AN ACCOUNT

OF THE

CRUSTACEA

OF

NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY

G. O. SARS

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COPEPODA

CYCLOPOIDA

PARTS V & VI

CYCLOPIDÆ (continued)

WITH 16 AUTOTYPIC PLATES

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Remarks.—This form, the smallest of all our Cyclopses, has been confounded by several authors (Rehberg, Daday, Lande, Richard) with *C. diaphanus* Fischer, from which it differs in many essential points, being much more nearly related to *C. varicans*. From this latter species it may be easily recognised by its much smaller size, the shorter and only 11-articulate anterior antennæ, and the different structure of the caudal setæ, finally by the peculiar colouring of the body when alive.

Occurrence.—I have only found this form quite occasionally in small grassy ponds near Christiania. In spite of its small size, it may be readily detected, owing to its peculiar and beautiful colour, which character indeed has given rise to the specific name proposed.

Distribution.—Sweden (Lilljeborg), Germany (Schmeil), Hungary (Daday), Poland (Lande), France (Richard).

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

Generic Characters.—Body more or less slender, with the anterior division generally rather tumid, the posterior very slender. Epimeral parts of the trunk-segments scarcely prominent laterally and, as a rule, not visible in the dorsal aspect of the animal. Last trunk-segment very small, not produced laterally. Genital segment in female rather elongated and very little dilated in front. Caudal rami of moderate length or very short, with all the apical setæ generally well developed. Anterior antennæ slender and elongated, generally 17-articulate. Posterior antennæ likewise slender, with the apical setæ long and curved. Maxillipeds rather fully developed. Natatory legs, as a rule, with both rami 3-articulate; terminal joint of outer ramus in all pairs with only 2 spines outside, its inner edge carrying in the 1st pair 2, in the other pairs 3 setæ; terminal joint of inner ramus unusually prolonged, especially in the posterior pairs. Last pair of legs very small and generally biarticulate, distal joint carrying 2 slender subequal setæ. Seminal receptacle in all the species of a very characteristic form, anterior part short, bilobular, posterior greatly prolonged, tongue-shaped.

Remarks.—This new genus answers to the group of Cyclopses distinguished by Dr. Schmeil as the "*Leuckarti* group". The species included in this group differ conspicuously in their external appearance from the more typical Cyclopses described in the preceding pages, and more resemble those belonging to the next genus, *Pachycyclops*, with which they also agree in the unusually slender form of

both pairs of antennæ. In the structure of the natatory legs, the unusual prolongation of the terminal joint of the inner ramus is rather characteristic. The last pair of legs are also distinguished by the presence on the distal joint of 2 slender, subequal setæ, the inner one replacing the short lateral spine found in the species of Cyclops (sens. strict.). Finally, the very characteristic form of the seminal receptacle may be here mentioned.

To the fauna of Norway belong 4 well-defined species, to be described below, and also a number of exotic species may be adduced to the same genus. Thus it is evident that the 2 African species, *C. emini* Mràzek and *C. neglectus* G. O. Sars, recorded by the present author in his paper on the Copepoda of the Tanganyika Expedition, are referable to this genus, as is unquestionably the case with the North American species, *C. edax* Forbes, perhaps also with the South American species, *C. spinifer* Daday. I am likewise of opinion that *C. gracilis* Lilljeborg must be placed within the present genus, in spite of the reduction of the number of joints in the anterior antennæ, and the imperfect development of the legs, as this form otherwise has an unmistakable resemblance to the species here under consideration.

33. Mesocyclops obsoletus (Koch).

(Pl. XXXV).

Cyclops obsoletus, Koch, l. c. Heft 21, Tab. 5.

Syn: *Cyclops Leuckarti*, Claus.
„ „ *simplex*, Poggenpol.
„ „ *Scourfieldi*, Brady.

Specific Characters.—Female. Body moderately slender, with the anterior division regularly elliptical in outline, greatest width slightly exceeding half the length and occurring about in the middle. Cephalic segment very large, almost twice the length of the 4 succeeding segments combined. Last trunk-segment very small. Tail slender, exceeding in length $^2/_3$ of the anterior division; genital segment long and narrow, fully attaining the length of the 3 succeeding segments combined, and almost cylindrical in form. Caudal rami of moderate length, though scarcely as long as the last 2 segments combined, and only slightly divergent; seta of outer edge rather far from the apex, being attached a little behind the middle; apical setæ comparatively slender and elongated, the inner mediate one attaining the length of the tail, seta of outer corner rather produced, though scarcely half as long as that of the inner. Anterior antennæ long and slender, reaching, when reflexed, almost to the end of the 3rd segment, outer joints rather narrow and bordered by a delicate hyaline rib, which on the last joint, at some

distance from the end, exhibits a very conspicuous semilunar incision. Posterior antennæ likewise unusually slender, with the terminal joint long and narrow. Anterior maxillipeds with the posterior edge of the basal part distinctly crenulated. Posterior pair of maxillipeds of the usual structure. Natatory legs comparatively slender, spines of outer ramus rather coarse, the distal outer spine of the terminal joint apparently issuing from the tip itself, outer edge of the joints very finely spinulose; terminal joint of inner ramus in all pairs unusually prolonged, being fully as long as the other 2 joints combined, setæ of inner edge in the 3 posterior pairs rather far from the apex and some of them reduced in size; apical spines of this ramus in 4th pair almost equal-sized; connecting plate of same pair produced behind, on each side, to an acute projection. Last pair of legs with the distal joint rather narrow, both setæ very slender and elongated, the inner one somewhat remote from the tip. Ovisacs of moderate size and somewhat diverging. Seminal receptacle exhibiting the form characteristic of the genus, anterior lobes somewhat exserted at the ends, posterior part extending almost to the end of the genital segment.

Colour generally pale yellow, with a more or less distinct bluish green tinge.

Length of adult female 1.00—1.30 mm.

Remarks.—I have no doubt that the *C. obsoletus* of Koch is in reality this species. The figure he gives is rather characteristic, and cannot properly be adduced to any other species. As the specific name proposed by Koch is much older than that given to the species by Claus, it must be retained for the present form. The *C. Scourfieldi* of Brady is the same species, and according to Dr. Schmeil, *C. simplex* Poggenpol also is to be regarded as a synonym.

Occurrence.—This is one of our commonest Cyclopids, occurring very abundantly both in small ponds and ditches and in larger lakes. In the latter it lives as a true limnetic form, being found everywhere near the surface of the water together with other limnetic animals.

Distribution.—Throughout Europe, central and northern parts of Asia, Ceylon, central and southern parts of Africa, North America, Brazil, Patagonia, Australia. The cosmopolitan distribution of this species is very remarkable.

34. Mesocyclops oithonoides, G. O. Sars.

(Pl. XXXVI).

Cyclops oithonoides, G. O. Sars, l. c. p. 32.

Syn: *Cyclops hyalinus*, Rehberg.

Specific Characters.—Female. Body very 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 somewhat longer than the 4 succeeding segments combined. Last trunk-segment very small, with the lateral parts obtusely rounded. Tail attaining $^2/_3$ of the length of the anterior division; genital segment about equalling in length the 2 succeeding segments combined, and almost cylindrical in form. Caudal rami of moderate length and somewhat diverging, seta of outer edge placed almost in the middle; apical setæ comparatively shorter than in the preceding species, the inner mediate one scarcely exceeding half the length of the tail; seta of inner corner fully 3 times as long as that of the outer, and only slightly shorter than the outer mediate one; dorsal bristle unusually slender. Anterior antennæ much elongated, reaching, when reflexed, even somewhat beyond the 3rd segment, and clothed with rather slender setæ, lateral ribs of outer joints very slight and quite simple. Posterior antennæ with the terminal joint less narrow than in *M. obsoletus*, and scarcely longer than the penultimate one. Both pairs of maxillipeds largely developed, the anterior ones without any crenulation of the hind edge. Natatory legs with the rami very slender; apical spine of outer ramus in 2nd to 4th pairs much elongated and coarsely denticulated; terminal joint of inner ramus shorter than the other 2 combined; apical spines of this ramus in 4th pair very unequal, the outer one being extremely small, the inner very much elongated and generally somewhat bent inwards; connecting lamella of same pair with the projections of the hind edge obtuse at the tip. Last pair of legs resembling in shape those in *M. obsoletus*, but having the apical setæ comparatively shorter. Ovisacs, as a rule, small, rounded, and containing only a very limited number of ova. Seminal receptacle resembling that of the preceding species, though having the anterior lobes more obtuse and the posterior part narrower.

Body highly pellucid, with a very faint yellow tinge.

Length of adult female scarcely exceeding 0.90 mm.

Remarks.—This form is easily recognisable by its very slender and narrow body and the long spreading setæ clothing the anterior antennæ, these characters, as also its habits, somewhat recalling the slender pelagic species of the marine genus *Oithona*. It was indeed in allusion to this resemblance that the specific name, *oithonoides*, was proposed by the present author. The *Cyclops hyalinus* of Rehberg is unquestionably this species, as is easily seen from the figure he gives of the furca.

Occurrence.—I have found this form not infrequently in several of our larger lakes, more rarely in small tarns. In habits it is a true limnetic form, keeping itself always freely suspended in the water, and generally near the surface.

Distribution.—Sweden (Lilljeborg), Germany (Schmeil), central part of Asia (G. O. Sars), North America (Herrick).

35. Mesocyclops crassus (Fischer).

(Pl. XXXVII).

Cyclops crassus, Fischer, Beiträge zur Kenntniss der Cyclopiden (Fortsetzung). Bulletin Soc. Imp. Nat. Moscou, Tome XXVI, Part 1, p. 92, Pl. III, figs. 13—18.

Syn: *Cyclops oithonoides*, var. *hyalina*, Schmeil.
„ „ *hyalinus*, Lande, Richard, Lilljeborg (not Rehberg).

Specific Characters.—Female. Body rather short and stout, with the anterior division oval in form, greatest width attaining fully half the length and occurring in the middle. Last trunk-segment small, though somewhat broader than in the 2 preceding species. Tail scarcely exceeding half the length of the anterior division; genital segment about the length of the 3 succeeding segments combined, and somewhat tapered behind. Caudal rami unusually short and thick, scarcely exceeding in length the anal segment, and somewhat divergent; seta of outer edge very small and attached not far from the apex; apical setæ of moderate length, the inner mediate one almost as long as the tail; seta of inner corner more than 3 times as long as that of the outer, and not much shorter than the outer mediate one. Anterior antennæ somewhat less slender than in the 2 preceding species, reaching, when reflexed, about to the end of the 2nd segment, lateral rib of the outer joints very slight. Posterior antennæ nearly as in *M. oithonoides*. Maxillipeds, however, comparatively smaller. Natatory legs with the rami less slender and the apical spines shorter; those of inner ramus in 4th pair less unequal, the inner one being scarcely more than twice as long as the outer and much shorter than the terminal joint of the ramus; connecting lamella of this pair with the projections of the hind edge coarsely dentate. Last pair of legs resembling in shape those in *M. oithonoides*, though having the distal joint somewhat smaller and the apical setæ comparatively shorter. Ovisacs rounded oval in form and generally containing only a limited number of ova. Seminal receptacle about as in *M. oithonoides*.

Body very pellucid, with a faint yellowish tinge.

Length of adult female about 0.80 mm.

Remarks.—The identity of the above-described form with Fischer's *Cyclops crassus* seems to me evident. It has erroneously been identified by Dr. Schmeil and several other authors with *C. hyalinus* Rehberg, which, as stated above, is unquestionably a typical *M. oithonoides*. From the latter species it is at once distinguished by its much shorter and stouter body, and by the unusually short and thick caudal rami, thus fully deserving the specific name proposed for it by Fischer. In these respects it much more resembles the African species, *M. neglectus* G. O. Sars, which however differs in the much shorter innermost caudal seta.

Occurrence.—I have met with this species not unfrequently in the lake Vansjø near Moss, where it lives as a true limnetic form. I have also found it occasionally in wide expanses of the river Glommen, at Nipen.

Distribution.—Sweden (Lilljeborg), Germany (Schmeil), Poland (Lande), France (Richard), Russia (Fischer), Cape of Good Hope (G. O. Sars).

36. Mesocyclops Dybowskyi (Lande).

(Pl. XXXVIII).

Cyclops Dybowskyi, A. Lande, Materyały do Fauny Skorupiaków Widłonogich, Copepoda, p. 57, Pl. XVII, figs. 51—59.

Syn: *Cyclops crassus*, Lilljeborg (not Fischer).

Specific Characters.—Female. Body somewhat less robust than in *M. crassus*, with the anterior division regularly oval in outline, greatest width about half the length and occurring somewhat in front of the middle. Last trunk-segment about as in the preceding species. Tail considerably exceeding half the length of the anterior division; genital segment about the length of the 3 succeeding ones combined, and gradually tapered behind. Caudal rami more produced than in *M. crassus*, considerably exceeding in length the anal segment, and only slightly divergent; seta of outer edge comparatively small and attached at a short distance from the end; apical setæ not much elongated, the inner mediate one not nearly attaining the length of the tail; seta of inner corner much shorter than in the 3 preceding species, being only slightly longer than that of the outer corner and scarcely half as long as the outer mediate one, dorsal bristle not particularly slender. Anterior antennæ of moderate length, reaching, when reflexed, about to the end of the 2nd segment. Posterior antennæ and maxillipeds about as in *M. crassus*. Natatory legs also on the whole rather similar; apical spines of inner ramus in 4th pair, however, distinctly different, the outer spine being considerably larger than the inner. Last pair of legs with the distal joint comparatively thicker than in the other species and having the apical setæ rather short. Ovisacs of moderate size, oval in shape, and rather divergent. Seminal receptacle with the anterior lobes distinctly recurved. Spermatophores attached to the genital opening narrow oblong in form and diverging obliquely behind.

Colour rather peculiar, the body being, as a rule, tinged with a dark bluish or brownish violet hue.

Length of adult female about 0.90 mm.

