

AN ACCOUNT
OF THE
CRUSTACEA
OF
NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY

G. O. SARS

VOL. V

COPEPODA
HARPACTICOIDA

PARTS V & VI

HARPACTICIDÆ (concluded), PELTIDIIDÆ, TEGASTIDÆ, POR-
CELLIDIIDÆ, IDYIDÆ (part)

WITH 16 AUTOGRAPHIC PLATES



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Three distinct species of this genus belong to the fauna of Norway. Mr. Poppe has moreover described a 4th species from the Behring Sea as *Z. Aurelii*, and another species is recorded by Prof. Brady from the Kerguelen Islands, but it is erroneously identified by him with one of the northern species (*Z. spinatus*).

35. *Zaus spinatus*, Goodsir.

(Pl. XXXI).

Zaus spinatus, Goodsir, On several new Species of Crustaceans allied to *Saphirina*. Ann. Mag. Nat. Hist. Vol. XVI, pag. 326, Pl. XI, figs. 1—8.

Syn: *Zaus spinosus*, Claus.

Specific Characters.—*Female.* Anterior division of body, seen dorsally, oval in outline, though scarcely attenuated behind. Cephalic segment narrowly rounded in front, rostrum slightly prominent, obtuse at the tip. Last pedigerous segment very small and becoming suddenly much narrower than the others. Urosome about half the length of the anterior division, genital segment rather broad, with the lateral parts expanded, and finely setiferous at the edges; the 3 succeeding segments rapidly diminishing in size. Caudal rami about as long as they are broad, and obtusely truncated at the tip, the innermost but one of the apical setæ rather elongated, exceeding half the length of the body. Anterior antennæ moderately slender, almost attaining the length of the cephalic segment, terminal part longer than the preceding joint. Posterior antennæ with the terminal joint about the length of the basal one, its 3 spines clothed outside with a dense brush of cilia. Posterior maxillipeds with the hand quadrate in form, dactylus comparatively short, with a secondary spine at the base inside. First pair of legs with the distal joint of the outer ramus shorter than the proximal one, and widening considerably towards the end, apical claws bordered on one side with a dense comb-like series of cilia; inner ramus exceeding half the length of the outer and only biarticulate, last joint very small, with a single apical claw of the same appearance as those on the outer ramus. Natatory legs with the spines outside the last 2 joints of the outer ramus bordered on one side with a comb-like series of cilia. Last pair of legs of moderate size, distal joint much smaller than the proximal one, and broadly oval in form; inner expansion of the latter rather broad, with the edge evenly convex and densely ciliated between the setæ.

Male considerably smaller than female, with the urosome narrower and distinctly 5-articulate. Anterior antennæ very strongly built, 6-articulate, 2nd joint quite short, 3rd large, gradually widening distally, penultimate considerably

tumefied, last small, claw-like and very mobile. Last pair of legs with the distal joint of exactly the same appearance as in the female, proximal one, however, much smaller and not at all expanded.

Colour pale yellow, sometimes with a faint rosy tinge.

Length of adult female 0.56 mm., of male 0.44 mm.

Remarks.—This form was briefly described by Goodsir as early as the year 1845, and has subsequently been observed by several other authors. The Arctic form, *Z. Aurelii* of Poppe, is very nearly related to this species, scarcely differing except in the form of the distal joint of the last pair of legs, which is comparatively narrower and more produced at the tip.

Occurrence.—I have met with this form not unfrequently along the greater part of the Norwegian coast, and I am disposed to believe that the form recorded by Th. Scott from Finmark as *Z. Aurelii* Poppe, may more properly be referable to the present species. It is a strictly littoral form, living near the shore among algæ, and is occasionally left in tidal pools together with other littoral species. The flattened form of its body makes it very easy for it to run along the fronds of the algæ or other smooth objects. Male and female are often found tied together in copula, as figured by Claus.

Distribution.—British Isles (Goodsir), Heligoland (Claus), coast of France (Canu), Arctic Ocean, at Novaja Zemlia and Franz Josef's Land (Scott).

36. *Zaus abbreviatus*, G. O. Sars, n. sp.

(Pl. XXXII).

Specific Characters.—*Female.* Body very flat, shield-like, rounded oval in outline, with the segments of the anterior division lamellarly expanded laterally. Cephalic segment broadly rounded in front, rostrum broad, lamellar, obtusely truncated at the tip. Last pedigerous segment very small. Urosome comparatively short and broad, not nearly attaining half the length of the anterior division; genital segment considerably expanded and densely ciliated at the edges, postero-lateral corners of this and the succeeding segment conically produced. Caudal rami about as in *Z. spinatus*. Anterior antennæ with the terminal part very short, scarcely longer than the preceding joint. Posterior antennæ and oral parts resembling in structure those parts in the preceding species. First pair of legs likewise rather similar, though with the distal joint of the outer ramus comparatively longer and less dilated towards the end; inner ramus armed at the tip with 2 spines, one of which is digitiform and quite smooth. Natatory legs comparatively

more slender than in *Z. spinatus*, spines outside the last 2 joints of the outer ramus provided, as in that species, with a dense brush of cilia on one of the edges. Last pair of legs differing conspicuously in form from those in the other known species, distal joint rather large and somewhat lozenge-shaped, outer margin convex, inner straight, apex narrowly produced, both edges densely ciliated; proximal joint constricted in the middle, with the posterior edge deeply concaved and quite smooth between the marginal setæ, 2 of which, attached close to the extremity, are considerably elongated.

Body of a light yellow colour, with a dark orange transverse band across the back, occupying the dorsal parts of the 2 anterior free segments of metasome; urosome more or less deeply tinged with the same colour.

Length of adult female 0.62 mm.

Remarks.—This form may be easily distinguished both from *Z. spinatus* and *Z. Aurelii* by its short, broad, shield-like body, and by the characteristic form of the last pair of legs. It is very strange that this distinct species, which most probably also occurs off the Scottish coast, has quite escaped the attention of that diligent observer, Th. Scott. It has perhaps been confounded by him with *Z. spinatus*.

Occurrence. The present species is by no means rare off the west coast of Norway. It is however never found close to the shore, like *Z. spinatus*, but seems to be restricted to the region of the red algæ, where it often occurs in considerable numbers.

Distribution. Polar islands north of Grinnell Land (2nd Fram Expedition).

37. *Zaus Goodsiri*, Brady.

(Pl. XXXV).

Zaus Goodsiri, Brady, Monograph of British Copepoda, Vol. II, p. 156, Pl. LXVI, figs. 10–13.

Syn: *Zaus ovalis*, Claus (not Goodsir).

Specific Characters.—*Female.* Body oblong in form and much depressed, with the integuments very much incrustated. Cephalic segment large and broadly rounded in front, rostrum broad, lamellar. Epimeral plates of the 3 succeeding segments tongue-shaped, with a nodiform projection at the base anteriorly. Last segment of metasome comparatively larger than in the 2 preceding species, though much narrower than the other segments. Urosome equal in length to about $\frac{2}{3}$ of the anterior division, genital segment rather large and, like the succeeding segment, produced at the postero-lateral corners to conical projections finely cili-

ated outside; last segment very small and deeply cleft. Caudal rami nearly twice as long as they are broad, and each produced at the tip outside to a dentiform projection; apical setæ unusually short, the innermost but one scarcely exceeding half the length of the urosome. Anterior antennæ comparatively shorter and stouter than in the 2 preceding species. Posterior antenna with the terminal joint comparatively short and much dilated distally, spines of outer edge provided with short cilia on the one side. Mandibles, maxillæ and anterior maxillipeds about as in the other species. Posterior maxillipeds, however, considerably stronger, with the hand oval in form, and the dactylus very coarse. First pair of legs rather slender, distal joint of outer ramus scarcely widening at all towards the end, apical claws with short cilia; inner ramus distinctly 3-articulate, last 2 joints small, but well defined, apical claws very strong. Natatory legs resembling in structure those in the 2 preceding species, but with the inner ramus comparatively shorter. Last pair of legs very large, distal joint oblong oval in form and densely hirsute; inner expansion of proximal joint lamellar, transversely truncated at the tip, which is finely denticulate at the edge, and provided with 4 very unequal setæ, the outermost rather small, the next much elongated, the 2 innermost very coarse and spiniform.

Body of a dark yellow colour, with a broad reddish brown transverse band across the back, occupying the dorsal parts of the 3 first free segments of metasome.

Length of adult female 1.40 mm.

Remarks.—I fully agree with Prof. Brady in saying that the identification by Claus of this form with *Sterope ovalis* Goodsir, cannot properly be sanctioned; and the name proposed by Brady is now also generally accepted by other authors. It is an easily recognizable species, being much larger than any of the others, and also differs conspicuously in the more elongated form of body.

Occurrence.—Only a few specimens of this form, all of them females, have hitherto come under my notice. They were found off the west coast of Norway, in depths varying from 20 to 50 fathoms.

Distribution.—British Isles (Brady), Heligoland (Claus), Arctic Ocean west of Spitsbergen (Scott), Polar islands north of Grinnell Land (2nd Fram Expedition).

Fam. 6. Peltidiidæ.

Characters.—Body short, depressed, with greatly incrustated integuments. Cephalic segment large, more or less flattened, rostrum immobile, not defined at the base. Epimeral plates of the 3 succeeding segments, in some cases also of the last, lamellarly expanded. Urosome short and broad, generally bent downwards. Eye present. Anterior antennæ 6—9 articulate, in male slightly transformed. Posterior antennæ distinctly 3-articulate, outer ramus comparatively small, biarticulate. Mandibles not very strong, palp slender, bi- or uniramous. Maxillæ comparatively small. Anterior maxillipeds with 3 slender setiferous lappets inside, terminal joint incurved and generally armed at the tip with a slender claw. Posterior maxillipeds terminating in a strongly clawed hand. First pair of legs with the inner ramus natatory, the outer distinctly prehensile. Natatory legs with both rami slender, 3-articulate. Last pair of legs of the same appearance in the two sexes, biarticulate, more or less falciform, proximal joint scarcely expanded. Ovisac single, rounded, extending in front between the bases of the natatory legs.

Remarks.—In the restriction here adopted, this family is chiefly characterised by the short depressed form of body, the short more or less incurved urosome, the immobile rostrum, and the structure of the 1st and last pairs of legs. In the structure of the posterior antennæ and the oral parts, well-marked differences from the *Harpacticidæ* are also to be found. The family comprises as yet 3 genera, 2 of which are represented in the fauna of Norway.

Gen. 16. *Alteutha*, Baird, 1845.

Syn: *Carillus* & *Sterope*, Goodsir.

„ *Peltidium*, Brady (not Philippi).

Generic Characters.—Body more or less oval in outline, with the lateral parts of the cephalic segments inflexed ventrally. Epimeral plates of last segment of metasome much smaller and more rounded than those of the 3 preceding segments. Genital segment large and expanded, the succeeding segments of urosome short and tapering rapidly. Caudal rami short and broad, lamellar, each with a strong spine on the lower face, apical setæ comparatively short, 3 of them placed close together at the inner corner. Anterior antennæ of moderate length, 8- or

9-articulate. Mandibular palp distinctly biramous. Maxillæ with the palp normally developed, endopodal part somewhat produced. Anterior maxillipeds with the terminal joint of moderate length, and tipped with a slender claw. Posterior maxillipeds with the basal part uni- or biarticulate. First pair of legs with both rami 3-articulate, terminal joint of outer ramus armed with several hook-like claws of unequal size. Last pair of legs very strongly built, and extending along the sides of the urosome, distal joint large, sword-shaped, and armed with strong spines at the tip.

Remarks.—This genus was established in the year 1845 by Baird, to include one of the 2 species described below. The 2 genera, *Sterope* and *Curillus*, recorded by Goodsir, are both apparently synonymous with Baird's genus. Prof. Brady erroneously referred the species of this genus to *Peltidium* Philippi, from which the present genus is clearly distinguished both by the general aspect of the body, and the structure of the several appendages. We know at present of 3 distinct species of this genus, 2 of which belong to the fauna of Norway.

38. *Alteutha interrupta* (Goodsir).

(Pl. XXXVI & XXXVII).

Sterope interrupta, Goodsir, Ann. & Mag. Nat. Hist. Vol. XVI, p. 326, Pl. XI, fig. 10.

Syn: *Alteutha bopyroides*, Claus.
 " — *norvegica*, Boeck.
 " *Peltidium interruptum*, Brady.
 " — *conophorum*, Poppe.

Specific Characters.—*Female.* Body rather compact, somewhat vaulted above, and capable of rolling itself into a ball; seen dorsally, oval pyriform in outline, with the greatest width in front of the middle, and gradually tapering behind. Cephalic segment occupying about half the length of the anterior division, postero-lateral corners rounded, rostral projection short, deflexed, obtuse at the tip. Epimeral plates of the 3 succeeding segments only slightly produced at the posterior corners; those of last segment well defined, though less prominent than the preceding ones, and evenly rounded at the tip. Urosome short and flattened, with the genital segment broad and expanded in front, clypeiform; postero-lateral corners of this and the 2 succeeding segments conically produced. Caudal rami only slightly longer than they are broad, subquadrangular in form, and obliquely truncated at the tip, the innermost but one of the apical setæ much dilated in its proximal part. Eye large, placed near the frontal margin. Anterior antennæ rather slender, 8-articulate, 2nd joint much the largest. Posterior maxillipeds

with the basal part uniaarticulate, hand narrow oblong in form. First pair of legs very slender, with the first 2 joints of the outer ramus subequal in size, last joint very small and armed with 5 claws gradually increasing in length inwards; inner ramus much shorter than the outer, all 3 joints setiferous. Last pair of legs with the proximal joint very short, distal joint oblong, flattened, with 3 strong spines at the tip, and 2 smaller ones on the outer edge, surface transversely rugulose.

Male differing but little from female in external appearance, though easily recognizable by the more strongly built and prehensile anterior antennæ. Urosome distinctly 5-articulate, 1st segment much the largest and provided on each side, at the postero-lateral corners, with a small appendage tipped with a strong spine.

Colour dark chocolate brown, anterior part of cephalic segment lighter.

Length of adult female 1.20 mm.

Remarks.—I think Prof. Brady is quite right in considering the *Sterope interrupta* of Goodsir to be the present species, and as the specific name *bopyroides*, proposed by Claus and accepted by most other authors, is of much later date, it ought to give place to that given to the species by Goodsir. The *Alteutha norvegica* of Boeck is the same species, as is also most certainly the *Peltidium conophorum* of Poppe. I have often met with specimens in which the middle of the 3 setæ issuing from the inner corners of the caudal rami has been broken off near the base, giving it exactly the appearance figured by Poppe from his solitary specimen.

Occurrence.—This is one of our commonest Copepoda, occurring rather abundantly along the whole south and west coast of Norway, at least up to the Trondhjem Fjord. It is generally found in depths varying from 2 to 20 fathoms among Laminariæ and other algæ, and is easily observable even to the naked eye, on account of its dark-coloured body. It is rather an active little creature, swimming about with considerable speed and a somewhat rolling motion, now and then affixing itself to the fronds of the algæ or the walls of the vessel in which it is observed. When disturbed, it rolls itself almost into a ball, and remains in this attitude quite immovable for some time.

Distribution.—British Isles (Brady), Heligoland (Claus), Baltic (Poppe), coast of France (Canu), Mediterranean (Canu).

39. *Alteutha depressa*, Baird.

(Pl. XXXVIII).

Alteutha depressa, Baird, Brit. Entomostraca, p. 216, Pl. XXX, figs. 1, 2.

- Syn: *Carillus oblongus*, Goodsir.
 „ *Peltidium purpureum*, White (not Philippi).
 „ *Alteutha purpurocineta*, Norman.
 „ *Peltidium depressum*, Brady.
 „ *Eupelte purpurocineta*, Canu.

Specific Characters.—*Female.* Body much depressed, seen dorsally, oblong oval in form, with the greatest width about the middle. Cephalic segment very large, considerably exceeding in length the 4 succeeding segments combined, postero-lateral corners acutangular, rostrum large and prominent, truncated at the tip. Epimeral plates of the first 3 free segments of metasome acutely produced behind, especially those of 3rd segment. Last segment with the epimeral plates evenly rounded and far less prominent. Urosome short and broad, of a structure similar to that in the preceding species. Caudal rami of exactly the same appearance as in that species, apical setæ, however, shorter, and none of them conspicuously thickened at the base. Eye placed rather far back. Anterior antennæ comparatively shorter and stouter than in *A. interrupta*, and distinctly 9-articulate. Posterior antennæ, mandibles, maxillæ and anterior maxillipeds of a structure very similar to that in the preceding species. Posterior maxillipeds, however, somewhat different, the basal part being distinctly biarticulate, and the hand shorter and broader, oval fusiform in shape. First pair of legs comparatively more robust, with the inner ramus almost as long as the outer, and without the seta inside the middle joint. Natatory legs resembling those in *A. interrupta*, except that in the inner ramus of 4th pair some of the setæ are spiniform. Last pair of legs very large and robust, falciform, proximal joint rather large, distal one conically tapered, and armed at the tip with 3 very coarse spines.

Body of a yellowish olive colour, with a dark purplish blue transverse band across the middle, occupying the whole of the first 3 free segments of metasome.

Length of adult female 1.30 mm.

Remarks.—Although the figures and description of this form given by Baird are rather poor, I must agree with Prof. Brady in thinking that they in all probability refer to the present species. It is also, as opined by the same author, very likely that the *Carillus oblongus* of Goodsir is the same species. Mr. Norman, who considered the species as new, described it under the name of *Alteutha purpurocineta*, a name which has been accepted by several other authors.

The species has been referred by Canu and also by Th. Scott to the genus *Eupelte* of Claus; but in this view I cannot by any means agree, since Claus expressly states that in this genus the inner ramus of the 1st pair of legs consists of only 2 joints. It is true that the present species differs somewhat from *A. interrupta* in the structure of the anterior antennæ and posterior maxillipeds; but in all other respects it exhibits so great a resemblance to that species, that it can hardly be separated generically.

Occurrence.—This form is not nearly so common as *A. interrupta*. I have, however, taken it occasionally in several places off the west coast of Norway, as also in the Trondhjem Fjord. It occurs in depths varying from 6 to 20 fathoms, on a sandy or gravelly bottom.

Distribution.—British Isles (Brady), coast of France (Canu).

Gen. 17. *Peltidium*, Philippi, 1839.

Syn: *Omscidium*, Claus.

„ *Reticulina*, Cleve.

