

REPORT  
TO THE GOVERNMENT OF CEYLON  
ON THE  
PEARL OYSTER FISHERIES  
OF THE

GULF OF MANAAR,

BY

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WITH SUPPLEMENTARY REPORTS

UPON THE

MARINE BIOLOGY OF CEYLON,  
BY OTHER NATURALISTS.

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PART IV.

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REPORT  
ON THE  
ISOPODA

COLLECTED BY

PROFESSOR HERDMAN, AT CEYLON, IN 1902.

BY

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[WITH TWELVE PLATES.]

THE interest of the present collection is not to be measured by the number of species or the number of specimens, still less by the size of the animals. The species are not numerous, the examples in many cases are few, and of some the dimensions have proved to be afflictingly small. On the other hand, there is no want of variety, since the thirty-four species more or less definitely discriminated are spread over five very distinct tribes and divided among sixteen families. There is no want of novelty, since two of the families, three of the genera, and fourteen of the species are now added to science on what appear to be satisfactory grounds. Certainly the family AMESOPODIDÆ, founded on some small creatures allied to *Idotea*, must be thought well worthy of notice.

The only family illustrated by a rather large supply of specimens is that of the Sphæromidæ. But the supply has not thrown much convincing illumination on the difficulties of this group, which have of late years arrested the attention of several writers. Any person of impatient temper who has ever attempted, when pressed for time, to disentangle with unskilful fingers a knotted skein of string, may understand the plight of a busy naturalist who has Sphæromidæ to classify. There is always the chance in regard to this family that, after struggling with the complexities of the situation, one may have done more harm than good, by adding to the confusion instead of lessening it. It is, indeed, a general disadvantage attending the description of a local fauna, or of a special collection, that it may involve the fragmentary treatment of problems which can only properly be solved by a monographic survey.

The tribal division of the Isopoda is here accepted from the invaluable 'Crustacea of Norway,' by Professor G. O. SARS.

## DESCRIPTION OF THE SPECIES.

## ISOPODA ANOMALA.

## TRIBE: CHELIFERA.

## FAMILY: TANAIIDÆ.

**Tanais**, AUDOUIN and MILNE-EDWARDS.

1828, **Tanais**, AUDOUIN and MILNE-EDWARDS, 'Résumé d'Entomologie,' p. 182, pl. 29, fig. 1, and 'Précis d'Entomologie,' vol. 1, p. 46, pl. 29, fig. 1.

The genus was named *Anisochirus* by WESTWOOD in 1832 ('Ann. Sci. Nat.,' vol. 27), *Zeuxo* by TEMPLETON in 1836 ('Trans. Entom. Soc.,' vol. 2, p. 201), and *Crossurus* by RATHKE in 1843 ('Fauna Norwegens,' p. 35). SARS, when defining it in 1896 ('Crustacea of Norway,' vol. 2, part i., p. 11), remarked that it was well distinguished from all the other genera of the family, especially by the circumstance that the pleon was composed of only five segments and carried only three pairs of pleopods. He assigned to it only four species: *T. tomentosus*, KRÖYER; *T. cavolinii*, MILNE-EDWARDS; *T. dulongii* (AUDOUIN); and *T. novæ-zealandiæ*, THOMSON. According to DOLLFUS ('Bull. Soc. Zool. France,' vol. 21, p. 207, 1897) the first of them is a synonym of the second. But several other species are on record, *T. macrocheles*, NICOLET, 1849; *T. brasiliensis*, DANA, 1849; *T. loricatus*, BATE, 1864; *T. gracilis*, HELLER, 1866; *T. willemoesii*, STUDER, 1884; *T. hirsutus*, BEDDARD, 1886; and since SARS wrote, several additions have been made to the list, namely, *T. robustus*, MOORE, 1894; *T. grimaldii*, DOLLFUS, 1897; *T. chevreuxi*, DOLLFUS, 1897; *T. testudinicola*, DOLLFUS, 1897; *T. alascensis*, H. RICHARDSON, 1899; *T. stamfordi*, H. RICHARDSON, 1901; *T. philetærus*, STEBBING, 1904; *T. normani*, H. RICHARDSON, 1905. In this group it must be noticed that *brasiliensis*, *gracilis*, *willemoesii*, *hirsutus*, *robustus*, *testudinicola*, *normani*, are all excluded from the genus, not as defined by DANA, but as restricted by SARS, since they all have six segments in the pleon instead of five. It is not improbable that other more or less correlated differences will be found to exist, but the material here at disposal would not justify interference in the matter. It may, however, be observed that *T. testudinicola*, DOLLFUS, is evidently the same species as *T. robustus*, MOORE. *T. loricatus*, BATE, described from an imperfect specimen, still awaits fuller description. *T. novæ-zealandiæ*, G. M. THOMSON ('Trans. N. Zealand Institute,' vol. 13, p. 207, plate 7, fig. 3), according to the figure, has the pleon distinctly six-jointed, but no notice of this is taken in the text, which includes in the generic definition the character "pleon five-jointed."

**Tanais gracilis**, HELLER—Plate I. (D).

1866, *Tanais gracilis*, HELLER, 'Novara Exp., Zool.,' vol. 2, pt. 3 (Crustacea), p. 133, pl. 12, fig. 3.

HELLER's description is as follows:—"The head very short, the roundish black eyes placed forward on the somewhat projecting lateral angles, the front bluntly triangular. The lower antennæ five-jointed, thinner than, but almost as long as, the upper, which are three-jointed. The first [coalesced] peræon segment is the largest of all, narrowed forward, the second [first free] segment the shortest, the fifth, sixth and seventh sub-equal one to the other. The pleon narrows gradually backwards. The first three pleon segments shorter than those of the peræon, but longer than the fourth and fifth pleon segment, the last (sixth) again larger and apically rounded. The uropods (Schwanzanhänge) five-jointed, their basal joint thick, triangular, the first joint of the appendage (des Anhanges) tolerably long, towards the end somewhat thickened, the four following somewhat shorter than the first, among themselves subequal, cylindrical, the last blunt-ended, all the joints beset with long setæ. The first chelipeds large and strong. The legs little setose. The colour of the body on the surface yellowish or brownish, with dark points and markings. Locality:—St. Paul." Length, 3 millims.

In HELLER's account there are one or two ambiguities, for, while he speaks of and figures six segments in the pleon, he uses the expression "fourth and fifth pleon segment" as if intending to mention a composite segment, and, while he distinctly says that the uropods are five-jointed, he appears to distinguish a peduncular joint from a five-jointed ramus. His figure shows only five joints in all, as in our specimen, which was not otherwise separable from HELLER's. The mouth organs agree with those in the genus *Tanais*. The upper antennæ have a fourth joint in the shape of a tubercle, representing the flagellum. The finger in the hinder group of peræopods is strongly uncinatè. The pleopods are delicate in structure. Whether there were more than three pairs I did not succeed in ascertaining.

Length of specimen, 2 millims.

Locality:—Gulf of Manaar.

In *T. brasiliensis* and *T. normani* the uropods are six-jointed, in *T. willemoesii* nine-jointed, in *T. hirsutus* about twelve-jointed, in *T. robustus* four-jointed.

**Heterotanais**, G. O. SARS.

1880, *Heterotanais*, SARS, 'Arch. Naturv. Kristian.,' vol. 7 (1881), separat., p. 28.

1886, *Heterotanais*, SARS, 'Arch. Naturv. Kristian.,' vol. 11, p. 333.

1886, *Heterotanais*, NORMAN and STEBBING, 'Trans. Zool. Soc. London,' vol. 12, pt. 4, p. 108.

1896, *Heterotanais*, SARS, 'Crustacea of Norway,' vol. 2, pt. 1, p. 13.

1897, *Heterotanais*, DOLLFUS, 'Mém. Soc. Zool. France,' vol. 11, p. 38.

1901, *Heterotanais*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 23, p. 501.

The leading feature in this genus is the sexual difference in the first gnathopods, which are small and normally chelate in the female, but large and complexly

subchelate or not normally chelate in the male. It is, however, probable that up to a certain stage the males may not exhibit this distinction. The species referred to the genus by SARS are *H. ørstedii* (KRÖYER), *H. limicola* (HARGER), *H. tenuis* (G. M. THOMSON), *H. anomalus*, SARS. To these DOLLFUS, in 1897, adds *H. algiricus* and *H. provincialis*, but, upon a comparison of the descriptions and figures of *H. algiricus* and *H. anomalus*, there is no character given by which they can be distinguished. H. V. HODGSON ('Nat. Hist. of the "Southern Cross,"' p. 240, 1902) remarks that but for the structure of the uropods he would have placed his own *Paratanais antarctica* and BEDDARD'S *P. dimorphus* in SARS' genus *Heterotanais*.

The species now offered as an additional member of the genus labours under the considerable disadvantage of not being represented by any adult male specimen, apart from which it is not easy to say whether junior or female specimens should be allotted to *Heterotanais* or *Leptocheilia*. As will be seen by the description, if the minute character of the maxillary palp can be trusted, the species belongs to *Heterotanais*. As the first gnathopods are remarkably stout, one may be glad to rescue it from a genus like *Leptocheilia* that derives its name from the slenderness of those appendages.

***Heterotanais crassicornis*, n. sp.—Plate I. (A).**

In the cephalothorax the line of junction between the head and the first peræon segment is slightly indicated. The antepenultimate and penultimate segments of the peræon are the longest. The first five segments of the pleon are subequal, the telsonic segment not elongate.

The eyes are socketed, at apex in dorsal view apparently, but not really, acute, lenses about 12 in number.

First antennæ: first joint unusually stout, not twice as long as broad, more than twice as long as the second; third not longer than the second, very narrow, tapering, with three setæ, one of which is, perhaps, attached to a scarcely perceptible flagellar joint.

Second antennæ shorter and much narrower than the first, second joint the widest, fourth the longest, but not very long; a minute flagellar joint is tipped with a very long seta.

Mandibles nearly as figured by SARS ('Crustacea of Norway,' pl. 6) for *H. ørstedii*, but on the left mandible the cutting edge and accessory plate are far less distinctly denticulate, and on the right the cutting edge shows a little tooth, the serration of the upper border being barely perceptible. There is no accessory plate on the right, and on both mandibles the molar is very prominent, as in the species described by SARS.

The first maxilla has the palp terminated by one seta, in accordance with the generic character given by SARS, whereas in the female of *Leptocheilia* this organ is tipped with two setæ.

The first gnathopods are remarkably stout, the fifth joint being a little longer than broad, but almost quadrate, the sixth subequal to it in length but less broad, with the trunk a little longer than its rather broad thumb. The thumb has a slightly serrate inner margin, ends in a small tooth, and is furnished with a row of three setæ on the surface and one seta on the outer margin. The finger is more slender, with undulating inner margin.

The second gnathopods are very slender, with second joint scarcely longer than the fifth or sixth, which are subequal; the fourth joint is much shorter than these, but a little longer than the third; the slender curved finger is about as long as the sixth joint.

The peræopods are small, with the second joint decidedly longer and, especially in the last three pairs, broader than any of the other joints; the fourth and fifth joints differ little in length, each being shorter than the sixth, which is also considerably longer than the finger.

The pleopods resemble those of *Leptochelia*, having the inner margin of each oval ramus fringed with setæ, and the outer margin of the outer ramus carrying one seta placed high up.

The uropods have a six-jointed inner ramus, of which the first joint is the stoutest and the last the longest, carrying at its apex one seta as long as the ramus and one or two shorter setæ. The outer ramus, which is also tipped with a long and a short seta, is composed of two joints, the first very short, the second more than twice as long, the two together rather longer than the first joint of the inner ramus.

Length:—Of four specimens the largest measured a little over 2 millims., and the smallest a little over 1 millim. in length.

Locality:—Gulf of Manaar.

The specific name refers to the remarkable stoutness of the first antennæ, which appears to distinguish the species from any hitherto described in this genus or *Leptochelia*.

#### **Leptochelia, DANA.**

1849, *Leptochelia*, DANA, 'Amer. J. Sci.,' ser. 2, vol. 8, p. 425.

1900, *Leptochelia*, STEBBING, in WILLEY'S 'Zoological Results,' pt. 5, p. 614.

1900, *Leptochelia*, BORRADAILE, 'Proc. Zool. Soc.,' London, p. 797.

1902, *Leptochelia*, H. F. MOORE, 'Bull. U.S. Fish Comm.,' vol. 20 (for 1900), p. 165.

1902, *Leptochelia*, H. RICHARDSON, 'Trans. Connecticut Ac. Sci.,' vol. 11, p. 279.

For a fuller synonymy of this genus down to 1900, WILLEY'S 'Zoological Results' may be consulted. Mr. H. F. MOORE'S recently established Porto Rican species, *L. incerta*, is hesitatingly referred by Miss H. RICHARDSON to *L. dubia* (KRÖYER). The undesigned coincidence of dubiety and uncertainty in the specific names with the note of interrogation in the reference very appropriately marks the position of the systematist in dealing with this genus. When the generic name is justified by the presence of the extraordinarily elongated first gnathopods of the mature male, the standing ground is tolerably firm. This applies to four species, but in those leaves

the determination of female and immature specimens in obscurity. In regard to the uropods the outer branch seems to vary not only in different species but even in the same species, being sometimes two-jointed and sometimes one-jointed. The inner branch has always more than three joints.

**Leptochelia mirabilis**, n. sp.—Plate I. (B).

While in many of its features resembling *L. minuta*, DANA, and *L. forresti* (STEBBING), the present species is easily distinguishable from them both and from *L. rapax*, HARGER, by characters of the first and second antennæ, of the first gnathopods and the uropods, as well as by its much greater size.

The cephalothorax has the front rather broadly angled, not reaching beyond the eyes, the sides at first slightly concave, then considerably bulging. In the dorsal line the free segments of the peræon are successively longer to the antepenultimate, with a slight successive decrease in the remaining two. The first five segments of the pleon are subequally short, the telsonic segment equal to two of them combined, apically angular. The pleon at the centre is slightly wider than the peræon.

The eyes are movably socketed, dark, composed of a few large lenses.

The first antennæ are once and two-thirds as long as the body, the first joint a little swollen and bent at the base, about nine times as long as the third joint, the more slender second being about eight times the third; the flagellum of thirteen joints, carrying sensory filaments, is between two and three times as long as the third joint.

The second antennæ are about one-fourth as long as the first, the fourth joint of the peduncle longer than the three preceding joints combined and more than twice as long as the fifth joint, which is a little shorter than the two-jointed needle-like flagellum, not including its two or three long apical setæ attached to the minute second joint.

The first gnathopods are of very surprising length, being much more than twice as long as the whole body of the animal, and while, considered in themselves, they are very slender, on the other hand, when compared with the frame that carries them, their stoutness becomes a matter for wonder. The basal joints are short, but the three terminal joints are of enormous length. The pair are not symmetrical and both members are damaged, so that exact measurements cannot be given. In the larger one the slender, apically curved, movable finger is equal in length to the first joint of the first antennæ; it is shorter than the trunk of the hand, which widens to the hinge of the finger, and is produced to a long slender thumb or immovable finger, the apex of which is broken. The existing portion of the antepenultimate joint is longer than the trunk of the hand, and is narrower near the base than in the greater part of its length. In the shorter member the hand widens more abruptly and shows a little gap at the base of the fingers, the movable finger being sinuous, and having three little tubercles on the inner margin near the base.

Second gnathopods of quite insignificant size, agreeing in character with the first

and second peræopods, but rather longer, all the joints slender, the third very short, the sixth shorter than the second, but longer than the fourth or fifth, these being subequal, each a little longer than the very slender slightly curved finger.

The third, fourth, and fifth peræopods are shorter and stouter than the preceding pairs, with curved spines round the apex of the fifth, and small setæ round that of the sixth joint; the finger tolerably stout.

The pleopods, as in the other species and in *Heterotanais*, have the two narrowly oval subequal rami fringed on the inner margin with long plumose setæ, the outer ramus having high up on its outer margin a single adpressed seta.

The uropods have the inner ramus seven-jointed, the joints carrying numerous setæ (the apex of the seventh broken); the outer ramus has two joints, longer than the first two of the inner ramus.

Length, 6 millims. to 7 millims. For *L. minuta* and *L. forresti* the recorded length does not exceed 2.5 millims.

Locality:—Gulf of Manaar.

**Leptochelia lifuensis**, STEBBING—Plate I. (C).

1900, *Leptochelia lifuensis*, STEBBING, in WILLEY'S 'Zool. Results,' pt. 5, p. 616, pl. 64C, D, pl. 65B.

1900, *Leptochelia*, sp., BORRADAILE, 'Proc. Zool. Soc. London,' p. 797, pl. 51, figs. 2-2c.

This species has recently been described and figured, and the illustrations here given will, I think, show that the Ceylon specimens are in substantial agreement with those from Lifu. They also show the considerable contrast between the antennæ and gnathopods of the male in this species and those in *L. mirabilis*. The question, however, remains open as to a possible dimorphism in the males, which would diminish or destroy the contrast.

Specimens in the collection from eight stations are referred to this species.

Locality, &c.:—On baskets of oysters hung to buoy at Galle: Two specimens, female; one 3.35 millims. long with seven large eggs. From pearl oysters, East Cheval Paar, Gulf of Manaar: A male, 2 millims. long; the two teeth on the thumb of the cheliped rather close together, and on one of the chelipeds not fully formed; outer ramus of uropod one-jointed, inner five-jointed. Female from same station, 2.5 millims. long and agreeing with description in WILLEY'S 'Zoological Results.' From pearl oysters, Gulf of Manaar: Male, 2.5 millims. long; two teeth on thumb of cheliped close together; outer ramus of uropod one-jointed, very short; inner ramus imperfect. Female, 3 millims. long. Off Mutwal Island, March 19, 1902: A female, 4 millims. long; outer ramus of uropod two-jointed, inner six-jointed. Cheval Paar, Gulf of Manaar: A female, 3 millims. long; outer ramus of uropod one-jointed, inner five-jointed, the last two joints rather long; the one-jointed ramus very short. Also a female, 1.75 millims. long; outer ramus one-jointed, inner four-jointed. At each of two other points in the Gulf of Manaar a female specimen was taken. By "female" should be understood specimens without any distinctively male characters.

## ISOPODA GENUINA.

## TRIBE : FLABELLIFERA.

## FAMILY : ANTHURIDÆ.

**Calathura**, NORMAN and STEBBING.

1886, *Calathura*, NORMAN and STEBBING, 'Trans. Zool. Soc.,' London, vol. 12, pt. 4, p. 122.

1897, *Calathura*, SARS, 'Crustacea of Norway,' vol. 2, p. 44.

1901, *Calathura*, WHITELEGGE, 'Mem. Australian Mus.,' vol. 4, pt. 2, p. 225.

1901, *Calathura*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 23, p. 509.

To the species *Calathura brachiata* (STIMPSON) SARS has added his *C. norvegica*, WHITELEGGE his *C. gigas*, and Miss RICHARDSON her *C. crenulata*. BONNIER'S *C. affinis* (1896) seems rather to belong to *Paranthura*.

**Calathura**, sp.

Two specimens occur in the collection, one from weed-bearing oysters off south-east of Modragam Paar, the other from north end of Chilaw Paar, February 2, 1902, 9 to 11 fathoms. Both have dark eyes. The former is about 14 millims. in length, the latter about 9 millims. They may be the species which HASWELL has described in 'Proc. Linn. Soc. N. S. Wales,' vol. 5, p. 478, plate 10, fig. 5, 1881, as *Paranthura* (?) *crassicornis*, sp. nov. The Australian Anthuridæ will no doubt before long be more fully described, and I have therefore left over these specimens till a more favourable opportunity offers for their specific identification.

## FAMILY : GNATHIIDÆ.

**Gnathia**, LEACH.

1814, *Gnathia*, LEACH, 'Edinb. Encycl.,' vol. 7, p. 402.

1835, *Gnathia*, WESTWOOD, LOUDON'S 'Mag. Nat. Hist.,' vol. 8, p. 273.

1885, *Anceus*, HASWELL, 'Proc. Linn. Soc. N. S. Wales,' vol. 9, pt. 4, p. 1005.

1887, *Anceus*, H. J. HANSEN, 'Dijmphna-Togtets Krebsdyr,' p. 205.

1896, *Gnathia*, BONNIER, 'Ann. Univ. Lyon,' vol. 26, p. 571.

1900, *Gnathia*, STEBBING, in WILLEY'S 'Zoological Results,' pt. 5, p. 625.

1901, *Gnathia*, OHLIN, 'Bihang K. Svenska Vet.-Akad. Handlingar,' vol. 26, No. 12, p. 20.

1902, *Gnathia*, HODGSON, 'Nat. Hist. of the "Southern Cross,"' p. 241.

The references here given are supplementary to the much longer list supplied in WILLEY'S 'Zoological Results.' As the material in the present collection is limited to a single small specimen, it would not be a suitable opportunity for an extended review of the genus. Especial attention, however, should be directed to *Gnathia ferox* (HASWELL), since it is evidently a near ally of the species about to be described. The details of the mandibles are similar in the two, but by the relative size and position of these features the appendages in question are strongly distinguished. The maxillipeds and first gnathopods of *G. ferox* are as yet undescribed. It is not

improbable that a separate genus will be thought desirable for these species, when they are more fully known.

**Gnathia insolita**, n. sp.—Plate XII. (B).

The head is very broad, markedly emarginate between the mandibles, the minute rostral point in the emargination only becoming visible after mounting, which involved some flattening of the frontal border. The telson is acutely triangular. Eyes small, dark, oval, slightly oblique in position, facets numerous.

Upper antennæ: Second joint shorter than first, first shorter than third, flagellum with very short first joint, long second, which is subequal to remaining three joints combined.

Lower antennæ: These are longer than the upper, with second joint of the four-jointed peduncle much the shortest; of the six-jointed flagellum the first joint is the longest.

The mandibles implanted wide apart are of uncommon pattern. There is no tooth on the outer margin; about midway on the inner is a quadrate process that might represent the molar; the apical part presents two strongly divergent teeth, with a small convex lamina at the bottom of the cavity between them.

The maxillipeds are of very delicate structure, except for the strong muscles in the second joint. This joint is broader than long, not showing any distinct apical lobe. In the four-jointed palp each joint is successively narrower than its predecessor. They have the outer margin fringed with setæ, 3 on the first, 5 on the second, 8 or 9 on the third, and 7 on the rounded incurved fourth joint.

The first gnathopods are very distinctive of the species, not having the ordinary tapering character, but the principal joint being as broad as it is long. Within are seen the chitinized areas, probably indicative of original joints now in coalescence. The middle area is the most extensive, the lowest has a feebly indicated companion. The upper half of the rounded margin is furnished with 21 graduated setæ. This margin is the upper and inner when these valve-like limbs are closed together, but it is not to be inferred that that is the proper description according to homology. There is a very small apical joint, with no trace of a division into two joints.

The second gnathopods are rather longer than the four pairs of peræopods, of which the second pair are slightly the shortest. In general character all five pairs of trunk-limbs agree.

The first pleopods have the rami rather longer than those of the other four pairs. All five agree with the uropods in carrying rather long setæ, which is contrary to custom in the adult male of this genus.

Length barely 2 millims., breadth a little less than half the length.

Locality:—Gulf of Manaar, off Karativo, from a sponge.

The specific name refers to the unusual characters of the mandibles and first gnathopods.

## FAMILY : EURYDICIDÆ.

(Cirolanidæ of HARGER, HANSEN, BONNIER, STEBBING, NORMAN, and others.)

Among the genera that have been assigned to this family, *Eurydice*, LEACH, 1815, is beyond dispute the earliest, so that the name Cirolanidæ, notwithstanding the distinction conferred upon it as the title of HANSEN'S notable work in 1890, is bound to give way to Eurydicidæ. Another generic name has "page precedence" over *Cirolana*, since in 1818 LEACH established *Nelocira* as his tenth genus of Cymothoadæ, and *Cirolana* as the eleventh, assigning a single species to each respectively, *Nelocira swainsoni* and *Cirolana cranchii*. These are now considered to be one and the same species. The only distinction between them which LEACH supplied was that the pleon of *Nelocira* had five segments and that of *Cirolana* six. As, therefore, the generic character of *Nelocira* is erroneous, it is just that the preference should be given to the correctly described *Cirolana*, and this has been done by general consent. It is, moreover, convenient, because *Nelocira* is apt to be confused with the very similarly named but quite distinct genus which LEACH at the same date called *Nerocila*.

The family at present includes seven closely connected genera, distinguished in the following synoptic table:—

- |   |   |  |
|---|---|--|
| 1 | { Pleon forming only two distinct segments.   | 1. <i>Colopisthus</i> , H. RICHARDSON, 1902. |
|   | { Pleon forming more than two distinct segments—2.                                    |  |
| 2 | { Eyes absent; peduncle of uropods with inner apex not produced.                      | 2. <i>Cirolanides</i> , BENEDICT, 1896.      |
|   | { Eyes present; peduncle of uropods with inner apex produced—3.                       |  |
| 3 | { Peduncle of second antennæ four-jointed; maxillipeds without hooks on second joint. | 3. <i>Eurydice</i> , LEACH, 1815.            |
|   | { Peduncle of second antennæ five-jointed;* maxillipeds with hooks on second joint—4. |  |
| 4 | { First pleopods with inner branch broad.   | 4. <i>Cirolana</i> , LEACH, 1818.            |
|   | { First pleopods with inner branch narrow—5.  |  |
| 5 | { Head and trunk broad.   | 5. <i>Hansenolana</i> , STEBBING, 1900.      |
|   | { Head and trunk narrow—6.  |  |

\* With regard to a sixth joint in this peduncle in *Cirolana*, *Conilera* and *Bathynomus*, see HANSEN, 'Journ. Linn. Soc.,' vol. 29, p. 339.

- 6 { First pleopods indurated; second with male appendix attached at base of inner ramus. 6. *Conilera*, LEACH, 1818.
- 6 { First pleopods not indurated; second with male appendix attached far from base of inner ramus. 7. *Conilorpheus*, n. gen., 1905.

In addition to these some authors include in this family the huge-eyed *Bathynomus*, A. MILNE-EDWARDS, 1879, which has the two abnormal characters of an accessory branch on the first antennæ and supplementary branchiæ on the pleopods, the blind *Anuropus*, BEDDARD, 1886, in which the uropods resemble the pleopods in character, and the maxillipeds have a one-jointed palp, and *Branchuropus*, H. F. MOORE, 1902, which agrees with *Anuropus* in the characters just mentioned, but differs from it by possessing eyes and in the general habit of body. I am disposed to allot *Bathynomus* to a separate family Bathynomidæ, and the other two genera to a family Anuropidæ, as already suggested for the former of them in 1893.

A. DOLLFUS ('Ann. Sci. Nat.,' Zool., Ser. 8, vol. 20, p. 271) now transfers his genus *Sphæromides*, 1898, to the family Cirolanidæ, and institutes in that family a new genus *Faucheria* for *Cæcospharoma faucheri*, DOLLFUS and VIRÉ, 1900, to which he believes that *Spelæospharoma julium*, FERUGLIO, 1904, is nearly allied.

#### Cirolana, LEACH.

- 1818, *Cirolana*, LEACH, 'Diet. Sci. Nat.,' vol. 12, p. 347.
- 1881, *Cirolana*, MIERS, 'Ann. Nat. Hist.,' ser. 5, vol. 8, p. 369.
- 1896, *Cirolana*, BONNIER, "Édriophthalmes du 'Caudan,'" 'Ann. Univ. Lyon,' vol. 26, p. 574.
- 1900, *Cirolana*, STEBBING, in WILLEY'S 'Zoological Results,' part 5, p. 629.
- 1902, *Cirolana*, F. MOORE, 'Bull. U.S. Fish Commission,' vol. 20 (for 1900), pt. 2, p. 166.
- 1902, *Cirolana*, STEBBING, 'South African Crustacea,' part 2, p. 49.
- 1903, *Cirolana*, DOLLFUS, 'Bull. Soc. Zool. France,' vol. 28, p. 5.
- 1904, *Cirolana*, STEBBING, in WILLEY'S 'Spolia Zeylanica,' vol. 2, pt. 5, p. 11.
- 1904, *Cirolana*, STEBBING, in GARDINER'S 'Fauna, Maldive and Laccadive Archip.,' vol. 2, pt. 3, p. 701.
- 1904, *Cirolana*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 27, p. 35.
- 1904, *Cirolana*, NORMAN, 'Ann. Nat. Hist.,' ser. 7, vol. 14, p. 437.
- 1905, *Cirolana*, HANSEN, 'Journ. Linn. Soc. London,' Zool., vol. 29, p. 339.