Remarks.—This form, first described by A. Lande under the above specific name, has been erroneously identified by Lilljeborg with *Cyclops crassus*

Fischer, which, as stated above, is the form described by him as *C. hyalinus*. Though nearly allied to that species, it may easily be distinguished by the somewhat different shape of the caudal rami, and more particularly by the comparatively short innermost apical seta. In the living state it is moreover at once recognised by the peculiar colour of the body.

Occurrence.—I have met with this form only quite occasionally in some small lagunes at the border of the lake Østensjø near Christiania, and also in wide expanses of the river Glommen, at Nipen.

Distribution.—Sweden (Lilljeborg), Germany (Schmeil), Poland (Lande).

37. Mesocyclops gracilis (Lilljeborg).

(Pl. XXXIX).

Cyclops gracilis, Lilljeborg, De crustaceis ex ordinibus tribus in Scania occurrentibus, Appendix, p. 208.

Specific Characters.—Female. Body very slender, resembling in outward appearance that of *M. oithonoides*, the anterior division being narrow oblong in outline and contracted behind, with the greatest width quite in front. Last trunk-segment very small, with the lateral parts rounded off. Tail slender, equalling in length about $^2/_3$ of the anterior division; genital segment attaining the length of the 3 remaining segments combined, and slightly tapered behind. Caudal rami somewhat longer than the anal segment and slightly divergent; seta of outer edge attached in the middle; apical setæ comparatively short, the inner mediate one scarcely exceeding half the length of the tail; seta of inner corner only slightly longer than that of the outer, and scarcely half as long as the outer mediate one; dorsal bristle of moderate length. Anterior antennæ long and slender, reaching, when reflexed, to about the middle of the 3rd segment, and composed of only 11 joints clothed with very long, diverging, partly ciliated setæ. Posterior antennæ likewise comparatively slender, with the terminal joint longer than the penultimate one, lateral bristles of the latter joint reduced in number. Maxillipeds rather fully developed resembling in structure those in the other species of the present genus. Natatory legs, on the other hand, imperfectly developed, the rami in all of them being composed of only 2 joints; 1st joint of outer ramus in 4th pair without any seta inside; apical spines of inner ramus in same pair very unequal, the outer one being quite rudimentary, the inner long and slender. Last pair of legs likewise imperfectly developed, the proximal joint being quite confluent with the segment, distal joint extremely small, rod-like, and carrying on the tip 2 very unequal setæ, the inner one being quite rudimentary. Ovisacs comparatively small and rounded oval in shape, each con-

taining only a very limited number of ova. Seminal receptacle of quite a similar shape to that in the other species of the present genus, the anterior part being bilobular, the posterior greatly produced tongue-shaped.

Colour, according to Lilljeborg, dark brownish, or light greyish brown.

Length of adult female about 0.80 mm.

Remarks.—Through the kindness of Prof. Wirén of the Upsala University I have had the opportunity of examining this interesting species, and have thereby found my above-indicated suggestion about the systematic position of this form fully confirmed. In spite of the reduction of the number of joints in the anterior antennæ and the imperfect development of the legs, it must, in reality, be referred to the present genus, with which it otherwise agrees perfectly. Its resemblance, indeed, both as regards size and general appearance, to one of the above-described species, viz., *M. oithonoides*, is so perplexing, that at first sight it might even easily be confounded with that form. It will be found that the above-mentioned differences in the structure of the anterior antennæ and the legs are quite analogous to those observed in certain species of the genus *Cyclops* (sens. strict.), and are merely due to a retarded development of these appendages.

Occurrence.—This form, it is true, has not yet been observed within the limits of our country; but, as it occurs in the neighbouring parts of Sweden, it is very probable that, on a closer investigation, it will in reality be found in some place or other in the south-eastern part of the country.

Distribution.—Sweden (Lilljeborg), Germany (Schmeil), Poland (Lande).

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

Generic Characters.—Body robust, with the anterior division much dilated and boldly vaulted above. Epimeral parts of the trunk-segments not produced laterally; last segment very small. Tail not very slender, with the genital segment of moderate size and only slightly dilated in front. Caudal rami comparatively short, but with the apical setæ well developed. Anterior antennæ long and slender, 17-articulate. Posterior antennæ likewise slender, with long curved apical setæ. Maxillipeds comparatively shorter and stouter than in *Mesocyclops*. Natatory legs normally developed, with both rami 3-articulate, terminal joint of outer ramus in 1st to 3rd pairs with 3 spines outside, in 4th pair with only 2 such spines, inner edge of this joint carrying in 1st pair 3, in the succeeding pairs 4 setæ. Last pair of legs biarticulate, proximal joint more or less pro-

longed and carrying at the outer distal corner the usual slender bristle, distal joint short, lamelliform, constricted at the base and trilobate at the end, carrying 2 unequal spines and an intermediate slender seta attached to a conical prominence of the joint. Seminal receptacle with the posterior part more or less distinctly bipartite.

Remarks.—This genus answers to the "*fuscus-albidus* group" of Dr. Schmeil, and comprises a limited number of species, which are all distinguished by their robust body, the tumid and boldly vaulted anterior division, and the very slender and elongated anterior antennæ. Of anatomical details may be particularly mentioned the characteristic structure of the last pair of legs, which is very unlike that in any of the other known groups of Cyclopses. 3 species belonging to this genus will be described below, and I am inclined to believe, that also the North-American species, *Cyclops ater* Herrick, may be referable to this genus, though the last pair of legs are said to be uniarticulate.

38. Pachycyclops signatus (Koch).

(Pl. XL).

Cyclops signatus, Koch, l. c. Heft 21, Tab. 8.

Syn: *Cyclops quadricornis fuscus*, Jurine.
„ „ *coronatus*, Claus.
„ „ *fuscus*, Schmeil.

Specific Characters.—Female: Anterior division of body broadly ovate in outline, greatest width about equalling half the length and occurring in front of the middle. Cephalic segment large and tumid, with the frontal edge narrowly truncated. Last trunk-segment very small and sharply defined from the preceding one. Tail comparatively short, scarcely attaining half the length of the anterior division; genital segment about the length of the 3 succeeding segments combined, and almost cylindrical in form. Caudal rami rather short, though somewhat longer than the anal segment, and slightly divergent, inner edge finely ciliated; seta of outer edge very small and attached close to the end; apical setæ densely plumose and rather spreading, the inner mediate one exceeding the tail in length; seta of outer corner rather elongate, though shorter than that of the inner corner. Anterior antennæ very slender and attenuated, reaching, when reflexed, to the end of the 3rd segment, distal edge of the 8th, 9th, 11th, 12th and 13th joints distinctly denticulated, the 3 outermost joints very narrow and exhibiting along the upper face a delicate hyaline rib, which on the proximal part of the last joint is divided into 8 strong serrations. Posterior antennæ unusually slender, with the penultimate joint long and narrow, attaining fully the length of the

terminal one, antepenultimate joint comparatively short and broad, oval in form, and coarsely denticulated on the hind edge: 2 of the apical setæ much more elongated than the others. Anterior maxillipeds strongly built, with the claw and spines issuing from the distal part very coarse and denticulated inside. Posterior maxillipeds, on the other hand, comparatively slender, with the first 2 joints narrower than usual. Natatory legs exhibiting the structure characteristic of the genus, rami comparatively slender, especially those of 4th pair; apical spines of inner ramus in this pair rather unequal, the outer one being much the larger. Last pair of legs with the proximal joint oblong quadrangular in form, and densely clothed inside with small spikes, distal joint somewhat shorter and much narrower, spine of inner edge almost twice as long as that of the outer, both being comparatively slender and finely denticulated; apical seta still longer and clothed with scattered cilia. Ovisacs comparatively large and borne closely appressed to the body, so as partly to obtect the dorsal face of the tail. Seminal receptacle with the posterior part rather produced and narrowly cleft in the middle.

Body of a more or less dark fuscous colour, with a greenish or bluish tinge and variegated with still darker irregular shadows; caudal rami and adjoining part of tail bluish green, and also the anterior antennæ and the legs tinged with the same colour, ova in the ovisacs generally of a very dark brown hue.

Length of adult female amounting to 2.50 mm.

Remarks.—This is one of our largest and most beautiful Cyclopids, being easily recognisable from most other species. The *Cyplops quadricornis fuscus* of Jurine is in all probability referable to the present species; but, as noted before, I find it scarcely admissible to appropriate the varietal names appended by that author to his species *C. quadricornis* as true specific designations. That the *Cyplops signatus* of Koch is this species, is quite certain, and this has also been admitted by all authors. The name *C. coronatus* proposed by Claus for this species is of much later date, and must of course cede to that of Koch.

Occurrence.—I have met with this handsome species chiefly at the borders of large lakes or in lagunes and ponds left by the reflux of the water in these lakes. In habits, like the other species of the present genus, it is a true bottom-form, being frequently seen clinging to some object on the ground or to the plants growing upon it. When disturbed it darts away with a sudden bound, and so rapidly that it becomes a matter of great difficulty to catch it by the aid of an ordinary dipping-tube.

Distribution.—Sweden (Lilljeborg), British Isles (Brady), Germany (Schmeil), Poland (Lande), France (Richard), Central Asia (G. O. Sars), North America (Herrick).

39. Pachycyclops bistriatus (Koch).

(Pl. XLI).

Cyclops bistriatus, Koch, l. c. Heft 21, Tab. 7.

Syn: *Cyclops distinctus*, Richard.

" " *gracilicornis*, Lande.

Specific Characters.—Female. Anterior division of body regularly oval in outline, greatest width somewhat exceeding half the length and occurring about in the middle. Tail comparatively short, scarcely attaining half the length of the anterior division; genital segment somewhat shorter and broader than in *P. signatus*. Caudal rami a little more produced, though scarcely attaining the length of the last 2 segments combined; apical setæ rather spreading and exhibiting nearly the same mutual relation in length as in the preceding species. Anterior antennæ still more slender and elongated than in that species, reaching, when reflexed, even to the end of the 4th segment, lateral rib of the outer joints inconspicuous. Posterior antennæ of normal structure, the penultimate joint being much shorter than the terminal one and also distinctly thicker; apical setæ, as usual, gradually increasing in length inwards. Both pairs of maxillipeds conspicuously smaller than in the preceding species. Natatory legs with the rami comparatively broader; terminal joint of inner ramus in 4th pair somewhat curved in the middle, and having the apical spines less unequal, the inner one conspicuously bent inwards. Last pair of legs resembling in structure those in the preceding species, though having the distal joint comparatively larger in proportion to the proximal one. Ovisacs rather large and slightly divergent. Seminal receptacle with the posterior part rather produced and very conspicuously bipartite.

Body of a dark blue colour, with the anterior part of the cephalic segment somewhat lighter.

Length of adult female about 2.20 mm.

Remarks.—I think I am right in identifying the above-described form with *Cyclops bistriatus* of Koch. The figure given by Koch applies fairly well to the present form, and also his notes about the colour agree. In any case it is evident that the figure represents a true *Pachycyclops*, and as the 2 other species are both very recognisably figured by that author, the said figure cannot refer to any other species than the one here under discussion. As Koch's name has the precedence both to that given to the species by Dr. Richard, and to that proposed by A. Lande, it ought to be retained for the present species, though it is somewhat inappropriate, being apparently derived from the anteriorly somewhat divergent dark ovarial tubes shining through the body. Dr. Schmeil at first opined that this form was merely a hybrid between the 2 other species; but

he has subsequently recognised its specific distinctness. As to its relation to the 2 other species, I think that it comes nearer to *P. signatus* than to *P. annulicornis*.

Occurrence.—The only place where I have as yet met with this form, is in a small tarn near Christiansand. It occurred here, together with other Entomostraca, near the bank on a muddy bottom covered with coarse gravel. All the specimens observed were of a very dark bluish colour and in their whole behaviour exhibited so great a resemblance to *P. signatus*, that at that time I regarded them as merely belonging to a variety of that species, for which reason I only made a coloured drawing of one of them, omitting to preserve the specimens for further examination. The figures here given are from Swedish specimens kindly sent to me by Prof. Wirén of the Upsala University.

Distribution.—Sweden (Lilljeborg), Germany (Schmeil), France (Richard), Poland (Lande).

40. Pachycyclops annulicornis (Koch).

(Pl. XLII).

Cyclops annulicornis, Koch, l. c. Heft 21, Tab. 6.

Syn: *Cyclops qvadricornis albidus*, Jurine.
„ „ *tenuicornis*, Claus.
„ „ *albidus*, Schmeil.
„ „ *gyrinus*, Forbes.

Specific Characters.—Female. Anterior division of body broadly oval in outline, greatest width exceeding half the length and occurring somewhat in front of the middle. Tail comparatively more slender than in the 2 preceding species, somewhat exceeding half the length of the anterior division; genital segment of about the same shape as in *P. signatus*. Caudal rami comparatively short and only slightly diverging, inner edge scarcely ciliated; apical setæ less densely plumose and less spreading than in the 2 preceding species, the inner mediate one almost attaining half the length of the body; seta of outer corner comparatively short, scarcely exceeding in length $^1/_3$ of that of the inner corner. Anterior antennæ long and slender, reaching, when reflexed, beyond the 3rd segment, outer joints very narrow and exhibiting a well-defined lateral rib, which is quite smooth throughout, and projects at the end in a small lappet. Posterior antennæ with the terminal joint much longer and narrower than the penultimate one. Maxillipeds about as in *P. bistriatus*. Natatory legs likewise very similar; terminal joint of inner ramus in 4th pair, however, distinguished by the quite rudimentary condition of the distal seta of inner edge; apical spines of this ramus slightly unequal, the outer one being the larger. Last pair of legs of almost exactly the same shape as in *P. signatus*, the distal joint being conspicuously smaller than the

proximal one. Ovisacs generally narrow oblong or fusiform in shape and, as a rule, diverging greatly, in some cases, however, more appressed to the body. Seminal receptacle with the posterior part very little produced and slightly emarginated in the middle. Spermatophores attached to the genital orifice lageniform and closely juxtaposed.

