

AN ACCOUNT
OF THE
CRUSTACEA
OF
NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY
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VOL. VI
COPEPODA
CYCLOPOIDA

PARTS XIII & XIV

LICHOMOLGIDÆ (concluded), ONCÆIDÆ, CORYCÆIDÆ, ERGASIL-
LIDÆ, CLAUSIIDÆ, EUNICICOLIDÆ, SUPPLEMENT

WITH 22 AUTOTYPIC PLATES



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Gen. 41. **Modiolicola**, Aurivillius, 1883.

Generic Characters.—Anterior division of body moderately dilated and more or less depressed, with the 1st trunk-segment well defined from the cephalon. Tail slender and attenuated. Integuments thin and soft. Anterior antennæ 7-articulate and of a structure similar to that in the preceding genera. Posterior antennæ slender and almost naked, with the penultimate joint unusually prolonged; apical claws 3 in number. Maxillæ with the terminal lappet much produced, falciform; palp small, tri-setose. Anterior maxillipeds without the usual lateral spine on the distal joint. Posterior maxillipeds in female much reduced, in male well developed, prehensile. Natatory legs with both rami 3-articulate in all the pairs; inner ramus of 4th pair with no setæ inside the terminal joint. Last pair of legs uniarticulate, bisetose.

Remarks.—This genus was established in the year 1883 by Aurivillius, to include a peculiar Copepod found by him parasitic within the valves of the well-known mussel *Modiola vulgaris*. The genus is chiefly distinguished from those treated of in the preceding pages by the distinctly 3-articulate inner ramus of the 4th pair of natatory legs, and partly also by the structure of the posterior antennæ. Otherwise this genus is rather closely allied to *Lichomolgus*. In addition to the type species described below, Canu has recorded another species under the name of *M. inermis*. Only the type species has been observed by me.

93. **Modiolicola insignis**, Aurivillius.

(Pl. XCVII).

Modiolicola insignis, Aurivillius, Bidrag til Kännedomen om Krustaceer, som lefva hos Mollusker och Tunicater, p. 10 & 39, Pl. II, figs. 1—10, Pl. IV, figs. 1—8.

Specific Characters.—*Female.* Body moderately slender, with the anterior division rather expanded, rounded oval in outline, and pronouncedly flattened. Cephalic segment large and slightly produced in front, exhibiting behind a very distinct transverse suture limiting the cephalon from the 1st pedigerous segment. Epimeral plates of the 3 succeeding segments evenly rounded off. Tail equalling in length $\frac{2}{3}$ of the anterior division; genital segment about the length of the 3 succeeding segments combined, and somewhat tumid in its anterior part, which is rather sharply defined from the cylindrical posterior part; anal segment a little smaller than the preceding one.

Caudal rami scarcely longer than that segment, and not at all divergent; seta of outer edge attached about in the middle; apical setæ comparatively short. Anterior antennæ about the length of the cephalon and rather narrow, being clothed with comparatively short anteriorly-curving setæ. Posterior antennæ unusually slender and attenuated, almost naked, except at the tip, which carries 3 strongly curved claws accompanied outside with 2 setæ. Posterior maxillipeds without any armature whatever, terminal joint small, tuberculiform. Natatory legs well developed, with the rami subequal in length; inner ramus of 4th pair fully as large as that of the preceding pairs, but only provided with 2 setæ and 2 spines, the latter attached to the end of the terminal joint. Last pair of legs with the free joint rather small, sub-cylindrical in form, and carrying on the tip 2 very unequal setæ, the inner one much the larger and curved backwards. Ovisacs comparatively large, oblong in form, and only slightly divergent.

Male much smaller than female, and having the anterior division of the body less expanded. Genital segment greatly tumefied. Posterior maxillipeds powerfully developed, with the apical claw very long and slender.

Body of female semipellucid, with the ovarial tubes of a bright rosy colour; ova in the ovisacs reddish orange.

Length of adult female 1.40 mm., of male 1.00 mm.

Remarks.—This form was first described by Aurivillius, and has subsequently been recorded by several other authors. It is the type of the present genus.

Occurrence.—I have found this form not unfrequently within the pallial cavity of large specimens of *Modiola modiolus* taken in the outer part of the Christiania Fjord, at Hvalør. Aurivillius has also occasionally obtained it from *Mytilus edulis*.

Distribution.—Bohuslän (Aurivillius), British Isles (Scott), coast of France (Canu), Mediterranean (Raf. Monticelli).

Gen. 42. **Hermannella**, Canu, 1891.

Generic Characters.—Body of somewhat different form in the different species, and having the integuments well chitinised, cephalon more or less distinctly defined from the 1st pedigerous segment, and produced in front to a well-marked incurved rostrum. Tail attenuated, with the genital segment in

female scarcely subdivided. Anterior antennæ of the usual structure, 7-articulate. Posterior antennæ more or less strongly developed, in some cases pronouncedly prehensile, in other cases imperfectly prehensile. Oral parts on the whole of normal structure, the posterior maxillipeds in female having the dagtylar joint well developed, spiniform. Natatory legs with both rami distinctly 3-articulate; inner ramus of 4th pair however in most cases somewhat smaller than in the other pairs. Last pair of legs comparatively small, bisetose.

Remarks.—This genus, established by Canu, is nearly allied to *Modiolicola*; but differs in the more strongly chitinised integuments, the well defined rostrum, and the somewhat unlike structure of the posterior antennæ and the posterior maxillipeds. 5 species referable to this genus will be described in the sequel. All these have been found occasionally among dredged material; but it is very likely to believe, that they in reality, like the species of the preceding genus, lead a semiparasitic existence, probably within different bivalve Molluscs. This has indeed been stated to be the case with the type of this genus, *Hermannella rostrata* Canu, as also with *H. maxima* (Thomps.).

94. *Hermannella valida*, G. O. Sars, n. sp.

(Pl. XCVIII).

Specific Characters.—*Female.* Body rather stout and robust, with the anterior division considerably dilated in front, its greatest width equalling about half the length of the body. Cephalic segment very large and expanded, exhibiting behind a rather slight transverse suture defining the cephalon from the 1st pedigerous segment, lateral edges evenly curved throughout. Epimeral plates of the 2 succeeding segments obtusely rounded, those of penultimate segment acutely produced. Last segment of trunk very small. Tail comparatively short, scarcely longer than the 4 free trunkal segments combined; genital segment occupying about half the length of the tail, and somewhat dilated in the middle; anal segment considerably longer than the preceding one. Caudal rami much shorter than that segment, and only slightly longer than they are broad, each having close to the base outside a small bristle; caudal setæ not much different in length, that of the outer edge attached near the end. Anterior antennæ rather slender and of quite normal structure. Posterior antennæ very powerfully developed and pronouncedly prehensile, 1st joint much the largest and obliquely produced at the end; the 3 succeeding joints successively diminishing in size, the last one armed at the end with a single very strong claw accompanied by a number of unequal setæ. Maxillæ with the masticatory

lappet densely hairy and exerted to a slender setiform lash; palp provided at the end with 3 setæ, the innermost very small. Anterior maxillipeds with the terminal process only slightly curved and having 3 of the denticles stronger than the others. Posterior maxillipeds of moderate size, propodal joint scarcely as long as the basal one and provided inside, about in the middle, with a short seta; dactylar joint conical in form and having outside a slender spine. Inner ramus of the 3 anterior pairs of natatory legs somewhat longer than the outer; that of 4th pair however rather shorter, with the terminal joint narrow sublinear in form and only provided with 2 unequal spines, both issuing from the end. Last pair of legs with the free joint subfusiform in shape, inner apical seta short, spiniform, outer one 3 times as long.

Colour not yet ascertained.

Length of adult female 1.75 mm.

Male unknown.

Remarks.—This new species is readily recognised by the broadly expanded anterior division of the body, the comparatively short caudal rami, and the very powerful structure of the posterior antennæ. In size it is, next to *H. maxima* (Thompson), the largest of the northern species.

Occurrence.—Only a single female specimen of this form has hitherto come under my notice. It was taken, several years ago, in the inner part of the Stavanger Fjord, at Hjelmeland, from a depth of about 50 fathoms, among dredged material.

95. *Hermannella parva*, Scott.

(Pl. XCIX).

Hermannella parva, Norman & Scott, Crustacea of Devon and Cornwall, p. 199, Pl. XIII, fig. 15; Pl. XV, figs. 7–10; Pl. XVI, fig. 12; Pl. XIX, fig. 5.

Specific Characters.—*Female.* Body far less robust than in the preceding species, with the anterior division regularly oval in outline, greatest width not nearly attaining half the length of the body and occurring in the middle. Cephalic segment rather large and somewhat applanated, exhibiting behind a well-marked transverse suture, front narrowly rounded. Epimeral plates of the 3 succeeding segments obtusely rounded. Last trunkal segment very small. Tail not fully attaining half the length of the anterior division and attenuated behind; genital segment obpyriform in shape and scarcely longer than the 3 succeeding segments combined. Caudal rami rather narrow, sublinear in form, and scarcely at all divergent, exceeding in length the 2 preced-

ing segments combined; seta of outer edge attached near the middle; apical setæ rather unequal in length, the 2 middle ones being much longer than the other 2, which are rather small. Anterior antennæ shorter than the cephalon and of a similar structure to that in the preceding species. Posterior antennæ however rather unlike, being far less robust and imperfectly prehensile; basal joint not at all expanded; 2nd much the largest and angular at the end behind; 3rd joint very short and armed at the end anteriorly with an unguiform spine accompanied in front by 2 short setæ; last joint well developed and carrying at the tip 3 subequal, almost setiform claws, behind which 3 setæ are attached. Maxillæ with the masticatory lappet securiform in shape and almost naked outside; palp with one lateral and 2 apical setæ. Anterior maxillipeds with the terminal process much curved and clothed outside with delicate spinules. Posterior maxillipeds well developed; propodal joint scarcely smaller than the basal one, and armed inside, about in the middle, with a ciliated anteriorly-curving spine; dactylar joint unguiform and having at the base a similar spine to that of the propodal joint accompanied by a short seta. Natatory legs comparatively more slender than in the preceding species; inner ramus of 4th pair somewhat shorter and much narrower than the outer, terminal joint with the inner edge quite smooth, outer edge exhibiting about in the middle a well-marked ledge, apex with 2 very unequal spines flanked on each side by a somewhat projecting corner. Last pair of legs with the free joint exceedingly small and slightly produced at the end outside; both apical setæ very short. Ovisacs of moderate size, oblong oval in form, and slightly divergent.

Colour pale yellow, with an orange tinge.

Length of adult female 0.73 mm.

Male unknown.

Remarks.—This form was described and figured by Scott in the above-quoted treatise from a solitary female specimen. As observed by that author, it somewhat resembles, in the general form of the body, *Pseudanthessius gracilis* Claus. It is however of far inferior size and, on closer examination, differs materially in the structure of the several appendages, agreeing in this respect with the other species of the present genus.

Occurrence.—I have met with this form occasionally both of the west and south coasts of Norway in moderate depths. All the specimens obtained were of the female sex.

Distribution.—British Isles (Scott).

96. *Hermannella prehensilis*, G. O. Sars, n. sp.

(Pl. C).

Specific Characters.—*Female.* Body rather slender, resembling somewhat in shape that of *H. parva*, though having the anterior division less expanded, with the greatest width in front of the middle. Last segment of trunk rather narrow and exhibiting on each side, inside the insertion of the free joint of last pair of legs, a small dentiform projection. Tail about half the length of the anterior division; genital segment somewhat fusiform in shape, being pronouncedly dilated in the middle, and shorter than the 3 succeeding segments combined; anal segment nearly twice as large as the preceding one. Caudal rami about the length of the last 2 segments combined and slightly divergent; seta of outer edge attached in the middle; apical setæ nearly as in *H. parva*. Anterior antennæ rather slender, equalling about the cephalon in length. Posterior antennæ much shorter, but very strongly built and pronouncedly prehensile; the first 2 joints rather thick and muscular; 3rd joint very movably articulated to the 2nd and armed at the end anteriorly with an exceedingly strong hooked claw; last joint small, without any claws, but clothed with a number of thin curved setæ. Maxillæ with the masticatory lappet securiform and very finely denticulated along the outer edge; palp with one lateral and 3 apical setæ. Anterior maxillipeds about as in *H. parva*. Posterior maxillipeds comparatively smaller, with the dactylar joint conical in form and provided with a single small spinule inside. Natatory legs resembling in structure those in *H. parva*, though having the inner ramus comparatively shorter and stouter; that of 4th pair somewhat smaller than the outer, with the terminal joint broader than in *H. parva*, and carrying 5 spines, one on the outer edge, 2 on the inner, and 2 on the tip. Last pair of legs with the free joint narrow cylindrical in form and having the 2 apical setæ well developed.

Colour not yet ascertained.

Length of adult female 1.40 mm.

Male unknown.

Remarks.—This new species is especially distinguished by the peculiar structure and pronouncedly prehensile character of the posterior antennæ. Otherwise it agrees pretty well with the other species of the present genus.

Occurrence.—Only a single female specimen of this form has hitherto come under my notice. It was taken, many years ago, at Skjerjehavn, outside the Sogn Fjord from a depth of about 20 fathoms.

97. *Hermannella finmarchica*, Scott.

(Pl. CI).

Hermannella (?) *finmarchica*, Scott, Ann. Mag. Nat. Hist. Ser. 7, Vol. XI, p. 28, Pl. IV, figs. 14—19.

Specific Characters.—*Female.* Body comparatively slender, with the anterior division oblong oval in outline, greatest width only slightly exceeding half the length and occurring somewhat in front of the middle. Cephalic segment of moderate size and exhibiting behind a well-marked transverse suture defining the cephalon from the 1st pedigerous segment, frontal margin narrowly rounded. Last segment of trunk rather broad and, as in *H. prehensilis*, exhibiting on each side, just behind the insertion of the free joint of last pair of legs, a well-marked dentiform projection. Tail scarcely attaining half the length of the anterior division; genital segment comparatively large, exceeding in length the remaining 3 segments combined, and having the anterior part rather dilated and sharply defined from the short cylindrical posterior part. Caudal rami of moderate length, being about as long as the last 2 segments combined, and slightly divergent; seta of outer edge attached somewhat dorsally at about the hind third part of the ramus; the 2 middle apical setæ rather slender and elongated. Anterior antennæ scarcely as long as the cephalon, and having the first 2 joints comparatively broader than in the preceding species. Posterior antennæ resembling in structure those in *H. parva*, being rather feeble and imperfectly prehensile, with the apical claws slender, setiform. Maxillæ with the masticatory lappet securiform and finely crenulated outside; palp with 1 lateral and 2 apical setæ. Anterior maxillipeds of normal structure. Posterior maxillipeds comparatively short and stout, propodal joint conspicuously dilated in the middle and provided with 2 small spinules; dactylar joint short, conical in form. Natatory legs comparatively strongly built, with both rami well developed in all the pairs and about equal in size, all the spines pronouncedly dagger-shaped; inner ramus of 1st pair, as usual, with a single such spine, that of 2nd pair with 3, that of 3rd pair with 4, and that of 4th pair with 5 spines, all on the terminal joint. Last pair of legs with the free joint of moderate size, sub-cylindrical in shape, and slightly produced at the hind distal corner, apical setæ well developed, the inner one the longer. Ovisacs rather narrow and somewhat irregular in form.

Male, as usual, much smaller than female, and easily recognisable by the greatly tumefied genital segment. Posterior maxillipeds with the propodos somewhat contracted distally, dactylus long and slender, abruptly bent at the base.

Colour of female light yellow.

Length of adult female 1.30 mm., of male 0.90 mm.

Remarks.—Though the description and figures of this form given by Scott are rather imperfect owing to the bad condition of the specimens examined by him, I cannot doubt that the above-described form is the same. Scott had some doubt about its right position within the genus *Hermannella*, and indeed in some points it differs conspicuously from the typical species *H. rostrata* Canu, especially as regards the structure of the 4th pair of legs, the inner ramus of which is much fuller developed than in that species. But otherwise I find that it agrees fairly well with the other species here described.

Occurrence.—I have met with this form occasionally both off the west and south coasts of Norway in moderate depths. The specimens examined by Scott were collected by Canon Norman in Bugø Fjord, East Finmark. It thus appears that this form is distributed along the whole Norwegian coast. Out of Norway, however, it has not yet been recorded.

98. *Hermannella tenuicaudis*, G. O. Sars, n. sp.

(Pl. CII).

Specific Characters.—*Female.* Body rather slender, with the anterior division regularly oblong oval in outline, greatest width scarcely exceeding half the length, and occurring about in the middle. Cephalic segment about twice as long as the 3 succeeding segments combined, and exhibiting behind a well-marked transversal suture, frontal margin narrowly rounded. Last trunkal segment, as in the 2 preceding species, exhibiting on each side, behind the insertion of the free joint of last pair of legs, a dentiform projection. Tail very slender and attenuated, considerably exceeding half the length of the anterior division; genital segment about the length of the 3 succeeding segments combined and considerably dilated in the middle. Caudal rami long and narrow, fully equalling half the length of the remaining part of the tail, and slightly divergent; seta of outer edge placed about in the middle and somewhat dorsally; apical setæ comparatively less elongated than in *H. finmarchica*. Anterior antennæ more slender, equalling in length the cephalon. Posterior antennæ very like those in the said species, though having the apical claws still more slender. Maxillæ with the masticatory lappet rather large and finely serrate along the outer edge, the proximal serrations rather coarse; palp with 1 lateral and 3 apical setæ. Anterior maxillipeds with the terminal process less curved than in *H. finmarchica* and having the proximal spinule much

stronger than the others, lateral spine likewise with a coarse spinule near the base followed by 3 much smaller ones. Posterior maxillipeds resembling in shape those in the said species, though having the dactylar joint more produced. Natatory legs almost exactly as in *H. finmarchica*. Last pair of legs likewise rather similar, the free joint being cylindrical in form, with 2 very unequal apical setæ.

Body pellucid, of a whitish grey colour, with dark blue translucent intestine.

Length of adult female 1.20 mm.

Male unknown.

Remarks.—This form is closely allied to *H. finmarchica*, but at once distinguished by the much longer and narrower caudal rami, reminding in this respect on *Pseudanthessius Thorelli* Brady.

Occurrence.—Only a single female specimen of this form has hitherto come under my notice. It was taken, many years ago, off the west coast of Norway, the exact locality not having been noted, and a coloured drawing was at that time made from the specimen, when still alive.

Gen. 43. **Pseudomolgus**, G. O. Sars 1916.

Generic Characters.—General form of body resembling that in the preceding genus, the anterior division being more or less expanded, the posterior slender and attenuated. Cephalon well defined from the 1st pedigerous segment and produced in front below to an obtuse incurved rostrum. Anterior antennæ slender and generally composed of 7 articulations clothed with comparatively short setæ. Posterior antennæ unusually short and stout, with the outer joints imperfectly separated, apical claws exceedingly strong, hooked and distinctly biarticulate. Maxillæ with the masticatory part apparently bifid, an appendicular lappet being inserted inside the principal one and, like the latter, produced to a slender incurved lash; principal lappet coarsely denticulate along the outer edge; palp small, lamellar. Anterior maxillipeds with the terminal process short and armed with a limited number of subequal spinules. Posterior maxillipeds in female imperfectly developed, sub-lamellar, and apparently quite immobile; those in male, as usual, well developed, prehensile. Natatory legs with the rami rather broad and subequal

in size; inner ramus of 4th pair resembling that in the preceding pairs. Last pair of legs more fully developed than in the preceding genera, the free joint being rather produced, and armed with one lateral and 2 apical spines having between them a slender bristle.

Remarks.—The type of this genus, recently established by the present author, is *Lichomolgus arenicola* Brady, which, as shown by T. Scott, differs in several points very conspicuously from Thorell's genus. Scott referred this form provisionally to the genus *Hermannella* of Canu, apparently owing to the distinctly 3-articulate inner ramus of the 4th pair of legs. It cannot however in my opinion be referred to that genus, as it differs in some very important points, thus in the structure of the posterior antennæ, the maxillæ, the posterior maxillipeds in the female, and finally in the form and armature of the last pair of legs. The typical species has not yet been observed by me; but 2 nearly allied species will be described below.

99. *Pseudomolgus leptostylis*, G. O. Sars.

(Pl. CIII).

Pseudomolgus leptostylis, G. O. Sars, Bulletin de l'Institut océanographique de Monaco No. 323, 1916, p. 51, Pl. III.

Specific Characters.—*Female.* Body rather slender, but with the anterior division conspicuously more expanded than in the type species and broadly oval in outline, greatest width exceeding half the length and occurring in front of the middle. Last truncal segment rather narrow and without any lateral projections. Tail very slender and narrow, considerably exceeding half the length of the anterior division; genital segment not very large and only slightly dilated in the middle; anal segment nearly as long as the 2 preceding segments combined. Caudal rami much more produced than in the type species and very narrow, attaining almost half the length of the remaining part of the tail; seta of outer edge attached about in the middle; apical setæ not much elongated. Anterior antennæ moderately slender, not fully attaining the length of the cephalon, and composed of 7 well defined joints, the 2nd of which is the longest. Posterior antennæ much shorter than the anterior, but very strongly built and of nearly equal width throughout, last 2 joints completely fused together, apical claws 4 in number of about equal length, the hindmost one, however, conspicuously narrower than the others. Maxillæ with the principal masticatory lappet coarsely denticulated along the outer edge, the 2 proximal denticles being much stronger than the others; palp

forming a somewhat irregular short lamella carrying 2 small setæ, one outside and one at the tip, inner edge with an angular projection in the middle. Anterior maxillipeds with the terminal process divided into 5 slender subequal spinules. Posterior maxillipeds without any armature whatever, each forming a simple somewhat lamellar stem terminating in a minute point. Natatory legs with the 1st joint of the outer ramus distinctly denticulated outside; terminal joint of inner ramus in 1st pair with one, in 2nd pair with 3, and in the last 2 pairs with 4 spines; all the spines distinctly dagger-shaped. Last pair of legs with the free joint narrow oblong in form, edges partly ciliated, marginal spines rather slender, that of the outer edge attached at about the posterior 4th part of the joint.

Male, as usual, of smaller size than female, and having the genital segment considerably dilated. Posterior maxillipeds powerfully developed, with the propodos coarsely denticulated along the whole inner edge, dactylus long and curved.

Colour not yet ascertained.

Length of the female here described about 2 mm.; that of male 1.50 mm.

Remarks.—This species has recently been briefly mentioned and figured by the present author in the above-quoted journal from a female specimen procured during the Monaco Expedition. It is closely allied to the type species, *P. arenicola* (Brady), but easily distinguished by the comparatively broader and more expanded anterior division of the body, and more particularly by the much more produced caudal rami. The structure of the several appendages seems to agree very closely with that in the type species, except that the anterior antennæ are distinctly 7-articulate, whereas these antennæ in *P. arenicola*, both according to Brady and Scott, are only composed of 6 joints.