The species assigned to this genus are now very numerous, and it must be considered a fortunate circumstance that there is no necessity for transferring them to *Nelocira*, which lapses as practically a nomen nudum. The references above given will enable the student to trace a far longer list. The blind *C. cubensis*, W. P. HAY, 1903, needs to be compared with *C. cæca*, DOLLFUS, 1903.

#### *Cirolana sulcatauda*, STEBBING.

- 1900, *Cirolana sulcatauda*, STEBBING, in GARDINER'S 'Fauna, Maldive and Laccadive Archip.,' vol. 2, pt. 3, p. 701, pl. 49B.

Of this species a specimen measuring about 6 millims. in length was taken at

Cheval Paar, and five specimens occurred in a tow-net gathering off Marichchukaddi. With the five there were four young specimens, two of which did not certainly belong to the same species. In this latter gathering there were also two specimens of a young *Idotea*.

***Cirolana parva*, H. J. HANSEN.**

1890, *Cirolana parva*, HANSEN, 'Vid. Selsk. Skr.,' ser. 6, vol. 3, pp. 321, 340, pl. 2, fig. 6-6*b*; pl. 3, fig. 1-1*d*.

1901, *Cirolana parva*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 23, p. 514 (Localities).

1902, *Cirolana parva*, H. F. MOORE, 'Bull. U.S. Fish. Com.,' vol. 20 (for 1900), pt. 2, pp. 166, 167, pl. 8, figs. 6-8.

This species is known from both the East and West Indies, and is probably to some extent variable, since HANSEN and MOORE agree in saying that the broad, sub-triangular telsonic segment has the rounded apical margin furnished with about eight spines, while in our specimens the number appears to be uniformly six.

MOORE describes the uropods as "short, reaching hardly to end of telson: rami subequal, narrow at ends, bifid, their margins furnished with spines and a few short setæ." But our specimens agree with HANSEN'S account, according to which the inner ramus reaches beyond the outer and is broader, and with his figure which shows it to be very much broader, so as to make the term subequal quite inapplicable.

The first antennæ have the third joint of the peduncle about as long as the composite first and second joint, the flagellum little shorter than the peduncle, nine-jointed in both adult male and female. HANSEN gives it as eleven-jointed, much shorter than the peduncle, MOORE as eleven- to twelve-jointed. The second antennæ have the first three joints of the peduncle very short, fourth a little shorter than the fifth, flagellum in male twenty-six-jointed, in female twenty- to twenty-two-jointed. A specimen not fully adult, having the fifth peræopods unarmed and much shorter than the fourth, had the flagellum of the first antennæ seven-jointed, that of the second fifteen-jointed.

In the maxillipeds the antepenultimate joint is furnished with only four or five setæ on the outer margin.

The first gnathopods have five blunt spines on the hind margin, the bluntness probably due to wear. At the apex of the inner margin the sixth joint in all the limbs has a rather strong spine.

The male appendix of the second pleopods is slender, the acute apex slightly incurved, reaching beyond the rami.

Length, male about 6.5 millims., breadth 2 millims.; female about the same size; specimen not adult, 3 millims. long, 1.25 millims. broad.

Localities:—Male, Chilaw Paar, Station LXIX., 8 to 11 fathoms; female with young, Muttuvaratu Paar, 10 fathoms. Specimen not adult, Talaivillu Paar.

***Cirolana*, sp.**

The telsonic segment is smooth, triangular, with the apex almost acute, but not

quite, since a high magnification shows it narrowly truncate, carrying two spines. Each side also carries two spines just above the apex.

The eyes are rather small, lateral. The first antennæ have the third joint about as long as the composite first and second, and the flagellum of seven joints, most of which carry sensory filaments. In the second antennæ the ultimate joint of the peduncle is slightly longer than the penultimate; the flagellum is rather long, fifteen-jointed. The mouth organs are of the pattern characteristic of *Cirolana*. The limbs are rather slender, not very strongly setose or spinose, the first gnathopods being, as usual, discriminated from the succeeding legs by the position of the fifth joint. The uropods, like the telson, have a fringing of fine spines and feathered setæ; the inner apex of the peduncle is rather sharply produced about to the middle of the broad inner ramus, which narrows apically and extends beyond the telsonic segment and the narrower inner ramus. The integument is covered with scale-like markings.

The length is 5 millims., with a breadth of about 2 millims. The specimen carried several young ones, still enclosed in membranous capsules, but with the eyes already visible. I hesitate about applying a specific name, whether new or old, to this small ovigerous specimen.

Locality:—Deep water, south of Galle, depth up to 100 fathoms.

#### **Conilorpheus**, n. gen.

Only the male known. Both first and second antennæ short. First maxillæ carrying four strong plumose setæ on the inner plate. The maxillipeds having the plate of the second joint furnished with hooked spines. The male appendix of the second pleopods is attached far down on the inner ramus. The uropods have the process of the peduncle very elongate and the outer ramus much smaller than the inner.

The body is almost cylindrical, with the basal segment of the short pleon covered by the lacinated seventh segment of the peræon. In the first pleopods the peduncle is not longer than broad, and neither ramus is hard.

The generic name refers to the combination of characters, here presented, partly pointing to the genus *Conilera* and partly to the genus *Eurydice*, which takes its name from the wife of Orpheus. The first maxillæ, like those of *Bathynomus*, show an unusual feature in carrying four setæ instead of three on the inner plate, and the lacinate border of the last peræon segment is also uncommon in this family.

#### **Conilorpheus herdmani**, n. sp.—Plate II. (A).

The head is produced into a narrow distally widened process between the first antennæ; its breadth is not much greater than its length. The second and third segments of the parallel-sided peræon are the shortest; the first segment even at the forward produced sides is not longer than the seventh, of which the postero-dorsal

margin is cut into four acute lappets; between these the pleon segments, second to fifth, are partially seen. The telsonic segment narrows near the base, forming a broad oval, of which the serrate apical margin is beset with setæ and small spines.

The eyes are not large, wide apart, round.

The short stout first antennæ have the second joint of the peduncle as it were embedded in the broader first joint; the tapering flagellum is composed of seven short joints, most of them carrying sensory filaments. The second antennæ are about twice the length of the first. The third joint of the peduncle is the longest, and not much longer than broad, the fourth joint is of equal length and breadth, shorter but much broader than the fifth joint and on its obliquely truncate distal margin carrying some elongate setæ; one such seta is similarly situate on the fifth joint. The flagellum is shorter than the peduncle, nine-jointed.

The mouth-parts are as in *Cirolana*, except that the first maxillæ have four stout plumose setæ on the inner plate. The spines on the outer plate are slender. The maxillipeds are well furnished with setæ and spines, and the antepenultimate joint is large.

The first gnathopods have the second joint distally widened and the third still more so, the latter having the front apex and hind margin fringed with setæ. The fourth joint has four blunt spines on the hind margin and a long spine on the front apex; it entirely overlaps the small fifth joint which carries two blunt spines, one of them minute. The sixth joint has a stout spine between two thin ones, and some long setæ. The finger is slightly curved, nearly as long as the sixth joint, and, like the other limbs, has on the inner margin a small tooth or spine at the base of the short curved nail.

The fourth and fifth peræopods are nearly alike and about equal in length, but the second and fourth joints are longer and the fifth and sixth joints are shorter in the fifth pair than in the fourth. The side-plates are distally subquadrate in the sixth peræon segment, but are more produced and distally triangular in the seventh.

The first pleopods have the peduncle of equal length and breadth, with four delicate coupling spines. The inner ramus is rather shorter than the outer and less than half as broad. Both have the rounded distal margin fringed with plumose setæ. In the second pair the peduncle is broader than long; the inner ramus is almost as long as the outer and much more than half as broad. The male appendix is slender, apically acute, attached just above the middle of the inner margin of the inner ramus and extending considerably beyond both rami, which are armed as in the preceding pair. In all five pairs the outer ramus is broad, more or less vaulted and distally fringed with setæ. The inner ramus has some distal setæ in all but the last pair.

The uropods have the short base of the peduncle produced on the inner side into a very long process. The inner ramus is large, oval, reaching nearly to the end of the telsonic segment, and having all its free margin similarly serrate and armed with short spines and long plumose setæ. It has two or three dark markings. The outer

ramus is only half as broad and half as long as the inner, with similar armature on the distal half.

Length 6 millims., breadth 1.5 millims.

Locality:—Station V., north end of Chilaw Paar, February 2, 1902, 9 to 11 fathoms.

The specific name is chosen out of respect to the president of the Linnean Society, to whose ever watchful activity in the interests of science the collection of species here described is due.

#### **Hansenolana, STEBBING.**

1900, *Hansenolana*, STEBBING, in WILLEY'S 'Zoological Results,' pt. 5, p. 634.

The species *H. anisopous*, for which this genus was originally established, shows, as I observed at the time, various points of resemblance to *Cirolana sphaeromiformis*, HANSEN. While retaining the latter in the genus *Cirolana*, HANSEN himself forcibly calls attention to the singularity of its appearance. He had at command only one specimen, a female, not ovigerous, 4.25 millims. long, from St. Thomas, in the West Indies. The examination of a male specimen in Professor HERDMAN'S collection induces me now to transfer the species to *Hansenolana*, the definition of which will in consequence require to be modified as follows:—

Head transverse, produced into a process between the two pairs of antennæ; first five segments of pleon very short. Eyes small and wide apart. Mouth organs nearly as in *Cirolana*, but on the inner plate of the first maxillæ the three setæ are spine-like and not coarsely plumose. In the second maxillæ the outer pair of plates carry very few spines. First gnathopods with the sixth joint broad. First pleopods with narrow rami. Male appendix of the second pleopods attached at some distance from the base of the ramus.

The two species which at present fall under this definition are easily distinguished:—

- |                                  |  |
|----------------------------------|--|
| Apex of telsonic segment broad.  | 1. <i>H. anisopous</i> , STEBBING.     |
| Apex of telsonic segment narrow. | 2. <i>H. sphaeromiformis</i> (HANSEN). |

Between these two may, perhaps, be placed *Cirolana hanseni*, BONNIER ('Ann. Univ. Lyon,' vol. 26, p. 574, 1896), originally described from an obviously juvenile specimen, and now (1905) re-described by HANSEN from specimens probably still immature. In this species the telsonic segment has an apex much less broad than that of *H. anisopous*, but considerably broader than that of *H. sphaeromiformis*.

#### **Hansenolana sphaeromiformis (HANSEN)—Plate II. (B).**

1890, *Cirolana sphaeromiformis*, H. J. HANSEN, 'Vid. Selsk. Skr.,' ser. 6, vol. 5, pp. 319, 351, pl. 4, fig. 3-3g.

1900, *Cirolana sphaeromiformis*, STEBBING, in WILLEY'S 'Zoological Results,' pt. 5, p. 634.

1901, *Cirolana sphaeromiformis*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 23, p. 512.

HANSEN'S full description, together with his figures of the female, and those here

given of the male, leaves only a few points needing to be submitted or explained. The flagellum of the second antennæ has in our specimen ten joints instead of twelve. The epistome and upper lip I did not clearly make out. HANSEN does not call attention to the almost complete smoothness of the three setæ on the inner plate of the first maxillæ. The second maxillæ have three spines on the outermost plate and four on its companion. In the second pleopods the inner ramus is narrow and has the male appendix attached about one-third of its length from the base, reaching beyond both rami, and having apparently a bifid apex. The first four pairs of pleopods have setæ on both rami; the fifth pair escaped observation. In the telsonic segment, which is covered with squamose markings rather more conspicuously than the rest of the body, the three dorsal carinæ are clearly developed. But here the lateral pair appear to run without divergence and none of the three quite reach the margin of the segment, in these respects differing from the female represented by HANSEN. According to HANSEN the apex is not spinose, and he says the same of the uropods. In our specimen both the segment and its appendages carry several minute spines, which are only visible under high magnification. This is also the case in a specimen sent me from Antigua by W. R. FORREST, Esq.

In the first gnathopods the spines on the inner margin of the broad hand show a variety of minute denticulations. In this and the other limbs the point of junction between nail and finger is marked on the convex margin by a group of microscopic setules. The first gnathopods cannot claim to be subchelate, though otherwise by breadth and compactness they make some approach to the corresponding limbs in *H. anisopous*. But, whereas in that species the two following pairs are very differently and more slenderly constructed, here they show a very near agreement, in all three pairs the fifth joint underriding the sixth.

Length scarcely 3 millims., breadth 1.5 millims., the proportion being 27:14. HANSEN's specimen was 4.25 millims. long.

Locality:—Among compound Ascidians and with other Isopods at Reef, Galle.

The small size and deceptive appearance of this species, rather than any actual rarity or any marvel of distribution, may account for the fact that the East Indies have now revealed a solitary specimen of the male fourteen years after the West Indies had disclosed a solitary specimen of the female.

#### FAMILY: ARGATHONIDÆ, nov.

Mandibles, with cutting edge bidentate or simple; molar represented by a feeble blade, not serrate. First maxillæ with inner plate broadly truncate, outer strongly produced, ending in an unguis with a small curved spine at its base. Second maxillæ very short, ending in a broadly rounded single lobe. Maxillipeds six-jointed, second joint not elongate, fourth and fifth joints fused together, seventh well-developed, blunt. Male appendix of second pleopods affixed at the base of the ramus.

By the character of the mandibles this family offers a connecting link between the

Eurydicidæ and other neighbouring families, such as the Corallanidæ, but in every one of the mouth parts it presents some distinctive feature. It is at present represented only by a single specimen of a single species, so that it is not possible to say what amount of sexual dimorphism may occur.

**Argathona**, n. gen.

The characters of the family will at present suffice for those of the single genus. *Argathona* is a nymph or half-goddess, so recently sprung from the brain of Mr. JUSTIN HUNTLY McCARTHY, that her name is not likely to have been hitherto borrowed for scientific purposes.

**Argathona normani**, n. sp.—Plate III. (A).

The first peræon segment is rather the longest, and the last rather the shortest. The side-plates are diagonally furrowed, those of the second and third segments less deep than the rest, and not produced beyond their segments; the last four pairs are rhomboidal. The fourth pleon segment overlaps the fifth at the sides. The telsonic segment, with sinuous sides, becomes rather narrowly triangular as it approaches the rounded apex. The dorsal surface of the animal from one end to the other is beset with spines large or small, the only segment free from them being the first of the pleon, but also a basal area is left free where one segment slides under another, and a sinuous free area marks what is probably the boundary between the sixth pleon segment and the true telson. The sixth and seventh segments of the peræon have each six pale tubercles among the fringing spines of the hind margin; the fourth pleon segment has the same number, but less regularly spaced; the fifth has two that are submedian and much larger than those already mentioned, and the sixth segment has a pair which are quite near to the sides. The telson carries numerous spines in the serrate border besides those that belong to the dorsal cover, and is likewise fringed with long plumose setæ.

The eyes are dark, rather large, set wide apart.

The short first antennæ have the first and second joints apparently fused into one thick joint, not much longer than the following more slender joint; the flagellum, rather longer than the peduncle, is twelve-jointed.

The second antennæ have the fourth joint rather longer than the three preceding joints combined, and the fifth rather longer than the fourth; the twenty-nine-jointed flagellum is once and two-thirds the length of the peduncle.

The frontal lamina is pentagonal, not very large. The epistome forms two arms widely divergent, reaching beyond the membranaceous upper lip, in which a transverse area is perceptible of normal form, probably more highly chitinized than the remainder of the appendage.

The lower lip is longer than broad, the lobes elongate piriform, flattened on the confronting margins, the rounded apices not as usual fringed with setules, but

carrying a short tooth or spine at the inner angle, and a longer one inserted a little behind and outside the other.

The mandibles are elongate, that on the left bidentate, that on the right with the cutting edge undivided; each has a narrow, transparent, apparently very feeble blade representing the molar, but devoid of the saw-teeth which are conspicuous in *Eurydice* and *Cirolana*. The palp is implanted near the base of the trunk, its second joint much longer either than the first or falciform third.

The maxillipeds are narrow, the three terminal joints setose, none very widely expanded.

The first gnathopods are moderately robust, with four short stout spines conspicuous on the stout fourth joint; the fifth joint short, not produced along the inner side of the sixth joint, which is very slightly armed; the finger curved, simple. The second gnathopods and first peræopods agree with the preceding limb. The four following pairs have a different character, with less tendency to geniculation, except between the second and third joints. There is little difference in length between the joints from the second to the sixth, the first three of these having the expanded distal margin beset with spines of varying length, and some of the spines, especially on the hinder apex of the fifth joint, are serrate. The finger shows a little projection at the base of the nail.

The pleopods have large rami. In the second pair the male appendix, affixed close to the base of the ramus, reaches a little beyond it, and is abruptly narrowed to a short linear apex; near the base its margin is fringed with minute setules.

The uropods have the peduncle considerably produced, spinose on its outer part, but dorsally almost clear, the long process having lateral and apical armature. The rami are strongly fringed like the telson, and the broad inner ramus, which reaches a little beyond the telson, is dorsally sprinkled with short spines, but the much narrower outer ramus has much of its dorsal surface smooth, evidently to suit its habit of folding underneath its companion.

The smooth ventral surface is orange-coloured, the spiny coating of the back dark brown, the limbs quite pale.

Length of the specimen in slightly bent position, 10 millims., which is about two and a-third times the breadth. A second specimen measured 12 millims. in length by 6 millims. in breadth.

Locality :—The smaller specimen was from coral reefs, Gulf of Manaar, the larger from Station XXXIX., south of Galle, up to 30 fathoms.

The clothing of this species gives it, when under the microscope, a very striking appearance; especially its caudal fan, by the grouping and variety of the spines and the addition of the long feathered setæ in more or less symmetrical arrangement, produces a particularly agreeable effect on the eye. I have named it in honour of my friend the Rev. A. M. NORMAN, D.C.L., F.R.S., whose services to the zoology of invertebrates are justly celebrated.

## FAMILY: CORALLANIDÆ.

It is only necessary here to recall that the family embraces the genera *Corallana*, DANA, *Tachaa*, SCHIÖDTE and MEINERT, *Alcirona*, HANSEN, and *Lanocira*, HANSEN, with HANSEN'S definition of the family Alcironidæ transferred to the modified family Corallanidæ.

**Lanocira**, HANSEN.

1890, *Lanocira*, HANSEN, 'Vid. Selsk. Skr.,' ser. 6, vol. 5, pt. 3, pp. 287, 313, 391, 395.

1904, *Lanocira*, STEBBING, in GARDINER'S 'Fauna, Maldive and Laccadive Archip.,' vol. 2, pt. 3, p. 706.

The species may be distinguished as follows:—

- |   |  |                                       |
|---|--|---------------------------------------|
| 1 | { The hinder part of the body not setigerous.  | 1. <i>L. krøyeri</i> , HANSEN.        |
|   | { The hinder part of the body setigerous—2.    |                                       |
| 2 | { Head (of male) with frontal horn.            | 2. <i>L. gardineri</i> , STEBBING.    |
|   | { Head without frontal horn—3.                 |                                       |
| 3 | { Telsonic segment with broadly rounded apex.  | 3. <i>L. rotundicauda</i> , STEBBING. |
|   | { Telsonic segment with narrowly rounded apex. | 4. <i>L. zeylanica</i> , n. sp.       |

**Lanocira gardineri**, STEBBING.

1904, *Lanocira gardineri*, STEBBING, in GARDINER'S 'Fauna, Maldive and Laccadive Archip.,' vol. 2, pt. 3, p. 706, pl. 51 A.

For the features which may apparently be relied on for distinguishing this species from *L. zeylanica*, see the next following account of the latter form.

Locality:—One specimen of *L. gardineri* was taken at the Galle reef, with compound Ascidians and some other Isopods. A second was taken along with some small sphaeromids at Cheval Paar, and a third was labelled "Gulf of Manaar."

**Lanocira zeylanica**, n. sp.—Plate V. (B).

The general resemblance of this species to *L. gardineri*, which I have recently described from the Maldive-Laccadive Archipelagoes, is extremely close. The distinguishing features are that the present form has the body from the fifth peræon segment to the extremity of the pleon far more strongly setigerous; that it has the front of the head with a well-marked margin and a faintly indicated longitudinal depression behind it, but no upturned frontal horn and no pair of dorsal tubercles between the eyes; that the first maxillæ are stronger; and that the fifth peræopods are armed on the third and fourth joints with far longer spines. As in the other species the second maxillæ are tipped with two setæ, but the difference in length between the two is greater here. The apical spine of the fourth joint in the first gnathopods is here stronger.

The eyes are dark. The first antennæ have a flagellum of five joints carrying sensory filaments. The mandibles with broad base and slender trunk exhibit an apical

tooth, and alongside of the plate which carries this a thin membrane, which appears to be prolonged backward into a slightly curved lingual representative of the molar, the whole apparatus being somewhat obscured by entanglement with the lower lip. The upper lip is slightly emarginate.

The curved finger of the first gnathopod shows two minute prominences on the inner margin, and one such prominence is visible on the other limbs, faintly marking the base of the nail, but the feature is not peculiar to this species. The telsonic segment has six spines at the apex.

Length 6 millims., breadth 2·75 millims.

Locality :—The dissected specimen was a male from Jokkenpiddi Paar. Two other specimens, apparently of the same species, were obtained at the south end of Cheval Paar.

#### FAMILY : ÆGIDÆ.

The accepted genera may be distinguished as follows :—

- |   |   |   |                                    |
|---|---|---|------------------------------------|
| 1 | { | Pleon abruptly narrower than peræon.  | 1. <i>Syscenus</i> , HARGER, 1880. |
|   | { | Pleon not abruptly narrower than peræon—2.  |                                    |
| 2 | { | First antennæ with flagellum of not more than six joints; maxillipeds of not more than four joints. | 2. <i>Rocinela</i> , LEACH, 1818.  |
|   | { | First antennæ with flagellum of more than six joints; maxillipeds of not less than six joints.      | 3. <i>Æga</i> , LEACH, 1815.       |

*Syscenus* agrees with *Rocinela* in respect to the maxillipeds. It is now recognised that the *Rocinela lilljeborgii* described by BOVALLIUS in 1885 is identical with *Syscenus infelix*, HARGER, 1880, but it seems to have been overlooked that BOVALLIUS himself was the first to acknowledge the generic identity, and to point out the probability that *Harponyx pranizoides*, SARS, would prove to be a young *Syscenus* ('Bihang till k. Svenska Vet. Akad. Handl.,' vol. 11, No. 17, p. 17, 1887). *Ægiochus*, BOVALLIUS, is not accepted as distinct from *Æga*. *Acherusia*, LUCAS, 1849, and *Alitropus*, MILNE-EDWARDS, 1840, are regarded as synonyms of *Rocinela*; *Pterelas*, GUÉRIN, 1836, and *Ægacylla*, DANA, 1856, as synonyms of *Æga*.

#### *Æga*, LEACH.

1815, *Æga*, LEACH, 'Trans. Linn. Soc. London,' vol. 11, p. 369.

1879, *Æga*, SCHIÖDTE and MEINERT, 'Naturhist. Tidsskr.,' ser. 3, vol. 12, p. 334.

1882, *Æga*, HASWELL, 'Proc. Linn. Soc. N.S. Wales,' vol. 6, p. 11.

1890, *Æga*, H. J. HANSEN, 'Vid.-Selsk. Skr.,' ser. 6, vol. 5, p. 316.

1897, *Æga*, SARS, 'Crustacea of Norway,' vol. 2, p. 58.

In recent years species have been added to this genus by HANSEN, WHITELEGGE, H. RICHARDSON and NORMAN. Many other references to it may be traced under those given above and in company with those given below for the genus *Rocinela*.

In defining the genus LEACH laid stress on the ample development of the first two

joints of the peduncle of the first antennæ. The dilatation of these joints is used as a character also by SCHIÖDTE and MEINERT. SARS, however, employs the qualified statement, "the first two peduncular joints more or less expanded," and, in fact, describes the antennæ as very slender both in *Æga arctica*, LÜTKEN, and *Æga ventrosa*, M. SARS. The absence of any expansion from the two peduncular joints in question is conspicuous in the figures given by SCHIÖDTE and MEINERT of their species *Æga nodosa*. They further speak of the frontal lamina, that is, the plate above the upper lip between the bases of the second antennæ, as large or very large in *Æga*, but minute or evanescent in *Rocinela*. But, taking all the species of the two genera together, this distinction does not seem to be stable.

In the species about to be described the peduncular joints of the first antennæ are not specially dilated and the frontal lamina is not very large. But while in these respects it makes an approach to *Rocinela*, it is clearly separated from that genus by the flagellum of the first antennæ and by the maxillipeds. Its peculiarities tempted me to make it the type of a new genus, but I am content to leave it for the present as a very distinct unit among the many species of the genus *Æga*.

*Æga ommatophylax*, n. sp.—Plates IV., V. (A).

The very marked and at present seemingly unique feature of this species pertains to the first peræon segment of the male. The anterior border of this segment projects a sub-median pair of cylindrical processes over the large contiguous eyes. The specific name has been chosen to suggest that their function is protective to the organs of vision. In *Rocinela cornuta*, RICHARDSON, the antero-lateral angles of the first peræon segment are extended straight forwards, probably with the same object. The defence obtained is presumably worth the interference with sight that must result from it.

Male. The head projects a distally widened round-ended frontal process slightly upturned, with the exception of this process having its dorsal surface almost completely and its ventral surface partially covered by the dark eyes. The first peræon segment, without including its slightly convergent antero-dorsal processes, is longer than any of the other segments, these varying little among themselves in length or breadth. The first five segments of the pleon are but little narrower than the peræon and are subequal one to the other, somewhat wider than the telsonic segment, which is broader than long, with its broadly rounded apical margin serrate, carrying spines and setæ and having the central point a little produced.

The eyes meet in the middle line of the head, leaving a little triangular interval above, but occupying all the hind margin.

The frontal lamina is not large. The bases of the first antennæ are concealed from above by the front of the head, and have a slender peduncle with flagellum thirteen- to fourteen-jointed. In the second pair the joints of the slender peduncle increase in length from the second to the fifth, and the flagellum is thirty-two-jointed.

The upper lip appears to be rounded, membranaceous. The mandibles have the palp planted near the base of the trunk, with the first joint nearly as long as the second, the third not very short. The first maxillæ are long and slender, the small apex carrying three hooked spines and four spinules. The second maxillæ are much broader than the first, having the inner margin of the apex armed with three little hooks, in addition to which a small, narrowly oval, movable inner plate is tipped with two hooks. The maxillipeds have an irregularly rounded epipod, as wide as the second joint, which is itself wide, elongate, and produced into a narrowly tapering process tipped with two setules. The third joint is short, distinct, the fourth and fifth have distinct outlines, but are, perhaps, only apically separate, the fifth carrying outward curved spines at its apex, its outer margin forming a continuous curve with the faintly separable sixth and seventh joints, which together have a free inner margin tipped with two outward curving spines. As will be seen from the figures, this account of the mouth organs in the male has been a little supplemented from the mouth organs of another specimen possibly of a different sex.

The first gnathopods have a few short finely plumose setæ along the front margin of the rather narrow second joint, and the same garniture seems to occur on the corresponding margin in the other limbs. The third joint is rather longer than the fourth and carries a single spine at its front apex. The fourth joint has two stout spines on the hind margin, the fifth is small, underriding the sixth, but not overlapped in front by the fourth; its spines like those of the hand are slight. The finger is nearly as long as the hand, with setules marking the base of the nail.

