schmeil and regarded as only a variety of *C. strenuus.* Without attempting to discuss the difficult, and in many cases insoluble question, What is species and what is variety? I may mention that I have always found this form easily distinguishable from *C. strenuus.* In my opinion, indeed, it is fully as distinct as several of the species admitted by Dr. Schmeil himself. In order to show the

differences, I subjoin a habitus-figure of this form and some corresponding detailfigures of both these species, drawn from Siberian specimens. As will be seen, the present species differs from *C. strenuus* not only in the peculiar development of the 2 last pedigerous segments, but also in the relative length of the caudal setæ, in the structure of the last pairs of legs, and in that of the inner ramus of the 4th pair, in all the characters therefore, which are generally quoted as distinguishing marks between the species.

Occurrence. — This form was collected in great abundance on the 10th July, 1885, from the lake Tustach Köli in the Jana territory.

16. **Cyclops vernalis,** Fischer.

Occurrence. — This form occurred in 2 samples taken on the 2nd August, 1886, at the river Sachar Urjach (Great Ljachof Island), partly from small ponds, partly from a little lake at the mouth of the river.

17. **Cyclops bisetosus,** Rehberg.

Occurrence. — Found occasionally in the same samples as the preceding species, and moreover in 2 samples from Maloje Simowje, taken on the 23rd August, 1886.

18. **Cyclops albidus,** Jurine.

Occurrence. — A few specimens of this form occurred in a sample taken on the 7th August, 1885, at Orgonjach, middle territory of Jana.

19. **Cyclops leuckarti,** Claus.

Some few specimens of this form were found in the same sample as the preceding species.

20. **Cyclops serrulatus,** Fischer.

A solitary specimen of this form was found in a sample from the territory of Jana. 8. VIII. 85.

Tribe: **Lernæoidea.**

Fam. *LERNÆOPODIDÆ.*

21. **Lernæopoda salmonea,** Lin.

Occurrence.— Some specimens, apparently belonging to this species, were taken by Dr. Bunge on the 7th July, 1886, from the fins of *Salmo (Onchorhynchus) lagocephalus*, caught on the Island Kotelnyi.

Ostracoda.

Tribe: **Podocopa.**

Fam. *CYPRIDIDÆ.*

1. **Cypria ophthalmica,** Jurine.

Occurrence. — A solitary specimen of this form was found in a sample taken on the 10th July, 1885, in the neighbourhood of Werchojansk (middle territory of Jana).

2. **Candona candida,** Müll.

Occurrence. — Some few specimens of a rather short and thick variety of this species were collected on the 7th July, 1886, in the Island Kotelnyi,' at Urassalach. The specimens, both of this and the other species here recorded, are, however, in a rather bad state of preservation, the valves being partly crushed, and sometimes almost completely decalcined by long immersion in alcohol.

3. **Candona inæquivalvis,** G. O. Sars, n. sp.

(Pl. XI, figs. 10, 11).

Specific Characters. — Shell rather compressed, and, seen laterally, semilunar in form, the greatest height exceeding half the length, and occurring rather behind the middle, dorsal margin boldly arched, ventral distinctly sinuated in the middle, anterior and posterior extremities nearly equal, both being nar-

rowly rounded; — seen dorsally oblong fusiform, greatest width but little exceeding ⅓ of the length, left side considerably more convex than the right. Valves very unequal, the left one considerably overlapping the right along the whole dorsal face, surface smooth and but slightly hairy at both extremities. Length 1.20 mm.

Remarks. — This form seems to be allied to *C. candida*; but the form of the shell looks so different, that I am not disposed to regard it as merely a variety of that species. The inequality of the valves is very remarkable, and much more pronounced than in any other species with which I am acquainted. For want of sufficient material, I have been unable to examine the structure of the limbs more closely.

Occurrence. — 3 specimens only of this form were found in a sample taken by Baron Toll at the end of May, 1885, near the town of Werchojansk.

4. **Candona rostrata,** Brady & Norman.

Occurrence. — Some well-marked specimens of this form, with the surface of the shell strongly hirsute, were taken in the same locality as the preceding species. The less hairy form figured on the accompanying plate, fig. 25, I now regard as only a variety of this species.

5. **Candona fragilis,** G. O. Sars, n. sp.

(Pl. XI, figs. 12—22).

Specific Characters. — ♀. Shell, seen laterally, oblong oval, more than twice as long as it is high, greatest height behind the middle, dorsal margin but slightly and somewhat irregularly curved, with a small sinus just above the eye, ventral nearly straight, or very slightly concave in the middle, anterior extremity obtusely truncated, posterior somewhat exserted below, and narrowly rounded at the tip; — seen dorsally moderately tumid, greatest width slightly exceeding ⅓ of the length, both extremities obtusely acuminate. Valves very thin and pellucid, but slightly unequal, the right one overlapping the left only at the posterior extremity; surface smooth and shining, being clothed at each extremity, especially the anterior one, with very

delicate hairs. Caudal rami very much curved, and rather broad at the base, tapering rapidly towards the tip, apical claws about half the length of the rami, dorsal seta comparatively short. Length scarcely exceeding 1 mm.

Remarks. — This is a rather distinct, and easily recognisable species, which, in the form of the shell, and the pellucidity of the valves, somewhat recalls the species of the genus *Candonopsis*. A closer examination of the several appendages (see the detail figures here given) has, however, shown it to be a true *Candona*. Only female specimens have come under my notice.

Occurrence. — Several specimens of this form are in the collection, having been taken in 4 different localities, viz.,:

1. Island Kotelnyi, on the river Urassalach, 7. VII. 86: several specimens.
2. Pond near the lake Tschastnoje (Great Ljachof Island), 8th July, 86: 1 specimen.
3. Pond at Sachar Urjach (ibid.), 2. VIII. 86: 1 specimen.
4. Maloje Simowje, 22. VIII. (3. IX.) 86: 2 specimens.

6. **Candona oblonga**, G. O. Sars, n. sp.

(Pl. XI, figs. 23—24).

Specific Characters. — ♀. Shell compressed and, seen laterally, rather narrow, irregularly oblong oval in form, with the greatest height not equal to half the length, and occurring at about the middle, dorsal margin boldly arched, ventral almost straight, anterior extremity obliquely rounded, posterior subtruncate, forming below an almost right angle; — seen dorsally very narrow, greatest width not nearly attaining ⅓ of the length, both extremities obtusely acuminate. Valves less pellucid than in the preceding species, and nearly equal; surface smooth and only slightly hairy at each extremity. Length 1.30 mm.

Remarks. — This new species differs from the preceding one in the more compressed form of the shell, and its rather different outline, when seen laterally. The shell is also of a coarser structure, and somewhat larger in size. The appendages could not be examined for want of sufficient material.

Occurrence. — A solitary female specimen of this form was found in the sample taken by Baron Toll near the town of Werchojansk in the latter days of May, 1885.

7. **Candonopsis kingsleyi**, Brady.

Occurrence. — Some few specimens, apparently belonging to this form, occurred in the same sample as the preceding species.

Taking into consideration the very remote and isolated situation of the New Siberian Islands, and the want of acquaintance with the fauna of that region, I think it will be of some interest to give here a complete list of all the species of *Entomostraca*, which have hitherto been stated to occur within the limits of these islands.

Phyllopoda:

1. *Lepidurus arcticus*, Pallas.
2. *Chirocephalus claviger*, Fischer.
3. *Artemiopsis bungei*, G. O. Sars.
4. *Branchinecta paludosa*, Müll.
5. *Polyartemia forcipata*, Fischer.

Cladocera:

6. *Daphnia pulex*, de Geer.
7. *Bosmina obtusirostris*, G. O. Sars.
8. *Chydorus sphaericus*, Müll.

Copepoda:

9. *Heterocope borealis*, Fischer.
10. *Diaptomus bacillifer*, Koebel.
11. *Temorella* sp.?
12. *Drepanopus bungei*, G. O. Sars.
13. *Pseudocalanus elongatus*, Boeck.
14. *Canthocamptus minutus*, Jur.
15. *Danielssenia sibirica*, G. O. Sars.
16. *Ectinosoma curticornis*, Boeck.
17. *Cyclops viridis*, Jurine.
18. „ *strenuus*, Fischer.
19. „ *vernalis*, Fischer.
20. „ *bisetosus*, Rehberg.
21. *Lernæopoda salmonea*, Lin.

Ostracoda:

22. *Candona candida*, Müll.
23. „ *fragilis*, G. O. Sars.

Explanation of the Plates.

Pl. VI.

Daphnia pulex, de Geer.

Fig. 1. Adult parthenogenetic female from the Island Kotelnyi, viewed from left side; magnified about 40 diameters.

Fig. 2. Adult gamogenetic female from Maloje Simowje, viewed from left side; same amplification.

Fig. 3. Extremity of tail, lateral view; magnified 100 diam.

Fig. 4. Male specimen from Maloje Simowje, viewed from right side; magnified 40 diam.

Fig. 5. Right antennula of same, with adjacent part of head; magnified 100 diam.

Fig. 6. Tail of same, viewed from right side; same amplification.

Daphnia pulex, var. tenebrosa G. O. Sars.

Fig. 7. Adult gamogenetic female of the short-spined form, from Sagastyr, viewed from left side; magnified 40 diam.

Fig. 8. Left caudal claw of same, with the adjacent part of tail; magnified 150 diam.

Fig. 9. Adult gamogenetic female of the long-spined form, from the Jana Delta, viewed from left side; magnified 40 diam.

Fig. 10. Tail of same, lateral view, magnified 100 diam.

Simocephalus vetuloides, G. O. Sars.

Fig. 11. Adult parthenogenetic female, viewed from right side; magnified 45 diam.

Fig. 12. Tail of same, lateral view; magnified 56 diam.

Simocephalus sibiricus, G. O. Sars.

Fig. 13. Adult parthenogenetic female, viewed from left side; magnified 35 diam.

Fig. 14. Head of same, lateral view; magnified 50 diam.

Fig. 15. Same, extremity of tail, lateral view; same amplification.

Pl. VII.

Heterocope borealis, Fischer.

Fig. 1. Adult female, dorsal view; magnified 35 diam.
Fig. 2. Adult male, viewed from right side; same amplification.
Fig. 3. Tail of female, dorsal view; magnified 50 diam.
Fig. 4. Last pair of legs of female; magnified 100 diam.
Fig. 5. Last pair of legs of male; same amplification.

Diaptomus bacillifer, Koebel.

