

AN ACCOUNT
OF THE
CRUSTACEA
OF
NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY

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VOL. VIII

COPEPODA
MONSTRILLOIDA & NOTODELPHYOIDA

PARTS V & VI

BOTRYLLOPHILIDÆ, ENTEROCOLIDÆ, SUPPLEMENT

WITH 16 AUTOTYPIC PLATES



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large, far exceeding in length the body of the mandible, rami however of very unequal size, the inner one being much the larger and fully twice as long as the basal part, proximal joint of this ramus imperfectly defined and without any setæ, distal joint oblong oval in form, and provided with 5 coarse setæ, one of which is attached to the outer edge, the other 4 to the obtusely rounded extremity; outer ramus attached close to the base of the inner, and forming a small triangular lamella, edged with 3 plumose setæ. Maxillæ with the masticatory lobe comparatively small, with a restricted number of spines; endopodal part with 2 comparatively short setæ inside the base, terminal joint imperfectly defined and edged with 3 similar setæ; exopodal lobe obsolete and replaced by 3 short setæ attached to the outer nearly straight edge of the palp, which is produced both proximally and distally to a small knob-like prominence. Anterior maxillipeds with the basal part imperfectly subdivided, and exhibiting inside 5 digitiform lobes and as many curved setæ; terminal part small, uniarticulate, with a minute apical spine and a densely ciliated seta outside the base. Posterior maxillipeds composed each of a very large and massive basal part divided into 2 segments, and of a comparatively short, but very mobile biarticulate dactylus curved inwards. The 4 anterior pairs of legs much reduced, with both rami quite short and uniarticulate, the outer one narrow triangular in form, with the inner edge perfectly smooth, the outer armed with 5 somewhat unequal spines; inner ramus rounded oval in form and fringed with thickish, sparingly ciliated setæ, the number of which is somewhat varying in the different pairs. Last pair of legs far less produced than in the other species, and attached to the sides of the posterior part of the trunk, somewhat nearer the dorsal face; each having the form of a narrow lanceolate lappet carrying on the tip a rather strong curved seta accompanied by 2 much smaller bristles, another still smaller bristle occurring on the upper edge somewhat beyond the middle. Only a single comparatively large globular ovisac present, attached to the dorsal face of the genital segment.

Body in the living animal of a pale reddish orange hue, with the ovarial tubes and the ripe ova bright green in colour. Length of adult female 1.70 mm.

Male unknown.

Remarks.—The above-described species may be easily distinguished from any of the other forms recorded by the quite unsegmented anterior division of the body, as also by the poor development of the legs.

Occurrence.—Some few female specimens of this form were found, many years ago, within the body cavity of a species of *Botryllus*, taken at Espevær, west coast of Norway.

Gen. 13. *Pteropygus*, G. O. Sars, n.

Generic Characters.—Body (of female) perfectly segmented, with the anterior division well marked off from the posterior, but less tumid than in *Botryllophilus*. Tail much narrower than the anterior division, and only composed of 3 segments; caudal rami short, clawed at the end. Antennæ and oral parts of a structure similar to that in *Botryllophilus*. The 4 anterior pairs of legs with both rami short, unarticulate, the outer one spiniferous, the inner setiferous. Last pair of legs transformed to 2 large wing-like lamellæ encompassing the last trunkal segment and meeting each other at the base dorsally, partly obtecting the single cake-like ovisac.

Remarks.—The present new genus is nearly allied to *Botryllophilus*, but differs conspicuously in the perfect segmentation of the anterior division of the body, the 3-articulate tail, and more particularly in the very unlike appearance of the last pair of legs, which are developed in a somewhat similar manner to that in the genus *Ascidicola*. The genus comprises as yet only a single species, to be described below.

23. *Pteropygus vestitus*, G. O. Sars, n. sp.

(Pl. XXXIII).

Specific Characters.—*Female*. Body comparatively short and stout, with the anterior division of nearly equal width throughout, and only very slightly vaulted dorsally. Cephalic segment scarcely narrower than the succeeding segment and evenly rounded in front, rostral prominence very slight. Last trunkal segment well defined and abruptly narrowed behind. Tail about equalling in length the trunk, and narrow cylindrical in form, with its 3 segments of nearly equal size. Caudal rami turned straight outwards, and armed at the end with 4 strong curved claws arranged in pairs. Eye very small. Anterior antennæ short and compressed, broad at the base, but rapidly tapered distally, being composed of 6 well defined joints clothed in front with numerous unequal rigid setæ. Posterior antennæ very like those in *Botryllophilus*, last joint armed with 8 spines, 4 on the outer edge and 4 on the tip. Mandibles with the 2 outermost teeth of the cutting edge much larger than the others; palp very large, nearly twice the length of the body of the mandible, and of a structure very similar to that in *Botryllophilus*. Maxillæ likewise rather similar, though having the terminal joint of the palp distinctly defined at the base. Anterior maxillipeds comparatively more fully developed than in that

genus, but built on the very same type. Posterior maxillipeds large and massive, forming, as in *Botryllophilus*, the chief attaching organs. The 4 anterior pairs of legs very imperfectly developed, outer ramus eultriform, with 6 strong spines outside, inner ramus rather smaller and scarcely lamelliform, being narrowed distally, and only provided with a restricted number of setæ at the tip. Last pair of legs forming 2 broadly oval lamellæ encompassing the body like a mantle, and extending nearly to the middle of the tail, each lamella provided at the end below with a small bristle. Ovisac oval, flattened, and extending almost to the end of the tail.

Colour whitish gray.

Length of adult female 1.80 mm.

Male unknown.

Remarks.—The above-described form cannot be confounded with any of the other members of the present family. From the species of the genus *Botryllophilus* it is at once distinguished by the very different appearance of the transformed last pair of legs, in which respect it more resembles the form next to be described.

Occurrence.—A few female specimens only of this peculiar form have as yet come under my notice. They were taken at Risør, south coast of Norway, and, as far as I remember it, from the branchial cavity of *Phallusia obliqua*.

Gen. 14. **Schizoproctus**, Aurivillius, 1885.

Generic Characters.—Body of female fusiform in shape, with thin and soft integuments and the segments only indicated by slight constrictions; that of male more distinctly segmented and of extremely small size, as compared with the female, to the ventral face of which it is found attached. Tail apparently composed of 5 segments, and not very sharply marked off from the trunk. Caudal rami small, curving outside, and minutely clawed at the end. Antennæ and oral parts built on the same type as in the 2 preceding genera, but on the whole less fully developed. The 4 anterior pairs of legs very small, with the rami uniaarticulate and nearly of equal structure, both forming small triangular pieces armed outside with short spines. Last pair of legs (in female), as in *Pteropygus*, transformed to broad lamellæ extending on each side along the base of the tail and separated dorsally by a deep and narrow cleft. Ovisac not yet observed.

Remarks.—This genus, established by Aurivillius, is evidently referable to the same family as the 2 preceding genera, though the outward appearance

of the body looks rather different, and more resembles that in some forms belonging to the next family. In the structure of the several appendages it seems to come nearest to the genus *Pteropygus*, but differs conspicuously in the general form of the body and its less distinctly marked segmentation, as also very essentially in the structure of the tail. The genus comprises as yet only a single species, to be described below.

24. *Schizoproctus inflatus*, Aurivillius.

(Pl. XXXIV)

Schizoproctus inflatus, Aurivillius, Krustaceer hos arktiske Tunicater, Vega Expeditionens vetenskaplige Arbeten, p. 248, Pl. 9, figs. 21—32.