Occurrence.—A solitary adult female specimen of this form (that here figured) was taken, several years ago, in the inner part of the Trondhjem Fjord, at Vennæs, from the considerable depth of 100—150 fathoms, and recently some few young female specimens and an adult male were picked up from the bottom-residue of a large collecting bottle containing various animals collected by Mr. Kjær in the Christiania Fjord, near Drøbak.

Distribution.—Off the Amsterdam island, Spitsbergen (Monaco expedition).

100. *Pseudomolgus dilatatus*, G. O. Sars, n. sp.
(Pl. CIV).

Specific Characters.—*Female.* Body far less slender than in the preceding species, with the anterior division considerably expanded and rounded oval in outline, greatest width equalling half the length of the body (without the caudal rami). Cephalic segment much broader than it is long, and having the edges quite evenly arcuate throughout. Last trunkal segment comparatively broader than in the preceding species. Tail only slightly exceeding half the length of the anterior division; genital segment of moderate size and slightly dilated in front; anal segment but little longer than the preceding one. Caudal rami rather narrow and produced, though not nearly attaining half the length of the remaining part of the tail; seta of outer edge attached about in the middle and somewhat dorsally; apical setæ about as in the preceding species. Anterior antennæ rather slender, exceeding somewhat the length of the cephalon and, as in the preceding species, composed of 7 well defined joints. Posterior antennæ of a still more compact structure than in the preceding species, being scarcely more than half as long as the anterior ones, but very thick; apical claws 3 in number, the hindmost one rather thin, almost setiform, the other 2 very large with the distal part strongly hooked. Oral parts nearly agreeing in structure with those in the preceding species. Legs also very similar; those of last pair however comparatively smaller, with the marginal spines less slender.

Colour not yet ascertained.

Length of the specimen examined 1.40 mm.

Male unknown.

Remarks.—The above-described species is evidently congeneric with the preceding one, though easily distinguishable by the much more robust form of the body, as also by the structure of the posterior antennæ. It is moreover rather inferior in size.

Occurrence.—A single female specimen of this form was taken, many years ago, in the Romsdal Fjord, near Molde, from a depth of about 100 fathoms.

Gen. 44. **Rhinomolgus**, G. O. Sars, n.

Generic Characters.—Body cyclopoid in shape, with the anterior division moderately expanded. Cephalon only faintly separated from the 1st trunkal segment, and provided beneath the front with a peculiar mobile rostral lamella.

Tail with the genital segment in female scarcely subdivided. Caudal rami sub-lamellar, with 2 successive setæ on the outer edge and 3 on the tip. Anterior antennæ composed in female of 7 joints, the first 2 of which are much larger than the others and clothed with numerous strong setæ; outer joints in male coalesced. Posterior antennæ much elongated and distinctly prehensile, being armed at the tip with a short uncinatè claw. Anterior lip deeply incised in the middle. Maxillæ with a slender appendicular masticatory lappet inside the principal one; the latter securiform in shape and rather expanded at the base, its outer edge coarsely serrated and divided proximally into 2 unequal lobules, one of which is distinctly denticulated; palp unusually large and incurved, resembling in structure that in the *Clausidiidæ*. Anterior maxillipeds with the basal part very large and massive, terminal part produced into a straight digitiform process denticulated at the tip, and having inside a densely spinulose seta. Posterior maxillipeds, as usual, very different in the 2 sexes, in female conically tapered, with the dactylar joint small and tipped by a short uncinatè claw, in male very large and distinctly prehensile, dactylus long and slender. Natatory legs strongly built, with both rami 3-articulate in all the pairs. Last pair of legs biarticulate, proximal joint small and less perfectly separated from the segment, distal joint comparatively large, foliaceous, and extending laterally, being armed in a similar manner to that in the preceding genus.

Remarks.—This is a very distinct genus, exhibiting several aberrant characters, some of which seem to point to the *Clausidiidæ*. According to the prehensile nature of the posterior antennæ and the structure of the masticatory part of the maxillæ, it ought however unquestionably to be included in the present family. One of the most perplexing peculiarities is perhaps the remarkable mobile rostral lamella, from which indeed the generic name here proposed has been derived. The genus comprises as yet only a single species, to be described below.

101. *Rhinomolgus anomalus*, G. O. Sars, n. sp.
(Pl. CV & CVI).

Specific Characters.—*Female.* Body not particularly slender, with the anterior division oval fusiform in outline, greatest width about equalling $\frac{2}{3}$ of the length and occurring a little in front of the middle. Cephalic segment large, and exhibiting behind a rather slight transverse suture defining the cephalon from the 1st pedigerous segment; front narrowly rounded. Rostral

lamella pronouncedly spatulate in form, being contracted at the base and gradually widening towards the extremity, which is broadly truncated. Lateral lobes of the 3 succeeding segments rounded of the end. Last truncal segment rather narrow. Tail exceeding half the length of the anterior division; genital segment about as long as the 3 succeeding segments combined, and somewhat dilated in the middle; anal segment scarcely larger than the preceding one. Caudal rami somewhat lamellar and oblong oval in form, exceeding in length the anal segment, inner edge finely ciliated, outer edge with 2 successive setæ, the distal one apparently answering to the outer apical seta in other forms, the somewhat narrowed extremity carrying 3 unequal setæ and a small dorsal bristle extending outwards. Eye wholly absent. Anterior antennæ shorter than the cephalon, and somewhat abruptly bent near the middle, being composed of 7 well defined joints, the 2nd of which is much the largest and densely clothed with unusually long and coarse, finely annulated setæ, the 5 outer joints much narrower than the first 2. Posterior antennæ exceeding in length the anterior and nearly naked, being composed of 5 well defined joints, the first of which is very short, the 2nd much the largest, the 3rd about half as long and equal to the combined length of the outer 2 joints; terminal joint armed on the tip with a comparatively short uncinatè claw accompanied by a small bristle, and having moreover 2 unequal setæ attached to a distinct ledge at some distance from the tip behind. Natatory legs with the inner ramus a little longer than the outer, its terminal joint comparatively large, fully as long as the other 2 combined, and exhibiting a somewhat different armature in the several pairs, that of 1st pair having one spine outside the tip, that of 2nd pair 3, that of 3rd pair 4, and that of 4th pair 5 spines. Last pair of legs with the proximal joint rather small and carrying outside the usual slender bristle; distal joint oblong oval in form and finely ciliated on the proximal part of the inner edge, being moreover provided with 3 slender marginal spines, one somewhat beyond the middle of the outer edge, the other 2 on the obtusely rounded extremity; between the latter a small bristle is attached. Ovisacs not very large, oval in form, and closely appressed to the sides of the tail.

Male somewhat smaller than female, and having the anterior division of the body less broad. Genital segment considerably tumefied and terminating on each side in a triangular lappet clothed with 2 setæ and a small denticle. Anterior antennæ with 2 well-defined recurved æstethasks, the one attached to the 2nd, the other to the 4th joint; the 3 outer joints wholly coalesced. Posterior maxillipeds very powerfully developed, propodos with the outer edge

sub-angular in the middle, inner edge straight and clothed with a row of slender spinules; dactylus very long and provided at the base inside with a slender spine.

Colour of female whitish grey, with translucent pale yellow ovarial tubes. Length of adult female 2.45 mm.; of male 2.20 mm.

Remarks.—The above-described form is easily distinguished from any of the other *Lichomolgidae*, both as to the general form of the body and to the structure of the several appendages. The remarkable rostral lamella attached beneath the frontal part of the head, between the insertions of the anterior antennæ, is more generally extended downwards, and accordingly is most conspicuous in the lateral or ventral aspects of the animal. As it however is very mobile, it may in some cases be protracted, so as to be visible also in the dorsal view of the animal, projecting in front with its broadly truncated extremity, as shown by the figures here given.

Occurrence.—A considerable number of specimens of this peculiar Copepod were picked up from the dredged material obtained by a single catch made in the outer part of the Trondhjem Fjord, about midway between Bejan and the opposite border of the Fjord, the depth ranging from 100 to 150 fathoms. The material contained various deep-water animals, of which a species of *Antedon*, *A. Sarsi*, was by far the most abundant. Though I am much disposed to believe that the present Copepod is a parasit of the said Crinoid, I am unable to state this with full certainty, as none of the specimens were found in immediate connexion with their supposed hosts.

Gen. 45. **Sabelliphilus**, M. Sars, 1862.

Generic Characters.—Form of body rather different from that in the other genera of the present family, being very narrow, with the anterior division only slightly dilated. Cephalon faintly defined from the 1st trunkal segment, and provided below the front with a strongly chitinised, immobile rostral plate extending backwards and deeply bifurcate at the end. Tail composed of the usual number of segments. Anterior antennæ 7-articulate, with the first 2 joints much larger than the others and lamellarly expanded. Posterior antennæ exceedingly powerful and armed at the end with very strong uncinated claws,

as also with a row of coarse spines inside the 2nd joint. Oral parts on the whole of normal structure. Natatory legs comparatively slender, with both rami 3-articulate; inner ramus of 4th pair with the number of setæ reduced. Last pair of legs very small, bisetose.

Remarks.—This genus was established by my late father as early as the year 1862, to include a peculiar Copepod found by him parasitic on the gills of a species of *Sabella*. It ought undoubtedly to be included in the family *Lichomolgidae*, as here defined, in spite of the aberrant form of the body and the likewise somewhat aberrant structure of the 2 pairs of antennæ. The genus comprises as yet only a single species, to be described below.

102. *Sabelliphilus elongatus*, M. Sars.

(Pl. CVII).

Sabelliphilus elongatus, M. Sars, Beskrivelse af 4 nye parasitiske Copepoder. Forh. Christiania Vid. Selskab f. 1861, p. 139.

Syn: *Sabelliphilus Sarsii*, Claparede.

" — *Leuckartii*, Kossman.

" *Lichomolgnus sabella*, Thompson.

Specific Characters.—*Female.* Body very slender and elongated, with the anterior division narrow oblong in outline, greatest width only slightly exceeding $\frac{1}{3}$ of the length. Cephalic segment nearly twice as long as the 3 succeeding segments combined and obtusely truncated in front, exhibiting behind a rather faintly marked transverse suture defining the cephalon from the 1st pedigerous segment; rostral plate of moderate size and closely appressed to the ventral face, projecting at the end into 2 strong spiniform processes. Lateral lobes of the 3 succeeding segments obtusely rounded. Last trunkal segment very small. Tail scarcely attaining half the length of the anterior division; genital segment of moderate size and considerably tumefied in its anterior part; anal segment longer than the preceding one. Caudal rami rather narrow, exceeding somewhat the anal segment in length, and scarcely divergent; seta of outer edge attached near the middle; apical setæ slender, the inner median one attaining the length of the tail. Anterior antennæ about half the length of the cephalon and clothed with comparatively short setæ; the first 2 joints much larger than the others and pronouncedly lamellar; 3rd joint very small; the remaining 4 joints gradually diminishing in size. Posterior antennæ unusually strongly built, 4-articulate, the first 2 joints very massive and forming with each other a geniculate bend; 2nd joint exhibiting inside a longitudinal crest divided into 5 very strong teeth; 3rd joint armed at the end

anteriorly with a strongly uncinatè claw; terminal joint with 3 similar claws accompanied by a number of curved setæ. Maxillæ with the masticatory lappet simple, securiform, and exerted to a slender point, outer edge coarsely serrate; palp comparatively narrow, with one lateral and 3 short apical setæ. Anterior maxillipeds with the basal part rather broad and provided outside with a densely serrated crest, terminal part exerted to a narrow incurved lash armed outside with 4 strong spinules and having inside at the base the usual appendicular spine. Posterior maxillipeds of moderate size, with the propodal joint about equal in size to the basal one; dactylar joint forming a strongly uncinatè claw, with a small appendicular spine inside. Natatory legs of comparatively feeble structure, with the rami rather narrow and nearly equal-sized in the 3 anterior pairs; inner ramus of 4th pair somewhat smaller, with the terminal joint narrow oblong in form and only provided with 2 spines at the end. Last pair of legs with the free joint short cylindrical in form, apical setæ rather small, the outer one the longer. Ovisacs very narrow and elongated, cylindrical in form.

Body in female of a whitish grey colour, with dark fuscous translucent ovarial tubes. Eye well marked, of bright red colour.

Length of adult female 1.65 mm.

Remarks.—The present form, as above mentioned, was briefly described by my late father under the above name, and has subsequently been observed by several other authors, though the specific identity was not recognised by them. I regard it as beyond doubt that the form recorded by Claparède as *S. Sarsii* is the very same species, and this seems also to be the case with *S. Leukartii* of Kossman and with *Lichomolgus sabellæ* of Thompson.

Occurrence.—My late father found this form attached to the gills of *Sabella Sarsi* captured off the west coast of Norway. I have myself met with this Copepod in 2 widely distant localities, viz., at Kvalø, on the Nordland coast, and at Risør, south coast of Norway. In both localities only a single female specimen was obtained among dredged material and detached from its host.

Distribution.—British Isles (Thompson), coast of France (Canu), Mediterranean (Claparède, Della Valle).

Fam. 12. *Oncæidæ*.

General Characters.—Body of rather different shape in the different genera, but with the anterior and posterior divisions always well defined, the latter generally rather slender and attenuated. Eye imperfectly developed or quite absent. Anterior antennæ not much elongated, with the number of joints more or less reduced. Posterior antennæ imperfectly prehensile. Maxillæ and anterior maxillipeds comparatively small. Posterior maxillipeds, as a rule, powerfully developed in both sexes, terminating in a clawed hand. Natatory legs with both rami 3-articulate, the inner one generally more slender than the outer. Last pair of legs small, uniarticulate.

Remarks.—This family was originally established by Giesbrecht to comprise 5 different genera, viz., *Oncæa*, *Concæa*, *Lubbockia*, *Pachysoma* and *Ratania*. The last named genus was however subsequently removed by that author and referred to the siphonostomous Cyclopoida (*Asterocheridæ*). A new genus referable to the present family, *Pseudolubbockia*, has more recently been added by the present author, so that the family still comprises 5 genera. The most aberrant of these genera is unquestionably the genus *Pachysoma* of Claus, the systematic position of which seems to me to be rather questionable. All the forms comprised within the present family lead a true pelagic existence; but it is very probable that, like the *Lichomolgidæ*, they are in reality semiparasitic in habits, though it has not yet been stated which pelagic animals are at time infested by them. Of the above-named genera only one is as yet represented in the Fauna of Norway.

Gen. 46. *Oncæa*, Philippi, 1843.

Syn: *Antaria*, Dana.

Generic Characters.—Body cyclopoid in shape, with the anterior division more or less dilated and strongly vaulted above. Cephalon distinctly defined from the 1st trunkal segment, and having below the front an obtuse incurved rostral prominence. The 3 succeeding segments gradually diminishing in size, and having the epimeral parts rounded and but little prominent. Last trunkal segment very small, though distinctly defined. Tail attenuated and composed in female of 4, in male of 5 segments, the 1st of which (the genital segment)

is much the largest. Caudal rami comparatively small, with the normal number of setæ. Eye wholly absent. Anterior antennæ of moderate length, 6-articulate, 3rd joint much the largest, the outer 3 joints forming together a well defined terminal part very movably articulated to the preceding joint and clothed at the end with long diverging setæ. Posterior antennæ smaller than the anterior and more or less strongly curved, being composed of only 3 joints, the last of which is provided at the end with long rigid setæ curving anteriorly. Maxillæ armed at the incurved extremity with 2 short movable claw-like spines; palp sub-clavate in form, with a limited number of small marginal setæ. Anterior maxillipeds biarticulate, distal joint carrying on the end 2 digitiform appendages coarsely spinulose on the inner edge. Posterior maxillipeds powerfully developed in both sexes and distinctly prehensile, propodos more or less dilated, dactylus slender and very mobile, especially in male. Natatory legs with the outer ramus more strongly built than the inner and armed outside and at the tip with coarse dagger-like spines, inner ramus with the terminal joint much produced, especially in the posterior pairs, assuming in the latter a narrow linear form. Last pair of legs small, bisetose. Two ovisacs present in female, attached somewhat dorsally, so as partly to cover the tail.

Remarks.—This genus was established as early as the year 1843 by Philippi, to include a mediterranean species (*O. venusta*). The genus *Antaria* of Dana is identical with Philippi's genus. No less than 10 different species are recorded by Giesbrecht in his great work. They all are very nearly related, and in some cases not easy to distinguish without a very close examination. The chief distinguishing characters refer to the relative size of the genital segment in the female, the length of the caudal rami, and partly also the mutual length of the outermost and innermost apical-seta of the tail. Two Norwegian species of this genus will be described below.

103. *Oncæa borealis*, G. O. Sars, n. sp.

(Pl. CVIII).

Syn: *Oncæa conifera*, G. O. Sars (not Giesbrecht).

Specific Characters.—*Female.* Body comparatively slender, with the anterior division oblong fusiform in outline, greatest width scarcely attaining half the length, and occurring about in the middle, 2nd trunkal segment, as in *O. conifera*, raised dorsally in the form of an hump-like prominence. Tail about half the length of the anterior division; genital segment scarcely longer than the remaining part of the tail, and gradually somewhat narrowed behind;

anal segment shorter than the 2 preceding segments combined. Caudal rami very small, being much shorter than the anal segment, and scarcely more than twice as long as they are broad; seta of outer edge attached a little in front of the middle; innermost apical seta slightly exceeding the outermost in length. Antennæ and oral parts on the whole resembling in structure those in *O. conifera*. Posterior maxillipeds, however, somewhat less strongly developed, with the propodos oblong oval in form; dactylus somewhat shorter than the propodos and finely denticulated along the inner edge. Natatory legs with the rami comparatively more slender than in *O. conifera*, and the spines of the outer ramus less strong. Last pair of legs with the free joint much smaller than in that species, not cylindrical, but rounded oval in form. Ovisacs of moderate size, extending about to the end of the anal segment, and oval in form.

Male much smaller than female, with the anterior division of the body narrower and wanting the dorsal hump. Tail comparatively shorter, with the genital segment very large and tumid. Anterior antennæ with the joints of the terminal part imperfectly separated. Posterior maxillipeds resembling in structure those in female, but of somewhat larger size, with the dactylus longer and quite smooth.

Body in both sexes, pellucid, with a faint yellow or orange tinge.

Length of adult female scarcely exceeding 0.70 mm.; that of male 0.40 mm.

Remarks.—The above described species has been previously identified by the present author with *O. conifera* Giesbrecht, which it resembles in the presence on the 2nd trunkal segment in the female of a hump-like dorsal prominence. Having however now had an opportunity of examining Giesbrecht's species, I find it to differ in some points so markedly that I am led to the conclusion, that it is specifically distinct from the form here treated of. I have recently examined another form from the Malayan Archipelago, the female of which has a quite similar dorsal hump, and which on this cause has been identified by Cleve with *O. conifera*; but which, on a closer examination, has turned out to be a very distinct species, different both from that species and the one here described. The above-mentioned dorsal hump cannot therefore be regarded as a character exclusive of *O. conifera*. The latter is a much larger and more robust species than the one here treated of, and moreover differs conspicuously in the relative size of the genital segment in the female, as also in the much fuller development of the last pair of legs.

Occurrence.—I have met with this form occasionally in plankton both of the west and south coasts of Norway, as also in the upper part of the Christiania Fjord. Mr. Nordgaard has taken it in Oster Fjord, near Bergen.

Distribution.—Polar Sea, north of Siberia (Nansen's Expedition), British Isles (Farran).

104. *Oncæa similis*, G. O. Sars, n. sp.

(Pl. CIX, fig. 1).

Specific Characters.—*Female*. General form of body very similar to that in the preceding species, though perhaps a little more slender. Anterior division narrow fusiform in outline, with the dorsal face quite evenly vaulted, no trace being found of the dorsal hump present in the preceding species. Tail about half the length of the anterior division, and having the genital segment rather large, nearly twice as long as the remaining part of the tail; the 2 succeeding segments very short, and combined scarcely longer than the anal segment. Caudal rami about the length of that segment and agreeing in form and armature with those in the preceding species. Antennæ and oral parts also very similar, except that the maxillary palp is of somewhat simpler structure, being only provided with 5 marginal setæ. Natatory legs on the whole agreeing in structure with those in the said species, though having the spines of the outer ramus comparatively stronger and more coarsely denticulated. Last pair of legs with the free joint still smaller than in *O. borealis*; apical setæ, however well developed.

Colour not yet ascertained.

Length of adult female 0.78 mm.

Male unknown.

Remarks.—The present form is closely allied to *O. borealis*, and may indeed at the first sight be easily confounded with it. On a closer inspection it is however at once distinguished by the absolute absence of the characteristic dorsal hump, as also by the rather different mutual relation of the caudal segments.

Occurrence.—A few female specimens of this form were found together with *O. borealis* in a plankton-sample taken by Mr. Nordgaard in the Oster Fjord, near Bergen, and kindly sent to me for examination.

Fam. 13. Corycæidæ.

General Characters.—Body not at all depressed, but more or less pronouncedly club-shaped, with the anterior division well defined from the posterior and obtusely truncated anteriorly. Front without any true rostral prominence, but provided with 2 very large juxtaposed corneal lenses (conspicilla). 1st trunkal segment confluent with the cephalon, or only very slightly defined from it. The 3 succeeding segments in some cases imperfectly separated dorsally; lateral lobes of 3rd segment generally produced to acute lappets. Last trunkal segment imperfectly developed. Tail with the segments reduced in number, in some cases wholly confluent. Caudal rami more or less produced, styliform, with the apical setæ partly spiniform and reduced in number. Anterior antennæ comparatively small; posterior ones very strong and pronouncedly prehensile, terminating in a clawed hand, which is larger in male than in female. Oral area placed far behind and somewhat prominent. Maxillæ and anterior maxillipeds very small and clawed at the extremity. Posterior maxillipeds well developed in both sexes and distinctly prehensile. Natatory legs with the inner ramus much smaller than the outer; that of 4th pair much reduced or quite wanting. Last pair of legs absent in both sexes.

Remarks.—This family is here taken in a more restricted sense than done by Giesbrecht, who comprised within it also the genus *Sapphirina* and allied genera. These, I believe, should more properly be removed to a separate family, the *Sapphirinidæ*, as they differ very conspicuously both in the general form of the body and in some of the structural details. In the restriction here adopted the family as yet only comprises 2 nearly-allied genera, viz., *Corycæus* Dana and *Corycella* Farran. Only the first-named genus is represented in the Fauna of Norway.

Gen. 47. **Corycæus**, Dana, 1845.

Syn: *Agetus*, Kröyer.