The second gnathopods are very similar to the first, but stronger and more spinose. The third joint has a stout spine on the hind margin, and the fourth has four or five such spines; the fifth joint does not underride the sixth. The first peræopod is of nearly the same appearance. On the left side of the specimen each of these limbs has, on the inner apex of the short fifth joint, an articulated obtuse process about twice as long as it is broad, giving the limb a subchelate character. On the right side of the specimen these processes are not present. Whether they are abnormal growths on the left side or are accidentally missing from the right I cannot determine.\* The side-plates of the second gnathopods are round-ended. In the following limbs they tend to become less and less obtuse and those of the fifth peræopods are subacute, produced over the first segment of the pleon, of which, however, the angles are free.

In the last four pairs of peræopods the third joint attains a considerable length, this and the three following joints being armed with numerous well developed spines, of which a group on the hind apex of the fifth joint, though not very long, are

\* It is worth noting for comparison that SARS ('Crustacea of Norway,' vol. 2, p. 61) describes the three anterior pairs of legs in *Aega crenulata*, LÜTKEN, as "distinguished by a very conspicuous cultriform spine, issuing from the end of the propodos, inside the base of the dactylus," and WHITELEGGE ('Mem. Australian Museum,' iv., pt. 2, p. 233) describes a similar process on first peræopods of his *Aega angustata*.

distinguished by their pectinate character. The genital papillæ on the ventral side of the last peræon segment are short and broad.

In the first pleopods the sinuous inner margin of the peduncle carries seven coupling spines and as many plumose setæ. The outer branch, as in the following pairs, is fringed round most of its margin with plumose setæ. The inner branch in this and the next pair has a fringe of setæ on the lower half of the inner margin and on the apical border. The second pair are distinguished by the extraordinary length of the slender male appendix, which is twice as long as the trunk of the supporting branch.

The uropods have the inner apex of the peduncle greatly produced into an acute process, of which the inner margin is setose. The broad inner ramus is mostly fringed with plumose setæ and carries eleven spines in the serrate part of its margin. The shorter and much narrower outer ramus is fringed also with plumose setæ and carries nine spines.

Length 14 millims., breadth about 6 millims.

Locality:—The single specimen, a male, was taken in "deep water off Galle."

A specimen which I deem to be the female or a younger form of the foregoing was "dredged off Mutwal Island," and measured 12 millims. in length, with a width of about 4.5 millims. It is devoid of the frontal process of the head, and the first peræon segment is without the two submedian dorsal processes. The last three segments of the peræon more decidedly surpass in length the preceding three segments than in the form already described; the first antennæ have twelve and the second antennæ have twenty-six joints to the flagellum. The peculiar process of the wrist in the second gnathopod and first peræopod is wanting. No male appendix could be discerned in the (undissected) pleon. Otherwise the agreement of the two specimens is extremely close. The remarkable eyes are alike in both, and though they agree with those of *Rocinela vigilans*, HASWELL, that much larger species, if the figure of the maxillipeds can be trusted, must be generically distinct. The tenacity with which some of the mouth parts in this and kindred species cling together makes satisfactory dissection difficult. But there is little reason to doubt that the frontal lamina, epistome, and rounded membranaceous upper lip figured from the second specimen would equally well represent those parts in the first, had they there been in a condition for figuring. *Æga cyclops*, HASWELL, is described as having the eyes confluent, the telsonic segment sub-triangular.

#### **Rocinela, LEACH.**

- 1818, *Rocinela*, LEACH, 'Dict. Sci. Nat.,' vol. 12, p. 349 ("Rocinèle," p. 348).  
 1825, *Rocinela*, DESMAREST, 'Consid. gén. Crust.,' p. 304.  
 1849, *Acherusia*, LUCAS, 'Explor. Algérie, Crust.,' p. 78.  
 1867, *Rocinela*, BATE and WESTWOOD, 'Brit. Sessile-eyed Crust.,' part 18, vol. 2, p. 289.  
 1879, *Rocinela*, SCHIÖDTE and MEINERT, 'Naturhist. Tidsskr.,' ser. 3, vol. 12, p. 380.  
 1880, *Rocinela*, HASWELL, 'Proc. Linn. Soc. N. S. Wales,' vol. 5, p. 472.  
 1883, *Rocinela*, HARGER, 'Bull. Mus. Comp. Zoöl.,' vol. 9, art. 23, p. 97.

- 1890, *Rocinela*, H. J. HANSEN, 'Vid. Selsk. Skr.,' ser. 6, vol. 5, pp. 298, 316, 406.  
 1893, *Rocinela*, STEBBING, 'History of Crustacea,' p. 348.  
 1896, *Rocinela*, BONNIER, "Édriophthalmes du 'Caudan,'" 'Ann. Univ. Lyon,' vol. 26, p. 578.  
 1897, *Rocinela*, H. J. HANSEN, 'Bull. Mus. Comp. Zoöl.,' vol. 31, p. 108.  
 1898, *Rocinela*, H. RICHARDSON, 'Proc. Amer. Philos. Soc.,' vol. 37, No. 157, p. 8.  
 1899, *Rocinela*, SARS, 'Crustacea of Norway,' vol. 2, p. 65.  
 1899, *Rocinela*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 21, p. 827.  
 1900, *Rocinela*, H. RICHARDSON, 'American Naturalist,' vol. 34, No. 399, p. 218.  
 1901, *Rocinela*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 23, pp. 520, 523.  
 1902, *Rocinela*, H. F. MOORE, 'Bull. U.S. Fish Commission,' vol. 20 (for 1900), pt. 2, p. 171.  
 1903, *Rocinela*, H. RICHARDSON, 'Bull. U.S. Fish Comm. for 1903,' p. 49.  
 1904, *Rocinela*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 27, p. 33.

In 1898 Miss HARRIET RICHARDSON reckoned the then known species of this genus at nineteen, of which she provided a useful analytic key. BONNIER's blind species, *R. typhlops*, 1896, had probably at that time not come under her notice, as it is not included in the list. On the other hand, one of the accepted nineteen is the Tasmanian species which G. M. THOMSON named *R. spongicola* in 1892 (1893). Since this has about fourteen joints to the flagellum of the first antennæ and a distinct third joint to the maxillipeds, it should be transferred to the genus *Aega*. In 1899 Miss RICHARDSON made *R. alaskensis* (LOCKINGTON) a synonym of *R. belliceps*, which STIMPSON had assigned to the genus *Aega*. In 1903 she described *R. hawaiiensis* as a new species, near to *R. orientalis*, and in 1904 established a new species, *R. affinis*, near to HARGER's *R. oculata*, and gave the name *R. angustata* to a form which she had previously supposed identical with HANSEN's *R. laticauda*. In 1902 LANCHESTER instituted *R. mundana* ('Proc. Zool. Soc. London,' p. 378, pl. 35, figs. 9-9a).

***Rocinela orientalis*, SCHIÖDTE and MEINERT.—Plate VI. (C).**

- 1879, *Rocinela orientalis*, SCHIÖDTE and MEINERT, 'Naturhist. Tidsskr.,' ser. 3, vol. 12, pp. 383, 395, pl. 13, figs. 1, 2.  
 1898, *Rocinela orientalis*, H. RICHARDSON, 'Proc. Amer. Philos. Soc.,' vol. 37, No. 157, pp. 9, 11.

This species belongs to a group distinguished by the Danish authors as having the eyes clearly separated, the flagellum of the second antennæ composed of fourteen to sixteen joints, and the sixth joint in the first three pairs of trunk-limbs armed with three or four spines. To distinguish it from its neighbours in this group, Miss RICHARDSON notes that the frontal margin is not produced as it is in *R. dumerilii* (LUCAS), and that, whereas SCHIÖDTE and MEINERT's *R. maculata* and *R. americana* have the telsonic segment "linguate," and both branches of the uropods crenulate on their exterior margins, in the present species the telsonic segment is subtriangular and the branches of the uropods are not crenulate on their exterior margins. The Danish authors mention the crenulation in the two former species, but neither deny nor affirm it in regard to *R. orientalis*, the telsonic segment of which they describe as subtriangular, with rounded sides, a phraseology quite as applicable to their figures of

that segment in *R. americana* and *R. maculata*. A more tangible distinction appears to lie in the proportions of the uropods, which in both the species last mentioned are said to have the inner branch a little longer and broader than the outer, while in the present species it is described as much longer and a little broader. Probably it was not the absolute length of each branch that was taken into comparison, but the inner branch was reckoned the longer by all that part of it which extended beyond the outer branch. It will be seen by the figures here given, that, if the specific determination is correct, the telsonic segment is subject to some variation, the apical margin passing from the subtriangular to a rather broadly rounded contour. In either case the margin is minutely serrate and fringed with minute spines and short plumose setæ. The uropods have the margins a little more strongly serrate and the armature rather stronger. Their peduncle is greatly produced at the inner apex, and the long process is rather strongly fringed with setæ.

In the first antennæ the flagellum is six-jointed, but in the smaller and perhaps not fully adult specimen five-jointed. The second antennæ have a long spine on the apex of the fourth joint of the peduncle, the flagellum in the male specimen with fourteen joints on one antenna and fifteen on the other, many of the joints fringed with setules. In the smaller specimen the flagella were twelve- and thirteen-jointed.

In the mandibles the first joint of the palp is the longest. The terminal joint of the maxillipeds has two outward curving apical spines, and a similar spine below the apex (this, however, not being clearly discerned in the male specimen).

The fingers of the prehensile legs are strongly hooked. The ambulatory legs have the third joint very elongate, especially in the last pair.

The first pleopods have both branches narrow, fringed with setæ, except on much of the outer border of the inner branch. The second pleopods have the outer branch longer and much broader than the inner. In both the margin is somewhat irregular and much of it fringed. The male appendix does not reach the end of the inner branch.

Length of largest specimen, male, 13 millims., with a breadth of 7 millims. The smaller specimen figured was 11·3 millims. long by 5 millims. broad. A specimen laden with eggs was 12 millims. long, 5·75 millims. broad.

Localities :—Station I., off Negombo, 20 fathoms; Station II., off Uluwitti, 8 fathoms; Station V., Chilaw Paar, 10 fathoms; on weed bearing oyster spat, S.E. of Modragam Paar.

#### FAMILY : CYMOTHOIDÆ.

#### **Anilocra, LEACH.**

1818, *Anilocra*, LEACH, 'Dict. Sci. Nat.,' vol. 12, pp. 348, 350.

1900, *Anilocra*, STEBBING, in WILLEY'S 'Zoological Results,' pt. 5, p. 639.

1901, *Anilocra*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 23, p. 528.

1902, *Anilocra*, H. F. MOORE, 'Bull. U.S. Fish Comm.,' vol. 20 (for 1900), pt. 2, p. 172.

**Anilocra dimidiata, BLEEKER.**

1857, *Anilocra dimidiata*, BLEEKER, 'Acta Soc. Sci. Indo-Neerl.,' vol. 2, art. 5, pp. 30, 31.

1881, *Anilocra dimidiata*, SCHIÖDTE and MEINERT, 'Nat. Tidsskr.,' ser. 3, vol. 13, p. 103, 111, pl. 8 (15), figs. 5, 6.

1900, *Anilocra dimidiata*, STEBBING, in WILLEY'S 'Zoological Results,' pt. 5, p. 639.

The two specimens obtained agree closely with the description given by SCHIÖDTE and MEINERT, having, in accordance with their conspectus of the species in this genus, the first antennæ geniculate, the coxæ not carinate but simple, and the fingers in the first four pairs of trunk-legs inflated in the middle, the inflation here forming a single nodule, not two or three nodules as in *A. leptosoma*, BLEEKER. The colouring also agrees, not merely in being yellow, bespattered with minute dark specks, which is common to so many preserved species, but in the much more peculiar character of being very much darker on the right side of the animal than on the other, in accordance with BLEEKER'S description. SCHIÖDTE and MEINERT write as though either side might be the darker.

The Danish authors speak of their specimens being more or less twisted to the right, whereas ours are quite straight as in BLEEKER'S figure. They attribute only nine joints to the second antennæ, while ours have these appendages ten-jointed. Both first and second antennæ, and the latter especially, are much compressed. In one specimen both members of the second pair, and in the other one member, have the antepenultimate joint shorter than either of its neighbours.

The fifth pleon segment has the postero-lateral angle produced a little over the telsonic segment, which is broader than represented by SCHIÖDTE and MEINERT, but is, as they describe, obscurely carinate, with raised lateral margins. The peduncle of the uropods is only shortly produced on the inner apex; the long narrow rami are perfectly smooth, approximately equal in length, the outer a little the narrower.

One specimen, carrying elongate eggs, measured 24 millims. in length, the other being 22 millims. long. In each case the greatest breadth was 8 millims.

Locality :—Palk Bay, 6 fathoms.

**Rhiothra, SCHIÖDTE and MEINERT.**

1884, *Rhiothra*, SCHIÖDTE and MEINERT, 'Nat. Tidsskr.,' ser. 3, vol. 14, p. 223, 318.

This genus is placed by the Danish authors in the Cymothoinæ, the second tribe of their family Cymothoidæ. In the somewhat conjectural reference to it of a single specimen, a male not fully grown, it would be out of place to indulge in any long discussion of the characters, for which the original work should be consulted. It may be remarked that the generic definition refers to the female, not to the adolescent male, in which the second antennæ have a larger number of joints.

**Rhiothra callipia, SCHIÖDTE and MEINERT.—Plate VI. (A).**

1884, *Rhiothra callipia*, SCHIÖDTE and MEINERT, 'Nat. Tidsskr.,' ser. 3, vol. 14, p. 319, pl. 12, figs. 8–13.

The single specimen here available agrees with the account of the "mas adolescens"

given by the Danish authors as well as could be expected considering its smaller size. The slender second antennæ, however, consist of thirteen joints instead of twelve. The eight-jointed first antennæ have the five joints of the flagellum each apically furnished with a spray of sensory filaments. The male appendix of the second pleopods, which the above-named authorities describe as very thin, hooked, scarcely reaching the end of the rami, is, in our example, only a third as long as the rami, not especially thin, and not showing any perceptible hook. The coupling spines of the peduncle are numerous. The delicately laminar rami of the uropods have fringes of finely plumose setæ and are scarcely, or not at all, shorter than the telsonic segment, the broadly rounded hind margin of which is fringed with very short but finely plumose setæ. Its base carries dorsally numerous setules, of which there are a few on the preceding segments. The pleopods are without setæ, according to the custom of the family Cymothoidæ.

A feature of our specimen, to which SCHIÖDTE and MEINERT make no allusion, is, that in all the limbs the fifth joint has the inner apex protruding, acutely in the first gnathopod, broadly in the fifth peræopod, where it is armed with three spines. The third joint is remarkably short in the former, but tolerably long in the latter pair of limbs. In all the limbs the finger is strongly uncinatè.

Colour orange yellow, lightly sprinkled with small dark flecks, especially on the sides, the limbs pale.

Length about 6·75 millims., breadth about 2·75 millims.

Locality :—Station LVIII., off Karativo Paar, 9 to 26 fathoms.

#### **Irona, SCHIÖDTE and MEINERT.**

1884, **Irona**, SCHIÖDTE and MEINERT, 'Nat. Tidsskr.,' ser. 3, vol. 14, pp. 327, 381.

1897, **Irona**, H. J. HANSEN, 'Bull. Mus. Comp. Zoöl. Harvard,' vol. 31, p. 110.

1901, **Irona**, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 23, pp. 525, 531.

This genus was placed by its authors in the Livonecinæ, the third tribe of their family Cymothoidæ. From the seven other genera which they assign to the same tribe it is distinguished by one or more of the following characters :—Segments of the pleon clearly separate, fifth peræopods subequal in length to the preceding legs, or a little longer, with uncinatè fingers, the body all moderately convex, the front broadly or shortly rounded, the pleon deeply immersed in the peræon.

In the definition of the genus nothing is said as to the mouth organs or the character of the pleopods. Four species were placed in the genus, to which HANSEN has since added a fifth, *I. foveolata*. This last agrees with the species about to be described in a rather striking feature, of which HANSEN gives the following account :—The side-plates of the sixth, and especially of the seventh, segment are much broader and posteriorly much more produced than the others, besides on each side rising considerably above the more lateral part of the dorsal surface of the thorax [peræon], which is brought about by the curious fact that these epimera are turned outwards

and somewhat upwards." In *Cterissa pterygota* (KOELBEL) there is a similar expansion of the side plates, but it applies to all six of them on one side of the animal and to none on the other side.

***Irona nanoides*, n. sp.—Plate VI. (B).**

The specimen, a female, having its pouch enormously distended with young ones, was slightly distorted so as to make the outline of the left side very convex. The middle of the back is raised considerably above the lateral parts of the segments. The head has a short, very broad front. The peræon is very broad, the side-plates of the fifth segment approaching the character of the two following pairs. The first two segments of the pleon are overlapped by the last segment of the peræon, the next three are very short but wider than the almost semicircular telsonic segment.

The eyes are wide apart, not very large, black. The first antennæ are rather stout, especially as to the first three of the eight joints. The ten-jointed second pair are slighter, subequal in length. The upper lip has a four-lobed margin as in *Anilocra cuvieri*, LEACH, and in *Renocila periophthalmi*, STEBBING. The mandibles have a stout first joint to the palp, the second much thinner and a little shorter, the third shorter and thinner than the second, and armed with a few spines. The trunk thins out in advance of the palp, apparently carrying a quasi-molar not very remote from the pointed cutting-plate. The slender first maxilla is tipped with five spinules. The second maxilla appears to have a membranous apical margin accompanied by a process carrying small hooked spines. The maxillipeds have the composite second and third joints long and broad, followed by a joint which is about equal in length and breadth, narrowed at the rounded apex, to which is attached the narrow terminal bearing two outward bent hooks at its summit and one such hook on its side.

The gnathopods and peræopods are all very similar in appearance and structure, the hinder pairs having some superiority of size. The second joint is substantial, but not conspicuously expanded; the third in the gnathopods is as long as the hand, but in the hinder peræopod is longer than any one of the joints that follow it; the fourth joint is short but wide, being especially bulging in the fifth peræopod; the fifth joint is of insignificant size, tending slightly to override the short curved hand, which does not exceed in length the simple but strongly hooked finger.

The pleopods are all of remarkable breadth, both branches similar in structure and devoid of setæ. The coupling spines of the short peduncles are small. The uropods are short, with two subequal oval branches, little longer than the stout peduncle, of which the inner apex is not produced. There are some tiny spinules on the branches, of which the inner is decidedly not longer than the outer. Colour in spirit yellow, with the upturned side-plates whitish.

Length 10 millims., greatest breadth 5.5 millims.

Locality:—Station XXXIX., Gallehogalle Bank, 16 to 20 fathoms.

The young ones taken from the mother's pouch have the broad front to the head as

in the adults and the eight-jointed first antennæ. In the limbs the nail is rather more distinct from the trunk of the finger than it is in the full-grown animal. The seventh segment of the peræon is, as usual, without limbs, and resembling the segments of the pleon which at this stage are much narrower than the peræon. The telsonic segment shows a broadly rounded or very obtusely-angled apical margin, which like those of the uropods, and possibly also those of the pleopods, is feebly and microscopically fringed with setules. There is no subapical constriction of the telsonic segment as in the "pullus stadii primi" of *Irona foveolata*, and the inner branch of the uropod is broader than in the young of that species.

In *Irona nana*, SCHIÖDTE and MEINERT, the adult female has the outer branch of the uropod much longer than the inner; in HANSEN'S species the inner is considerably longer than the outer, so that both species may be easily distinguished from the one here described.

FAMILY: SPHÆROMIDÆ.

The genera that with more or less acceptance have maintained places in this family are *Sphæroma*, BOSCH, 1802; *Campecopea*, LEACH, 1813; *Cymodoce*, LEACH, 1814; *Dynamene*, LEACH, 1814; *Næsa*, LEACH, 1815 (for *Nesæa*, LEACH, 1813, preoccupied); *Cilicæa*, LEACH, 1818; *Zuzara*, LEACH, 1818; *Cerceis*, *Amphoroidea*, *Cassidina*, *Ancinus*, all four instituted by MILNE-EDWARDS in 1840; *Monolistra*, GERSTÆCKER, 1856; *Isocladus*, MIERS, 1876; *Ceratocephalus*, WOODWARD, 1877 (not preoccupied by *Ceratocephala*, WARDER, 1838, and therefore taking precedence of *Bregmocerella*, HASWELL, 1885); *Cycloidura*, STEBBING, 1878 (for *Cyclura*, STEBBING, 1874, preoccupied); *Scutuloidea*, CHILTON, 1882; *Plakarthrium*, CHILTON, 1883 (of which *Chelonidium*, PFEFFER, 1887, is a synonym, so that the family Chelonidiidæ if maintained must be named Plakarthriidæ); *Haswellia*, MIERS, 1884 (for *Calyptura*, HASWELL, 1881, preoccupied); *Cymodocella*, PFEFFER, 1887; *Næsicopea*, STEBBING, 1893; *Cæcosphæroma*, DOLLFUS, 1896 (part); *Tecticeps*, H. RICHARDSON, 1897; *Exosphæroma*, STEBBING, 1900; *Cassidinella*, WHITELEGGE, 1901; *Chitonopsis*, WHITELEGGE, 1902; *Parasphæroma*, STEBBING, 1902; *Vireia*, DOLLFUS, 1905.

This rather unwieldy group suffers at present under various difficulties, towards the solution of which only a few suggestions can here be volunteered. EUGÈNE HESSE in 1872 undertook to prove, with a reserve which he evidently scarcely entertained, that *Sphæroma* represented the female of *Cymodoce* and *Dynamene* the female of *Næsa*. The discovery of undoubted males in several species of *Sphæroma* has shown that the first part of his hypothesis is untenable, but for the second part there is much to be said. It is exceedingly probable that *Dynamene montagui*, LEACH, is the young male, and that *Dynamene rubra* and *viridis*, LEACH, are young forms, female or male, of *Næsa bidentata* (ADAMS), which is the adult male. The colouring, the general structure, and very frequent occurrence under similar conditions of these four forms give warrant to this belief (see 'Journ. Linn. Soc.' London, vol. 12, p. 148, 1874). From acceptance of this view will follow the necessity of cancelling one of the generic

names. *Nesæa*, LEACH, has priority, but is preoccupied. *Næsa* was substituted for it. But *Dynamene* has priority over *Næsa*, although its title is a little peculiar. It was indeed defined in advance of the substituted naming of *Næsa*, but the species for which it was defined were not specified by name until 1818. The simplest issue out of the complication seems to be by reducing the two genera and their four representative species to a single genus and species under the name *Dynamene bidentata* (ADAMS). Thus *Næsa* disappears, and *Dynamene* in its place acquires an intelligible status.

The relief, however, is not very great, because there are several other species that have been assigned to this dimorphic genus before its dimorphism was understood, and of these the true generic position remains uncertain.

Although sexual dimorphism is not conspicuous in *Sphæroma*, *Exosphæroma*, or *Parasphæroma*, in many other genera of the family it has been more or less clearly established, and there exists at least a possibility that the females of different genera may be much less divergent in appearance than the males. The latter sex is distinguished in *Dynamene* and *Campecopea* by having the sixth segment of the peræon dorsally produced, in *Zuzara*, *Cycloidura*, *Isocladus*, and *Haswellia* by having the peræon's seventh segment so produced. In *Dynamene*, *Campecopea*, *Cilicæa*, and *Næsicopea* the males have the inner ramus of the uropods degraded (with an exception subsequently mentioned). In *Ancinus* that ramus is wanting, but the sexes have not as yet been discriminated either in that genus or in *Tecticeps*, which shows a near relationship to it. The uropods in *Tecticeps* are biramose, with the inner branch much the shorter.

In regard to some isolated members of the family, it may be suggested that *Sphæroma algoense*, STEBBING, 1875, *Cymodocella tubicauda*, PFEFFER, 1887, and *Sphæroma* (?) *egregia*, CHILTON, 1891, must all belong to the same genus, and may possibly deserve to be united under the name *Cymodocella algoensis*. *Cymodocea antarctica*, HODGSON, 1902, also appears to approach *Cymodocella* more nearly than *Cymodoce*. *Exosphæroma amplifrons*, STEBBING, would, according to my present view, stand better in the genus *Cymodoce*, and, in any case, I agree with my friend Dr. H. J. HANSEN that it cannot properly be retained under *Exosphæroma*.

Since the above was written, Mr. HOLMES has kindly sent me his interesting essay on the sexes of Sphæromids ('Proc. California Ac. Sci.,' ser. 3, Zool., vol. 3, p. 295). He takes the view that the name *Dynamene* should be accepted in place of *Næsa*, but further extends it to supersede *Cilicæa*, a procedure which can scarcely be accepted without more consideration and argument. As regards the male sex, *Cymodoce* seems fairly distinguishable by superficial characters from *Dynamene* and both sections of *Cilicæa*, but whether there are stable and sufficient marks for separating either the female or the juvenile forms of *Cymodoce* and *Cilicæa* in all cases is less clear. The addition of new species without tolerably full description and figures is rather to be deprecated than welcomed.

**Sphæroma, Bosc.**

- 1802, **Sphæroma**, BOSCH, 'Hist. Nat. des Crustacés,' vol. 2, p. 182.  
 1873, **Sphæroma**, HARGER, 'Amer. Journ. Sci.,' ser. 3, vol. 5, p. 314.  
 1880, **Sphæroma**, HARGER, 'Rep. U.S. Fish. Comm. for 1878,' p. 368.  
 1900, **Sphæroma** (*sensu restricto*), STEBBING, 'Proc. Zool. Soc. London,' p. 552.  
 1904, **Sphæroma**, STEBBING, in 'Spolia Zeylanica,' vol. 2, pt. 5, p. 15.  
 1904, **Sphæroma**, STEBBING, in GARDINER'S 'Fauna, Maldive and Laccadive Archip.,' vol. 2, pt. 3, p. 710.

The definition of the restricted genus may be formulated as follows:—Sexual dimorphism not conspicuous. Telsonic segment without apical sinus. Maxillipeds having the fourth and fifth joints fringed on the inner margin with long setæ, but neither these two joints nor the sixth produced into lobes. First and second gnathopods having the third and fourth joints fringed on the front margin with long setæ. Uropods with subequal rami.

Conforming to these characters are the type species, *S. serratum* (FABRICIUS), *S. terebrans*, BATE, *S. quadridentatum*, SAY, and *S. walkeri*, n. sp. In the multitude of species which from early dates down to the last two or three years have been assigned to *Sphæroma*, there are many which are obviously excluded from that genus as above defined. But there are several of which not enough is known to enable us to say whether they belong to it or not. There is a presumption in favour of *S. quoianum*, MILNE-EDWARDS, since HELLER in re-describing that species says that the first three pairs of feet have the middle joints fringed on the outer side with long hairs, and there is a similar presumption in regard to *S. sieboldii*, DOLLFUS, 1889, and *S. pentodon*, H. RICHARDSON, 1904. On the other hand, WHITELEGGE, describing *S. australe*, *S. latifrons*, and *S. plumosum* in 1902, speaks of the lobes in the palp of the maxillipeds as well developed. At least the first of these three may be referred with some certainty to *Exosphæroma*.

**Sphæroma walkeri**, n. sp.—Plate VII.

Head not very broad or long. Peræon convex, its segments not greatly differing in length, although a contrary impression may be produced by the telescoping or extension of a particular segment. The unsutured side-plates of the first segment are as usual much the longest, being subacutely outdrawn backwards and forwards. The next two pairs are apically narrowed, the following three somewhat squared, and the seventh pair with a rather deep trituberculate hind margin. The transverse tuberculation of the segments, which is scarcely perceptible on the first segment, gradually increases in prominence, and fringes the seventh segment in a very pronounced manner. In the front division of the pleon, representing five faintly distinguishable segments consolidated into one, there is a curved transverse row of tubercles, belonging chiefly to the fourth segment. The telsonic segment is only moderately convex, and becomes slightly concave near the broadly rounded, slightly

crenulate apical margin. This shield is ornamented by four longitudinal rows of tubercles, two submedian, of about eight tubercles apiece, and two sublateral of four, which lead to an encircling apical ridge, the sloping sides of the shield carrying at the upper part short divergent lines of tubercles, and usually a little tubercle outside each sublateral line.