Specific Characters.—*Female.* Body oblong fusiform in shape and rather tumid in the middle, but gradually narrowed both in front and behind; dorsal face evenly vaulted. Tail about equalling in length $\frac{2}{3}$ of the anterior division and somewhat tapered distally, last segment nearly twice the length of the preceding one and narrowly rounded at the extremity. Caudal rami comparatively small, each armed with 4 short, somewhat unequal claws. Anterior antennæ very short and stout, composed of only 4 joints clothed in front with comparatively short spiniform setæ of unequal length. Posterior antennæ shorter and stouter than in the 2 preceding species, terminal joint armed outside with 3 short spines and at the broadly truncated extremity with 3 similar spines followed by 2 thickish setæ. Mandibles and maxillæ of essentially same structure as in *Pteropygus*. Anterior maxillipeds however considerably shorter and stouter, with an additional small seta inside the base; seta of 3rd joint replaced by a claw-like spine. Posterior maxillipeds very thick at the base, with the posterior edge of 1st joint coarsely serrate. The 4 anterior pairs of legs with both rami short, triangular in form, the outer one armed outside with 5 stout spines. Last pair of legs, as in *Pteropygus*, broad, mantle-like and approximate dorsally.

Male of dwarfy size, scarcely exceeding in length $\frac{1}{5}$ of the female, and found attached to the ventral face of her genital segment. Body somewhat depressed and gradually attenuated behind, with all the segments sharply defined, the genital one rather swollen and containing on each side a pear-shaped spermatophore.

Colour not yet ascertained.

Length of adult female 6.10 mm, of male 1.30 mm.

Remarks.—The present remarkable form was described by Aurivillius in

the above-quoted paper from a solitary female specimen found in the branchial cavity of a *Phallusia* obtained off the coast of Spitsbergen. It was regarded by that author as the type of a particular family, for which he proposed the name *Shizoproctidæ*, not being aware of the close relationship of this form to the genus *Botryllophilus* of Hesse.

Occurrence.—Some few specimens of this form were obtained, many years ago, from the branchial cavity of *Phallusia obliqua* taken at Vadsö, eastern Finmark, from a depth of about 60 fathoms. Aurivillius also records a single female specimen from the Finmark coast.

Distribution.—Spitsbergen (Aurivillius).

Fam. 6. Enterocolidæ.

General Characters.—Body of female more or less vermiform in shape and nearly motionless, with thin and soft integuments and the segments only faintly indicated; that of male (according to Canu) cyclopoid in shape and provided with well developed locomotory appendages. Tail, as a rule, poorly developed, terminating in 2 small and simple blad-like caudal rami. Anterior antennæ very small. Posterior antennæ biarticulate and not prehensile (in female). Only 2 pairs of oral appendages present, the mandibles and the anterior maxillipeds being wholly absent¹). The 4 anterior pairs of legs (in female) very imperfectly developed, with the rami more or less rudimentary. 5th pair of legs, when present, forming 2 short lateral lappets issuing from the end of the anterior division of the body. Two free ov'sacs present in female appended to the base of the tail and generally very long, cylindrical in form.

Remarks.—The type of this family is the genus *Enterocola* of v. Beneden which in many respects differs considerably from the other Notodelphyoida, and in the general appearance of the body (in female) bears a strong resemblance to some of the Lernæoida (Condracanthidæ). This is perhaps still more the case with some of the other forms belonging to the present family. Yet, some well marked points of agreement with the family *Botryllophilidæ* are

¹) True, in some of the forms (*Enteropsis*, *Aplostoma*) mandibles have been described; but in my opinion the appendages so named are in reality not mandibles but more properly the maxillæ.

found to exist, and it therefore may be allowed to include the present family in the same great division. Moreover in habits these forms agree with the other Notodelphyoida in so far that they are parasites of the same group of animals, viz., the Tunicata. The want of any true masticatory appendages would seem to prove, that these Copepoda do not feed on any firm particles, but only on some nourishing fluids licked up from their hosts. In so far they present an evident agreement with the *poecilostomous Cyclopoida*, from which they indeed may be assumed to have been originally derived by a close adaption to changed conditions of life, just as the other Notodelphyoida in all probability by a similar adaption have taken their origin from *gnathostomous Cyclopoida*. 3 genera referable to the present family will be treated of below. Another genus, *Enteropsis*, has been established by Aurivillius, and moreover several of the peculiar forms recorded by Hesse, as found in compound Ascidians, may in all probability be included in the same family.

Gen. 15. **Cryptopodus**, Hesse, 1865.

Syn: *Aplostoma*, Canu.

Generic Characters.—Body of female oblong, more or less curved ventrally, with the anterior division well marked off from the posterior and terminating behind on each side in a short rounded lobe (the transformed 5th pair of legs), the last 2 trunkal segments coalesced. Tail very small and imperfectly segmented. Posterior antennæ smaller than the anterior ones, distal joint sublinear and minutely denticulate outside. Oral aperture forming a transverse fissure limited in front by a slightly prominent bell-shaped anterior lip. Maxillæ only present as a very trifling rudiment on each side of the oral aperture. Maxillipeds comparatively small, biarticulate, and terminating in a minute hook. The 4 anterior pairs of legs very imperfectly developed, basal part not distinctly defined, rami confluent at the base, the outer one forming a simple rounded lobe, the inner knife-shaped, with a few short denticles inside. Last pair of legs having the appearance of 2 simple conical lobes projecting on each side somewhat dorsally from the last trunkal segment. Ovisacs large, cylindrical in form.

Remarks.—This genus was established in the year 1865 by Hesse, but very imperfectly characterised, and on that account it was not recognised by subsequent authors. I think however I am right in identifying the genus *Aplostoma* of Canu with Hesse's genus. In any case the generic name proposed by Canu cannot be supported, as it has been long ago preoccupied.

The genus is prominently characterised by the small size of the posterior antennæ and the imperfect development of the oral parts, as also by the structure of the legs. Hesse records 2 species of this genus, *C. flavus* and *viridis*, none of which seems to be identical with the 2 Norwegian species here described.

25. *Cryptopodus brevicauda*, (Canu)

(Pl. XXXV)

Aplostoma brevicauda, Canu, Copépodes de Boulonnais, p. 223, Pl. XX, figs. 5—18.

Specific Characters.—*Female.* Body rather slender, with the anterior division nearly cylindrical in shape, though gradually narrowed in its anterior part; limits of the segments indicated by well-marked constrictions. Cephalic segment comparatively small and less distinctly defined, terminating in front in a minute tuberculiform prominence. Tail very short, scarcely exceeding in length $\frac{1}{6}$ of the anterior division, and only composed of 2 distinctly defined segments, the 1st rather broad at the base and rapidly tapered distally, the 2nd very small. Caudal rami somewhat divergent, each with a minute bristle in the middle of the outer edge and another still smaller one at the apex. Anterior antennæ conical in form and apparently composed of 4 joints, the outer 3 quite short and clothed with small bristles. Posterior antennæ much smaller than the anterior, with the distal joint narrow linear in form and armed outside with 4 minute denticles. Anterior lip with the hind edge quite smooth. Ovisacs fully as long as the entire body, cylindrical in form, and more or less twisted.

Body of the living animal rather opaque, of a pale rosy colour, with the ovarial tubes of a somewhat darker hue.

Length of adult female 2.50 mm.

Remarks.—The above-described form is unquestionably identical with that recorded by Canu as the type of his genus *Aplostoma*. Canu has also observed the male of this species, and has given good figures of it in the above-quoted work.

Occurrence.—Some few female specimens of this peculiar Copepod were taken, many years ago, at Espevær, west coast of Norway. They were found in the compound Ascidian, *Polyclinum luteum*, lying within a diverticle of the branchial sac of the Zooids.

Distribution.—Coast of France (Canu).