Fig. 6. Adult ovigerous female, dorsal view; magnified 48 diam.
Fig. 7. Same viewed from right side.
Fig. 8. Leg of last pair of female, magnified 100 diam.
Fig. 9. Adult male, viewed from left side; magnified 48 diam.
Fig. 10. Extremity of the right prehensile antenna of same; magnified 100 diam.
Fig. 11. Last pair of legs of same; same amplification.

Diaptomus theeli, Lilljeborg.

Fig. 12. Adult ovigerous female, dorsal view; magnified 25 diam.
Fig. 13. Same, without the ovisac, viewed from left side.
Fig. 14. Leg of last pair of female; magnified 130 diam.
Fig. 15. Adult male, viewed from right side; magnified 52 diam.
Fig. 16. Extremity of right prehensile antenna of same, magnified 100 diam.
Fig. 17. Last pair of legs of same; magnified 130 diam.

Pl. VIII.

Diaptomus angustilobus, G. O. Sars.

Fig. 1. Adult, ovigerous female, dorsal view, magnified 68 diam.
Fig. 2. Same, without the ovisac, viewed from left side.
Fig. 3. Adult male, viewed from right side; same amplification.
Fig. 4. Last pair of legs of female, magnified 155 diam.
Fig. 5. Outer part of right prehensile antenna of male, magnified 100 diam.
Fig. 6. Last pair of legs of male, magnified 155 diam.

Limnocalanus grimaldii, de Guerne.

Fig. 7. Adult female, viewed from right side, magnified 44 diam.

Temorella gracilis, G. O. Sars.

Fig. 8. Adult female, dorsal view; magnified 75 diam.
Fig. 9. Same, viewed from left side.
Fig. 10. Adult male, viewed from right side; same amplification.
Fig. 11. Extremity of tail of female, dorsal view; magnified 200 diam.
Fig. 12. Leg of 1st pair.
Fig. 13. Leg of 2nd pair.
Fig. 14. Leg of 4th pair.
Fig. 15. Last pair of legs of male.
Fig. 16. Same pair of male.
Fig. 17. Right prehensile antenna of male.
Fig. 18. Tail of same, with last pedigerous segment; magnified 130 diameters.

Pl. IX.

Drepanopus bungei, G. O. Sars.

Fig. 1. Adult female, dorsal view; magnified 80 diam.
Fig. 2. Same, viewed from left side.
Fig. 3. Posterior antenna, magnified 245 diam.
Fig. 4. Mandible and palp.
Fig. 5. Maxilla.
Fig. 6. Anterior maxilliped.
Fig. 7. Posterior maxilliped.
Fig. 8. Leg of 1st pair.
Fig. 9. Leg of 2nd pair.
Fig. 10. Leg of 3rd pair.
Fig. 11. Leg of 4th pair.
Fig. 12. Last pair of legs of female.
Fig. 13. Tail of female, dorsal view.
Fig. 14. Extremity of same, more highly magnified.
Fig. 15. Young male, viewed from left side; magnified 80 diam.
Fig. 16. Outer part of antenna of same.
Fig. 17. Last pair of legs of same.

Pl. X.

Danielssenia sibirica, G. O. Sars.

Fig. 1. Adult female, dorsal view; magnified 80 diam.
Fig. 2. Another ovigerous female, viewed from left side.
Fig. 3. Extremity of tail, magnified 100 diam.
Fig. 4. Extremity of head, with the rostral projection and left anterior antenna; magnified 245 diam.
Fig. 5. Posterior antenna.

Fig. 6. Mandible and palp.
Fig. 7. Maxilla.
Fig. 8. Anterior maxilliped.
Fig. 9. Posterior maxillipeds
Fig. 10. Leg of 1st pair.
Fig. 11. Leg of 2nd pair.
Fig. 12. Leg of 4th pair.
Fig. 13. Last pair of legs.
Fig. 14. Adult male, dorsal view; magnified 80 diam.
Fig. 15. Same, left anterior antenna; magnified 245 diam.
Fig. 16. Same, leg of 2nd pair.
Fig. 17. Same, leg of 3rd pair.
Fig. 18. Same, leg of 4th pair.
Fig. 19. Same, last pair of legs.
Fig. 20. Same, rudimentary caudal limb.

Ectinosoma curticornis, Boeck.

Fig. 22. Adult female, viewed from right side; magnified 95 diam.
Fig. 23. Same, dorsal view.
Fig. 24. Anterior antenna; magnified 185 diam.
Fig. 25. Leg of last pair.

Pl. XI.

Cyclops scutifer, G. O. Sars.

Fig. 1. Adult, ovigerous female, dorsal view; magnfied 70 diam.
Fig. 2. Tail together with last pedigerous segment, ventral view; magnified 110 diam.
Fig. 3. Extremity of tail, dorsal view; more highly magnified.
Fig. 4. Inner ramus of 4th leg.
Fig. 5. Leg of last pair, magnified 220 diam.

Cyclops strenuus, Fischer.

Fig. 6. Last pedigerous segment, with the rudimentary last pair of legs, ventral view; magnified 110 diam.
Fig. 7. Extremity of tail, dorsal view.
Fig. 8. Inner ramus of 4th leg.
Fig. 9. Leg of last pair.

Candona inæquivalvis, G. O. Sars.

Fig. 10. Shell of female, viewed from right side; magnified 52 diam.
Fig. 11. Same, dorsal view.

Candona fragilis, G. O. Sars.

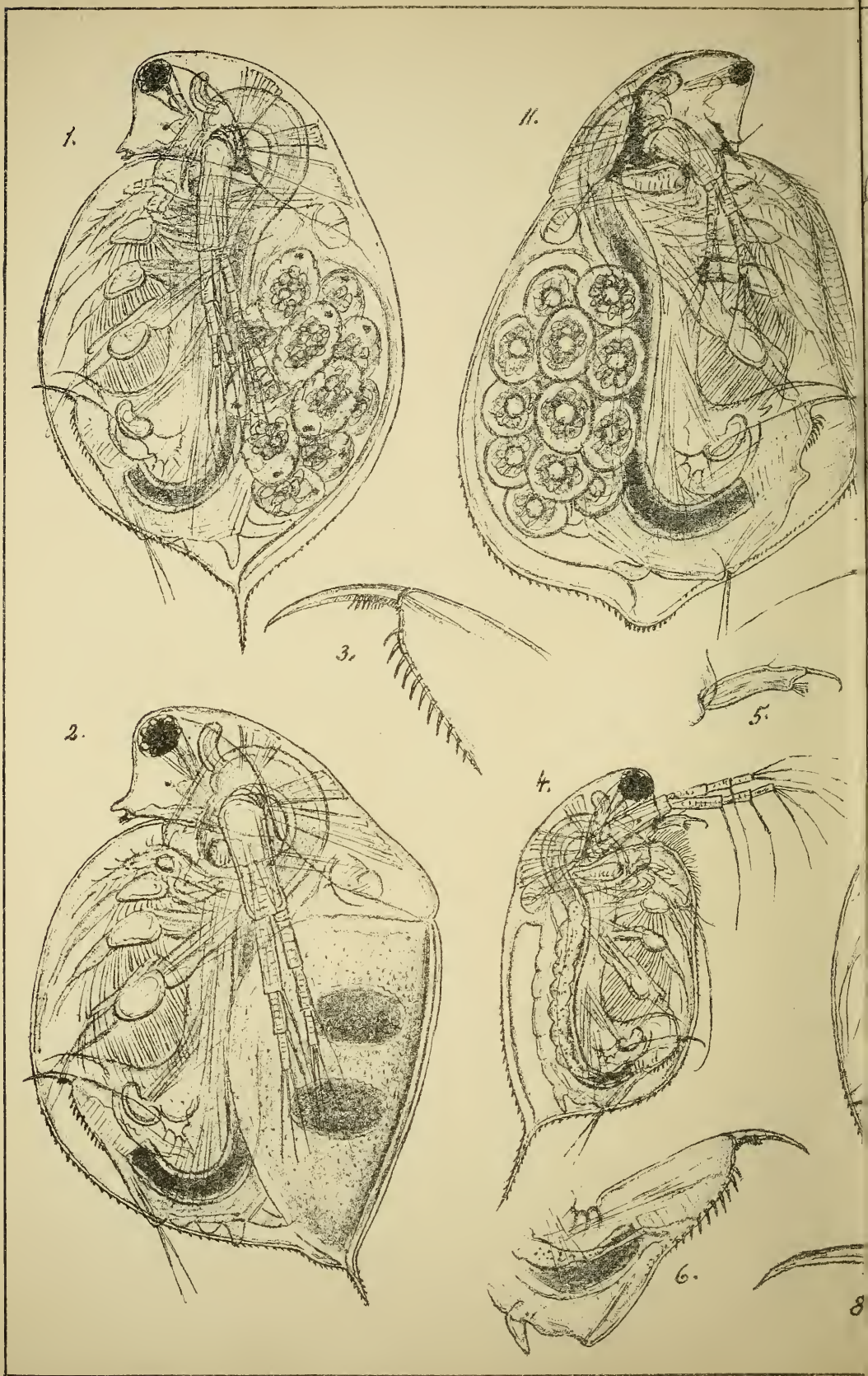
Fig. 12. Adult female, viewed from left side; magnified 68 diam.
Fig. 13. Same, dorsal view.
Fig. 14. Left valve with enclosed animal, viewed from the inner face; magnified 80 diam.
Fig. 15. Anterior antenna magnified 155 diam.
Fig. 16. Posterior antenna.
Fig. 17. Mandible and palp.
Fig. 18. Anterior maxilla.
Fig. 19. Posterior maxilla.
Fig. 20. Anterior leg.
Fig. 21. Posterior leg.
Fig. 22. Caudal ramus.

Candona oblonga, G. O. Sars.

Fig. 23. Shell of adult female, viewed from right side; magnified 2 diam.
Fig. 24. Same, dorsal view.

Candona rostrata, Brady & Norman, var.