Generic Characters.—Body short, flattened, strengthened with very conspicuous anastomosing chitinous stripes. Cephalic segment very large and expanded, lateral parts not inflexed ventrally; rostrum more or less prominent. Epimeral plates of all the segments of metasome, including those of the last, lamellarly produced, tongue-shaped, recurved. Urosome very short, with the genital segment expanded on each side like those of metasome; distal part very small and soft-skinned. Caudal rami narrow, with one of the apical setæ considerably elongated. Eye apparently consisting of 3 separate parts, one median and 2 lateral. Anterior antennæ comparatively short, 6—8-articulate. Posterior antennæ of about the same structure as in *Alteutha*. Mandibular palp uniramous. Maxillæ with the palp imperfectly developed, wanting the exopodal appendage. Anterior maxillipeds with the outermost of the lateral lappets very slender, terminal joint likewise exceedingly elongated and narrow, produced at the tip to a short digitiform process. Posterior maxillipeds with the basal part unarticulate; hand very large. First pair of legs with the outer ramus resembling that in *Alteutha*, inner comparatively broad, lamellar, biarticulate. Natatory legs slender, of normal structure. Last pair of legs wholly obstructed by the epimeral parts of the body, biarticulate, falciformly curved, distal joint armed at the tip and outer edge with strong spines.

Remarks.—This genus was established as early as the year 1839 by Philippi, to include the species described below. The genus *Oniscidium* of Claus is unquestionably identical with Philippi's genus, as is also the genus *Reticulina*, recently established by Prof. Cleve. The genus is especially characterised by the very conspicuous net-work of chitinous stripes strengthening the body, as also by the unusual development of the epimeral plates of the last segment of the metasome and the 1st of the urosome. Of the several appendages, the anterior maxillipeds and the 1st and last pair of legs in particular are of a characteristic structure. In addition to the typical species, 5 new species have recently been recorded by Mr. A. Scott from Ceylon. The form described by Prof. Cleve as *Reticulina aurivilli* from the Malay Archipelago is in all probability identical with one of these species.

40. *Peltidium purpureum*, Philippi.

(Pl. XXXIX & XL).

Peltidium purpureum, Philippi, Wiegmann's Archiv f. Naturgeschichte 1839, p. 131, Pl. IV, figs. 12, 13.

Syn: *Oniscidium armatum*, Claus.

Specific Characters.—*Femule*. Body, seen dorsally, oval quadrangular in outline, greatest width in front of the middle and exceeding half the length. Cephalic segment very large, occupying nearly half the body, postero-lateral corners acutely produced, frontal margin angular on each side, rostrum large and prominent, transversely truncated at the tip. Free segments of metasome each produced dorsally in the middle to a triangular, posteriorly-pointing projection; genital segment with 2 similar dorsal projections. Epimeral plates all of uniform appearance, tongue-shaped and curving posteriorly; those of genital segment extending beyond the extremity of the urosome, and having a much smaller acute lappet behind. Caudal rami far apart, sublinear in form, the innermost but one of the apical setæ much coarser than the others, and exceeding the urosome in length. Anterior antennæ not attaining half the length of the cephalic segment, 7-articulate and densely setiferous. 1st pair of legs with the 2nd joint of the outer ramus somewhat longer than the 1st, last joint small and armed with 3 strong claws and a curved seta; inner ramus of about the same length as the outer, distal joint fully as long as the proximal one and provided at the tip with 2 equal-sized setæ, and at the inner edge with a much coarser ciliated spine. Last pair of legs with the distal joint evenly curved, and armed with 6 strong ciliated spines, 3 of which issue from the outer edge.

Male somewhat smaller than female, but otherwise of a very similar external appearance. Anterior antennæ, as usual, prehensile. Appendicular lappet of genital segment replaced by a small trisetose piece.

Body in both sexes tinged all over with a rich carmine.

Length of adult female 1.05 mm.

Remarks.—This is an easily recognizable form, being distinguished from all our other Copepoda both by its general appearance and the beautiful colour of the body. The *Oniscidium armatum* of Claus seems to be identical with the present species.

Occurrence.—I have met with this form in several places on the west coast of Norway, as also in the Trondhjem Fjord, in depths varying from 6 to 20 fathoms, sandy bottom. It is at once observable, even with the naked eye, owing to its unusual colour.

Distribution.—Scottish coast (Scott), Mediterranean (Philippi).

Fam. 7. Tegastidæ.

Characters.—Body short and compact, highly compressed, with very hard integuments. Cephalic segment large, in some cases with a chitinous stripe across the back, indicating the posterior limit of the head; lateral parts very deep and terminating behind in a triangular promontory; rostrum short, deflexed, not defined at the base. Epimeral parts of the 3 succeeding segments rudimentary. Last segment of metasome more or less completely coalesced with the genital segment, which more generally forms a large and highly chitinized dilatation below, armed with variously formed projections. Distal part of urosome, as a rule, very small and thin-skinned. Caudal rami short, with the normal number of setæ. Eye well-developed, trilobate. Anterior antennæ slender, 6—8-articulate, and but sparsely setiferous; those in male transformed in the usual manner. Posterior antennæ 3-articulate, with a very small outer ramus; terminal joint wanting the usual geniculate setæ. Oral parts, except the posterior maxillipeds very small; the latter well developed, terminating in a strongly clawed hand. First pair of legs imperfectly prehensile, both rami short, uniaarticulate. Natatory legs with the rami extremely slender, the inner one being the longer. Last pair of legs of different shape in the two sexes, proximal joint in female greatly expanded, in male simple.

Remarks.—The forms belonging to this family exhibit several apparently very anomalous characters, especially as regards the general form of the body, the structure of the 1st pair of legs, and the composition of the genital apparatus. Yet in the structure of the greater number of the appendages, they seem to come nearest to the *Peltidiidae*, in spite of the very dissimilar external appearance of the body. Two nearly-related genera of this family are represented in the Norwegian fauna; and I regard the form recorded by Claus under the name of *Amy-mone harpactoides* as the type of a 3rd genus.

Gen. 18. **Tegastes**, Norman, 1903.

Syn: *Amy-mone*, Claus (not Müller).

Generic Characters. Body, seen laterally, almost circular in outline, with the back much curved, and the genital segment greatly produced below. Outer segments of urosome generally very short and retractile. Anterior antennæ 8-articulate, with the first 2 joints considerably larger than the others. Posterior antennæ rather slender, with the terminal joint not dilated distally, one of the apical spines very strong and prolonged; outer ramus biarticulate, with the last joint extremely minute. Mandibular palp uniramous, biarticulate. Maxillæ with the palp elongated, biarticulate, exopodal and epipodal appendages wanting. Anterior maxillipeds with the outermost lateral lobe considerably dilated at the end and carrying 3 thickish setæ, terminal joint scarcely produced at the tip. Posterior maxillipeds with the basal part uniarticulate, hand of different form in the different species. First pair of legs with the rami scarcely longer than the 2nd basal joint, the outer one considerably narrower than the inner. Natatory legs with both rami distinctly 3-articulate. Last pair of legs of moderate size, inner expansion of proximal joint in female triangular, distal joint very narrow and not extending beyond the proximal, with 2 slender setæ at the tip. No true ovisac present in female, only a single ovum being received between the lamellæ of the last pair of legs. The ovoid spermatophore in male contained in a large cornet-shaped reservoir issuing from the genital segment in front, and terminating in a two-lipped, beak-like extremity.

Remarks.—This genus was established in the year 1863 by Claus, to include some very peculiar Copepoda, some of which he found off Heligoland, and others in the Mediterranean. As however the generic name *Amy-mone* proposed by him

had been used by O. Fr. Müller in quite a different sense, viz., to designate some common larval forms (Nauplii), it cannot properly be accepted, and the Canon Norman has therefore recently proposed to substitute for this name that of *Tegastes*, the type being considered by him to be *T. satyrus* of Claus, which species certainly belongs to the present genus in the restriction here adopted. No less than 5 different species referable to this genus have been observed by the present author off the Norwegian coast.

41. *Tegastes falcatus* (Norman).

(Pl. XLI).

Amymone falcata, Norman, Brit. Assoc. Report, 1868, p. 296.

Syn: *Amymone sphaerica*, Brady (not Claus).

" — *rubra*, Boeck (1872).

Specific Characters.—*Female.* Cephalic segment very deep, with the postero-lateral corners greatly produced, acuminate; no chitinous stripe across the back. Genital segment produced below into 2 strong, posteriorly-curving hook-like projections. Distal part of urosome only very slightly projecting. The innermost but one of the caudal setæ peculiarly transformed, lancet-shaped. Posterior maxillipeds rather powerful, with the hand oblong oval in form, and densely ciliated along the palmar edge. Last pair of legs with the distal joint extending to the tip of the inner expansion of the proximal one, the latter with 3 short setæ along the curved anterior edge, and 2 unequal ones at the tip.

Male a little smaller than female, and easily recognizable by the prehensile character of the anterior antennæ, and by the large, acutely-beaked spermatophore-reservoir. None of the caudal setæ transformed. Last pair of legs very narrow, with the proximal joint small and simple.

Body of a golden yellow colour, variegated with a dark reddish brown pigment, especially along the ventral face and the posterior edges of the segments.

Length of adult female 0.46 mm.

Remarks.—This form was first briefly described by Norman from the Shetland Isles as *Amymone falcata*. It was subsequently erroneously identified by Prof. Brady with *A. sphaerica* of Claus, which is a very different species, and does not even belong to the same genus. The form recorded by Boeck as *A. rubra* is identical with Norman's species. It is the largest of the Norwegian species, and is moreover easily recognizable by the dark red colour of the body, and by the 2 very hooked projections of the genital segment.

Occurrence.—I have found this form not unfrequently in several places off the west coast of Norway, as also in the Trondhjem Fjord; and Mr. Scott also records it from Finnmark (as *A. sparica*). It generally occurs in depths varying from 3 to 20 fathoms, on a sandy bottom, and is easily observable, even with the naked eye, owing to its dark red colour and peculiar tremulous movements.

Distribution.—British Isles (Brady), Shetland Isles (Norman), Arctic Ocean: off Franz Josef's Land and Novaja Zemlia (Scott), Ceylon (A. Scott).

42. *Tegastes flavidus*, G. O. Sars, n. sp.

(Pl. LXII, fig. 1).

Specific Characters.—*Female.* Cephalic segment about as in the preceding species, with no trace of a chitinous stripe across the back. Genital segment with 2 projections below, the anterior one obtuse at the tip and not recurved, the posterior one broadly claw-shaped. Distal part of urosome much more prominent than in any of the other species; caudal setæ normal. Posterior maxillipeds somewhat less strong than in the preceding species, with the hand narrow oblong in form. Last pair of legs with the distal joint not extending to the tip of the inner expansion of the proximal one, the latter only provided with 2 setæ in front. Spermatophore-reservoir in *male* bluntly beaked at the tip.

Colour light yellowish gray.

Length of adult female 0.40 mm.

Remarks.—Though nearly allied to *T. fulvatus*, this form may be easily distinguished by the blunt anterior projection of the genital segment, the feebler posterior maxillipeds, and the unusually prominent distal part of the urosome. The last pair of legs and the male spermatophore-reservoir are moreover somewhat different in form. Finally, the colour of the body is rather different in the two species.

Occurrence.—I have only met with this form in 2 localities of the west coast of Norway, viz., at Kalvaag and Eggesbönæs. In both places it occurred rather sparsely at a depth of about 3 fathoms, muddy sand.

43. *Tegastes longimanus* (Claus).

(Pl. XLII, fig. 2).

? *Amymon longimana*, Claus, Die freilebenden Copepoden, p. 115, Pl. XX, figs. 13, 14.

Specific Characters.—*Female.* Cephalic segment with a distinct chitinous stripe across the back indicating the posterior limit of the head, postero-lateral

corners less acutely produced than in the 2 preceding species. Ventral protuberance of genital segment narrowly produced, with the tip slightly bilobed and the posterior edge projecting in a blunt tooth. Distal part of urosome only slightly projecting, caudal setæ normal. Posterior maxillipeds rather strong, with the hand oval triangular in form, palmar edge angularly curved above the middle. Last pair of legs resembling those in *T. flavidus*: inner expansion of proximal joint, however, with 3 setæ along the anterior edge.

Body of a pale yellow colour, and minutely speckled with reddish brown. Length of adult female 0.33 mm.

Remarks.—It is with considerable hesitation that I refer this form to Claus's species. Both the description of this species and the 2 figures given by that author are rather poor, and scarcely suffice for an exact determination; yet the form of the posterior maxillipeds, as represented by Claus in fig. 14, exhibit at any rate some resemblance to that in the present species. The characteristic form of the ventral protuberance of the genital segment at once distinguishes this species from any of the others here described; but unfortunately this part has been wholly omitted in Claus's figure of the animal (fig. 13).

Occurrence.—Some few specimens of this form were taken, together with *T. flavidus*, at Eggesbönæs, west coast of Norway.

Distribution.—Heligoland (Claus), British Isles (Brady).

44. *Tegastes grandimanus*, G. O. Sars, n. sp.

(Pl. XLII, fig. 3).

Specific Characters.—*Female.* Cephalic segment, as in *T. longimanus*, provided with a distinct chitinous stripe across the back, postero-lateral corners obtusely acuminate. Ventral protuberance of genital segment terminating in 2 unequal projections, the anterior obtuse, the posterior tooth-like and extending behind. Distal part of urosome scarcely projecting. Posterior maxillipeds exceedingly powerfully developed, hand very broad, with the palmar edge much curved in the middle, and deeply concave below, dactylus strong and curved. Last pair of legs with the distal joint rather short, extending little beyond the middle of the inner expansion of the proximal one.

Colour not yet stated.

Length of adult female 0.42 mm.

Remarks.—This form seems to be most nearly related to *T. longimanus* Claus, but is of considerably larger size, and has the posterior maxillipeds much

more powerfully developed. In the form of the ventral protuberance of the genital segment, it somewhat resembles *T. flavidus*; but the anterior projection is more obtuse, and the posterior scarcely unguiform at all.

Occurrence.—Only a single female specimen of this form has hitherto come under my notice. It was taken in the same place in which *T. longimanus* occurred.

45. *Tegastes nanus*, G. O. Sars, n. sp.

(Pl. XLII, fig. 4).

Specific Characters.—*Female*. Cephalic segment, as in the 2 preceding species, with a distinct chitinous stripe across the back, postero-lateral corners much produced, acuminate. Ventral protuberance of genital segment terminating in 2 blunt projections, the posterior one recurved. Distal part of urosome only slightly prominent. Posterior maxillipeds of moderate size, hand narrow oblong in form, with the palm not defined. Last pair of legs resembling in structure those in *T. grandimanus*. Spermatophore-reservoir of *male* rather thick, with the beak short, recurved.

Colour yellow, variegated with chestnut-brown.

Length of adult female 0.31 mm.

Remarks.—This is the smallest of the Norwegian species, and moreover easily recognizable, when alive, by the light brown colour of the body.

Occurrence.—In addition to the 2 above-mentioned localities of the west coast of Norway, I have found this form occasionally at Aalesund and Christiansund in moderate depths.

Gen. 19. *Parategastes*, G. O. Sars, n.

Syn: *Amygone*, Claus (part).

Generic Characters.—General form of body resembling that in *Tegastes*, the genital segment being expanded below in a similar manner, and the distal part of the urosome much shortened. Anterior antennæ composed of only 6 or 7 articulations. Posterior antennæ with the outer ramus unarticulate. Anterior maxillipeds with the 2 proximal lateral lobes replaced by simple setæ, outermost lobe less broad than in *Tegastes*, and provided with only 2 setæ at the tip, ter-

minimal joint produced at the tip to a long digitiform process. 2nd and 3rd pairs of legs with the outer ramus very short, biarticulate. Last pair of legs in female very large, with the inner expansion of the proximal joint broad and vaulted, distal joint somewhat dilated towards the end, with a single short apical seta. No true ovisac present in female. Male spermatophore-reservoir very prominent.

Remarks.—The type of this new genus is *Amymone spherica* of Claus, which, though resembling the species of *Tegastes*, as regards external appearance, exhibits some well-marked differences in anatomical details, which entitle it to be separated generically. The 4 new species of *Tegastes* recently described by Mr. A. Scott from Ceylon, also seem, according to the structure of the anterior antennæ and the natatory legs, to be more properly referable to the present genus.

46. *Parategastes sphaericus* (Claus).

(Pl. XLIII).

Amymone spherica, Claus, Die freilebenden Copepoden, p. 114, Pl. XX, figs. 1—9.

Syn: *Amymone nigrans*, Scott.

Specific Characters.—*Female.* Cephalic segment with a well-marked chitinous stripe across the back, postero-lateral corners moderately produced, obtusely acuminate, rostrum slightly prominent at the tip. Genital segment produced below to a rather massive, nearly quadrangular prominence, with the anterior corner somewhat exerted and tongue-shaped, the posterior unguiform and recurved, and exhibiting in the middle, between the two, a smaller recurved dentiform projection on each side. Distal part of urosome only slightly prominent. Anterior antennæ rather slender, 7-articulate. Posterior antennæ with the outer ramus extremely small, bisetose. Posterior maxillipeds of moderate size, hand oblong fusiform in shape. 4th pair of legs with the inner ramus extremely slender, terminal joint linear, without any lateral setæ, apex armed with 2 unequal spines. Last pair of legs with the distal joint extending somewhat beyond the tip of the inner expansion of the proximal joint, the outermost of the lateral setæ much elongated.

Male resembling the female in external appearance, but having the postero-lateral corners of the cephalic segment transversely truncated at the tip. Anterior antennæ, as usual, prehensile, with the 4th joint rather large, the last claw-shaped. Last pair of legs very narrow, with the proximal joint not expanded, distal joint linear, with 2 slender setæ at the extremity. Spermatophore-reservoir very large, terminating in 2 acute lappets.

Body of a dark cinereous colour, variegated with a sooty brown, or almost black pigment.

Length of adult female 0.35 mm.

Remarks.—There cannot in my opinion be any doubt that this is the true *Amymone sphaerica* of Claus, and the form recorded by Boeck under this name is also unquestionably the same species. Mr. Scott, who on the authority of Prof. Brady believed the *Amymone falcata* of Norman to be the Clausian species, described the present form as a new species under the name of *A. nigrans*. It is easily recognized from any of the species of *Tegastes* by the form and armature of the ventral prominence of the genital segment, as also by the very dark colour of the body.

Occurrence.—This form is rather common in the upper part of the Christiania Fjord, near the shore among algæ, and also occurs occasionally off the west coast of Norway. In spite of its small size, it is easily observable on account of the very dark colour of the body, the animals, when alive, looking like rapidly moving, black granules.