26. *Cryptopodus eruca*, (Norman).

(Pl. XXXV, 2)

Enterocola eruca, Norman, Last Shetland dredging Report, p. 300.

Specific Characters.—*Female.* Body resembling in shape that of the preceding species, but (in the specimens observed) more strongly curved and with the constrictions between the segments deeper. Tail comparatively still smaller than in *C. brevicauda*, with the caudal rami much shorter and without any bristles. Anterior antennæ apparently only composed of 3 joints. Posterior antennæ comparatively stouter than in that species, with the distal joint coarser and only armed with 3 short denticles outside. Anterior lip with the posterior edge divided into 6 very conspicuous tooth-like processes, 2 mediate and 2 on each side near the outer corner. The other appendages scarcely differing in structure from those in *C. brevicauda*. Ovisacs of quite an extraordinary length, being more than 3 times as long as the body, and of narrow cylindrical form.

Colour of the living animal not yet ascertained.

Length of adult female 2.30 mm.

Remarks.—My identification of the above-described form with Norman's *Enterocola eruca* is only based on its occurrence in the same host. For the remarks given by Norman are much too scanty for allowing any more exact comparison. It is undoubtedly congeneric with Canu's species, but differs conspicuously in the structure of the anterior lip, and more particularly in the enormous development of the ovisacs.

Occurrence.—Two female specimens, the one ovigerous, of this form were taken, many years ago, from as many specimens of *Styela intestinalis* collected in the upper part of the Christiania Fjord. Norman also obtained his specimen from the same Ascidian.

Distribution.—Shetland Isles (Norman).

Gen. 16. *Enterocola*, v. Benden 1860.

Generic Characters.—Body (of female) more or less slender, with the anterior division well marked off from the posterior and divided by slight constrictions into the normal number of segments. Tail more perfectly segmented than in *Cryptopodus*. Anterior antennæ very small. Posterior antennæ much larger, with the terminal joint lamellar and fringed at the end with spines or setæ. Anterior lip rounded. Maxillæ and maxillipeds rather

coarsely built, the former terminating in a stout conical process turned obliquely inwards, and having outside a scale-like palp edged with coarse spines; the latter imperfectly prehensile, with the distal joint produced at the end into 2 coarse spines. The 4 anterior pairs of legs more perfectly developed than in *Cryptopodus*, the basal part being well defined and biarticulate; rami comparatively small, uniarticulate, the outer one simple mucroniform, the inner lamelliform and provided at the end with 2 setæ; between each pair of these legs a thin connecting plate present, of different form in the different species. Last pair of legs transformed to 2 rather large curved lamellæ projecting on each side from the hind end of the trunk, and separated dorsally by a narrow cleft. Ovisacs less produced than in the preceding genus.

Remarks.—This genus was established as early as the year 1860 by v. Beneden, and ought of course to be considered as the type of the present family. It differs conspicuously from the preceding genus, especially as regards the structure of the posterior antennæ and the oral parts. Moreover the legs are built on a somewhat different type, and the transformed last pair bear an evident resemblance to those in some of the *Botryllophilidæ* (*Pteropygus*, *Schizoproctus*). A quite peculiar character of this genus is also found in the presence of a well-marked connecting plate between each pair of the 4 anterior pairs of legs. Two species of the present genus have been formerly recorded, viz., *E. fulgens* v. Beneden and *E. Betencourti* Canu. The Norwegian form described below cannot be referred to any of these 2 species.

27. **Enterocola bilamellata**, G. O. Sars, n. sp.
(Pl. XXXVI, 1)

Specific Characters.—*Female.* Body comparatively slender, with the anterior division almost perfectly cylindrical in shape, being scarcely at all narrowed in front. Cephalic segment nearly as large as the succeeding segment, and terminating in a blunt rostral prominence. Tail nearly attaining in length $\frac{1}{3}$ of the anterior division and rather swollen at the base, being composed of 4 well defined segments gradually narrowed behind. Caudal rami about the length of the last 2 segments combined and rather narrow, without any armature whatever. Anterior antennæ comparatively small, conical in form, and apparently composed of 4 joints, the 1st much the largest, the last very small, tuberculiform, without any bristles. Posterior antennæ with the distal joint remarkably large, forming a recurved oblong or linguiform plate divided at the end into 7 thin setiform appendages of unequal length. Maxilles with a

small bispinose lappet inside turning towards the mouth, terminal prominence very coarse, resembling somewhat in shape the molar process of the mandibles in higher Crustacea; palpe sub-spatulate in form, and armed on the broadly rounded terminal edge with 5 coarse spines of equal size. Maxillipeds short and stout, with a small conical process inside the large proximal joint; distal joint strongly chitinised, incurved, and projecting at the end into 2 coarse and somewhat unequal spiniform processes. The 4 anterior pairs of legs of essentially same structure, 2nd basal joint well defined from the 1st and projecting outside in a small, knob-like prominence; inner ramus oval in form, with the 2 apical setæ rather slender and considerably exceeding the ramus in length; connecting plate between these legs divided by a deep incisure into 2 rather prominent linguiform lamellæ. Last pair of legs obliquely oval in form and slightly upturned, advancing on each side somewhat over the base of the tail, each having on the posterior edge 2 small bristles. Ovisacs not present in the specimen examined.

Colour of the living animal not yet ascertained.

Length of the body 2.60 mm.

Male unknown.

Remarks.—The above-described form is unquestionably referable to the genus *Enterocola* of v. Beneden, but differs from the 2 other known species by the comparatively narrow cylindrical form of the anterior division of the body, as also in the structure of the posterior antennæ and oral parts. Another character by which this form is easily recognised is the peculiar bilamellar shape of the connecting plates between the 4 anterior pairs of legs. The specific name here proposed alludes to this character.

Occurrence.—A solitary specimen only of this form, an apparently fully grown female, but without ovisacs, has as yet come under my notice. It was found in a bottom-sample taken at Farsund, south coast of Norway, from a depth of about 40 fathoms, and had undoubtedly by some accident been thrown out from its abode within some compound Ascidian.

Gen. 17. *Mycophilus*, Hesse, 1865.

Generic Characters.—Body of female soft, vermiform, and more or less strongly curved dorsally, with no sharp demarcation between the anterior and posterior divisions. Trunkal segments indicated by slight constrictions of the body. Tail however not at all segmented, sac-like, with 2 very small lamellæ (the caudal rami) on the blunted extremity. Anal orifice not, as usual,

occurring at the end of the tail between these lamellæ, but transferred far in front on the dorsal face of the body, on which account the posterior part of the intestinal canal forms a peculiar coil within the caudal part. Antennæ and oral parts very imperfectly developed and densely crowded. Only 4 pairs of rudimentary legs present, the 5th pair being wholly absent. Ovisacs not yet observed.

Remarks.—This is one of the many genera established by Hesse for the peculiar parasites obtained by him from compound Ascidiæ. Indeed some of the characters distinguishing the present genus are so strange, that it could seem somewhat questionable if it might be included in the same family with the 2 preceding genera. Yet, some points of agreement are found to exist with the genus *Enteropsis* of Aurivillius, which is regarded as a true Enterocolid. The genus as yet only comprises a single species, to be described below.

28. *Mychophilus roseus*, Hesse.

(Pl. XXXVI, 2)

Mychophilus roseus, Hesse, Recherches sur les Crustacés rares ou nouveaux des côtes de France. Ann. d. sci. nat. Zoologie, Ser. 5, Vol. IV.

Syn: *Enteropsis warareusis*, Scott.