Generic Characters.—Body more or less elongated, subclavate in form, with the anterior division only slightly dilated. Cephalic segment very large, and in most cases exhibiting behind, across the back, a faint suture, indicating the limit between the cephalon and the 1st trunkal segment; corneal lenses

distinctly separated in the middle; pigmented ocular rodes far remote from the corneal lenses and converging to a point placed about in the middle of the anterior division, near the ventral face; each provided at the distal end with a highly refractive body.¹⁾ 3rd trunkal segment produced on each side to an acute posteriorly-pointing lappet; 4th segment much smaller than the preceding one, and in some cases confluent with it dorsally. Tail composed in both sexes of only 2 segments, which in some cases are imperfectly separated. Caudal rami narrowly produced, with 2 unequal spiniform apical setæ accompanied by a slender sub-dorsal bristle. Anterior antennæ short, 6-articulate. Posterior antennæ powerfully developed, especially in male, 3-articulate; middle joint rather dilated; terminal joint very mobile and tipped with a slender claw. Maxillæ armed at the extremity with a bifid movable claw, inside which a likewise movable spiniform appendage coarsely pectinate on the outer edge is attached; palp comparatively small, scale-like. Anterior maxillipeds short, with the terminal part imperfectly defined from the basal one and exerted to a curved claw, having moreover at the base inside 2 or 3 unequal pectinated setæ. Posterior maxillipeds distinctly 3-articulate, the last 2 joints forming together a clawed hand more strongly developed in male than in female. The 3 anterior pairs of natatory legs with both rami 3-articulate, the outer one much the larger and rather produced, being armed outside and at the tip with strong denticulated spines. 4th pair of legs much feebler in structure, with the inner ramus reduced to a single small joint. Ovisacs in female attached dorsally and in some cases confluent.

Remarks.—This genus was established by Dana as early as the year 1845, and is the type of the present family. The genus *Agetus* of Krøyer is identical with Dana's genus. It comprises a great number of species chiefly occurring in southern latitudes. No less than 20 different species have been enumerated by Giesbrecht in his great work; but some of these are more properly referable to the nearly-related genus *Corycella* Farran. Off the Norwegian coast only a single species has as yet been observed, to be described below.

¹⁾ I am however by no means convinced that the above-mentioned parts, as generally opined, are in reality visual in significance, but should be much more inclined to suppose, that they constitute a peculiarly modified photogenous apparatus for projecting condensed light forwards, like the light-projectors of our automobiles. To settle this question, observations on living specimens would be needed.

105. *Corycæus anglicus*, Lubbock.

(Pl. CIX, fig. 2, Pl. CX).

Corycæus anglicus, Lubbock, Ann. & Mag. Nat. Hist. 2nd series, Vol. XX, p. 408, Pl. XI, figs. 14—17.Syn: *Corycæus germanus*, Leuckart.

Specific Characters.—*Female.* Body moderately slender, with the anterior division narrow oblong in outline, greatest width not nearly attaining half the length and occurring somewhat in front of the middle. Cephalic segment very large, occupying about half the length of the body, and exhibiting across the back behind a rather slight suture limiting the cephalon from the 1st trunkal segment; lower edges strongly bulging in front of the middle. Lateral lappets of 3rd segment rather large, wing-like, and acuminate at the end, extending about as far as the middle of the genital segment; 4th segment well defined, and somewhat angular laterally. Tail slightly exceeding half the length of the anterior division and having its 2 segments well defined, the proximal one (genital segment) rather tumid and carinated below, the carina forming in front of the middle a projecting angle; distal caudal segment about half as long as the proximal one and evenly narrowed behind. Caudal rami rather slender, being fully twice as long as the anal segment, and conspicuously divergent; seta of outer edge very small and attached at a short distance from the end, the outer corner of which is produced to a small dentiform projection; inner apical seta about the length of the corresponding ramus and more than twice as long as the outer. Anterior antennæ with the joints not much different in size and clothed with slender diverging setæ. Posterior antennæ with a long spiniform seta issuing from the end of the basal joint anteriorly; middle joint large, oblong oval in form, and carrying inside the base a similar, but much shorter seta, its anterior edge forming a thin lamella divided at the end into 2 unequal dentiform projections, terminal joint armed at the base with 2 claw-like spines and carrying at the end a similar spine and a much stronger curved claw. Posterior maxillipeds with the propodos not much dilated and provided near the end with a short spine; dactylus about the length of the propodos. Outer ramus of the 3 anterior pairs of legs rather strongly built, with the terminal joint much the largest and armed with 4 spines, one on the tip and 3 on the outer edge; inner ramus scarcely more than half as long and much narrower, its terminal joint being provided in the 1st pair with 5, in the 2nd pair with 4, and in the 3rd pair with only 2 setæ. 4th pair of legs conspicuously smaller than the 3 preceding ones, outer ramus with no

spines on the middle joint and with only a single one on the terminal joint; inner ramus represented by a small joint carrying 2 slender setæ. Ovisacs confluent to a single almost globular bag attached to the dorsal face of the genital segment.

Male of about same size as female, and having the body more pronouncedly club-shaped. Lateral lappets of 3rd trunkal segment comparatively smaller. Tail with the genital segment considerably tumefied; anal segment smaller than in female. Caudal rami scarcely at all divergent. Posterior antennæ still more strongly developed than in female, with the apical claw much more produced. Posterior maxillipeds likewise more powerful, with the propodos larger and the dactylus very long.

Body in both sexes highly pellucid, and in some places tinged with a light reddish orange pigment.

Length of adult female about 1 mm.

Remarks.—This form was first described by Lubbock from specimens captured at the west coast of England (Plymouth), and has subsequently also been observed by several other authors, though its identity has not always been recognised. Thus the *C. germanus* of Leuckart is unquestionably the very same species. It is nearly allied to *C. obtusus* of Dana, but apparently specifically distinct.

Occurrence.—I have met with this form occasionally off the west coast of Norway, as also in the Christiania Fjord, at Dröbak, among plankton taken near the surface of the sea. It is, like the other species of this genus, a pronouncedly pelagic animal, which has its true home in the open sea and only quite accidentally is thrown by the currents nearer to the shores and into the Fjords.

Distribution.—North Atlantic Ocean, off the British Isles (Lubbock & Brady), Helgoland (Leuckart); coast of Bohuslän (Trybom).

Fam. 14. Ergasilidæ.

General Characters.—Body in the juvenile state of the animal quite cyclopid in shape, becoming however in the adult female, after its affixion, more or less deformed. Eye simple, of normal appearance. Anterior antennæ comparatively short, resembling in structure those in the *Corycæidæ*. Posterior

antennæ pronouncedly prehensile, terminating in a very movable claw, and more strongly developed in female than in male. Oral parts, as in the *Corycæidæ*, densely crowded on a protuberance of the ventral face, placed far behind the insertion of the antennæ. Maxillæ and anterior maxillipeds very small and clawed at the extremity. Posterior maxillipeds wanting in female, normally developed in male. Natatory legs comparatively feeble in structure, with the rami more or less incurved. Last pair of legs small, but well defined, uniarticulate. Ovisacs in female of very large size.

Remarks.—This family also is here taken in a more restricted sense than done by most other authors. Thus I find it necessary to remove the genus *Bomolochus* of Nordman, which is generally included in the present family, but which seems to me to differ in many points so materially from the other genera, that it scarcely can be associated with them. In the restriction here adopted the family as yet only comprises 3 genera, viz., *Ergasilus* Nordman, *Ergasiloides* G. O. Sars and *Thersetina* Norman (*Thersites* Pagenstecher). Only the first-named genus is as yet stated to be represented in the fauna of Norway.

Gen. 48. **Ergasilus**, Nordman, 1832.

Generic Characters.—Body of adult female more or less pyriform in shape, with the anterior part greatly tumefied and the segments not very sharply marked off from each other; that of young female (before affixion) and of male pronouncedly depressed and tapered behind, with all the segments sharply defined. Tail comparatively short, and composed in female of 4, in male of 5 segments. Anterior antennæ 6-articulate and densely setiferous. Posterior antennæ in female exceedingly powerful, 3-articulate, terminal joint together with its apical claw forming a very strong and movable dactylus admitting of being bent against the preceding joint; those in male much smaller, but of a similar structure. Maxillæ armed at the extremity with a movable claw-like spine accompanied by a short seta, and having moreover a somewhat similar spine outside at some distance from the tip; palp small, lamelliform. Anterior maxillipeds terminating in a single claw-like spine densely hairy on the edges. Posterior maxillipeds wholly absent in female, but well developed in male and terminating in a slender clawed hand. Natatory legs with the rami comparatively short and 3-articulate, except the outer ramus of

4th pair, which is only composed of 2 joints. Last pair of legs with the free joint well defined, bisetose.

Remarks.—This genus, the type of the present family, was established by Nordman as early as the year 1832, to include a peculiar parasite (*E. Sieboldi*) found by him on the gills of various fresh-water fishes. Another species apparently referable to this genus was subsequently recorded by Van Beneden under the name of *E. nanus*. Only the type species is as yet represented in the fauna of Norway.

106. *Ergasilus Sieboldi*, Nordman.

(Pl. CXI).

Ergasilus Sieboldi, Nordman, Mikroskopische Beiträge zur Naturgeschichte wirbelloser Thiere, Heft 2.

Specific Characters.—*Young female* (before affixion). Body moderately slender and gradually tapered behind, with the anterior division oblong in outline, greatest width not nearly attaining half the length and occurring in front of the middle. Cephalon well defined from the trunk and almost pentagonal in form, the frontal part being somewhat produced and narrowly rounded. Trunkal segments defined from each other by deep lateral incisions and gradually diminishing in size, epimeral plates obtusely rounded; last segment very small, but well defined. Tail comparatively short, scarcely exceeding in length $\frac{1}{4}$ of the anterior division; genital segment somewhat dilated and equal in length to the remaining 3 segments combined. Caudal rami narrow, sub-linear in form, and scarcely at all divergent, equalling about in length the last 2 segments combined; outer edge quite smooth, apex carrying 3 very unequal setæ the inner one much the largest, exceeding in length the tail. Eye very conspicuous with dark pigment. Anterior antennæ scarcely exceeding half the length of the cephalon, and composed of 6 well defined joints clothed with slender diverging setæ; last joint the smallest, the others not very different in size. Posterior antennæ exceedingly large and powerful, and almost quite naked; basal joint thick and massive, forming with the middle joint a geniculate bend; the latter joint much elongated and slightly narrowed distally, dactylar joint cylindrical in form and terminating in a very strong curved claw. Natatory legs with the basal part rather broad, rami comparatively short and nearly equal-sized; spines of the outer ramus very small and quite wanting on the middle joint in 2nd and 3rd pairs; terminal joint of both rami short, lamelliform, with densely crowded marginal setæ. Last pair of legs with the free joint oblong oval in form; apical setæ comparatively short.

Adult male more slender in form than female, with the cephalon less broad in front. Genital segment widening distally, and generally containing 2 well-marked spermatophores. Anterior antennæ of exactly same structure as in female. Posterior antennæ however much smaller than in female, though built in a similar manner. Posterior maxillipeds rather slender, with the dactylus very long and nearly straight, terminating in an obtuse point.

Body in both sexes rather pellucid, with very dark translucent intestine, and moreover exhibiting a bright blue pigment chiefly accumulated in the anterior part.

Length of young female, immediately before affixion, 1.30 mm.; that of adult male 1.10 mm.

Remarks.—The adult ovigerous female of this form was first described by Nordman in the above-quoted treatise, and has subsequently been more closely examined by several other authors. The male and the still free-living female are far less fully known, and I hope therefore that the description and figures here given will be of some interest.

Occurrence.—In the adult state, as above mentioned, the female of this form is found firmly attached by the strongly clawed posterior antennæ to the gills of various fresh-water fishes, and when once attached in this manner, it scarcely at all leaves its hold. In the juvenile state, however, it is a vagabond animal, swimming about, like the always free-living male, near the surface of the water in company with other free-living Copepods, from which it may at once be recognized by the bright blue pigment accumulated within the anterior part of the body. In this free-living state I have taken the present Copepod occasionally among plankton collected from some of our larger lakes. It is very likely to believe, that the female is fecundated by the male before its affixion.

Distribution.—Lakes of Sweden, Russia and central Europa.

Fam. 15. Clausiidæ.

General Characters.—Body more or less elongated and narrow, with no sharp demarkation between the anterior and posterior divisions; the latter composed (in female) of the normal number of segments. Anterior antennæ small, attenuated. Posterior antennæ comparatively short, but distinctly pre-

hensile. Oral parts more or less imperfectly developed; the posterior maxillipeds being in female rudimentary or quite absent. Natatory legs in some cases normally developed, in other cases much reduced. Last pair of legs present and extended laterally, being generally uniarticulate. 2 ovisacs present in female, attached laterally.

Remarks.—The type of this family is the genus *Clausia* of Claparède, the systematic position of which has remained rather questionable, though it evidently ought to be included within the great section of poecilostomous Cyclopoida. Another genus apparently referable to the same family will be treated of in the sequel.

Gen. 49. **Conchocheres**, G. O. Sars, n.

Generic Characters.—Body elongated, tapered behind, with the integuments very thin and soft. Anterior division divided into the normal number of segments, and not very sharply marked off from the posterior. Cephalon more or less distinctly defined, and in female conspicuously protuberant laterally, front without any rostral prominence. Tail in both sexes composed of 4 segments only. Caudal rami slender, with the apical setæ much reduced in size. Anterior antennæ composed of 6 joints clothed with comparatively short setæ, and in male moreover provided with a number of largely developed æstethasks. Posterior antennæ in both sexes short and stout, carrying on the tip a strong uncinatè claw. Oral area not far remote from the insertions of the antennæ, and but little protuberant. Anterior lip bell-shaped, with a small incision in the middle. Maxillæ very small, with the masticatory part narrowly exerted and armed at the tip with 3 hook-like spinules; palp small, lamelli-form. Anterior maxillipeds with the basal part oblong in form, tapering distally, terminal part imperfectly defined and provided with a single small curved spine. Posterior maxillipeds wholly absent in female, but distinctly developed in male and, as usual, prehensile. Natatory legs present in the normal number and all having the rami distinctly 3-articulate. Last pair of legs represented on each side by a small 3-setose joint.

Remarks.—The present genus agrees with the typical one in the comparatively slender form of the body, and partly also in the structure of the antennæ and the oral parts. The natatory legs, however, are rather different, and much more fully developed. On the other hand are the last pair of legs

of rather inferior size. It is probable, that the genus *Myicola* of Whright is nearly allied to the present genus; but I have had no opportunity of comparing them closer, as the paper of that author is not accessible to me. Only a single species of the present genus is as yet known to me.

107. *Conchocheres malleolatus*, G. O. Sars, n. sp.

(Pl. CXII).

Specific Characters.—Female. Body rather slender, with the anterior division dilated in front, but narrowed behind. Cephalon only faintly defined from the trunk, and produced on each side to a very conspicuous hammer-shaped protuberance, frontal part broadly rounded. Epimeral parts of the trunkal segments not at all prominent laterally. Last trunkal segment very small. Tail about equalling in length the trunk, and perfectly cylindrical in form; genital segment not at all dilated, and scarcely longer than the 2 succeeding segments combined; anal segment considerably larger than the preceding one. Caudal rami comparatively slender and narrow, tapered distally and slightly divergent; seta of outer edge small, and attached a little in front of the middle; apical setæ much reduced in size, the outermost one somewhat remote from the other 3. Eye wholly absent. Anterior antennæ scarcely exceeding half the length of the cephalon, some of the joints less sharply defined, the first 2 much the largest, the others rapidly diminishing in size. Posterior antennæ with the basal joint very large and massive, the other 2 abruptly much narrower and somewhat unequal in size, the last one being the larger; apical claw with a small denticle at the base. Natatory legs of a rather uniform structure and extended somewhat laterally, rami comparatively slender and nearly equal-sized, spines of the outer one small, 3 of them belonging to the terminal joint. Last pair of legs with the free joint very small, oblong oval in form, and carrying one lateral and 2 apical setæ. Ovisacs large, sub-cylindrical in form and distinctly curved inwards.

Male rather unlike the female and of much smaller size, with the cephalon more distinctly defined from the trunk and of quite normal appearance, no trace of the peculiar lateral protuberances present in the female being detected. Trunkal segments with the epimeral plates well defined and rounded at the end. Genital segment gradually widening behind and, as a rule, containing 2 well-marked spermatophores. Anterior antennæ comparatively larger than in female, with all the joints well defined, and carrying 5 large recurved

æstethasks. Posterior maxillipeds distinctly developed; propodos rather narrow and quite naked; dactylus long and slender, evenly curved in its outer part.

Colour in both sexes an uniform opaque white.

Length of adult female attaining 3.30 mm.; that of male only 1.60 mm.

Remarks.—The most conspicuous peculiarity distinguishing the above—described Copepod is perhaps the strongly marked lateral protuberances of the cephalon in the female, giving the body, as it were, a somewhat hammer-shaped form; hence the specific name here proposed. Moreover the peculiar curvature of the ovisacs distinguishes this form from most other Copepoda.

Occurrence.—I have found this remarkable Copepod occasionally within the pallial cavity of a species of *Neæra* (*N. obesa*) taken off the west coast of Norway. As the parasite is of rather large size in proportion to its host, it could be easily detected even to the naked eye as an opaque white mass shining through the pellucid valves of the shell. No doubt the parasite is very noxious to the Mollusk, and in all probability quite destroys its reproductive faculty.

Fam. 16. Eunicicolidæ.

General Characters.—Anterior division of body large, shield-like, with the segments more or less completely fused together dorsally, those of posterior division well defined. Anterior antennæ attenuated; posterior ones sub-prehensile. Oral parts rather peculiar in structure, though present in the normal number. Legs imperfectly developed, the 2 posterior pairs being wholly absent. 2 ovisacs present in female attached laterally.

Remarks.—This new family is established, to include the remarkable genus *Eunicicola* of Kurz (= *Eurynotus* Scott), the very aberrant characters of which prevent its reception within any of the other families here recorded. The description given by earlier authors (Kurz and Scott) could even leave some doubt about the right position of this genus within the section of the poecilostomous Cyclopoida, as here defined. On a careful examination of the oral parts, however, I have found that, in spite of their rather aberrant structure, they in reality are built on the type characteristic of that group of Copepoda.

Gen. 50. **Eunicicola**, Kurz, 1877.Syn: *Eurynotus*, Scott.

Generic Characters.—Body short and stout, with the integuments well chitinised, and the 2 chief divisions sharply marked off from each other, the anterior one clypeiform, and without any distinct segmentation dorsally. Tail composed in female of 4, in male of 5 segments. Anterior antennæ slender and attenuated. Posterior antennæ stout, 3-articulate, last joint armed at the end with 2 claw-like appendages, each terminating in a peculiar cup-shaped dilatation. A large circular sucking disk present in female, just in front of the oral aperture; but wholly wanting in male. Maxillæ with the masticatory part greatly produced, and not, as usual, incurved, but abruptly bent backwards and terminating in a slender, freely projecting knife-shaped extremity; palp of rather compact structure, and provided at the outer projecting corner with 2 strong and densely ciliated recurved setæ. Anterior maxillipeds rather small, with the terminal part conical in form and tipped with 2 setæ. Posterior maxillipeds in female forming 2 transversely oval gibbous prominences, coarsely scabrous from numerous scale-like spikes clothing their surface, each prominence exerted inside to a small setiferous lobe; those in male transformed to very strong, clawed prehensile organs. Only 3 pairs of legs present, the 2 anterior ones biramous, the 3rd pair with only a single (outer) ramus.

Remarks.—This genus was established by Kurz as early as the year 1877, to include a peculiar Copepod found by him parasitic on the skin of a species of *Eunice*. The genus *Eurynotus* of Scott is unquestionably identical with Kurz's genus, being indeed founded upon the very same form as that observed by the latter author. Of course only a single species of the present genus is as yet known.

108. **Eunicicola Clausi**, Kurz.

(Pl. CXIII).

Eunicicola Clausii, Kurz, Sitzb. d. K. Akad. der Wissensch. Berlin, I Jahrg. 1877, p. 1, Pl. I & II.Syn: *Eurynotus insolens*, Scott.

Specific Characters.—*Female.* Anterior division of body rounded oval or almost square in outline, being only slightly longer than broad; dorsal face evenly vaulted, and exhibiting, somewhat in front of the middle, a slight transverse furrow apparently indicating the limit between cephalon and trunk; ventral face flattened; front a little bulging, but without any true rostrum. Trunkal part

of body obtusely rounded behind, and without the slightest trace of a segmentation dorsally, whereas ventrally well-marked chitinous stripes are seen, running transversally between the insertions of the legs. Tail scarcely exceeding half the length of the anterior division and partly overlapped in front by the trunk; genital segment rather dilated in its anterior part, being almost twice as broad as it is long; the succeeding segments gradually attenuated; anal segment comparatively small and deeply incised behind in the middle. Caudal rami scarcely longer than the anal segment and somewhat divergent; seta of outer edge attached near the end; apical setæ rather unequal, the inner mediate one being the longest and somewhat exceeding half the length of the tail; innermost seta very small. Eye quite absent. Anterior antennæ about the length of the cephalic part of the body, and composed of 7 well-defined joints clothed anteriorly with comparatively short setæ; 1st joint rather broad; 2nd joint much the largest, carrying behind at the base a group of 4 short bristles and at the end a long densely ciliated seta; the remaining joints rapidly diminishing in size. Posterior antennæ rather strongly built, last joint of a somewhat irregular form, and provided at the end, in addition to the 2 peculiar cup-shaped claws, with 4 rather strong and partly ciliated setæ. Sucking disk very large and conspicuous, with densely crowded radiating fibres, and finely ciliated at the edge. The 2 anterior pairs of legs with the outer ramus 3-articulate and longer than the inner, which only consists of 2 joints. 3rd pair of legs considerably smaller and without any inner ramus, outer ramus biarticulate. Ovisacs slender, cylindrical in form, each containing a rather limited number of ova arranged in a single series.

Male of rather smaller size than female, and having the trunkal part of the body somewhat less broad behind. Tail comparatively more slender, with the genital segment widening behind and terminating on each side in an obtuse projection. Both pairs of antennæ exactly as in the female. Sucking disk however quite wanting. Posterior maxillipeds very powerfully developed; basal joint short with a strongly denticulated process inside; propodos much dilated, with the palmar edge bulging at the base and densely clothed with small spikes; dactylus strong and curved.

Colour not yet ascertained.

Length of adult female 0.90 mm., of male 0.65 mm.

Remarks.—This form was first recorded by Kurz in the above-quoted Journal, and was several years afterwards described by Scott under another name, viz., *Eurynotus insolens*, the paper of Kurz being at that time unknown

to him. The structure of the oral parts have not been satisfactorily made out either by Kurz or by Scott, and the signification of the peculiar sucking disk occurring in the female was quite misapprehended by Kurz, who believed it to enclose the oral aperture, a pair of chitinous rods joining this disk on each side and serving for its support being erroneously described as mandibles.