Distribution.—Scottish coast (Scott), Heligoland (Claus), coast of France (Canu), Mediterranean (Claus), Ceylon (A. Scott).

Fam. 8. Porcellidiidæ.

Characters.—Body much depressed, shield-like, with some of the segments imperfectly defined, and with the urosome short and flattened, biarticulate. Anterior antennæ short, and composed only of a limited number of articulations. Posterior antennæ 3-articulate, with a well-developed outer ramus. Oral parts on the whole of rather peculiar structure, mandibular palp very largely developed; posterior maxillipeds imperfectly subcheliform. First pair of legs with both rami flattened and very dissimilar, the inner one distinctly prehensile. Natatory legs normal. Last pair of legs very different in the two sexes. Sexual difference on the whole very much pronounced. A single flattened ovisac present in female.

Remarks.—This family is as yet only represented by a single genus, viz., *Porcellidium* Claus, which in several respects deviates considerably from the typical Harpacticoida. In the short depressed form of the body, it somewhat recalls the

Peltidiidae, to which family it was indeed referred by Claus; but the structure of the several appendages is very different, and more approaches that in the following family, the *Idyidae*.

Gen. 20. **Porcellidium**, Claus, 1860.

Syn: *Thyone*, Philippi (not Oken).

Generic Characters.—Body short and flattened, with the cephalic segment very large and expanded; rostrum broad, lamellar, not defined at the base. Epimeral plates of the first 2 free segments of metasome tongue-shaped, those of 3rd segment in female rudimentary, in male well developed. Last segment in both sexes without any trace of epimeral plates, and in female imperfectly defined behind. Urosome short and flattened, in both sexes composed of only 2 segments, the anterior one large and lamellar, the posterior small, subquadrate. Caudal rami more or less lamelliform, with very short apical setæ. Eye present, of usual structure. Anterior antennæ short, 6-articulate, in male strongly prehensile. Posterior antennæ with the outer ramus uniaarticulate. Mandibles very strong, with the palp excessively large, lamellar, indistinctly 3-lobed, and provided outside with numerous thick plumose setæ. Maxillæ with the palp normally developed. Anterior maxillipeds comparatively short and stout, with 2 unequal setiferous lobes inside, terminal joint rather broad, incurved, with several strong spiniform setæ on the tip. Posterior maxillipeds rather small, 3-articulate, 1st joint provided in front with an oval ciliated lamella, 2nd joint tapered distally, with a short deflexed lobe inside, last joint very small, with 2 short incurved claws at the tip. First pair of legs with the outer ramus 3-articulate and very delicate, being edged outside with soft plumose setæ, inner ramus biarticulate, 1st joint large and triangular in form, last small and armed with 2 subequal claws, densely fimbriate on one side. Natatory legs with both rami 3-articulate, inner ramus in 1st pair much larger than in the 2 succeeding pairs. Last pair of legs in female distinctly biarticulate, distal joint large, lanceolate; those in male much smaller, uniaarticulate, sub-quadrate, terminal edge aculeate.

Remarks.—This genus was established as early as the year 1839 by Philippi, to include a Mediterranean species, *T. viridis*; but as the name *Thyone* proposed by him had been previously appropriated by Oken for a genus of Holothuroidea, it was changed by Claus to *Porcellidium*. The latter author records 3

species of this genus from the Mediterranean, one of which may be the *Thyone viridis* of Philippi, and Mr. A. Scott has recently added 3 new species from Ceylon. To the Norwegian fauna belongs only a single species, to be described below.

47. *Porcellidium fimbriatum*, Claus.

(Pl. XLIV & XLV).

Porcellidium fimbriatum, Claus, Die freilebenden Copepoden, p. 140, Pl. XXII, fig. 1.

Syn: *Porcellidium fasciatum*, Boeck.
 " — *viride*, Brady (male).
 " — *subrotundum*, Norman (young).

Specific Characters.—*Female.* Body oval quadrangular in outline, width somewhat exceeding $\frac{2}{3}$ of the length. Cephalic segment very broad and flattened, obtusely truncated in front, with the lateral corners rounded; rostrum slightly prominent, broad, lamellar, truncated at the tip. Epimeral plates of the 2 succeeding segments large and closely contiguous, being, like the cephalic segment, surrounded by a narrow hyaline rim; those of 4th segment very small and easily overlooked. Last segment imperfectly defined. Urosome almost semicircular in outline, genital segment expanded on each side to a thin lamella finely ciliated at the edge and encompassing laterally the small quadrate terminal segment together with the caudal rami. The latter spatulate in form, about twice as long as broad, and slightly widening distally, tip transversely truncated and provided with 5 very small setæ, one of which issues from the inner corner, the others nearer to the outer one; moreover 2 similar setæ issue from the dorsal face of each ramus. Anterior antennæ scarcely extending beyond the antero-lateral corners of the cephalic segment, angularly bent at the base, and consisting of 6 articulations rapidly diminishing in size distally. Posterior antennæ with the 1st joint much larger than the others, outer ramus about the length of the middle joint, and carrying 6 plumose setæ. First pair of legs with the outer ramus gradually tapering distally, 1st joint much larger than the others, setæ of outer edge bulbously dilated at the base, terminal joint with 4 such setæ, and moreover with a slender apical spine and a strong plumose seta inside. Last pair of legs with the distal joint very large, lanceolate, extending between the epimera of the 2nd free segment of metasome and the lateral expansions of the genital segment, so as to look like a pair of epimeral plates.¹⁾ Ovisac almost wholly covered by the urosome.

¹⁾ They have also been regarded as such by Prof. Brady, who erroneously describes the lateral expansion of the genital segment as the last pair of legs.

Male considerably smaller than female and of a rather different external appearance. Cephalic segment transversely truncated in front, with the lateral corners sub-angular; rostrum almost obsolete. 3rd free segment of metasome with well-developed epimeral plates of the same appearance as those of the 2 preceding segments. Genital segment but slightly expanded, and not encompassing laterally the distal part of the urosome. Caudal rami much shorter than in female, being considerably broader than they are long. Anterior antennæ very strongly built and angularly bent at the base, 4-articulate, 3rd joint considerably dilated, last joint unguiform and very mobile. Last pair of legs spatulate, intercalated between the epimeral plates of the 3rd free segment of metasome and the urosome, tip obliquely truncated and armed with a row of 6 short spines.

Body in both sexes of a clear yellowish green colour, and generally provided dorsally with a dark violet transverse band across the posterior part of the cephalic segment, urosome in female tinged at the base with a similar colour.

Length of adult female 0.90 mm., of male 0.60 mm.

Remarks.—The remarkable sexual difference occurring in this form has led Prof. Brady, and perhaps also Claus, to describe the two sexes as 2 different species. There cannot, in my opinion, be any doubt that the form recorded by Prof. Brady as *P. viride*, and regarded as identical with *P. dentatum* of Claus, is nothing but the male of the present species. True, a figure is also given of the supposed female of *P. viride*; but the specimen drawn is certainly not adult, and appears to be a young male, in which the anterior antennæ have not yet been fully transformed. Nor can I doubt that the *P. subrotundum* of Norman is founded upon immature specimens of the present species (compare the figure of such a specimen given on the accompanying plate). The *Porcellidium fasciatum* of Bocck is not, as opined by Prof. Brady, identical with *Aspidiscus fasciatus* Norman, but is most certainly the present species. Whether Philippi's species is the male of this species or a distinct form, it is very difficult to decide. The female of the present species, at any rate, is easily recognizable by the greatly expanded genital segment and by the characteristic form of the caudal rami.

Occurrence.—I have met with this form rather frequently in several places on the west coast of Norway, as also in the Trondhjem Fjord. It lives, as a rule, on the fronds of *Laminariæ*, to which it applies its flattened body so closely, that it is only with great difficulty that it can be loosened from its hold, when alive. On employing its natatory legs, the animal runs about rather quickly along the fronds or other smooth objects, with an even, gliding motion.

Distribution.—British Isles (Brady), Mediterranean (Claus), Ceylon (A. Scott).

Fam. 9. Idyidæ.

Characters.—Body more or less depressed, with the posterior division becoming abruptly much narrower than the anterior, both with the normal number of segments. Eye distinct or wanting. Anterior antennæ more or less slender, 8- or 9-articulate, distinctly prehensile in male. Posterior antennæ 3-articulate, with the outer ramus well developed. Oral parts differing somewhat in structure in the different genera. First pair of legs, as a rule, with both rami 3-articulate, but of rather different structure, the inner one generally the longer and always prehensile. Natatory legs normal. Last pair of legs more or less extended laterally, proximal joint but slightly expanded, distal joint more or less elongated. A single ovisac present in female.

Remarks.—The forms belonging to this family are chiefly characterised by the sharp demarcation between the anterior and posterior divisions of the body, the former being more or less expanded and depressed, the latter abruptly much narrower. In the structure of the several appendages, some approach may be found, partly to that in the *Porcellidiidæ*, partly to that in the *Thalestridæ*. The shape of the last pair of legs is, however, rather different from that in either of those 2 families, and agrees more with that found in the *Peltidiidæ*. We know as yet of 6 different genera belonging to this family, all of which are represented in the fauna of Norway.

Gen. 21. *Aspidiscus*, Norman, 1868.

Syn: *Scutellidium*, Brady (not Claus).

Generic Characters.—Anterior division of body much expanded and depressed, clypeiform, with the dorsal face slightly vaulted and very smooth. Cephalic segment large and evenly curved in front, and, like the epimeral plates, bordered by a narrow hyaline rim; rostrum lamellar, distinctly defined at the base. Epimeral plates of the first 3 free segments of metasome well developed, imbricate, recurved; 3rd segment fornicate behind, arching over the very small last segment, as also over the anterior part of the urosome. The latter abruptly much narrower than the anterior division and gradually tapering distally, genital segment scarcely expanded. Caudal rami very small, but with the apical setæ much elongated and extending straight backwards. Eye distinct, of usual

structure. Anterior antennæ of moderate length, not dilated in the middle, 9-articulate. Posterior antennæ with the apical setæ comparatively short, outer ramus fully as long as the inner and 3-articulate, with one of the apical setæ much elongated. Mandibular palp rather large and complex, produced in front to a digitiform, finely ciliated process. Maxillæ with the epipodal plate very large and tipped with 2 exceedingly strong plumose setæ. Maxillipeds comparatively small and simple in structure, the anterior ones without any lateral lobes, terminal joint small and tipped with 2 ciliated spines; the posterior ones with a single comparatively short claw at the tip. First pair of legs rather large and of a very delicate structure, with both rami flattened and somewhat resembling those in the genus *Porcellidium*; inner ramus, however, distinctly 3-articulate, with the 1st joint large and dilated in the middle, the outer 2 comparatively short, last joint carrying 2 digitiform claws densely fimbriate on one side. Natatory legs with both rami of nearly equal length, middle joint of inner ramus in 1st pair with 2 setæ inside, in the 2 succeeding pairs with only one. Last pair of legs differing somewhat in shape in the two sexes, those in female rather coarse, with the proximal joint elongated and scarcely at all expanded, distal joint more or less lamelliform.

Remarks.—This genus was established by Norman in the year 1868, to include a form found by him off the Shetland Isles and named *A. fasciatus*. The genus was not, however, accepted by Prof. Brady, who in his Monograph referred Norman's species to the genus *Scutellidium* Claus (= *Psamathe Philippi*), to which genus it certainly exhibits a close relationship. I think, however, that Norman's genus ought to be maintained, since 2 nearly-related species exist showing the very same characteristic differences from Claus's genus, which likewise comprises 2 or 3 closely-related species. The most characteristic feature of the present genus consists in the peculiar fornicate condition of the 3rd free segment of the metasome, a character not found in any other Copepoda with which I am acquainted. Moreover, on a closer comparison, several well-marked differences are found to exist in the structure of some of the appendages. The genus comprises, as above stated, 2 well defined species, to be described below.

48. *Aspidiscus littoralis*, G. O. Sars, n. sp.

(Pl. XLVI & XLVII).

Syn: *Scutellidium fasciatum*, Brady (not Norman).

Specific Characters.—*Female.* Anterior division of body very broad, scarcely narrowed behind. Cephalic segment large, occupying more than half

the length of the anterior division, edges evenly curved throughout, posterolateral corners acutely produced and applying closely against the 1st pair of epimeral plates; rostrum but slightly projecting, broad, lamellar, with the terminal edge evenly curved. Epimeral plates of the first 2 free segments of metasome much produced and closely imbricate; those of 2nd segment extending as far back as the tip of the succeeding pair. 3rd segment highly fornicate behind, wholly obtecting the last segment and the anterior half of the genital segment, posterior edge slightly arched and bordered with a broad hyaline rim. Urosome scarcely $\frac{1}{3}$ as long as the anterior division, and having the segments very sharply defined. Caudal rami extremely small, the innermost but one of the apical setæ almost 3 times as long as the urosome. Anterior antennæ scarcely more than half as long as the cephalic segment and rather narrow, terminal part slightly exceeding in length the 2 preceding articulations combined. Posterior antennæ with the spines outside the terminal joint coarsely denticulated on the one side. Last pair of legs rather elongated and curving evenly behind, proximal joint only very slightly widened towards the end, distal joint about the same length as the proximal one, and narrow oblong in form, with 4 delicate setæ at the end, outer face and edges densely hairy. Ovisac large, rounded oval, and somewhat flattened.

Male considerably smaller than female, and having the anterior division of the body less expanded, and oval in outline. Epimeral plates less produced, those of the 2nd free segment of metasome not extending to the tip of the succeeding pair. Urosome narrower and distinctly 5-articulate. Anterior antennæ more strongly developed than in female, and hinged between the 5th and 6th articulation. Last pair of legs considerably smaller than in female, with the proximal joint much shorter than the distal one.

Body in both sexes generally of a uniform golden yellow colour, occasionally exhibiting on the back 2 irregular patches of a dark red hue, the one occupying the centre of the cephalic segment, the other the dorsal part of the 3rd free segment of metasome.

Length of adult female about 1 mm., of male 0.70 mm.

Remarks.—This form has been described and figured by Prof. Brady in his well-known Monograph, as *Scutellidium fasciatum*, as it was believed to be identical both with the form recorded by Boeck as *Porcellidium fasciatum*, and with that described by Norman as *Aspidiscus fasciatus*. It has been stated above that Boeck's species is undoubtedly quite a different form, viz., *Porcellidium fimbriatum* Claus, and I also regard it as beyond doubt that Norman's rather full description of his *Aspidiscus fasciatus* does not refer to the present, but to the next species, for which reason it has been necessary to give a new specific name

to the species here under discussion. It may easily be distinguished from Norman's species by its more robust form, and especially by the great development of the 2nd pair of epimeral plates in the female. The colour of the body is moreover rather different in the two species.

Occurrence.—I have taken this form rather abundantly in some places on the west coast of Norway, for instance, at Haugesund, Kopervik and Bukken. It is a sub-littoral form, being found close to the shore on the fronds of *Laminaria digitata* at low-water mark. The animal, like the species of *Porecellidium*, has the power of applying its body very firmly to any objects, so that it can only be loosened with considerable difficulty when alive. After the collecting-vessels have been emptied therefore, the greater number of the specimens remain in the bottles, firmly attached to the sides. On shaking the bottles with some fresh water, however, the specimens very soon leave their hold and can be emptied out with the water. In this manner I was enabled, during my last excursion, to secure a great number of specimens.

Distribution.—British Isles (Brady).

49. *Aspidiscus fasciatus*, Norman.

(Pl. XLVIII).

Aspidiscus fasciatus, Norman, Last Report on Dredging among the Shetland Isles. Brit. Assoc. Report for 1868, p. 298.

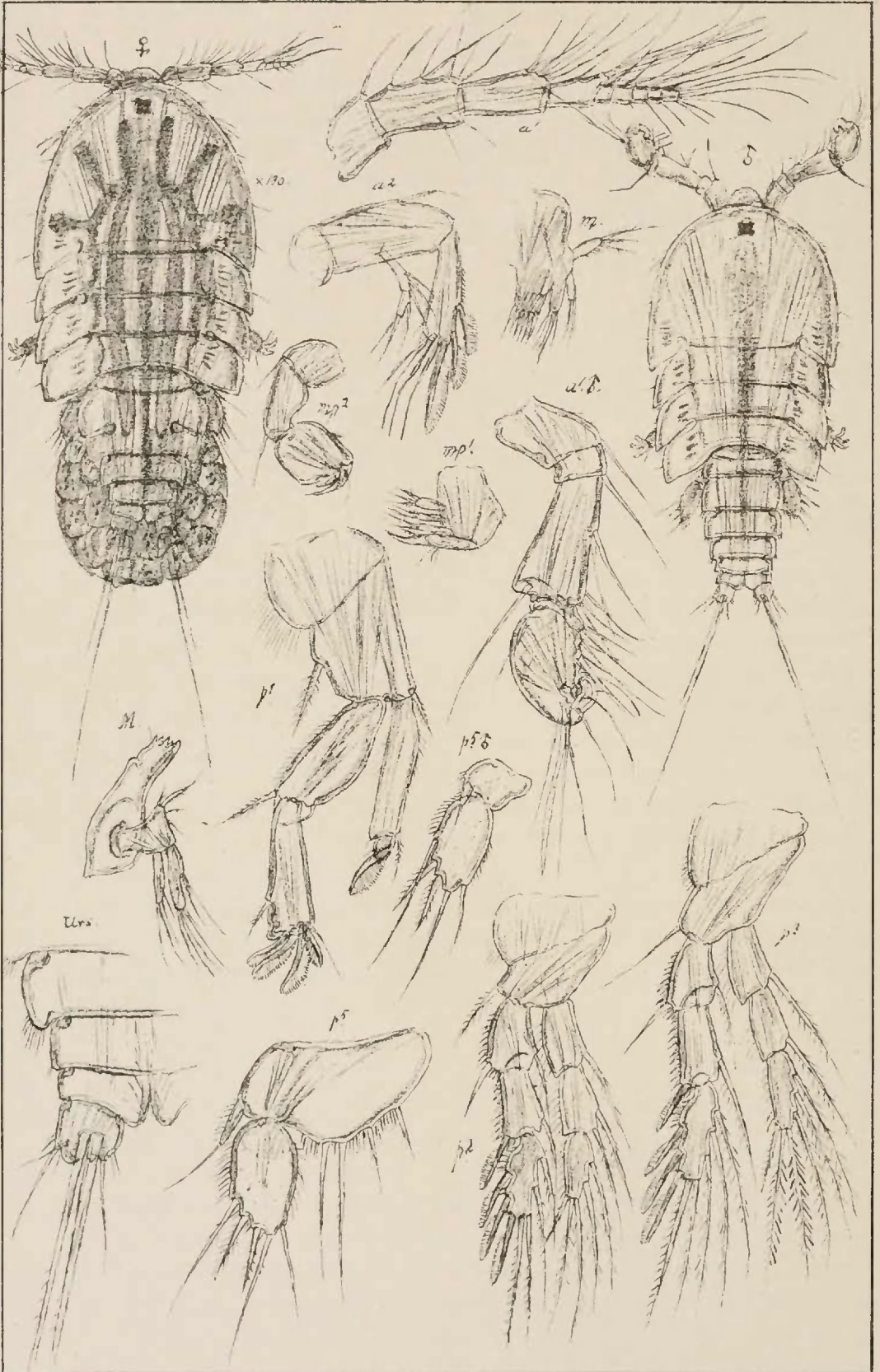
Specific Characters.—*Female.* Very like the preceding species in its general appearance, but of somewhat smaller size and less robust form of body. Anterior division broadly oval in outline, slightly narrowed both in front and behind. Rostrum somewhat more prominent than in *A. littoralis*, though exhibiting a very similar form. Epimeral plates of the first 3 free segments of metasome less produced behind, 2nd pair not extending nearly as far as the tip of the succeeding pair; posterior edge of 3rd segment straight, scarcely at all limbate. Last segment of metasome, as in the preceding species, wholly obtected by the fornicate hind part of the 3rd segment. Urosome with the segments somewhat less sharply defined than in *A. littoralis*. Caudal rami extremely small, but with the apical setæ excessively elongated, the innermost but one almost attaining the length of the whole body. Antennæ, oral parts and anterior pairs of legs of almost exactly the same structure as in *A. littoralis*. Last pair of legs, however, differing conspicuously in form; proximal joint less curved, and considerably dilated towards the end; distal joint shorter than the proximal one, and broadly oval or

Copepoda

Harpacticidæ.