Specific Characters.—*Female.* Body slender, cylindrical in form, though having its posterior part always strongly curved dorsally. Cephalic segment comparatively small and somewhat contracted in front, terminating in a very minute knob-like rostral prominence. Trunkal segments only faintly marked, the last one confluent with the tail. Caudal part of body nearly occupying half the entire length, and scarcely at all narrower than the anterior division, its extremity bluntly rounded and carrying 2 very small blade-like caudal rami. Anal orifice occurring nearly in the middle of the dorsal face of the body, and defined by 2 distinctly projecting lips. Posterior part of the intestine rather narrow and forming a more or less deep coil within the tail, ascending along its dorsal face to the anal orifice. Anterior antennæ very small, and apparently only composed of 2 joints. Posterior antennæ with the distal joint abruptly recurved and terminating in an acute point. Maxillæ of a somewhat similar shape, but provided with a small lateral appendage (palp). Maxillipeds poorly developed, imperfectly articulate, and terminating in a very small hook-like point. Legs of uniform appearance, forming simple conical prominences extending laterally and each terminating in 2 very minute chitinous pieces (rudiments of rami). Ovisacs not yet observed.

Colour of the living animal pale rosy.

Length of adult female 1.50 mm.

Male unknown.

Remarks.—The figure given by Hesse does not leave any doubt on the identity of the above-described form with that observed by him, and it is likewise quite certain that the form recorded by Scott under the name of *Enteropsis wararensis* is the same species. Its very peculiar outward appearance renders it indeed easily recognisable from any other members of the present family.

Occurrence.—Some female specimens of this peculiar Copepod were obtained, many years ago, at Espevær, west coast of Norway. They were found in a species of *Botryllus*, taken up from a depth of about 20 fathoms.

Distribution.—Coast of France (Hesse), Scottish coast (Scott).

Supplement.

Gen. **Buprorus**, Thorell.

(See p. 61)

Of this remarkable genus, hitherto only represented by a solitary species, *B. Lovéni* Thorell, I have recently had an opportunity of examining a well defined new species, to be described below.

29. **Buprorus Nordgaard**i, G. O. Sars, n. sp.

(Pl. XXXVII, 1.)

Specific Characters.—*Female.* Body exhibiting the short bag-like form characteristic of the genus, though having the cephalic part considerably more exerted, and the posterior part, limiting the incubatory cavity, greatly expanded and broadly rounded off behind. Dorsal face of trunk exhibiting throughout a dense clothing of small scale-like prickles. Anterior antennæ resembling in shape those in *B. Lovéni*, being however divided into 7 well defined joints clothed in front with rather strong and somewhat unequal curved setæ, the 3 outermost joints much smaller than the others. Posterior antenna with the terminal joint nearly as large as the middle one and armed on the transversely truncated extremity with a stout spine followed by 4 somewhat curved setæ.

Mandibles considerably stronger than in the type species, with the palp well defined, conical in form, and provided at the tip with 2 unequal setæ. Maxillæ and posterior maxillipeds nearly as in *B. Lovéni*. Anterior maxillipeds, however, somewhat different, being comparatively more powerfully developed, with only a single bispinose lobe inside, and the terminal part undivided, claw-like, carrying outside, about in the middle, a bundle of 3 curved setæ. Legs on the whole less robust than in the type species, with the rami narrower and the spines on both of them uniseriate and much more slender, nearly setiform, 2 of them attached outside the terminal joint of the outer ramus; 4th pair smaller than the preceding ones, and having the number of spines considerably reduced. Last pair of legs about as in *B. Lovéni*, but with the apical spines more slender.

Colour of the living animal not yet ascertained.

Length of adult female scarcely exceeding 0.70 mm.

Male unknown.

Remarks.—The above-described form is unquestionably referable to the genus *Buprorus* of Thorell, but differs from the type species decidedly both as regards the general shape of the body and in the structure of some of the appendages, as indicated in the above diagnosis. It is also of much inferior size.

Occurrence.—2 female specimens of this form, the one with the incubatory cavity filled with embryos in the last (Nauplian) stage, were found in a small compound Ascidian (*Amoroecium*) taken by Mr. O. Nordgaard in the Trondhjem Fjord and kindly sent to me for examination together with other kinds of Ascidians. The species is named in honour of that distinguished naturalist, who also otherwise has assisted me in my investigation of the Norwegian Copepoda.

Fam. Anomopsyllidæ.

Gen. *Anomopsyllus*, G. O. Sars, n.

Generic Characters.—Body (of female) divided into 3 sharply defined sections: head, trunk and tail. Head comparatively small, triangular in form. Trunk rather tumid and without any distinct segmentation. Tail comparatively short and much narrower than the trunk, terminating in 2 diverging caudal

rami provided with the usual number of setæ. Antennæ attached close together, the anterior ones slender, multiarticulate, the posterior ones much smaller and not prehensile. Oral parts imperfectly developed, except the posterior maxillipeds, which are of a very peculiar structure and apparently prehensile, terminating in a narrow and very mobile digit minutely clawed at the tip. Only 3 pairs of legs present, all very imperfectly developed, forming small and simple triangular lamellæ without any armature whatever. 2 ovisacs present in female attached to the sides of the genital segment.

Remarks.—It is very questionable, if this remarkable genus at all is referable to the *Notodelphyoida*, and it is only provisionally recorded here, as I am at present unable to determine with certainty its true systematic position. In any case it ought to be regarded as the type of a quite distinct family, *Anomopsyllidæ*. The genus is founded on a single species, to be described below.

30. *Anomopsyllus pranizoides*, G. O. Sars, n. sp.

(Pl. XXXVII, 2)

Specific Characters.—*Female.* Body moderately slender, exhibiting in its general outline a perplexing similarity to a *Praniza*. Head rather small and produced in front to a beak-like prominence, its lateral edges abruptly curved behind. Trunk oblong oval in form, somewhat narrower in front than behind, posterior extremity very slightly emarginated in the middle, with the lateral corners evenly rounded off. Tail scarcely exceeding in length $\frac{1}{3}$ of the trunk, and apparently only composed of 3 segments, the 1st, or genital one, being rather tumid at the base; anal segment larger than the middle one and not dilated distally. Caudal rami narrow, sublinear in form, and considerably diverging, being about as long as the anal segment, each carrying at the tip 4 setæ, the 2 middle ones rather slender and abruptly bent outwards, the other 2 very small; seta of outer edge attached about in the middle. Anterior antennæ comparatively slender and attenuated, fully attaining the length of the head, and composed of 7 joints clothed with a few slender setæ. Posterior antennæ scarcely exceeding in length $\frac{1}{3}$ of the anterior, and composed of 3 nearly equal-sized joints, the last one tipped with a number of somewhat unequal setæ. Oral area exhibiting in the middle a rather wide hollowed space limited in front by a slightly curved projecting border, probably answering the anterior lip, and behind by a narrow oblong triangular plate (metastome). Mandibles and maxillæ undistinguishable, being replaced by an irregularly twisted chitinous frame limiting the above-mentioned hollowed space on each

side and sending off inwards 2 short prominences. Anterior maxillipeds very little prominent, and of a somewhat pyriform shape, converging anteriorly, and each terminating in a knob-like point closely applied to the anterior extremity of the metastomal plate. Posterior maxillipeds freely projecting and rather fully developed, but very unlike in structure those in other Copepoda, being doubly geniculate and composed of 4 joints, the 2nd of which is very large and lamellarly expanded inside; last 2 joints much narrower and forming together a slender very mobile digit, which is allowed to impinge against the inner sharpened edge of the preceding joint; proximal joint of this digit unarmed, distal joint somewhat attenuated and armed at the tip with 2 very small claws and, at some distance from the extremity, with another somewhat stronger claw. Legs with a slight indication to a division in a basal and terminal part, the latter exerted to an obtuse point without any traces of spines or setæ; 1st pair somewhat larger than the other 2, which successively diminish in size. Ovarial tubes in the specimen examined very conspicuous, extending throughout the greater part of the trunk, 2 tubes present on each side connected behind by a narrow commissure. Ovisacs broken off in the specimen examined, though indicated by a trifling piece of their coating still adhering to each side of the genital segment.