Body of a clear yellowish grey colour, with a more or less distinct olivaceous tinge, and variegated with dark transverse bands at the end of some of the segments, as also across the cephalic part; anterior antennæ generally with 2 very conspicuous dark bands, the one occupying the 2nd and 3rd joints, the other the 10th and 11th joints.

Length of adult female about 1.80 mm.

Remarks.—This form has generally been recorded by recent authors under the name of *Cyclops albidus* Jurine, a name which is very little significant, as the present species in most cases exhibits a rather conspicuous colouring of the body. For the reason noted above the name ought also to be rejected, and to be replaced by that proposed by Koch, which has the precedence to the name *tenuicornis* given to the species by Claus. The *Cyclops gyrinus* of Forbes is unquestionably this species, and is not, as opined by Dr. Schmeil, identical with *C. distinctus* Richard.

The present species is nearly allied to the 2 preceding ones, but is of smaller size, and moreover easily recognisable from them by the shortness of the outermost caudal seta. The manner in which the ovisacs are born is also very characteristic, though in some cases specimens are found in which they are more appressed to the body, a circumstance which at first led me to the erroneous opinion that these specimens might belong to a different species.

Occurrence.—This is one of our commonest Cyclopids, being found both in small ponds and ditches and in large lakes. In the latter it not only occurs at the borders, but descends to rather considerable depths. In the lake Mjøsen I have even taken it in great numbers down to 50 fathoms together with *Cyclops vulgaris*.

Distribution.—Throughout Europe, northern part of Asia, Central Africa, Australia, North and South America, Hawaii Islands. The distribution of this form is accordingly almost cosmopolitan.

Gen. 15. **Leptocyclops**, G. O. Sars, n.

Generic Characters.—Body more or less slender, with the 2 chief divisions very sharply defined. Epimeral parts of the trunk-segments, as a rule, distinctly prominent laterally, especially those of penultimate segment, though rounded at the extremities. Last trunk-segment short and broad, being produced on each side to a narrowly rounded and densely hairy lobe, somewhat impinging upon the base of the genital segment. Tail very slender and narrow, with the genital segment comparatively short and abruptly contracted immediately behind the base. Caudal rami more or less prolonged, and in most cases exhibiting along the outer edge a delicate denticulation; seta of this edge small and not far from the end; middle apical setæ slender and elongated, being, as a rule, clothed on the proximal part with scattered coarse hairs; seta of inner corner of inconsiderable length and very thin, that of the outer corner more or less spiniform. Anterior antennæ in all the known species composed of 12 joints, the outer ones generally very slender and narrow. Posterior antennæ and oral parts on the whole of normal structure. Natatory legs well developed, with 3-articulate rami; 1st pair, as usual, the smallest, and having the 2nd basal joint conically produced at the inner corner and provided with a long deflexed spine; armature of the rami as in the genus *Pachycyclops*. Last pair of legs very small, each forming a simple somewhat trilobate lamella armed inside with a denticulated spine, outside and at the conically exserted tip with a slender seta. Ovisacs generally oval fusiform in shape. Seminal receptacle with the posterior part not produced, forming 2 transverse bands defined in the middle by a slight emargination.

Remarks.—The type of this genus is the species generally described under the name of *Cyclops serrulatus* Fischer, with which Dr. Schmeil has connected another rather diviating form, *C. prasinus* Fischer, to form a particular group of Cyclopses, viz., his "*serrulatus-prasinus* group". The most prominent character distinguishing this genus from the 3 preceding ones, is undoubtedly the very different structure of the last pair of legs. Several other characters common to the greater number of the species comprised within this genus may also be adduced, and are shortly enumerated in the above diagnosis. The genus seems to be very rich in species; but most of these are so closely related to each other, that they can be distinguished only by a careful examination, and for this reason they have been regarded by most earlier authors as only varieties of one and the same species, viz., *C. serrulatus* of Fischer. In the following

pages 5 Norwegian species belonging to this genus will be described. To these may be added a considerable number of exotic species. I have for instance recorded no less than 7 species from the Central African lake, Tanganyika, and another well-defined African species is known to me from Cape Colony. Moreover the North-American species, *Cyclops elegans* Herrick and *C. pectinifer* Cragin, unquestionably belong to the same genus, and also 2 other, apparently new species from the same part of the world have been examined by me.

41. Leptocyclops agilis, (Koch).

(Pl. XLIII).

Cyclops agilis, Koch, l. c. Heft 21, Tab. 3.

Syn: *Cyclops serrulatus.* Fischer.

„ „ *varius*, var. *brachyura*, Lilljeborg.

Specific Characters.—Female. Body moderately slender, with the anterior division oval in outline, greatest width somewhat exceeding half the length and occurring in the middle. Tail slender, about equalling in length $^2/_3$ of the anterior division; genital segment scarcely longer than the 2 succeeding segments combined and considerably dilated at the base. Caudal rami generally not much prolonged, equalling about the length of the last 2 segments combined, and slightly bent outwards at the ends, outer edge finely denticulated throughout; seta of this edge very small and attached near the end somewhat dorsally; middle apical setæ rather slender and, as usual, clothed in their proximal parts with scattered coarse hairs, the inner one about equalling half the length of the body, the outer considerably shorter; seta of inner corner scarcely longer than that of the outer, which is much coarser, spiniform. Anterior antennæ long and slender, reaching, when reflexed, to the end of the 2nd segment, the 3 outer joints very narrow and bordered by a hyaline rib, which is quite smooth throughout. Posterior antennæ with the terminal joint scarcely longer than the penultimate one. Anterior maxillipeds comparatively short and stout, with the subdivision of the 1st basal segment indistinct. Posterior maxillipeds likewise short, with the outer 2 joints imperfectly defined and the setæ issuing from them in front stout and curved against each other. Natatory legs exhibiting the structure characteristic of the genus; apical spines of inner ramus in 4th pair of moderate size, the inner one somewhat longer and more slender than the outer. Last pair of legs with the spine of the inner edge very large and coarsely dentate. Ovisacs oval fusiform in shape and slightly divergent, each containing a rather limited number of ova. Seminal receptacle with the anterior part transversely elliptical in form and slightly emarginated anteriorly.

Colour more or less dark olivaceous, with a greenish tinge; genital segment and bases of the caudal rami generally ochraceous.

Length of adult female scarcely exceeding 1 mm.

Remarks.—This appears to be the species that has been observed by most authors, and to which the name *Cyclops serrulatus* Fischer has generally been applied. It seems evident to me, indeed, that the figures given by Fischer are referable to the present species; but, as the name *agilis* proposed by Koch is of much earlier date, it must be retained for the species. Lilljeborg has applied the name *serrulatus* to a different species, which will be described below as *L. Lilljeborgi*, whereas he has given to the present species a new name, viz., *Cyclops varius*. The latter species he again divides into 3 varieties, viz., *C. speratus*, *C. proximus* and *C. brachyurus*. The first of these supposed varieties I regard as a distinct species, whereas the other 2 must be combined within the species here under consideration. The *C. proximus* does not differ from the typical form *(C. brachyurus)* except in the somewhat longer caudal rami.

Occurrence.—This is a very common Cyclopid, being found everywhere in small ponds and ditches, as also at the margin of large lakes. It is a very active little creature, moving about with considerable speed, and thus fully deserving the specific name given to it by Koch. Like the other species of the present genus, it is however a true bottom-form, keeping constantly near the ground, and scarcely ever being met with in company with the true limnetic species.

Distribution.—Throughout Europe, central and northern parts of Asia, Algeria, Azores, Polar island north of Grinnell Land (2nd Fram Exped.), North America, Australia.

42. Leptocyclops speratus, (Lilljeborg).

(Pl. XLIV).

Cyclops varius, var. *sperata*, Liljeborg, Synopsis specierum generis Cyclops, p. 88, Pl. V, figs. 12—15.

Specific Characters.—Female. Rather like the preceding species, but of much larger size and somewhat more slender form of body. Caudal rami considerably prolonged, attaining almost the length of the last 3 segments combined, and closely approximate throughout, not being at all divergent, outer edge nearly smooth, or with only very slight traces of denticles in its posterior part; middle apical setæ of the usual structure, seta of inner corner considerably longer than the spine of the outer. Anterior antennæ very slender, reaching, when reflexed, even beyond the 2nd segment, outer joints with a distinct

lateral rib, which, as in the preceding species, is quite smooth. Posterior antennæ and anterior maxillipeds about as in that species. Posterior maxillipeds with the last 2 joints well defined. Natatory legs comparatively more strongly built than in the type species, with the rami broader; apical spines of inner ramus in 4th pair rather strong, the inner one being the longer. Last pair of legs somewhat more produced in relation to the width, and having the spine of the inner edge still larger, with very coarse denticles on both edges. Ovisacs comparatively large and considerably divergent. Seminal receptacle with the anterior part evenly convex in front.

Colour light olivaceous or yellowish grey.

Length of adult female 1.20 to 1.50 mm.

Remarks.—This form, as stated above, was considered by Lilljeborg as merely a variety of his species *Cyclops varius* (= *C. agilis* Koch). I think, however that it is entitled to be ranged as a distinct species, as it differs not only in its much larger size, but also in some structural details mentioned in the above diagnosis.

Occurrence.—I have hitherto only met with this form in 2 localities, viz., in some small lagunes at the border of the lake Østensjø, near Christiania, and in widenings of the river Glommen, at Nipen. In both localities it only occurred quite occasionally.

Distribution.—Sweden (Lilljeborg).

43. Leptocyclops Lilljeborgi, G. O. Sars, new name.

(Pl. XLV).

Cyclops serrulatus, Lilljeborg, Synopsis, p. 81, Pl. V, figs. 1—6 (not Fischer).

Specific Characters.—Female. Body somewhat less slender than in the last-described species, and more resembling in shape that of *L. agilis*. Caudal rami, however, more produced, nearly attaining the length of the last 3 segments combined, and slightly flexuous, with the distal part somewhat divergent; outer edge distinctly denticulated throughout, the denticles being especially conspicuous in the distal part; middle apical setæ of the usual structure; seta of inner corner unusually prolonged, attaining almost the length of the corresponding ramus; spine of outer corner likewise somewhat longer than usual, though much shorter than the said seta. Anterior antennæ long and slender, reaching, when reflexed, to the end of the 2nd segment, lateral rib of the outer joints well marked and on the proximal part of last joint divided into a number of well-marked denticles, otherwise only very faintly striated. Posterior antennæ and oral parts of normal

structure. Natatory legs likewise much as in the preceding species, though having the apical spines of the rami more coarsely denticulate; those of inner ramus in 4th pair very unequal, the inner one being nearly twice as long as the outer. Last pair of legs with the spine of the inner edge much feebler than in the 2 preceding species, and only minutely denticulated. Ovisacs of moderate size and somewhat divergent. Seminal receptacle with the anterior part very broad, occupying almost the whole width of the genital segment, and having the front edge nearly straight.

Colour olivaceous, with a more or less brownish tinge.

Length of adult female only slightly exceeding 1 mm.

Remarks.—This form was identified by Lilljeborg with *Cyclops serrulatus* of Fischer, chiefly on account of a short note given by that author, according to which, on a strong amplification, irregular rows of very small spinules were traced on the outer joints of the anterior antennæ. As however similar spinules are also stated to occur on the tail and on the trunk segments, it seems to me very questionable whether this structure in reality refers to the dentate portion of the lateral rib, as opined by Lilljeborg. In any case the figures given by Fischer are evidently not referable to the present species but to *C. agilis* Koch. Through the kindness of Prof. Wirén of the Upsala University, I have had the opportunity of examining the type specimens from which Lilljeborg's description was made.

Occurrence.—I have found this form occasionally in several places near Christiania, sometimes in small tarns, sometimes in ponds and ditches. In a sample taken in France by Dr. Sig. Thor, and kindly sent to me for examination, this form occurred not unfrequently together with *L. agilis*, and could at once be distinguished from the latter by the rather different shape of the caudal rami.

Distribution.—Sweden (Lilljeborg), France (G. O. Sars); very probably also distributed in other parts of Europe.

44. Leptocyclops macruroides, (Lilljeborg).

(Pl. XLVI).

Cyclops macruroides, Lilljeborg, Synopsis, p. 85, Pl. V, figs. 7—11.

Specific Characters.—Female. Body somewhat more slender than in the last described species, with the tail comparatively longer in proportion to the anterior division. Caudal rami very narrow and prolonged, exceeding somewhat in length the last 3 segments combined, and diverging very little, though somewhat remote at the base; outer edge distinctly denticulate throughout, seta of that edge somewhat remote from the end; middle apical setæ of the usual

appearance; seta of inner corner scarcely more than half as long as the corresponding ramus, though longer than the spine of the outer corner; the latter comparatively short and thick. Anterior antennæ less elongated than in the preceding species, scarcely reaching, when reflexed, beyond the middle of the 2nd segment, lateral rib of the outer joints very finely denticulated in the proximal part of last joint, otherwise quite smooth. Posterior antennæ and oral parts scarcely different in structure from these parts in the preceding species. Natatory legs rather strongly built, but likewise of the usual structure. Last pair of legs with the spine of the inner edge comparatively shorter than in *L. Lilljeborgi*, but much thicker and coarsely denticulated. Ovisacs rather large and somewhat divergent. Seminal receptacle with the anterior part less broad than in the last described species.

Colour light yellowish grey.

Length of adult female amounting to 1.30 mm.

Remarks.—This species is nearly allied to *L. Lilljeborgi*, but may be easily distinguished by the very narrow and prolonged caudal rami and by the somewhat shorter anterior antennæ. It also grows to a considerably larger size than that species. The North American form, *Cyclops elegans* Herrich, of which I have had specimens for examination, is not, as opined by Lilljeborg, identical with the present species, as it has the anterior antennæ much more elongated and also exhibits some differences in the structure of the caudal rami and of the last pair of legs.

Occurrence.—I have only met with this species in large lakes, for instance, in the Maridal Lake near Christiania, and in the great lakes Mjøsen and Tyrifjord. It is generally found at a depth of a few fathoms, near the margin, but in some cases it descends to much greater depths. In Lake Mjøsen I have for instance taken it occasionally down to 50 fathoms.