Occurrence.—Two female specimens of this peculiar Copepod were found last summer at Risør, south coast of Norway, among dredged material taken up from a depth of about 50 fathoms, and some other specimens, among them an adult male, were recently picked up from the bottom-residue of a large collecting bottle containing various marine animals obtained by Mr. Kjær in the Christiania Fjord, near Drøbak. Kurz, as above mentioned, found this form parasitic on a species of *Eunice* (*E. Claparèdi*), and no doubt this form also off our coasts may be stated to infest some nearly-allied worms.

Distribution.—British Isles (Scott), Mediterranean at Triest (Kurz).

CORRECTIONS AND ADDITIONS.

Page 8. For *Oithona helgolandica*, Claus read:

Oithona similis, Claus.

Oithona similis, Claus, Die Copepoden Fauna von Nizza, p. 14.

Remarks.—On a closer consideration, I am now led to the conclusion, that the 2 forms recorded by Claus under the names *O. helgolandica* and *O. similis* are in reality very distinct species, the former being in all probability identical with the form subsequently described by Giesbrecht as *O. nana*. This species, which accordingly must bear the older name *helgolandica*, has not yet been observed off the Norwegian coast. For the northern species described page 8 as *O. helgolandica* the specific name *similis* given to it by Claus ought of course to be retained.

Page 9. Add the following genus and species:

Gen. **Paroithona**, Farran, 1908.

Generic Characters.—General form of body resembling that in *Oithona*, the 2 chief divisions being sharply marked off from each other. Cephalon distinctly defined from the first trunkal segment, and having the front rounded off below, without any rostral projection. Tail slender, with long diverging apical setæ. Antennæ and oral parts on the whole built on the same type as in *Oithona*, except that the mandibular palp is somewhat simpler in structure. Natatory legs with the inner ramus in all pairs only composed of 2 joints. Last pair of legs very small.

Remarks.—This genus, recently established by Farran, is closely allied to *Oithona*, from which it is chiefly distinguished by the inner ramus of all the natatory legs being only biarticulate. Mr. Farran has recorded 2 species

referable to this genus, the one, *P. parvula*, from the west coast of Ireland, the other, *P. pulla*, from the Indian Ocean. The first-named species also occurs off the Norwegian coast, and will be described below.

***Paroithona parvula*, Farran.**

(Pl. CXIV).

Paroithona parvula, Farran, Second Report on the Copepoda of the Irish Atlantic Slope. Fisheries Ireland. Scient. Investig. 1906, II, p. 89, Pl. X, figs. 1—13.

Specific Characters.—*Female.* Body moderately slender, with the anterior division regularly oval fusiform in outline, greatest width equalling about half the length and occurring a little in front of the middle; frontal part obtusely blunted and evenly rounded below, without the slightest trace of any rostrum. Tail exceeding somewhat half the length of the anterior division, and very narrow, cylindrical in form; genital segment only slightly dilated in its anterior part and longer than the 2 succeeding segments combined; anal segment fully as long as the preceding one and slightly widening distally. Caudal rami quite short, not nearly attaining the length of the anal segment, and slightly divergent; seta of outer edge attached near the base; apical setæ very unequal, 2 of them excessively prolonged and crossing each other at the base. All integuments very thin and fragile. Anterior antennæ not attaining the length of the anterior division, and composed of 9 joints clothed with partly very long and diverging setæ; some of the joints being however less perfectly defined. Posterior antennæ biarticulate, proximal joint nearly twice as long as the distal one. Mandibular palp armed at the inner projecting corner with a single strong claw-like spine clothed on both edges with a limited number of slender spikes; inner ramus very small, outer well developed, imperfectly 3-articulate, and provided with 5 long densely plumous setæ. Maxillæ and maxillipeds of a structure very similar to that in *Oithona*. Natatory legs rather slender and partly extending laterally; inner ramus in 1st pair about the size of the outer, in the other 3 pairs much smaller; outer ramus in all the pairs distinctly 3-articulate, its terminal joint having outside in the 2 anterior pairs 2 spines, in the 2 posterior pairs a single spine; apical spine of this ramus in the 3 posterior pairs exceedingly long and slender. Last pair of legs apparently represented on each side by a single short seta arising from a knob-like prominence.

Colour not yet ascertained.

Length of adult female 0.52 mm.

Male unknown.

Remarks.—This form was described and figured by Mr. Farran in the above-quoted Report as the type of his genus *Paroithona*. It may easily be recognised from the 2 Norwegian species of *Oithona* described in the present work by its small size and the somewhat less slender form of the body, in which respect it however resembles some exotic species of that genus. From the Indian species, *P. pulla* Farran, it differs among other things in the distinctly 3-articulate outer ramus of the 1st pair of legs, this ramus being in the said species, like the inner, only composed of 2 joints.

Occurrence.—The occurrence of the present form off the Norwegian coast has first been stated by Mr. Farran, who found it not unfrequently in a plankton-sample taken from deep water in the Hundfjord, west coast of Norway (Nordfjord), some of the specimens having kindly been sent to me for examination. I am moreover enabled to state its occurrence in another locality of the Norwegian coast, 2 or 3 female specimens having recently been picked up from a sample of pelagic Copepoda taken by Mr. Nordgaard in the Herløfjord, near Bergen.

Distribution.—West coast of Ireland (Farran).

Page 14. For *Cyclopina brevifurca*, G. O. Sars, read:

***Cyclopina Schneideri*, Scott.**

Cyclopina Schneideri, Scott, Notes on some Copepoda from Arctic seas, collected by Canon A. M. Norman. Ann. Mag. Nat. Hist. Ser. 7. Vol. XI, p. 6, Pl. 1, figs. 1—6.

Remarks.—I am now disposed to regard the form described by me on p. 14 as *C. brevifurca* to be more properly identical with the species recorded by Scott from east Finmark under the above name. True there are some apparent differences, chiefly as regards the size¹⁾ and the structure of the last pair of legs (according to the figure given); but in all other respects the agreement between these 2 forms are so complete, that I find it unreasonable to keep them apart as distinct species.

Page 16. Add the 2 following species:

***Cyclopina euacantha*, G. O. Sars, n. sp.**

(Pl. CXV, fig. 1).

Specific Characters.—*Female.* Body not very slender, with the anterior division oval in outline, greatest width exceeding half the length and

¹⁾ Scott gives the length of his specimen to rather more than 1 mm.

occurring somewhat behind the middle. Cephalic segment longer than the 4 succeeding segments combined and slightly narrowed in front. Tail somewhat exceeding half the length of the anterior division; genital segment only slightly dilated in its anterior part, and about the length of the 3 succeeding segments combined. Caudal rami moderately produced and rather narrow, being scarcely at all divergent; seta of outer edge attached about in the middle; apical setæ normally developed. Anterior antennæ slender and elongated, exceeding in length the cephalic segment, and composed of 19 well-defined joints, 1st, 2nd, 4th, and 7th the largest, the other joints very small. Posterior antennæ with the terminal joint much shorter than the antepenultimate one. Natatory legs comparatively short and stout, with the spines of the outer ramus unusually strong, dagger-like. Last pair of legs biarticulate, proximal joint rather broad, being angularly produced outside, distal joint considerably longer, but much narrower, oblong in form, and armed with 3 very strong dagger-like spines, 1 apical and 2 lateral ones.

Colour not yet ascertained.

Length of adult female 0.80 mm.

Male unknown.

Remarks.—This form, which has briefly been mentioned on page 11, was observed many years ago by the present author, and was at that time subjected to a careful anatomical examination; but both the specimens and the dissections have unfortunately been lost, so that I have had no opportunity of renewing my investigation. The figures given on the accompanying plate, which are copied from my earlier drawings, will however at once show it to be a very distinct species.

Occurrence.—The specimens of this form observed were taken off the Lofoten islands, at Skraaven, from a depth of about 12 fathoms, sandy bottom. Only a few female specimens were obtained, none of them carrying ovisacs.

Cyclopina pygmæa, G. O. Sars, n. sp.

(Pl. CXV, fig. 2).

Specific Characters.—*Female.* Body resembling in shape that in *C. gracilis*, though comparatively more slender, with the anterior division oblong oval in outline, greatest width only slightly exceeding half the length and occurring about in the middle. Tail rather narrow, with the genital segment scarcely longer than the 2 succeeding segments combined. Caudal rami considerably produced, exceeding in length the last 2 segments combined, and

slightly divergent, being somewhat contracted in the middle, but a little widening towards the end; the outer corner of which is produced to a small dentiform projection; seta of outer edge attached considerably in front of the middle; apical setæ rather slender, the 2 middle ones coarsely spinulose at the edges for some part of their length; seta of inner corner much longer than that of the outer. Anterior antennæ comparatively short, not nearly attaining the length of the cephalic segment and, as in *C. gracilis*, composed of only 10 joints, the 6th being much the largest and about equalling in length the outer 4 joints combined. Posterior antennæ, oral parts and natatory legs resembling in structure those parts in *C. gracilis*. Last pair of legs also rather similar, though comparatively of somewhat smaller size. Ovisacs rather small and closely appressed to the sides of the tail.

Colour whitish grey.

Length of adult female not exceeding 0.42 mm.

Remarks.—The above-described form is closely allied to *C. gracilis* Claus, and indeed at first I was inclined to regard it as merely a small variety of that species. Having however subsequently met with this form in many different localities and always found its characters pretty constant, I am now of opinion that it should be kept apart as a distinct species.

Occurrence.—I first observed this form at Skutesnæs SW coast of Norway, where it occurred not unfrequently together with *C. gracilis*, from which it at once distinguished itself by its much smaller size. The same form has subsequently occurred to me in the following localities of the southern coast: Farsund, Lillesand, Grimstad and Risør.

Page 32. For *Cyclop strenuus*, Fisher, read:

***Cyclops pictus*, Koch.**

Deutschlands Crustaceen, Myriapoden und Arachniden. Heft. 21, Pl. 1.

Remarks.—As it appears to me beyond doubt, that Koch's species is the same as that subsequently described by Fischer as *C. strenuus*, I think that, according to the rules of priority, the name proposed by the first named author must be retained for the present species.

Page 109. Add the following genus and species:

Gen. **Scottomyzon**, Giesbrecht, 1897.

Generic Characters.—Body short and stout, with the anterior division very sharply marked off from the posterior and greatly dilated, especially in female. Rostral prominence obtuse, incurved. Tail very small and consisting in female of only 3, in male of 4 segments; genital segment in both sexes greatly tumefied. Caudal rami short, with the usual number of setæ. Anterior antennæ not much produced, but, as in most other Ascomyzontidæ, divided into numerous short articulations; those in male distinctly hinged near the end, but without any supplementary æstethasks. Posterior antennæ with the appendicular (outer) ramus more fully developed than in the other Ascomyzontidæ. Siphonal tube quite short, with large opening. Mandibles with the masticatory part not much produced, palp small, unisetose. Maxillæ with both lobes well developed and nearly equalsized. Anterior maxillipeds much more strongly built than the posterior. Natatory legs with the rami comparatively slender, terminal joint of the outer one with only 2 spines outside. Last pair of legs small, biarticulate.

Remarks.—This genus was established by Giesbrecht to include a species first described by T. Scott and referred by him to the genus *Dermatomyzon* of Claus. It is chiefly characterised by the short and stout form of the body, the unusual size of the outer ramus of the posterior antennæ and the very strong development of the anterior maxillipeds; finally by the peculiar structure of the siphonal tube. Only a single species is as yet known.

Scottomyzon gibberum (Scott).

(Pl. CXVI).

Dermatomyzon gibberum, Scott. On some new and rare Crustacea from Scotland. Ann. Mag. Nat. Hist. Ser. 6, Vol. XIII, p. 141, Pl. IX, figs. 10—14.

Specific Characters.—*Female.* Form of body very short and compact, more so than in any of the other known Ascomyzontidæ. Anterior division of somewhat varying shape according to age, being in young specimens subclavate or pear-shaped, in fully adult specimens nearly circular in outline, with the greatest width about equal to the length. Cephalic segment exceedingly large, with the lateral edges quite evenly arcuate throughout. The succeeding segments rapidly diminishing in size, and having the epimeral plates rounded off. Tail very short, being scarcely $\frac{1}{5}$ as long as the anterior division; genital

segment much dilated, nearly twice as broad as it is long, the 2 succeeding segments small. Caudal rami likewise of inconsiderable size, scarcely longer than they are broad, and somewhat divergent; apical setæ not much produced and somewhat spreading. Anterior antennæ scarcely more than half as long as the cephalic segment, and composed of 18 joints, the 1st and 3rd of which are the largest. Posterior antennæ with the terminal joint comparatively small and of conical form, being provided with a short lateral seta and a rather feeble apical spine accompanied by 2 unequal bristles; appendicular ramus almost as long as the penultimate joint and carrying on the tip 3 short bristles. Siphonal tube nearly oval in form. Mandibles with the extremity quite simple, without any denticles. Maxillæ with the inner lobe a little shorter and stouter than the outer, and carrying on the end 3 rather strong subequal and densely ciliated setæ; outer lobe sublinear in form and provided with 4 more slender apical setæ. Anterior maxillipeds very powerful, with the terminal claw exceedingly strong and abruptly curved at the tip in a hook-like manner. Posterior maxillipeds of quite normal structure. Natatory legs with the inner ramus in the 2 anterior pairs about equal in size to the outer, in the 2 posterior pairs rather smaller; spines of outer ramus in all the pairs rather small. Last pair of legs with the distal joint narrow oblong in form and provided at the tip with 2 comparatively short setæ and inside with a very minute bristle. Ovisacs globular in form, each containing a very limited number of ova.

Male much smaller than female, and having the anterior division of the body far less tumefied. Tail comparatively more fully developed, with the genital segment somewhat larger and, as a rule, containing 2 globular spermatophores, genital lappets each tipped by a long seta pointing obliquely outwards. Anterior antennæ more strongly built than in female and composed of only 16 joints, the last 2 of which form together a very movable terminal part admitting of being bent against the preceding part.

Body in female of a more or less vivid brick-red colour, that in male much paler.

Length of adult female amounting to 0.56 mm.; that of male 0.45 mm.

Remarks.—This form, as above mentioned, was first described by T. Scott as a species of the genus *Dermatomyzon* of Claus, but was subsequently justly removed from this genus by Giesbrecht, to form the type of his new genus *Scottomyzon*. It is an easily recognisable form, which cannot be confounded with any of the other Ascomyzontidæ.

Occurrence.—I have recently found this form parasitic on our common starfish, *Asterias rubens* taken at Risør, south coast of Norway, as also in the

upper part of the Christiania Fjord. Owing to its small size, it is not easy to detect the parasite when still attached to its host, and it was indeed only after immersion of the starfishes in a feeble solution of alcohol that, by an examination of the bottom-residue of the bottle. I succeeded in getting sight of the detached parasites. The greater number of the specimens thus secured were of the male sex, and only very few female specimens were obtained, among them a fully adult ovigerous one, that here figured. Mr. A. Scott has procured this form by the same proceeding from starfishes collected of the British coast.

Distribution.—British Isles (Scott),

Page 172. Add the following species:

Pseudanthessius dubius, G. O. Sars, n. sp.

(Pl. CXVII).

Specific Characters.—*Female.* Body moderately slender, with the anterior division comparatively broad and regularly oval in outline, greatest width equalling about $\frac{2}{3}$ of the length and occurring in the middle. Cephalic segment very large, and scarcely exhibiting any transversal suture behind, front narrowly rounded. Last trunkal segment very small. Tail slender, equalling in length about $\frac{2}{3}$ of the anterior division, and only composed of 3 segments, the 1st of which (the genital segment) is, as usual, much the largest and sub-fusiform in shape, being divided in the middle by a transversal suture into 2 parts, the anterior one somewhat bellshaped, the posterior rapidly tapered; the 2 succeeding segments sharply marked off from each other, both of narrow cylindrical form, fully twice as long as they are broad. Caudal rami very slender and narrow, being nearly as long as the last 2 segments combined, and slightly divergent; seta of outer edge attached somewhat beyond the middle; apical setæ rather unequal, the 2 middle ones being, as usual, much longer than the other 2, which are very small, especially that attached to the outer corner. Anterior antennæ slender and narrow, being composed of the usual number of joints clothed with moderately long setæ; 2nd joint the largest, last joint very small. Posterior antennæ likewise rather slender, though a little shorter than the anterior ones; 2nd joint about as long as the last 2 combined; terminal joint armed at the tip with a single well-developed claw accompanied by 5 strong curved setæ. Maxillæ not examined. Anterior maxillipeds with the terminal process only slightly curved. Posterior maxillipeds with the propodal joint fully as large as the basal one, and provided inside

in the middle with a very small spine accompanied by a likewise small bristle; dactylar joint conical in form, with a minute spinule at the base. Natatory legs resembling in structure those in the type species (*P. gracilis*); inner ramus of 4th pair however of larger size and densely ciliated on both edges, the outer one exhibiting in the middle a well-marked dentiform projection. Last pair of legs, as in the other species of this genus, quite rudimentary, being represented on each side by a short spine and 2 setæ, all attached immediately to the corresponding segment.

Body, in the living state of the animal, very pellucid, of whitish colour, with orange-coloured intestine and light fuscous ovarian tubes.

Length of adult female slightly exceeding 1 mm.

Male unknown.

Remarks.—The most prominent peculiarity of the present species is the composition of the tail of only 3 segments, in which respect it differs not only from the other species of this genus, but from all the known Lichomolgidæ. The structure of the several appendages, however, is in full accordance with that found in the genus *Pseudanthessius*, to which it accordingly must be referred. In the very narrow and produced caudal rami it resembles the form recorded by Brady as *Lichomoligus Thorelli*, and indeed at first I was inclined to regard it as identical with that species. The structure of the caudal segments, however, as also that of the last pair of legs, is, according to the figures given by Brady of these parts, so totally different that an identification of these 2 forms is inadmissible.

Occurrence.—Only a single female specimen of this form has hitherto come under my notice. It was taken many years ago off the west coast of Norway, the exact locality not being noted, and, after a coloured drawing was made from the still living animal, it was submitted to a careful anatomical examination. The figures here given are copied from the drawings made at that time.

Page 189. Add the following genus and species:

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

Generic Character.—General form of body somewhat resembling that in the genus *Machrocheiron*. Tail however comparatively shorter and stouter, with the genital segment (in female) rather massive and exhibiting behind 2 peculiar ventral lappets confluent in the middle. Anterior antennæ unusually

short, though composed of the normal number of joints. Posterior antennæ likewise short and stout, distinctly prehensile. Maxillæ not examined. Anterior maxillipeds of quite normal structure. Posterior maxillipeds, however, rather unlike those in other female *Lichomolgida*, the propodal joint being considerably dilated and the dactylar joint claw-like. Natatory legs with the rami comparatively short and stout, and having all the spines very strongly developed; inner ramus of 4th pair very short, uniarticulate, with 2 apical spines. Last pair of legs represented on each side by a small, but well defined bisetose joint.

Remarks.—This new genus is established, to include a small Lichomolgid, which I have found it impossible to range within any of the other genera, though it exhibits some affinity both to the genus *Macrocheiron* and to *Pseudantessius*. With the latter genus it agrees in the structure of the 4th pair of legs, the inner ramus of which is uniarticulate; but the last pair of legs are rather different, having a well defined bisetose joint, as in most other Lichomolgida. In the structure of the genital segment and of the posterior maxillipeds it differs conspicuously from any of the other genera.

Lichomolgella pusilla, G. O. Sars, n. sp.

(Pl. CXVIII, fig. 1).

Specific Characters.—*Female.* Body moderately slender, with the anterior division oval in outline, greatest width equalling about $\frac{2}{3}$ of the length and occurring in the middle. Cephalic segment very large, occupying almost half the length of the body, and exhibiting near the middle a faint arcuate transverse suture. The 3 succeeding segments rapidly diminishing in size, and having the lateral parts evenly rounded off. Last trunkal segment very small. Tail rather short, not nearly attaining half the length of the anterior division; genital segment comparatively large, exceeding in length the remaining part of the tail, and exhibiting on each side, at some distance from the end, an angular corner; ventral lappets each tipped by a slender seta pointing obliquely outwards; the 3 succeeding segments subequal in size, and fully twice as broad as they are long. Caudal rami very short, being scarcely longer than the anal segment; seta of outer edge attached about in the middle; apical setæ partly broken in the specimen examined. Anterior antennæ unusually short and stout, but composed of 7 well-defined joints clothed with slender setæ. Posterior antennæ about the length of the anterior ones, and rather strongly built; 2nd joint considerably longer than the outer 2 combined, and projecting at the end behind in a rounded corner; penultimate joint very short and armed at

the end anteriorly with a slender biarticulate claw and 3 small bristles; terminal joint carrying on the end 5 curved setæ and a slender claw of same appearance as that on the penultimate joint. Posterior maxillipeds with the propodal joint considerably dilated and oval in form, carrying somewhat beyond the middle a short spine and in front of it a slender seta; dactylar joint exerted in the form of an almost straight claw with a slender spinule at the base. Natatory legs with the rami in the 3 anterior pairs nearly equal-sized; inner ramus of 4th pair, however, much reduced in size, forming a single oval joint with 2 somewhat unequal spines on the tip. Last pair of legs with the free joint rather small and oblong in form; apical setæ not much produced and subequal in size.

Colour not yet ascertained.

Length of the specimen examined 0.45 mm.

Male unknown.

Remarks.—The above-described form may be easily distinguished from any of the other Lichomolgidæ by its small size, the unusually short anterior antennæ and the structure of the tail.

Occurrence.—Only a single specimen of this form, an apparently full-grown female, has hitherto come under my notice. It was picked up from a sample taken several years ago at Skutesnæs, SW coast of Norway, from a depth of about 20 fathoms.

Page 193. Add the following species:

***Oncæa minuta*, Giesbrecht.**

(Pl. CXVIII, fig. 2).

Oncæa minuta, Giesbrecht, Fauna & Flora des Golfes von Neapel, Pelagische Copepoden, p. 591, Pl. 47, figs. 3, 6, 26, 46, 59.

Specific Characters.—*Female.* Body moderately slender, with the anterior division oval fusiform in outline, greatest width about half the length and occurring in the middle, dorsal face evenly vaulted throughout. Last trunkal segment extremely small. Tail not attaining half the length of the anterior division; genital segment evenly dilated in the middle and slightly longer than the remaining part of the tail; anal segment larger than either of the 2 preceding segments. Caudal rami comparatively short, scarcely attaining the length of the anal segment; seta of outer edge attached about in the middle; apical setæ not much produced, that of the inner corner very small, shorter than that of the outer. Structure of the several appendages very similar

to that in the 2 other Norwegian species. Inner ramus of 4th pair of legs, however, wanting the plug-shaped process between the 2 apical setæ¹⁾. Last pair of legs extremely small, with the free joint nodiform.

Colour not yet ascertained.

Length of adult female scarcely 0.46 mm.