Fig. 25. Shell of female, viewed from right side; magnified 52 diam.
Fig. 26. Caudal ramus.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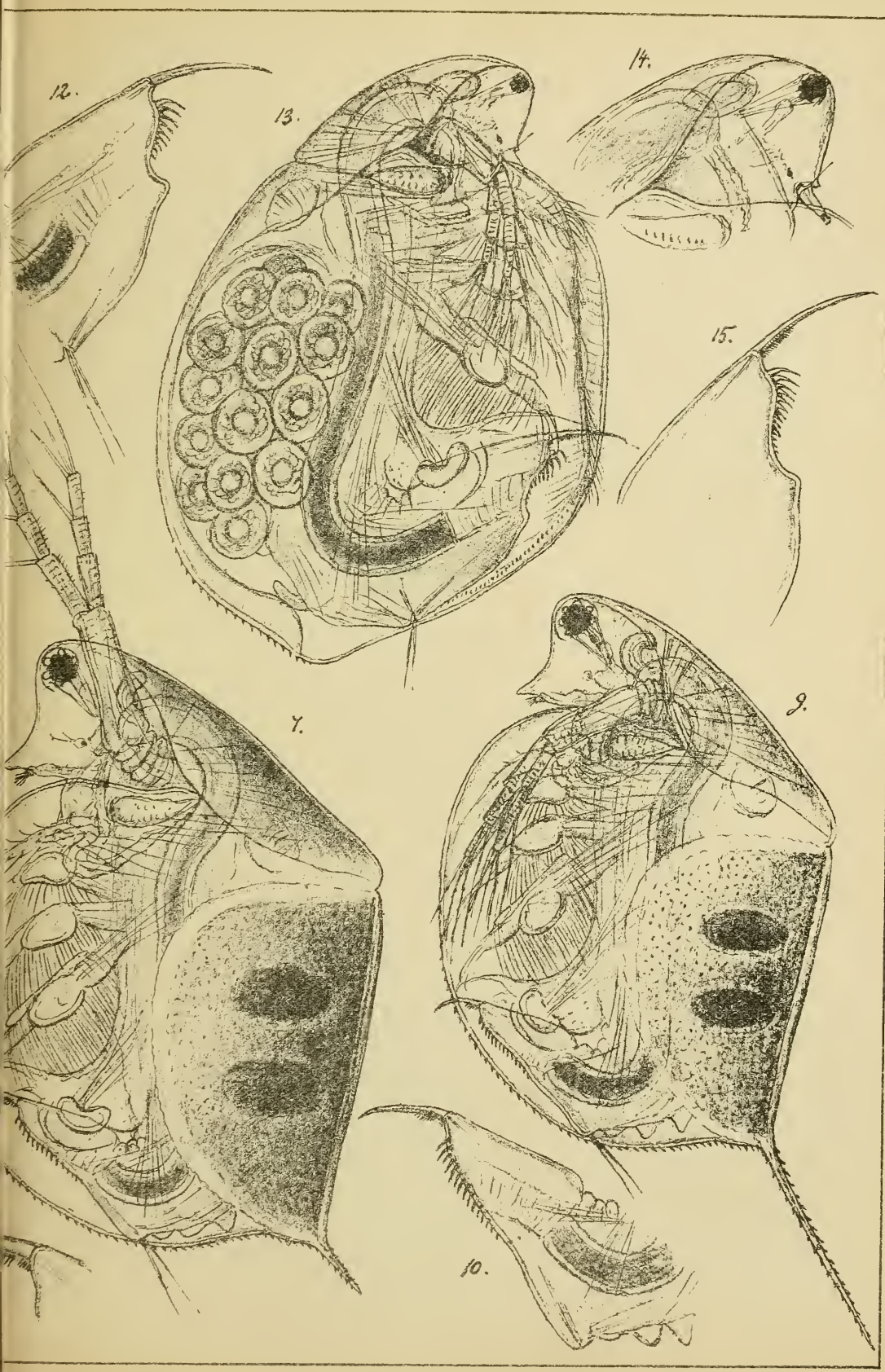
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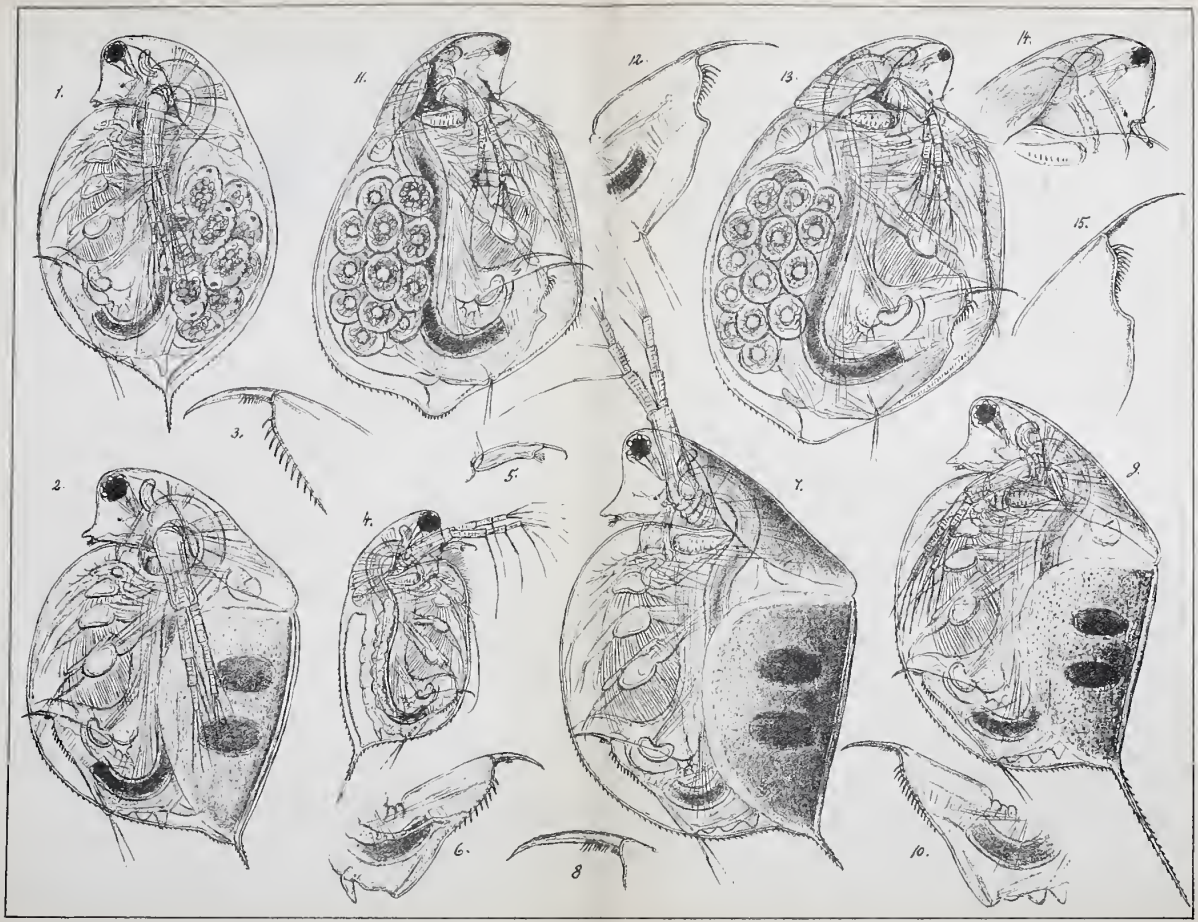