Harpacticoida.

Pl. XXXIII.



G.O. Sars autogr.

Zaus spinatus, (Goodsir.)

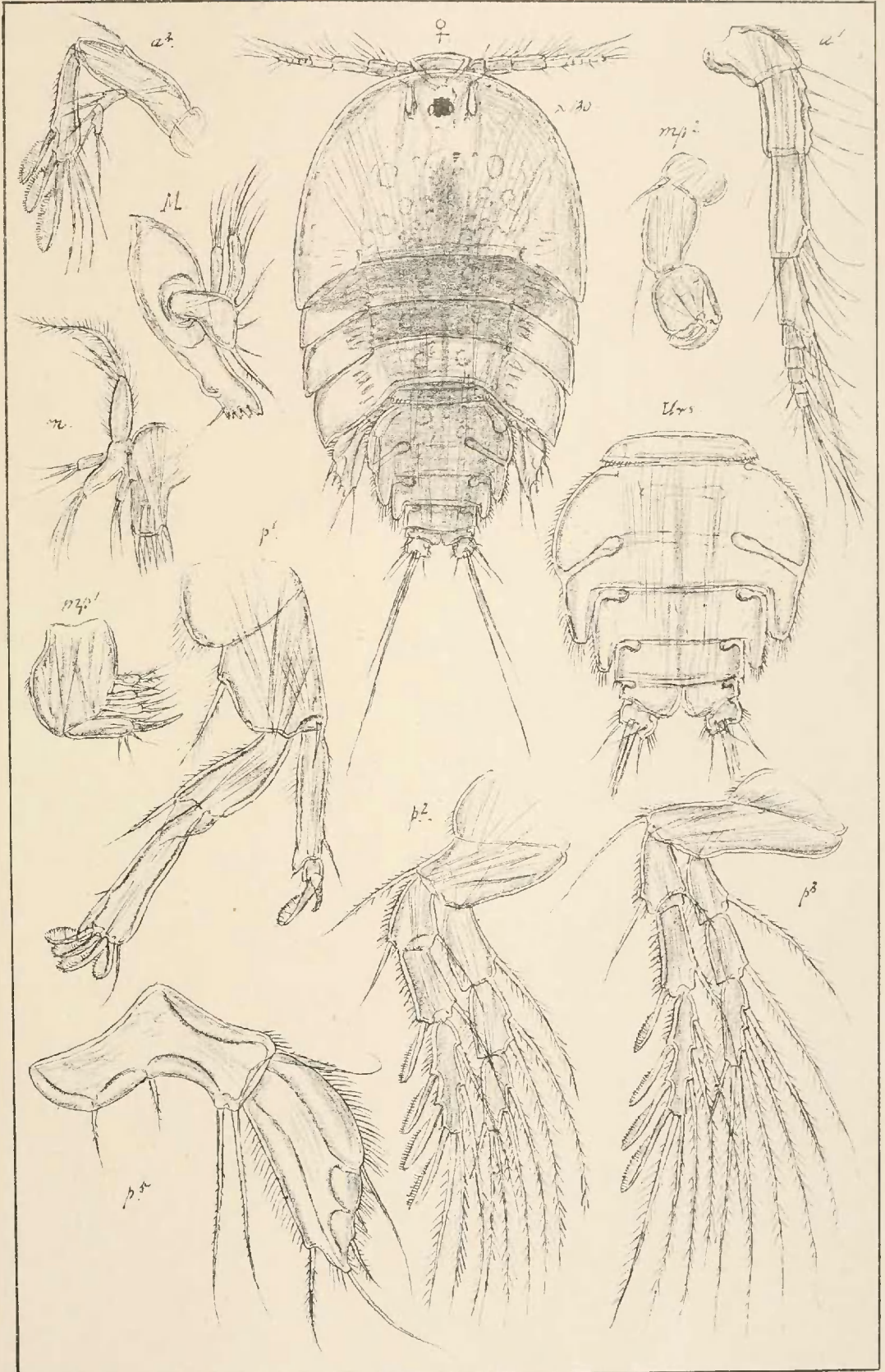
Norsk Lithgr. Officin.

Copepoda

Harpacticidæ.

Harpacticoida.

Pl. XXXIV.



G.O. Sars autogr.

Zaus abbreviatus, G.O. Sars.

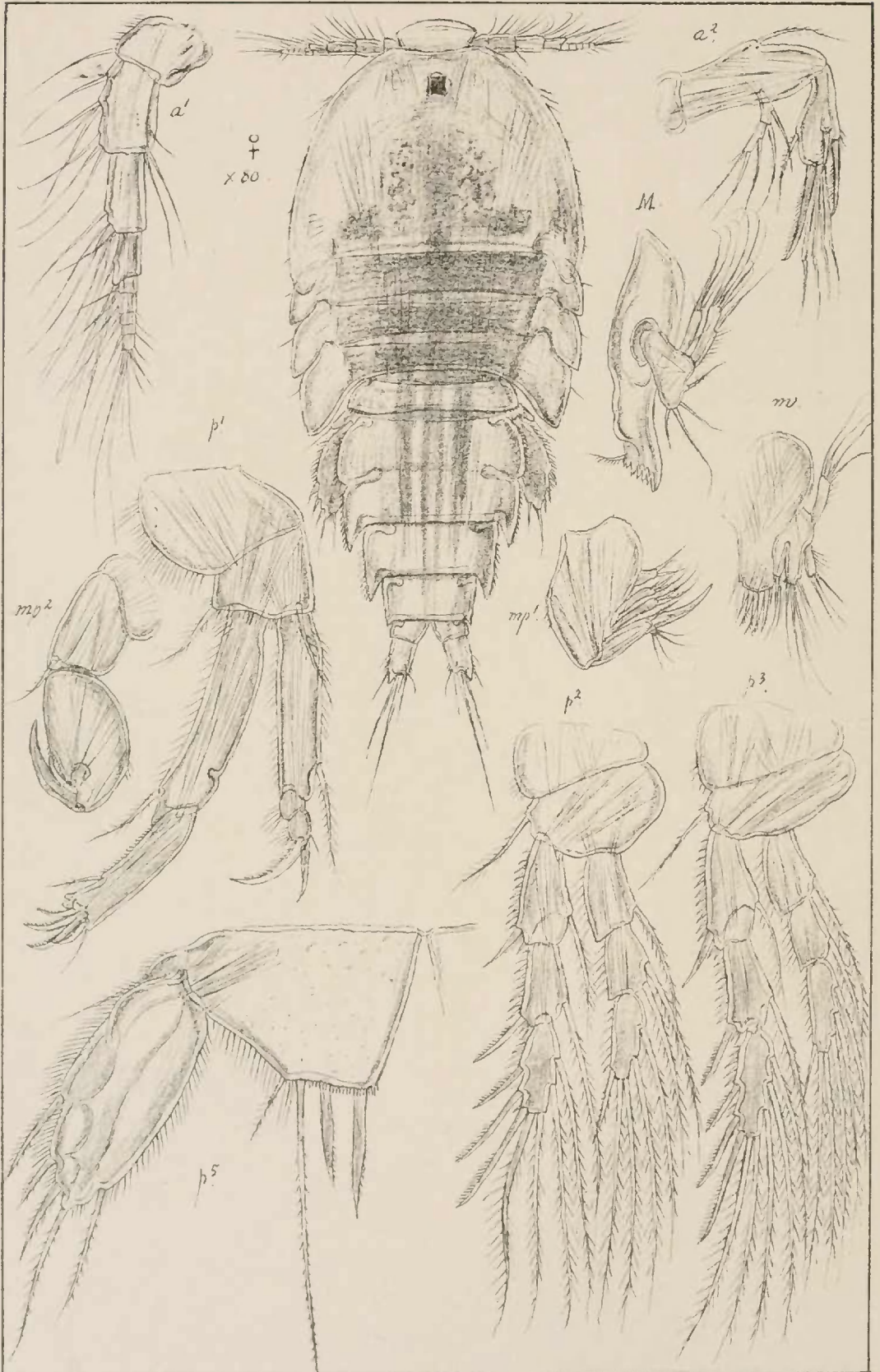
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Copepoda

Harpacticidæ.

Harpacticoida.

Pl. XXXV.



G.O. Sars autogr.

Zaus Goodsiri, Brady

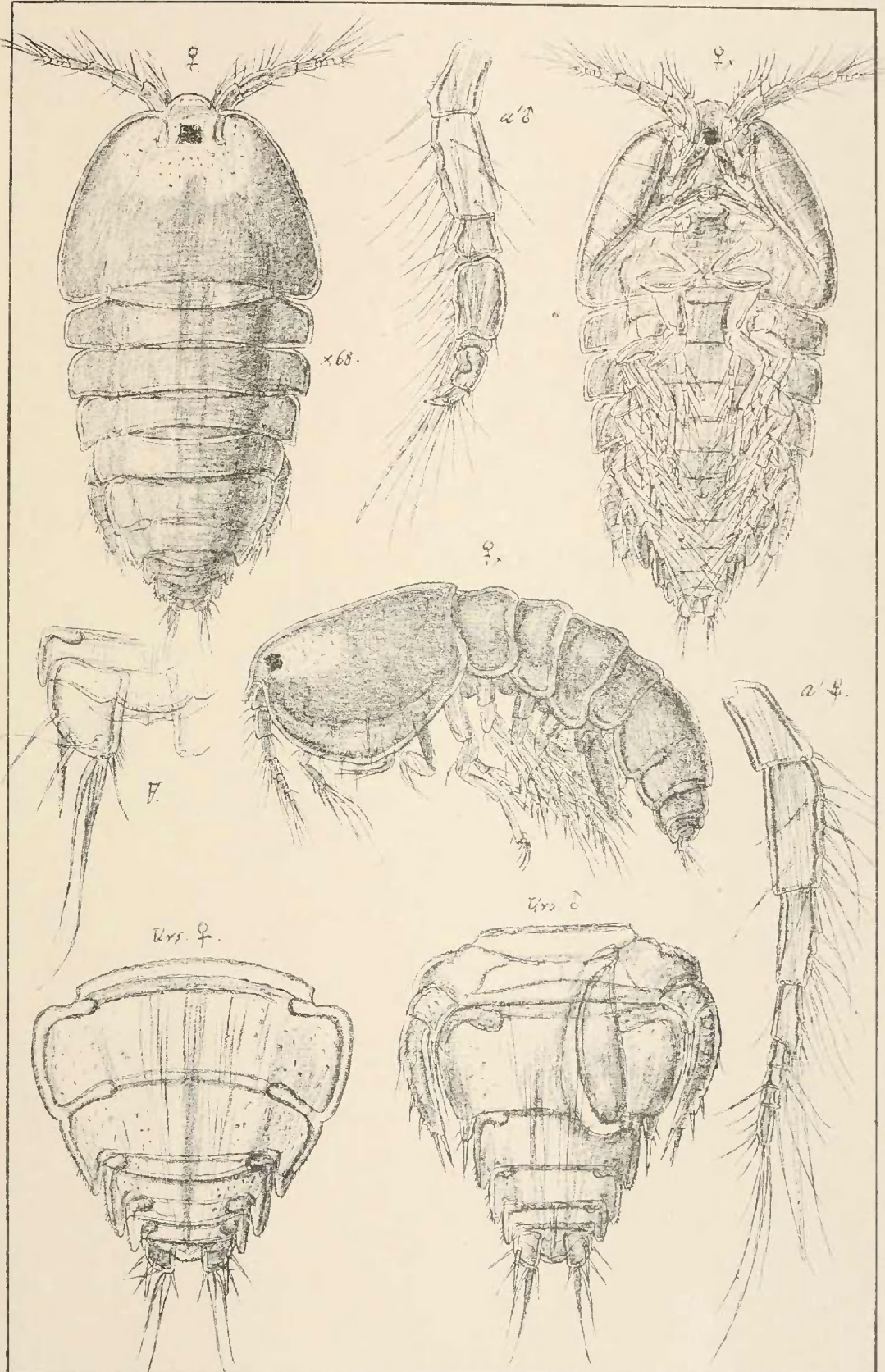
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Copepoda

Peltidiidæ.

Harpacticoida.

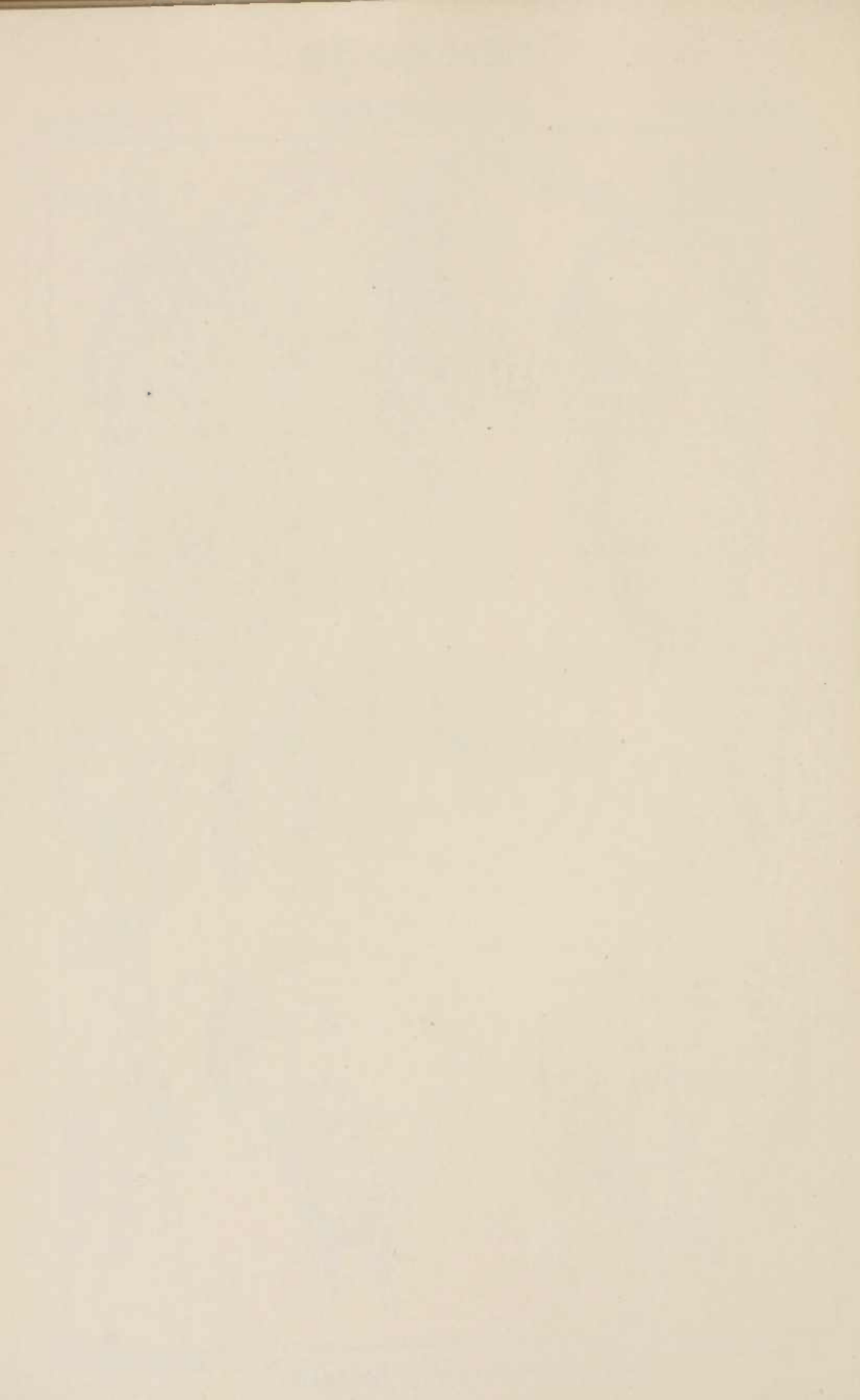
Pl. XXXVI.



G.O. Sars autogr.

Alteutha interrupta (Goodsir.)

Norsk Lithgr. Officin.