Remarks.—I cannot doubt that the above-described form is that recorded by Giesbrecht as *O. minuta*. Beside by its small size, it differs from the 2 other Norwegian species by the form and relative size of the genital segment, and by the very small innermost caudal seta.

Occurrence.—Two female specimens of this form were recently found among some pelagic Copepoda kindly sent to me from Mr. Nordgaard, who obtained them in the Herløjfjord near Bergen.

Distribution.—North Atlantic Ocean, Mediterranean, Pacific, Indian Ocean.

¹⁾ True, Giesbrecht, asserts that such a process is present; but I suspect that the leg he figures is in reality not the 4th, but the 3rd, in which this process is well marked.

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(With corrections).

The following are the chief signs on the figures, with their signification:

♀ female; ♂ male; *C.* cephalon; *R.* rostrum; *T.* tail; *gen. reg.* genital region; *F.* furca or caudal rami; *a*¹ anterior antenna; *a*² posterior antenna; *or. area* oral area; *S.* siphonal tube; *M.* mandible; *Mp.* mandibular palp; *m.* maxilla; *mp.*¹ anterior maxilliped; *mp.*² posterior maxilliped; *p*¹—*p*⁵. legs of 1st to 5th pairs.

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- Pl. LXXVI.
Bradypontius caudatus, G. O. Sars.
- Pl. LXXVII.
Cribropontius Normani (Brady).
- Pl. LXXVIII.
Artotrogus orbicularis, Boeck.
- Pl. LXXIX.
Parartotrogus arcticus, Scott.
- Pl. LXXX.
Cancerilla tubulata, Dalyell.
- Pl. LXXXI.
Hemicyclops purpureus, Boeck.
- Pl. LXXXII.
Hippomolgus furcifer, G. O. Sars.
- Pl. LXXXIII.
Lichomolgus albens, Thorell.
- Pl. LXXXIV.
Lichomolgus forficula, Thorell.
- Pl. LXXXV.
Lichomolgus marginatus, Thorell.
- Pl. LXXXVI.
Lichomólgus furcillatus, Thorell.
- Pl. LXXXVII.
Lichomolgus Canui, G. O. Sars.
- Pl. LXXXVIII.
Lichomolgus Poucheti, Canu.
- Pl. LXXXIX.
Lichomolgus tenuifurcatus, G. O. Sars.
- Pl. XC.
Lichomolgus agilis (Leydig).
- Pl. XCI.
Pseudanthessius gracilis, Claus.
- Pl. XCII.
Pseudanthessius liber (Brady).
- Pl. XCIII.
Pseudanthessius assimilis, G. O. Sars.
- Pl. XCIV.
Pseudanthessius Sauvagei, Canu.
- Pl. XCV.
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- Pl. XCVI.
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- Pl. XCVII.
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- Pl. XCVIII.
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- Pl. XCIX.
Hermannella parva, Norm. & Scott.
- Pl. C.
Hermannella prehensilis, G. O. Sars.
- Pl. CI.
Hermannella finmarchica, Scott.
- Pl. CII.
Hermannella tenuicaudis, G. O. Sars.

Pl. CIII.
Pseudomolgus leptostylis, G. O. Sars.

Pl. CIV.
Pseudomolgus dilatatus, G. O. Sars.

Pl. CV.
Rhinomolgus anomalus, G. O. Sars.

Pl. CVI.
Rhinomolgus anomalus (continued).

Pl. CVII.
Sabelliplutilus elongatus, M. Sars.

Pl. CVIII.
Oncæa borealis, G. O. Sars

- Pl. CIX.
1. Oncæa similis, G. O. Sars.
 2. Corycæus anglicus, Lubb. (male).

Pl. CX.
Corycæus anglicus, Lubb. (female).

Pl. CXI.
Ergasilus Sieboldi, Nordman.

Pl. CXII.
Conchocheres malleolatus, G. O. Sars.

Pl. CXIII.
Eunicicola Clausi, Kurz.

Pl. CXIV.
Paroithona parvula, Farran.

- Pl. CXV.
1. Cyclopina euacantha, G. O. Sars.
 2. — pygmæa, G. O. Sars.

Pl. CXVI.
Scottomyzon gibberum (Scott).

Pl. CXVII.
Pseudanthessius dubius, G. O. Sars.

- Pl. CXVIII.
1. Lichomolgella pusilla, G. O. Sars.
 2. Oncæa minuta Giesbrecht.

AN ACCOUNT
OF THE
CRUSTACEA
OF
NORWAY

AN ACCOUNT
OF THE
CRUSTACEA
OF
NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY

G. O. SARS

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VOL. VI

COPEPODA
CYCLOPOIDA

WITH 118 AUTOTYPIC PLATES



BERGEN

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1918

PREFACE.

In concluding this Volume, I wish to observe that I am far from claiming it to give any exhaustive account of the group treated off. Especially as regards the semiparasitic forms belonging to the sections *Siphonostoma* and *Poecilostoma*, there is certainly still much to do, and I have no doubt that, on a closer and more methodical investigation of these interesting forms, many new species will be added to those here described, the greater number of which have been met with only quite accidentally in isolated specimens detached from their hosts. Yet I hope that this Volume will be useful as comprehending what is as yet known about this part of our Fauna.

As to the plates accompanying the present Volume, they are, as will be seen, reproduced in quite a different manner from those in the preceding Volumes, where the autographic method has been applied throughout. This latter method may indeed give very good results, as seen from some of the earlier Volumes of the present work. But the method involves some danger for the clearness of the drawings, if not the outmost care is taken in their transfer on the stone. I have been very sorry to see that several of the plates accompanying the last (5th) Volume, for want of an habile and experienced printer, have been less satisfactorily reproduced, and I therefore have thought it right to abandon this method altogether and to chose another method, the phototypic one, which, though somewhat more costly, will better ensure the perfect reproduction of my drawings.

By the elaboration of the present Volume I have been assisted by the same gentleman who did it in the case of the preceding Volume, and my hearty thanks are here again paid to them for their kindness. I also is much indebted to Prof. Wirén of the Upsala University and to Mr. G. P. Farran, Dublin, for kindly sending me specimens for examination. My best thanks are moreover due to Mr. A. Kjær for kindly having given me an opportunity of

examining the bottom-residue of some large collecting bottles for search of semiparasitic forms. Several interesting species of both siphonostomous and poecilostomous Cyclopoida have thereby been secured and submitted to a closer investigation. Finally I beg to thank the direction of the Bergen Museum for the readiness with which it has admitted the increased expenses by the altered reproduction of the plates, and for the interest it has shown in the continued publication of my work.

G. O. Sars.

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SYSTEMATIC LIST

OF THE SPECIES DESCRIBED IN THE PRESENT VOLUME.

Gnathostoma.

Oithonidæ.

Oithona, Baird.

spinirostris, Claus.

similis, Claus.

Paroithona, Faran.

parvula, Farran.

Cyclopinidæ.

Cyclopina, Claus.

gracilis, Claus.

longicornis, Boeck.

Schneideri, Scott.

elegans, Scott.

euacantha, G. O. Sars.

pygmæa, G. O. Sars.

Cyclopinella, G. O. Sars.

tumidula, G. O. Sars.

Cyclopetta, G. O. Sars.

difficilis, G. O. Sars.

Pterinopsyllus, Brady.

insignis, Brady.

Cyclopidæ.

Cyclops, Müller.

pictus, Koch.

abyssorum, G. O. Sars.

lacustris, G. O. Sars.

scutifer, G. O. Sars.

vicinus, Uljanin.

insignis, Claus.

vulgaris, Koch.

gigas, Claus.

capillatus, G. O. Sars.

lucidulus, Koch.

robustus, G. O. Sars.

pulchellus, Koch.

bisetosus, Rehberg.

crassicaudis, G. O. Sars.

langvidus, G. O. Sars.

diaphanus, Fischer.

abyssicola, Lilljeborg.

varicans, G. O. Sars.

bicolor, G. O. Sars.

Mesocyclops, G. O. Sars.

obsoletus, Koch.

oithonoides, G. O. Sars.

crassus, Fischer.

Dybowskyi, Lande.

gracilis, Lilljeborg.

Pachycyclops, G. O. Sars.

signatus, Koch.

bistriatus, Koch.

annulicornis, Koch.

Leptocyclops, G. O. Sars.

agilis, Koch.

speratus, Lilljeborg.

Lilljeborgi, G. O. Sars.
macruroides, Lilljeborg.
macrurus, G. O. Sars.

Platycyclops, G. O. Sars.
phaleratus, Koch.
affinis, G. O. Sars.
fimbriatus, Fischer.

Siphonostoma.

Ascomyzontidæ.

Ascomyzon, Thorell.
asterocheres, Boeck.
Lilljeborgi, Thorell.
Boeckii, Brady.
simulans, Scott.
latum, Brady.
parvum, Giesbrecht.

Echinocheres, Claus.
violaceus, Claus.

Dermatomyzon, Claus.
nigripes, Brady.

Rhynchomyzon, Giesbr.
purpurocinctum, Scott.
rubrovittatum, G. O. Sars.

Collocheres, Canu.
gracilicauda, Brady.

Mesocheres, Norm. & Scott.
anglicus, Norm. & Scott.

Leptomyzon, G. O. Sars.
elegans, A. Scott.

Scottocheres, Giesbrecht.
elongatus, Scott.

Scottomyzon, Giesbr.
gibberum, Scott.

Acontiophoridæ.

Acontiophorus, Brady.
scutatus, Brady.

Myzopontiidæ.

Myzopontius, Giesbr.
pungens, Giesbr.
 Neopontius, Scott.
angularis, Scott.

Dyspontiidæ.

Dyspontius, Thorell.
striatus, Thorell.
 Cryptopontius, Giesbr.
brevifurcatus, Giesbr.
 Arctopontius, G. O. Sars.
expansus, G. O. Sars.
 Bradyopontius, Giesbr.
magniceps, Brady.
papillatus, Scott.
major, G. O. Sars.
caudatus, G. O. Sars.
 Cribropontius, Giesbrecht.
Normani, Brady.

Artotrogidæ.

Artotrogus, Boeck.
orbicularis, Boeck.

Cancerillidæ.

Parartotrogus, Scott.
arcticus, Scott.
 Cancerilla, Dalyell.
tubulata, Dalyell.

Poecilostoma.

Clausidiidæ.

Hemicyclops, Boeck.
purpureus, Boeck.
 Hippomolgus, G. O. Sars.
furcifer, G. O. Sars.

Lichomolgidae.

- Lichomoligus, Thorell.
albens, Thorell.
marginatus, Thorell.
forficula, Thorell.
furcillata, Thorell.
Canui, G. O. Sars.
Poucheti, Canu.
tenuifurcatus, G. O. Sars.
agilis, Leydig.
- Macrocheiron, Brady.
fucicolum, Brady.
hirsutipes, Scott.
- Pseudanthessus, Claus.
gracilis, Claus.
liber, Brady.
assimilis, G. O. Sars.
Sauvagei, Canu.
dubius, G. O. Sars.
- Lichomolgella, G. O. Sars.
pusilla, G. O. Sars.
- Modiolicola, Auriv.
insignis, Auriv.
- Hermannella, Canu.
valida, G. O. Sars.
parva, Norm. & Scott.
prehensilis, G. O. Sars.
finmarchica, Scott.
tenuicaudis, G. O. Sars.
- Pseudomoligus, G. O. Sars.
leptostylis, G. O. Sars.
dilatatus, G. O. Sars.

- Rhinomoligus, G. O. Sars.
anomalus, G. O. Sars.
- Sabelliphilus, M. Sars.
elongatus, M. Sars.

Oncaëidæ.

- Oncæa, Philippi.
borealis, G. O. Sars.
similis, G. O. Sars.
minuta, Giesbr.

Corycæidæ.

- Corycæus, Dana.
anglicus, Lubbock.

Ergasilidæ.

- Ergasilus, Nordman.
Sieboldi, Nordm.

Clausiidæ.

- Conchocheres, G. O. Sars.
malleolatus, G. O. Sars.

Eunicicolidæ.

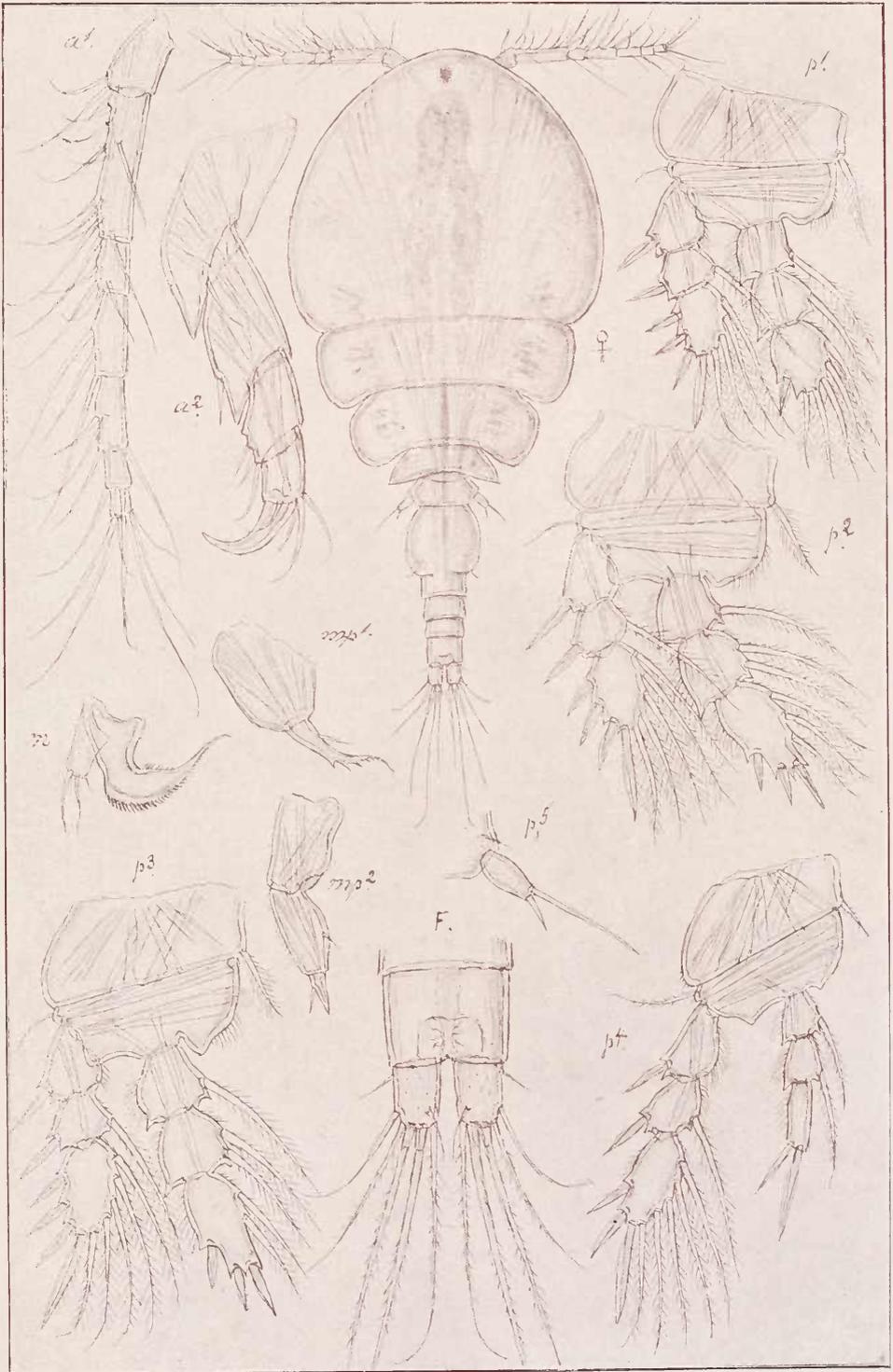
- Eunicicola, Kurz.
Çlasi, Kurz.