Colour of the living animal not yet ascertained.

Length of the specimen examined about 3 mm.

Male unknown.

Remarks.—The above-described form may be at once recognised from any of the hitherto known Copepoda. Indeed, the curious similarity it exhibits in the general outline of the body with a *Praniza* is very striking, and has given rise to the specific name here proposed. On the parasitic nature of this Copepod, no doubt can arise.

Occurrence.—A solitary specimen of this remarkable Copepod was found, detached from its host, in a bottom-sample taken in the upper part of the Christiania Fjord. In the same sample several other invertebrate animals were contained, among them also some Annelids, and it seems to me not improbable, that the present Copepod had originally been attached to one of these Annelids.

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¹⁾ I have not had an opportunity of consulting these papers.

SYSTEMATIC LIST

OF THE SPECIES DESCRIBED IN THE PRESENT VOLUME.

Monstrilloida.

Monstrilloida cyclopimorpha.

Thaumatopsyllidæ.

Thaumatopsyllus, G. O. Sars.
paradoxus, G. O. Sars.

Monstrilloida genuina.

Monstrillidæ.

Monstrilla, Dana.
longicornis, Thompson.
longiremis, Giesbrecht.
clavata, G. O. Sars.
leucopis, G. O. Sars.
gracilicauda, Giesbrecht.
helgolandica, Claus.
serricornis, G. O. Sars.

Cymbasoma, Thompson.
rigidum, Thompson.
Thompsoni, Giesbrecht,
longispinosum, Bourne.

Monstrillopsis, G. O. Sars.
dubia, Scott.

Notodelphyoida.

Notodelphyidæ.

Notodelphys, Allman.
Allmani, Thorell.
rufescens, Thorell.
caerulea, Thorell.
agilis, Thorell.
tenera, Thorell
elegans, Thorell.
prasina, Thorell.

Agnathaner, Canu.
typicus, Canu.

Doropygidæ.

Doropygus, Thorell.
pulex, Thorell.
psyllus, Thorell.
porcicauda, Brady.
Doropygopsis, G. O. Sars.
longicauda, Aurivillius.
Doropygella, G. O. Sars.
Thorelli, Aurivillius.

Pachypygus, G. O. Sars.

gibber, Thorell.

Notopterophorus, Costa.

auritus, Thorell.

papilio, Hesse.

micropterus, G. O. Sars.

Gunentophorus, Costa.

globularis, Costa.

Botachus, Thorell.

cylindratus, Thorell.

Buproridæ.

Buprorus, Thorell.

Lovèni, Thorell.

Nordgaardi, G. O. Sars.

Ascidicolidæ.

Ascidicola, Thorell.

rosea, Thorell.

Botryllophilidæ.

Botryllophilus, Hesse.

brevipes, G. O. Sars.

Pteropygus, G. O. Sars.

vestitus, G. O. Sars.

Schizoproctus, Aurivillius.

inflatus, Aurivillius.

Enterocolidæ.

Cryptopodus, Hesse.

brevicauda, Canu.

eruca, Norman.

Enterocola, v. Beneden.

bilamellata, G. O. Sars.

Mycophilus, Hesse.

roseus, Hesse

Anomopsyllidæ.

Anomopsyllus, G. O. Sars.

pranizoides, G. O. Sars.

INDEX.

| | Page. | | Page. | | Page. |
|------------------------------|--------|-------------------------------|------------|--------------------------------|--------------|
| <i>Agnathaner</i> | 38 | <i>gibber</i> | 51 | <i>Monstrillopsis</i> | 25 |
| <i>typicus</i> | 39 | <i>longicauda</i> | 47 | <i>dubia</i> | 26 |
| <i>Anomopsyllidæ</i> | 81 | <i>Normani</i> | 45 | <i>Mycophilus</i> | 78 |
| <i>Anomopsyllus</i> | 81 | <i>porcicauda</i> | 45 | <i>roseus</i> | 79 |
| <i>pranizoides</i> | 82 | <i>psyllus</i> | 44 | <i>Notodelphyidæ</i> | 29 |
| <i>Aplostoma</i> | 74 | <i>pulex</i> | 42 | <i>Notodelphyoida</i> | 28 |
| <i>brevicauda</i> | 75 | <i>pullus</i> | 42, 43 | <i>Notodelphys</i> | 30 |
| <i>Ascidicola</i> | 64 | <i>Thorelli</i> | 49 | <i>agilis</i> | 35 |
| <i>rosea</i> | 64 | <i>Enterocola</i> | 76 | <i>ascidicola</i> | 33 |
| <i>Bonnierilla</i> | 41, 57 | <i>betencourti</i> | 77 | <i>Allmani</i> | 31 |
| <i>Botachus</i> | 59 | <i>bilamellata</i> | 77 | <i>caerulea</i> | 34 |
| <i>cylindratus</i> | 59 | <i>eruca</i> | 76 | <i>elegans</i> | 37 |
| <i>fusiformis</i> | 59 | <i>fulgens</i> | 77 | <i>mediterranea</i> | 31, 33 |
| <i>Botryllophilidæ</i> | 66 | <i>Enterocolidæ</i> | 73 | <i>rufescens</i> | 33 |
| <i>Botryllophilus</i> | 67 | <i>Enteropsis</i> | 74 | <i>prasina</i> | 37 |
| <i>brevipes</i> | 67 | <i>wararensis</i> | 79 | <i>pusilla</i> | 37 |
| <i>macropus</i> | 67 | <i>Goniodelphys</i> | 41, 51 | <i>tenera</i> | 36 |
| <i>ruber</i> | 67 | <i>Gunentophorus</i> | 56 | <i>Notopterophorus</i> | 52 |
| <i>Buproridæ</i> | 61 | <i>globularis</i> | 57 | <i>auritus</i> | 53 |
| <i>Buprorus</i> | 61 | <i>Hæmocera</i> | 19 | <i>elongatus</i> | 55 |
| <i>Lovèni</i> | 62 | <i>Danæ</i> | 20 | <i>mipropterus</i> | 56 |
| <i>Nordgaardii</i> | 62 | <i>Monstrilla</i> | 10 | <i>papilio</i> | 55 |
| <i>Coeliacola</i> | 64 | <i>anglica</i> | 16 | <i>Pachypygus</i> | 51 |
| <i>setigera</i> | 64, 66 | <i>clavata</i> | 14 | <i>gibber</i> | 51 |
| <i>Cryptopodus</i> | 74 | <i>Danæ</i> | 22, 24, 27 | <i>Pteropygus</i> | 70 |
| <i>brevicauda</i> | 75 | <i>dubia</i> | 26 | <i>vestitus</i> | 70 |
| <i>eruca</i> | 76 | <i>gracilicauda</i> | 16 | <i>Schizoproctus</i> | 71 |
| <i>flavus</i> | 75 | <i>grandis</i> | 15 | <i>inflatus</i> | 72 |
| <i>viridis</i> | 75 | <i>helgolandica</i> | 17 | <i>Sphæronotus</i> | 56 |
| <i>Cymbasoma</i> | 9, 19 | <i>intermedia</i> | 11 | <i>Thorelli</i> | 57 |
| <i>longispinosum</i> | 23 | <i>leucopis</i> | 15 | <i>Thaumaleus</i> | 8, 9, 10, 19 |
| <i>rigidum</i> | 20 | <i>longicornis</i> | 11 | <i>Claparèdi</i> | 20 |
| <i>Thompsoni</i> | 22 | <i>longiremis</i> | 13 | <i>germanicus</i> | 20 |
| <i>Doroixys</i> | 41 | <i>longispinosa</i> | 23 | <i>longispinosus</i> | 23 |
| <i>Doropygella</i> | 49 | <i>rigida</i> | 20 | <i>rigidus</i> | 20 |
| <i>Thorelli</i> | 49 | <i>serricornis</i> | 18 | <i>Thompsoni</i> | 22 |
| <i>Doropygidæ</i> | 40 | <i>viridis</i> | 8 | <i>typicus</i> | 8 |
| <i>doropygopsis</i> | 46 | <i>Monstrillidæ</i> | 7 | <i>Thaumatoapsyllidæ</i> | 4 |
| <i>longicauda</i> | 47 | <i>Monstrilloida</i> | 3 | <i>Thaumatoapsyllus</i> | 4 |
| <i>Doropygus</i> | 42 | <i>M. cyclopimorpha</i> | 4 | <i>paradoxus</i> | 5 |
| <i>auritus</i> | 53 | <i>M. genuina</i> | 7 | | |