The eyes are dark, deeply inserted in the front margin of the peræon.

The first antennæ have a broad basal joint, probably representing two joints consolidated. The following joint is small, scarcely as long as broad. The flagellum in the specimen examined consisted of fourteen joints, the first much the longest, as long as the basal and twice as long as the terminal joint of the peduncle.

The slender second antennæ are rather longer than the first; the fourth and fifth joints of the peduncle are equal in length; the flagellum is fourteen-jointed, rather longer than the peduncle.

The epistome is somewhat longer than broad; the upper lip has a feebly trilobed margin.

The gastric spines on the folds of the stomach at its entrance display a variety of shapes, which, however, may be customary.

The mandibles have the molar strong and prominent, the palp less slight than usual. In both pairs of maxillæ the plates appear to be somewhat broader than is usually the case.

The maxillipeds have the plate of the second joint broad, strongly setose round the convex distal margin and down the surface at some distance from the inner margin. The latter is armed with an exceptionally long and slender upward-bent coupling spine. The third joint is exceedingly small, the fourth as broad as long, with inner margin narrower than the outer, the fifth about square, like the preceding joint having its inner margin densely fringed with long setæ; the sixth and seventh joints are subequal, apically setose, considerably longer and narrower than the fifth joint.

The first gnathopods have the hind margin of the second joint setose in its upper part, the third joint nearly as long, with the plumose setæ of the front margin very long; the much shorter fourth joint has long plumose setæ on the convex front margin; the triangular fifth joint is quite small; the sixth joint is about as long as the fourth, with short plumose setæ distally on the front margin and a serrate spine at apex of hind margin; the finger has minute setules along the concave hind margin.

The second gnathopod differs from the first chiefly by the cylindrical fifth joint, which is nearly as long as the sixth, the former carrying plumose setæ at its front apex, and both being setose along the hind margin.

The peræopods are fringed with setæ on the front margin of the second, third, and fourth joints, and on the hind margin of all joints from the second or third to the sixth in the first two pairs, and on the corresponding but inverted margins of the other three pairs. The second and third joints are more robust than in the gnathopods.

The fifth joint is uniformly shorter than the sixth, which in the fifth pair is considerably elongated, being as long, though not as broad, as the third joint.

The fixed inner branch of the uropods has two or three tubercles on its upper surface; the outer branch is fringed with setæ along the inner margin and has the outer divided into six or seven teeth.

The colouring (as preserved) is a symmetrical dark-grey mottling on a pale ground.

The specimen figured was 9 millims. long and 5 millims. broad. The second pleopods showed no trace of a male appendix.

Numerous examples were obtained at Jokkenpidi Paar, one in tow-net gathering at Marichchukaddi, two at Cheval Paar, one in Galle Harbour, and one elsewhere.

The tuberculation of the dorsal surface is not incapable of being regarded as forming a series of transverse lines, but the general effect produced is that of a striking contrast between longitudinal lines on the telsonic segment and transverse lines on the rest of the body. I name this prettily sculptured species in honour of A. O. WALKER, Esq., F.L.S., a carcinological colleague whose cheering friendship I have for many years enjoyed.

#### *Cilicæa*, LEACH.

- 1818, *Cilicæa*, LEACH, 'Dictionnaire des Sciences Naturelles,' vol. 12, p. 342 (" *Cilicée*," p. 341).  
 1818, *Næsa* (part), SAY, 'Journ. Acad. Sci. Philad.,' vol. 1, p. 482.  
 1825, *Cilicæa*, DESMAREST, 'Consid. gén. Crust.,' p. 295 (" *Cicilæa*," p. 442).  
 1829, *Cilicæa*, LATREILLE, 'Le Règne Animal,' vol. 4, p. 138.  
 1836, *Cilicæa*, GUÉRIN, 'Iconogr. Règne Animal, Crust.,' pl. 30.  
 1840, *Næsea* (part), MILNE-EDWARDS, 'Hist. Nat. Crust.,' vol. 3, p. 216 (" *Næsea*," p. 628).  
 1853, *Nesæa* (part), DANA, 'U.S. Expl. Exp.,' vol. 13, p. 749.  
 1879, *Nesæa*, G. M. THOMSON, 'Trans. New Zealand Inst.,' vol. 11, p. 234.  
 1881, *Cilicæa*, HASWELL, 'Proc. Linn. Soc. N.S. Wales,' vol. 5, p. 475.  
 1882, *Cilicæa*, HASWELL, 'Proc. Linn. Soc. N.S. Wales,' vol. 6, p. 1.  
 1882, *Cilicæa*, HASWELL, 'Catal. Australian Crust.,' p. 295.  
 1884, *Cilicæa*, MIERS, 'Zool. of the "Alert,"' p. 308.  
 1886, *Cymodocea*, BEDDARD, "'Challenger" (Isopoda) Reports,' vol. 17, p. 145.  
 1891, *Cymodocea*, IVES, 'Proc. Acad. Sci. Philad.,' pp. 188, 194.  
 1899, *Cilicæa*, H. RICHARDSON, 'Proc. U.S. Nat. Mus.,' vol. 21, pp. 831, 838.  
 1900, *Cilicæa*, H. RICHARDSON, 'The American Naturalist,' vol. 34, No. 399, p. 222.  
 1900, *Cilicæa*, STEBBING, WILLEY'S 'Zoological Results,' pt. 5, p. 643.  
 1901, *Cilicæa*, H. RICHARDSON, 'Proc. U.S. Nat. Mus.,' vol. 23, pp. 532, 535.  
 1902, *Cilicæa*, H. F. MOORE, 'Bull. U.S. Fish Comm.,' vol. 20 (for 1900), p. 172.  
 1902, *Cilicæa*, H. RICHARDSON, 'Trans. Connect. Acad.,' vol. 11, p. 291.  
 1902, *Cilicæa*, WHITELEGGE, 'Mem. Australian Mus.,' Mem. 4, p. 265.

To include the numerous species now assigned to this genus, the following definition is offered:—

Sexual dimorphism conspicuous. Segments of peræon devoid of dorsal processes. Telsonic segment with an apical sinus. Maxillipeds with fourth, fifth, and sixth joints

produced into apically setose lobes. Gnathopods without fringes of long plumose setæ. Uropods of male (except in *C. spinulosa*) having only the outer ramus strongly developed.

LEACH having only *C. latreillii* on which to found his genus, availed himself of characters which would exclude many of the forms now grouped under this generic name. The four marks which he used for distinguishing *Cilicæa* among the Sphæromidæ were: first, the approximate equality of the sixth and seventh segments of the peræon; second, the prolonged medio-dorsal process on the anterior division of the pleon; third, the apical sinus with central lobe in the hinder division of the pleon; and fourth, the rudimentary character of the inner ramus of the uropods. The second of these characters is conspicuous in fewer than half the species at present assigned to the genus.

The lobe within the apical sinus of the pleon is found in only four of the species, and the fourth character is subject to one curious exception, since in *C. spinulosa* the inner ramus of the uropods is rather longer than the outer. LEACH himself evidently suspected that the long process of the pleon might be peculiar to the male, and this has proved to be the case. But the females, so far as is known, besides being without the dorsal process, have the apical sinus, at least usually, simple, and the rami of the uropods subequal. WHITELEGGE, however, says that "the sexual differences in *C. hystrix* are very slight," and that in *C. stylifera* "the female does not differ materially from the male." He thinks it highly probable that the form figured by HASWELL as the female of *C. hystrix* may really be the female of *C. spinulosa*, HASWELL in his text leaving the point ambiguous. MIERS regards *Sphæroma pubescens*, MILNE-EDWARDS, the *Cymodocea pubescens* of HASWELL, as with scarcely any doubt the female of *C. latreillii*. H. F. MOORE explains *Cymodocea bermudensis*, IVES, as female of *C. caudata* (SAY), and suggests that *Dynamene nodulosa*, RICHARDSON, is the female of *C. caudata-gilliana*, RICHARDSON, *nodulosa* being apparently named by a slip of the pen instead of *tuberculosa*. But S. J. HOLMES makes it fairly certain that *Dynamene tuberculosa* is the female of *Cilicæa cordata*, RICHARDSON. As *tuberculosa* has page precedence, it will supersede *cordata*, and not without advantage to the genus, since to many ears *cordata* and *caudata* are indistinguishable. The confusion caused by the sexual dimorphism in this genus will not, perhaps, be very easily disentangled.

The following synoptic view of the species rather suggests that, for practical convenience, those which are devoid of the great dorsal process might be grouped under a separate generic name:—

- |   |   |   |
|---|---|---|
| 1 | { | Anterior division of pleon in male with |
|   |   | long medio-dorsal process—2.            |
| 1 | { | Anterior division of pleon in male      |
|   |   | without such process—11.                |

- |    |   |  |  |
|----|---|--|--|
| 2  | { | Apical sinus in male with prominent central lobe—3.            |  |
|    | { | Apical sinus in male with central lobe very small or absent—5. |  |
| 3  | { | The medio-dorsal process with apex simple.                     | 1. <i>C. latreillii</i> , LEACH, 1818.     |
|    | { | The medio-dorsal process with apex bifid—4.                    |  |
| 4  | { | Outer ramus of uropods sub-apically notched.                   | 2. <i>C. crassa</i> , HASWELL, 1882.       |
|    | { | Outer ramus of uropods not notched.                            | 3. <i>C. longispina</i> , MIERS, 1884.     |
| 5  | { | Apical sinus of pleon in male with very small central lobe.    | 4. <i>C. antennalis</i> , MIERS, 1884.     |
|    | { | Apical sinus of pleon in male without central lobe—6.          |  |
| 6  | { | Surface of peræon conspicuously spinulose—7.                   |  |
|    | { | Surface of peræon smooth or moderately granular—8.             |  |
| 7  | { | Inner ramus of the uropods in male not shorter than the outer. | 5. <i>C. spinulosa</i> , HASWELL, 1882.    |
|    | { | Inner ramus of the uropods in male shorter than the outer.     | 6. <i>C. hystrix</i> , HASWELL, 1882.      |
| 8  | { | Apex of medio-dorsal process not distinctly bifid—9.           |  |
|    | { | Apex of medio-dorsal process distinctly bifid—10.              |  |
| 9  | { | Apex of medio-dorsal process truncate, slightly indented.      | 7. <i>C. caniculata</i> (THOMSON), 1879.   |
|    | { | Apex of medio-dorsal process truncate, slightly trifid.        | 8. <i>C. granulata</i> , WHITELEGGE, 1902. |
| 10 | { | Outer ramus of uropods in male with bifurcate apex.            | 9. <i>C. tenuicaudata</i> , HASWELL, 1881. |
|    | { | Outer ramus of uropods in male with simple apex.               | 10. <i>C. whiteleggei</i> , n. sp., 1905.  |
| 11 | { | Apical sinus of pleon in male with minute central lobe.        |  |
|    | { | Apical sinus of pleon in male with large central lobe—12.      | 11. <i>C. sculpta</i> (HOLMES), 1904.      |
|    | { | Apical sinus of pleon in male without central lobe—13.         |  |

- |    |   |   |  |
|----|---|---|--|
| 12 | { | Central lobe with the flanking apices bifid.      | 12. <i>C. granulosa</i> , H. RICHARDSON, 1899.   |
|    |   | Central lobe with the flanking apices simple.     | 13. <i>C. linguicauda</i> , H. RICHARDSON, 1901. |
| 13 | { | Apical sinus in male simple—14.                   |  |
|    |   | Apical sinus in male sculptured—17.               |  |
| 14 | { | Apical sinus visible from above—15.               |  |
|    |   | Apical sinus dorsally concealed—16.               |  |
| 15 | { | Movable ramus of uropods in male stiliform.       | 14. <i>C. stylifera</i> , WHITELEGGE, 1902.      |
|    |   | Movable ramus of uropods in male unciniate.       | 15. <i>C. carinata</i> , H. RICHARDSON, 1900.    |
| 16 | { | Apical sinus concealed by a trilobed process.     | 16. <i>C. curtispina</i> , HASWELL, 1882.        |
|    |   | Apical sinus concealed by a simple acute process. | 17. <i>C. ornata</i> , WHITELEGGE, 1902.         |
| 17 | { | Apical sinus with two teeth in the border.        | 18. <i>C. beddardi</i> , n. sp., 1905.           |
|    |   | Apical sinus with four teeth in the border.       | 19. <i>C. caudata</i> (SAY), 1818.               |
|    |   | Apical sinus with six teeth in the border—18.     |  |
| 18 | { | Teeth in the sinus boldly cut.                    | 20. <i>C. tuberculosa</i> (H. RICHARDSON), 1899. |
|    |   | Teeth in the sinus minute.                        | 21. <i>C. gilliana</i> , H. RICHARDSON, 1899.    |

In regard to this list it should be mentioned that MIERS treats HASWELL'S *C. crassicaudata* and his own *C. longispina* as two varieties of *C. latreillii*. The specific name of *C. antennalis* he adopts from WHITE, who published it in 1847 without a description. The species described by G. M. THOMSON, in 1879, as *Nesea caniculata* was recorded by THOMSON and CHILTON, in 1886, as *Næsa canaliculata*, with a notice that MIERS supposed it to belong to *Cilicæa*, and that the type specimen had apparently been lost. Miss RICHARDSON'S *C. gilliana* was described by her under the name *C. caudata gilliana*, as a new sub-species of *C. caudata* (SAY). Species that may belong to the genus, but which have as yet only been described in the female form, are not included in the list.

#### *Cilicæa latreillii*, LEACH—Plates III. (B), VIII.

- 1818, *Cilicæa latreillii*, LEACH, 'Dict. Sci. Nat.,' vol. 12, p. 342.  
 1825, *Cilicæa latreillii*, DESMAREST, 'Consid. gén. Crust.,' p. 296, pl. 48, fig. 3.  
 1836, *Cilicæa latreillii*, GUÉRIN, 'Iconogr. Règne Animal,' pl. 30, fig. 4 (by error marked 2 on plate; see explanation of plates, p. 32, second edition).  
 1840, *Næsea latreillii*, MILNE-EDWARDS, 'Hist. Nat. Crust.,' vol. 3, p. 218.

- 1881, *Cilicæa crassicaudata*, HASWELL, 'Proc. Linn. Soc., N.S. Wales,' vol. 5, p. 475, pl. 17, fig. 3.  
 1884, *Cilicæa latreillei*, MIERS, 'Zool. of the "Alert,"' p. 308, var. *crassicaudata*, p. 309.  
 1902, *Cilicæa crassicaudata*, WHITELEGGE, 'Mem. Austral. Mus.,' Mem. 4, p. 273, fig. 35.

Male.—MIERS says, "the segments of the body are covered with a very short stiff pubescence." In the Ceylon specimen the integument is clothed with plumose setules accompanied by thin pellucid undulating fringes, the precise character of which is not easy to determine. Their function may be to retain a concealing coverlet of mud on the animal's coat, as suggested by DOFLEIN ('Brachyura of the "Valdivia,"' p. 203), for the "leaf-hairs" of the Dromiacea and Oxyrrhyncha. The hind region of the last three peræon segments is ornamented with transverse rows of small granules. The long unsutured side-plates of the first segment have the narrowly-squared front apex commonly found in this and some other genera. In contrast to these, the side-plates of the next three segments are extremely short, those of the third segment ending acutely, with the points less produced than those of their neighbours on either side. The anterior division of the pleon projects a thick, apically obtuse, medio-dorsal process over and beyond the telsonic segment, leaving exposed to view the pair of sub-lateral bosses on that segment, but covering both the central lobe and the sides of its apical notch.

The first antennæ in the specimen figured have a flagellum of twenty-one joints. The second antennæ in the same specimen show a want of symmetry, in one member of the pair the fourth and fifth joints of the peduncle being considerably longer than any of the preceding joints, the flagellum ten-jointed, shorter than the peduncle, while in the other member the fourth and fifth joints of the peduncle are each shorter than the second, and the flagellum is twelve-jointed, longer than the peduncle. Normally, as shown by another specimen, and in DESMAREST'S figure, the first antennæ are not, as in this instance, longer, but shorter than the second.

Mandibles with dark horn-coloured cutting edge with dentation obscure, accessory plate bidentate on one mandible, simple on the other, a tuft of spines between this and the prominent molar, palp slender.

Maxillipeds: The second joint has a sinuous outer margin to the stem, its plate is of moderate breadth, and the ultimate joint of the palp reaches well beyond the lobe of the penultimate joint.

First gnathopods: Third joint elongate, hind margin carrying many little groups of spinules, front distally channeled and above the groove produced into an obtuse spine-tipped process, fourth joint broader than long, its spine-tipped front apex overlapping the fifth joint, with seven spines along the hind margin; small fifth joint with five, and sixth joint with six spines along the hind margin, of the last set the sixth being shorter than the one before it, but with this exception, the three successive sets of slightly serrate spines beginning with smaller and ending with larger forms. The finger is strong, as long as the stout sixth joint, ending in two horny nails, of which the short inner one is serrate on its inner margin.

The second gnathopods are less robust, the spines of the front margin more developed, those of the hind margin more numerous, but for the most part not so strong, the fifth joint not differing greatly in size and character from the fourth, the finger not quite so long as the sixth joint, and its inner nail showing no serration.

The fifth peræopod is the longest of the limbs, the process of the third joint by successive reduction in prominence here almost disappearing, the fourth, fifth, and sixth joints attaining their greatest elongation, and the finger being decidedly shorter than the preceding joint.

The first pleopods exhibit an interesting feature of the inner branch in that its inner margin, instead of joining the outer either by a continuous straight line or a convex curve, here makes a slightly concave sweep from the point where the fringe of long, feathered setæ begins. The second pleopods, as already described and figured by Mr. WHITELEGGE, are remarkable for the great length and corrugated appearance of the male stilet. This in our specimen, as in that described by Mr. WHITELEGGE, was stiffened into a strongly bent position. The three following pairs have the covering branch sutured and lying very close to the branchial plate. In the fifth pair the short, but broad, portion beyond the suture is bilobed, and from the junction of the lobes rises a forward-pointing lappet, this, with the border of the inner lobe, and two tubercles just in advance of the suture, being also closely beset with little teeth or prickles in regular arrangement.

The uropods have the short stout peduncle produced on the inner side to a short thick process representing the inner ramus, of which the appearance varies considerably with the point of view. The stout, blunt outer ramus has a tooth on the outer margin at some distance from the apex, often obscure, and, according to MIERS, occasionally obsolete.

Length, 11 millims. to 13 millims. From the tendency of the specimens to fold up, the exact length is not very easily measured.

Localities :—South of Manaar ; Coral reef, Gulf of Manaar ; Pearl banks, Palk Bay. One specimen was obtained at each station.

***Cilicæa latreillii*, LEACH, juv.—Plate III. (B).**

This small specimen is remarkable for its coat. This may be described as thickly beset with short, stiff, irregularly blunt setæ covering all the dorsal surface, except such parts as are adapted for sliding under neighbouring parts. In the 'Zoology of H.M.S. "Alert,"' pp. 308–310, 1884, Mr. E. J. MIERS makes *Sphæroma pubescens*, MILNE-EDWARDS, 1840, doubtfully, a synonym of *Cilicæa latreillii*, and HASWELL'S *Cymodocea pubescens*, 1881, with conviction, another synonym. His remarks on the variations of this species according to age, sex, and individuality, should be carefully studied by anyone interested in the subject. HASWELL gives the length of his longest specimen of *Cymodocea pubescens* as 1 inch. That the setose covering should be worn down in large specimens might be easily explained, but it is

less easy to understand in an evidently young specimen, such as that in the present collection. Probably, therefore, the peculiar setæ are not stumps due to attrition, but an inchoate stage of the undulating fringes noticed above. It will be observed that the spines of the first gnathopod are not blunted, and the finger clearly shows a delicate serration of the inner margin and small setules on the outer. In the adult male the serration is less easy to observe, the finger having become thicker and coarser.

Length 6 millims., breadth 3 millims.

Locality:—Coast of Ceylon, under 100 fathoms.

*Cilicæa whiteleggei*, n. sp.—Plate IX. (A), (B).

Male.—This species is easily distinguished from *C. latreillii* by its much slighter general structure, as well as by the character of the very elongate dorsal process in the front division of the pleon, the terminal part of which is not conical but almost parallel-sided and sharply bifid at the apex. Also, the apical notch of the telsonic segment is simply semicircular without median lobe. The three species which make a nearer approach are *C. tenuicaudata*, HASWELL, distinguished by the bifid apices of the uropods; *C. caniculata* (G. M. THOMSON), with practically truncate apex to the dorsal process and the free ramus of the uropods short and thick; and lastly *C. granulata*, WHITELEGGE, which also has the dorsal process truncate, “with three small terminal subspiniform granules.” This last species attains a length of 13 millims., therefore greatly exceeding in size that which I am here naming after Mr. WHITELEGGE out of respect for his useful researches in this group.

The surface is very inconspicuously granular and hairy, only on the pleon and uropods showing these characters at all distinctly. The side-plates are similar to those of the preceding species, but having in addition a subcarinate appearance along the upper portion. The pleon, which is as long as head and peræon combined, has a rounded tooth or projection on either side of the dorsal process at its base, which must be regarded as an additional distinction between this species and *C. granulata*. It has “a submedian pair of tubercles transversely disposed behind the middle of the terminal segment,” such as WHITELEGGE considers distinctive of the female in his species.

The first antennæ have the flagellum consisting of ten or eleven unequal joints, with sensory filaments on the last five. The longer second antennæ have the last joint of the peduncle decidedly longer than the penultimate, the flagellum longer than the peduncle, fifteen-jointed.

In the mouth organs it was probably a casual abnormality that the first maxilla had only three setæ instead of the usual four on the inner plate.

The maxillipeds differ from those of *C. latreillii* by the stronger stem of the second joint, which has a straight outer margin and carries a much wider plate; also the lobes of the fifth and sixth joints are longer than in the older species.

First gnathopods: The third joint projects and carries a spine at the middle of

the front margin, but has no process. The fourth joint has a spine at the front apex and three on the hind margin, the small triangular fifth has two spines, and the sixth three on the hind margin; the finger has a horny principal nail, but the accessory nail is only represented by a small pellucid spine.

The second gnathopods have similar fingers, but the four preceding joints more elongate, the fifth joint being of the same character as in the peræopods. Most of these limbs show a fur-like clothing of the inner margin of the fourth and two following joints; the spines are quite small and not very numerous; the proportions of the joints are variable, in the long fifth peræopods the fourth joint being as long as the third or the sixth and a little longer than the fifth.

The first pleopods have the inner branch triangular with no distal emargination of the inner border. Both branches are covered with scale-like markings. The male appendix of the second pair is produced only a little way beyond the branches and is subapically widened but apically narrowed to a short obtuse point, thus differing from the longer, not subapically widened, stilet in *C. granulata*. The third pleopods differ from those of *C. latreillii* by having the inner branch considerably shorter than the outer, and the part of the outer branch below the suture with a breadth much less in excess of its length.

The uropods have a dorsal tubercle on the peduncle; the peduncle is widened above on the inner side, and is still more widened below into the short unjointed inner ramus. The outer ramus is very long and nearly straight, the tolerably acute tip tending to bend outwards.

Length at full stretch from front of head to end of dorsal process of pleon, 8.5 millims. The uropods reach little beyond the dorsal process.

Localities:—Cheval Paar, Gulf of Manaar; deep water off Galle; off Foul Point, Trincomalee, Station XXIV.

Female.—The form which I regard as the female of this species is devoid of the long dorsal process and has the rami of the uropods subequal. It is also considerably smaller than the male. But in other respects the agreement between the two forms is so close as to leave little room for doubt that they are the same species. The maxillipeds are especially characteristic. The antennæ, first gnathopods, and fifth peræopods, as will be seen by the illustrative figures, are in close agreement. The pleopods, in addition to agreement in shape, show the same scale-like markings.

The uropods have the fixed branch squarely truncate, the outer narrowly ovate, with its apex acute, turned slightly outward. The front division of the pleon has a faintly marked medio-dorsal projection of its hind margin. The telsonic segment has two prominent submedian bosses and a semicircular apical notch.

Localities:—Trincomalee, Station XXIV., off Foul Point; deep water off Galle.

*Cilicæa beddardi*, n. sp.—Plate X. (A), (B).

Male.—This species is nearly related to *C. caudata* (SAY), but, according to the

more recent descriptions and figures of the latter by IVES ('Proc. Ac. Sci., Philad.,' 1891, pp. 188, 194, pl. 6, figs. 11-16), and by H. F. MOORE ('Bull. U.S. Fish. Comm.,' vol. 20 for 1900, p. 172, pl. 10, figs. 5-8, 1902), the present form must be considered distinct. SAY, in his original account, speaks of the telsonic segment as "marked by a deep sinus, within which are two or four small teeth." IVES, who had six male specimens from Bermudas, takes no notice of the alternative two teeth, but says, "there appears to be a tendency in the four spines within the sinus of the posterior abdominal segment to become double." MOORE says, "the apical notch is furnished with four teeth, two small ones at the base, and two larger ones outside of them and at a slightly lower level. The two limbs forming the borders of the notch are notched at their tips and furnished with a tuft of setæ." These notches at the tips are also very clearly shown in the figure given by IVES. In the Ceylon species there are decidedly only two teeth within the sinus, and the tips of the sinus are not notched, but carry dorsally an upright tuft of setules seemingly seated on a tubercle.

A few setules rise from the dorsal surface throughout the length of the animal. There is little difference in length between the segments of the peræon, except in regard to the seventh, which is the shortest, and has its side-plates rounded, less produced than the rest. The anterior division of the pleon has a transverse row of five small setulose tubercles. To these succeed on the telsonic segment three longitudinal ridges divided into tubercles, some of which carry setules. Behind the ridges the segment is depressed and has a group of setules in advance of the sinus which has been above described.

The first antennæ have an eight-jointed flagellum. In the second antennæ one member had the flagellum ten-jointed, while in the other it was seven-jointed.

The epistome is conspicuously tri-lobed above. The distal margin of the upper lip is evenly convex.

One of the mandibles has both cutting edge and accessory plate tri-dentate. On the other the dentation of these parts is obscure. They are succeeded by a bunch of spines. The molar is well developed; the palp slender, with its first joint not much longer than the second or third.

The first maxillæ have the usual four feathered setæ on the inner plate, the apical spines of the outer plate slender.

The maxillipeds are slightly constructed, with the last four joints apically setiferous, the three preceding the terminal joint being produced into narrow lobes.

The limbs are very similar to those of *Cilicæa whiteleggei*, but rather less robust. The second peræopod on the right side of the specimen figured has the sixth joint reduced to an oval stump, carrying no finger.

The first pleopods are remarkable for having the inner ramus twice as broad as it is long, agreeing with the same appendage as described by WHITELEGGE for *Zuzara emarginata*, HASWELL. The second pleopods also have the inner ramus much

broader than long, with the male appendix a little longer than the breadth of the ramus, transparent, smooth, of uniform width, with the apex turned a little away from the ramus. The outer ramus has the serration of its distal outer margin produced into prominent teeth. The third pleopods have the portion of the outer ramus beyond the suture nearly as long as it is broad. The fourth and fifth pairs have branchial folds on both rami.

The uropods are very hairy. The short peduncle is produced into a quadrate process representing the inner ramus, which has its lower angle a little acutely produced and beset with short feathered setæ. The movable ramus is long, cylindrical, slightly curved, the outer margin being convex.

Length 5 millims., breadth 2·5 millims.

Locality:—Cheval Paar; Muttuvaratu Paar.