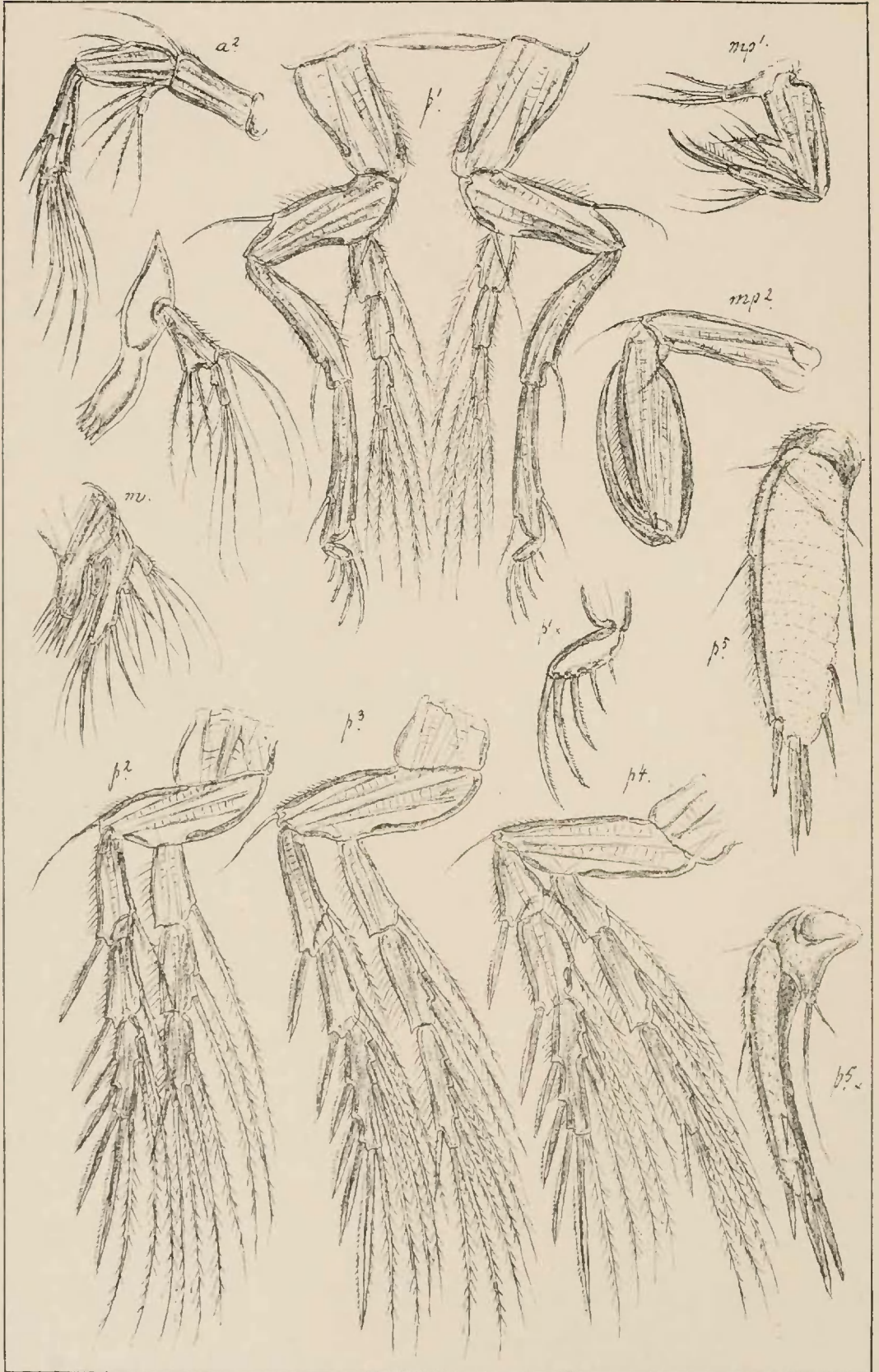


Copepoda

Peltidiidæ.

Harpacticoida.

Pl. XXXVII.



G.O. Sars autogr.

Alteutha interrupta (Goodsir.)

Norsk Lithgr. Officin.

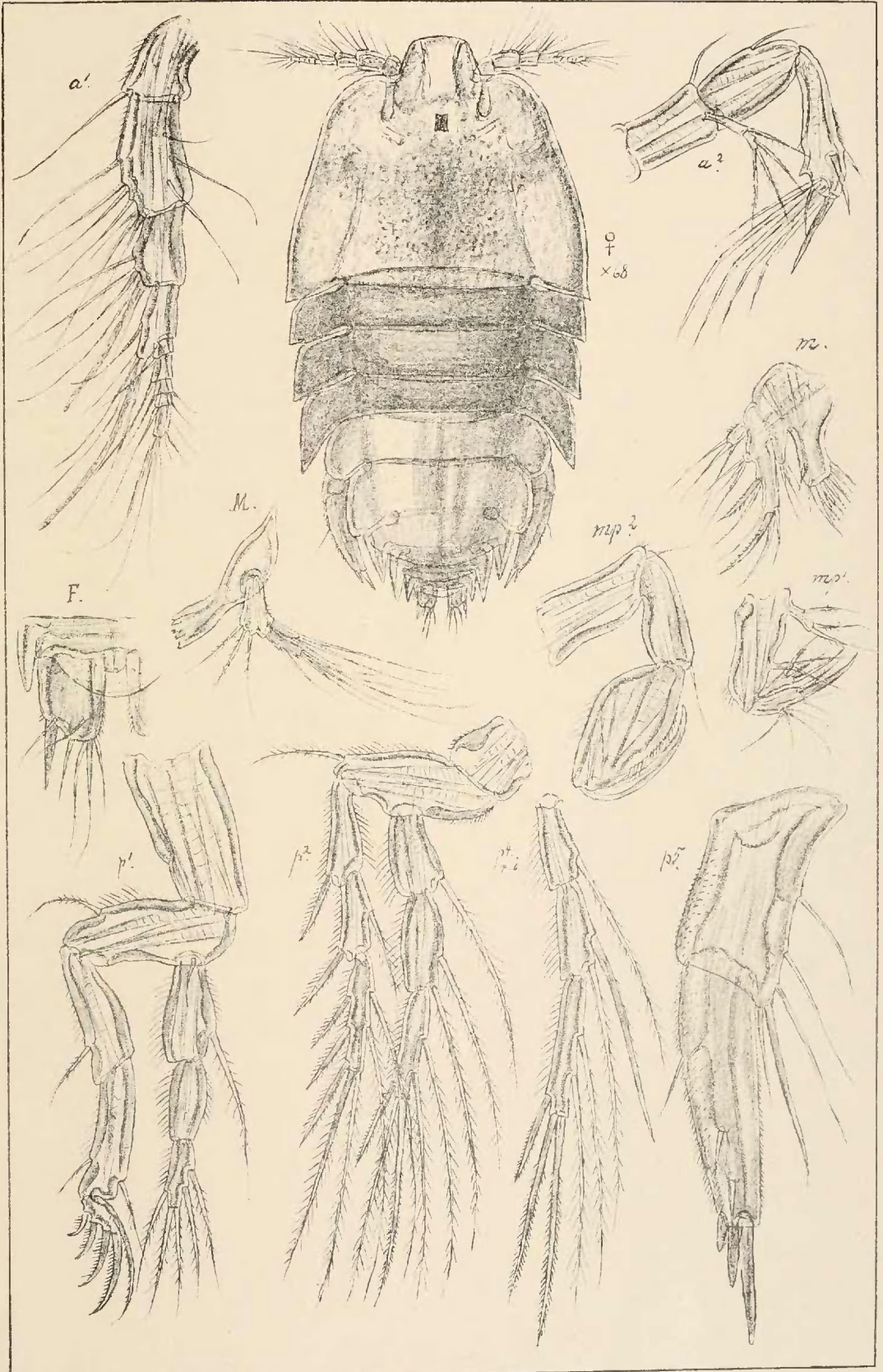
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Copepoda

Peltidiidæ.

Harpacticoida.

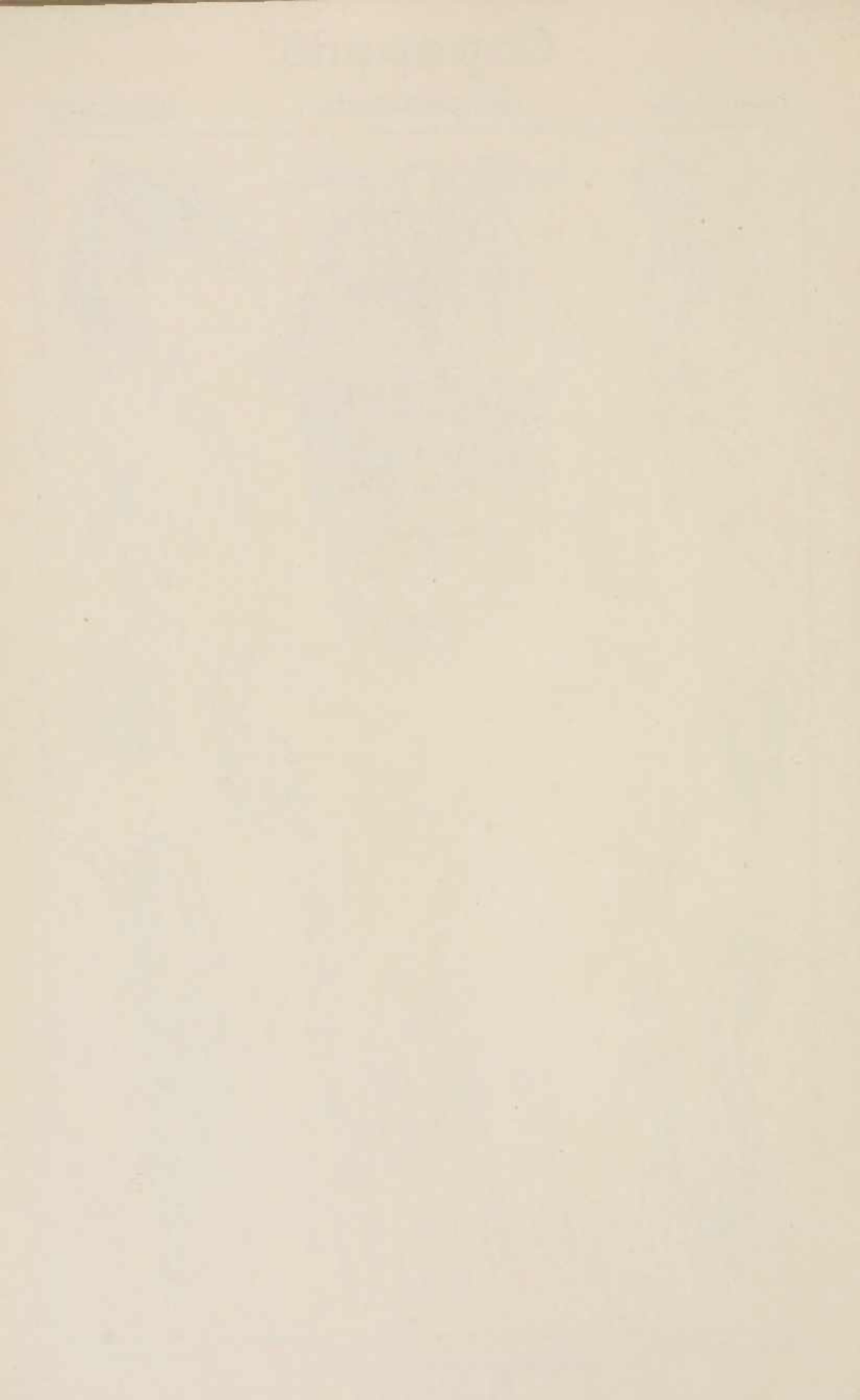
PI XXXVIII.



G.O. Sars autogr.

Alteutha depressa, Baird

Norsk Lithgr. Officin.

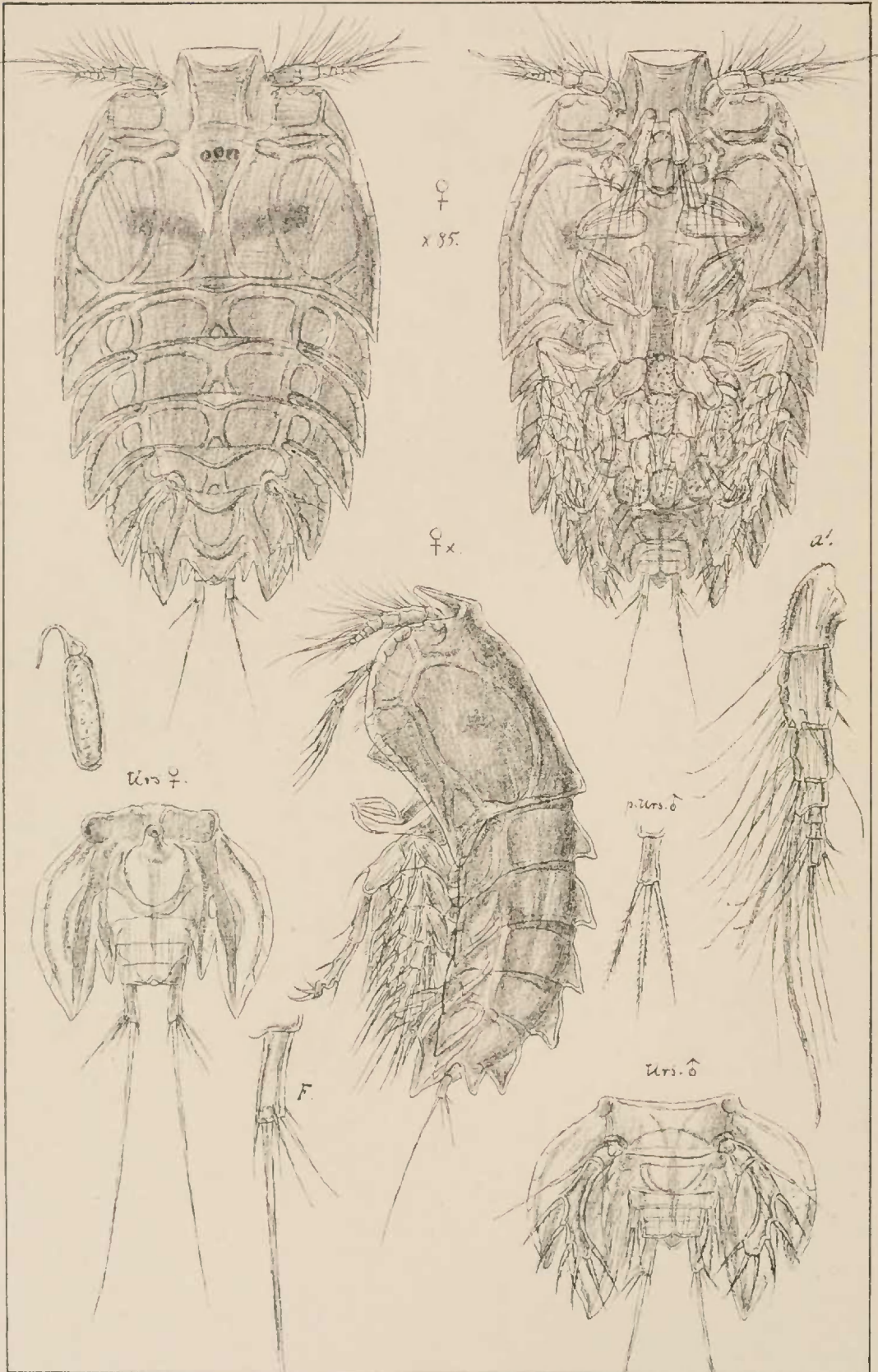


Copepoda

Peltidiidæ.

Harpacticoida.

Pl. XXXIX.



G.O. Sars autogr.

Peltidium purpureum, Phil.

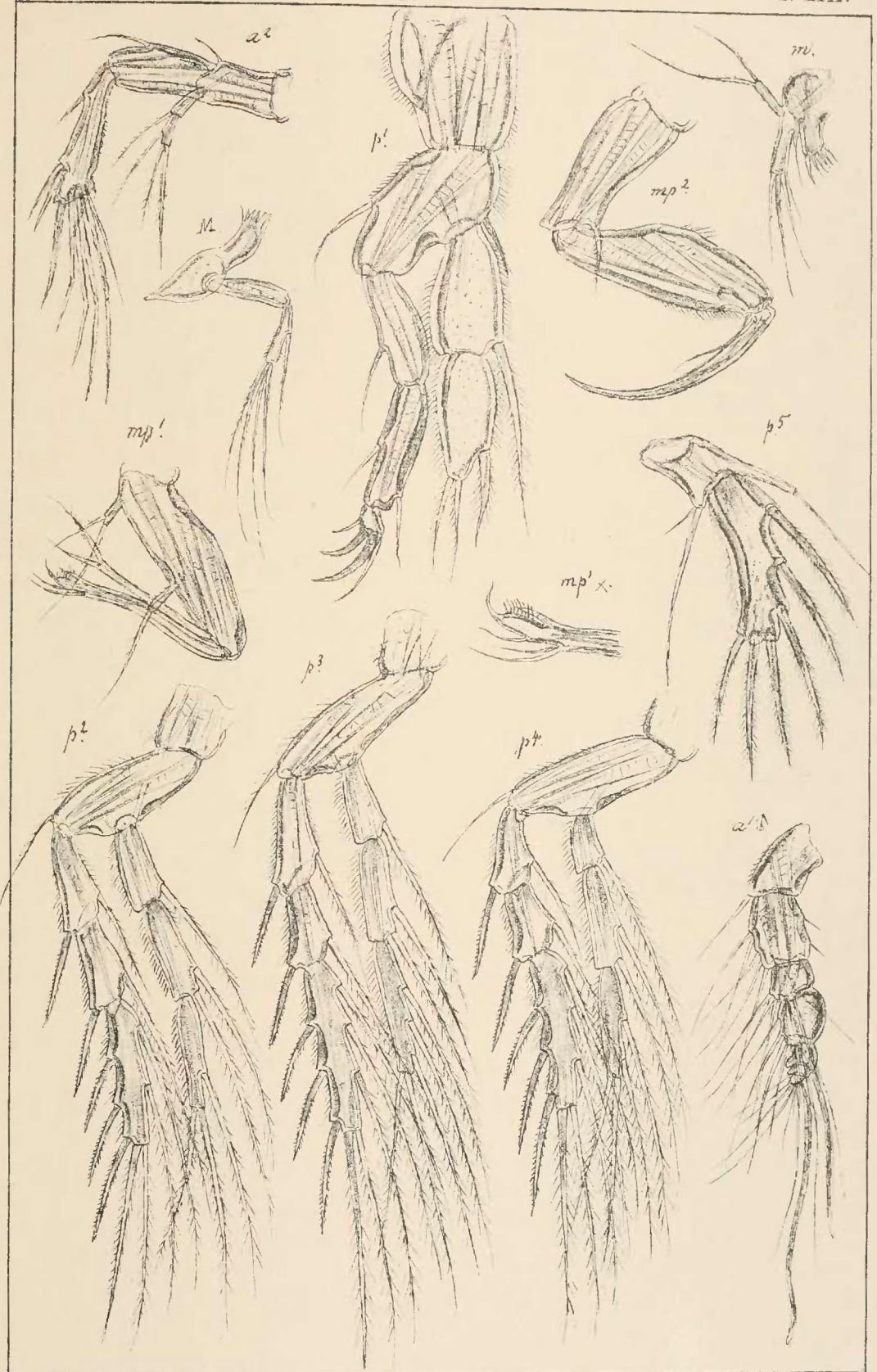
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Copepoda

Peltidiidæ.