Copepoda

Lichomolgidae

Cyclopoida

Pl. XCVIII



G. O. Sars, del.

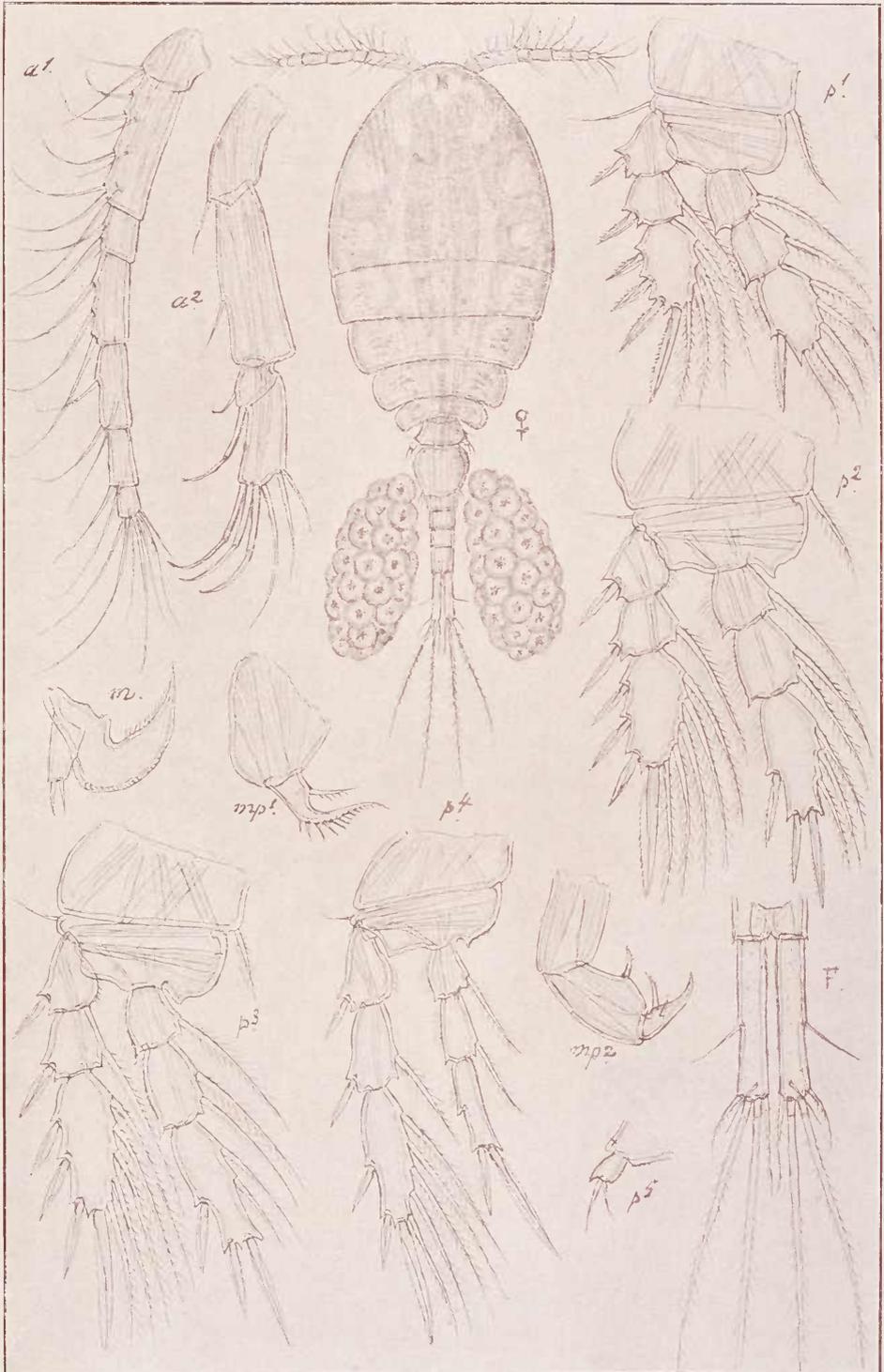
Hermannella valida, G. O. Sars

Copepoda

Lichomolgidae

Cyclopoida

Pl. XCIX



G. O. Sars, del.

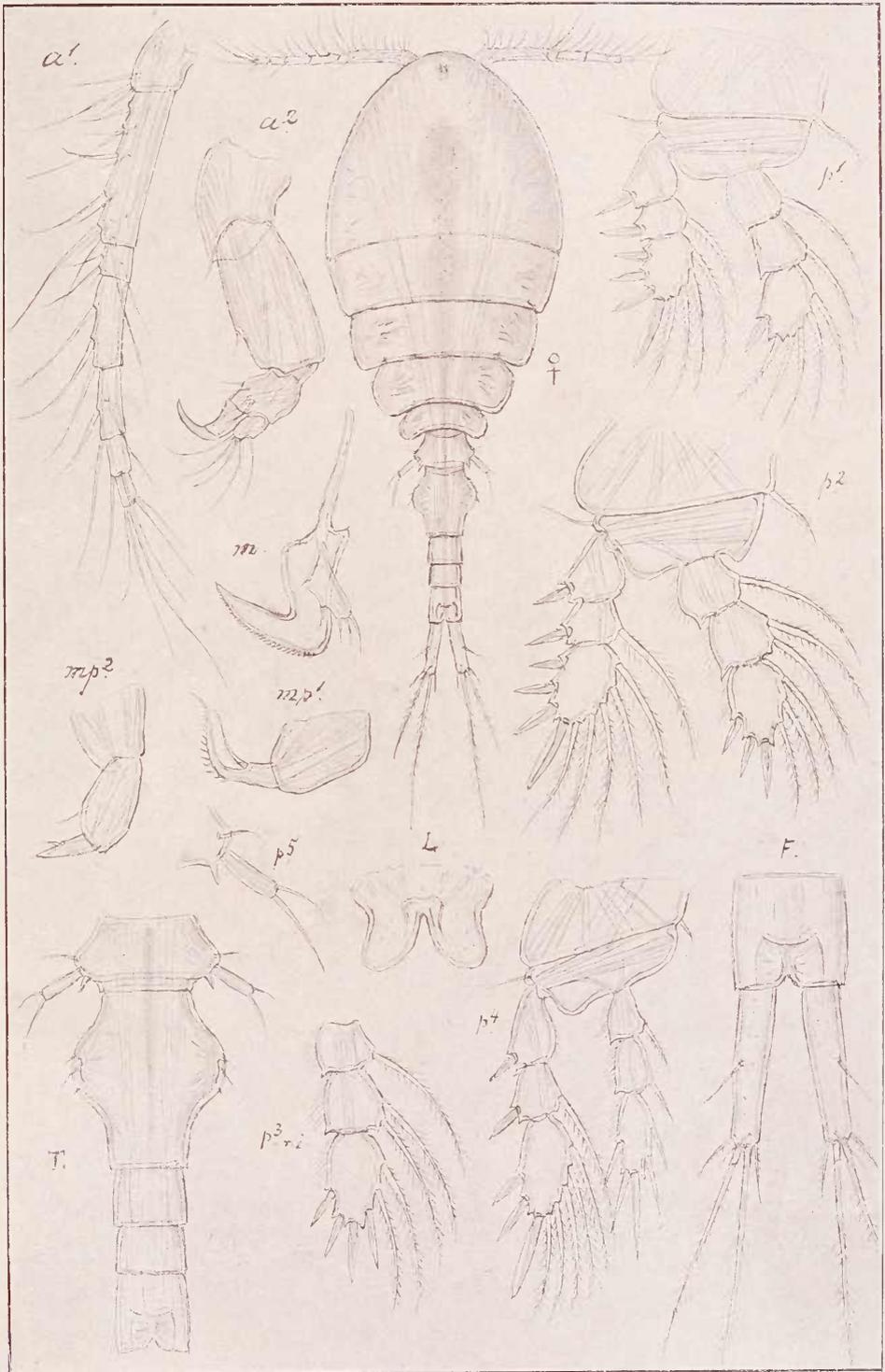
Hermannella parva, Norm. & Scott

Copepoda

Lichomolgidæ

Cyclopoida

Pl. C



G. O. Sars, del.

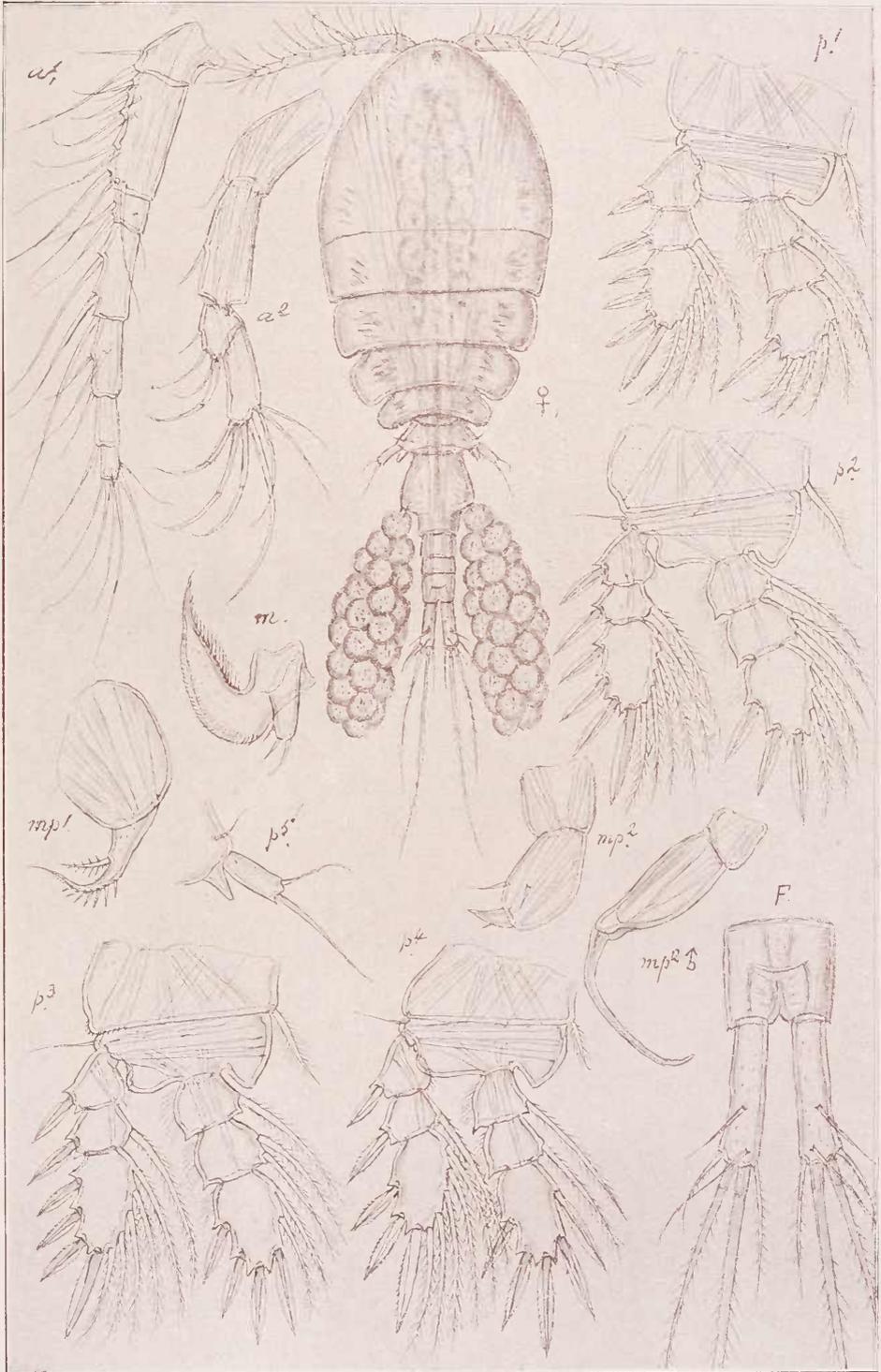
Hermannella prehensilis. G. O. Sars

Copepoda

Cyclopoida

Lichomolgidae

Pl. CI



G. O. Sars, del.

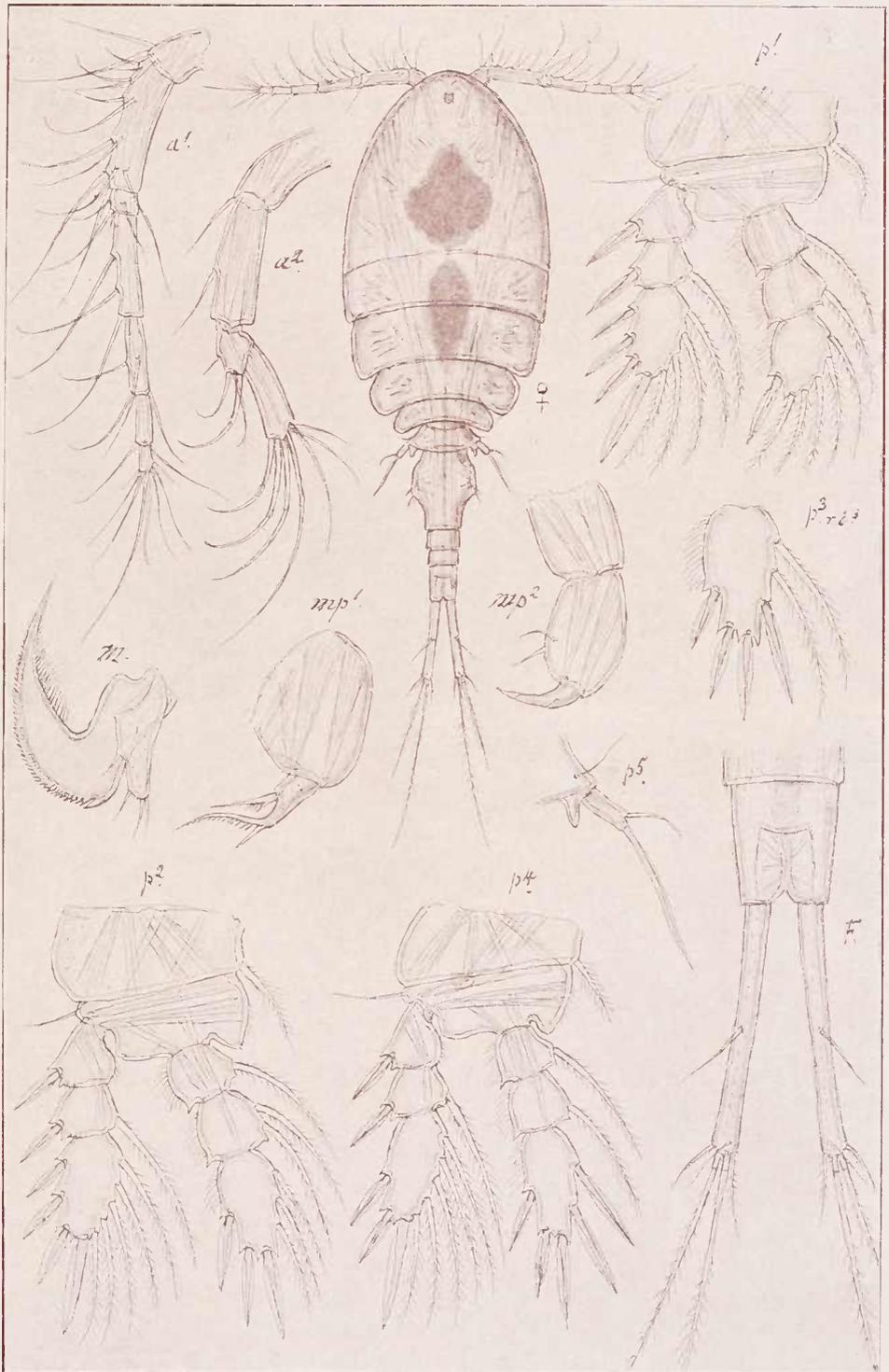
Hermannella finmarchica, Scott

Copepoda

Lichomolgidae

Cyclopoidea

Pl. CII



G. O. Sars, del.

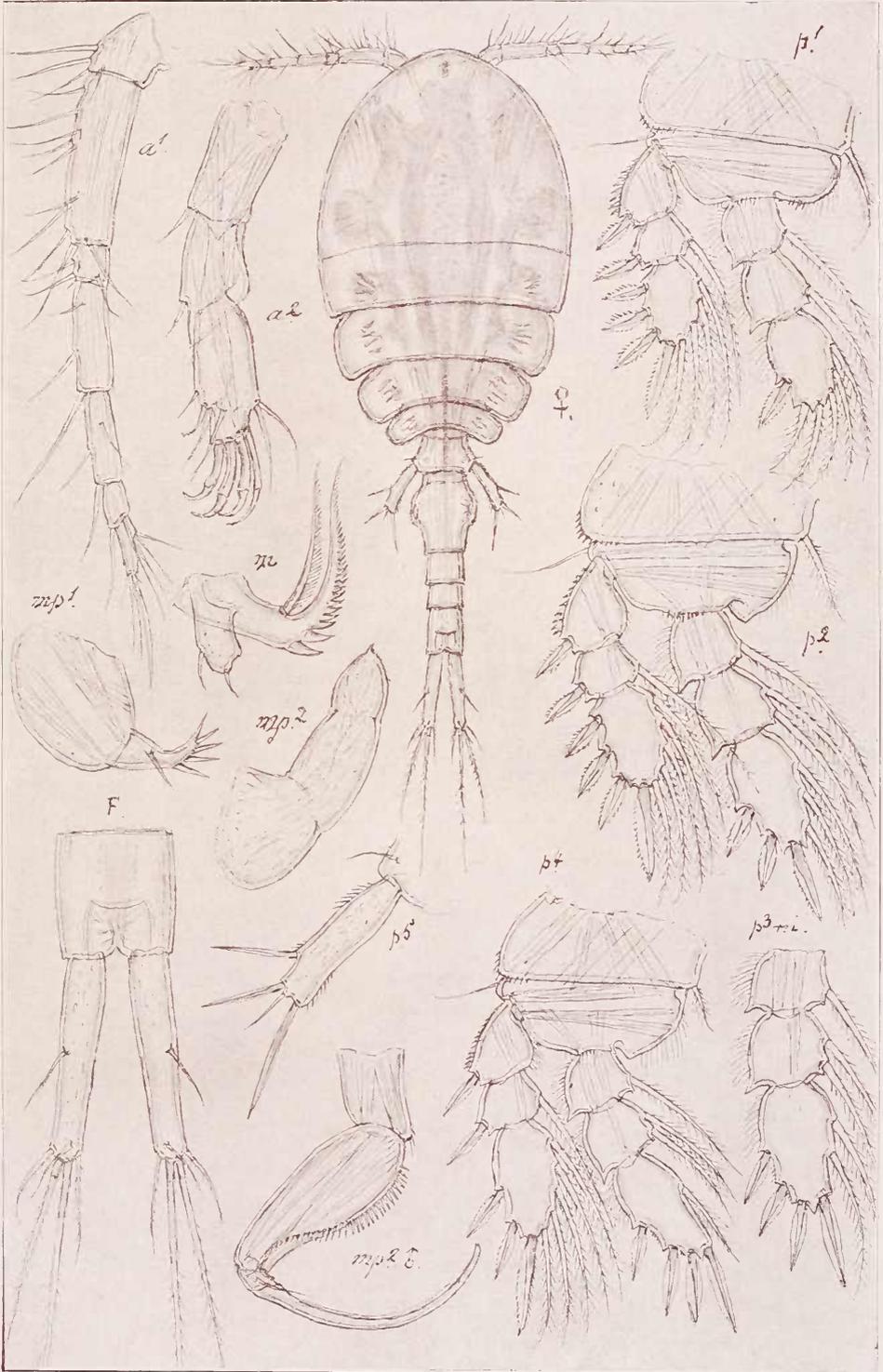
Hermanella tenuicaudis, G. O. Sars

Copepoda

Cyclopoida

Lichomolgidae

Pl. CIII



G. O. Sars, del.

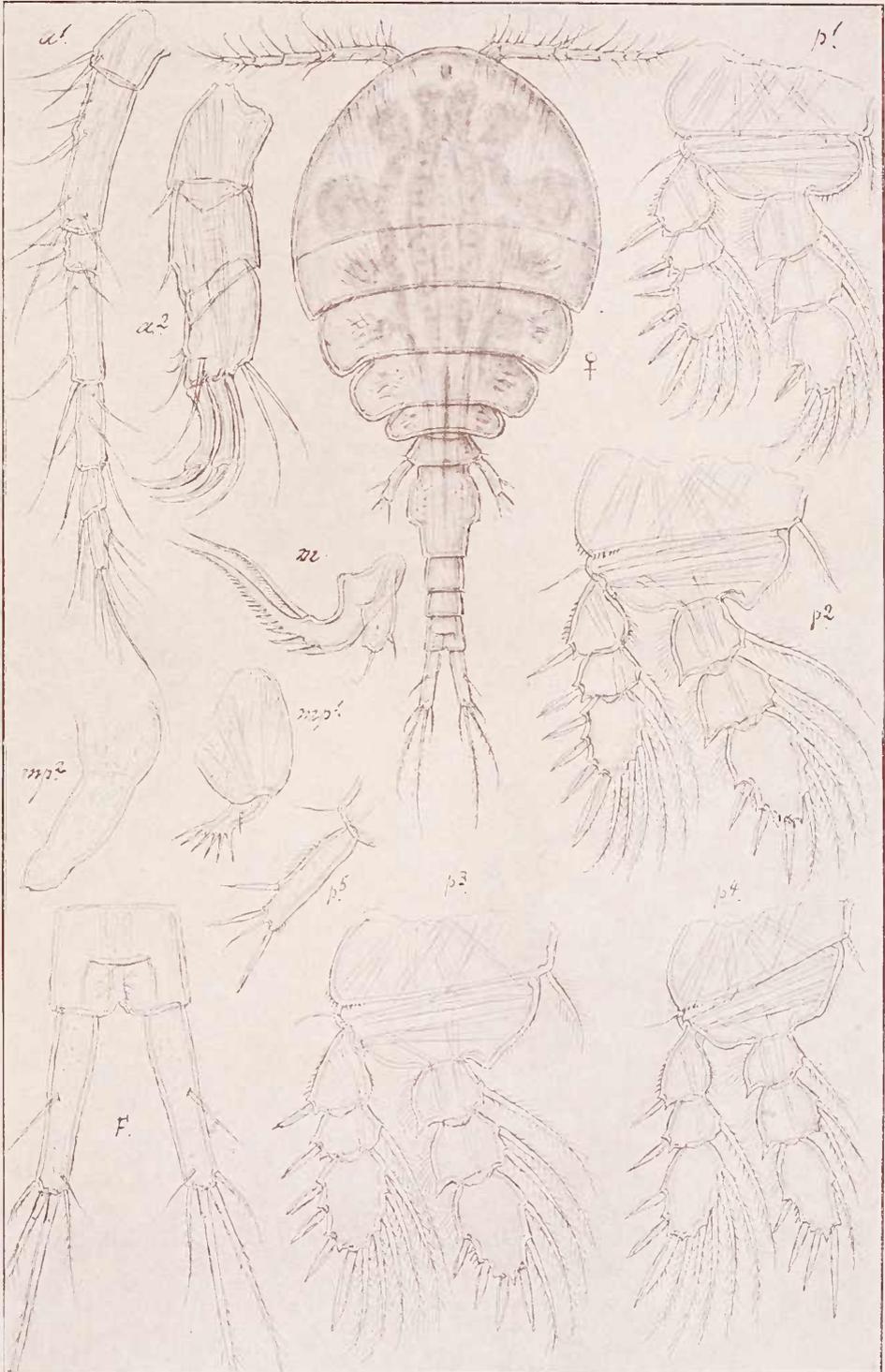
Pseudomolgus leptostylis, G. O. Sars

Copepoda

Cyclopoida

Lichomolgidae

PI. CIV



G. O. Sars, del.

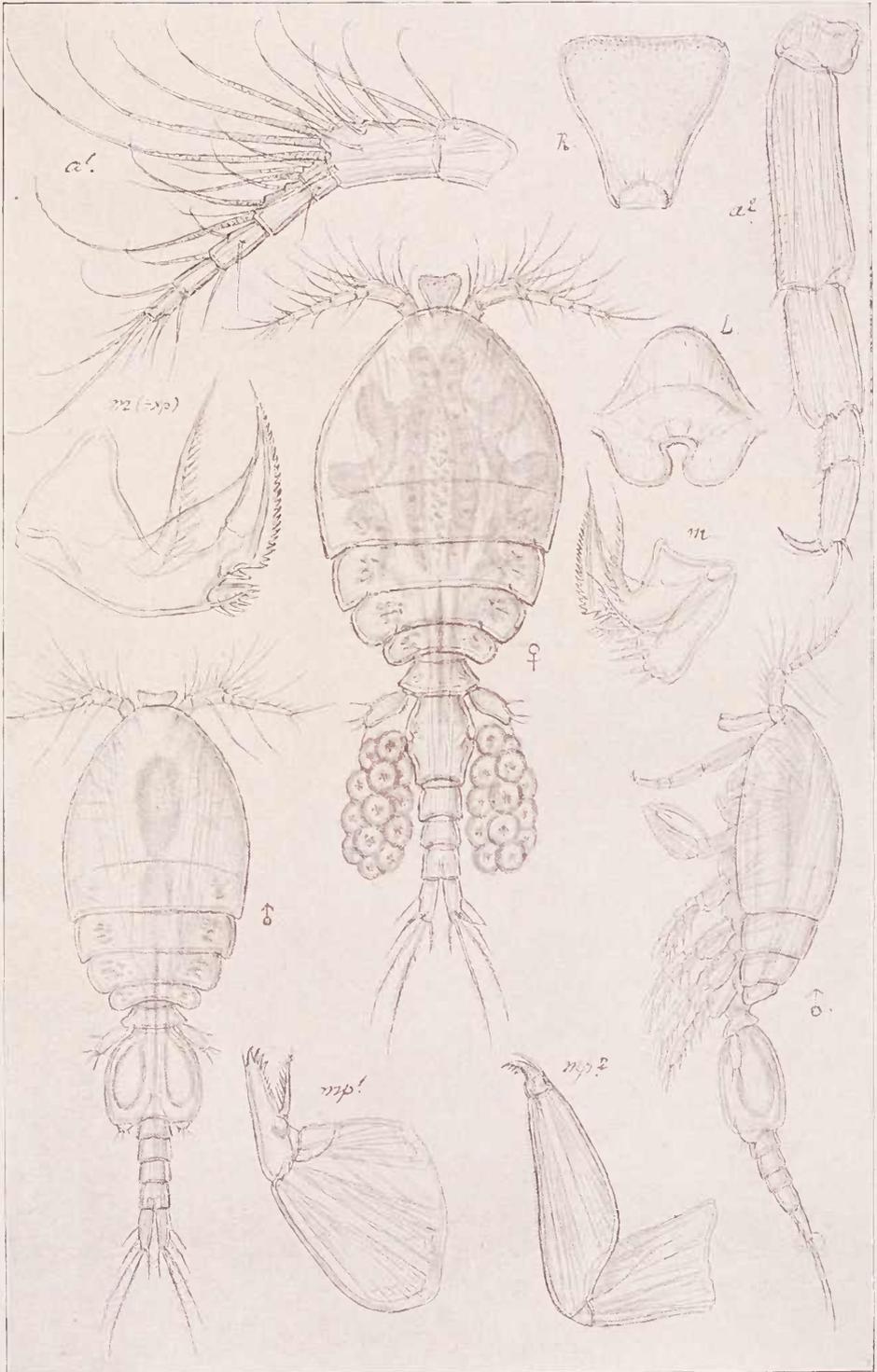
Pseudomolgus dilatatus, G. O. Sars

Copepoda