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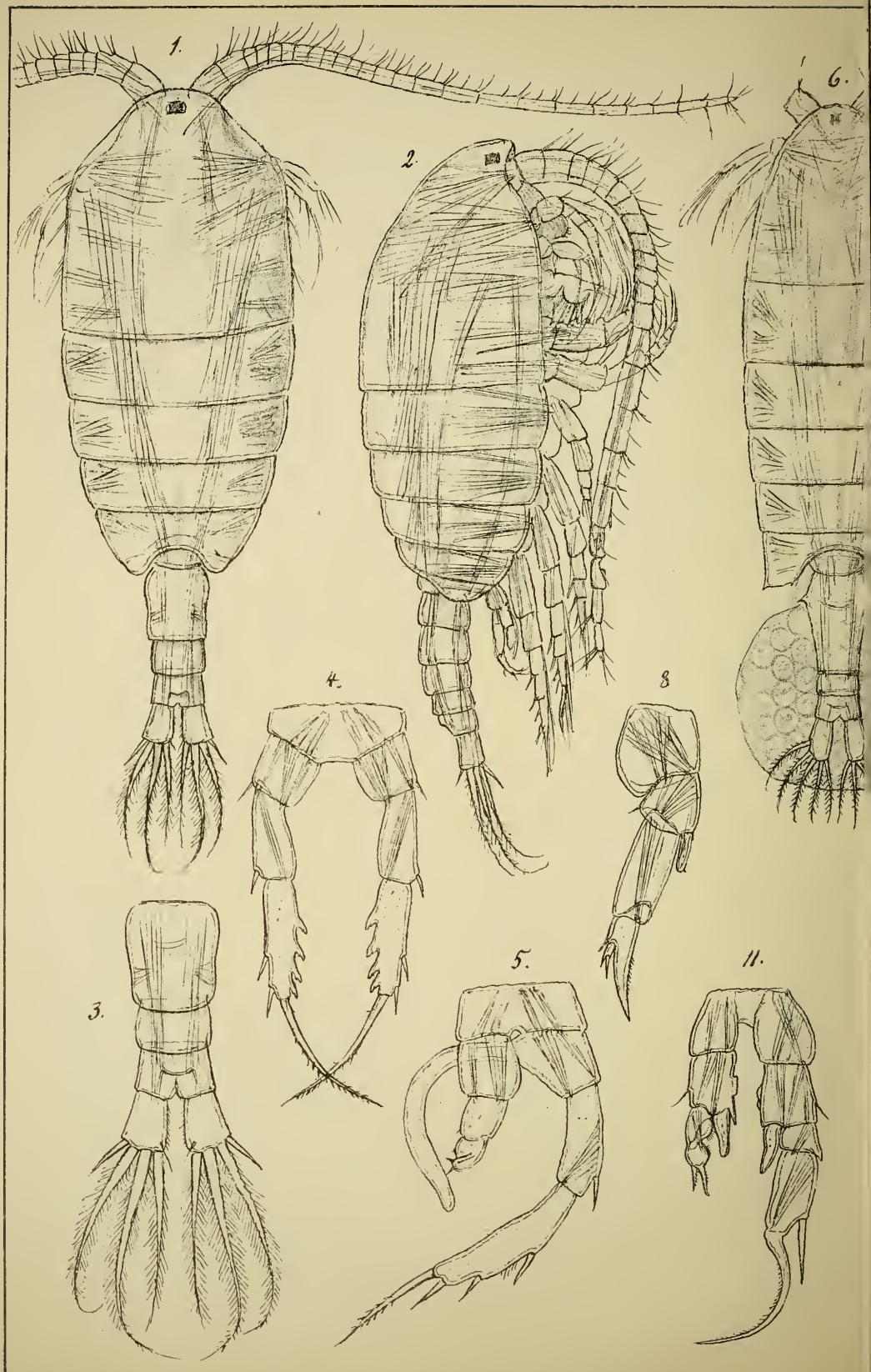
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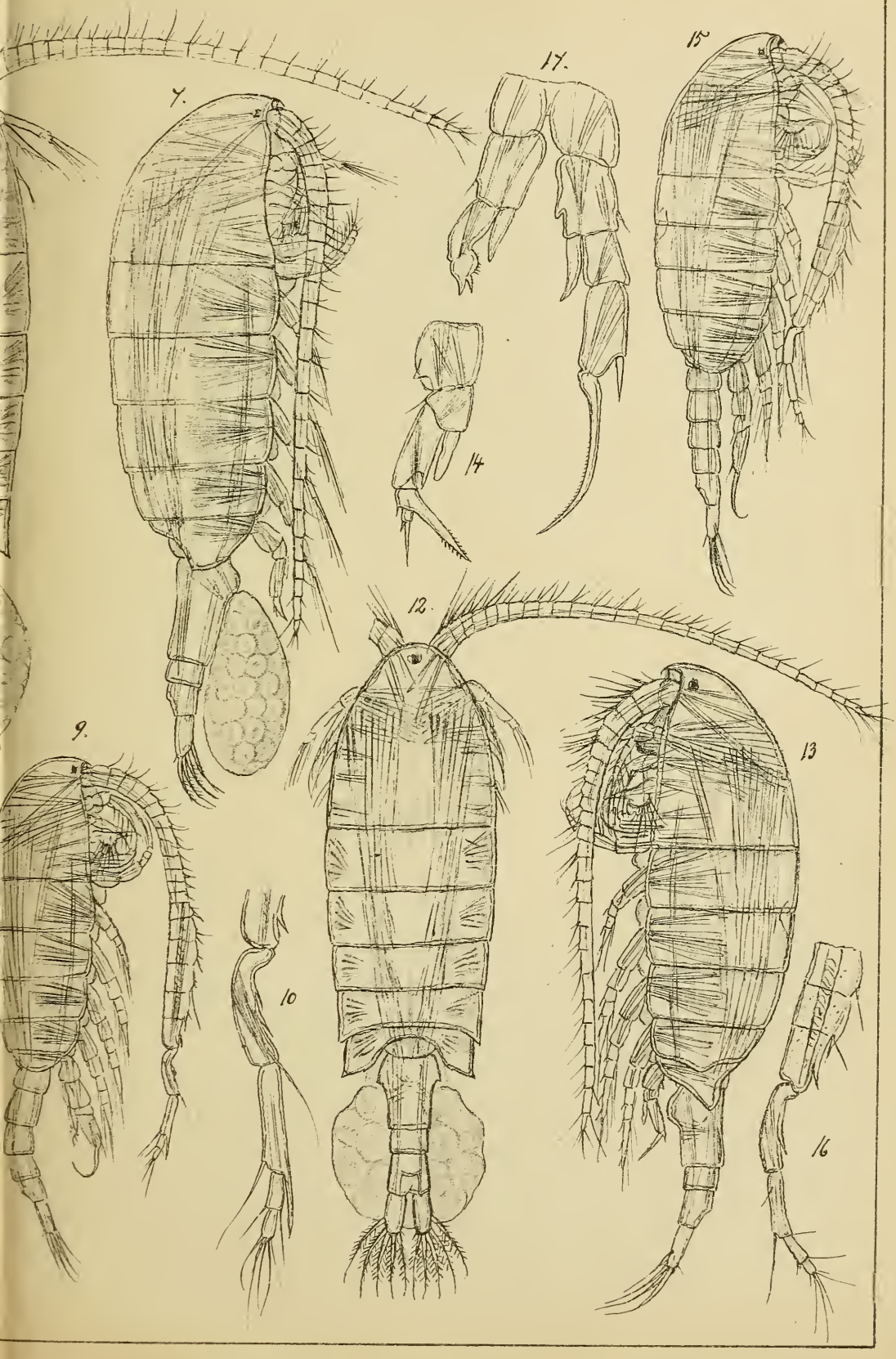
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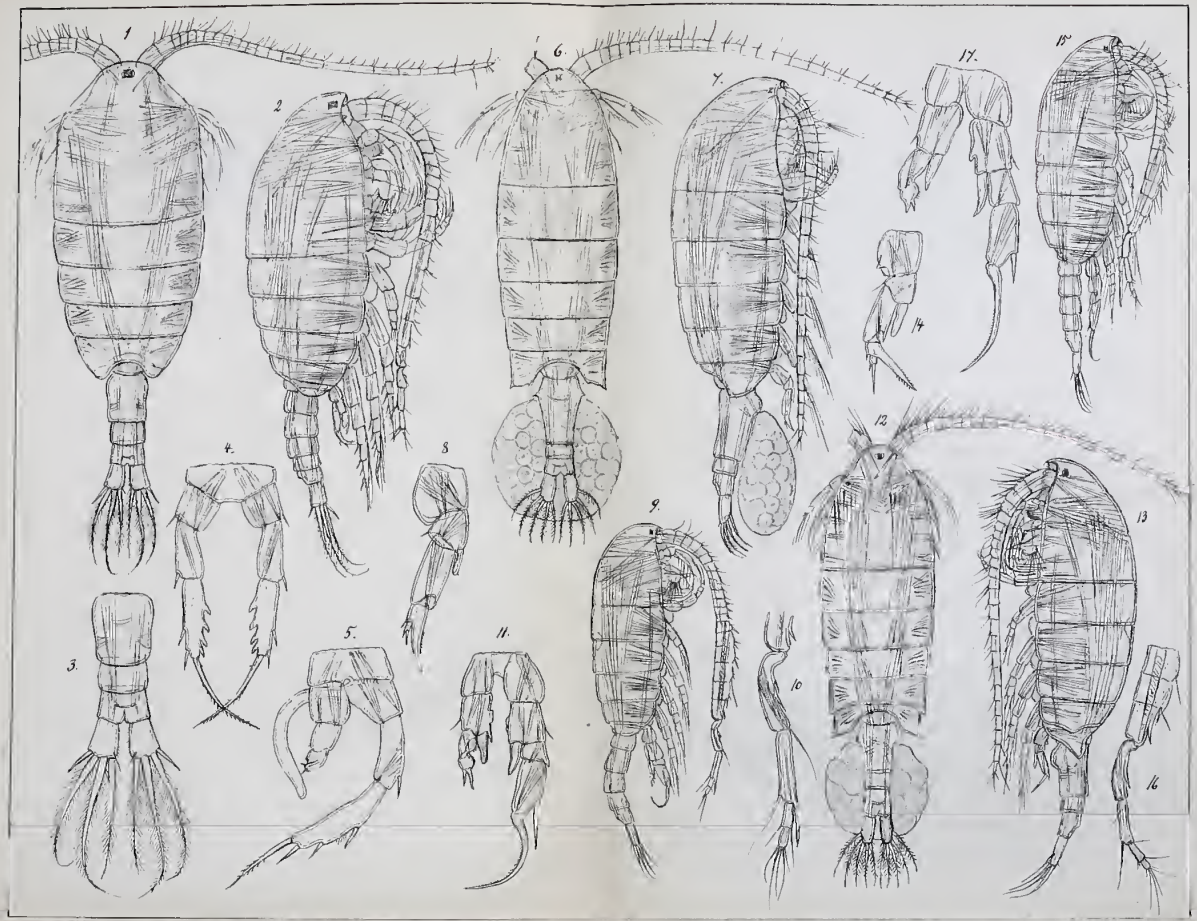