Distribution.—Sweden (Lilljeborg), peninsula of Kola and northern part of Siberia (same author).

45. Leptocyclops macrurus, G. O. Sars.

(Pl. XLVII).

Cyclops macrurus, G. O. Sars, l. c. p. 45.

Syn: *Cyclops maarensis*, Vosseler.

Specific Characters.—Female. Body rather slender, with the tail much produced and only slightly shorter than the anterior division. Caudal rami exceedingly long and narrow, almost attaining the length of the whole remaining

part of the tail, linear in shape and scarcely at all divergent; outer edge for the greater part of its extent quite smooth, with only a short, somewhat oblique row of 4 or 5 small denticles just in front of the seta of this edge; the latter rather remote from the end, and attached somewhat dorsally; middle apical setæ of the usual structure; seta of inner corner fully twice as long as the spine of the outer. Anterior antennæ much shorter than in any of the preceding species, scarcely reaching, when reflexed, to the end of the cephalic segment, outer joints less narrow and without any distinct lateral rib. Posterior antennæ and oral parts of the usual structure. Natatory legs likewise built in the usual manner; apical spines of inner ramus in 4th pair rather strong and coarsely denticulate, the inner one only slightly longer than the outer. Last pair of legs with the spine of the inner edge very small. Ovisacs of smaller size than in the other species and closely appressed to the tail. Seminal receptacle with the anterior part narrowly exserted on each side.

Colour light yellowish grey, with a faint olivaceous tinge.

Length of adult female amounting to 1.10 mm.

Remarks.— This species was established by the present author as early as the year 1863, and has been admitted by all subsequent authors. It is indeed easily distinguishable by its extremely long and narrow caudal rami, which give to the tail a more slender appearance than in most other Cyclopidæ, a character which has given rise to the specific name proposed. According to Dr. Schmeil, the *Cyclops maarensis* of Vosseler is identical with the present species.

Occurrence.—Like the last described species, this form chiefly belongs to the fauna of large lakes, occurring there in shallow water among aquatic plants. It is also occasionally found in small lagunes and ponds formed by the reflux of the water in these lakes.

Distribution.—Sweden (Lilljeborg), British Isles (Brady), Germany (Schmeil), Poland (Lande), France (Richard).

Gen. 16. **Platycyclops,** G. O. Sars, n.

Generic Characters.—Body comparatively robust, with the anterior part conspicuously applanated and the epimeral parts expanded laterally. Last trunk-segment short and broad, with the lateral parts more or less densely hairy. Tail robust, sub-cylindric in shape, and having the genital segment comparatively short and stout. Caudal rami of different shape in the different species, and

generally clothed on the dorsal face with oblique rows of fine spikes; middle apical setæ comparatively strong and rather unequal in length, being minutely denticulated for a good part of their length. Anterior antennæ short, with the number of joints more or less reduced. Posterior antennæ likewise less slender than in the preceding genera. Both pairs of maxillipeds comparatively short and stout; the posterior ones with the outer 2 joints confluent. Natatory legs with the basal part broad and flattened, the rami 3-articulate and nearly equal in length; middle joint of inner ramus in 1st pair with only a single seta inside; terminal joint of same ramus in all the pairs comparatively small. Last pair of legs in some cases well defined, each forming a small lamella carrying 2 thin setæ and inside them a denticulated spine, in other cases replaced on each side by 3 spines only. Seminal receptacle short and broad, not produced behind.

Remarks.—The present genus answers to the last of the groups of Cyclopses distinguished by Dr. Schmeil, viz., his "*phaleratus—affinis—fimbriatus* group". The species belonging to this genus are especially distinguished by the pronouncedly applanated form of the anterior division of the body, which gives them a rather characteristic appearance, and also exerts a certain influence on the movements of the animal. It is indeed from this character that the generic name here proposed has been derived. In some particulars a certain agreement with the preceding genus *Leptocyclops* may be found to exist; but in other points the species here under consideration differ so much, that they cannot properly be brought together in the same genus. In addition to the 3 Norwegian species described below, the *Cyclops Poppei* Rehberg is unquestionably referable to the present genus. This form, it is true, has been considered by Dr. Schmeil as merely a variety of *C. fimbriatus* Fischer; but in my opinion it ought to be kept apart as a distinct, though nearly allied species. Further, among the several species of Cyclops recorded by the present author from Lake Tanganyika, the 2 forms, *C. oligarthrus* and *C. compactus* are undoubtedly members of the same genus. We know accordingly as yet of 6 different species belonging to the present genus.

46. Platycyclops phaleratus, (Koch).

(Pl. XLVIII)

Cyclops phaleratus, Koch, l. c., Heft 21, Tab. 9.

Syn: *Cyclops canthocarpoides*, Fischer.

" " *lascivus*, Poggenpol.

Specific Characters.—Female. Body rather short and stout, with the anterior division pronouncedly applanated and broadly oval in outline, greatest width about equalling $^2/_3$ of the length and occurring in the middle. Cephalic segment of moderate size, about the length of the 4 succeeding segments combined, and evenly rounded in front. Last trunk-segment comparatively broad, with the lateral parts slightly produced and minutely hairy. Tail unusually robust, somewhat exceeding half the length of the anterior division, and having the posterior edge of all the segments coarsely denticulated ventrally and laterally; genital segment scarcely as long as the 2 succeeding segments combined, and of nearly equal width throughout; last segment very short. Caudal rami short and thick, about equalling in length the penultimate segment, and scarcely divergent, distal part a little contracted and obliquely truncated at the end, upper face crossed by 3 obliquely curved rows of very delicate spikes, outer edge clothed in the middle with a few small spinules, seta of this edge very small and not far from the end, issuing somewhat dorsally; middle apical setæ very strong and clothed for the greater part of their extent with small appressed spinules, the inner one more than twice as long as the outer; seta of inner corner small, scarcely longer than the spine of the outer. Anterior antennæ much shorter than the cephalic segment and only slightly dilated in their proximal part, being composed of 10 joints clothed with comparatively short simple setæ; 1st and 6th joints the largest. Posterior antennæ very strongly built, with the first 2 joints imperfectly defined, 3rd joint densely hairy in front and on the upper face, its seta very short, spiniform; terminal joint much shorter than the penultimate one, apical setæ of both joints very coarse and curved. Mandibles and maxillæ of usual structure. Anterior maxillipeds very short and stout, with the basal part much dilated. Posterior maxillipeds likewise unusually stout, with the first 2 joints imperfectly defined, the 2nd exhibiting outside a ledge densely clothed with spinules, last joint very small and conically produced inside, carrying 2 short, thick, hairy setæ and outside them 2 thin bristles. Natatory legs distinguished by their exceedingly broad basal part and the coarsely spinulose rami; 2nd basal joint in 1st pair only slightly produced at the inner corner, but having the deflexed spine of quite an unusual size; terminal joint of outer ramus in 1st—3rd pairs with 3 coarse spines outside, in 4th pair with

only 2 such spines; apical spine of inner ramus in 1st pair not particularly strong; those in 4th pair very unequal, the inner one more than twice as long as the outer and equalling in length the 2 outer joints of the ramus combined. Last pair of legs imperfectly developed, and replaced on each side by 3 strong ciliated spines attached to the lateral corners of the corresponding segment, the outermost spine being somewhat thinner and less densely ciliated than the other 2. Ovisacs of moderate size, oblong oval in form and generally closely appressed to the sides of the tail. Ovarial tubes extending backwards more or less far within the tail, generally to the penultimate segment. Seminal receptacle short and broad, occupying almost the whole width of the genital segment.

Colour generally dark reddish brown, with the 1st free trunk-segment somewhat lighter.

Length of adult female about 1.10 mm.

Remarks.—This very characteristic form was first recorded by Koch, who has given a very recognisable figure of an adult female specimen. It was subsequently redescribed by Fischer as a new species under the name *C. canthocarpoides*, a name that was also adopted by some of the subsequent authors. According to Dr. Schmeil, the *Cyclops lascivus* of Poggenpol is also identical with the present species.

Occurrence.—I have found this form occasionally in stagnant pools near Christiania, especially in such as have their surface more or less densely covered with Lemma. Like the other species of the present genus, it is a true bottom form, keeping constantly close to the ground, along which it moves with great rapidity. Even when out of the water, it has the power for some time of creeping along a plane surface. The manner in which the male gets hold of the female during copulation, is rather different from that observed in most other Cyclopidæ, and more resembles that generally found in the *Harpacticoida*. As in the latter, the male grasps the female with his prehensile anterior antennæ dorsally across the tail, and the hold is so firm that it not infrequently happen that the two sexes remain tied together in this manner after being killed in alcohol.

Distribution.—Throughout Europe, Turkestan (H. Ganin), North America (Herrich), Australia (G. O. Sars).

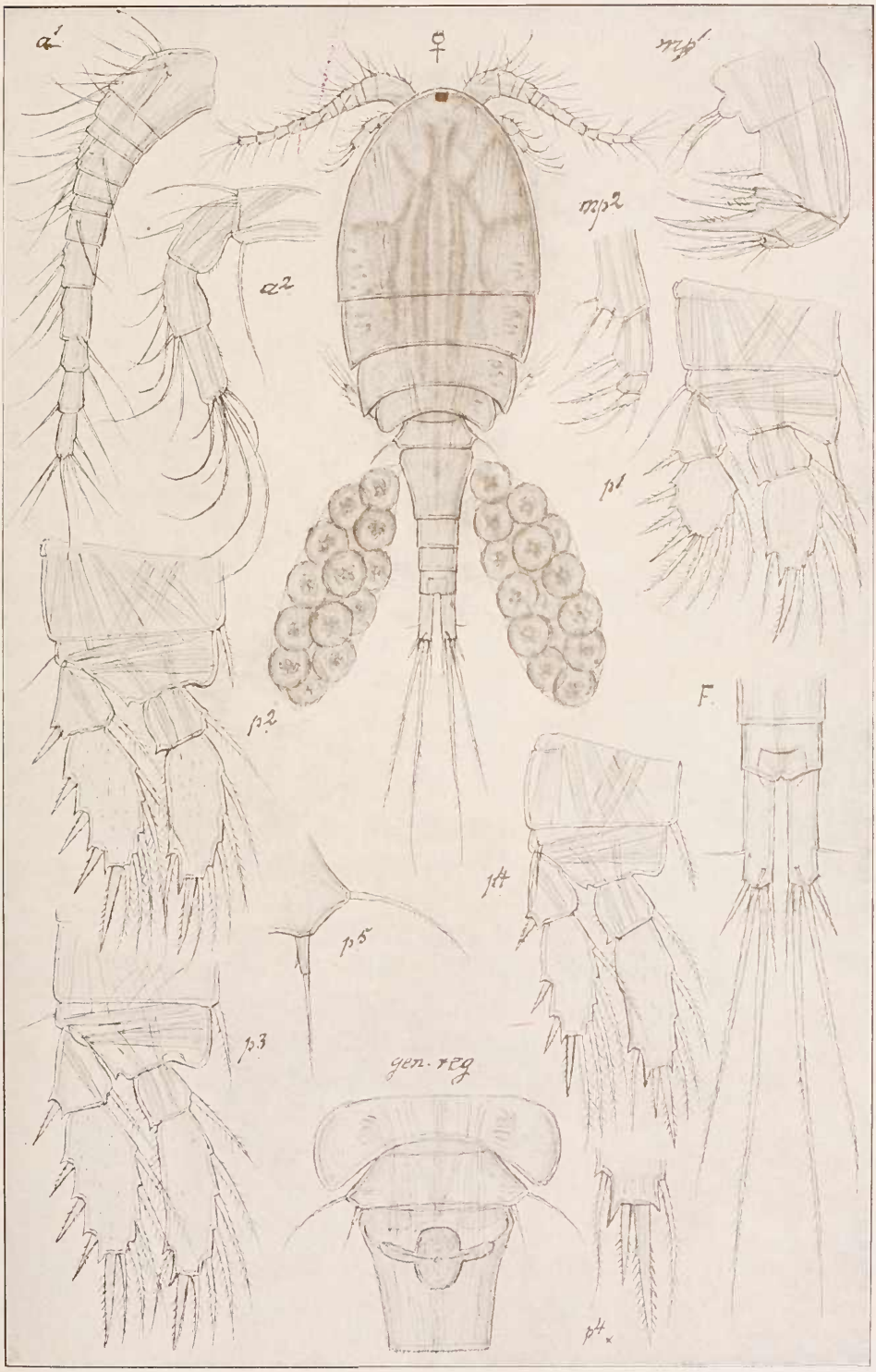
47. Platycyclops affinis, G. O. Sars.

(Pl. XLIX).

Cyclops affinis, G. O. Sars, l. c., p. 47.