Lichomolgidae

Cyclopoida

Pl. CV



G. O. Sars del.

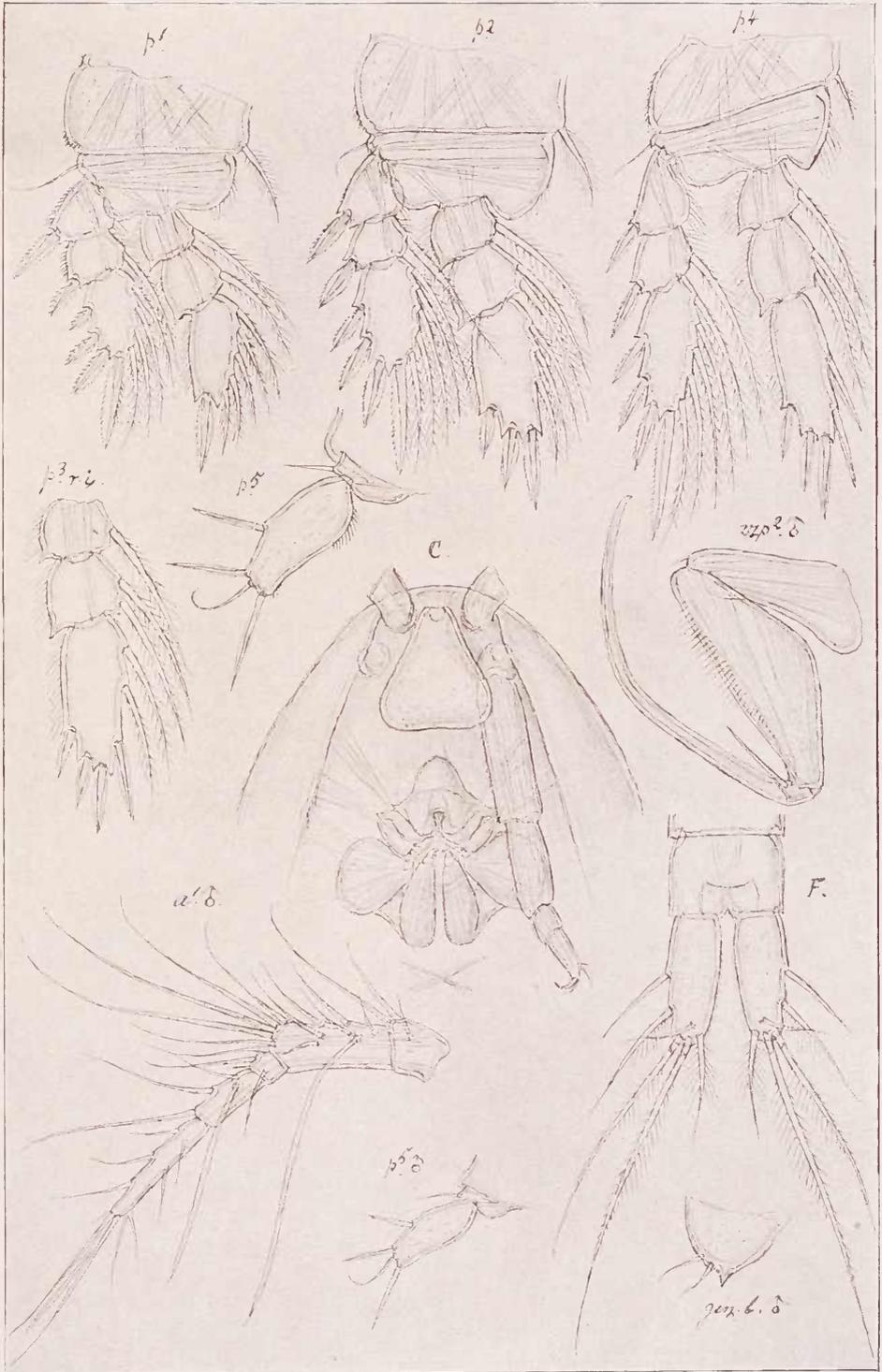
Rhinomolgus anomalus, G. O. Sars

Copepoda

Lichomolgidae

Cyclopoida

Pl. CVI



G. O. Sars, del.

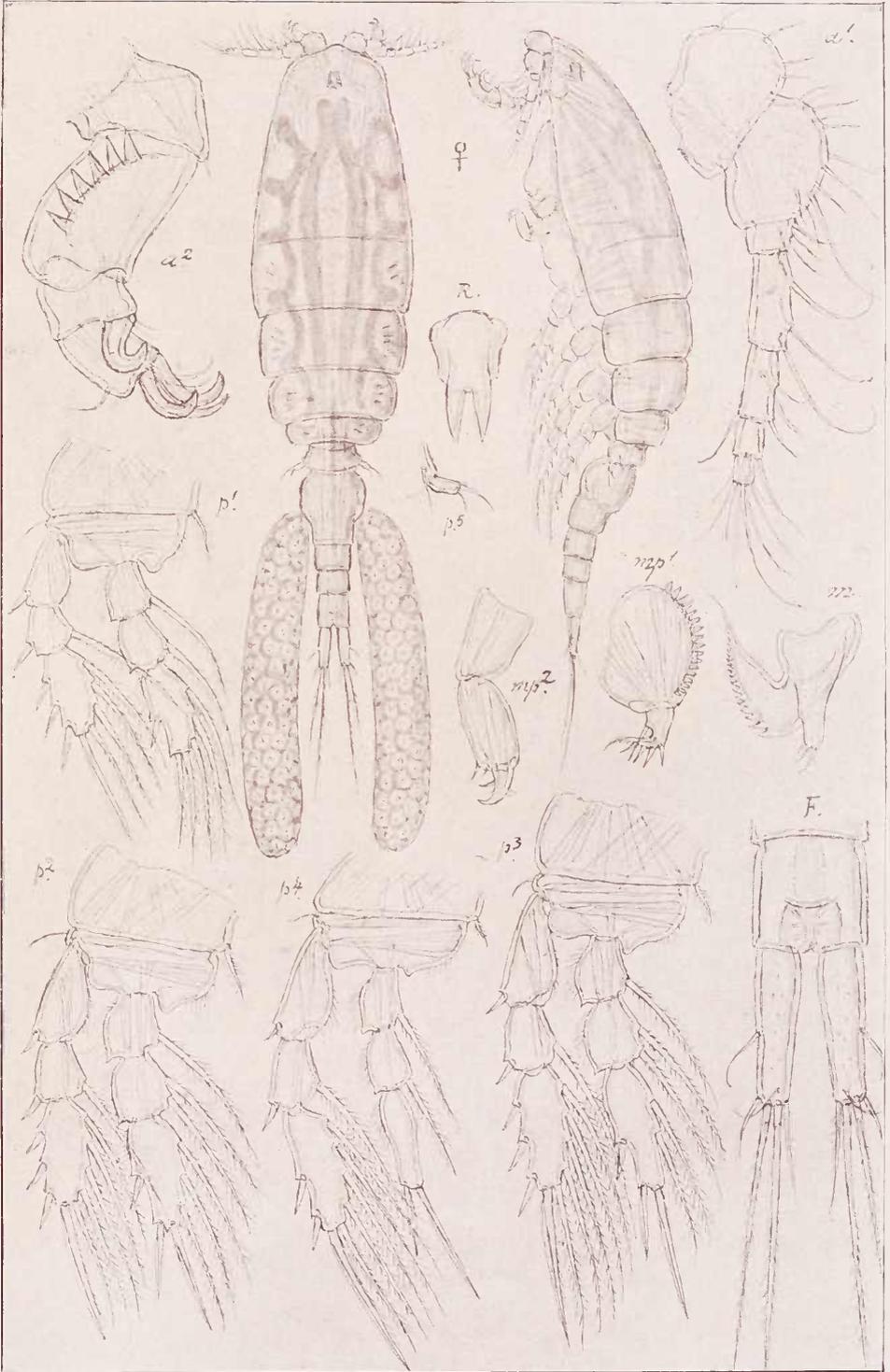
Rhinomolgus anomalus, G. O. Sars
(continued)

Copepoda

Lichomolgidæ

Cyclopoida

Pl. CVII



G. O. Sars, del.

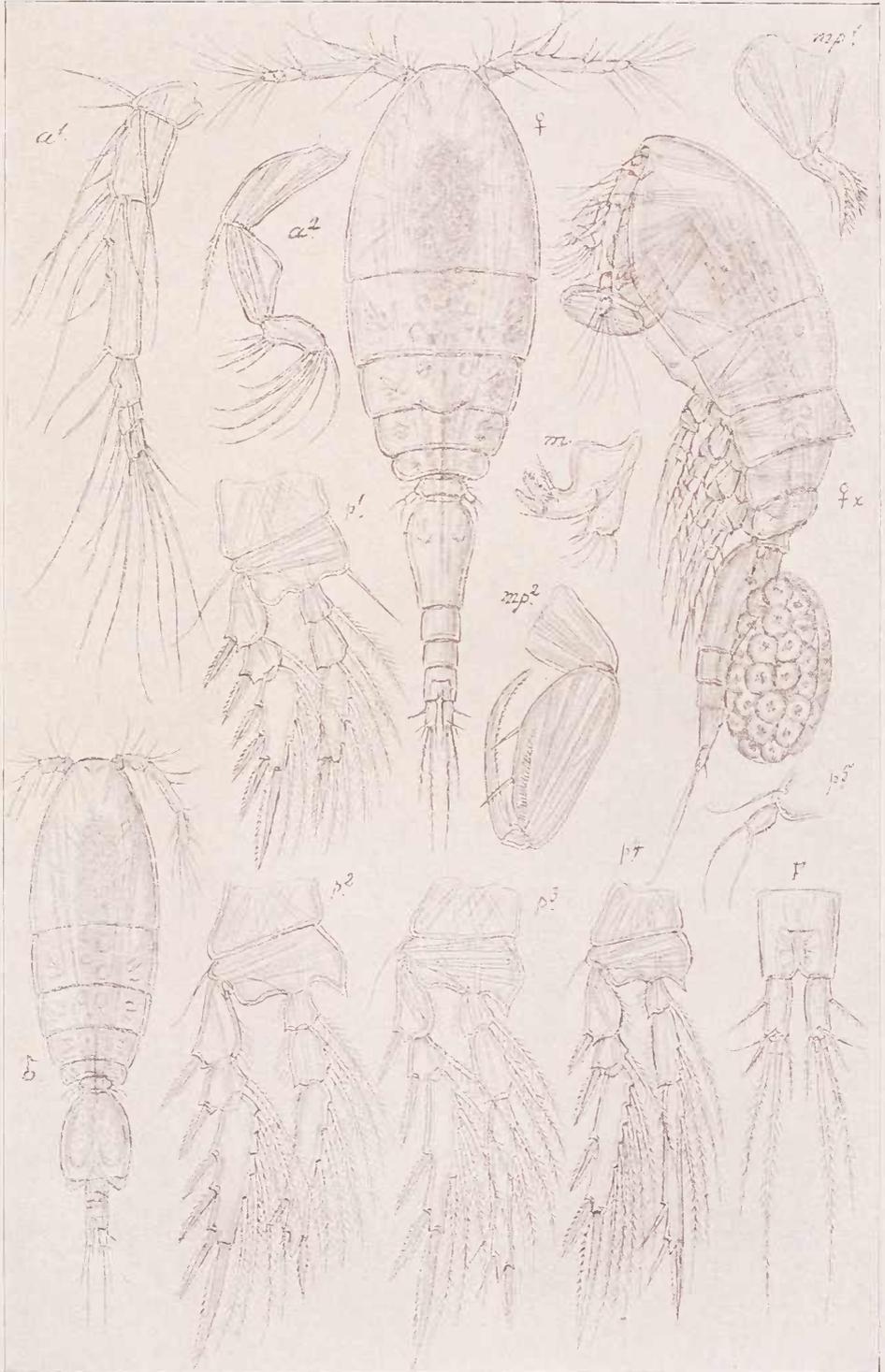
Sabelliphilus elongatus, M. Sars

Copepoda

Oncæidæ

Cyclopoida

Pl. CVIII



G. O. Sars, del.

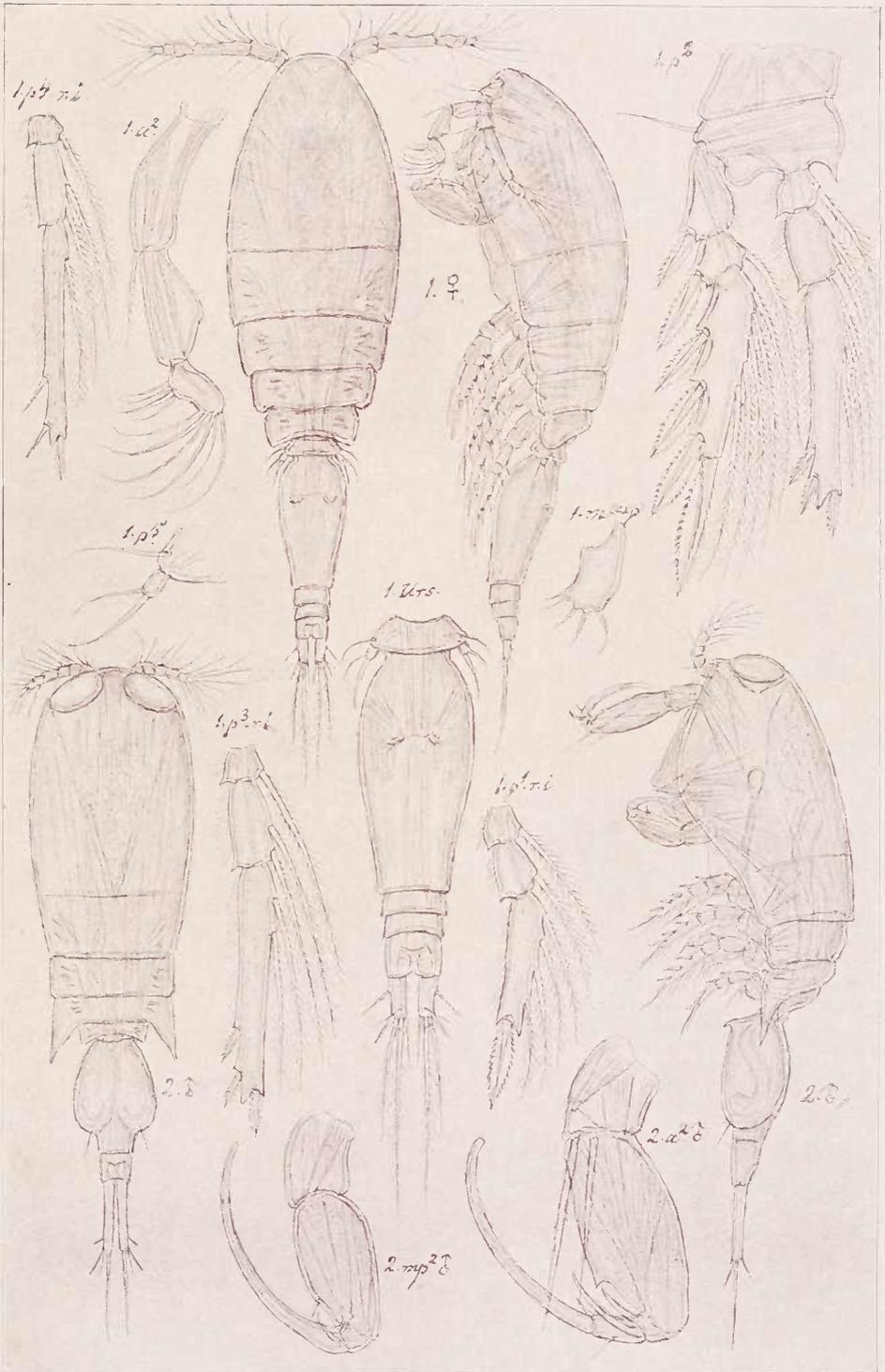
Oncæa borealis. G. O. Sars

Copepoda

Oncaëidæ—Corycæidæ

Cyclopoida

Pl. CIX



G. O. Sars, del.

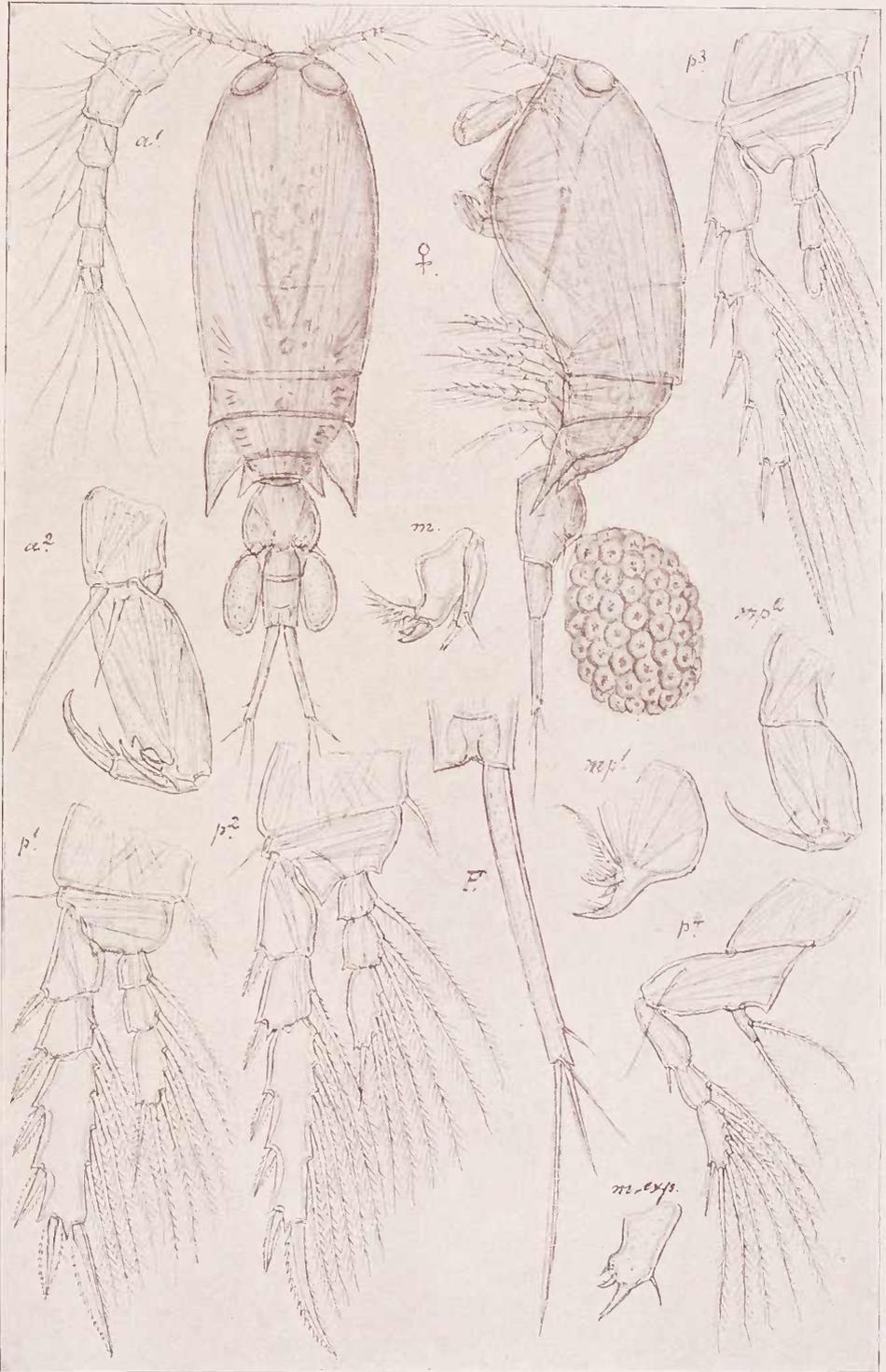
1. *Oncaea similis*, G. O. Sars
2. *Corycaeus anglicus*, Lubbock ♂

Copepoda

Corycæidæ

Cyclopoida

Pl. CX



G. O. Sars, del.

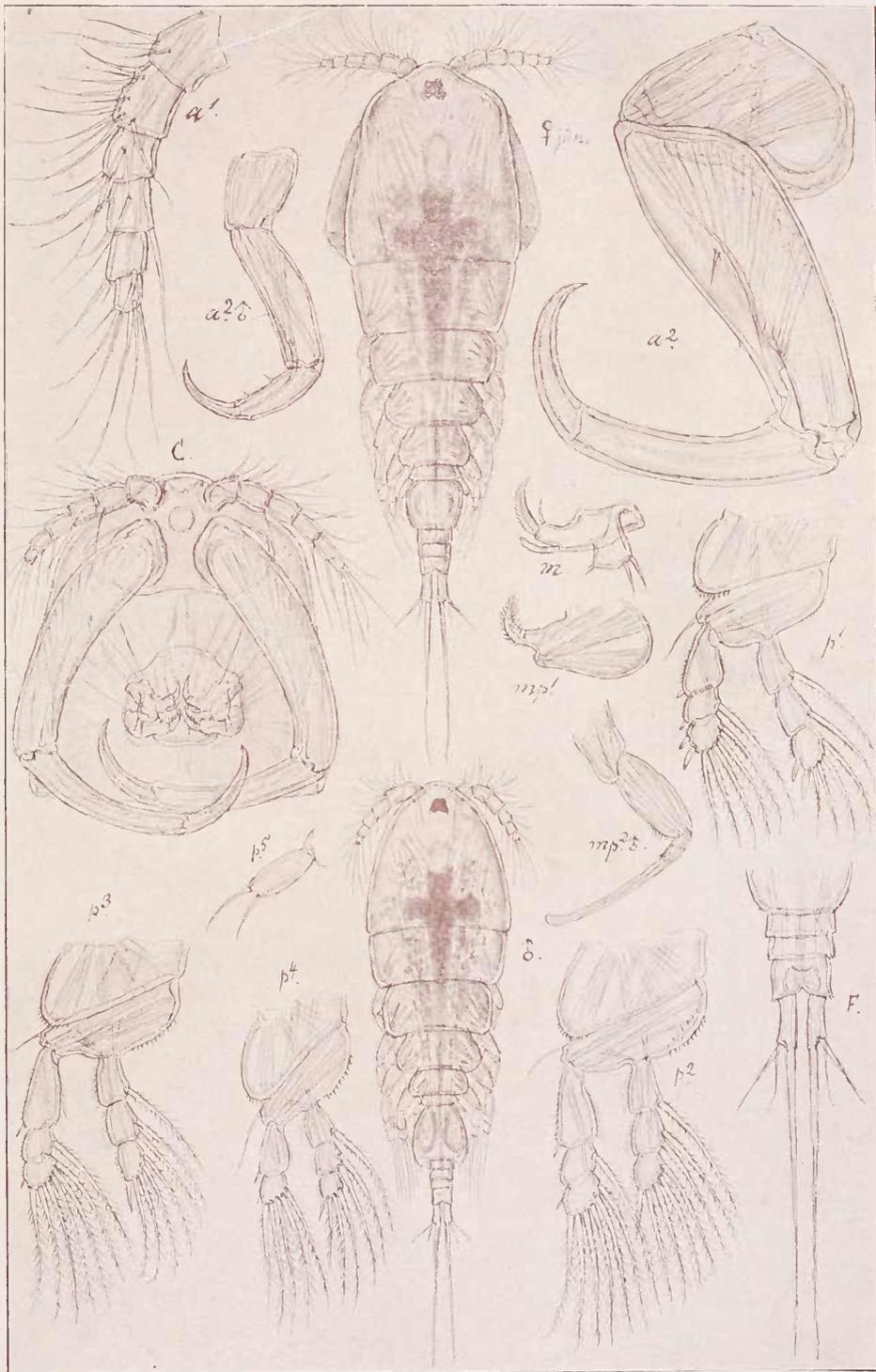
Corycæus anglicus, Lubbock ♀

Copepoda

Ergasilidæ

Cyclopoida

Pl. CXI



G. O. Sars, del.

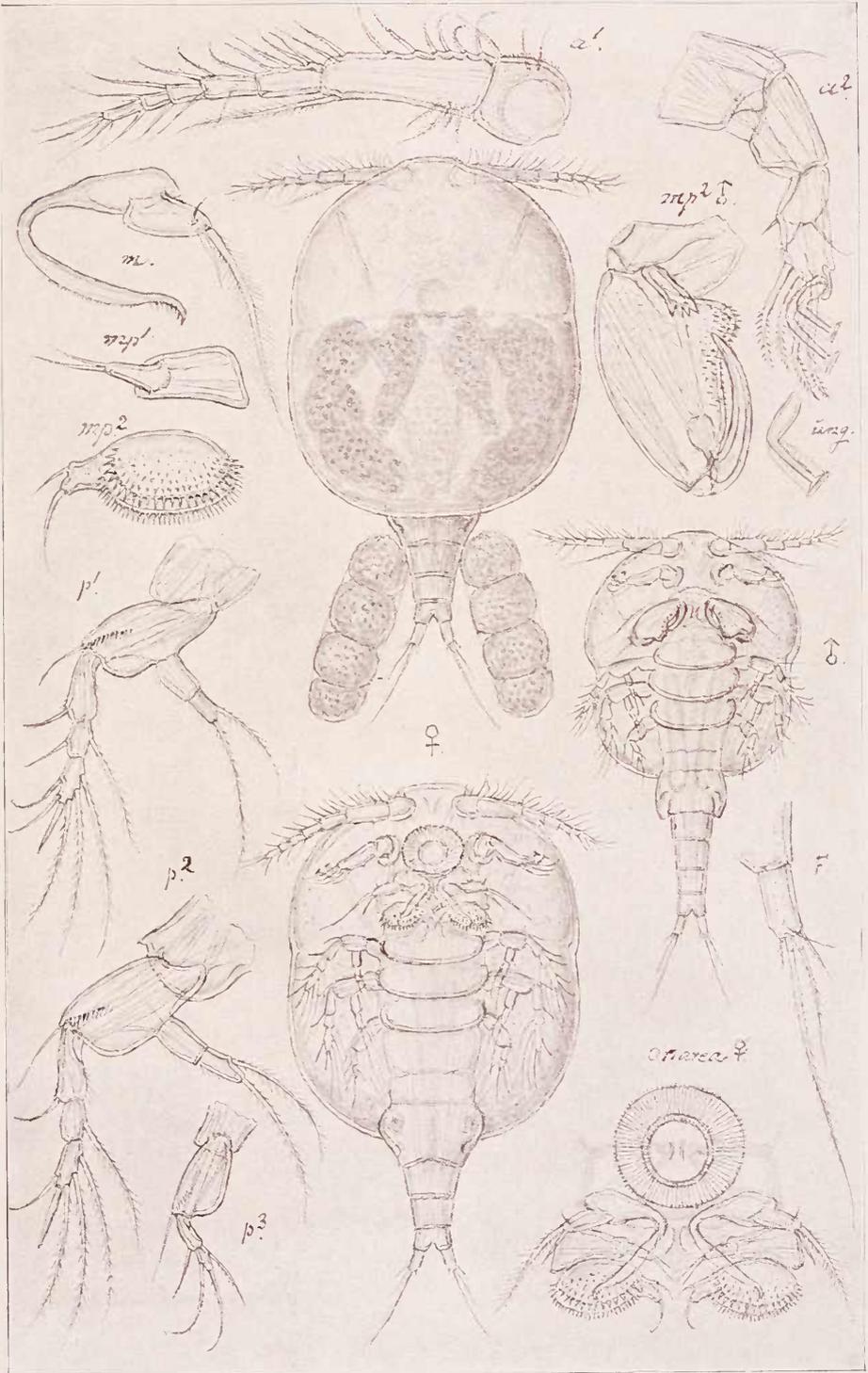
Ergasilus Sieboldi, Nordm.