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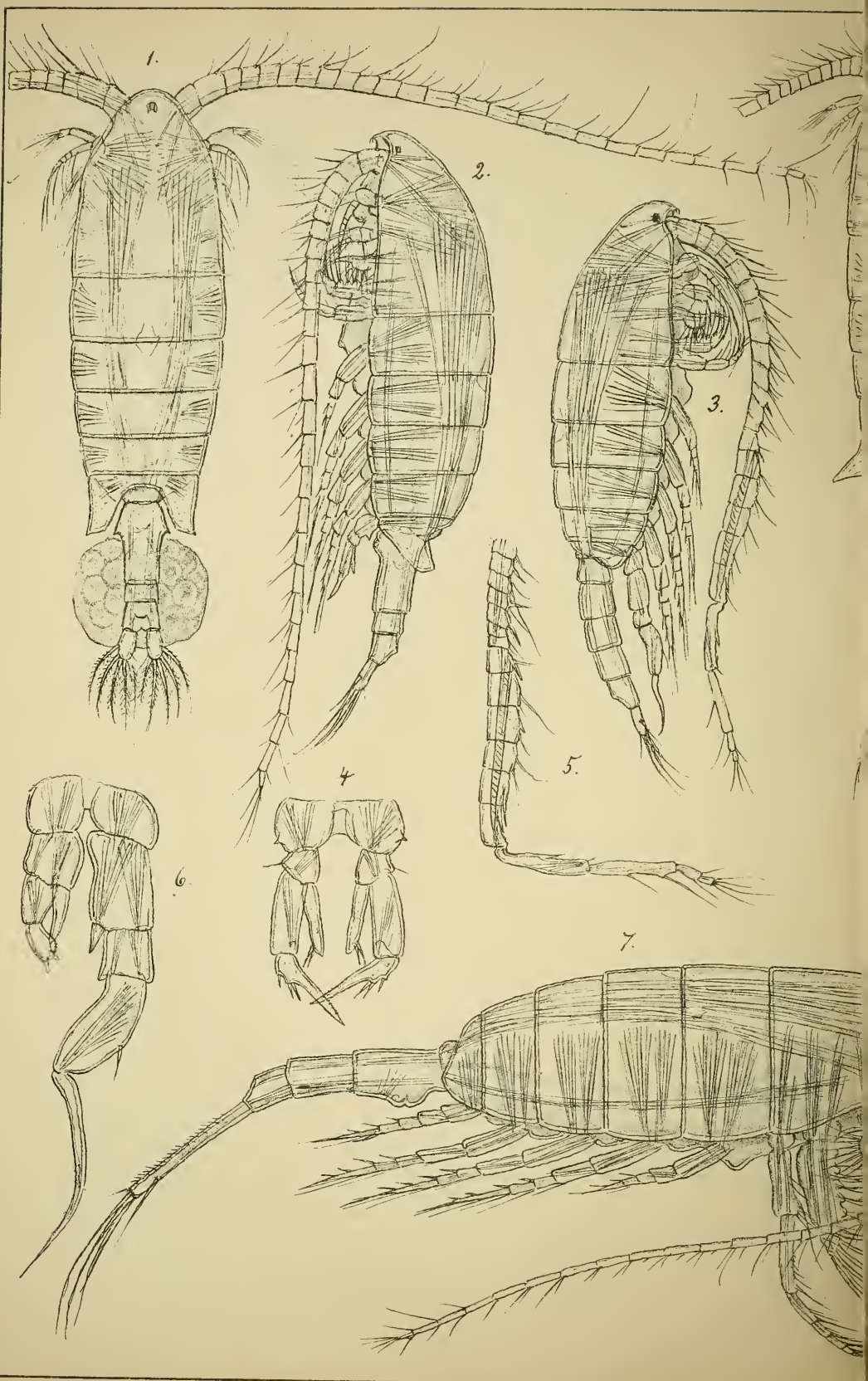
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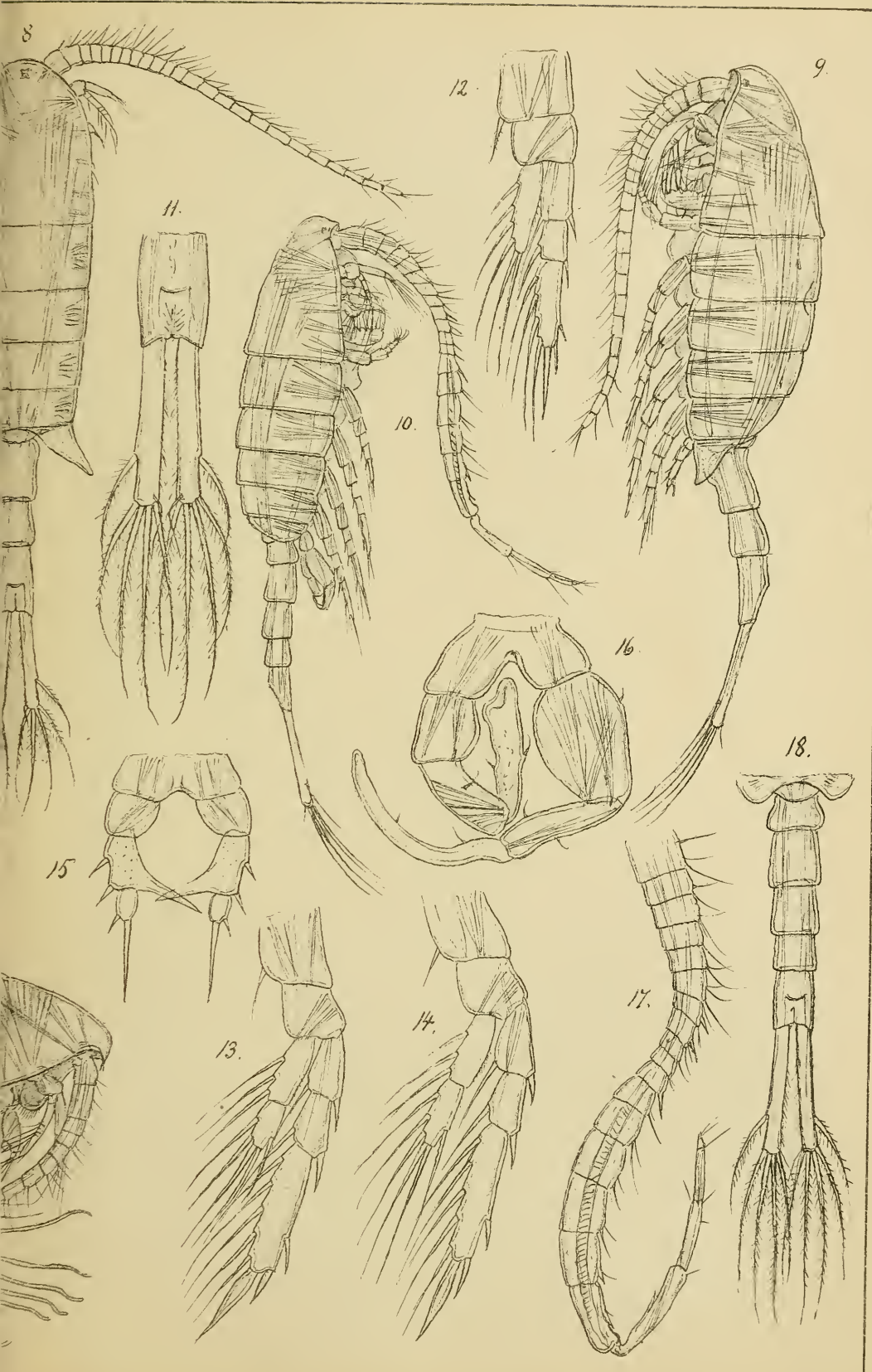
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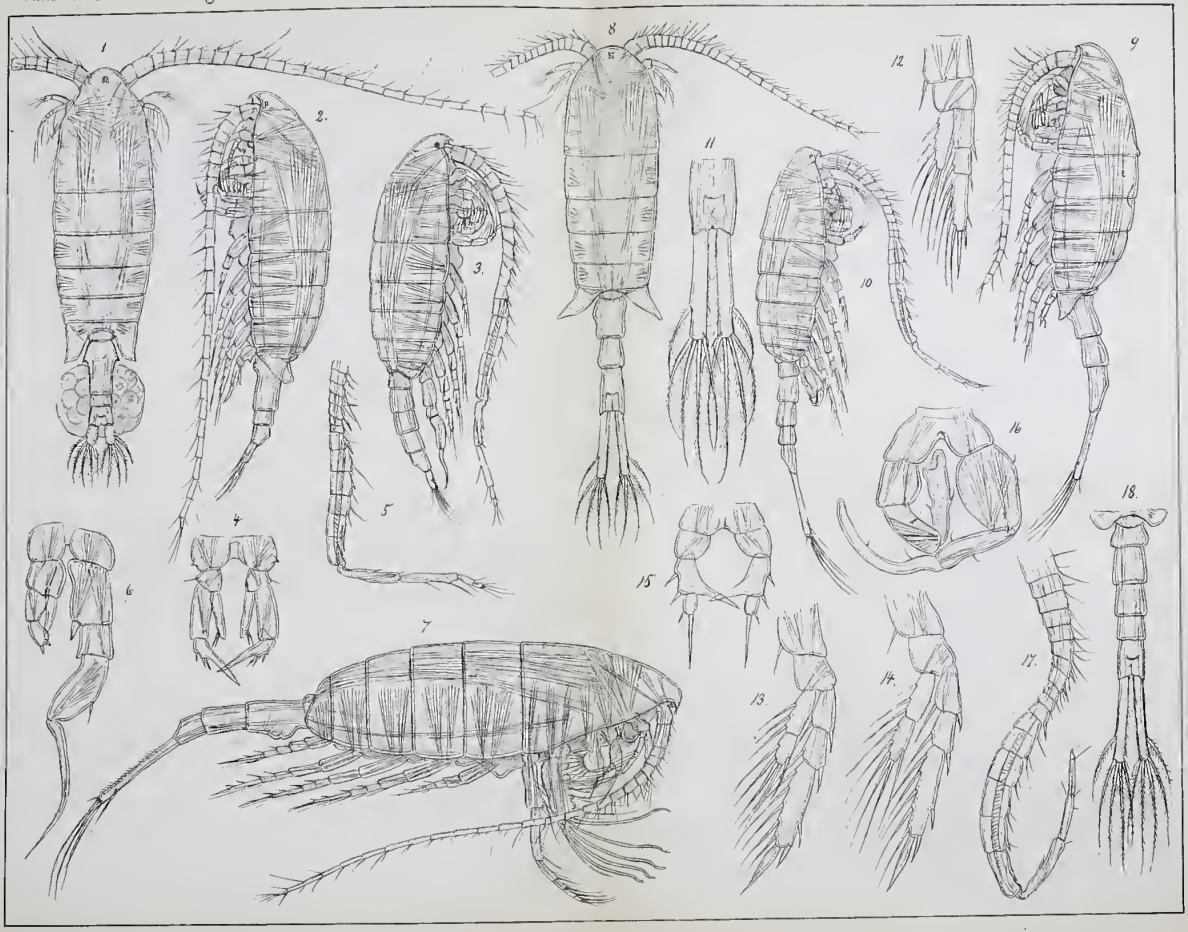