Harpacticoida.

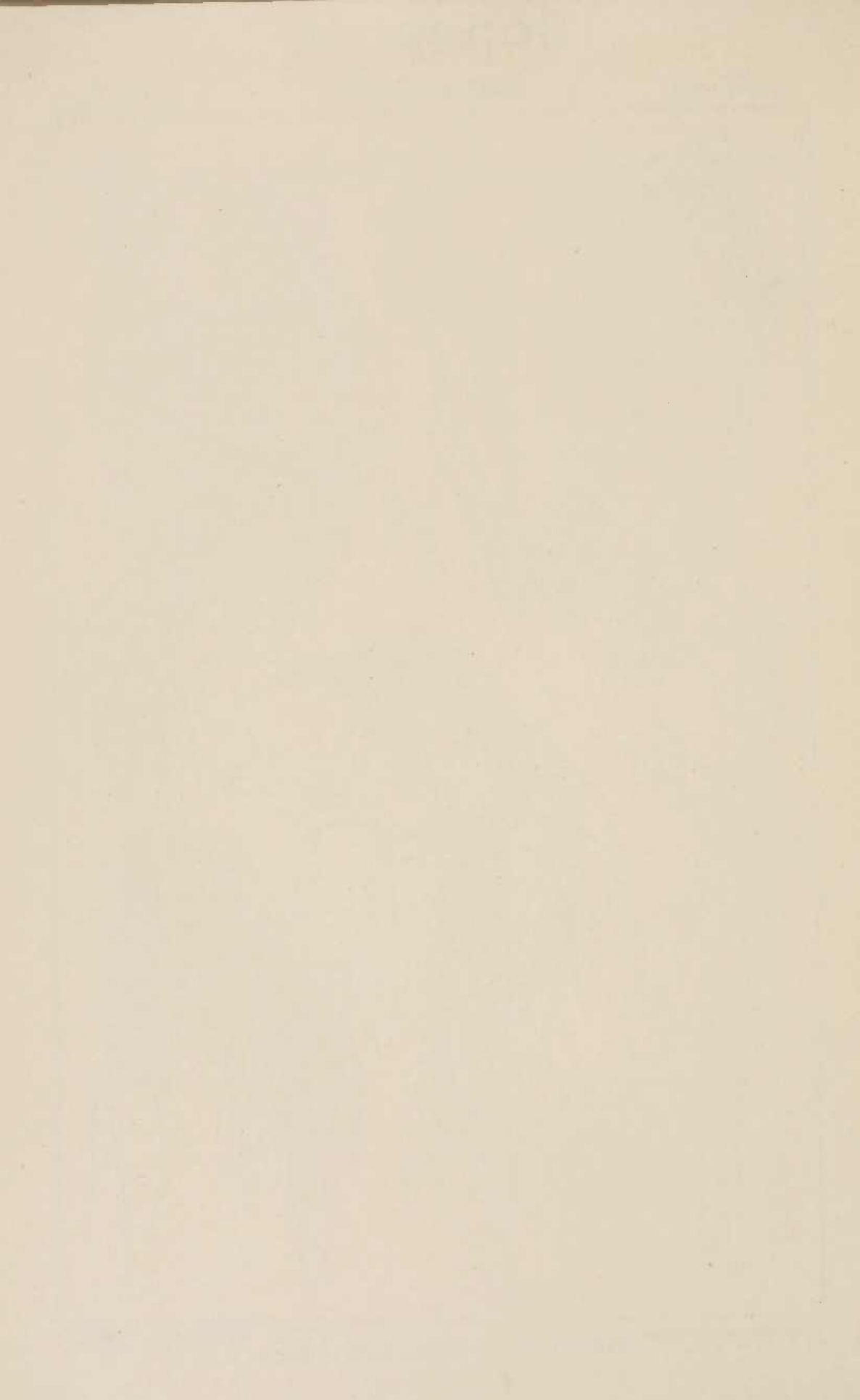
Pl. XL.



G O. Sars autogr.

Peltidium purpureum, Phil.
(continued)

Norsk Lithgr. Officin.

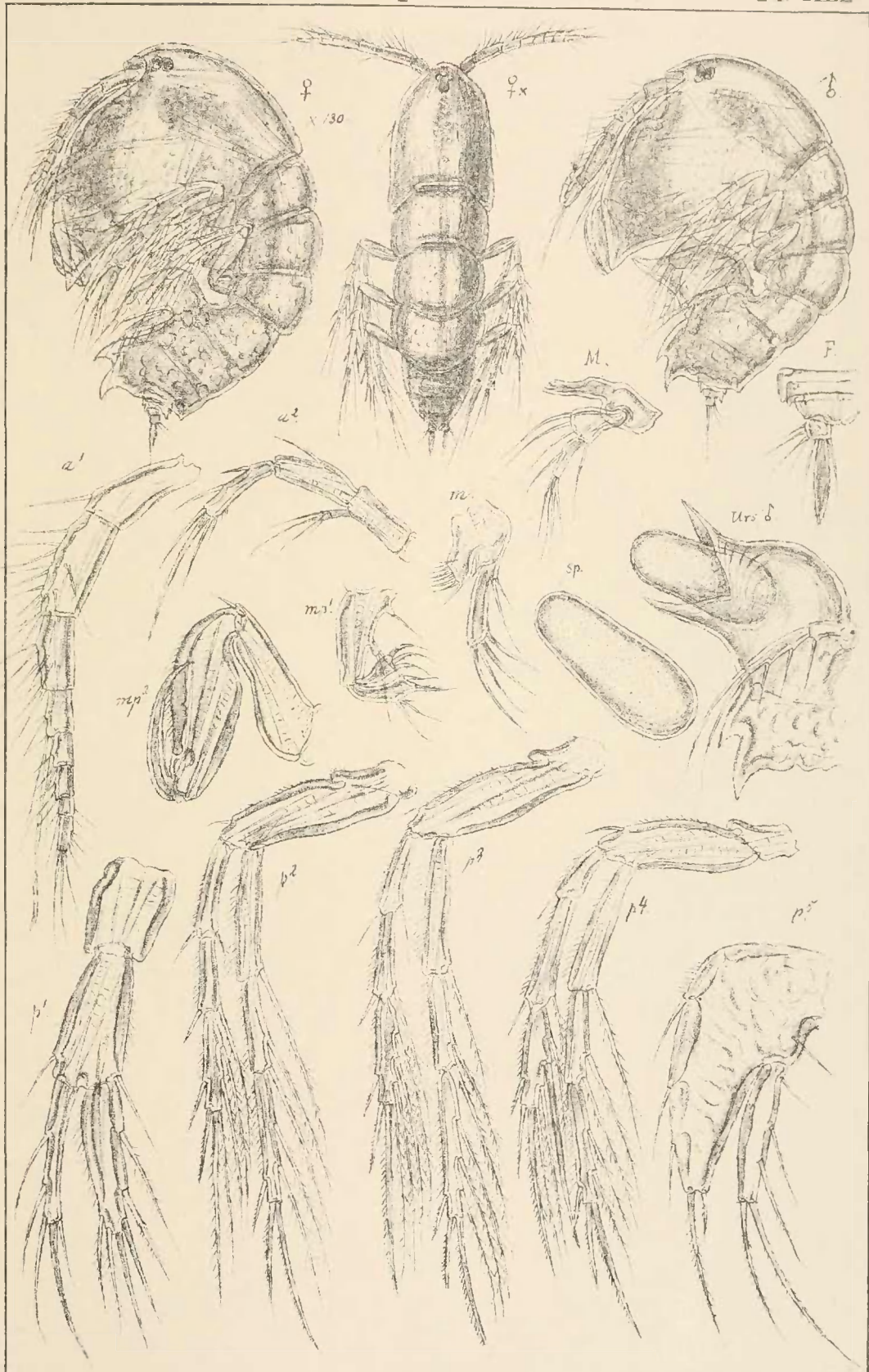


Copepoda

Tegastidæ

Harpacticoida.

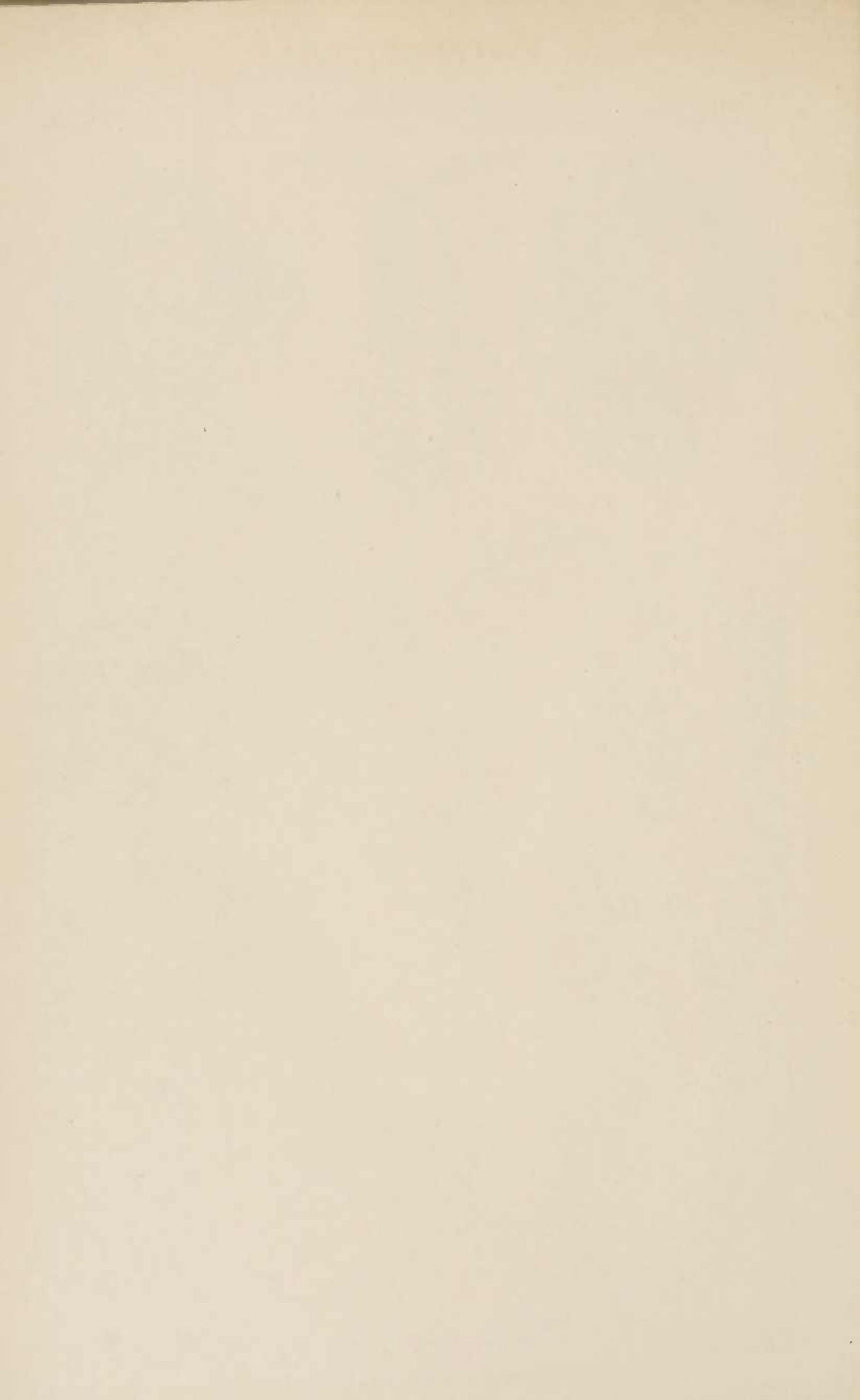
Pl. XII



G O. Sars autogr.

Norsk Lithgr. Officin.

Tegastes falcatus, Norman.

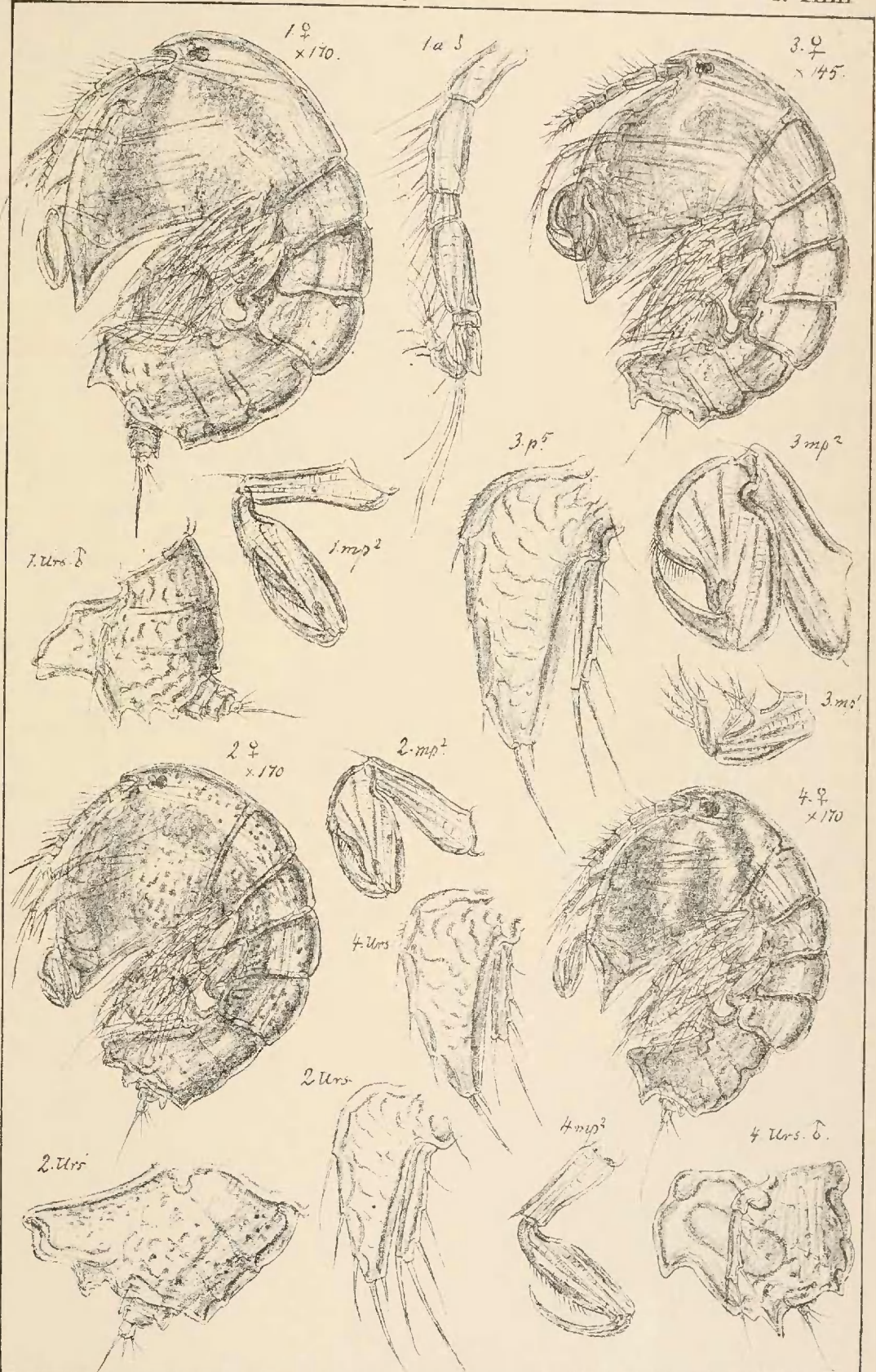


Copepoda

Tegastidæ

Harpacticoida.

Pl. XLII



G.O. Sars autogr.

Norsk Lithogr. Officin.

1. *Tegastes flavidus*, G.O. Sars.—2. *T. longimanus*, (Cl.)—

3. *T. grandimanus*, G.O. Sars.—4. *T. nanus*, G.O. Sars.

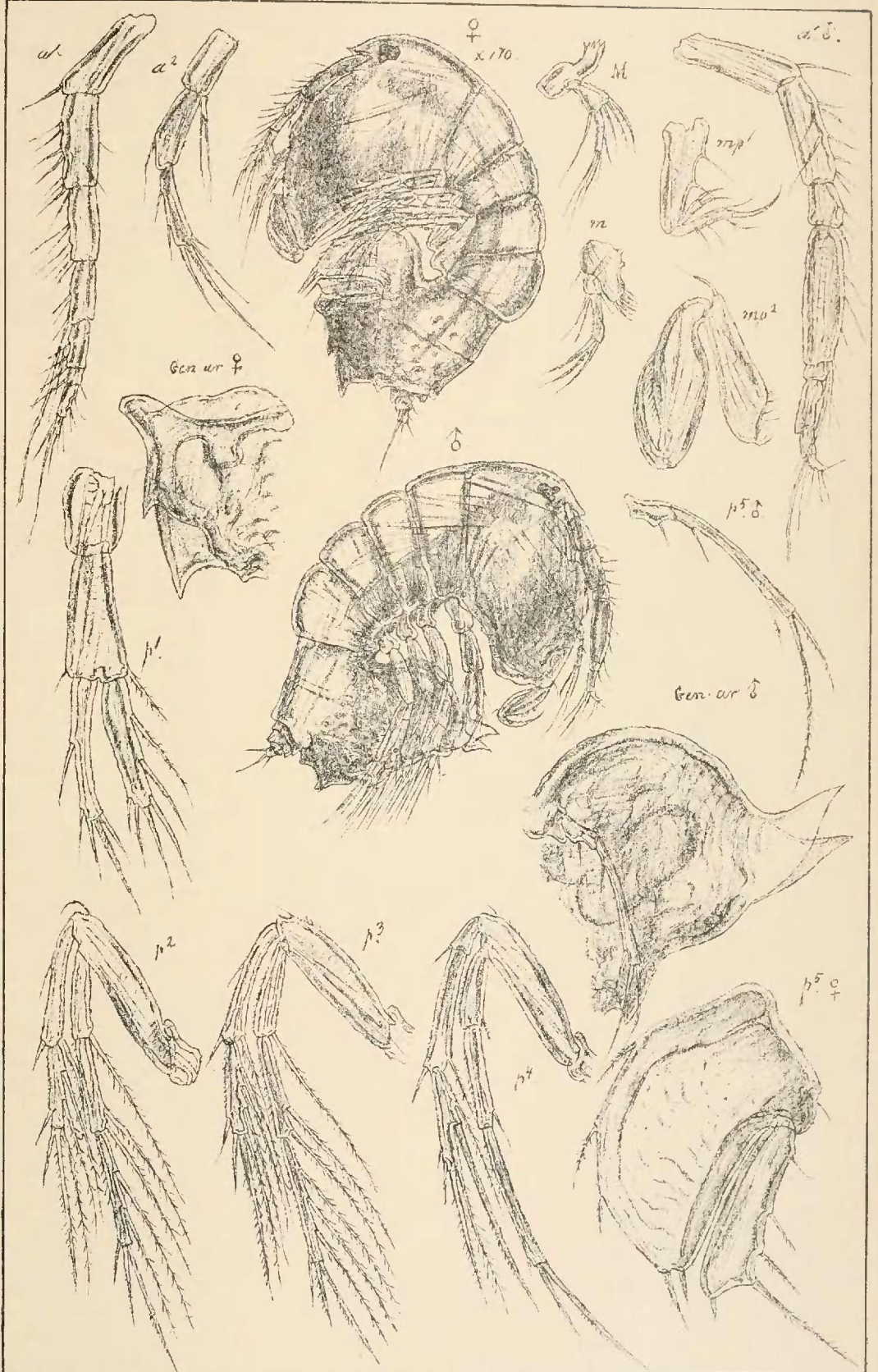


Copepoda

Harpacticoida.