**Cilicæa** (?), sp. juv.—Plate IX. (C).

The small specimen figured is no doubt immature, as may be judged from the unfurnished condition of the maxillipeds. The pleon differs little from that of the female or young *C. whiteleggei*, except that the outer ramus of the uropods shows no outward curving. The first antennæ have a massive peduncle and a flagellum of eight joints or, perhaps, more. The flagellum of the second antennæ is twelve-jointed. In the finger of the gnathopods the little spine or tooth at the base of the nail is comparatively strong.

Length, in a somewhat bent position, about 5·5 millims.

Locality:—Palk Bay.

**Cymodoce**, LEACH.

1814, *Cymodoce*, LEACH, 'Edinburgh Encycl.,' vol. 7, p. 433.

1902, *Cymodoce*, STEBBING, 'South African Crustacea,' part 2, p. 73.

1904, *Cymodoce*, STEBBING, in GARDINER'S 'Fauna, Maldive and Laccadive Archip.,' vol. 2, pt. 3, p. 712.

**Cymodoce bicarinata**, STEBBING—Plate X. (C).

1904, *Cymodoce bicarinata*, STEBBING, in GARDINER'S 'Fauna, Maldive and Laccadive Archip.,' vol. 2, pt. 3, p. 712, pl. 52B.

The specimen here figured differed from the type by its greater proportionate breadth, being 4 millims. broad by 6 millims. long, while the flagellum of the first antennæ was only eleven-jointed, and that of the second fourteen-jointed. But the long genital papillæ\* of the seventh peræon segment and the greatly produced inward curving male appendix of the second pleopods and various other features showed close agreement. To judge by other specimens, the breadth is variable.

MILNE-EDWARDS, 'Hist. Nat. Crust.,' vol. 3, p. 213, 1840, describes *C. pilosa* as

\* This term is introduced by Dr. H. C. WILLIAMSON in the 'Twenty-second Annual Report of the Fishery Board for Scotland,' part iii., p. 101, 1904. For an earlier vague use of it by v. WILLEMoes SUHM, see '“Challenger” Amphipoda,' p. 438.

follows:—"Body very flexible and almost smooth in front, but granular and setose in the hinder half. Front obtuse as in *Sphæroma*; hind margin of the first pleon segment furnished with two rounded tubercles; two tubercles similar but much larger, more salient and above all more elongated, situated on the last pleon segment and separated by a longitudinal furrow, at the extremity of which is found a boss furnished with a pencil of long setæ. Terminal incision of the pleon very wide; the elongate median process almost cylindrical, rounded at the end, and terminating at the level of the extremity of the two teeth formed by the sides of the incision. Terminal plates of the uropods reaching much beyond the extremity of the pleon; the inner large and obtuse; the outer much broader, thin on the inner side, but very thick towards the outer margin and armed with a conical tooth at its extremity. Length about 6 lines. Habitat, the Mediterranean." A length of 12.5 millims., compared with 6 millims., makes the difference in size very considerable, but in other respects there is a close resemblance between the Pacific species and that described from the Mediterranean.

Localities:—East of Shoal buoy; off Chilavaturai; on trap sunk to bottom, Shoal buoy.

***Cymodoce inornata*, WHITELEGGE.**

1902, *Cymodoce inornata*, WHITELEGGE, 'Mem. Australian Mus.,' iv., pt. 4, p. 263, fig. in text.

The specimen referred to this species agrees well with Mr. WHITELEGGE'S account and figure. It has the body minutely hairy, the pigmented area of the eyes with the narrow end directed backwards, the process in the apical sinus of the telsonic segment small and rounded, the outer ramus of the uropods bidentate, with the outer tooth smaller and higher up than the inner.

On the other hand, it should be stated that the apical sinus is much more marked than that which Mr. WHITELEGGE represents, and the tip of the median process scarcely reaches the level of the apices of the sinus. The outer ramus of the uropods is not so forcibly bidentate as in Mr. WHITELEGGE'S figure, and above the semi-circular depression, which that author mentions as extending from one uropod to the other, the telsonic segment is here bilobed. In the Australian memoir it is spoken of simply as convex.

Length about 12 millims., equal to twice the breadth. The specimen was crowded with young ones, in which the eyes were already visible.

Locality:—Coral reefs, Gulf of Manaar. A second specimen was taken south of Adam's Bridge.

TRIBE: VALVIFERA.

To the tribe, in 1897, Sars assigned the three families Idotheidæ (synonymous with Idoteidæ), Arcturidæ (with suggestion of Astacillidæ as the proper substitute), and Chætiliidæ. The late AXEL OHLIN in 1901 added a new family, Pseudidotheidæ, to receive the three species, *Idothea miersii*, STUDER, *Pseudidothea bonnierii*, OHLIN, and *Arcturides cornutus*, STUDER. He was, however, almost convinced that the first

two were identical, and suspected that in any case both would have to be transferred to *Arcturides*, the genus of the third. He recognised that in the latter event the family name would have to be changed. It would rather inconveniently become Arcturididæ. Another family, likewise intermediate between the Idoteidæ and Astacillidæ, is now required. This is remarkable for the negative character in which it agrees with the Amphipoda Caprellidea, a common result being no doubt referable not to any close tie of consanguinity, but to the simple fact that in each instance nature has enabled a species to get rid of limbs for which it had no further use. For the genera *Antarcturus* and *Pseudoprion*, ZUR STRASSEN, see 'Zool. Anzeiger,' vol. 25, p. 686; vol. 26, p. 31; 1902-03.

FAMILY: AMESOPODIDÆ, nov.

Body not geniculate, but antennæ, mouth organs, first gnathopods, and appendages of pleon nearly as in the Astacillidæ. Second gnathopods ambulatory, not setose, not fully jointed. First and second pairs of peræopods unrepresented, except by the marsupial plates in the female.

**Amesopous**, n. gen.

To the characters of the family none can be added for generic distinction, so long as the family contains but a single genus. It may be noticed that the first segment of the peræon is coalesced with the head, that all the segments of the pleon are fused into one, and that the wrist and hand of the first gnathopods are fringed with conspicuously trifid setæ.

The name is framed to express the default of the median pairs of legs. In *Cleantis*, DANA, a genus of the Idoteidæ, which in general facies makes some approach to the present, the second peræopods are the smallest of the limbs. In *Arcturides* the head is only incompletely separated from the first peræon segment, but OHLIN finds this fusion complete in his *Astacilla falclandica*, and nearly so in *A. magellanica*.

**Amesopous richardsonæ**, n. sp.—Plate XI. (A).

Head united to first peræon segment without apparent suture, rostral point minute, lateral lobes produced about to the end of the first joint of the upper antennæ. Body in male narrowly cylindrical, the limbless segments of the peræon the smallest, but in the ovigerous female the cephalothorax widens distally, and the second, third, and fourth peræon segments which carry large marsupial plates are much wider, the third and fourth being also considerably longer than any of the three following segments. The pleon is narrowly ovoid, narrowly rounded at the apex. In lateral view the dorsal outline is corrugated, and the female has a pair of dorso-lateral tubercles on each of the second, third, and fourth peræon segments.

The eyes are dark, laterally protuberant just below the frontal lobes of the head. The facets are small and numerous.

The first antennæ reach some way along the third joint of the second pair which

they overlie. The first joint is stout, a little longer than broad, the second and third shorter and much narrower, together as long as the one-jointed flagellum, which carries three apical sensory filaments.

The second antennæ have a very short first joint, the second not long, the fifth rather longer than the third and rather shorter than the fourth, the three-jointed flagellum being as long as the peduncle's third joint. The very short apical joint is tipped with a curved spine.

The upper lip appears to be rounded. The lower lip forms two broadly rounded lobes.

The mandibles are without palp, with small tridentate cutting plate and narrow accessory plate, close to which is a strong but not elongate molar with finely denticulate crown.

The first maxillæ show only two plumose setæ on the apex of the inner plate, and nine not very elongate spines on that of the outer plate.

The second maxillæ are remarkably short, with short comparatively broad plates, the outermost tipped with two long setæ, the middle one with four that are not so long, and the innermost with five that are shorter and more spine-like.

The maxillipeds have the lobe of the second joint produced about to the end of the fifth joint and armed on the inner margin with setæ and with three or sometimes only two hooks. The third joint is small, the fifth broadly oval, the sixth much shorter, nearly as broad as long, the seventh almost tubercular; the fifth and sixth are well fringed with setæ on the inner margin. The epipod is quadrately oval in the female, but in the male balloon-like, being very narrow at the base.

The first gnathopods are closely applied to the mouth. They have the fourth joint somewhat cup-like, much broader than the third, the fifth joint longer but not so wide, the sixth narrower than the fifth but subequal to it in length, and both of these notable for the trifold setæ along the inner margin. The middle branch of the setæ is the longest. The narrowed apical part of the sixth joint has curved setæ on the outer margin. The finger is short and conical, and tipped with a spine.

The second gnathopods display only five joints. The finger has its inner margin denticulate and ends in a very small curved unguis, agreeing with the finger in the third, fourth, and fifth peræopods. The two preceding joints have the inner margin denticulate or serrate. Of the four joints preceding the finger the second is not longer than broad, the third is shorter than the first, and the first than the fourth. Whether the first represents a coalescence of the first and second or of the second and third joints, or whether the fourth may be a fusion of the true fifth and sixth joints it is, perhaps, vain to speculate.

The three hinder peræopods are almost exactly alike, the second joint in the female decidedly longer than the sixth, but scarcely so in the male. The third joint is longer than the fourth and the fourth than the fifth.

The first and second pleopods have two slender branches with long apical setæ.

The others appear to be simply branchial, narrowly oval, without setæ. A male pleopod figured shows one of the branches apically divided for a short distance. The smooth inner division is probably the male stilet in preparation.

The uropods are elongate, the narrowly triangular terminal division being about a quarter as long as the peduncle. Within it is a plate about two-thirds as long and half as broad, with a long seta on its rounded apex.

The female is brown, with numerous conspicuous white spots, and three dorsal longitudinal dark bands. The males did not exhibit any white spots, and had two dorso-lateral dark bands.

The length of the female was 6 millims., not including the second antennæ which were 2.75 millims. long. The longest male was 4 millims. From this the detail figures of the male are taken. The male figured measured 2.5 millims. in length. The sex of the female specimen was beyond question, as it was provided with fourteen large eggs. As to the other much smaller specimens one must speak with more reserve, as they might be young ones of either sex.

Locality:—From pearl oysters, East Cheval Paar.

The specific name is given out of respect to the assiduous work which Miss HARRIET RICHARDSON has devoted to this tribe of the Isopoda.

FAMILY: IDOTEIDÆ.

**Idotea**, FABRICIUS.

1798, *Idotea*, FABRICIUS, 'Supplementum Ent. Syst.,' p. 302.

**Idotea** sp.

In a tow-net gathering off Marichchukaddi there were two specimens of a young *Idotea*, 2 millims. long, in which the last pair of peræopods were not yet visible.

FAMILY: ASTACILLIDÆ.

**Astacilla**, CORDINER.

1795, *Astacilla*, CORDINER, 'Remarkable Ruins . . . and Singular Subjects of Natural History.' Section, "Astacillæ," etc.

1893, *Astacilla*, STEBBING, 'History of Crustacea,' p. 370.

1897, *Astacilla*, SARS, 'Crustacea of Norway,' vol. 2, p. 87.

1904, *Astacilla*, NORMAN, 'Ann. Nat. Hist.,' ser. 7, vol. 14, p. 447.

**Astacilla amblyura**, n. sp.—Plate XI. (B).

The head has a minute rostral point and the usual broad lateral lobes in advance of the dark protuberant eyes; it is rather gibbous between the eyes and apparently has a pair of tubercles wide apart in advance of the hump. The specimen was rather foul with adhesive extraneous matter, by which the excrescences were in part obscured, in part exaggerated, and there was some risk, in clearing away what was adventitious,

of removing what really belonged to the animal. A strong groove (but not necessarily an articulation) separates the first segment of the peræon from the head. The long fourth segment has a dorsal hump in advance of the middle and a small medio-dorsal tubercle closely flanked by two others a little to the rear of it on the hind margin. The sixth peræon segment appears to have two lateral tubercles, the fifth and seventh segments each one such tubercle on either side. No transverse dorsal divisions of the pleon could be discerned, but on each lateral margin there are three projections; to the last and most prominent of these a short obtusely ending apical triangle succeeds, very different from the acute ending of the pleon in the four Norwegian species figured by Professor G. O. SARS, but agreeing with the apex in *A. granulata*, SARS, and *A. marionensis*, BEDDARD.

The first antennæ are normal, with stout first joint, the second and third successively narrower, the one-jointed flagellum fringed with thirteen or fourteen sensory filaments.

The second antennæ are very little shorter than the body, the third joint much stouter distally than at its base, the fourth joint the longest of all, but much narrower than the third and curving to a little conspicuous tooth not far from the base; the fifth joint is narrower, intermediate in length between the third and fourth, about twice as long as the three-jointed flagellum.

In the mouth parts and limbs there is scarcely any tangible difference from the corresponding structures figured by SARS for *A. longicornis* (SOWERBY).

On one of the mandibles, between the accessory plate and the strong molar, in this species two or three short spines are to be seen crowded into a very narrow space. The cutting edge has three or four close-set teeth. The first maxillæ have three setæ on the inner plate, nine very short spines on the outer. The second maxillæ have the inner plate much broader and more setose than the other two plates. In the maxillipeds the broad plate of the second joint is armed with a remarkably large coupling hook; the seventh joint is well developed, not unguiform.

The first gnathopods, of which the last four joints are by no means unlike the corresponding four of the maxillipeds, have serrate spines on the broad fifth joint. The seventh joint has one conspicuous spine among many that are smaller. The second gnathopods and the first and second peræopods are, as usual, alike, very slender, with the seventh joint minute, this and the three preceding joints being furnished with very long setæ. The fourth, fifth and sixth joints are subequal in length. The third peræopods are a little longer than the fourth or fifth, all three pairs being stoutly built, with the second and sixth joints longest, but none very elongate or conspicuously armed, except the finger which has a stout apical tooth on the inner margin in addition to the short curved nail. The finger is also tuberculate on the inner margin, and this is perhaps the case with some of the preceding joints.

The pleopods agree very nearly with those which have been figured by SARS for the male of *A. longicornis* and *A. granulata*, the first two pairs having slender rami, with

the setæ of the apical border elongate, and the masculine appendix of the second pair forming a narrow stilet which reaches to the end of the ramus and carries two long apical setæ.

The uropods are rounded above, widest below the middle, then rather rapidly narrowed to the rami, of which the external is very small, acutely triangular, and reaching to the apex of the pleon. The internal ramus is still smaller. Colour in spirit a dull yellowish.

Length 9 millims., apart from the antennæ, the lower of which are nearly as long as the body, about 8.5 millims.

Locality :—Periya Paar, Gulf of Manaar.

A specimen, 4 millims. long, delicately pink in colour, from East Cheval Paar, is no doubt the young of this species. It has the first peræon segment not marked off from the head, the fourth segment very elongate and smooth. The flagellum of the first antennæ is armed about the apex with only three or four sensory filaments. The fifth peræopods are still imperfectly articulated, very small, ending obtusely without a nail.

Another specimen, from East Cheval Paar, is only 3 millims. long, with the fifth peræopods in a still more inchoate condition. Here, however, the fourth segment of the peræon is not especially elongate and shows traces of median and terminal tuberculation. The colour is a delicate pink. Neither in this nor the other juvenile specimen is there a tooth on the fourth joint of the lower antennæ.

The specific name is from the Greek ἀμβλύς, blunt, and οὐρά, tail. Apart from size and arrangement of tubercles, the distinguishing characters of this species depend on the antennal tooth just mentioned, the decided groove between head and peræon, the solidarity of the pleon, and the extension of the uropods further back than appears to be the case in any of the species hitherto described.

#### TRIBE : ASELLOTA.

#### FAMILY : JANIRIDÆ.

SARS, when separating this family in 1897 from the Asellidæ, incidentally mentioned *Stenetrium* as belonging to the latter. Miss RICHARDSON, in 1902, without comment transferred the genus to the newer division within the Asellota. It certainly seems to conform in many important respects to the following definition which SARS himself gives of the Janiridæ :—

“General-habitus that of the Asellidæ, but the lateral parts of the cephalon always lamellarly expanded. Eyes, when present, subdorsal. Superior antennæ sometimes well developed, with the flagellum multiarticulate, sometimes very small, with rudimentary flagellum. Inferior antennæ always longer than the superior, with the peduncle six-articulate, and generally carrying a small accessory appendage (scale) outside the third joint. Oral parts normal. Legs subequal in length, with the dactylus generally bi- or tri-unguiculate ; first pair sometimes differing from the others

in being prehensile. First pair of uropoda [pleopoda] in female transformed into a single, large, opercular plate; in male, constituting the median piece of the compound operculum, the lateral pieces of which are formed by the copulative appendages. The three succeeding pairs very delicate, the last pair forming simple, smooth lamellæ, the two preceding ones with the outer ramus narrow and confluent with the basal part. Uropoda biramous, more or less developed."

From this characterization Miss RICHARDSON'S account varies in one or two respects, assigning to the Asellidæ and Janiridæ in common a feature which Sars only attributes to the former, namely, that the first antennæ issue close together, which cannot be predicated of all the Janiridæ, and omitting a feature on which Sars lays stress, namely, that the peduncle of the second antenna is six-jointed. In two species of *Stenetrium* the small fourth joint of this peduncle has been clearly observed, but in three of the species, including the one first assigned to the genus, it is either not present or has been overlooked.

Sars speaks of nine or ten genera as being included in the family, and since he wrote, the genus *Carpas*, RICHARDSON, 1902, has been added. In 1901, Dr. ORTMANN ('Proc. Ac. Philad.,' p. 157) introduced the new generic name *Tole* to take the place of "*Janthe*, BOVALLIUS," on the ground of preoccupation. In this he is followed by Miss RICHARDSON in 1905. But the genus which BOVALLIUS instituted in 1881 is *Ianthe*, not *Janthe*, so that no change is required. Moreover, in his key to the species of *Tole*, the first species which Dr. ORTMANN mentions is "*J. bovallii* (STUDER)," which was named *Ianthopsis bovallii* by BEDDARD in 1886 ("Challenger" Isopoda,' vol. 17, pt. 48, p. 15, pl. 5, fig. 5). Seeing that Dr. ORTMANN expressly adopts the type species of *Ianthe* as the type of *Tole*, that name must lapse as a synonym, and could not properly be revived in case either *Tole libbeyi*, ORTMANN, or *Tole holmesi*, RICHARDSON, should in future be transferred from *Ianthe* to a distinct genus.

#### Janira, LEACH.

1814, *Janira*, LEACH, 'Edinburgh Encycl.,' vol. 7, p. 434.

1886, *Janira*, BEDDARD, "Challenger," Isopoda, Reports,' vol. 17, part 48, p. 5.

1897, *Janira*, Sars, 'Crustacea of Norway,' vol. 2, p. 98.

1898, *Janira*, A. O. WALKER, 'Trans. Biol. Soc. Liverpool,' vol. 12, p. 280.

The species about to be described agrees in many respects with this genus as defined by Sars, but the fifth joint or wrist of the first gnathopods is not subfusiform; it is distally expanded, so as to form a kind of bidentate palm. The single specimen in the collection appears to be an adult male. It was, however, so exceedingly small and defective, having lost most parts of the second antennæ, all the last three pairs of peræopods, and the uropods, that it was not well suited for initiating a new genus. The parallel-sided peræon agrees with what is found in *Jæropsis*, *Stenetrium*, and *Iais*. HASWELL'S *Stenetrium inerme* may be congeneric, but the great difference in size makes specific agreement very unlikely.

**Janira (?) nana**, n. sp.—Plate III. (C).

The general appearance agrees with that of *Jæropsis curvicornis*, in company with which the specimen was taken, but the segments of the peræon are not so markedly separated. The pleon is nearly circular, not serrate, with a small apical convexity, on either side of which the uropods probably protrude.

The eyes are pale orange coloured, differing from those of *Iais pubescens* by having not two but thirty-eight components.

The first antennæ have a stout basal joint, the second much smaller, and the third almost like a flagellar joint; the flagellum is longer than the peduncle, its seven joints unequal in length, all slender, the last tipped with a couple of long setæ or filaments.

The upper lip is rounded, and seemed to be projected forward with the lower lip. The mandibles have a prominent cutting-plate divided into five teeth, the accessory plate on the left similarly divided, but bidentate on the right. The spine-row has five or six spines. The molar is prominent, denticulate. The three joints of the palp are subequal in length. The first maxillæ have a slender inner plate, and nine, mostly denticulate, spines on the outer. The outer and middle plates of the second maxillæ carry each three setæ. In the maxillipeds the plate of the second joint is rather large, with several plumose setæ on the distal margin, and one hook on the inner margin; the third, fourth, and fifth joints are broad, the fifth having its outer margin longer than the inner; the sixth and seventh joints are narrow.

The first gnathopods have the fifth joint much broader but not longer than the sixth, which in closing down would reach much beyond the palmar margin. The finger is much the same in all the known limbs of the peræon, having a short trunk with two distinct nails. The second gnathopods agree with the first and second peræopods in structure, but are longer, especially in the second, fifth, and sixth joints; the sixth joint is narrower than the preceding joint.

The male operculum is composed of the first two pairs of pleopods. The first pair are narrow and more or less tapering, but with a constriction below the middle. They end in two pairs of overlapping shortly lanceolate lobes. The second pair are semicircular, with a long sinuous almost filiform masculine appendix.

Length 1·5 millims. HASWELL'S *Stenetrium inerme* is described as  $\frac{5}{16}$ ths of an inch in length.

Locality :—Gulf of Manaar.

**Jæropsis, KOEHLER.**

- 1885, *Jæropsis*, KOEHLER, 'Ann. Sci. Nat.,' sér. 6, Zool., vol. 19, Art. 1, p. 2.  
 1886, *Jæropsis*, BEDDARD, '“Challenger,” Isopoda, Reports,' vol. 17, p. 20.  
 1891, *Jæropsis*, CHILTON, 'Trans. New Zealand Inst.,' vol. 24, p. 267.  
 1893, *Jæropsis*, STEBBING, 'History of Crustacea,' p. 379.  
 1899, *Jæropsis*, H. RICHARDSON, 'Proc. U.S. Mus.,' vol. 21, p. 857.

1899, *Jæropsis*, NORMAN, 'Ann. Nat. Hist.,' ser. 7, vol. 4, p. 291.

1900, *Jæropsis*, H. RICHARDSON, 'Amer. Naturalist,' vol. 34, No. 400, p. 298.

1902, *Jæropsis*, H. RICHARDSON, 'Trans. Connect. Acad. Sci.,' vol. 11, p. 298.

By the addition, which is well justified, of *Jæra curvicornis*, NICOLET, Miss RICHARDSON is able to say in 1902 that "six species of this genus have been heretofore described." They are *J. curvicornis* (NICOLET); *J. brevicornis*, KOEHLER; *J. marionis*, BEDDARD; *J. neo-zelanica*, CHILTON; *J. lobata*, RICHARDSON; *J. dollfusi*, NORMAN; to which on the same occasion Miss RICHARDSON adds *J. rathbunæ*. *Jæra antarctica*, PFEFFER, may perhaps belong to the group, but the description and figures leave its generic location quite uncertain. All the species have many features in common. They range in size from 2 millims. to a little over 4 millims. The sides of the middle body or peræon are nearly or quite parallel, with the segments very distinctly separated. Both pairs of antennæ are short. The appendages of the peræon are truly isopodous, without any real distinction between gnathopods and peræopods. The uropods are small, carrying two minute dissimilar rami, and occupying emarginations in the distal border of the caudal shield. In the second antennæ the joint numbered second by KOEHLER, third by CHILTON, BEDDARD, and RICHARDSON, fourth by Canon NORMAN, is broadly expanded, unless *J. marionis* be an exception, for in that species the joint is figured as cylindrical rather than laminar.

It may perhaps be objected that there is a want of authority for the statement that the uropods occupy emarginations in the telsonic segment. Miss RICHARDSON indeed says that her species, *J. lobata*, differs from KOEHLER'S "in the shape of the terminal segment, which is perfectly rounded in *J. brevicornis*," while in *J. lobata* "there are two posterior incisions for the reception of the uropods." But one may easily press too far the differences shown in the habitus figures of very minute animals. When the highly magnified figure of the uropod of *J. brevicornis* is considered, it will be noticed that the outer margin is serrate, and this makes it probable that here as in other species it has its share in completing the curve of the tail-piece.

#### *Jæropsis curvicornis* (NICOLET)—Plate XI. (C).

1849, *Jæra curvicornis*, NICOLET, in GAY'S 'Hist. fis. y pol. de Chile,' Zool., vol. 3, p. 263, pl. 3, fig. 10.

1891, *Jæropsis neo-zelanica*, CHILTON, 'Trans. New Zealand Instit.,' p. 267.

1902, *Jæropsis curvicornis*, H. RICHARDSON, 'Trans. Connect. Acad. Sci.,' vol. 11, p. 298.

The body, as described by NICOLET, forms a rounded longitudinal medio-dorsal elevation. This is not particularly easy to see, but, when the specimen is placed back downwards, its rolling from side to side is evidence of the shape in question. The head corresponds with CHILTON'S description as being "produced slightly into a rostrum between the bases of the antennæ; end of rostrum emarginate, and with a

rounded lobe fitting into the emargination." NORMAN says of the head in *J. dollfusi* "the anterior margin is emarginate, and in front of this the buccal organs are conspicuously projected," but his figure also shows the rounded lobe in the emargination. The figure of *J. dollfusi* shows the pleon more sharply contracted towards the apex and the sides more deeply serrate than is the case with the present species.

The eyes are not large, not dark, placed near the front angles of the head. The first antennæ have a broad basal joint, seemingly denticulate at the front corners. The second joint is much shorter and much narrower, the third smaller than the second, and the two remaining joints very insignificant, but tipped with two long filaments.

The second antennæ are of the typical form, seemingly with three short basal joints, followed by the characteristic large dilated joint with thin outer margin slightly crenulate, not strongly as in *J. dollfusi*; to this succeeds a much smaller, apically expanded joint, helping to form a double geniculation. The five remaining joints, perhaps, constitute the flagellum, but the first, which is very far the largest of them, has usually been accounted the terminal joint of the peduncle. It is, however, not very usual for the penultimate joint of the peduncle to be shorter than the joint preceding as well as the joint following it.

The upper lip has a rounded distal margin. The mandibles have the cutting edge cut into five teeth, eight spines in the spine-row, the three-jointed palp very small. The first maxillæ have three short spine-like setæ on the inner plate, and nine to eleven spines, mostly denticulate, on the outer plate. The second maxillæ are notable for the shortness of the inner plate; each of the three plates carries four apical setæ. The maxillipeds have a very large second joint with extremely broad plate, the distal margin slightly and irregularly crenulate with a gentle curvature or sinuosity, distinct from the quadrate character displayed in *J. dollfusi*. The coupling hooks are two. The fourth joint is distally produced on the inner margin, the sixth joint is very narrow and the seventh minute.

The limbs of the peræon differ but little, the fourth joint being shorter than the third, fifth, or sixth. The finger has two conspicuous nails and one that is inconspicuous.

The operculum of the pleopods in the female is broadly rounded for nearly two-thirds of its length, and then contracts to a narrowly truncate apex carrying four setules. It does not show marks of a longitudinal or a transverse suture, such as are said by Dr. CHILTON to be indistinctly visible in his specimen.

The uropods fill the emarginations of the pleon. The peduncle is more strongly serrate on the inner than on the outer margin. The inner ramus is hook-like; the outer, which is even smaller than the inner, carries a bunch of setæ.

Length 2 millims. NICOLET gives 2 lines for the length of his specimen; CHILTON about 2.5 millims. for his.

Locality :—Gulf of Manaar.