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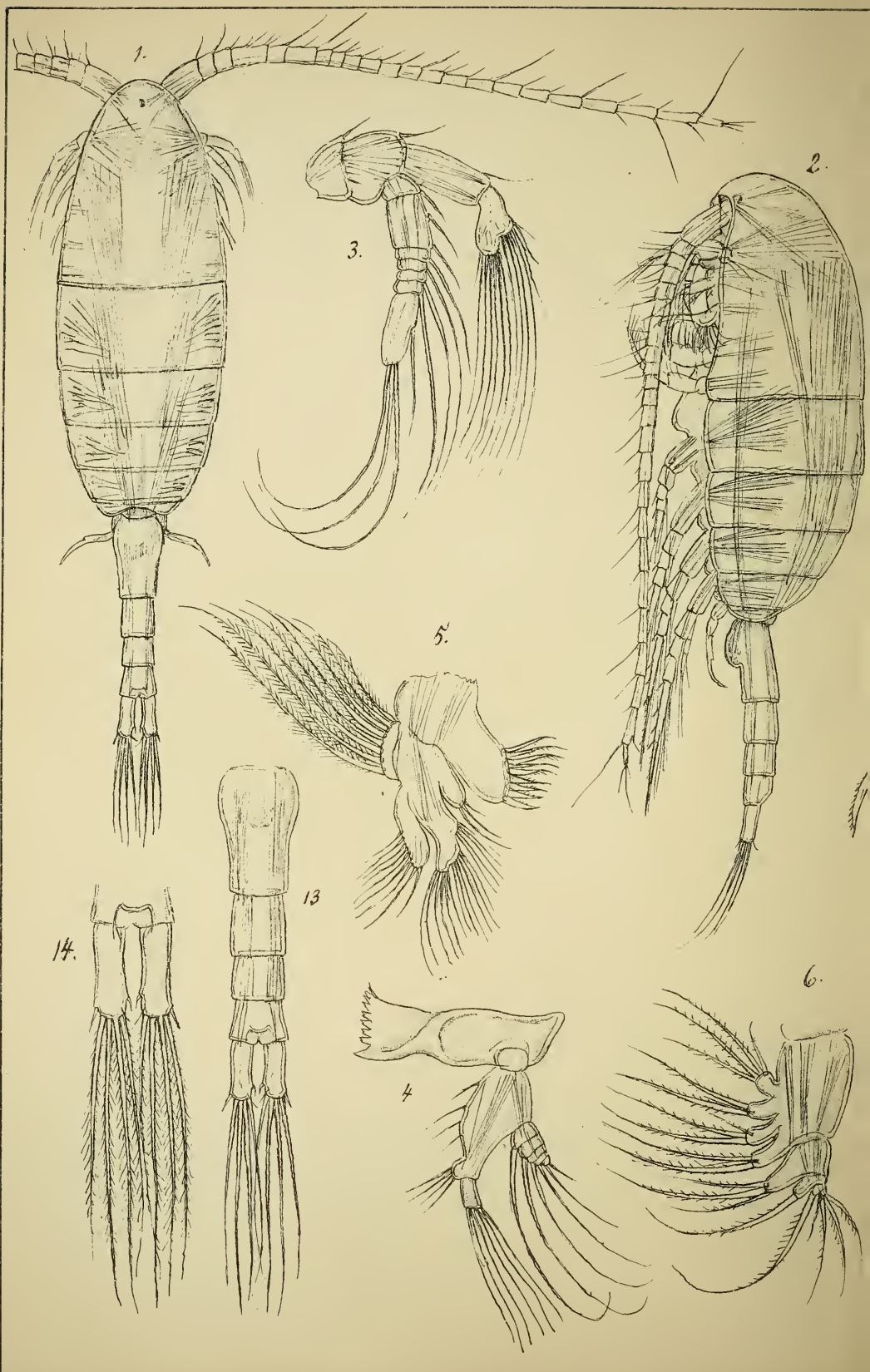
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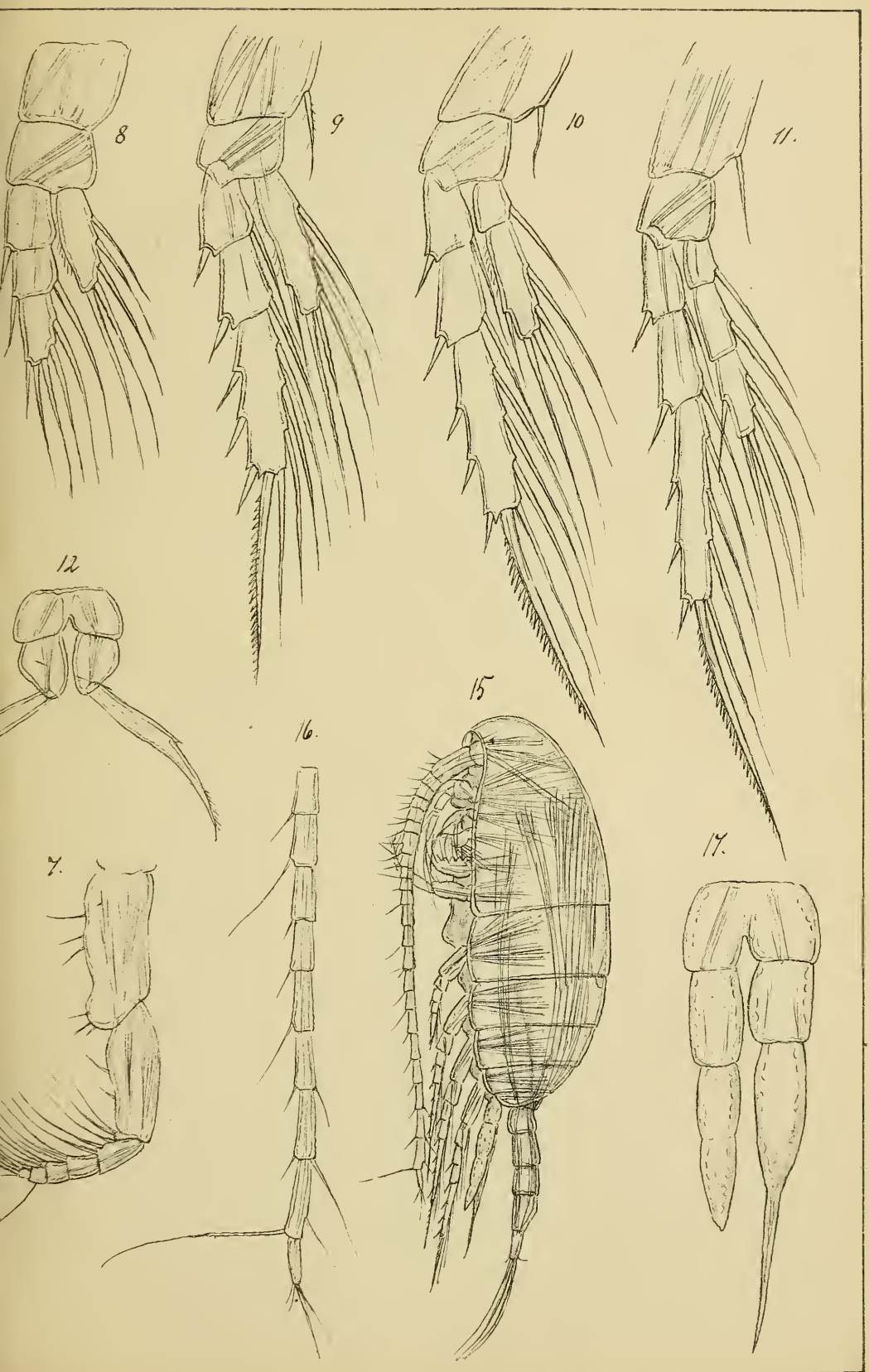
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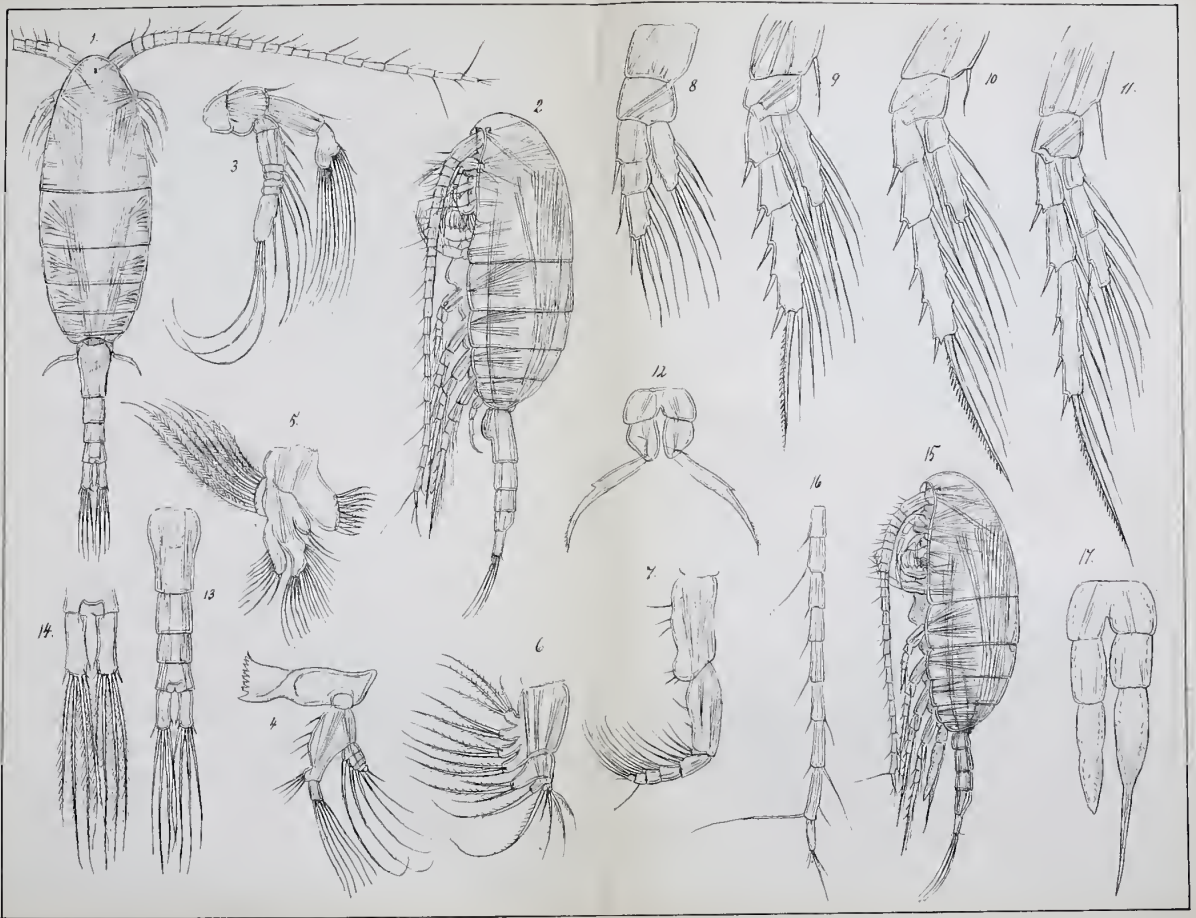