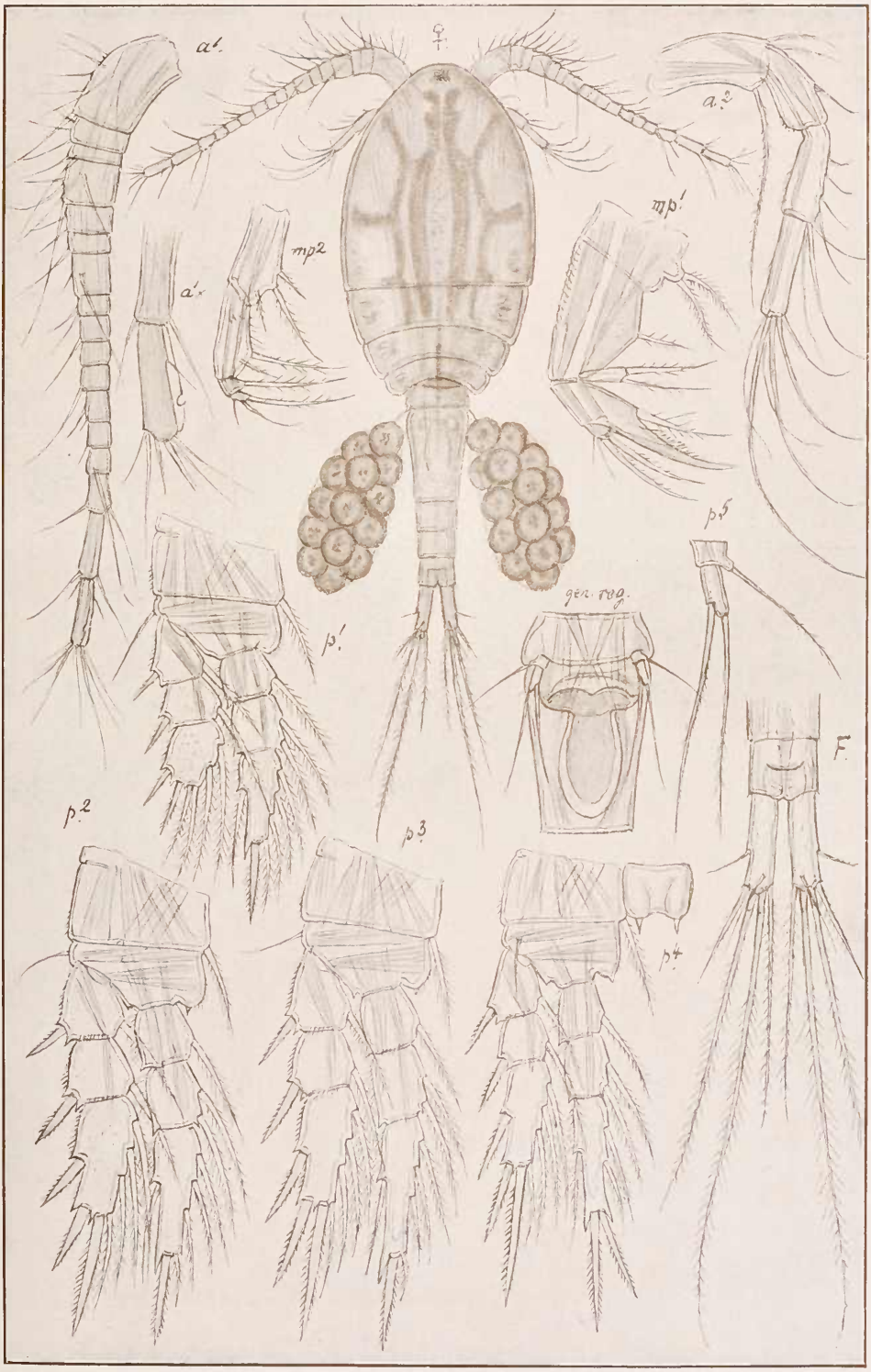
Syn: *Cyclops pygmæus*, Rehberg.

Specific Characters.—Female. Body somewhat less robust than in the preceding species, with the anterior division comparatively narrower. Cephalic segment considerably exceeding in length the 4 succeeding segments combined, and narrowly rounded in front. Last trunk-segment with the lateral parts slightly produced and clothed at the edge with slender recurved spinules. Tail about equalling in length $^2/_3$ of the anterior division, and slightly tapered distally; genital segment about as long as the 2 succeeding segments combined, and somewhat dilated at the base, last segment more fully developed than in *P. phaleratus*, though smaller than the penultimate segment. Caudal rami resembling in shape those in that species, but a little more produced; seta of outer edge very small, and attached near the end somewhat dorsally; upper face crossed by a row of small spikes extending from the said seta obliquely anteriorly; middle apical setæ strong and minutely denticulated for some part of their length, the inner one about twice as long as the outer, and equalling about half the length of the body; seta of inner corner very small, shorter than the spine of the outer. Anterior antennæ shorter than the cephalic segment, and, as in the preceding species, not much dilated in their proximal part, being composed of 11 joints clothed with short, simple setæ. Posterior antennæ far less robust than in *P. phaleratus*, with all the joints well defined. Maxillipeds resembling in structure those in that species; the posterior ones, however, wanting the spinulose ledge of the middle joint. Natatory legs with the basal part less broad and the rami less coarsely spinulose outside; 2nd basal joint in 1st pair obtusely produced at the inner corner, with the deflexed spine rather slender, terminal joint of outer ramus in 1st and 2nd pairs with 3 spines outside, in 3rd and 4th pairs with only 2 such spines; apical spine of inner ramus in 1st pair rather coarse; those in 4th pairs, as in the preceding species very unequal, the inner one being more than twice as long as the outer and conspicuously bent inwards; middle joint of same ramus with only a single seta inside. Last pair of legs well defined, each forming a small sub-quadrangular lamella carrying inside a very slender denticulated spine, outside a seta of about same length, and in the middle another much smaller seta. Ovisacs comparatively smaller than in the preceding species and containing only a limited number of ova. Seminal receptacle less broad.



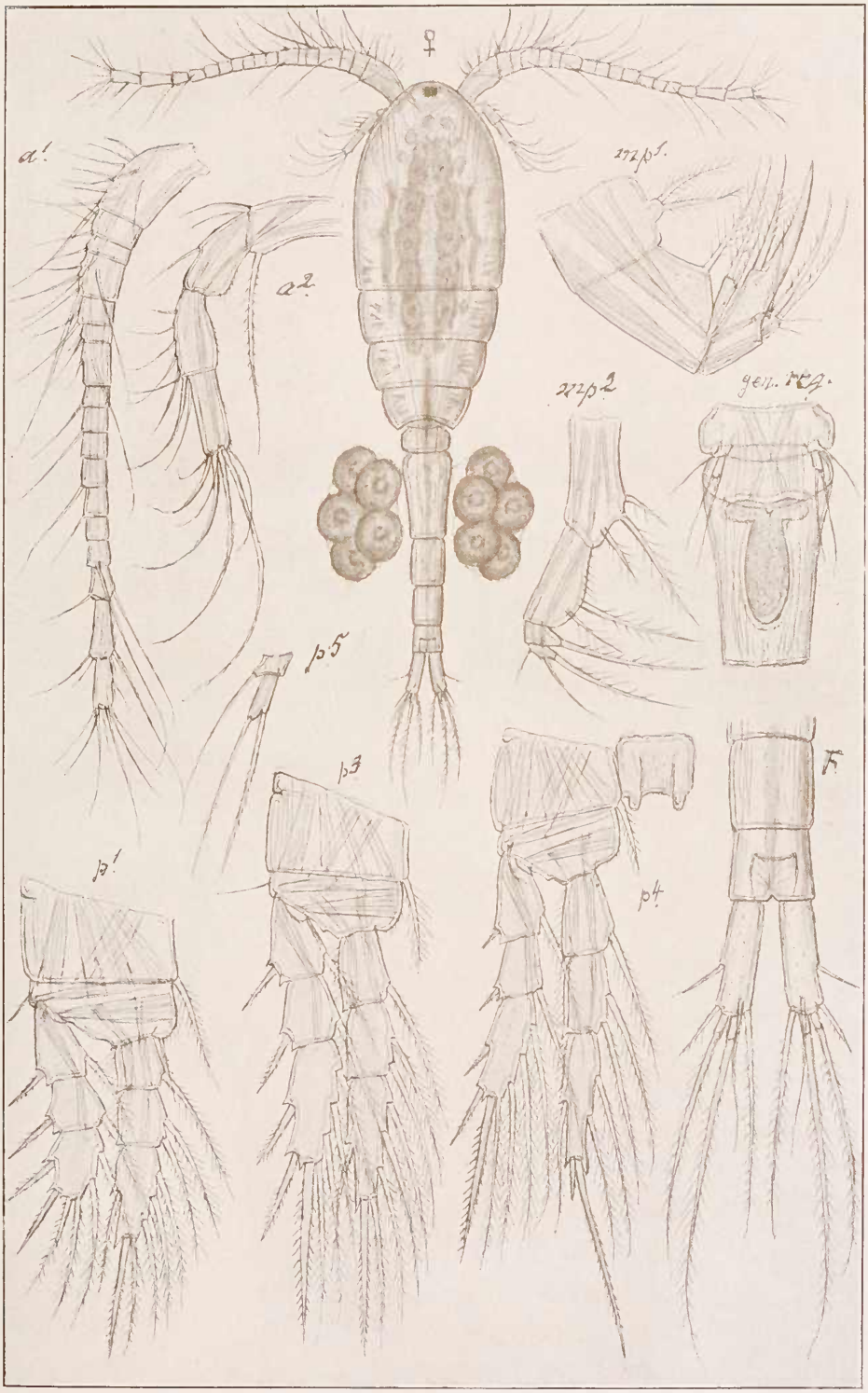
G. O. Sars, del.

Cyclops varicans, G. O. Sars.



G. O. Sars, del.

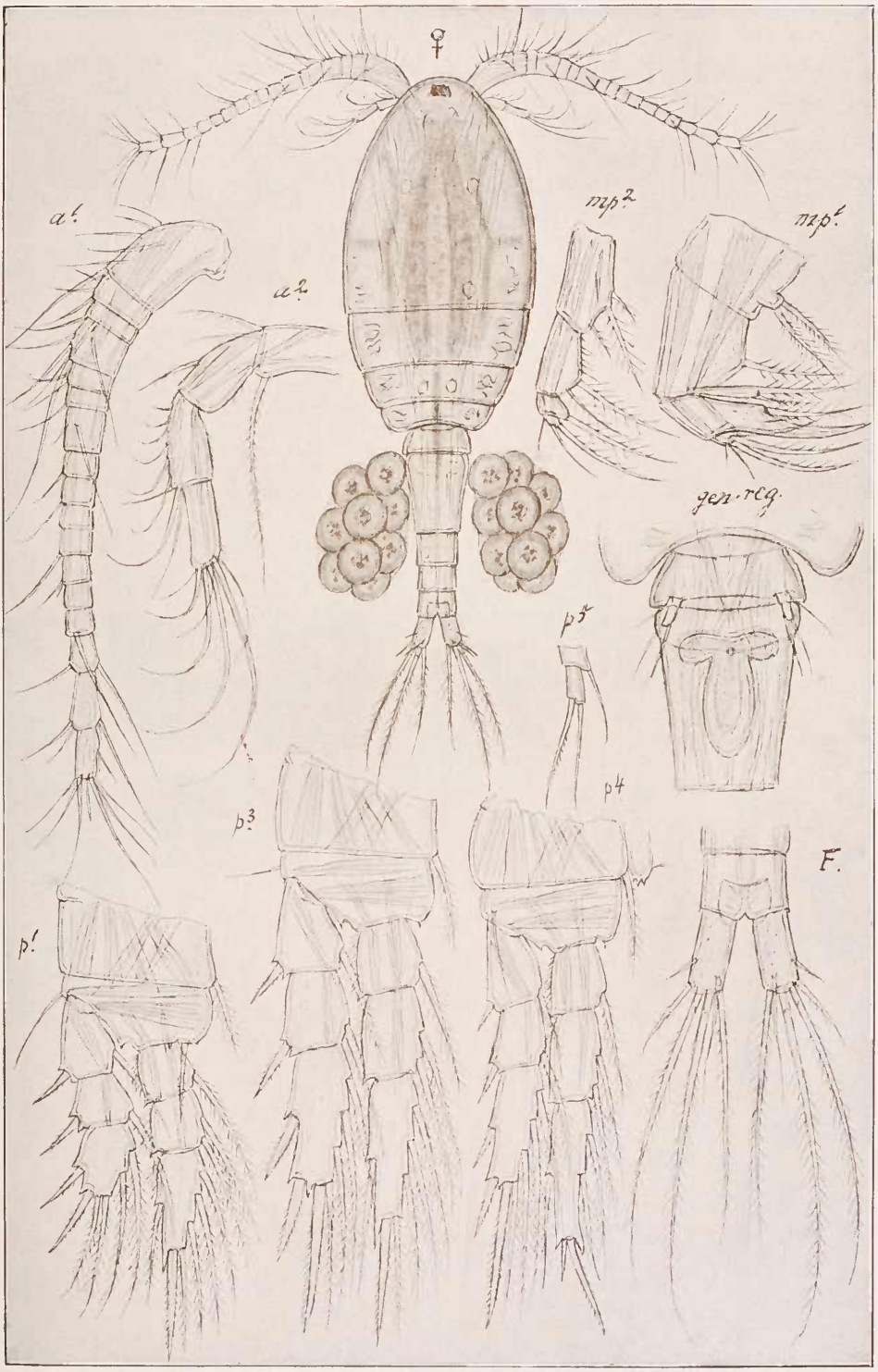
Mesocyclops obsoletus (Koch).