## FAMILY: STENETRIIDÆ\*

**Stenetrium, HASWELL.**

- 1881, *Stenetrium*, HASWELL, 'Pr. Linn. Soc. N.S. Wales,' vol. 5, p. 478.  
 1882, *Stenetrium*, HASWELL, 'Cat. of Australian (Malacostracan) Crustacea,' p. 308.  
 1884, *Stenetrium*, CHILTON, 'Trans. N. Zealand Instit.,' vol. 16, p. 251.  
 1885, *Stenetrium*, HASWELL, 'Pr. Linn. Soc. N.S. Wales,' vol. 9, p. 1009.  
 1886, *Stenetrium*, BEDDARD, '“Challenger” Isopoda, Reports,' vol. 17, pt. 48, p. 8.  
 1895, *Stenetrium*, HANSEN, 'Isopoden der Plankton-Exp.,' p. 6.  
 1902, *Stenetrium*, H. RICHARDSON, 'Trans. Connect. Ac. Sci.,' vol. 11, p. 295.  
 1905, *Stenetrium*, HANSEN, 'Proc. Zool. Soc. London,' pp. 303, 316.

Five species have been assigned to this genus, *S. armatum*, HASWELL, *S. inerme*, HASWELL, *S. fractum*, CHILTON, *S. haswelli*, BEDDARD, and *S. stebbingi*, RICHARDSON. But HASWELL'S *S. inerme* differs from his other species in having rounded lateral eyes, the antepenultimate joint of the maxillipeds distally narrowed, and perhaps, also by having the rostrum subacute. It appears to belong to the genus *Notasellus*, PFEFFER, 1887. The union of the other four species in a single genus is probably justifiable, though in each case some important evidence is wanting. For *S. armatum* HASWELL has twice figured the mandible, and on each occasion gives no indication of its possessing a molar. In *S. haswelli*, and in the species about to be described from Ceylon, this part of the mandible is strongly developed and too conspicuous to be overlooked. In the descriptions of *S. fractum* and *S. stebbingi* the presence or absence of this structure is not discussed. For the last-mentioned species no account is given of the pleopods, and for the other species the accounts of these organs are variable or uncertain. Including the new species, which is nearly allied to what is known of *S. fractum*, the genus may be defined as follows:—

Body depressed, parallel-sided. Pleon consolidated. Head bluntly rostrate. Eyes obliquely dorsal. First antennæ short, inserted close to the rostrum on either side of it. Second antennæ elongate, with exopod on the third joint. Mandible with palp. Maxillipeds with third to fifth joints broad, sixth and seventh narrow. First gnathopods simply or complexly subchelate. Second gnathopods and all the peræopods slender, ambulatory, biunguiculate. Pleopods not in every case biramose. Uropods biramose, not adjacent, inserted apically on the telsonic segment.

The uncertainty attending the characters in some of the species makes it difficult to

\* After the manuscript of this paper had passed out of my hands, I received the luminous essay, "On the Morphology and Classification of the *Asellota*-group of Crustaceans, with Descriptions of the Genus *Stenetrium*, HASW., and its Species," by Dr. H. J. HANSEN ('Proc. Zool. Soc. London,' p. 302, April 18, 1905). In this the new family Stenetriidæ is defined (*loc. cit.*, p. 315), and nine species of *Stenetrium* are described, with illustrative figures of several and a conspectus of them all. Five are new, *S. mediterraneum*, *S. serratum*, *S. occidentale*, *S. antillense*, *S. siamense*. For a more accurate account of the pleopods than I had myself arrived at I am now indebted to HANSEN'S instructive treatise.

produce a useful synoptic table. The following is offered, therefore, with all necessary reserves :—

	Telsonic segment without lateral notch.	1. <i>S. haswelli</i> , BEDDARD.
	Telsonic segment with lateral notch—2.	
2	{ First gnathopod with hind margin of wrist produced.	2. <i>S. stebbingi</i> , RICHARDSON.
	{ First gnathopod with hind margin of wrist not produced—3.	
3	{ First antenna, second joint as long as first.	3. <i>S. fractum</i> , CHILTON.
	{ First antenna, second joint shorter than first—4.	
4	{ Margin of head convex between rostrum and antero-lateral angles.	4. <i>S. armatum</i> , HASWELL.
	{ Margin of head angular between rostrum and antero-lateral angles.	5. <i>S. chiltoni</i> , n. sp.

In the adult male the first gnathopods strikingly distinguish *S. haswelli*, *S. stebbingi*, *S. armatum*. But in the female of the last-named species these gnathopods do not appear to differ from those of *S. fractum*, and from those of *S. chiltoni* only by the greater robustness of the hands.

***Stenetrium chiltoni*, n. sp.**—Plate XII. (A).

The whole body, dorsally and at the sides, is beset with rather long stiff setæ. The head has a rather broad, blunt rostrum not reaching so far forward as the broad epistome. The antero-lateral angles of the head are acutely incurved, and between each of these and the rostrum the margin is produced to a point, thus forming sockets for the first antennæ. The segments of the peræon differ but little in length or breadth; the sides are nearly straight, with the anterior angles of the first four pointing acutely forwards. The telsonic segment has the lateral margins regularly but quite microscopically serrate, and, as in all the species except *S. haswelli*, each of these margins far down is produced into a tooth. The indentation or pocket thus formed is followed lower down by a small setiferous indent, to which succeed the rounded corners of the broad apical margin, with its shallow convex projection between the uropods.

The eyes are narrowly bean-shaped, placed obliquely near the middle of the convex lateral ridges that run below the anterior lobes of the head.

The first antennæ agree closely with those of *S. armatum*, the second joint being much shorter than the first and not so long as the third; the flagellum is obscurely six-jointed. The second antennæ have the first joint acutely produced on the outer side, but the short second joint and the longer third are not produced on either side. The exopod is conical, having its truncate point tipped with a pencil of setæ. HASWELL has apparently overlooked the second joint and described the third as

produced like the first externally and distally into a slender acute process, the process ending in a hair-like appendage. He does not mention the articulated scale or exopod. For *S. fractum* CHILTON describes and figures the third joint as "produced acutely at its antero-distal angle, bearing on the outer edge an articulated appendage, which has the end rounded and supplied with a few long setæ." The small fourth joint, which is seen in the present species and in *S. haswelli*, is not noticed or figured in connexion with the other three species, as noted in the discussion of the family. The fifth and sixth joints of the peduncle are elongate, the sixth slightly longer than the fifth, the flagellum three times as long as the sixth joint, rather longer than the whole peduncle, composed of very many little scarcely separated joints, setose.

The upper lip is apically rounded. The two broad lobes of the lower lip have the usual armature of minute spines.

Left mandible with dentate accessory plate like the cutting edge but smaller, spine-row of five serrate spines; right mandible without accessory plate, unless it be represented by the first of the five spines in the spine-row; cutting edge with four or five crowded teeth, but within the mandible the new teeth in preparation for the moult are spread out in one plane; molar long and prominent; palp of three long joints, the second carrying five short spines between two long ones, the third falciform, with long spines at apex, short ones fringing the margin.

First maxilla with three spines, a little tooth and some setules on apex of inner plate, and nine more or less denticulate spines on apex of outer plate.

Second maxilla with about four slender spines on apex of outer plate, and also on that of the middle one, the rather broader and more oval inner plate carrying several spines along the inner margin.

Maxillipeds with large distally narrowed epipods reaching nearly to the apical border of the broad lobes which surmount the second joint and considerably overtop the fourth joint; the third joint is short but broad, the fourth larger than the fifth, both of them broad and widened distally, the sixth and seventh being abruptly much narrower.

The first gnathopods have the second joint moderately long, the three following joints short, the fourth subacutely produced on the front margin; the fifth joint is setose on the hind margin; the sixth joint is less than twice as long as its greatest breadth; the front margin is curved and carries a few setules, the hind margin straight, furnished with many setæ; the palm, defined by a long spine, carries several smaller pectinate spines sloping towards this palmar spine; the finger, which curves over the palm and ends in a small simple nail (broken in the specimen), has a few setules on the convex margin and several microscopical spines on the concave border. CHILTON speaks of the palm of his species as "armed with strong serrated setæ," and the finger as having the "inner edge thickly fringed with strong denticulated setæ," but these expressions may refer to the armature as it appears when very highly magnified.

The second gnathopods appear to have a round-lobed first joint; the second joint is

about as long as the third and fourth combined, the third being much longer than the fourth, nearly as long as the sixth, which is slightly shorter than the fifth. The finger is less than half as long as the sixth joint; it curves to a sharp apical point, which is overhung by an unguis-like spine, while on the concave margin of the finger there is a small spine. The peræopods differ little in character from the second gnathopods, except that the second joint is less elongated and the third joint is more nearly subequal in length to the sixth. To the first and second gnathopods and first and second peræopods in one of the specimens four pairs of marsupial plates were attached, the third pair being the largest, but the fourth also of considerable size. In dissection of the pleon there came away a linear ring, which, perhaps, represents a degraded first pleon segment. Dorsally two such segments are indicated.\* A small unpaired plate, square above and triangular below, without any trace of longitudinal or other suture, must be regarded as representing the first pair of pleopods.† The second pleopods are wanting, as in other females of this tribe. The third pleopods form a very large pair of biramose appendages, the peduncle small, the inner ramus branchial, with three or four setæ on the narrow apex, the outer ramus of great size, with slightly oblique transverse suture below the middle, but starting just above the apex of the inner ramus. The fourth pair are biramose, and have the oval inner branchial ramus much broader and not shorter than the outer ramus, which shows a transverse suture above the middle and has the tapering lower division fringed with several long setæ. In the fifth pair each pleopod consists of a single branchial ramus, possibly representing a coalescence of two rami, the outer margin raised and distally fringed with setæ.‡

The uropods are inserted a little within the distal margin of the telsonic segment, separated by the convexity which may be considered an equivalent of the actual telson. The peduncle is rather stout, shorter than the rami, of which the inner is the larger, both being well furnished with tufts of long setæ on sides and apex.

Description of the uropods and the complete second antennæ is based on a specimen of the same dimensions as the one figured, but which did not come to light till after the less complete example had been figured. This second specimen was straight, but a third, rather smaller specimen with it had a distortion similar to that shown in the plate.

Length 4.5 millims., breadth 1.5 millims.

Locality:—Reef, Galle, with Ascidians; and Coral banks, Gulf of Manaar.

\* For the genus at large HANSEN says, "two rudimentary segments are observed in front of the large abdominal shield" (*loc. cit.*, p. 304).

† HASWELL (*loc. cit.*, p. 1010) says: "The bases of the first pair of abdominal appendages are covered in both cases by a broad plate, with a bifid apex attached to the posterior border of the last thoracic segment." By "both cases" no doubt the two sexes are intended, and "the first pair of abdominal appendages" are really the third pair of pleopods.

‡ HANSEN in his character of the family says in regard to the pleopods, "fifth pair with only one ramus, in all probability the exopod" (*loc. cit.*, p. 315).

The specific name is given out of respect to my friend Dr. CHARLES CHILTON, whose *Stenetrium fractum* has a name only too suggestive of the mishaps to which these delicate isopods are liable. HASWELL'S species is described as half-an-inch long, CHILTON'S as about a sixth of an inch. Though it remains a little doubtful whether the species here described belongs to HASWELL'S genus, the possibility is also open that *S. armatum*, *S. fractum*, and *S. chiltoni* may all be the same species.

## FAMILY: MUNNIDÆ.

**Pleurocope, A. O. WALKER.**

1901, *Pleurocope*, WALKER, 'Journ. Linn. Soc.,' London, vol. 28, p. 297.

Mr. WALKER remarks that "this genus differs from *Pleurogonium*, its nearest ally, in the large size and peculiar appendages of the head, the different relative proportion and structure of the antennæ, in the form of the caudal segment, and in the position and size of the uropods, which are unusually large for the family." It may, however, be observed that in the genus *Dendrotion*, SARS, the uropods are larger and more conspicuous than in the present genus.

**Pleurocope dasyura, WALKER.**

1901, *Pleurocope dasyura*, WALKER, 'Journ. Linn. Soc.,' vol. 28, p. 297, pl. 27, figs. 12 to 18.

The description by Mr. A. O. WALKER, and the excellent figures by Mr. ANDREW SCOTT which accompany it, place the identification of this species beyond doubt. Beyond verification I have nothing to add, except that the peræon displayed four stiff upstanding dorsal setæ. A point of interest would have been to ascertain the character of the mandibles. But at the very moment when I was arranging the specimen for dissection, it disappeared like a dream, and defied all the efforts made for its re-discovery.

The length was a little over 1 millim., therefore approximately the same as Mr. WALKER'S type specimen from the Mediterranean. It came into my hands already named by Mr. A. SCOTT.

Locality:—Gulf of Manaar.

## TRIBE: ONISCIDEA.

## FAMILY: LIGIIDÆ.

**Ligia, FABRICIUS.**

1798, *Ligia*, FABRICIUS, 'Supplementum Ent. Syst.,' p. 301.

1885, *Ligia*, BUDDE LUND, 'Isopoda Terrestria,' p. 258.

**Ligia exotica, ROUX.**

1828, *Ligia exotica*, ROUX, 'Crust. Médit.,' livr. 3, pl. 18, f. 9.

1885, *Ligia exotica*, BUDDE LUND, 'Isopoda Terrestria,' p. 267.

A mutilated specimen occurs in the collection, which appears with little doubt to belong to this widely distributed species.

Locality:—Station XXXIX., Gallehogalle Bank, 16 to 30 fathoms

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<i>Hansenolana</i> . . . . .	15	<i>whiteleggei</i> ( <i>Cilicæa</i> ) . . . . .	39, Pl. IX. (A), (B).
<i>herdmani</i> ( <i>Conilorpheus</i> ) . . . . .	13, Pl. II. (A).	<i>zeylanica</i> ( <i>Lanocira</i> ) . . . . .	19, Pl. V. (B).
<i>Heterotanais</i> . . . . .	3		
<i>Idotea</i> . . . . .	46		
<i>Idoteidæ</i> . . . . .	46		
<i>inornata</i> ( <i>Cymodoce</i> ) . . . . .	43		

## EXPLANATION OF PLATES.

## PLATE I.

A. *Heterotanais crassicornis*, n. sp.—*n.s.*, natural size of specimen figured in lateral and in dorsal view; *a.s.*, *a.i.*, upper and lower antennæ more highly magnified; *gn.* 1, *gn.* 2, first and second gnathopods; *prp.* 1, *prp.* 3, first and third peræopods; *urp.*, uropod.

All the details are to the same scale, except the separate thumb and finger of *gn.* 1, and the separate outer branch of the uropod, which are more magnified than the other parts.

B. *Leptocheilia mirabilis*, n. sp.—*A.n.s.*, natural size of specimen figured in dorso-lateral view, with first gnathopod of the right side supplied from fragments; *gn.* 1, part of first gnathopod of the left side, probably belonging to the above specimen and drawn to the same scale; *a.s.*, *a.i.*, third joint of peduncle and the flagellum of upper antenna, and the lower antenna—these and the following details on a higher scale of magnification; *gn.* 2, *prp.* 5, second gnathopod and part of fifth peræopod; *plp.*, *urp.*, one of the pleopods and a uropod; *B.n.s.*, natural size of specimen figured in dorsal view, showing lower antennæ and base of right upper antenna; uropods broken.

C. *Leptocheilia lifuensis*.—*a.s.* ♀, *a.i.* ♀, upper and lower antennæ of female; *gn.* 1, ♀, *gn.* 2, ♀, first and second gnathopods of female; *urp.* ♀, uropod of female; *a.s.* ♂, *a.i.* ♂, upper and lower antennæ of male; *gn.* 1, ♂, first gnathopod of male; *urp.*, uropod of male.

All the above are magnified to the same scale as the general details in Plate I., A, except the separate ramus of the male uropod, which is magnified on the same scale as the corresponding ramus in Plate I., A.

D. *Tanais gracilis*, HELLER.—*n.s.*, natural size of specimen figured in lateral and dorsal views; *a.s.*, *a.i.*, upper and lower antennæ very highly magnified; *gn.* 1, *gn.* 2, *prp.* 4, first and second gnathopods and fourth peræopod; *Pl.*, *urp.*, dorsal view of pleon and uropods, to the same scale as the preceding details; *m.*, *mxp.*, mandible and maxillipeds, exopod of the latter detached and incomplete. These and the separate portions of the second gnathopod and fourth peræopod are more magnified than the other details.

## PLATE II.

A. *Conilorpheus herdmani*, n. gen. et sp.—*n.s.*, lines indicating natural size of specimen figured below in dorsal and lateral view; *C.*, dorsal view of the head; *Per.s.* 7, seventh segment of peræon in dorsal view, and in lateral view with the fifth peræopod and pleopods showing below; *Pl.*, pleon in dorsal view; *a.s.*, *a.i.*, first and second antennæ; *m.*, *m.*, *mx.* 1, *mx.* 2, *mxp.*, the two mandibles, first and second maxillæ, and maxillipeds, the mandible on the right figured from the inner side; *gn.* 1, *prp.* 4, *prp.* 5, *plp.* 1, *plp.* 2, *urp.*, first gnathopod, fourth and fifth peræopods, first and second pleopods, and uropods, the last in ventral view.

The mouth organs are magnified on a higher scale than the other appendages.

B. *Hansenolana sphaeromiformis* (HANSEN).—*n.s.*, lines indicating natural size of specimen figured in dorsal view; *Pl.*, pleon in dorsal view; *a.s.*, *a.i.*, first and second antennæ; *m.*, *mx.* 1, *mx.* 2, *mxp.*, mandible, first and second maxillæ, maxillipeds; *gn.* 1, *gn.* 2, *prp.* 5, *plp.* 1, *plp.* 2, *plp.* 4, *urp.*, first and second gnathopods, part of fifth peræopod, first, second, and fourth pleopods, and uropods. Below the full figure of *gn.* 1 from the outside is given a more enlarged figure of the other member of the pair from the inner side. The portion of this *gn.* 1 and the portion of *prp.* 5 are enlarged on the same scale as the mouth organs.

## PLATE III.

A. *Argathona normani*, n. gen. et sp.—*n.s.*, lines indicating natural size of the specimen represented by the adjoining figures in dorsal and lateral views; *Pl.*, pleon in dorsal view, more highly magnified; *a.s.*, *a.i.*, the first and second antennæ; *l.s.*, the upper lip, with the epistome surmounted by the frontal lamina; *l.i.*, the lower lip; *m.*, *m.*, the left mandible entire, and part of the right mandible; *mx.* 1, *mx.* 2, *mxp.*, the first and second maxillæ and the maxillipeds; *gn.* 1, *gn.* 2, *prp.* 5, the first gnathopod without side-plate, the second gnathopod and fifth peræopod each with its side-plate; *plp.* 2, the second pleopod.

The mouth parts are magnified on a higher scale than the other appendages, but the uropods figured in attachment to the pleon are enlarged on a lower scale than the rest.

B. *Cilicava latreillii*, LEACH, juv.—*n.s.*, lines indicating natural size of specimen figured below in dorsal and dorso-lateral aspects; *Pl.*, pleon in dorsal view; *a.s.*, *a.i.*, first and second antennæ; *l.s.*, upper lip with epistome; *mxp.*, maxillipeds; *gn.* 1, first gnathopod.

The mouth parts are more highly magnified than the other appendages.

C. *Janira* (?) *nana*, n. sp.—*n.s.*, line indicating natural size of the specimen; *Pl.*, pleon, without appendages; *a.s.*, *a.i.*, first antenna and four basal joints of second; *l.s.*, *l.i.*, upper and lower lips; *m.*, *m.*, *mx.* 1, *mx.* 2, *mxp.*, the mandibles, first and second maxillæ, and a maxilliped; *gn.* 1, *gn.* 2, *prp.* 1, first and second gnathopods and first peræopod, the finger of the first gnathopod and that of the first peræopod more enlarged; *plp.* 1, *plp.* 2, the first and (one of the) second pleopods, the two pairs together forming the male operculum.

The mouth parts are more highly magnified than the other appendages, being on the same scale as the more enlarged finger of the first gnathopod.

## PLATE IV.

*Æga ommatophylax*, n. sp., ♂.—*n.s.*, lines indicating natural size of the specimen figured in dorsal aspect; *C.*, the head in dorsal aspect; *C.L.*, lateral view of the head in conjunction with the first two segments of the peræon; *Per.s.* 1, anterior part of first segment of peræon in dorsal view; *g.p.*, ventral plate of the seventh peræon segment, with the genital papillæ also more highly magnified; *Pl.*, Pleon in ventral view, after removal of the pleopods; *a.s.*, *a.i.*, first and second antennæ; *m.*, *mx.* 1, *mx.* 2, *mx.* 2, *mxp.*, mandible, first maxilla, second maxilla in two positions, maxillipeds in ventral aspect. These organs are magnified on a higher scale than the other details in general, and the distal parts of mandible, first maxilla, and maxillipeds are again more highly magnified. In the mandible the third joint of the palp is missing. The further enlargement of the maxillipeds is from the dorsal aspect. *gn.* 1, *gn.* 2, *gn.* 2, *prp.* 3, *prp.* 5, *plp.* 1, 2, 5, *urp.*, the first and second gnathopods, third and fifth peræopods, first, second and fifth pleopods, and the uropod. The portions of these appendages which required further enlargement are on the same scale as the principal figures of the mouth organs. Both members of the second pair of gnathopods are figured, to show the difference mentioned in the text.

## PLATE V.

A. *Æga ommatophylax*, n. sp., ♀ (?).—*n.s.*, lines indicating natural size of specimen figured above in dorsal view; *C.*, ventral view of the head; *l.s.*, upper lip surmounted by the epistome and frontal lamina; *m.*, *m.*, the two mandibles, with higher magnification of a seta from second joint of palp, and of

apical portion of the trunk. In both mandibles a rounded lobe is shown below the apical margin, but this lobe was only indefinitely made out. *mx. 1, mx. 2, mxp.*, first and second maxillæ, with the apices more highly magnified, and the maxillipeds.

- B. *Lanocira zeylanica*, n. sp.—*n.s.*, lines indicating natural size of specimen figured above in dorsal view; *Pl.*, dorsal view of pleon more highly magnified; *a.s., a.i.*, first and second antennæ; *l.s.*, upper lip; *m., m., mx. 1, mx. 1, mx. 2, mxp.* the mandibles, first maxillæ, one of the second maxillæ, and the maxillipeds; *gn. 1, prp. 5*, first gnathopod and fifth peræopod; *plp. 1, plp. 2*, first and second pleopods.

The mouth organs are more highly magnified than the other appendages.

#### PLATE VI.

- A. *Rhiothra callipia*, SCHIÖDTE and MEINERT.—*n.s.*, lines indicating natural size of male specimen figured above in dorsal view; *C.*, the head, stripped of its appendages, in dorsal view; *a.s., a.i.*, the first and second antennæ, with the terminal portion of each more highly magnified; *m.*, a mandible in connexion with the epistome; *mx. 1, mx. 2, mxp.*, the first and second maxillæ and the maxillipeds; *gn. 1, prp. 5*, the first gnathopod and the fifth peræopod; *plp. 2*, the second pleopod, a more highly magnified portion showing the numerous coupling-spines of the peduncle and the male appendix of the inner branch. *urp.*, one of the uropods.

The mouth organs are more highly magnified than the full figures of the other appendages.

- B. *Irona nanoides*, n. sp.—*n.s.*, lines indicating natural size of the female specimen figured at the centre in dorsal view; *C.*, the head, stripped of its appendages, in dorsal view; *a.s., a.i.*, the first and second antennæ; *m.*, the mandible in connexion with the upper lip; *mx. 1, mxp.*, the first maxilla and a maxilliped; *gn. 1, prp. 5*, first gnathopod and fifth peræopod; *plp., urp.*, a pleopod and one of the uropods.

The mouth organs are more highly magnified than the other parts.

- C. *Rocinela orientalis*, SCHIÖDTE and MEINERT.—*n.s.*, lines indicating natural size of specimen figured at the centre in dorsal view; *n.s. ♂*, lines indicating natural size of a full-grown male specimen, from which the figures marked ♂ are taken; *a.s., a.s. ♂*, first antenna of each specimen; *mxp., mxp. ♂*, one maxilliped of the smaller specimen and both maxillipeds of the larger; *gn. 1, gn. 2, prp. 5*, first and second gnathopods and fifth peræopod from the smaller specimen; *plp. 2*, second pleopod of the full-grown male; *Pl. urp.*, dorsal view of the pleon of the smaller specimen, much of the right side omitted for want of space; *Pl. ♂, urp.*, telsonic segment and left uropod of the full-grown male in dorsal view. The unsymmetrical right margin of the segment is seen through the figure of the transparent pleopod placed above it for convenience.

The maxillipeds are more highly magnified than the other parts.

#### PLATE VII.

- Sphæroma walkeri*, n. sp.—*n.s., n.s.*, curved line indicating natural size of partially rolled specimen figured above in lateral view, crossed lines showing length and breadth of the same specimen unrolled and figured below in dorsal view; *a.s., a.i.*, first and second antennæ; *l.s.*, epistome and upper lip; *m., m.*, the mandibles, the palp of one separately figured on the right to display relative length of the first joint; *mx. 1, mx. 2, mxp., mxp.*, first and second maxillæ, and one of the maxillipeds figured from the outer and the inner surface; *gn. 1, gn. 2*, the first and second gnathopods, with a more enlarged figure of the terminal part of the first; *prp. 1, 4, 5*, first, fourth and fifth peræopods; *g.sp.*, gastric spines, more highly magnified than the other details, among which the mouth organs are on a higher scale than the antennæ and limbs.

## PLATE VIII.

*Cilicæa latreillii*, LEACH.—*n.s.*, outline indicating natural size of specimen figured below in partially bent position and in lateral view; *Pl.V.*, ventral view of the pleon, omitting the pleopods; *Pl.D.*, dorsal view of the pleon with seventh segment of the peræon; *a.s.*, upper antenna; *a.i.*, *a.i.*, both members of the lower pair of antennæ, to show the casual want of symmetry; *l.s.*, upper lip and epistome from the upper (inner) side; *l.i.*, lower lip; *m.*, *m.*, the two mandibles; *mx. 1*, *mx. 2*, *mxp.*, the first and second maxillæ and the maxillipeds; *gn. 1*, *prp. 5*, the first gnathopod and the fifth peræopod; *plp. 1, 2, 4, 5*, the first, second and fifth pleopods, and part of the fourth; *int.*, a small piece of the integument from side-plate of seventh peræon segment.

The antennæ, mouth organs, and limbs in detail are drawn to a uniform scale. The fragment of the integument is more highly magnified.

## PLATE IX.

- A. *Cilicæa whiteleggei*, n. sp., ♂.—*n.s.*, line indicating natural size of specimen figured above in partially bent position and in lateral view; *C.D.*, dorsal view of head with first two segments of peræon not flattened out; *Pl.D.*, *Pl.V.*, dorsal and ventral views of pleon to the same scale as preceding figure; *mx. 1*, *mxp.*, first maxilla and maxillipeds more highly magnified than the other figures, with one exception; *a.s.*, *a.i.*, *l.s.*, first and second antennæ with epistome and upper lip; *gn. 1*, *prp. 5*, first gnathopod and fifth peræopod; *plp. 1, 2, 3*, *plp. 2*, *m.s.*, first, second and third pleopods, to the same scale as the antennæ and trunk limbs, but the separate male stilet of *plp. 2* to the same scale as the maxillipeds.
- B. *Cilicæa whiteleggei*, n. sp., ♀.—*n.s.*, line indicating natural size of specimen figured above, much bent and in lateral view; *Pl.*, pleon in dorsal view, with last segment of peræon and parts of the two preceding segments; *a.s.*, *a.i.*, first and second antennæ; *mx. 1*, *mxp.*, first maxilla and maxillipeds. These are more highly magnified than the other details, and more highly than the corresponding parts of the male; *gn. 1*, *prp. 5*, *plp. 1*, first gnathopod, fifth peræopod, and first pleopod.
- C. *Cilicæa* sp., juv.—*n.s.*, line indicating natural size of specimen figured above, slightly bent, and in lateral view; *mxp.*, maxillipeds magnified to the same scale as those in Plate IX., B; *gn. 1*, *urp.*, first gnathopod and uropod.