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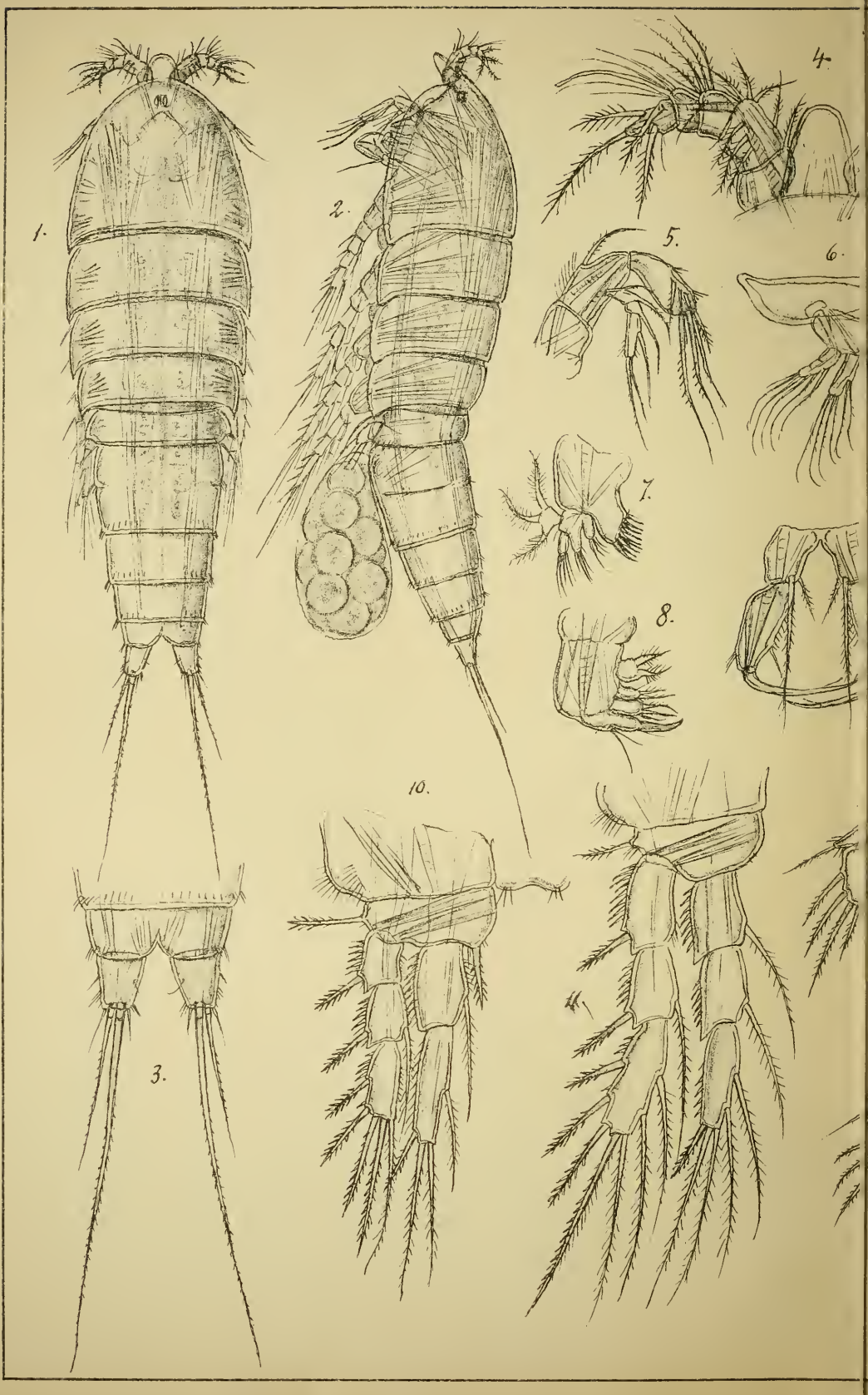
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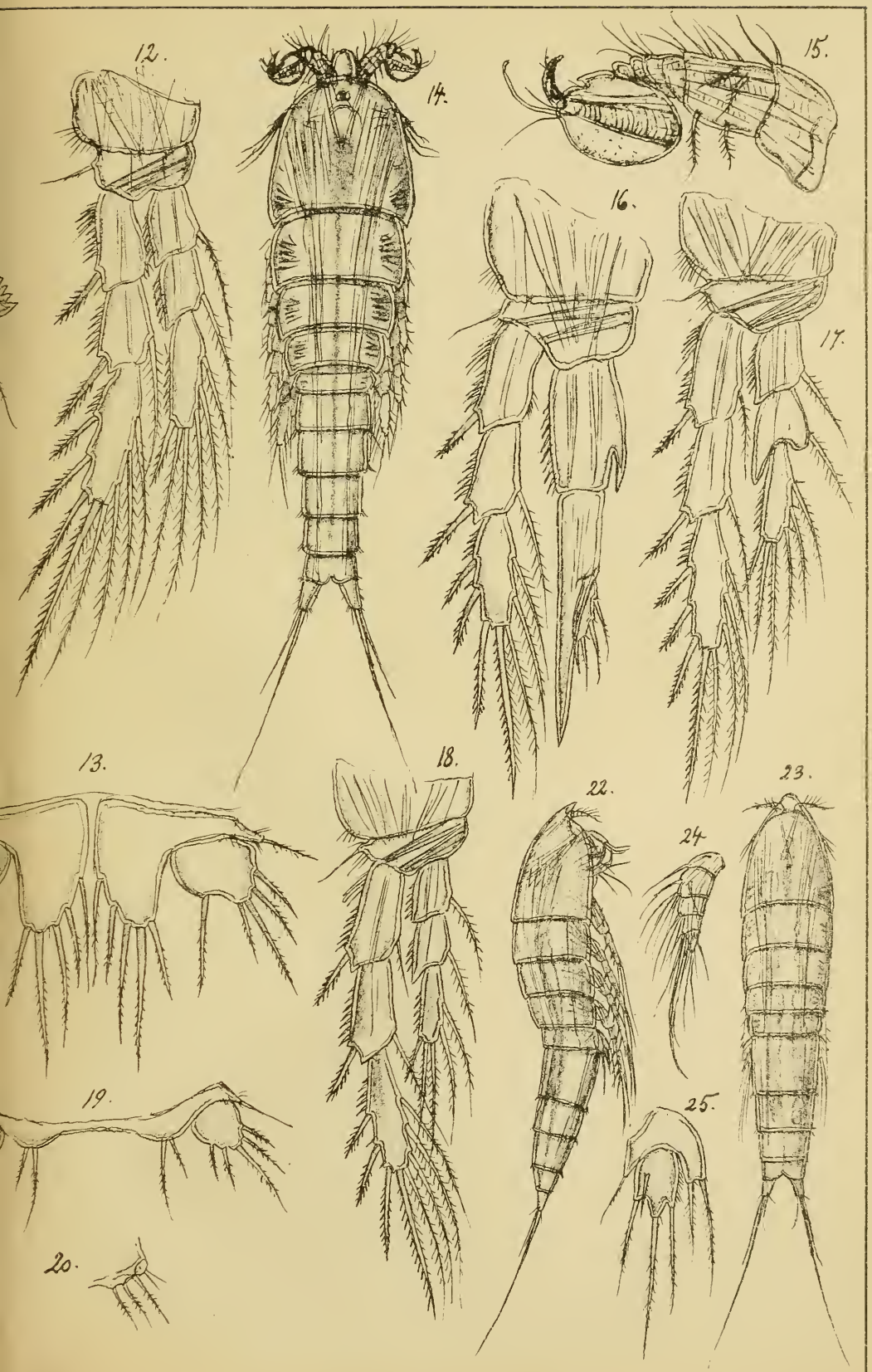
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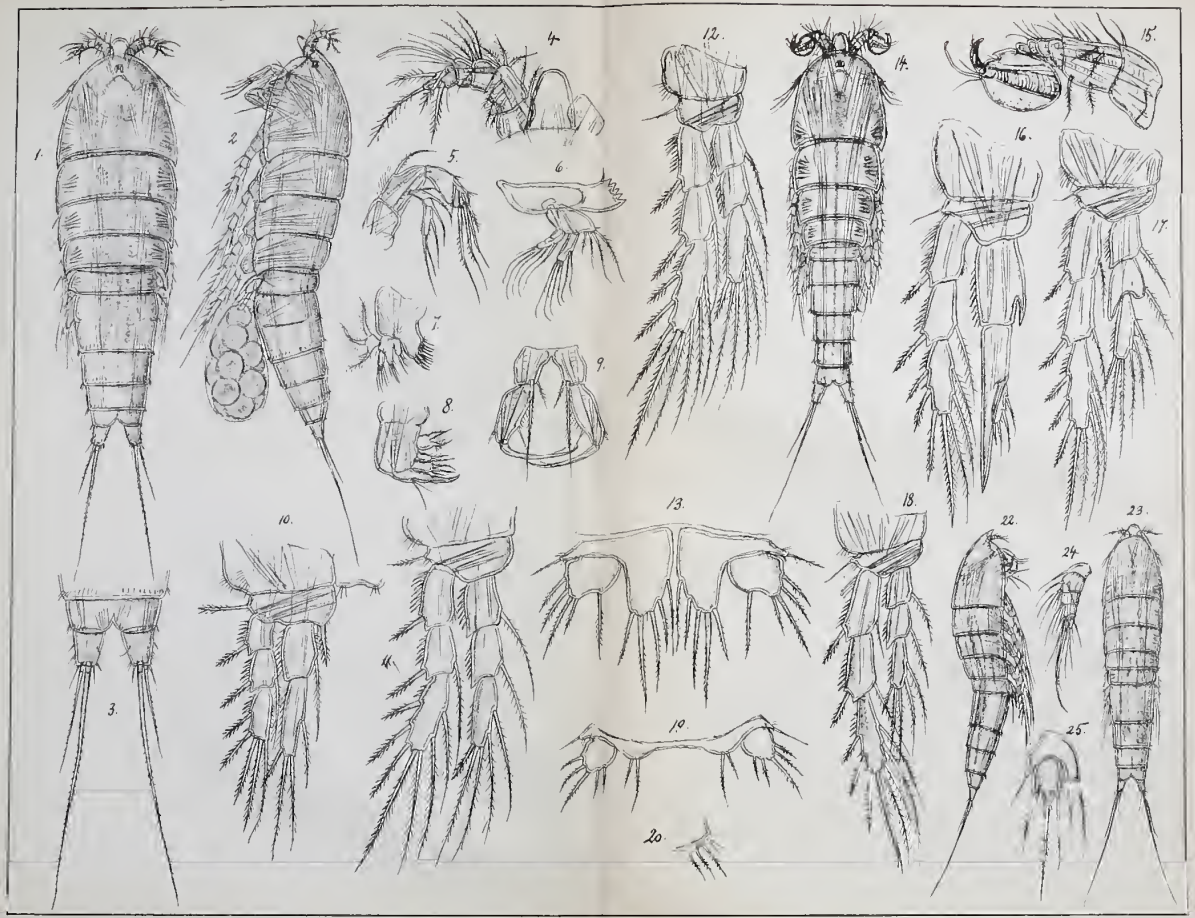
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