G. O. Sars, del.

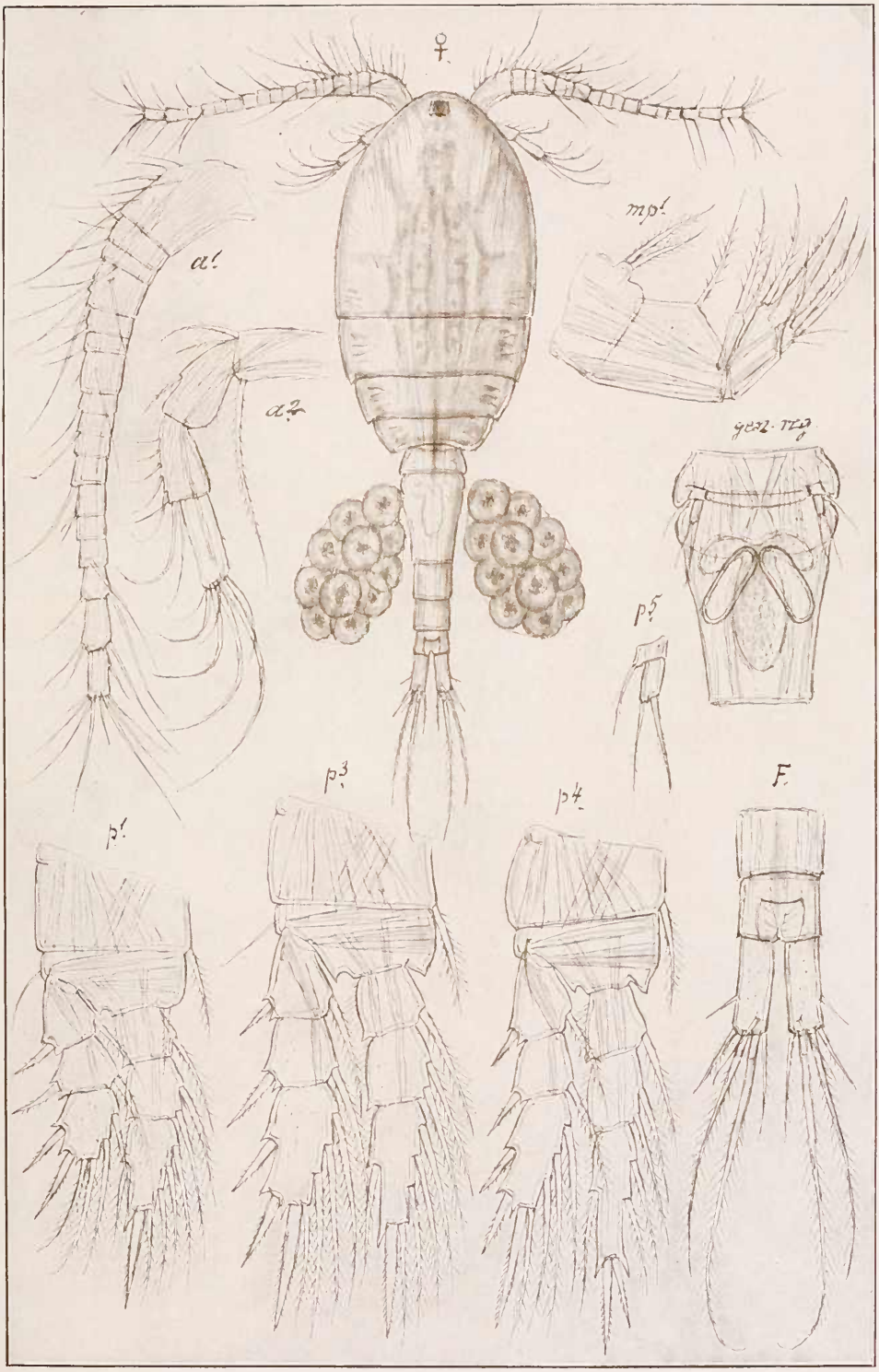
Mesocyclops oithonoides, G. O. Sars.

Copepoda



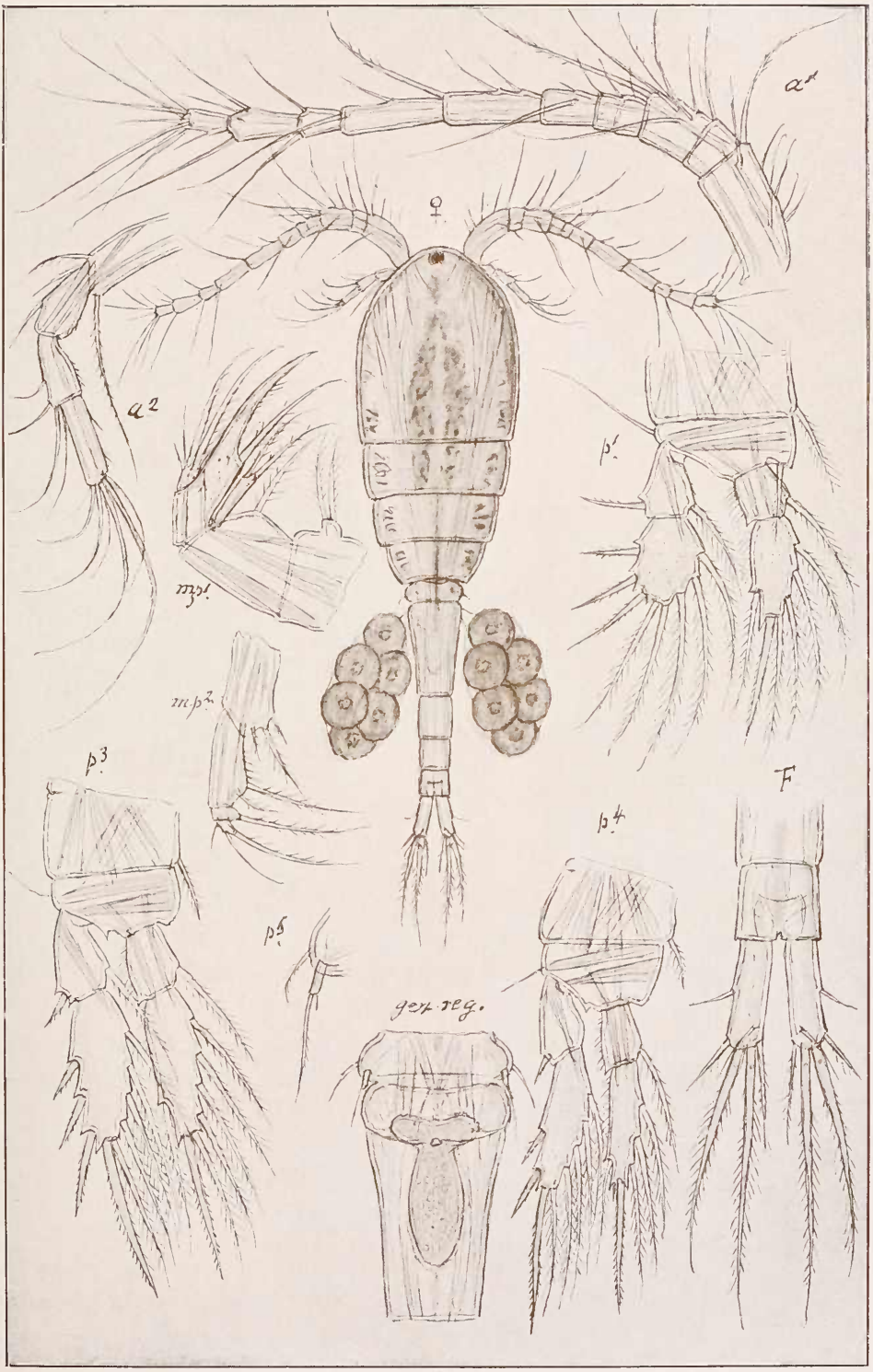
G. O. Sars, del.

Mesocyclops crassus, (Fischer).



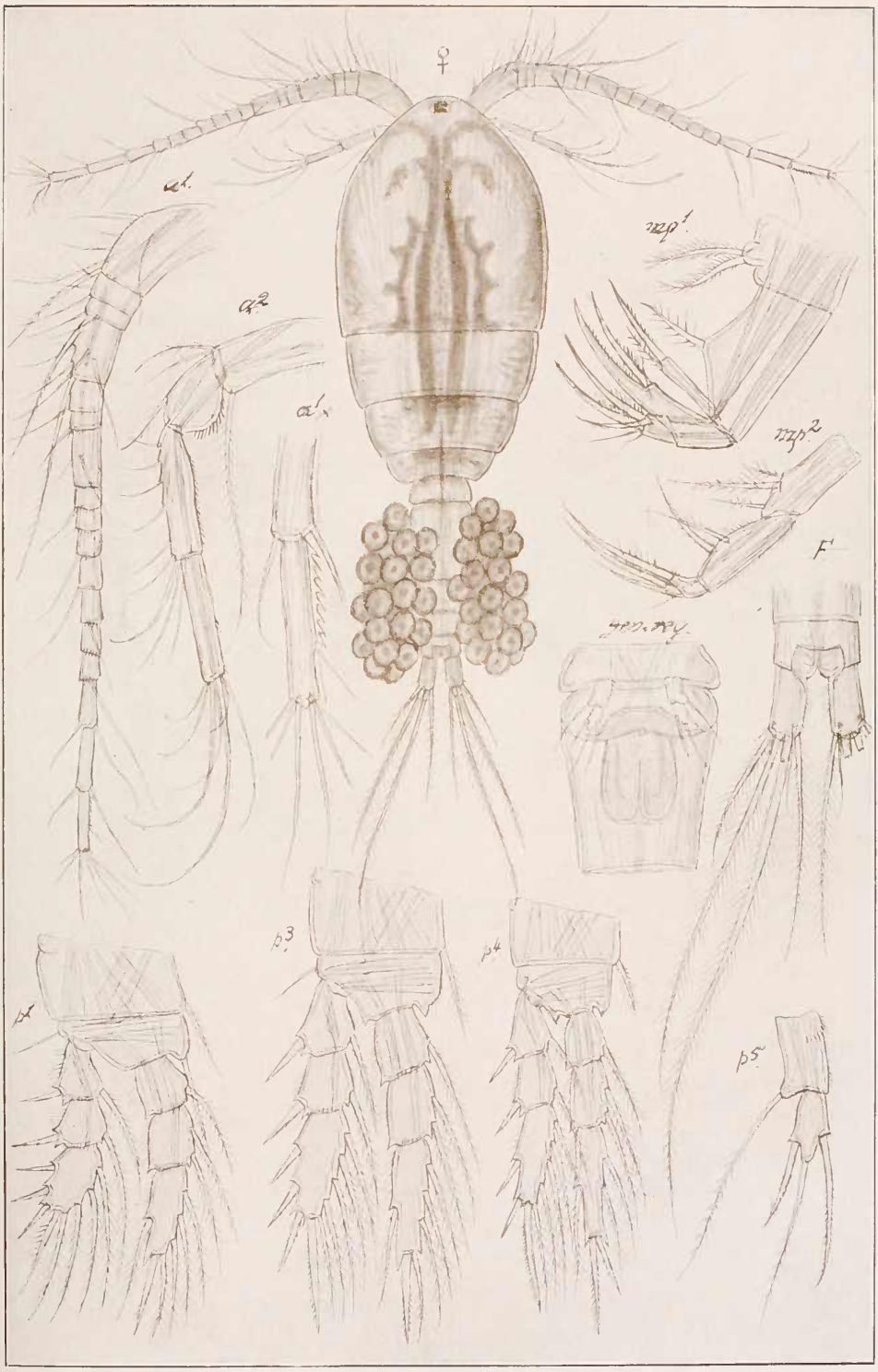
G. O. Sars, del.

Mesocyclops Dybowskyi, (Lande).



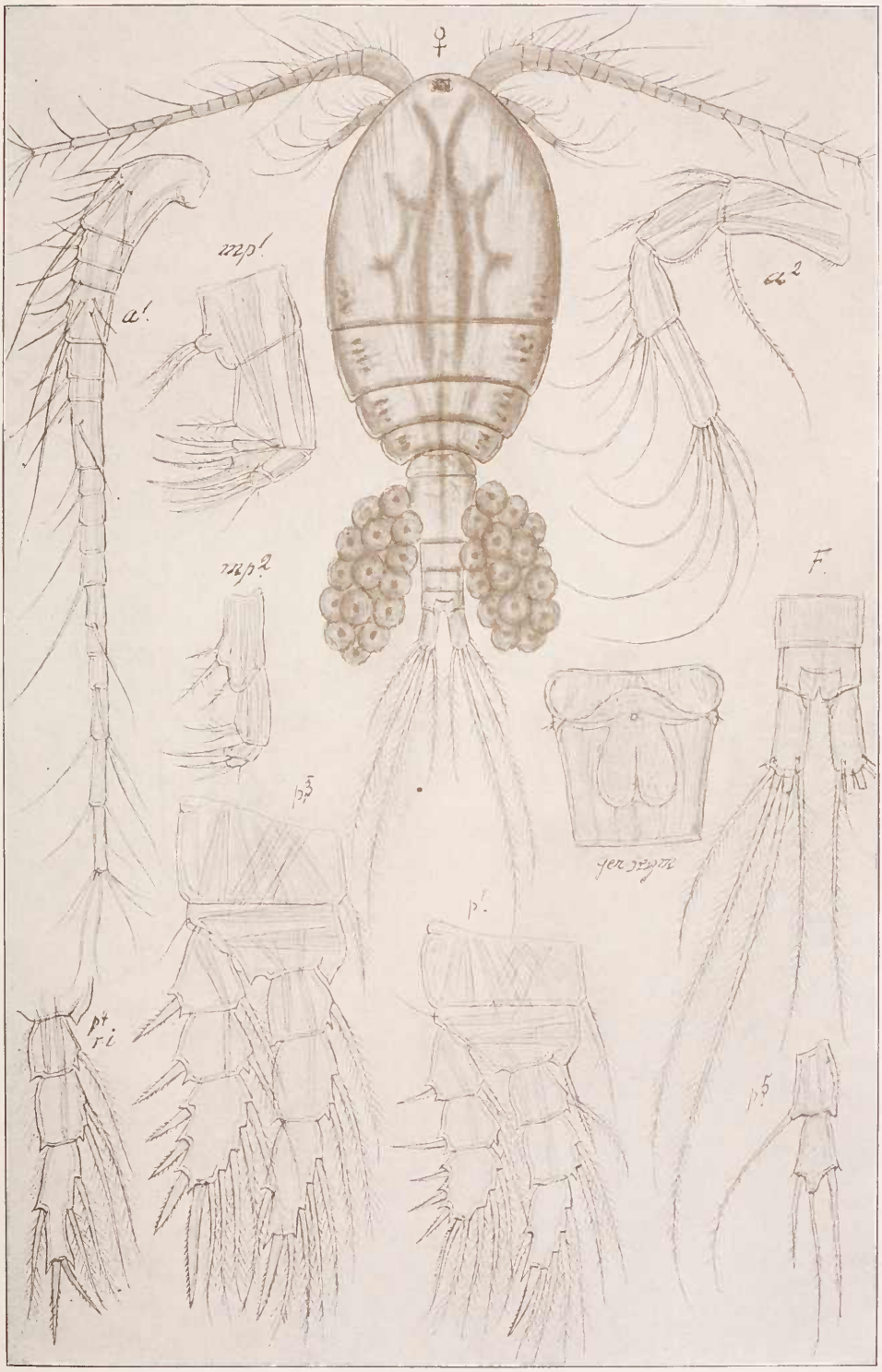
G. O. Sars, del.