## PLATE X.

- A. *Cilicæa beddardi*, n. sp. ♂.—*n.s.*, line indicating natural size of male specimen figured above in dorsal view; *a.s.*, *a.i.*, first and second antennæ; *l.s.*, upper lip with epistome; *l.i.*, lower lip; *m.*, *m.*, complete mandible on the right of the plate, and on the left the cutting edges and spine-row of its companion; *mx. 1*, *mxp.*, first maxilla and maxillipeds; *gn. 1, 2*, *prp. 1, 2, 3, 4, 5*, the first and second gnathopods and the five peræopods in lateral view, connected together; *plp. 1, 2, 5*, the first, second, and fifth pleopods; *urp.*, uropod.

Of the details, the mouth parts are magnified on a higher scale than the other appendages.

- B. *Cilicæa beddardi*, n. sp. ♀.—*n.s.*, line indicating natural size of female specimen figured above in dorsal view and not quite flat. Some of the details are from another female specimen; *juv.*, dorsal view of a young one taken out of the specimen of which the mouth organs and pleon are figured; *a.s.*, *a.i.*, first and second antennæ; *m.*, *l.i.*, *mx. 1, 2*, *mxp.*, mandible, lower lip, first and second maxillæ, and maxilliped, rather more highly magnified than the antennæ and limbs; *gn. 1*, *prp. 1*, first gnathopod and first peræopod; *Pl.*, telsonic segment and uropods.

- C. *Cymodoce bicarinata*, STEBBING.—*n.s.*, lines indicating natural size of specimen figured above in dorsal view; *Pl.*, ventral view of pleon, the pleopods removed; *g.*, part of the gastric apparatus; *a.s.*, *a.i.*, first and second antennæ; *l.s.*, *l.i.*, *m.x.p.*, upper and lower lips and maxillipeds; *gn.* 1, *prp.* 5, first gnathopod and fifth peræopod; *g.p.*, genital papillæ from seventh peræon segment; *plp.* 2, second pleopod, with apical part of male appendix more highly magnified.

## PLATE XI.

- A. *Amesopous richardsonæ*, n. gen. et sp.—*n.s.* ♀, line indicating length of body and second antennæ of the female specimen figured above in lateral and below in dorsal view; *n.s.* ♂, line indicating length of body of a young, probably male, specimen figured in dorsal view. *C.T.*, *a.s.*, *a.i.*, cephalothorax (head and first peræon segment), with a first antenna and part of the second as far as base of fourth joint; the flagellum shown separately; *l.i.*, *m.*, *m.x.* 1, *m.x.* 2, *m.x.p.*, lower lip, a mandible (with part more enlarged), first and second maxillæ, and maxillipeds; *gn.* 1, *gn.* 2, first and second gnathopods. All these details are from the female specimen, the mouth organs more highly magnified than the other appendages. *prp.* 4 ♂, *plp.* ♂, *urp.* ♂, fourth peræopod, second pleopod, and uropod from a male specimen 4 millims. long. The figures drawn to the same scale as that used for the limbs of the female.
- B. *Astacilla amblyura*, n. sp.—*n.s.*, line indicating length of body and second antennæ of the specimen figured in lateral view; *C.*, part of head; *Pl.*, dorsal view of pleon, showing one of the valvular uropods thrown open; *a.s.*, *a.i.*, first and second antennæ; *m.*, *m.x.* 1, *m.x.* 2, *m.x.p.*, mandible (with part more enlarged), first and second maxillæ, maxillipeds; *gn.* 1, *gn.* 2, *prp.* 5, first and second gnathopods and fifth peræopod, with the finger of each more enlarged; *plp.* 2, *urp.*, second pleopod and uropod.
- C. *Jæropsis curvicornis* (NICOLET).—*n.s.*, line indicating length of specimen figured above in dorsal view; *C.*, dorsal view of head, with upper lip and one of the mandibles projecting in front; *Pl.*, ventral view of pleon, without the pleopods; one uropod more highly magnified; *operc.*, opercular plate formed by the first pleopods; *a.s.*, *a.i.*, upper and lower antennæ, with most of the lower antenna more enlarged; *m.*, *m.*, *m.x.* 1, *m.x.* 2, *m.x.p.*, the mandibles, first and second maxillæ, and maxillipeds, with the cutting plates of the mandibles and one palp of the maxillipeds more highly magnified; *gn.* 1, *gn.* 2, *prp.* 5, first and second gnathopods and fifth peræopod, with the fingers of first gnathopod and fifth peræopod more enlarged.

All the detail figures are enlarged to the same scale, but are accompanied in some instances by parts more highly magnified.

## PLATE XII.

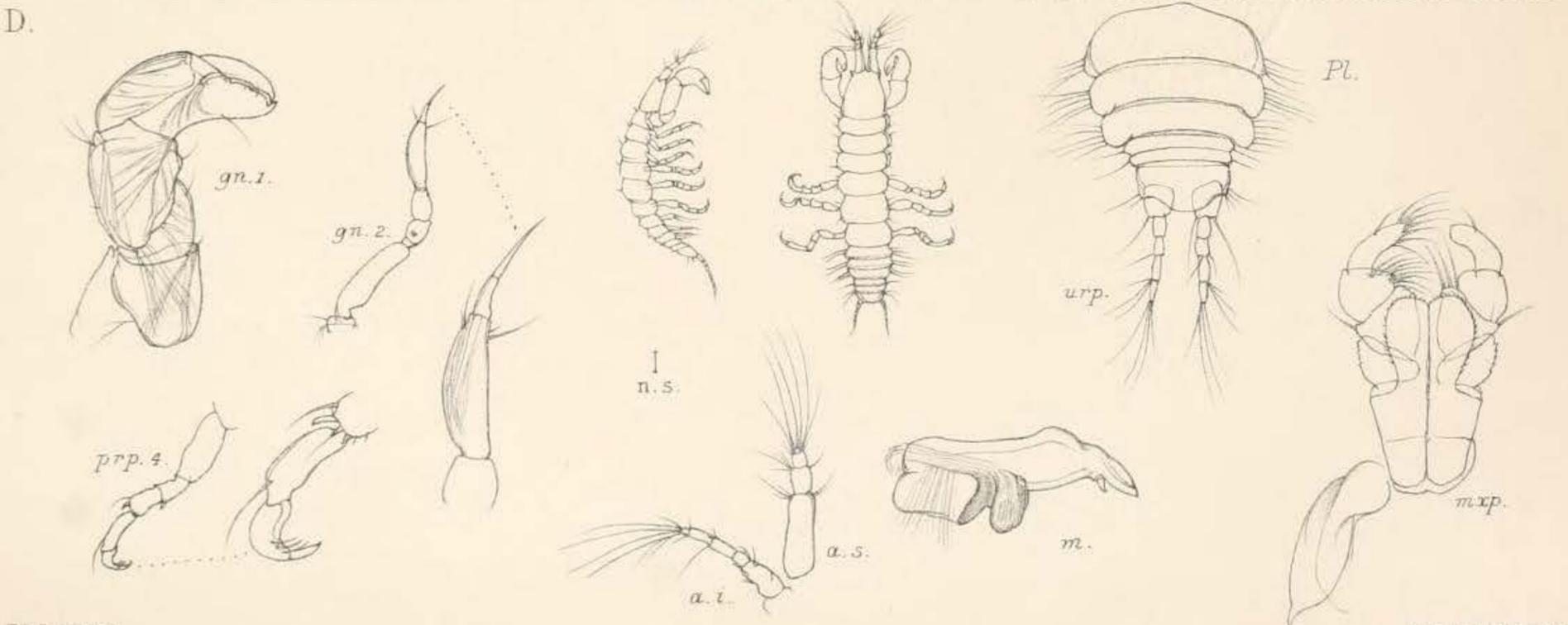
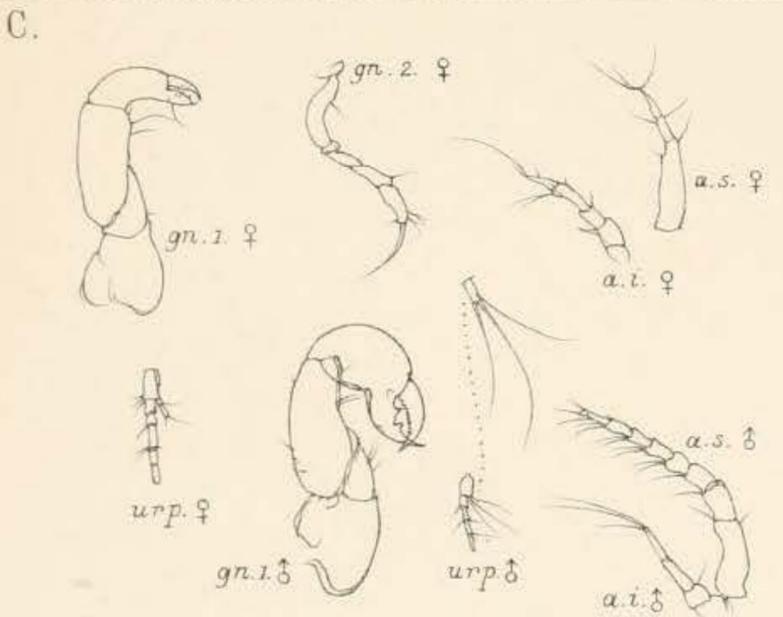
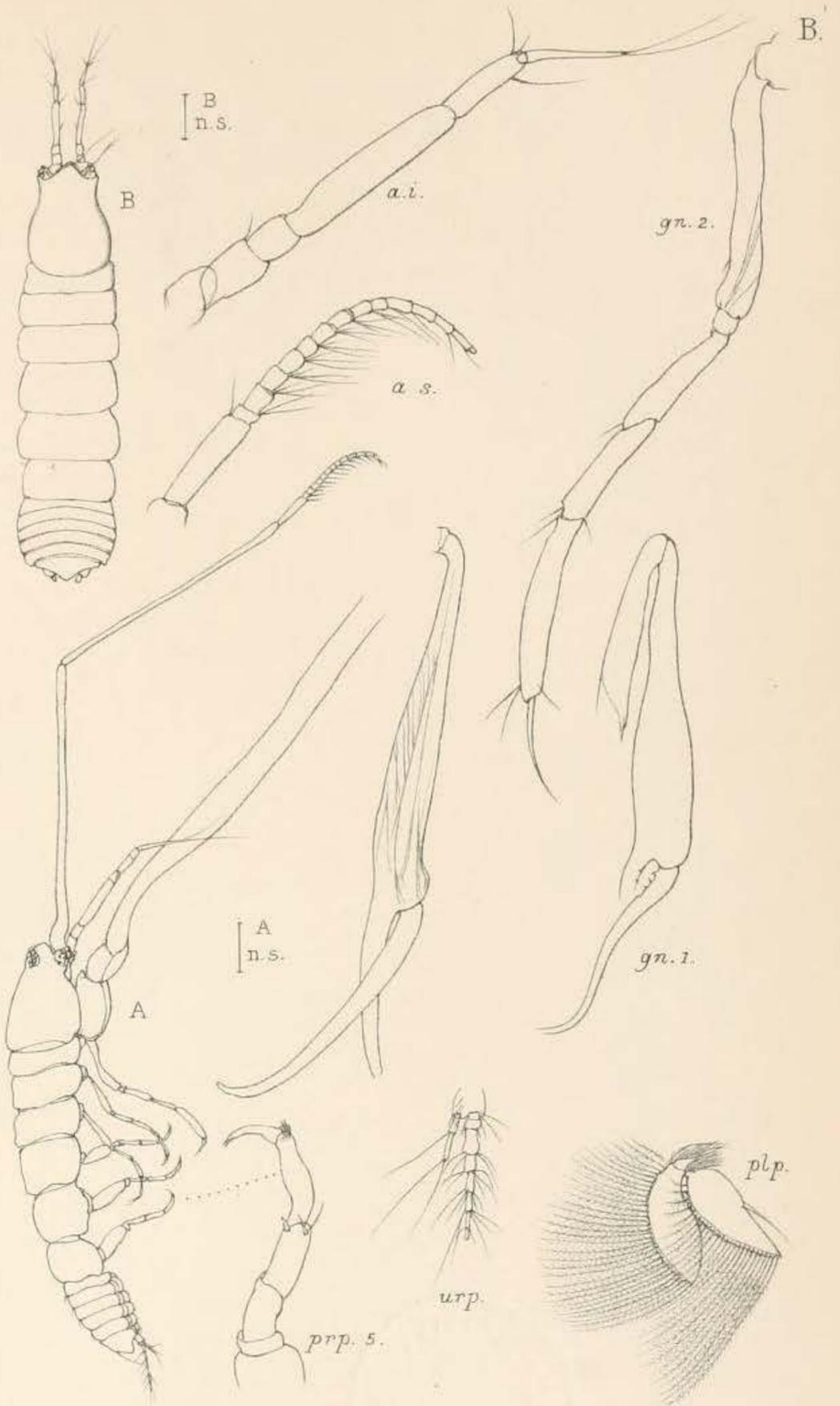
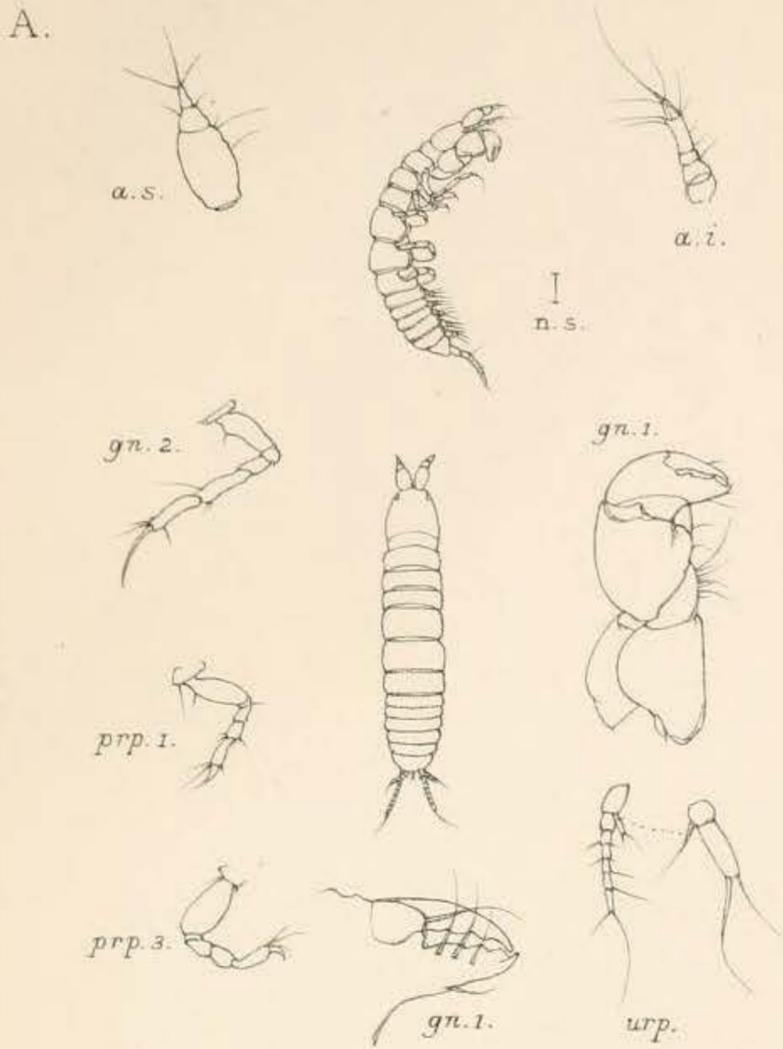
- A. *Stenetrium chiltoni*, n. sp.—*n.s.*, lines indicating natural size of specimen figured below in dorsal view; *C.*, *a.s.*, *a.i.*, dorsal view of head more enlarged, with the eyes, the first antenna of the left side, part of that on the right, and parts of the second antennæ, ending with the third joint on the left, with the fourth on the right. *Pl.*, terminal part of pleon; this, with the legs and pleopods, is enlarged to the same scale as the preceding figure, while the mouth organs are more highly magnified, and the spines of the first gnathopod still more highly. *l.s.*, *l.i.*, upper and lower lips; *m.*, *m.*, *m.x.* 1, *m.x.* 2, *m.x.p.*, *ep.*, mandibles, first and second maxillæ, maxillipeds, with one epipod detached; *gn.* 1, *gn.* 2, *prp.* 1, first gnathopod, with some of the spines of the palm and finger very highly magnified; second gnathopod; first peræopod; *plp.* 1, 3, 4, 5, the first, third, fourth and fifth pleopods; *a.i'*, second antenna from a different specimen, to which the following parts also belong;

*gn. 1'*, first gnathopod, showing the marsupial plate; *prp. 5'*, terminal part of fifth peræopod; *urp.'*, the uropods.

- B. *Gnathia insolita*, n. sp.—*r.s.*, lines indicating natural size of specimen figured in dorsal view; *C.*, cephalic region, showing the muscles belonging to the mandibles; *Pl.*, pleon in dorsal view, with rudimentary seventh segment of peræon; *a.s.*, *a.i.*, first and second antennæ; *m.*, *mxp.*, a mandible and the maxillipeds; *gn. 1, 2*, first and second gnathopods; *plp. 1, plp.*, first pleopod, and one of the following pairs.

All the details are magnified to the same scale.

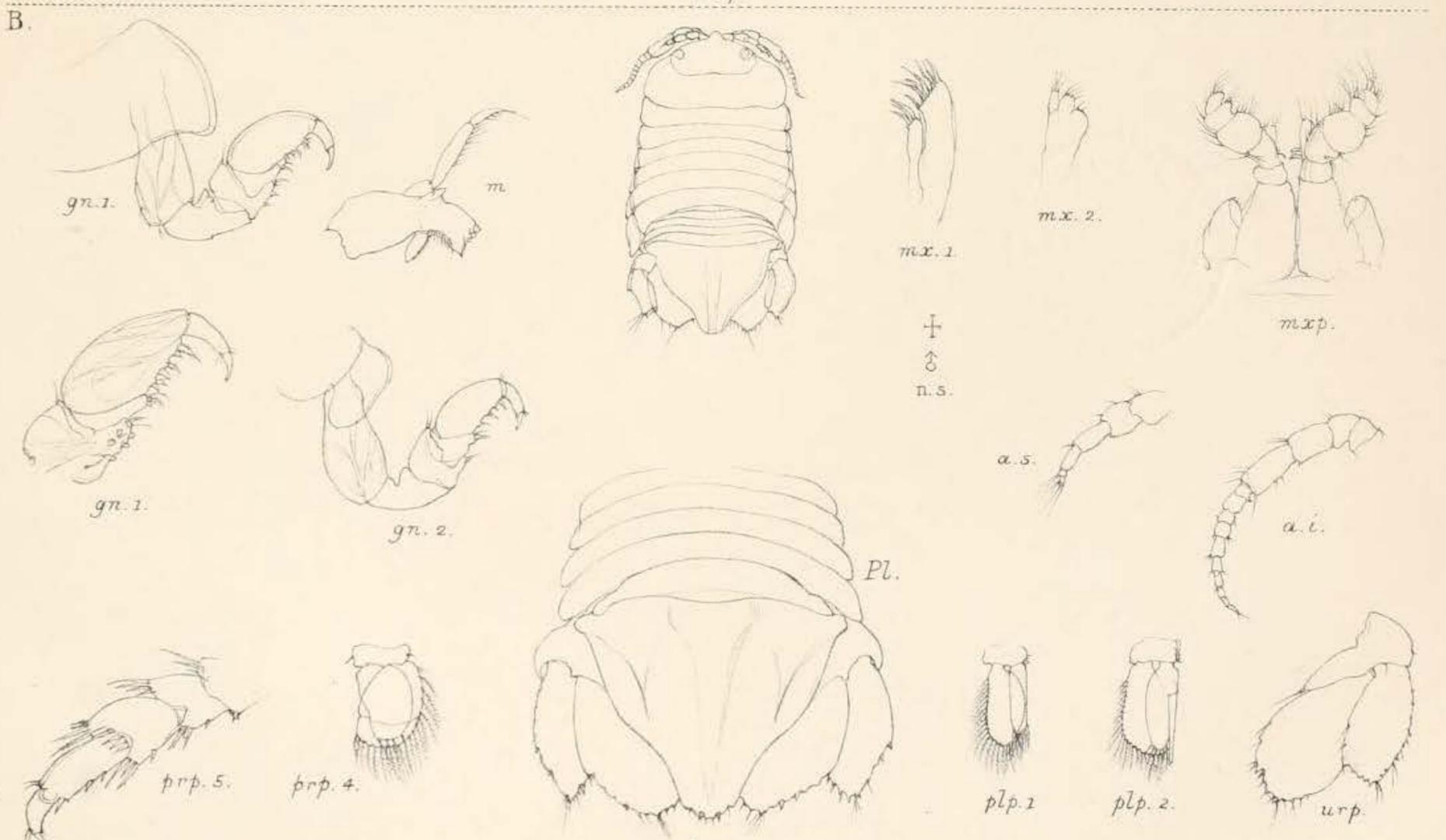
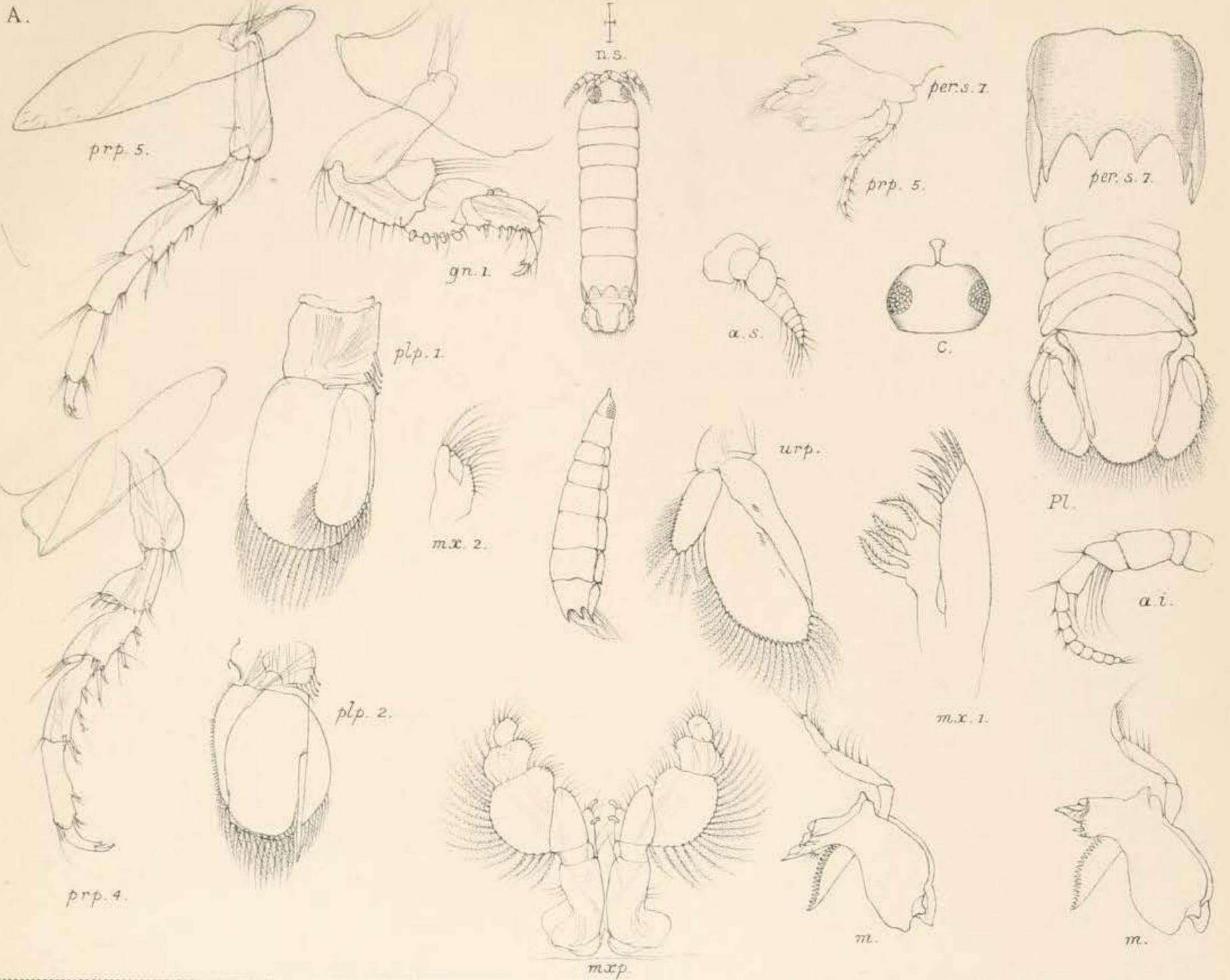
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Del. I.K.R. Stebbing.

J.T. Rennie Reid, Lith. Edin.

A. HETEROTANAIIS CRASSICORNIS, n. sp. B. LEPTOCHELIA MIRABILIS, n. sp. C. L. LIFUENSIS, Stebbing.  
 D. TANAIIS GRACILIS, Heller.