AN ACCOUNT
OF THE
CRUSTACEA
OF
NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY

G. O. SARS

PROFESSOR OF ZOOLOGY AT THE UNIVERSITY OF CHRISTIANIA

VOL. VIII

COPEPODA
MONSTRILLOIDA & NOTODELPHYOIDA
WITH 37 AUTOTYPIC PLATES



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1921

PREFACE.

By this Volume I definitely conclude my Account of the Norwegian *Copepoda*, it being my purpose in the next Volume to enter upon an entirely different group of Crustacea, viz., the *Ostracoda*. Although my Account of the former group has required no less than 5 Volumes, and more than 500 species have been described, I do not by any means imagine, that it gives a fully exhaustive record of the existing forms, and I am indeed convinced that many interesting species still remain to be detected, especially of the smaller deep-water Harpacticoida and of the semiparasitic forms. Yet, I hope that my Account may have thrown some light on this formerly much neglected part of our Fauna, and that it may serve as the basis for further investigations.

As to the two anomalous groups treated of in the present Volume, no record whatever has as yet been given on the Norwegian forms belonging to them.

I will not omit, also on this occasion, to tender my most sincere thanks to the Direction of the Bergen Museum for the interest, it still shows for the progress of my work.

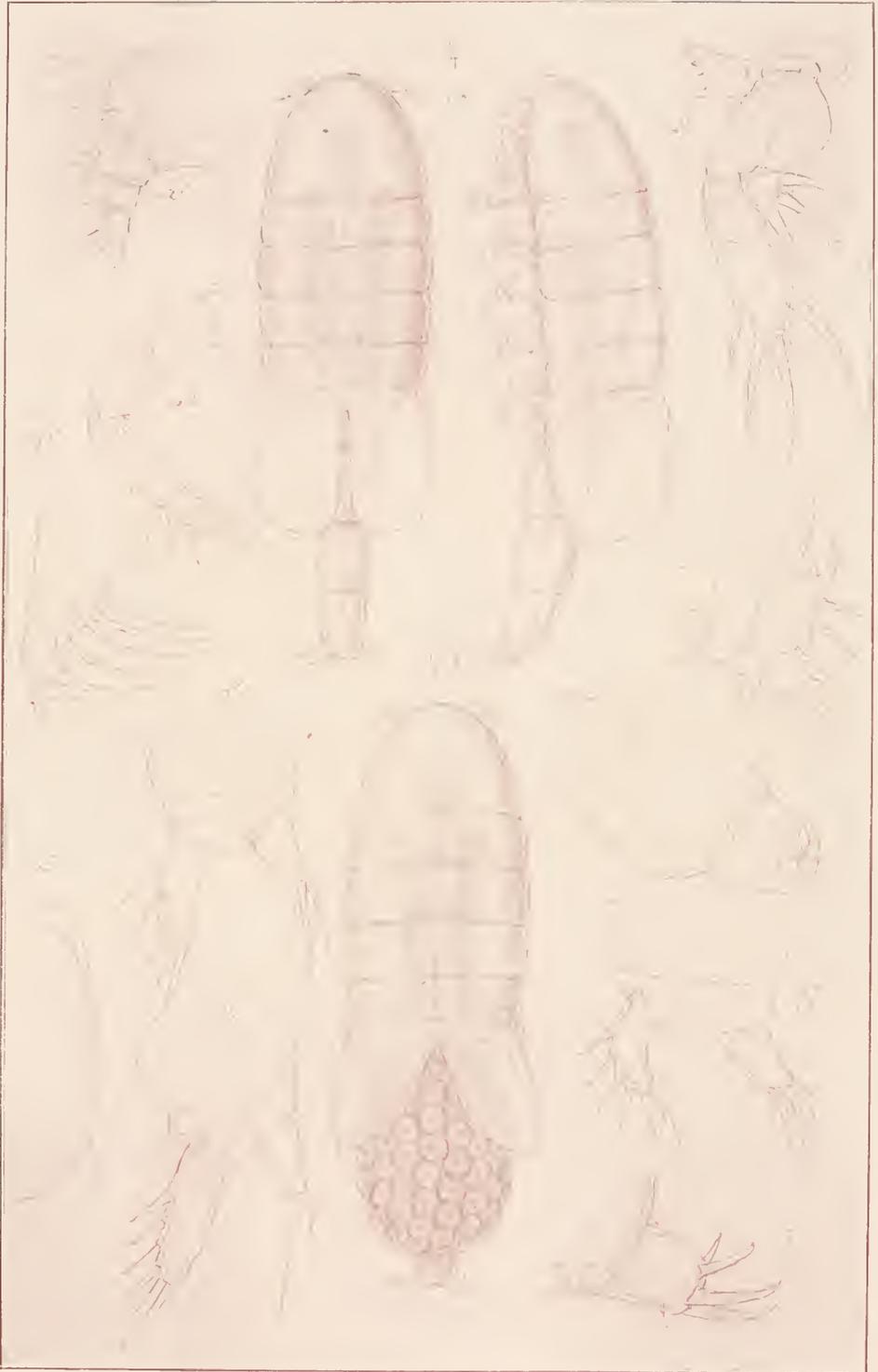
G. O. Sars

Copepoda

Botryllophilidæ

Notodelphyoida

Pl. XXXIII



G. O. Sars del.

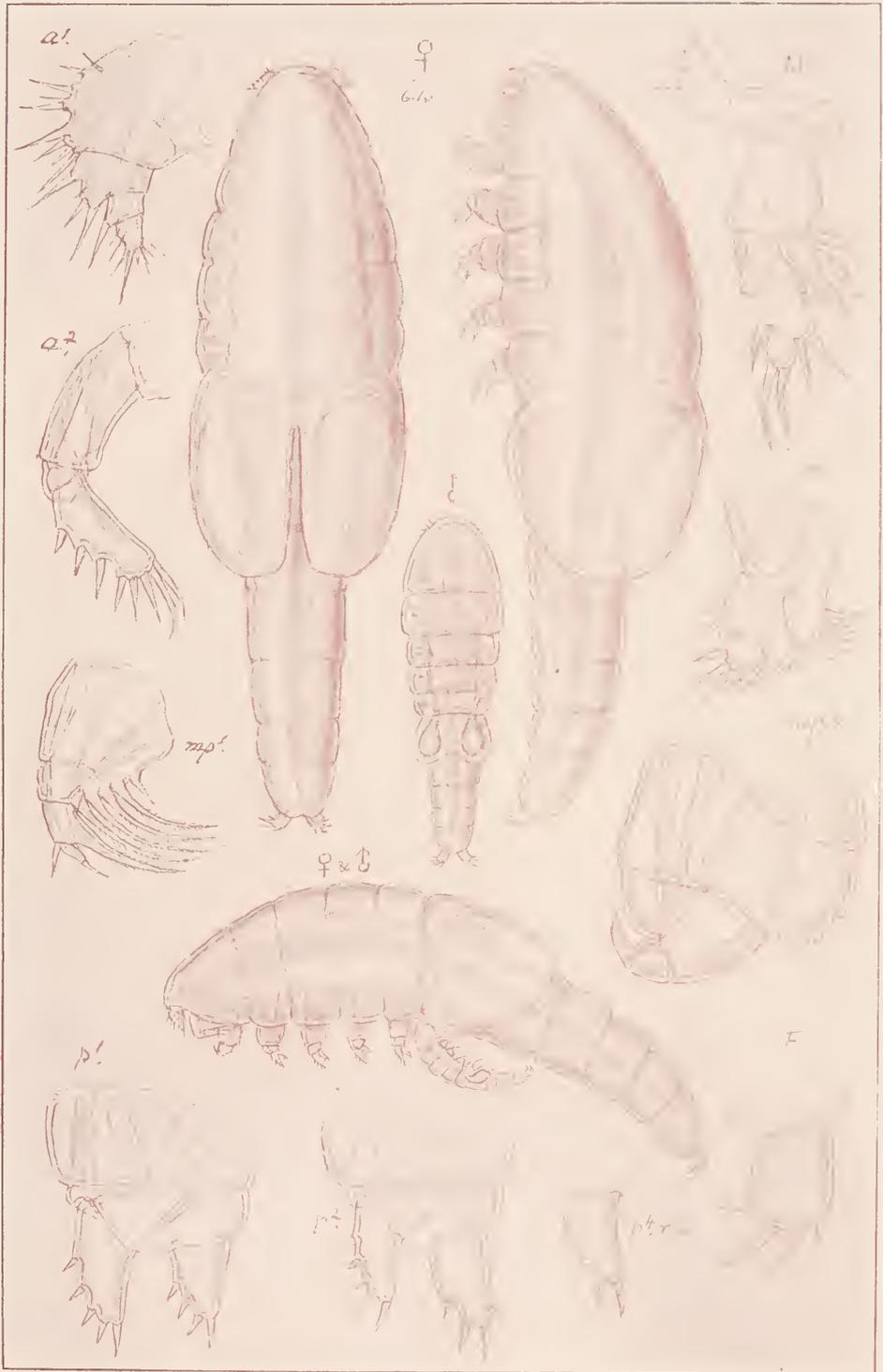
Pteropygus vestitus, G. O. Sars

Copepoda

Botryllophilidæ

Notodelphyoidea

Pl. XXXIV



G. O. Sars del.

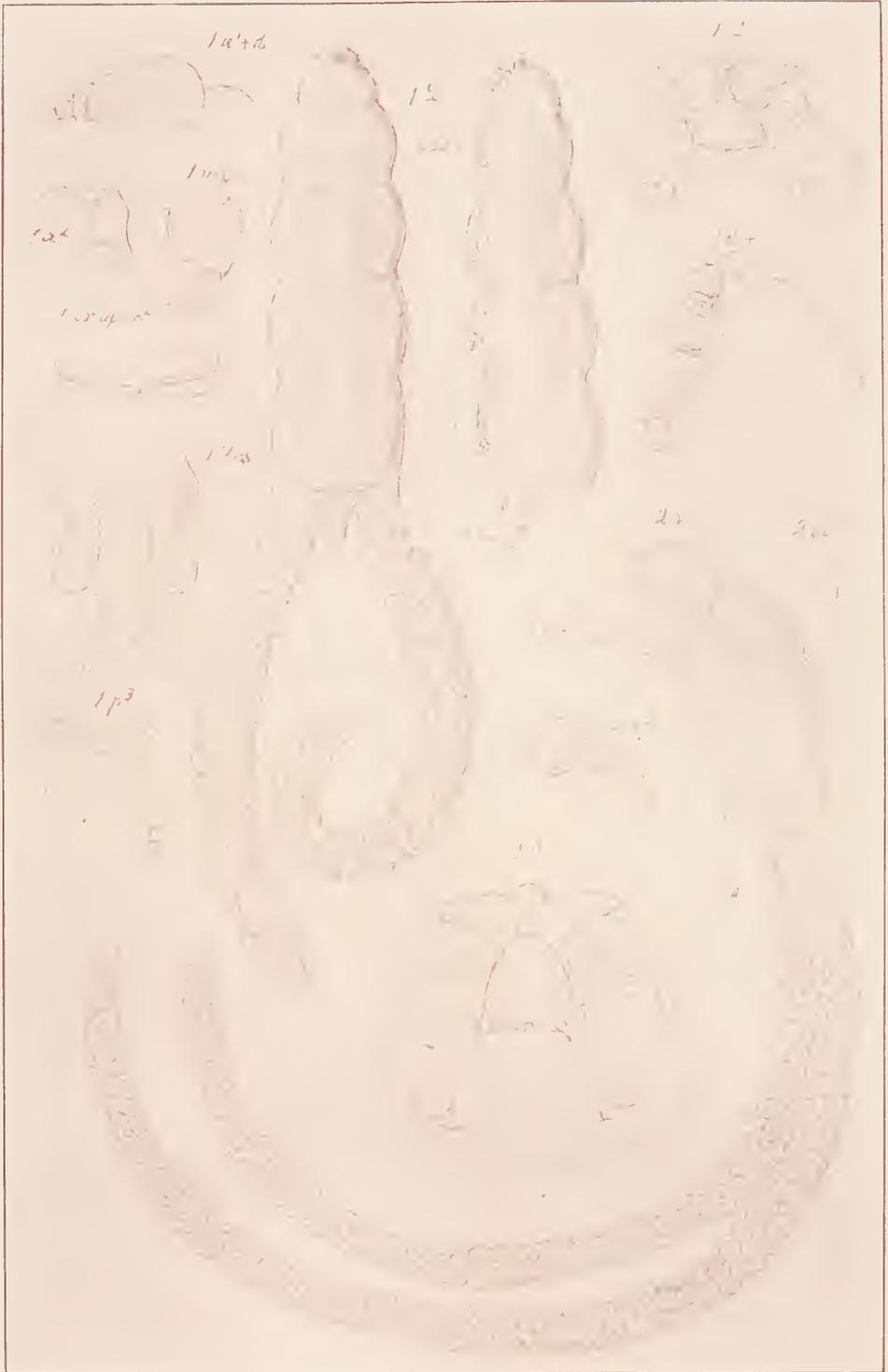
Schizoproctus inflatus, Auriv.