Tegastidæ

PI. XLIII.



G.O. Sars autogr.

Norsk Lithgr. Officin.

Parategastes sphaericus (Claus)

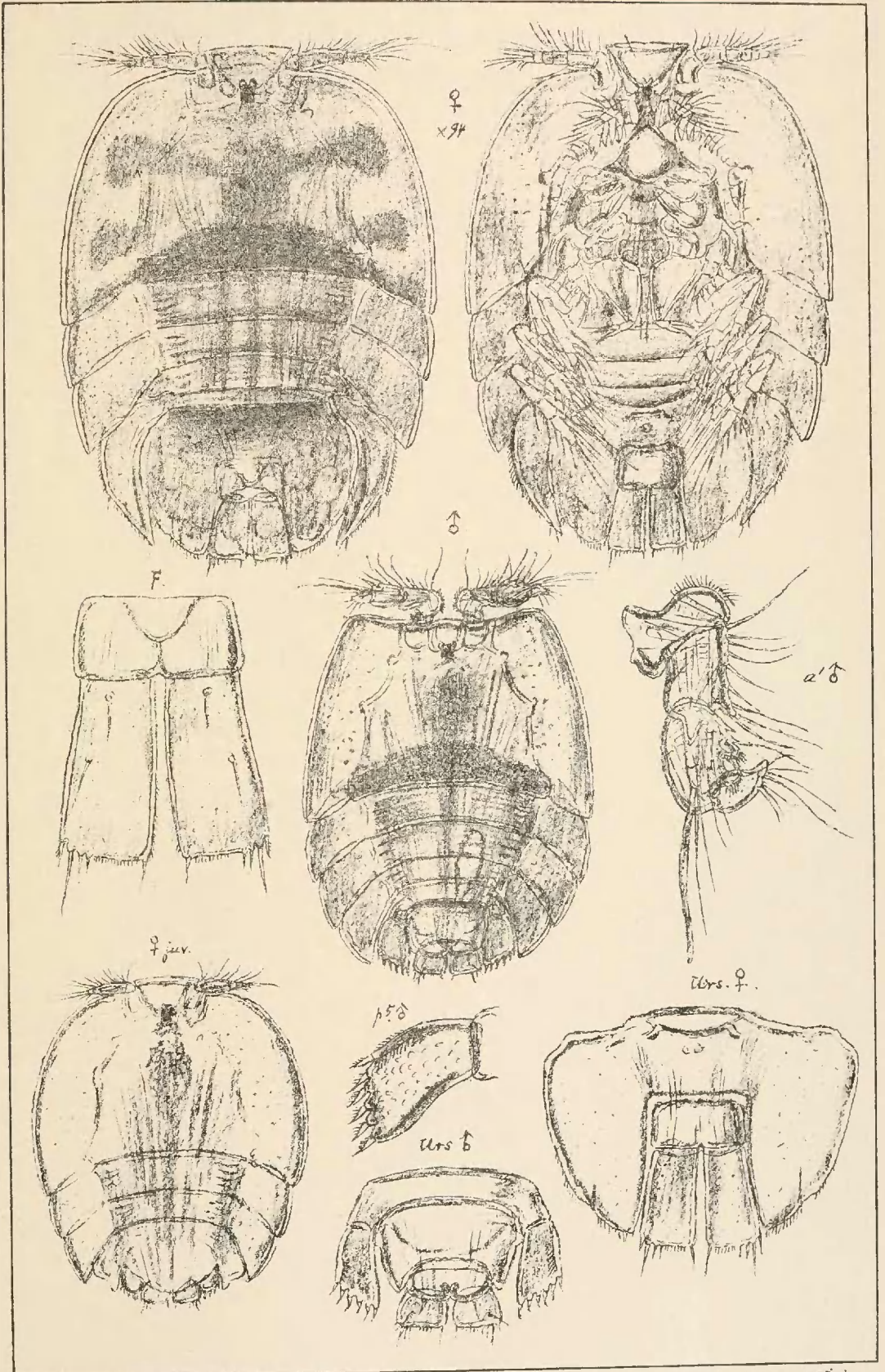


Copepoda

Porcellidiidæ

Harpacticoida.

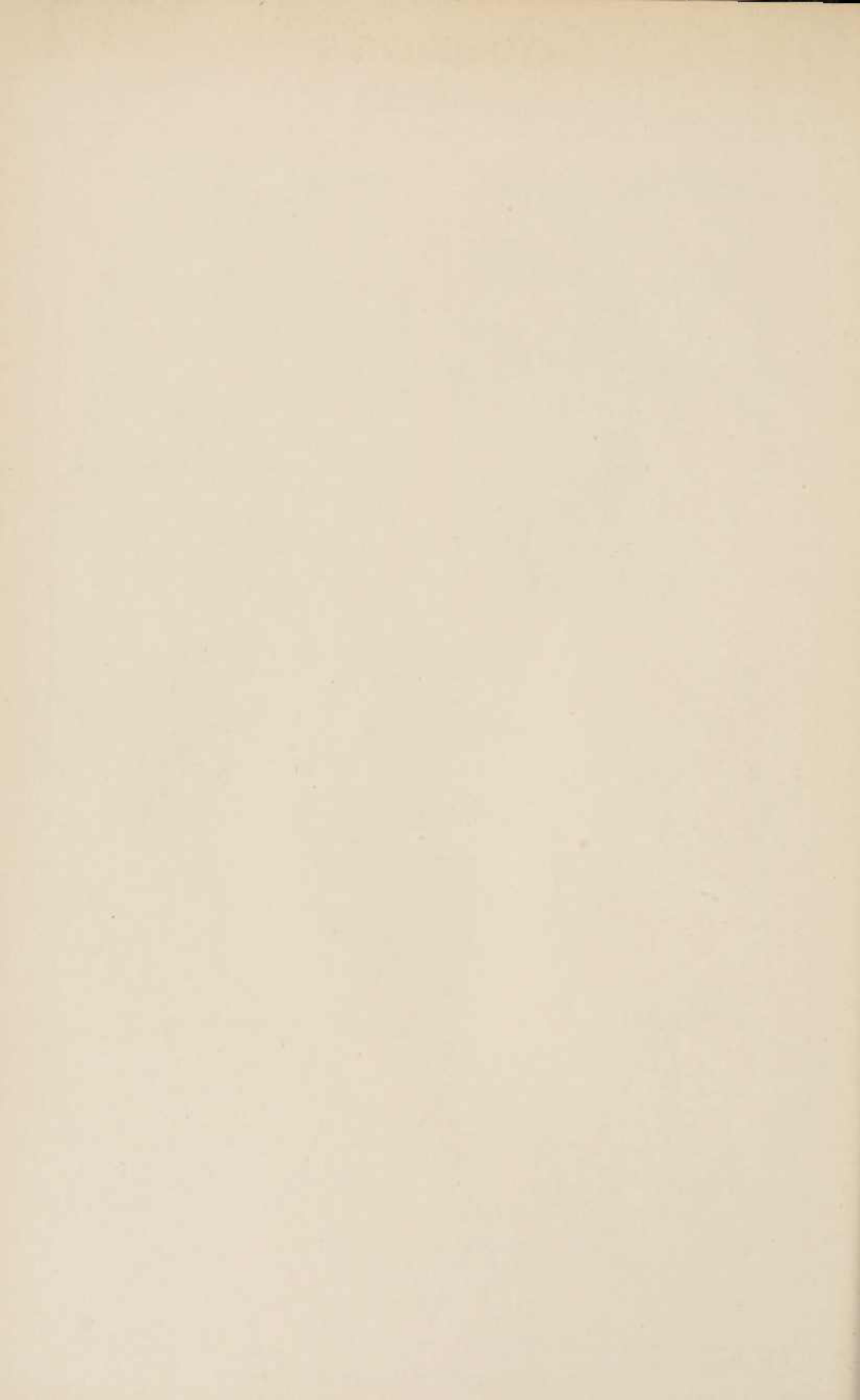
Pl. XLIV.



G.O. Sars autogr.

Norsk Lithgr. Officin.

Porcellidium fimbriatum, Cls.

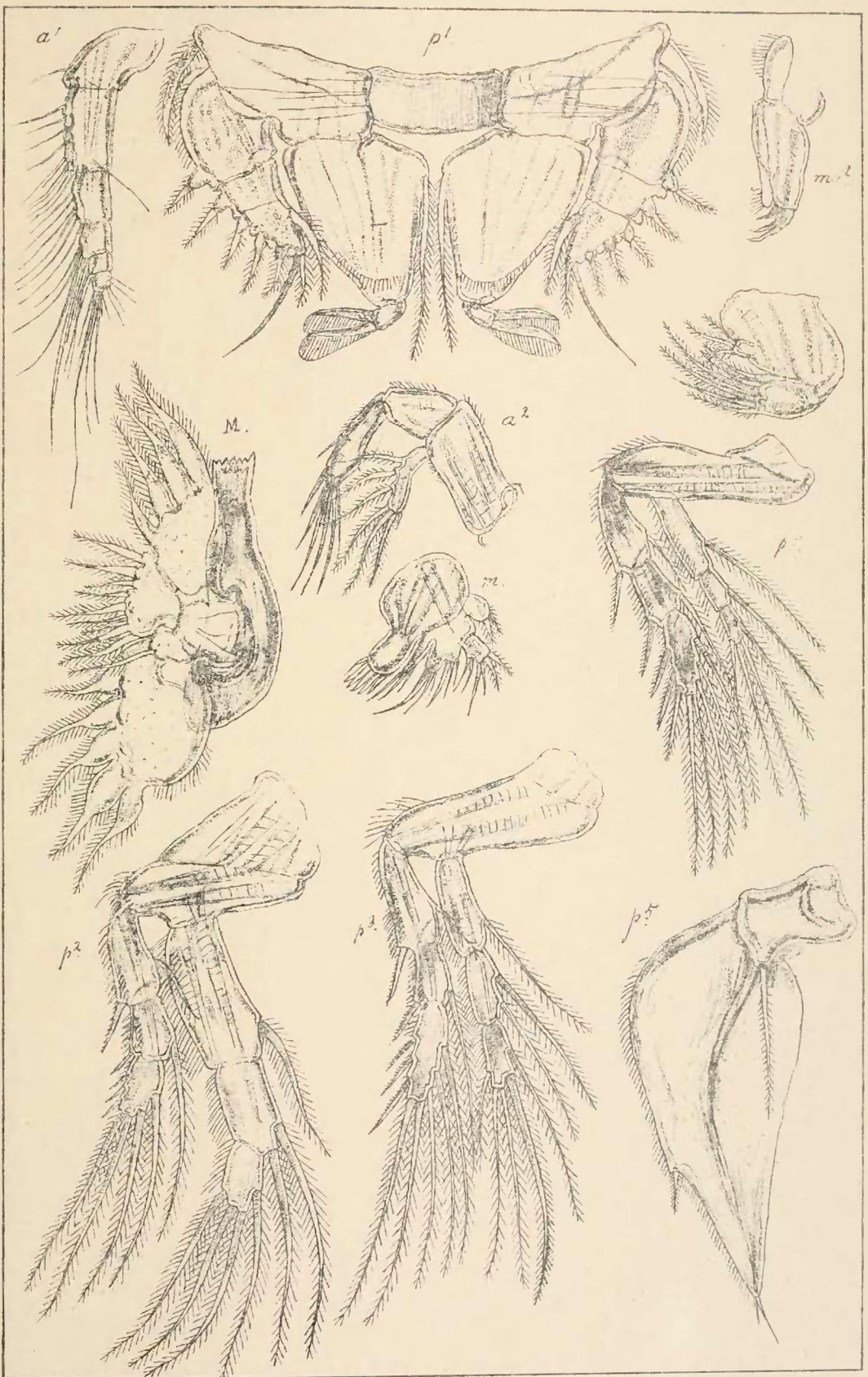


Copepoda

Porcellidiidæ

Harpacticoida.

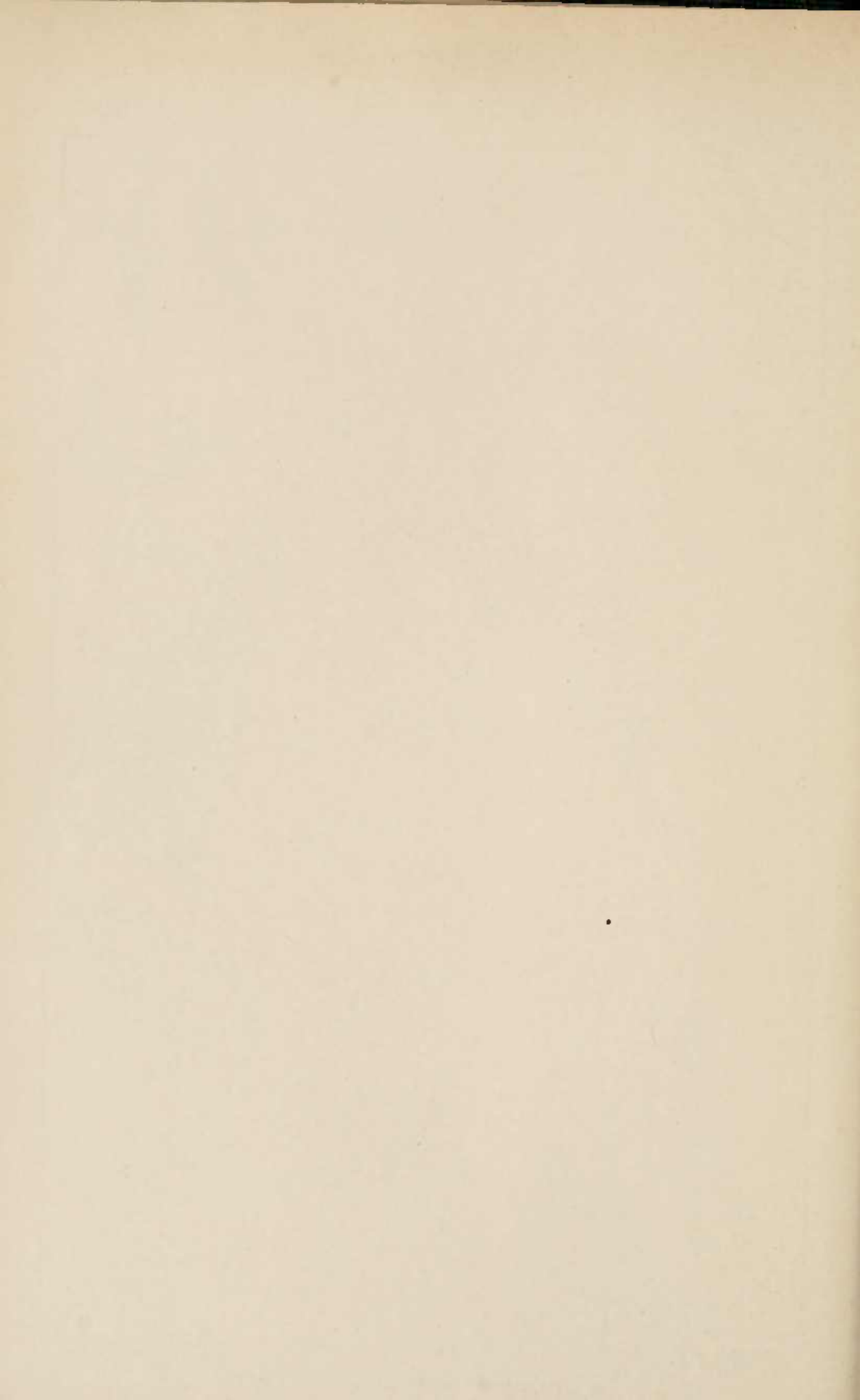
Pl. XIV



G.O. Sars autogr.

Norsk Lithgr. Officin.