Copepoda

Eunicolidæ

Cyclopoida

Pl. CXIII



G. O. Sars, del.

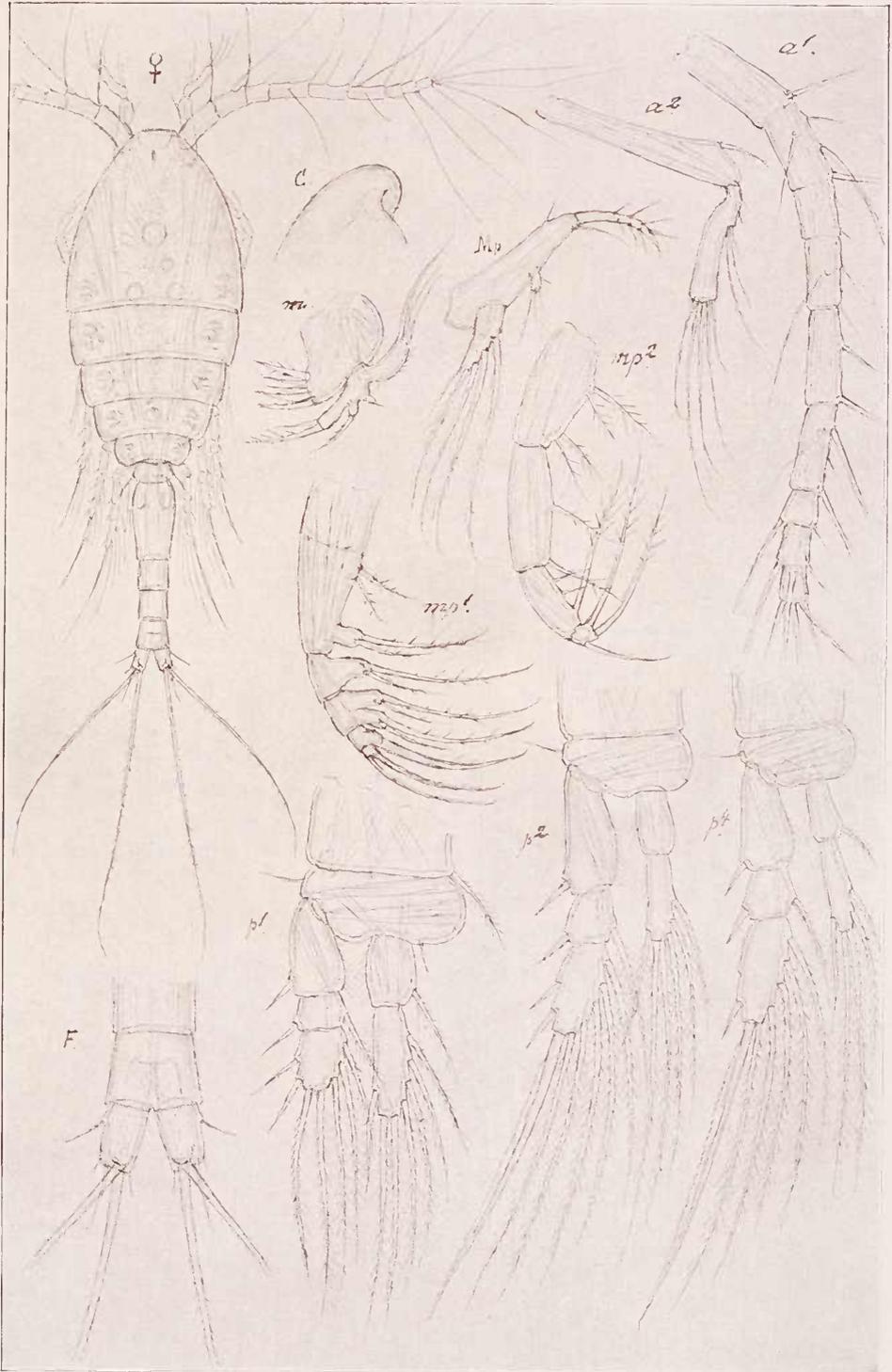
Eunicicola Clausi, Kurz

Copepoda

Oithonidæ

Cyclopoida

Pl. CXIV



G. O. Sars, del.

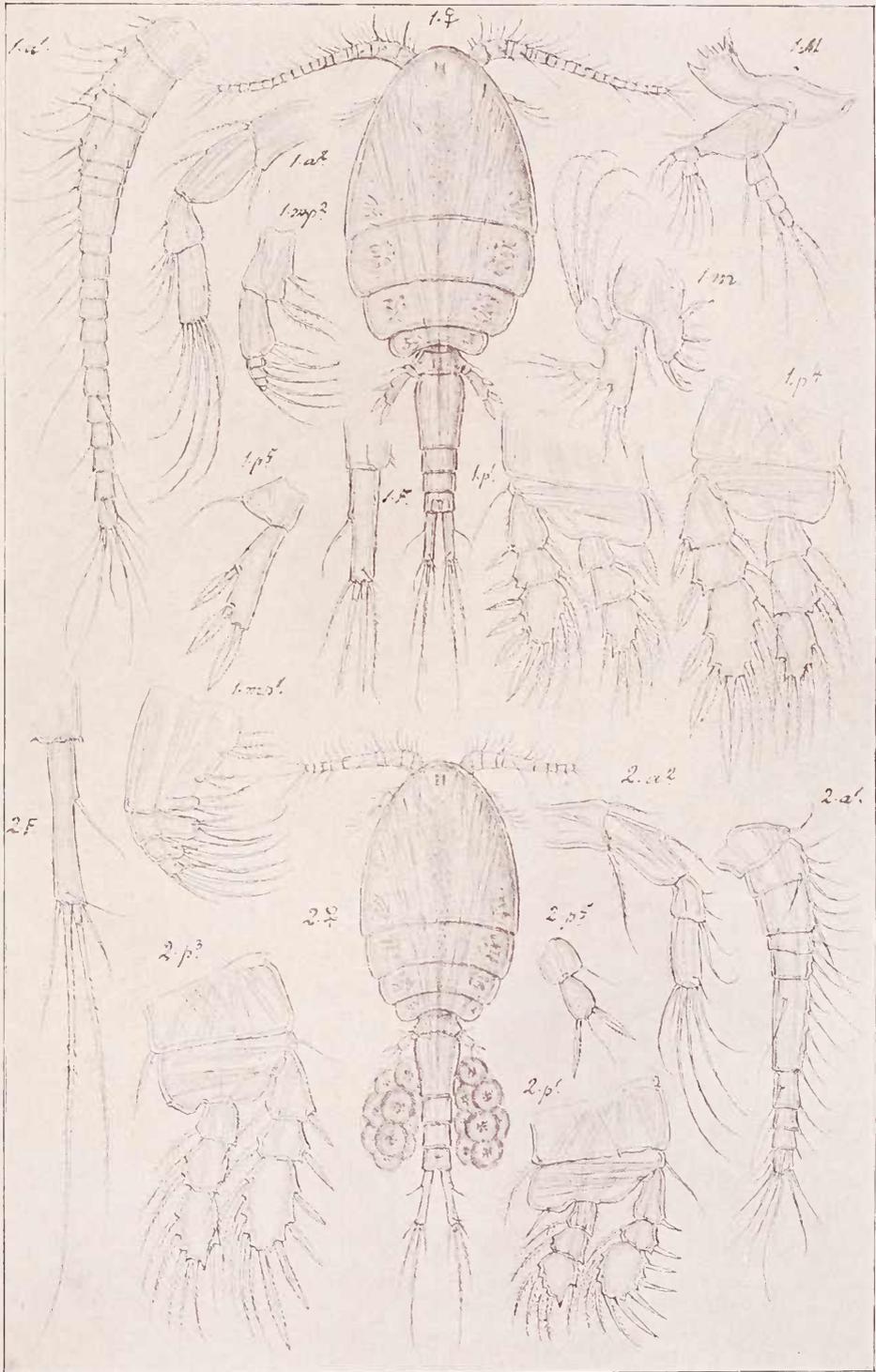
Paroithona parvula, Farran

Copepoda

Cyclopinidæ

Cyclopoida

Pl. CXV



G. O. Sars, del.

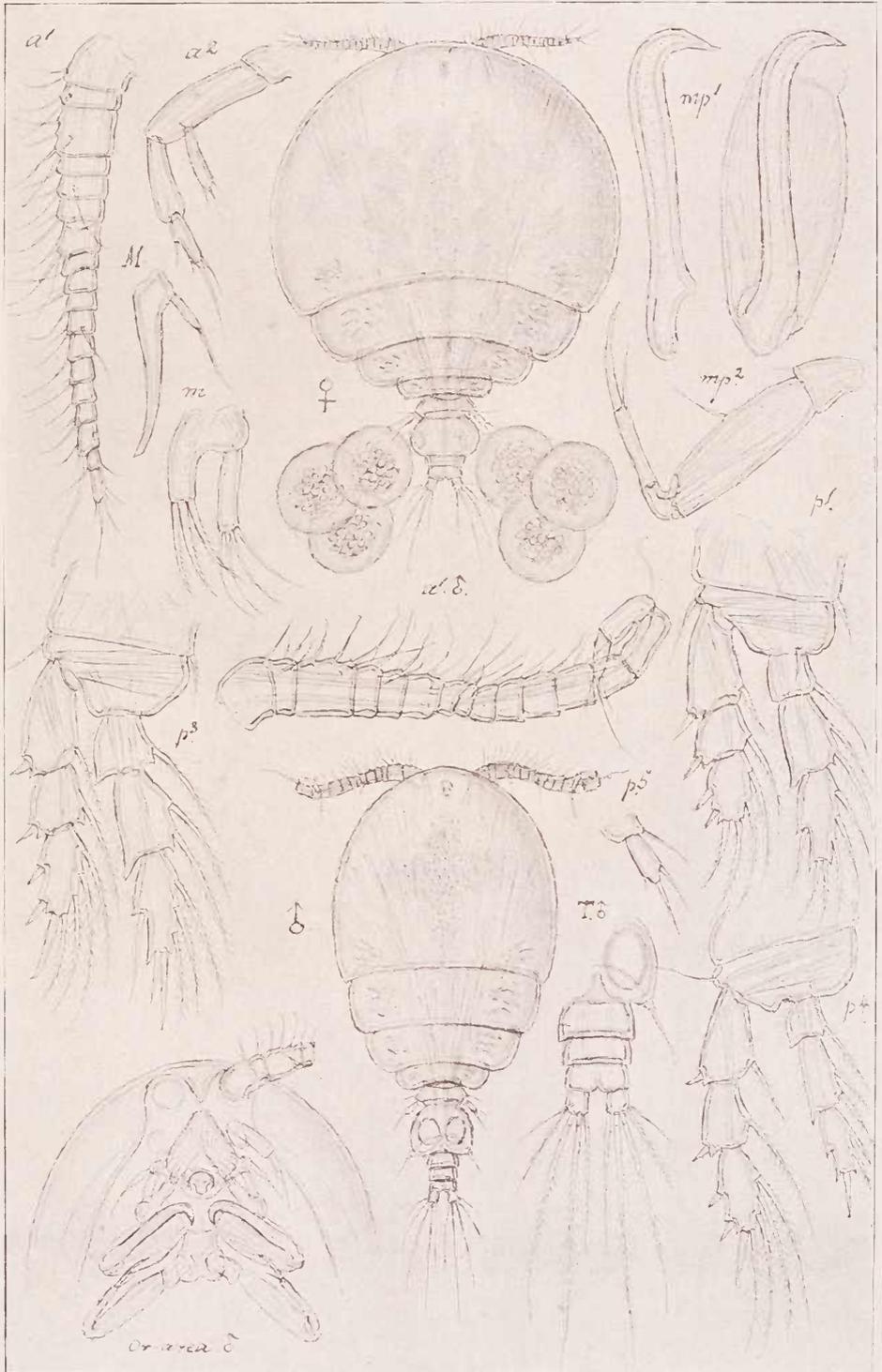
1. *Cyclopina euacantha*, G. O. Sars
2. " *pygmæa*, G. O. Sars

Copepoda

Ascomyzontidæ

Cyclopoida

Pl. CXVI



G. O. Sars, del.

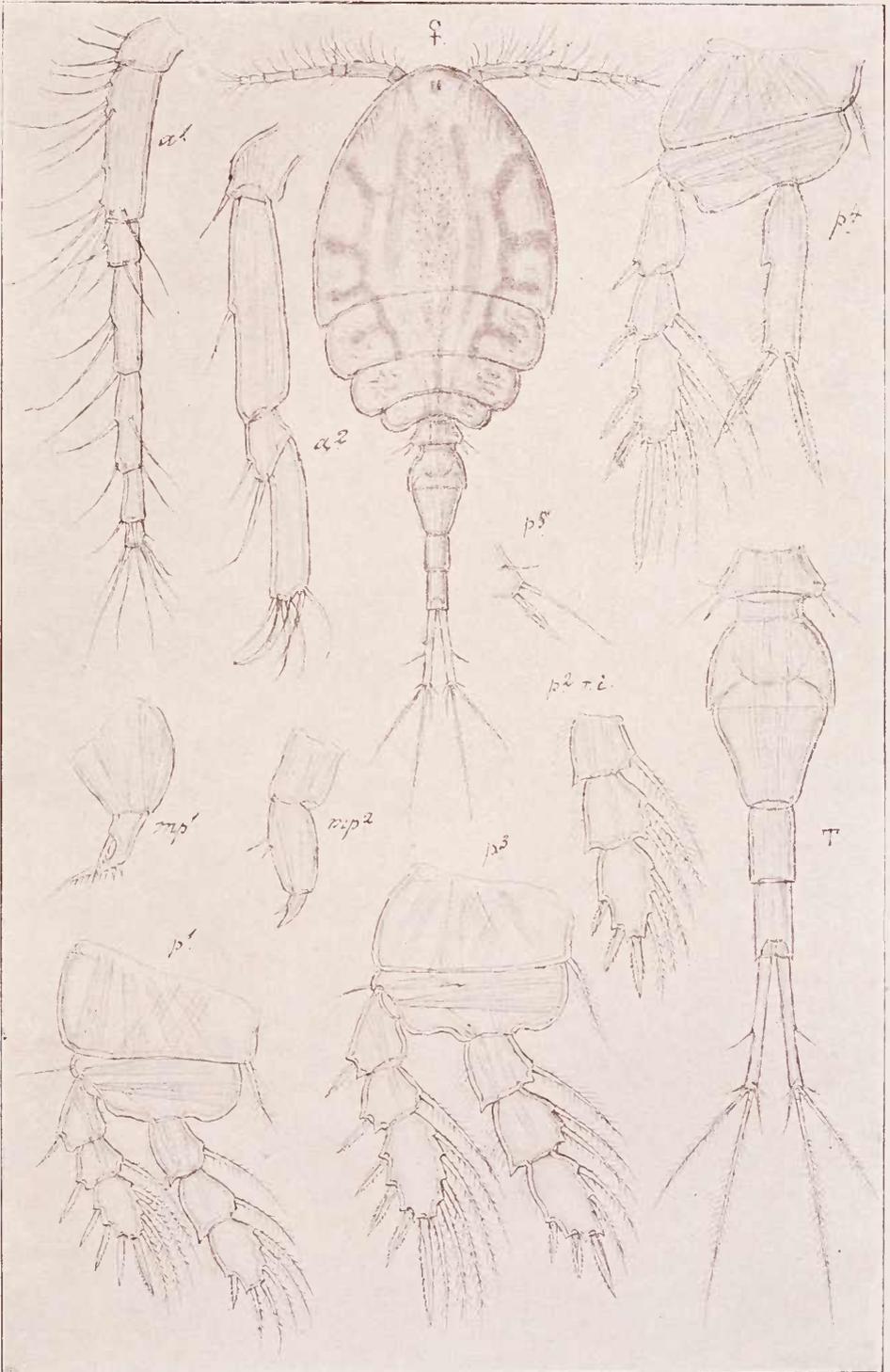
Scottomyzon gibberum, (Scott)

Copepoda

Lichomolgidæ

Cyclopoida

Pl. CXVII



G. O. Sars, del.

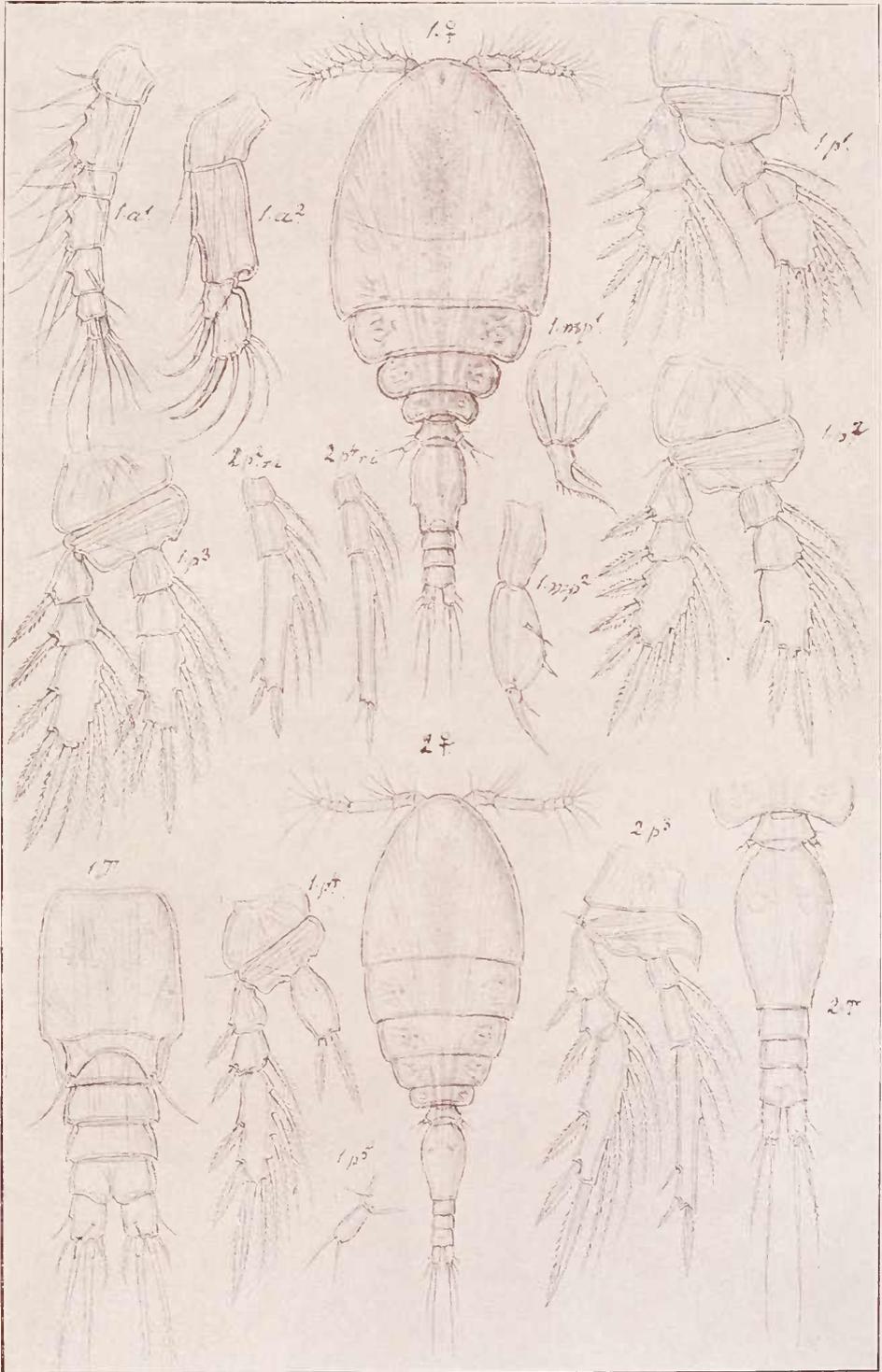
Pseudanthessius dubius, G. O. Sars

Copepoda

Lichomolgidae—Oncæidæ

Cyclopoida

Pl. CXVIII



G. O. Sars, del.

1. *Lichomolgella pusilla*, G. O. Sars
2. *Oncæa minuta*, Giesbr.