Mesocyclops gracilis, (Lilljeb).



G. O. Sars, del.

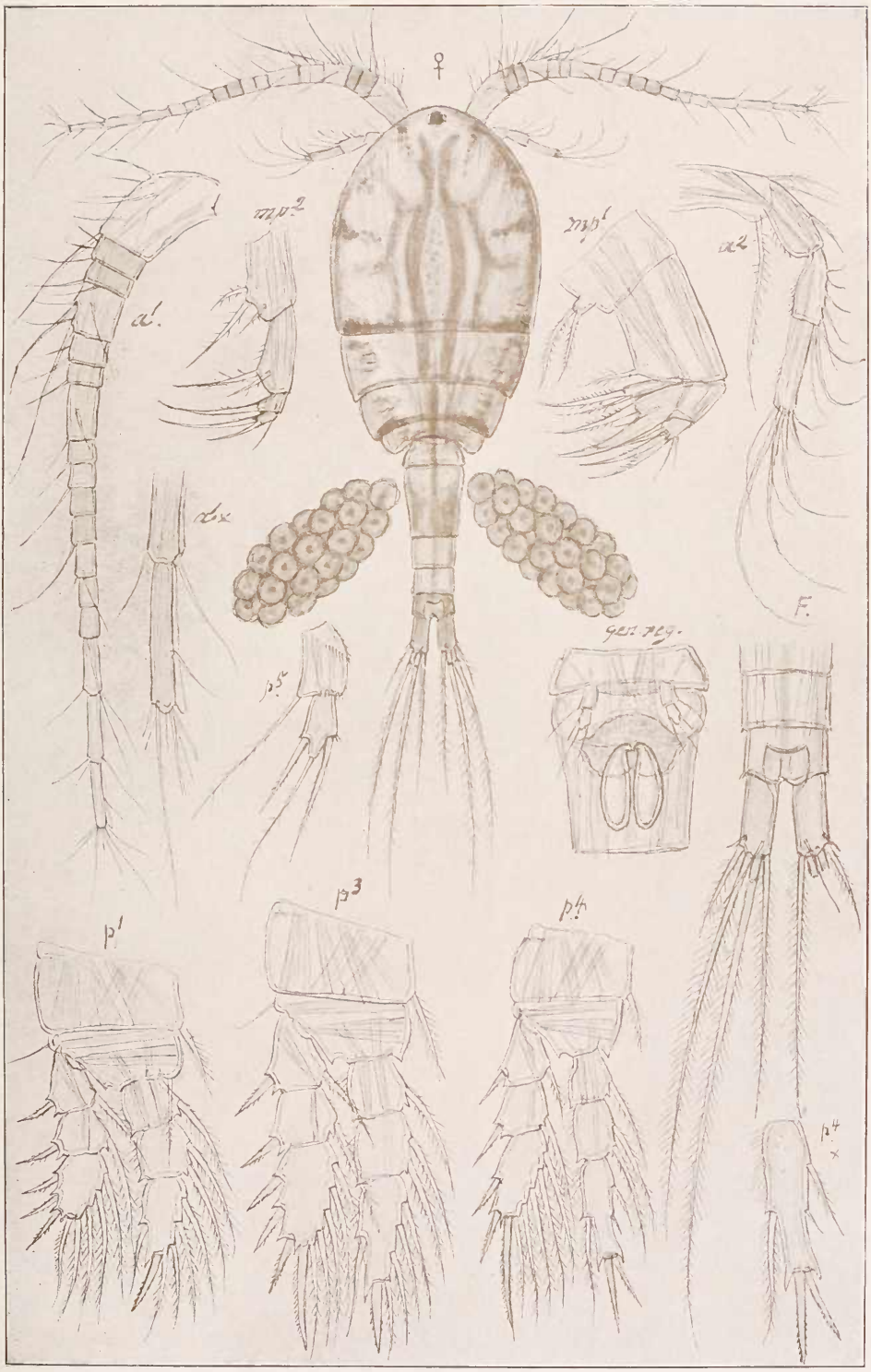
Pachycyclops signatus, (Koch).



G. O. Sars, del.

Pachycyclops bistriatus, (Koch).

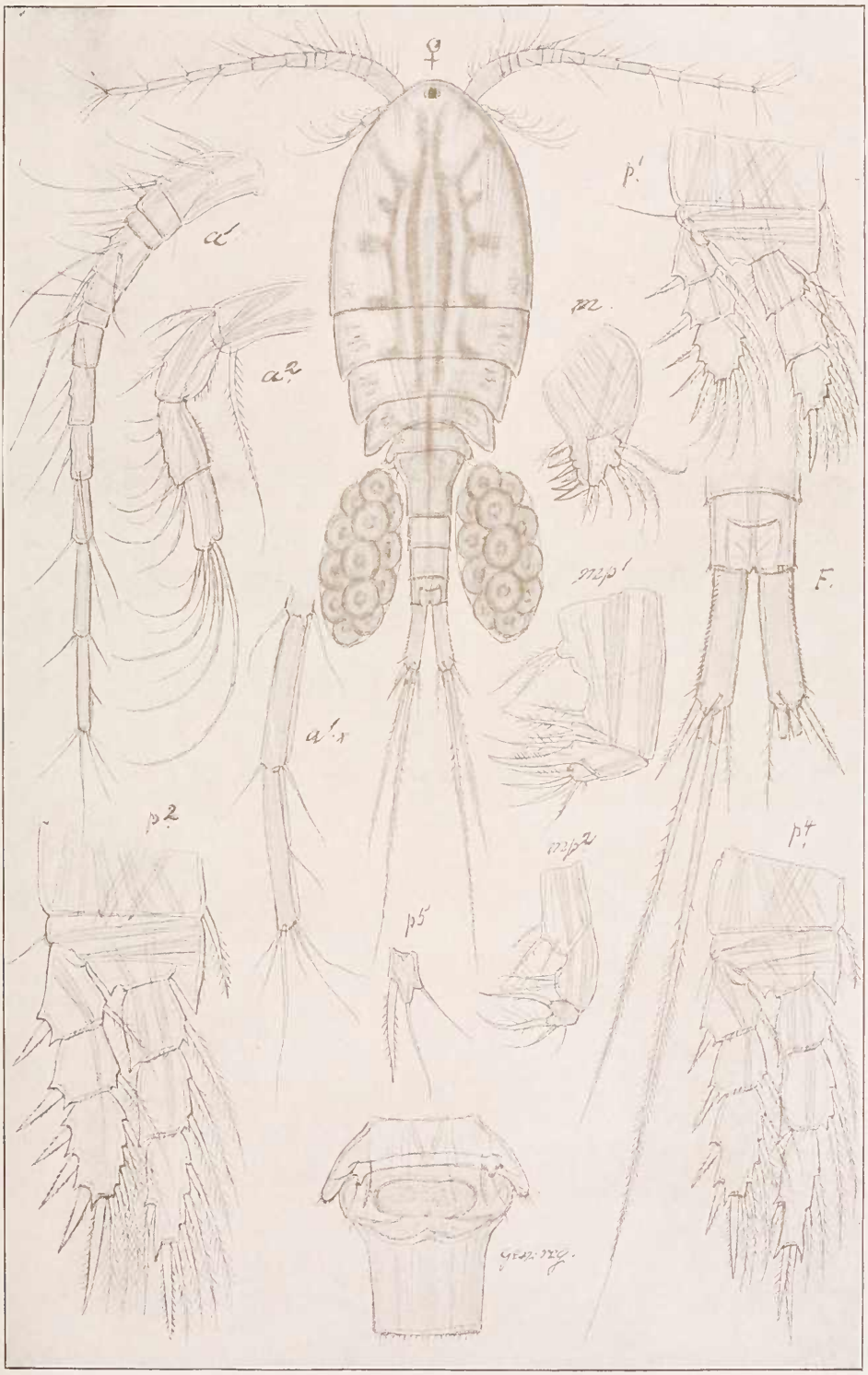
Copepoda



G. O. Sars, del.

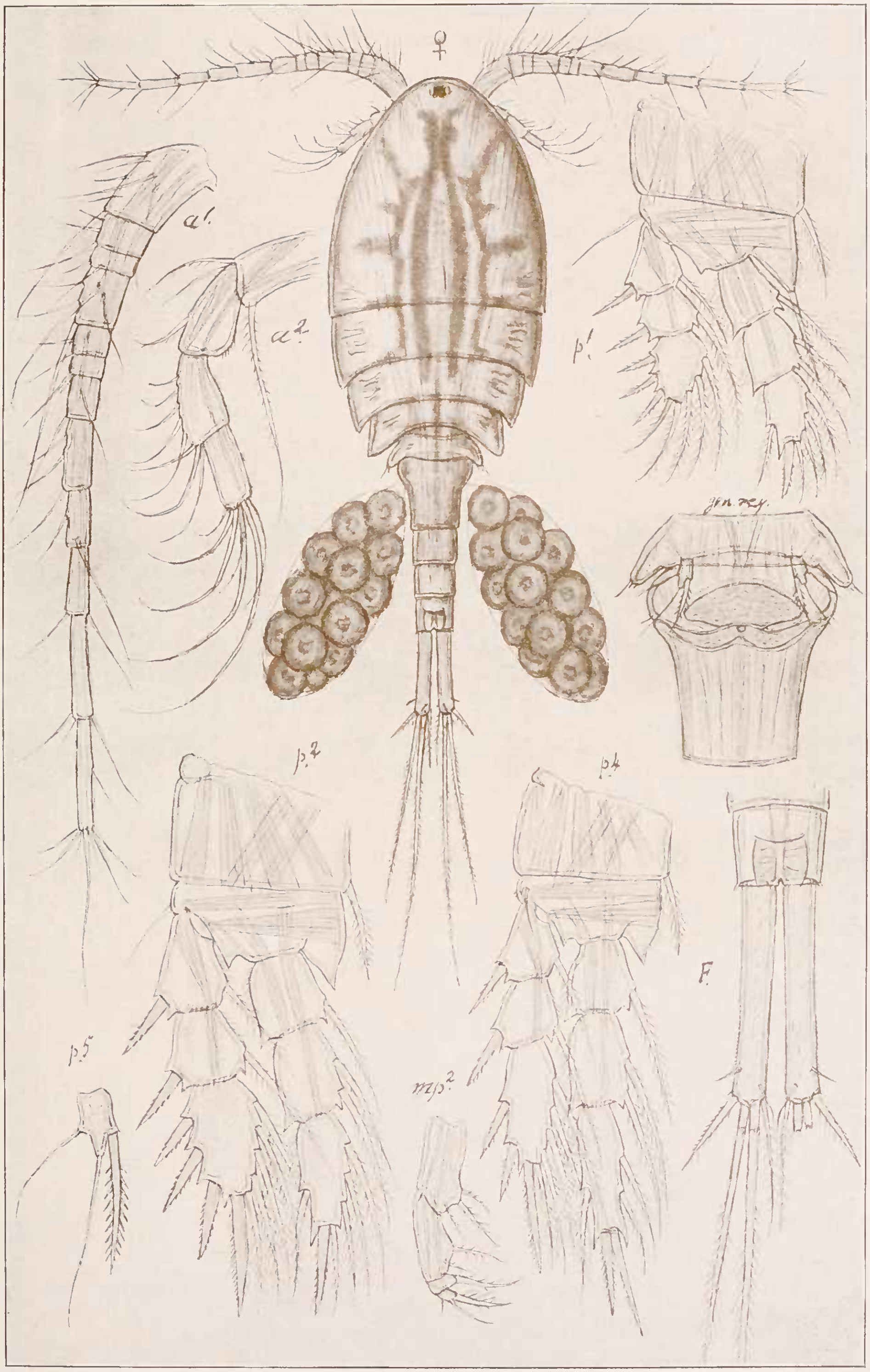
Pachycyclops annulicornis, (Koch).