Porcellidium fimbriatum Cls
(continued)

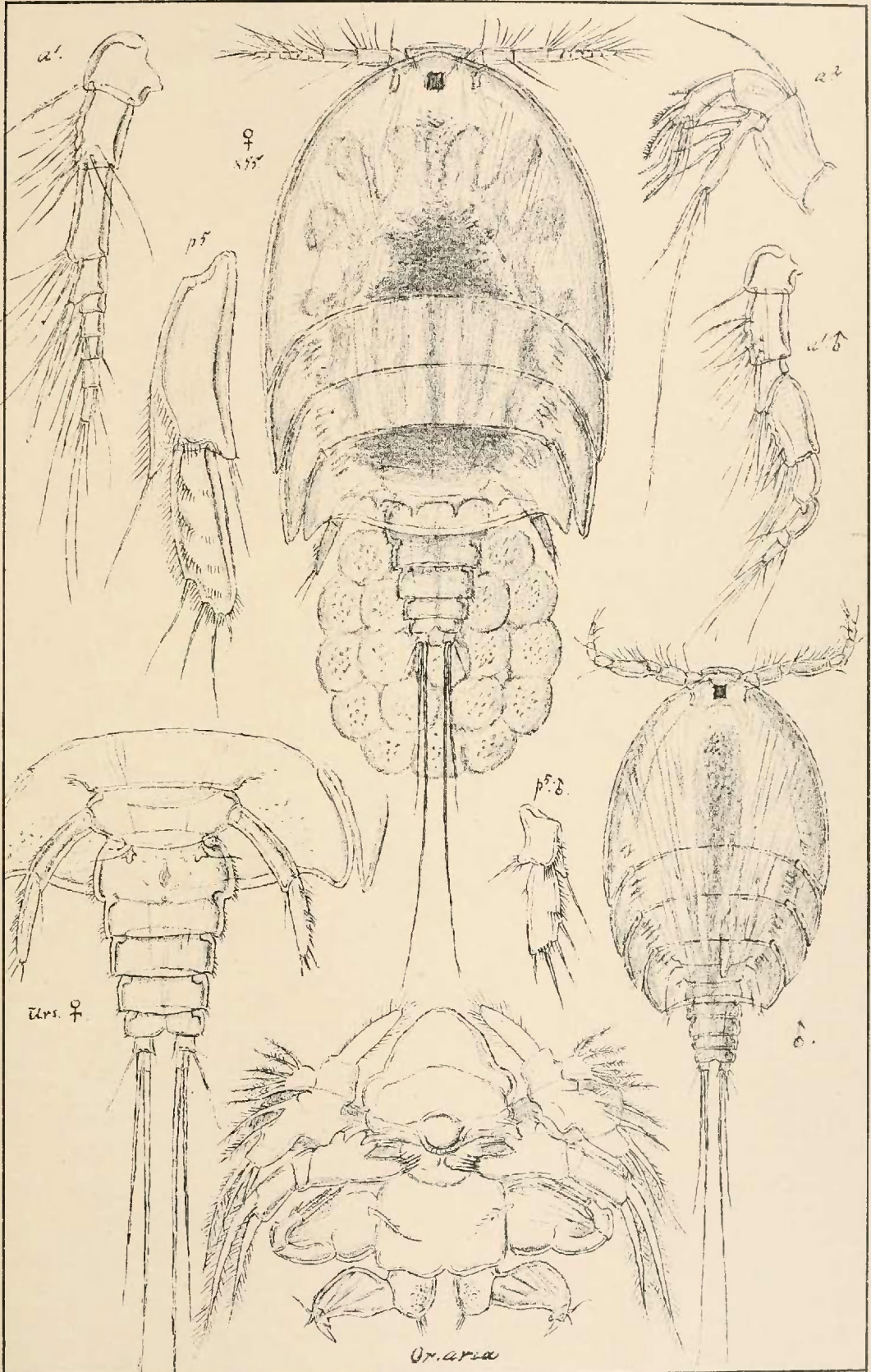


Copepoda

Harpacticoida.

Idyidæ

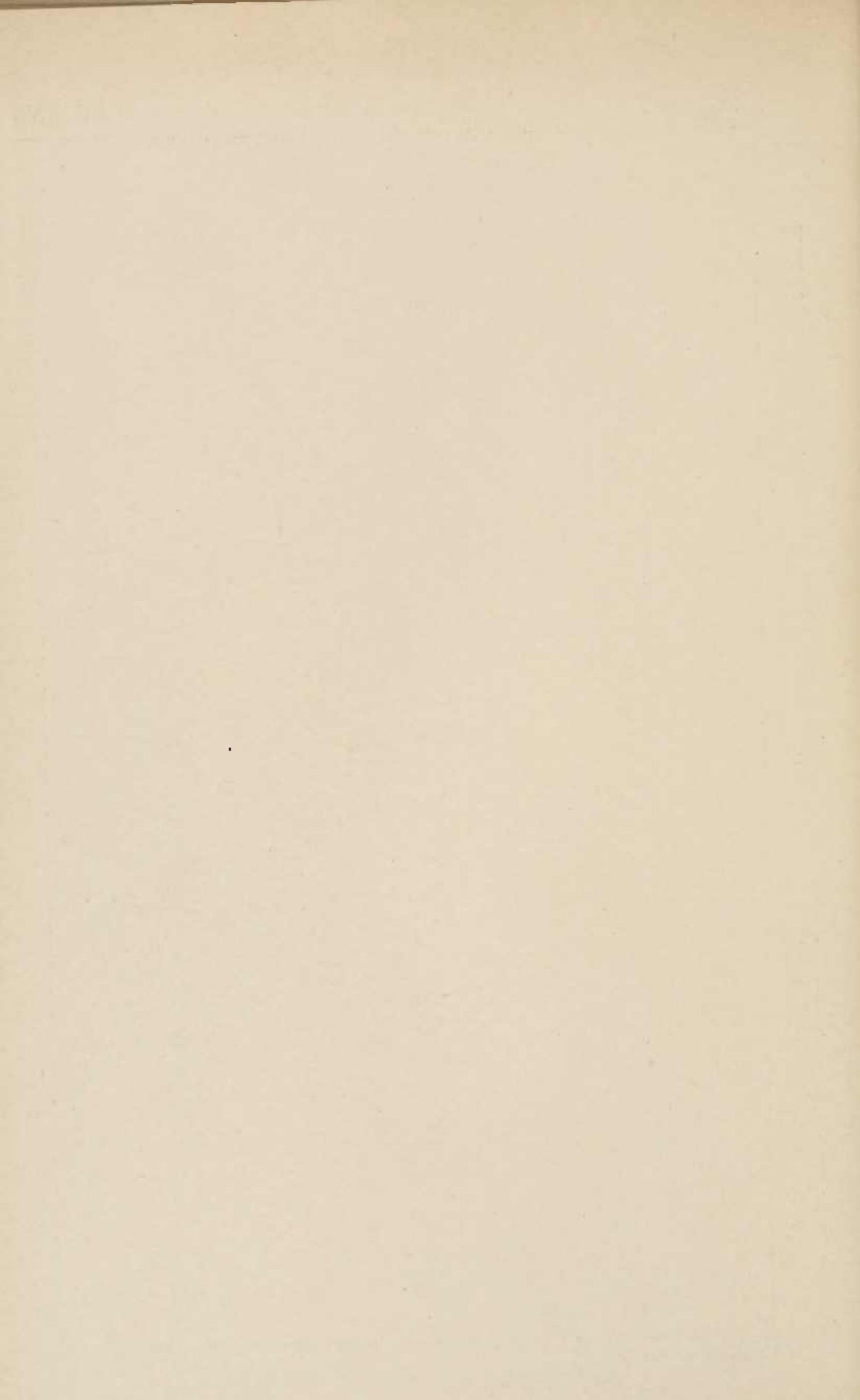
Pl. XLVI



G.O. Sars autogr.

Norsk Lithgr. Officin.

Aspidiscus littoralis, G.O. Sars.

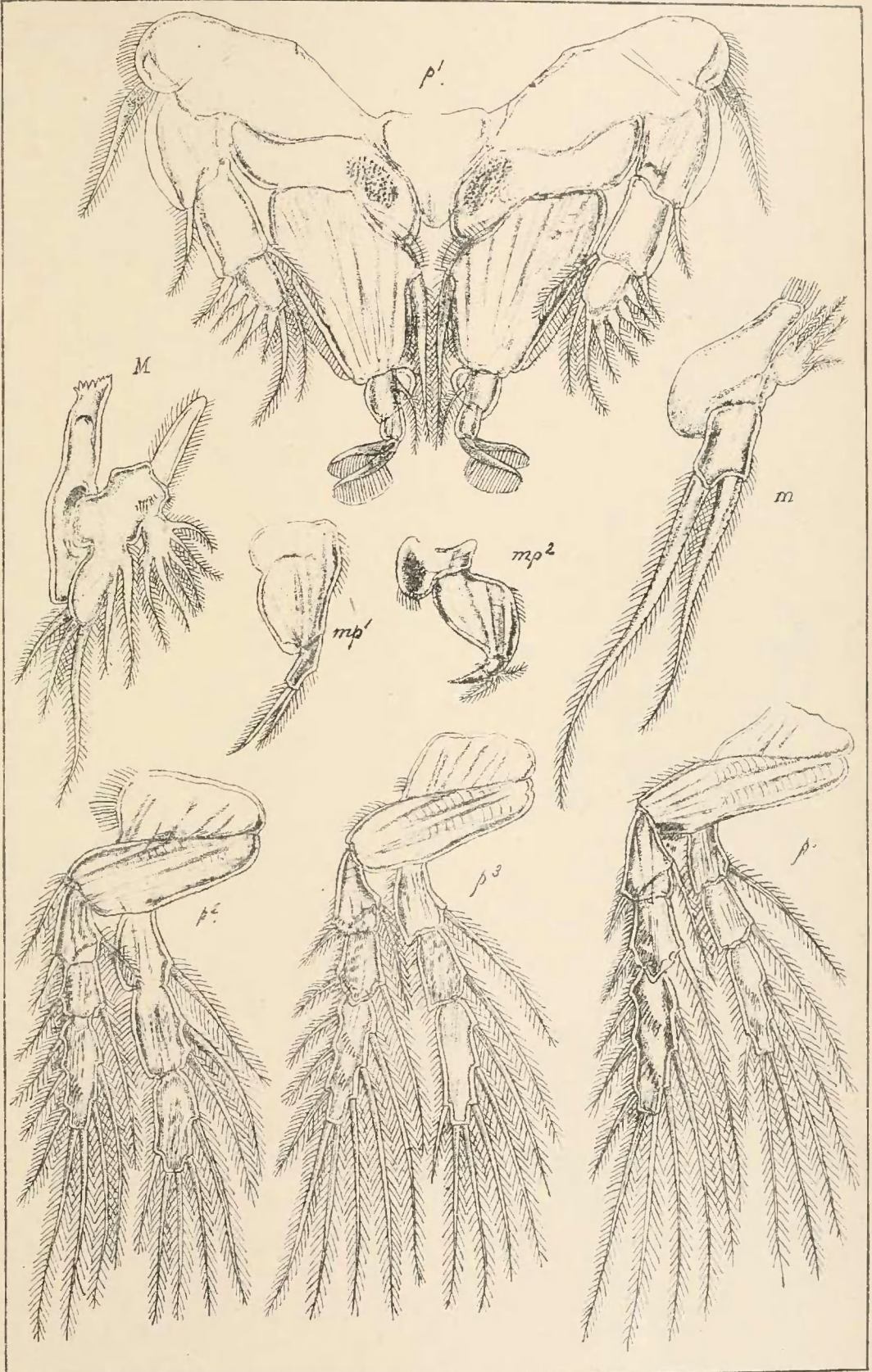


Copepoda

Harpacticoida.

Idyidae

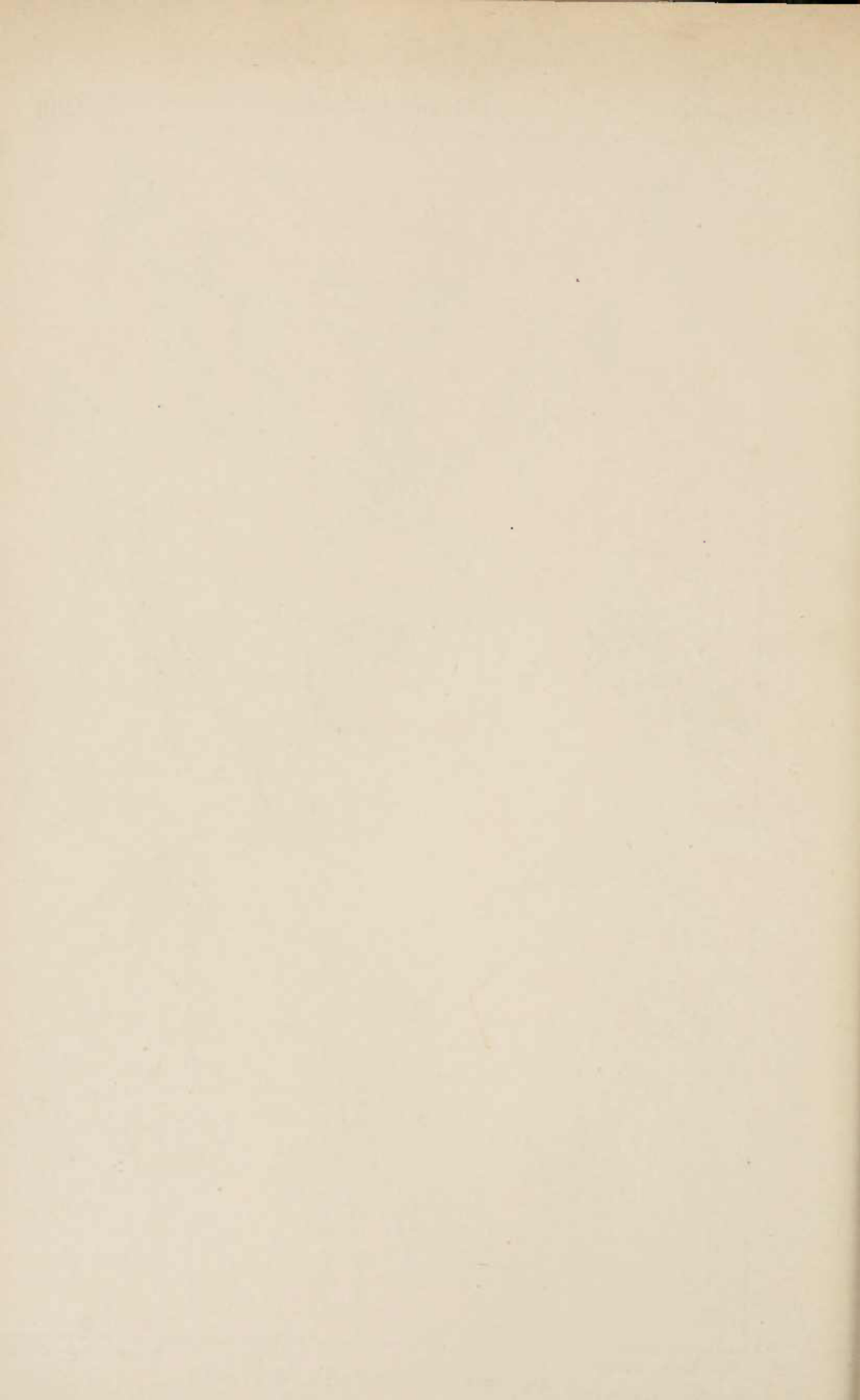
Pl. XLVII



G.O. Sars autogr.

Norsk Lithgr. Officin.

Aspidiscus littoralis, G.O. Sars.
(continued)

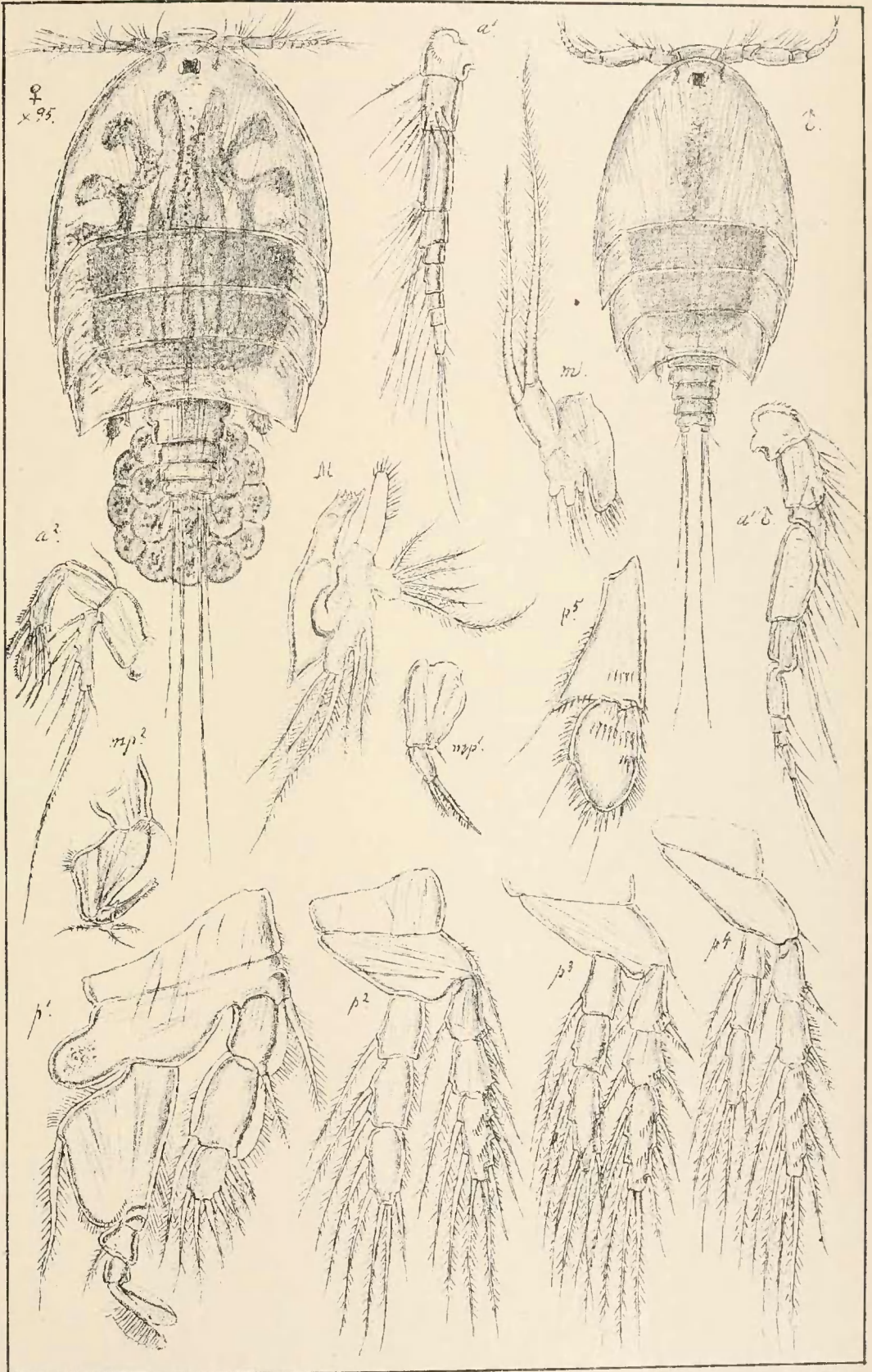


Copepoda

Idyidæ

Harpacticoida.

Pl. XLVIII.



G.O. Sars autogr.

Aspidiscus falcatus, Norman.

Norsk Lithgr. Officin.