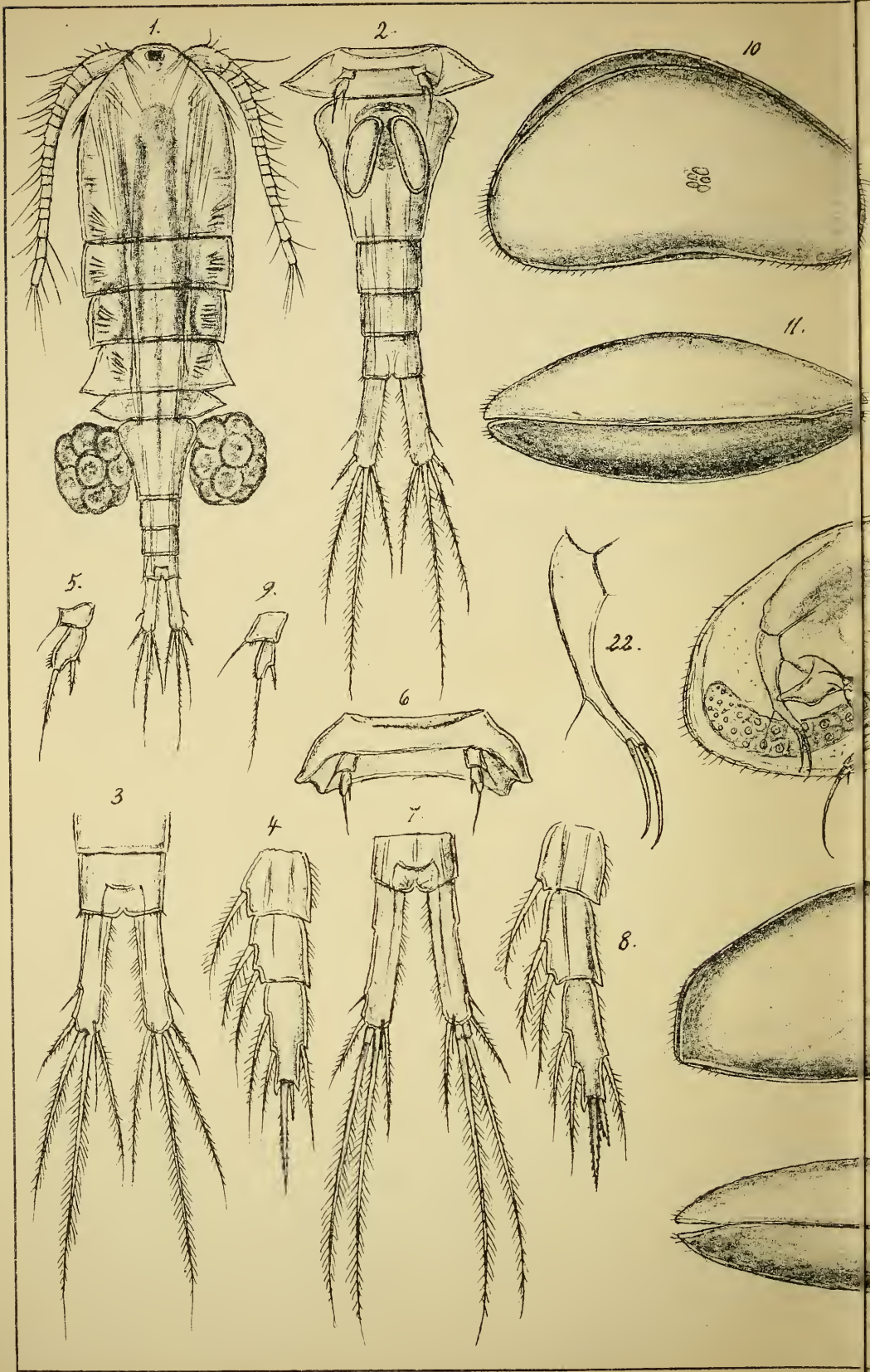
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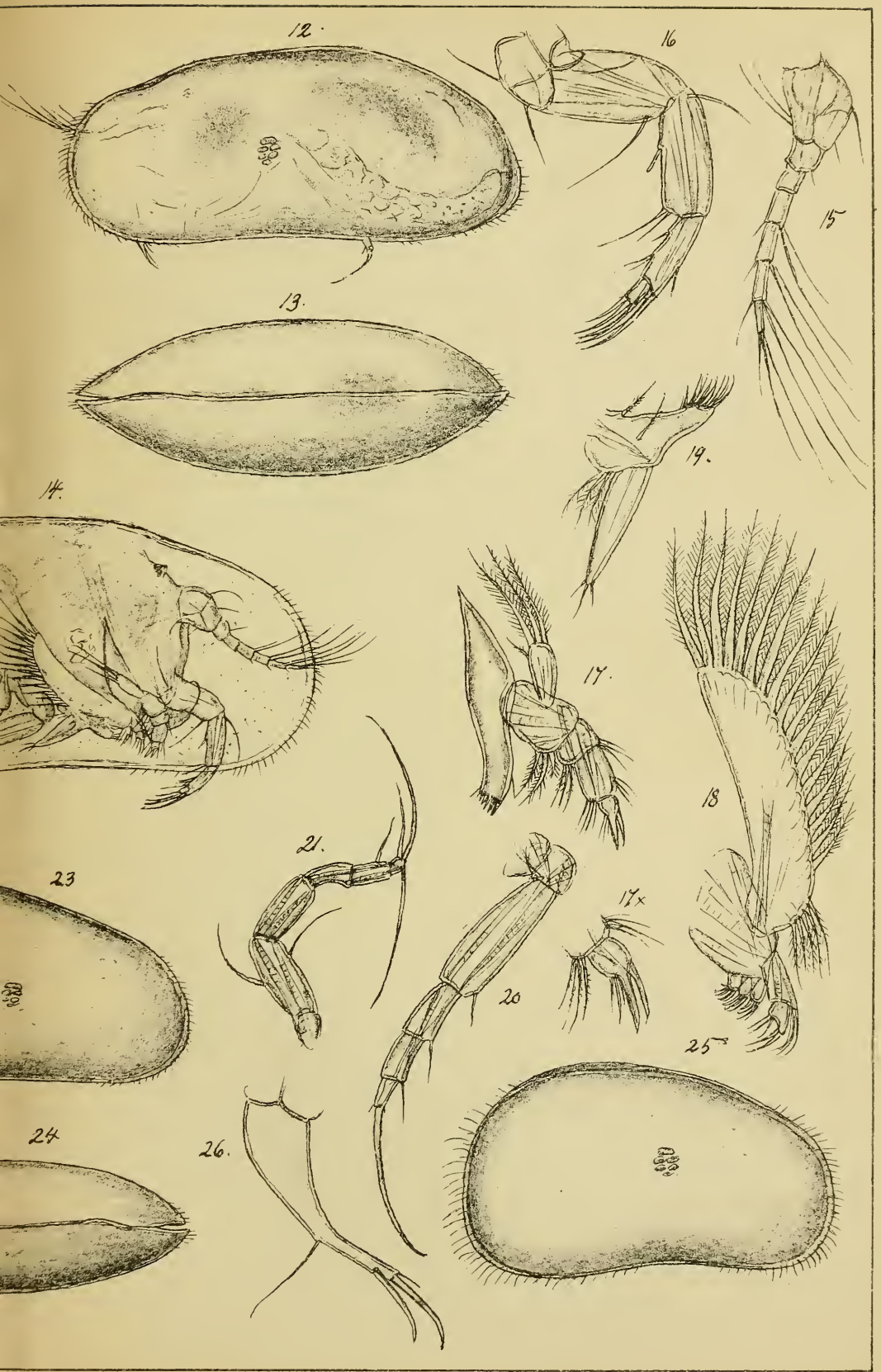
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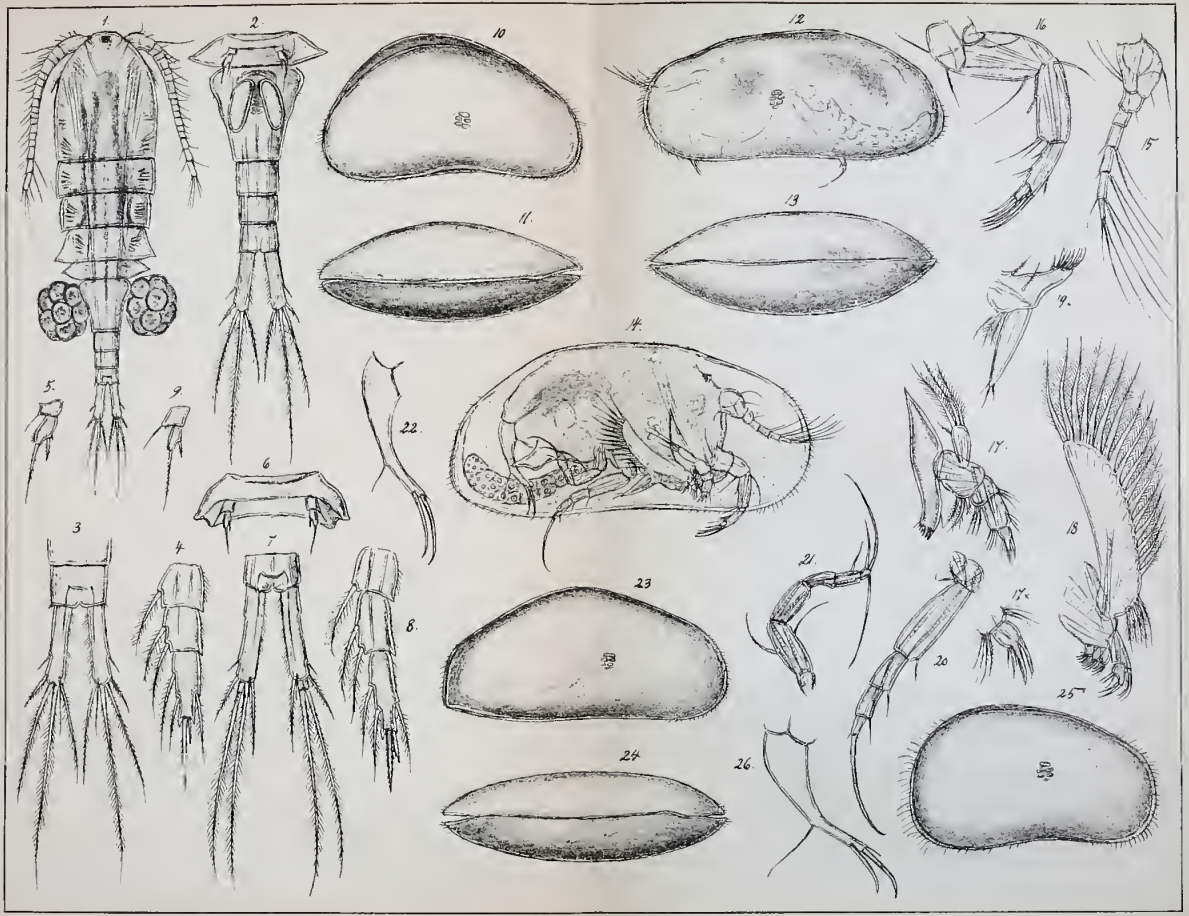
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