Copepoda

Enterocolidæ

Notodelphyoida

Pl. XXXV



G. O. Sars del.

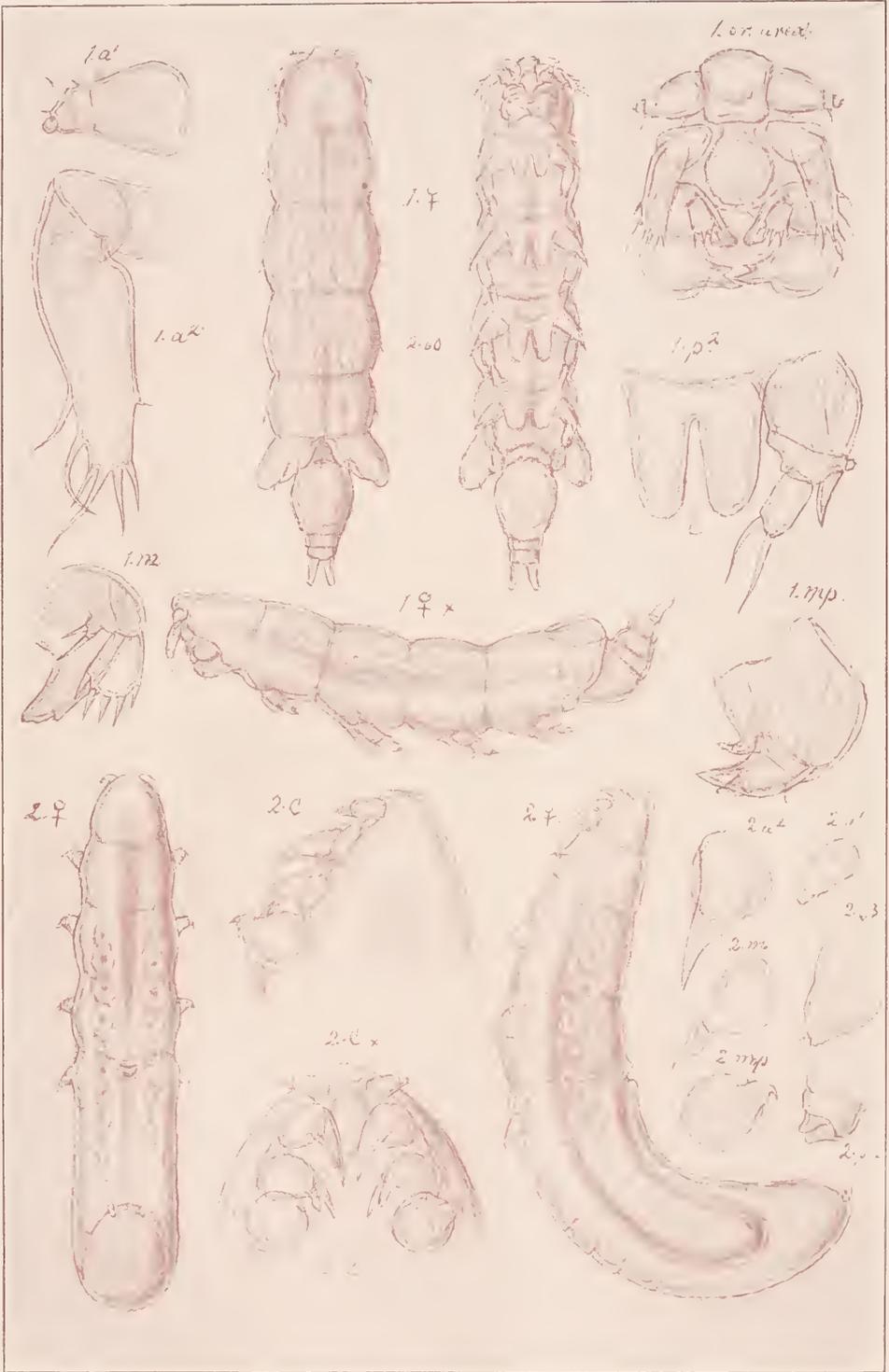
1. *Cryptopodus brevicauda* (Canu)
2. " *eruca* (Norman)

Copepoda

Enterocolidæ

Notodelphyoidea

Pl. XXXVI



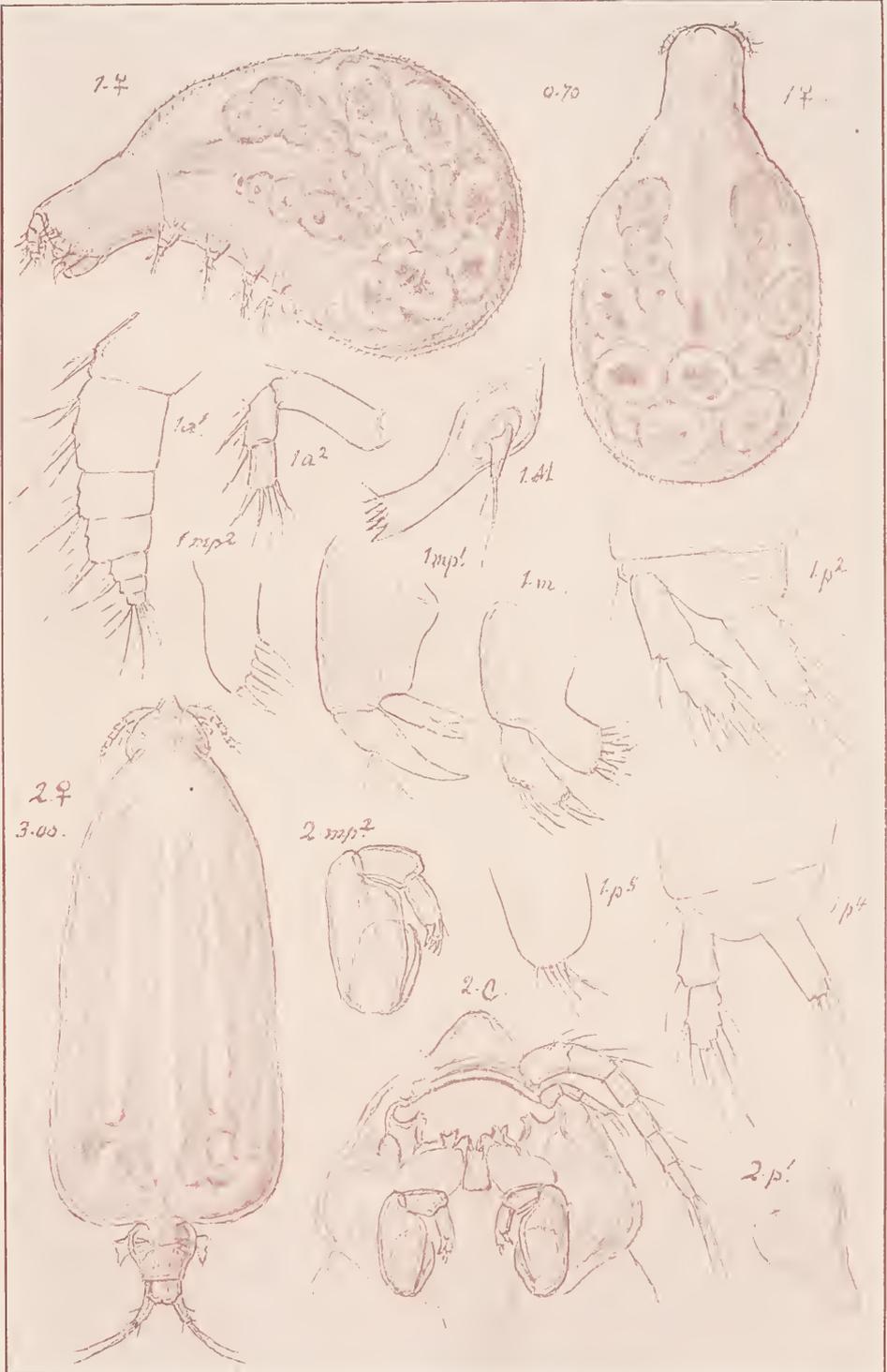
G. O. Sars del.

1. *Enterocola bilamellata*, G. O. Sars
2. *Mychophilus roseus*, Hesse

Copepoda

Buproridæ — Anomopsyllidæ Notodelphyoida

Pl. XXXVII



G. O. Sars del.

1. Buprorus Nordgaardi, G. O. Sars
2. Anomopsyllus pranzoides, G. O. Sars