Copepoda



G. O. Sars, del.

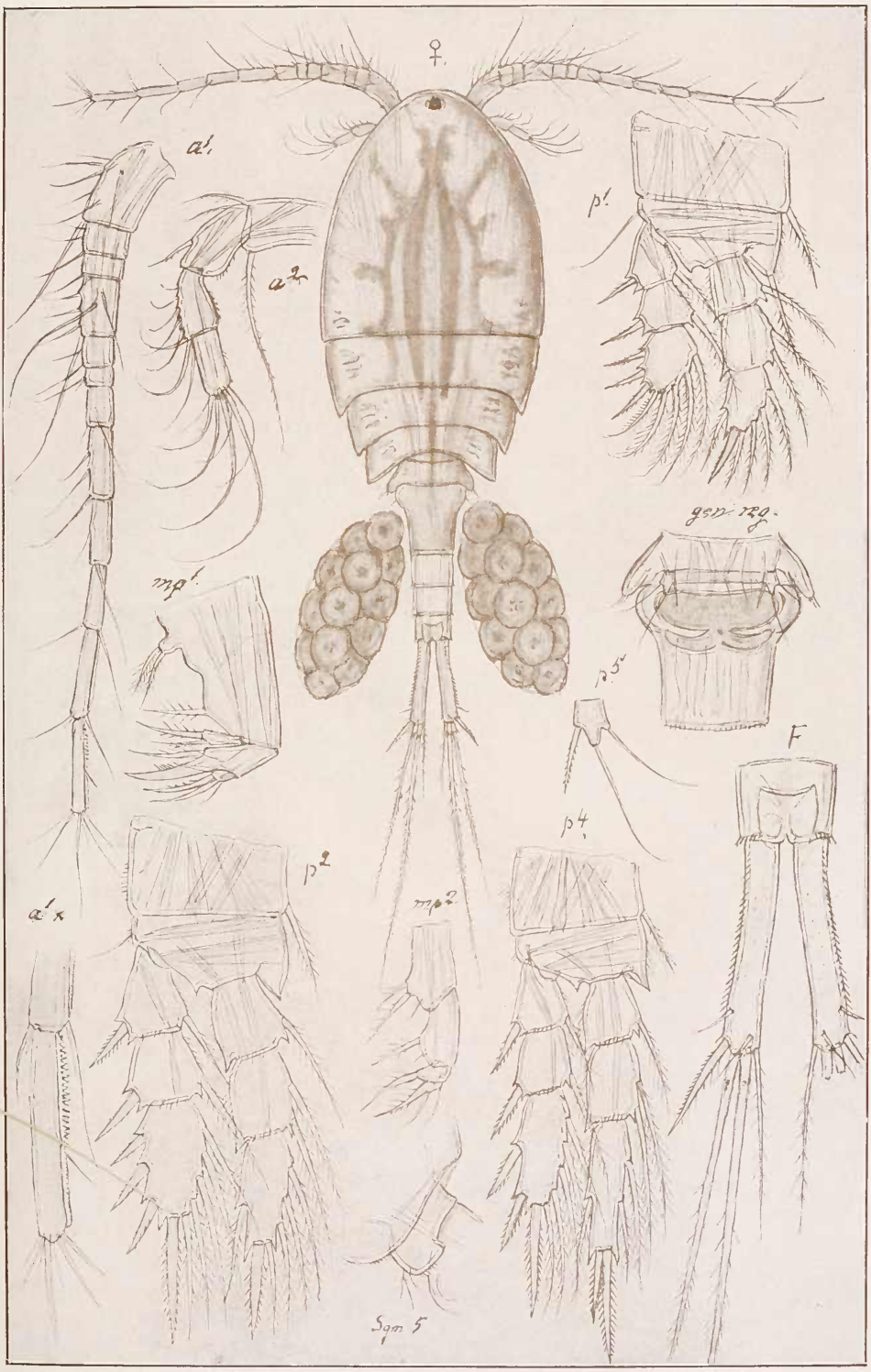
Leptocyclops agilis, (Koch).



G. O. Sars, del.

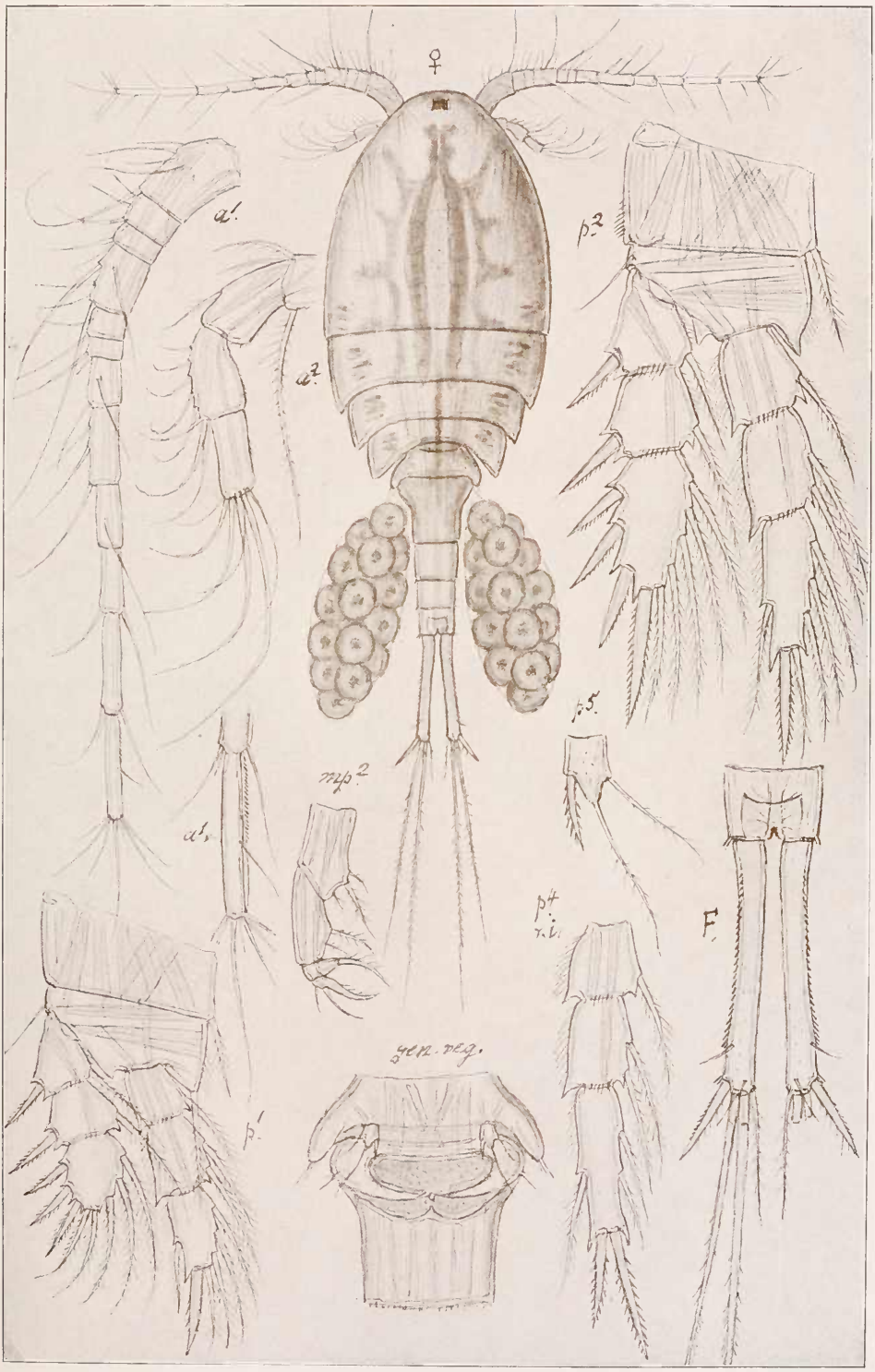
Leptocyclops speratus, (Lilljeb).

Copepoda



G. O. Sars, del.

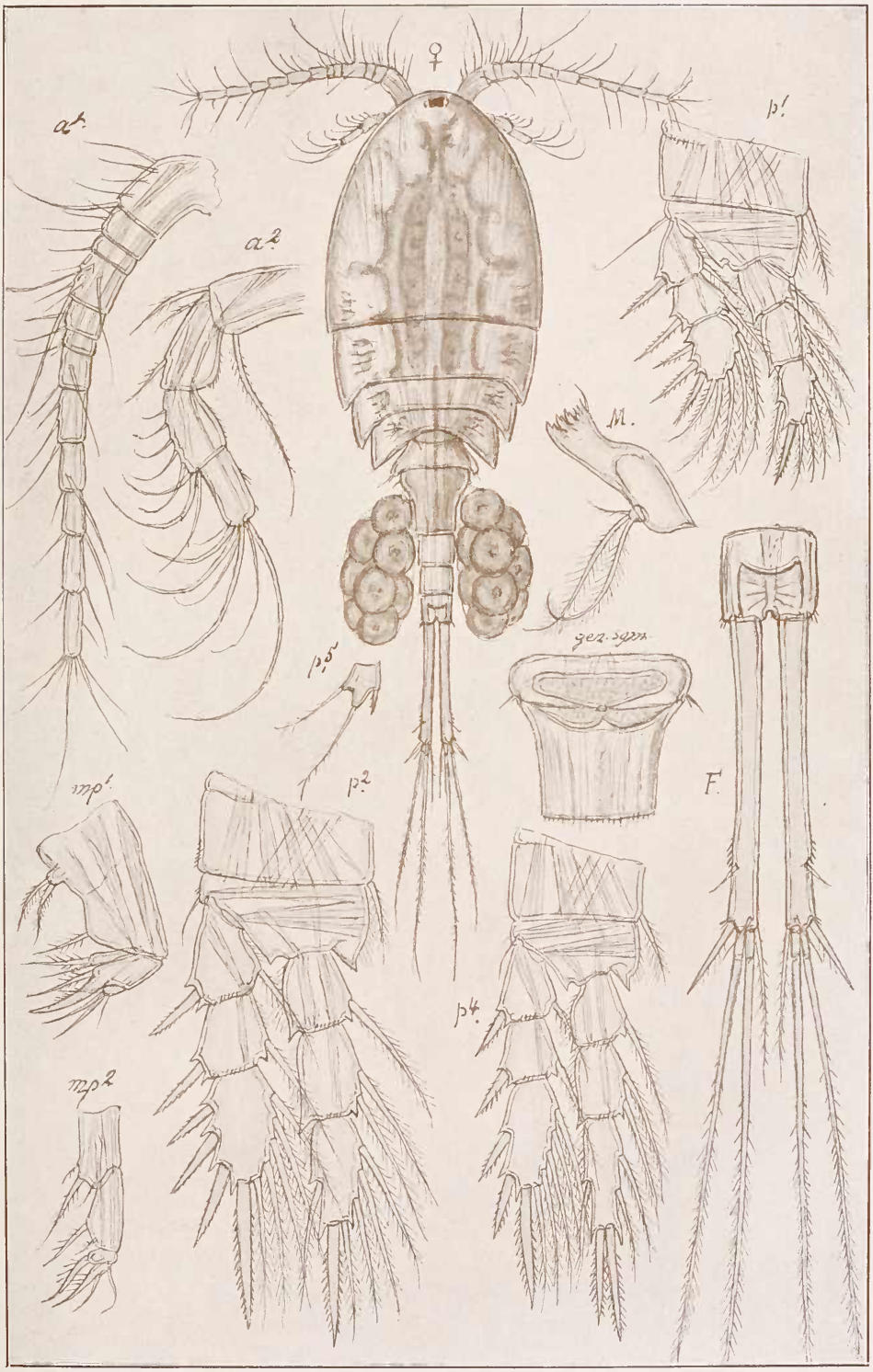
Leptocyclops Lilljeborgi, G. O. Sars.



G. O. Sars, del.

Leptocyclops macruroides, (Lilljeb).

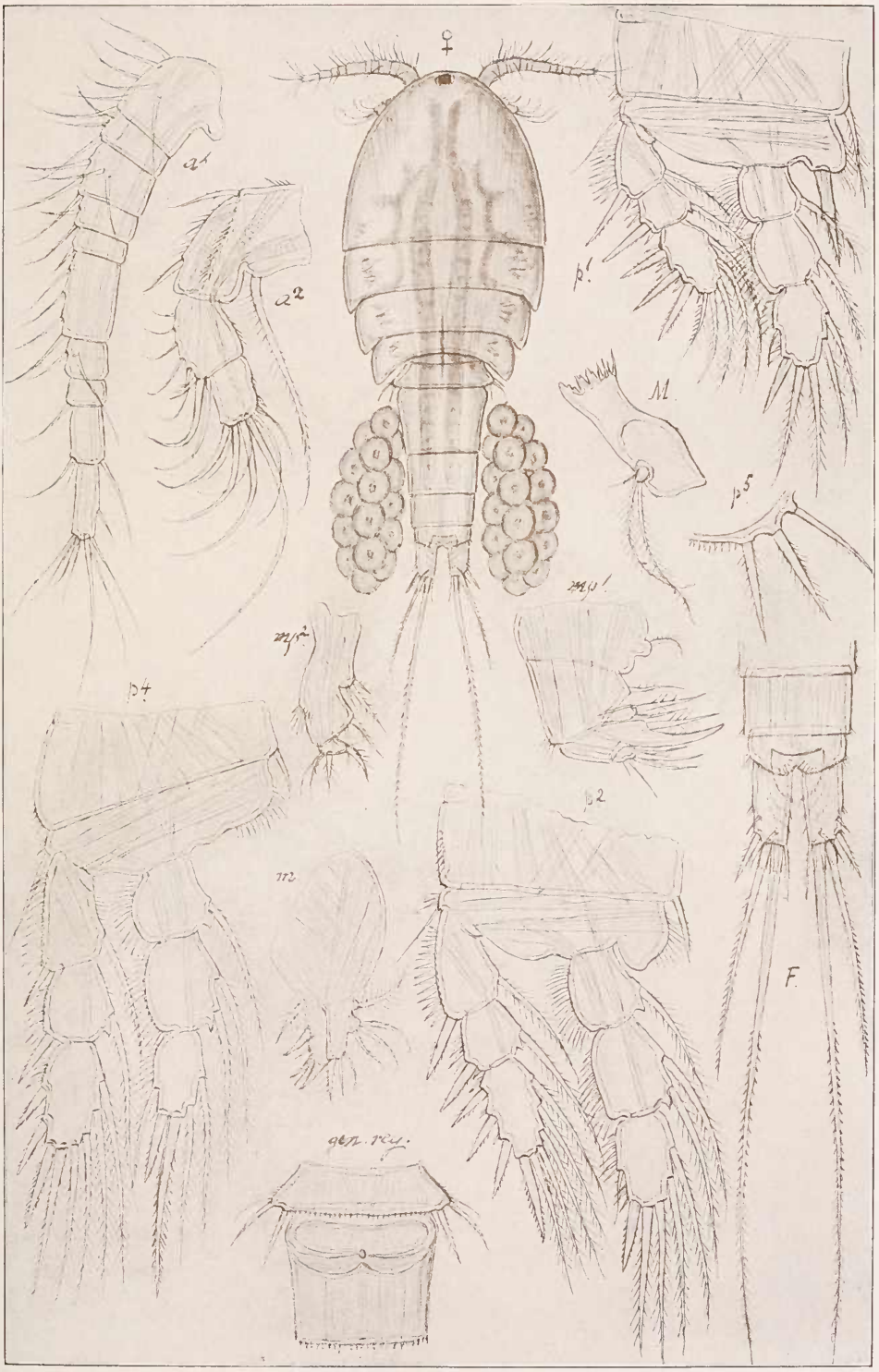
Copepoda



G. O. Sars, del.

Leptocyclops macrurus, G. O. Sars.

Copepoda



G. O. Sars, del.

Platycyclops phaleratus, (Koch).