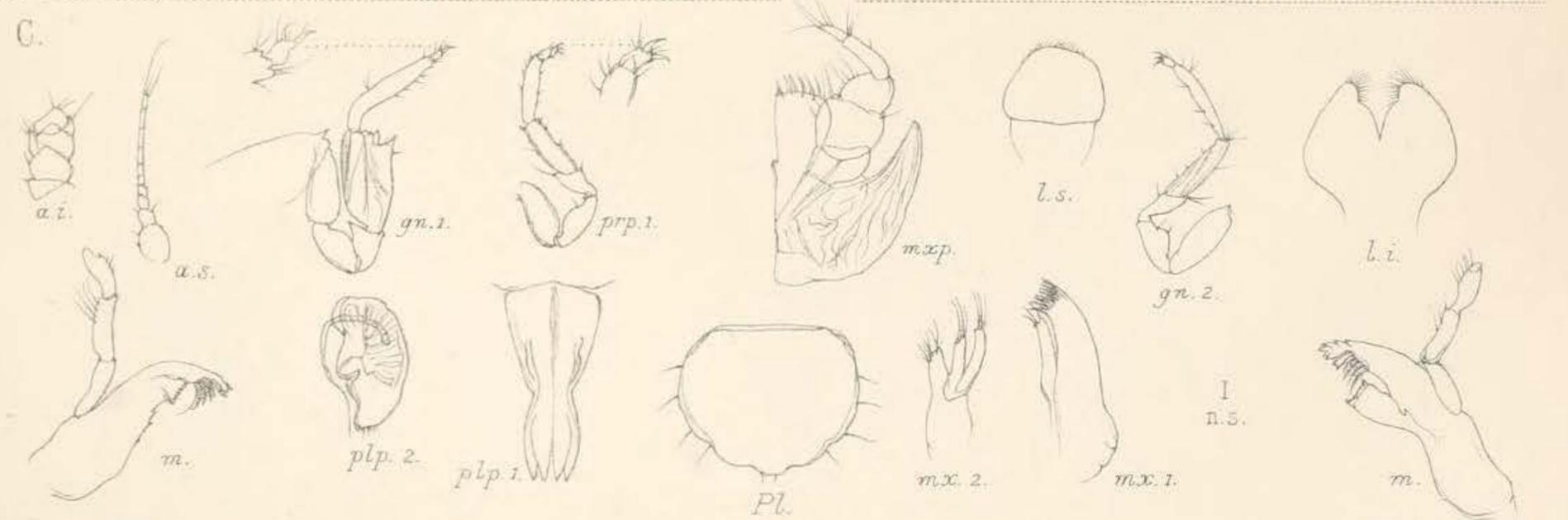
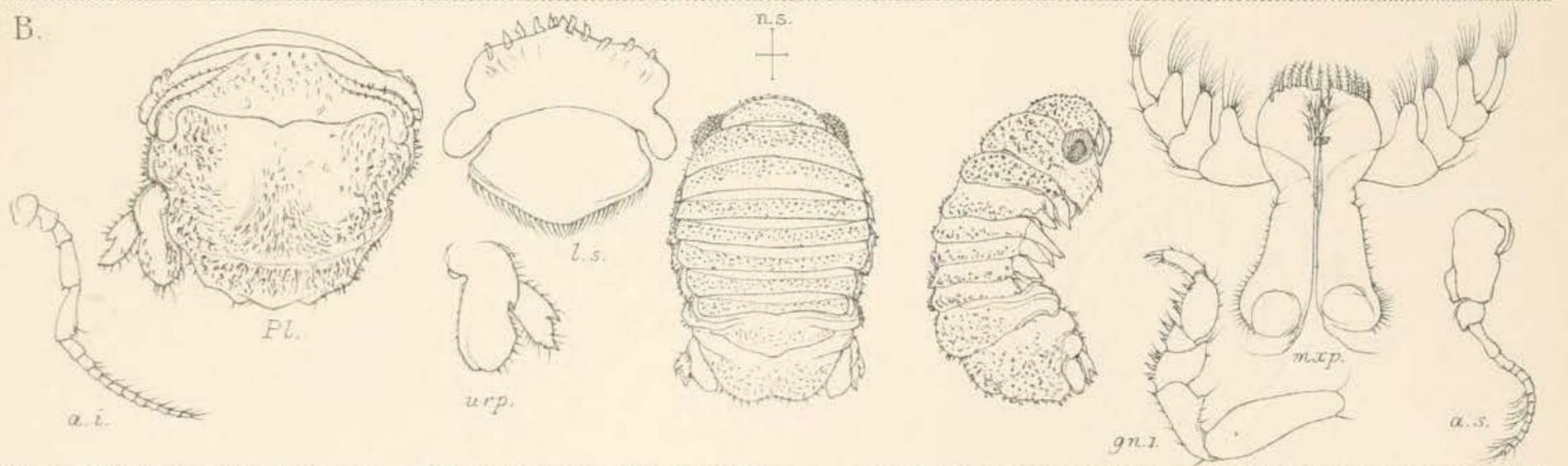
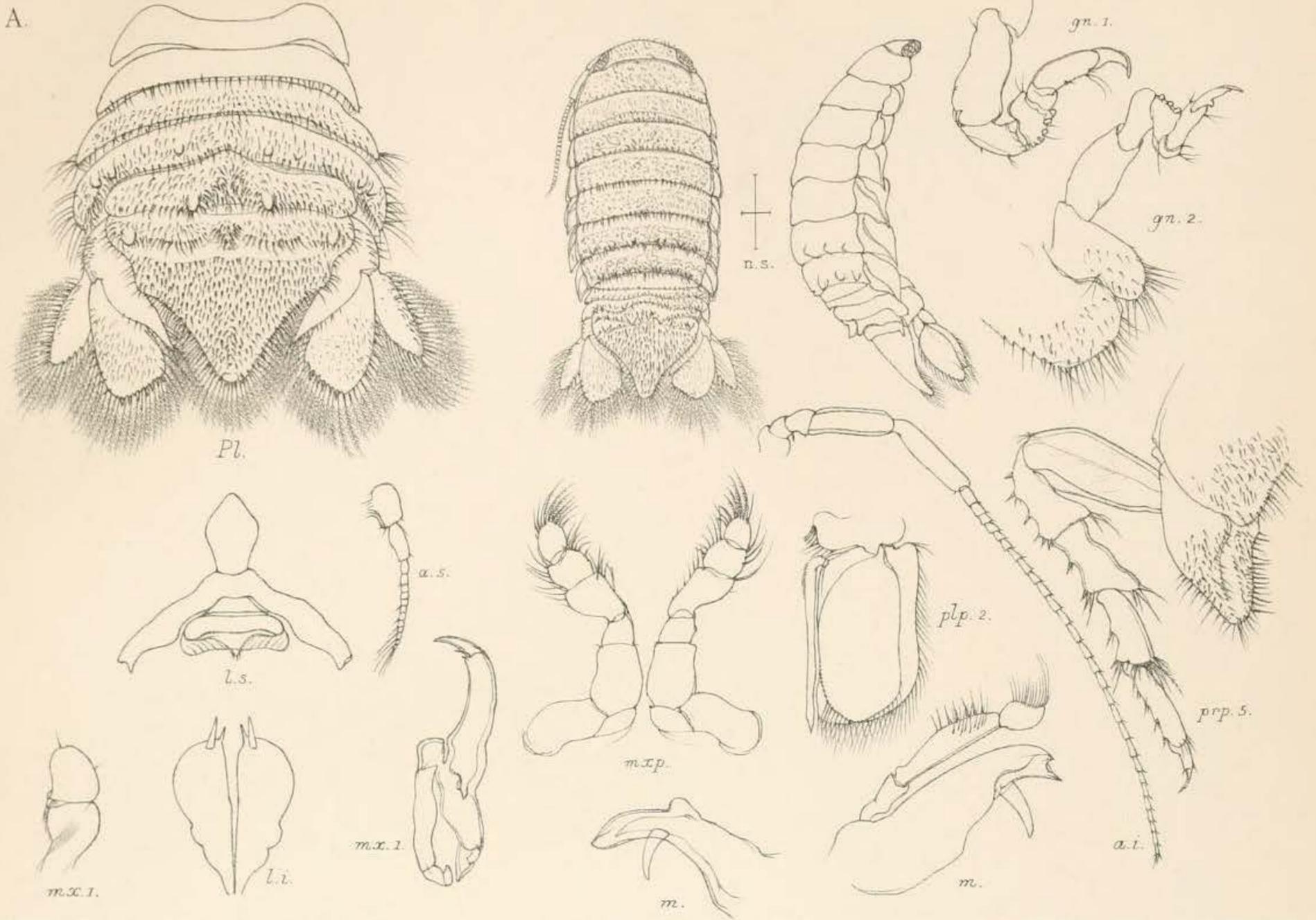


Del. T. R. E. Stebbing

A. CONILORPHEUS HERDMANI, n. g. et. sp.

J. T. Rennet Reid, Lich. Edinb.

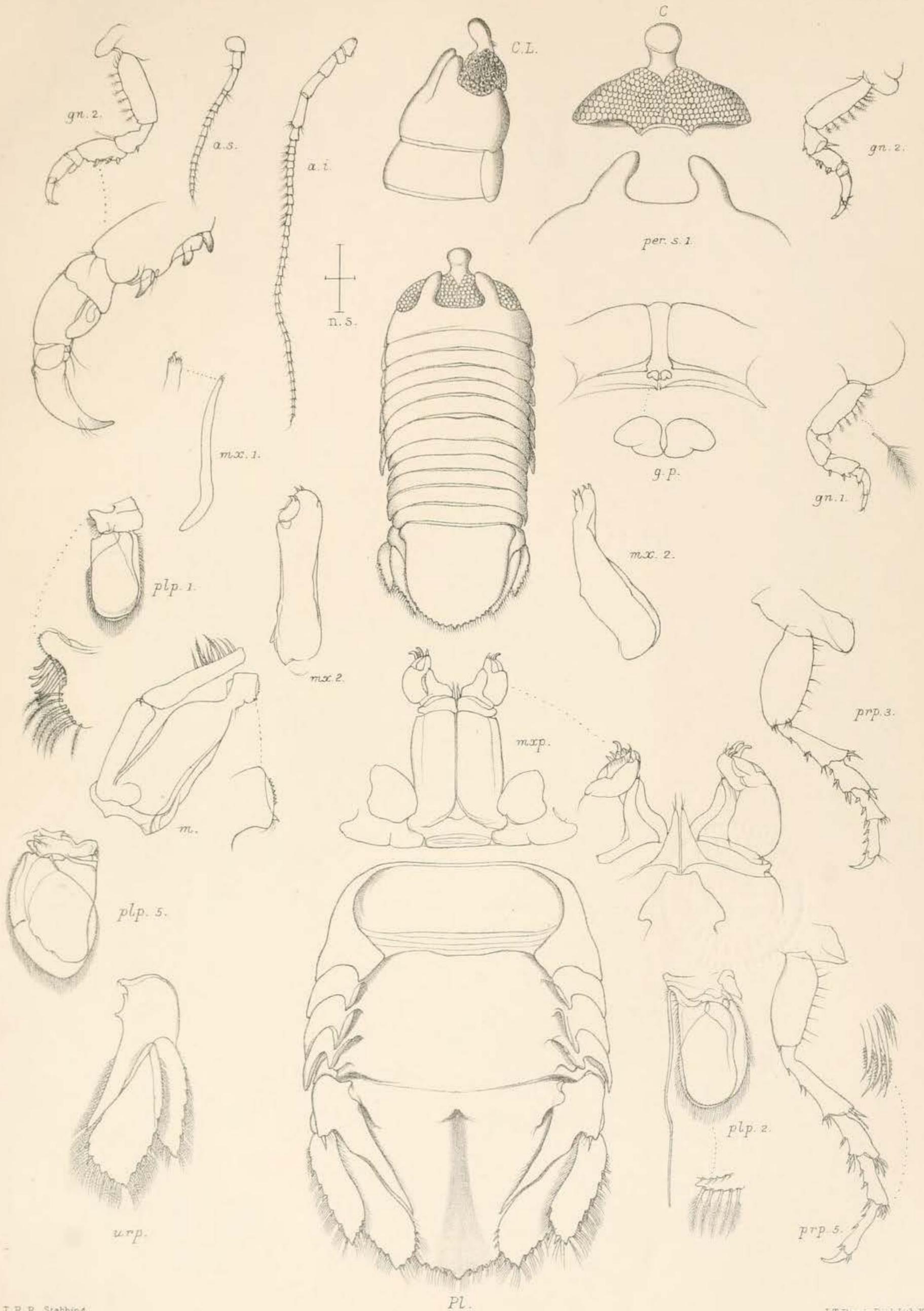
B. HANSENOLANA SPHAEROMIFORMIS (Hansen).



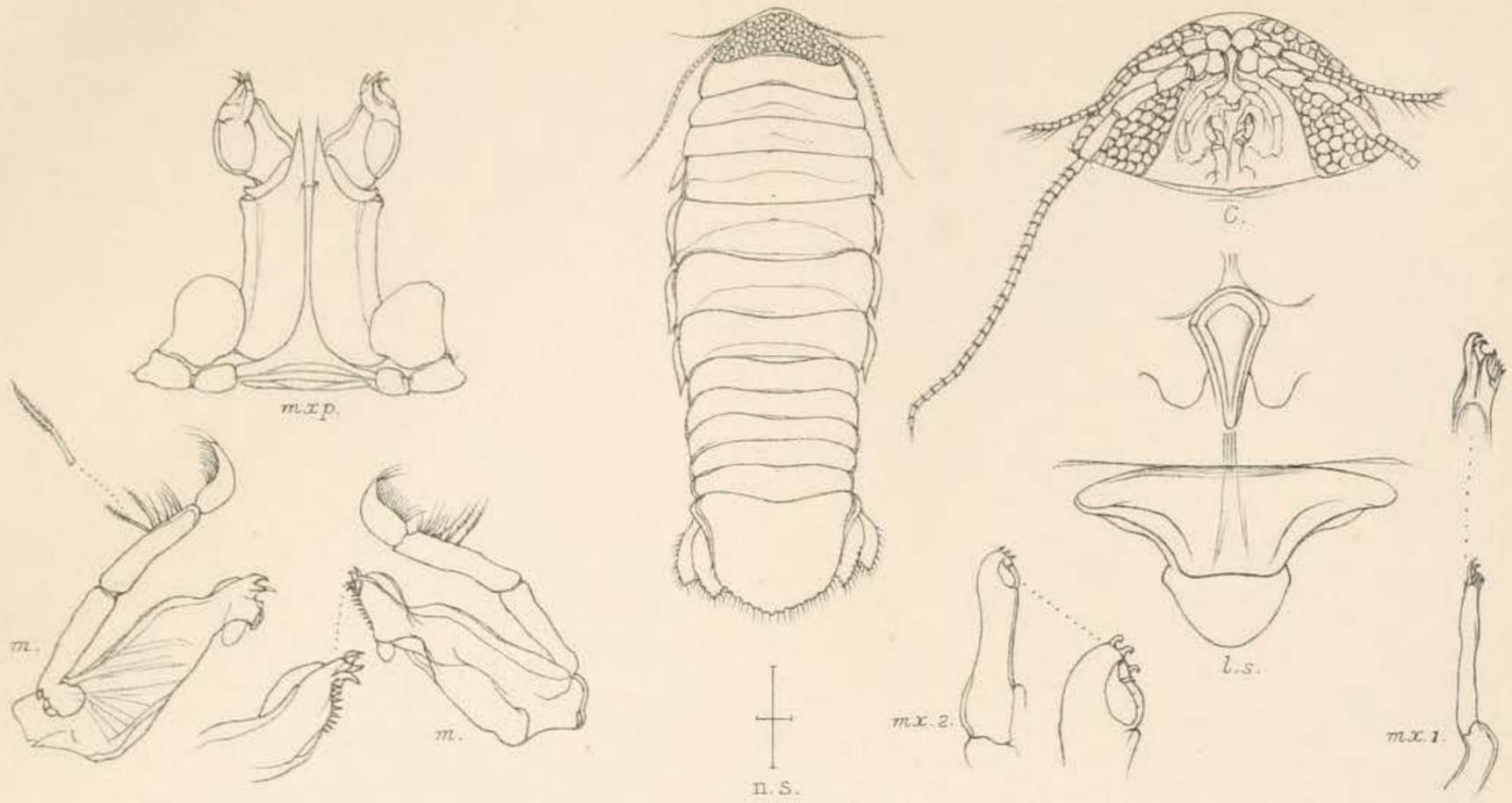
Del T. B. R. Stebbing.

J. T. Rennie Reid, Lith. Edin.

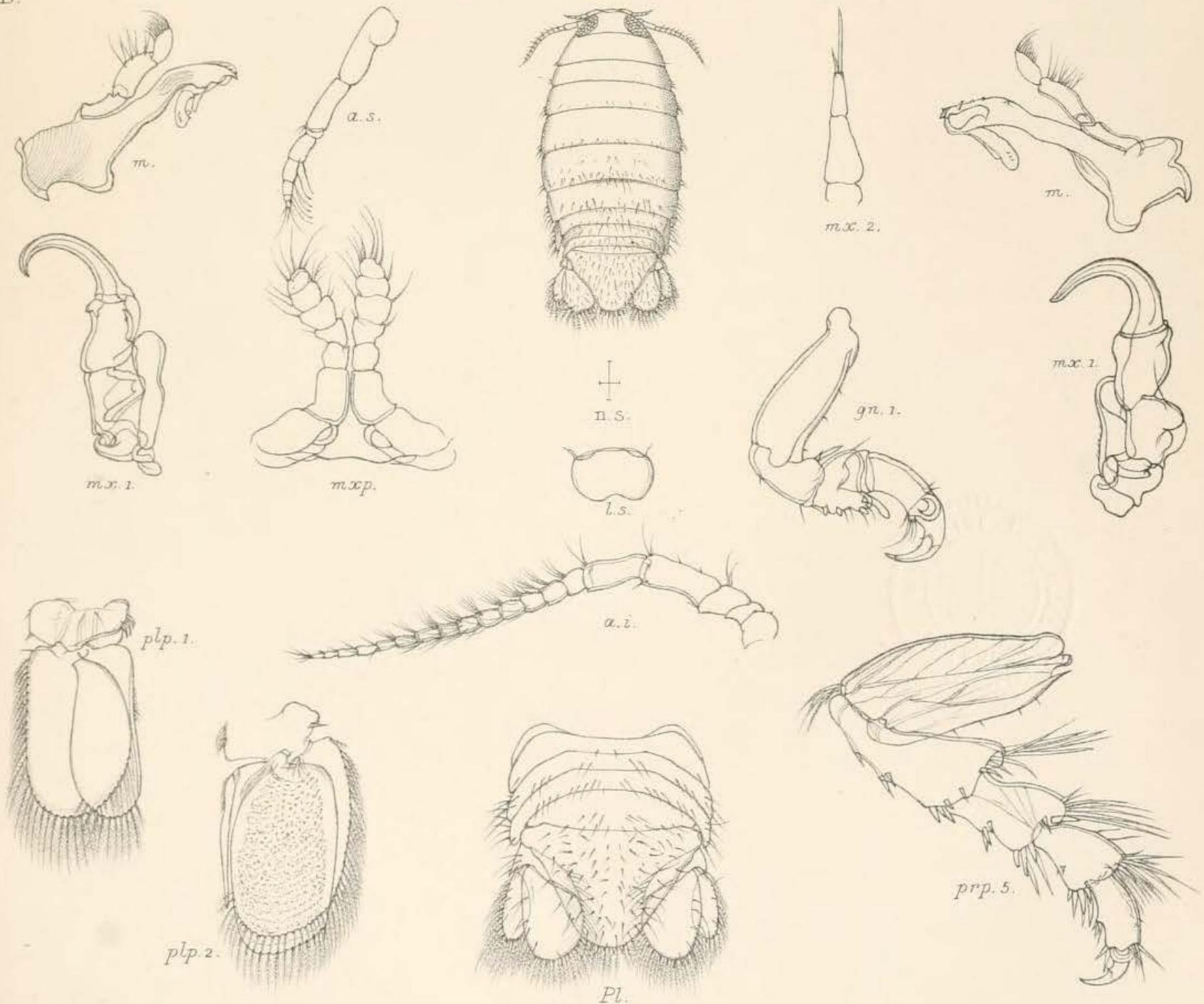
A. ARGATHONA NORMANI, n. g. et. sp. B. GILICÆA LATREILLII, Leach, juv. C. JANIRA(?) NANA, n. sp.

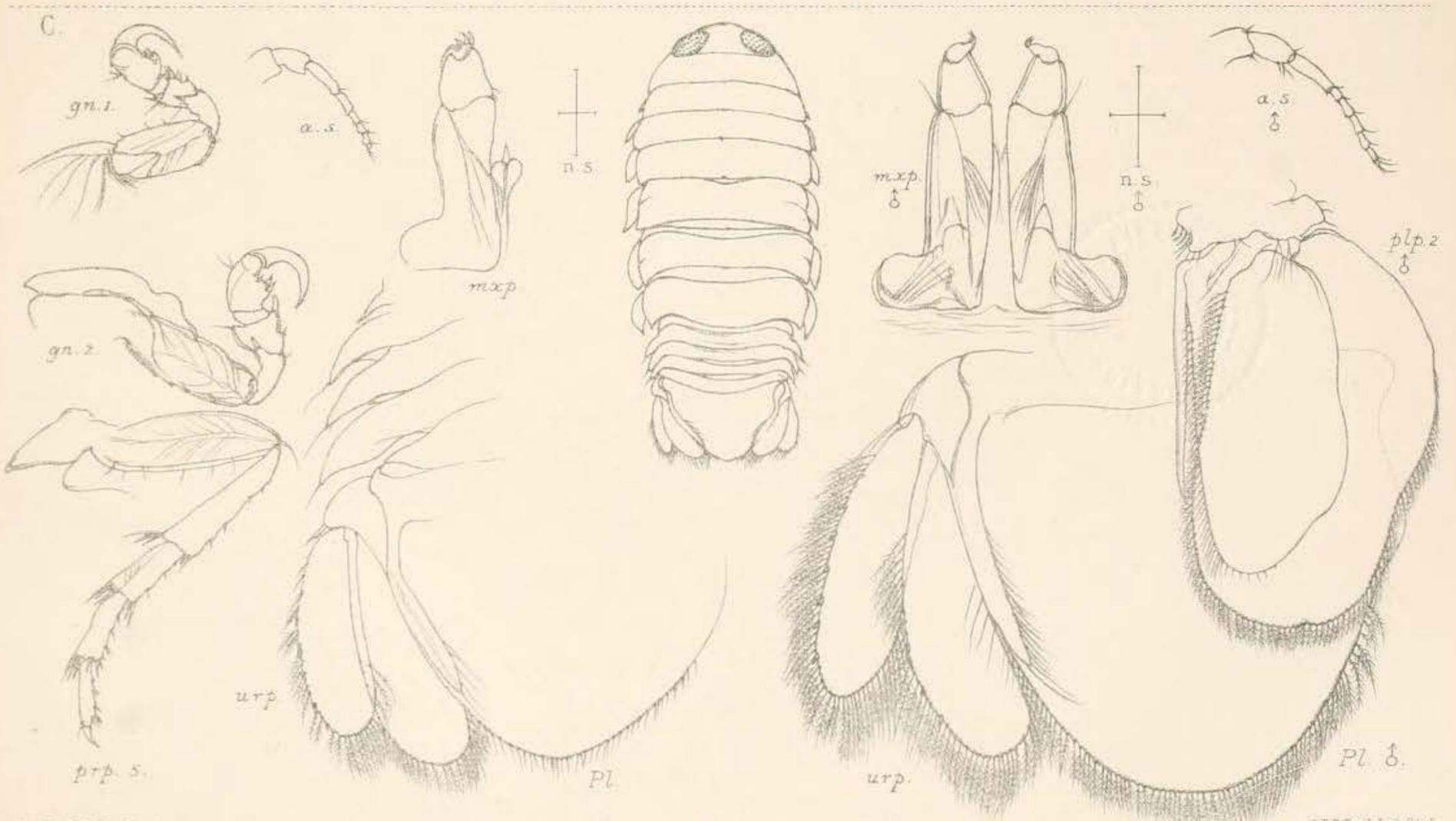
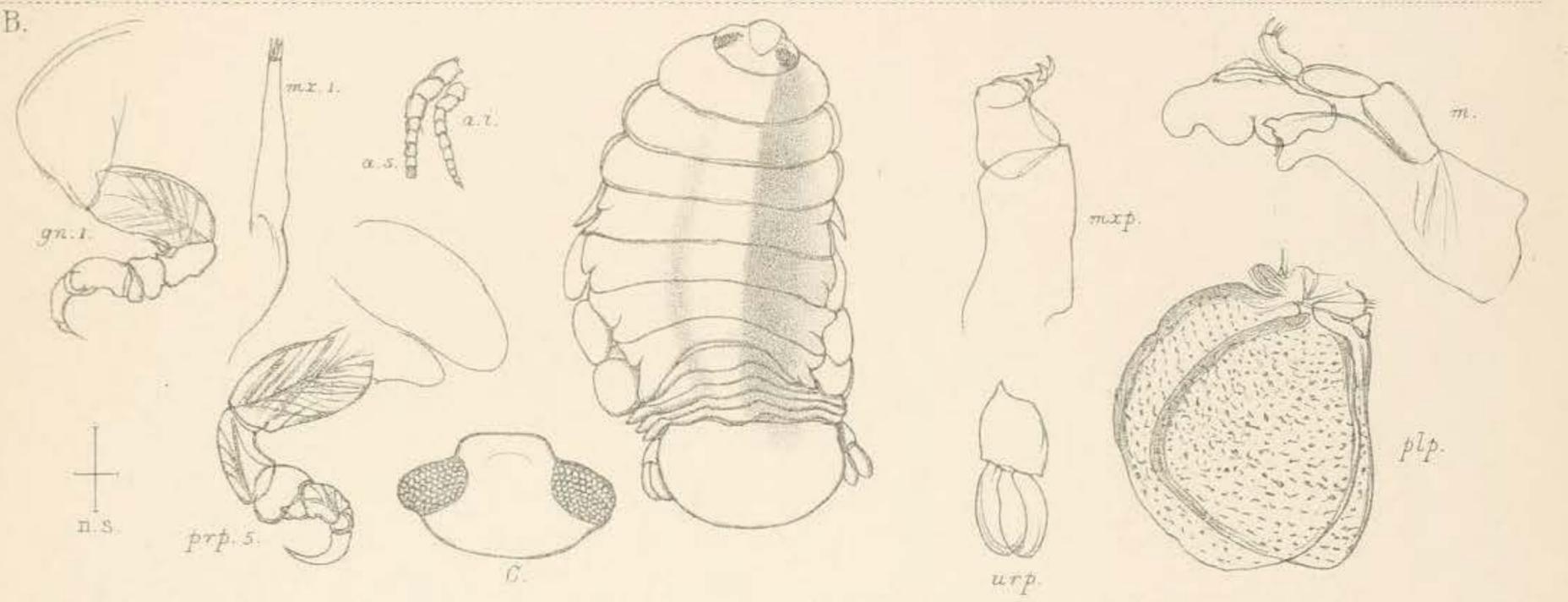
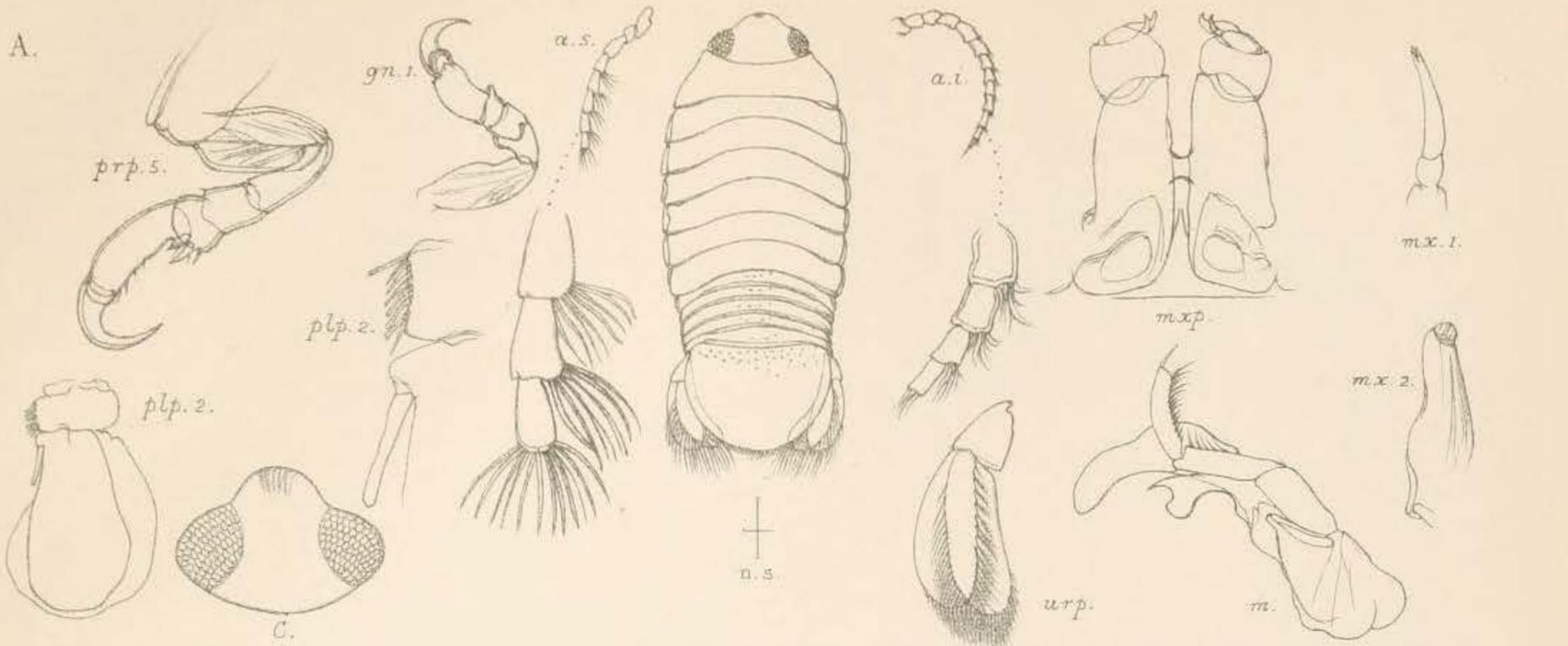


A.



B.

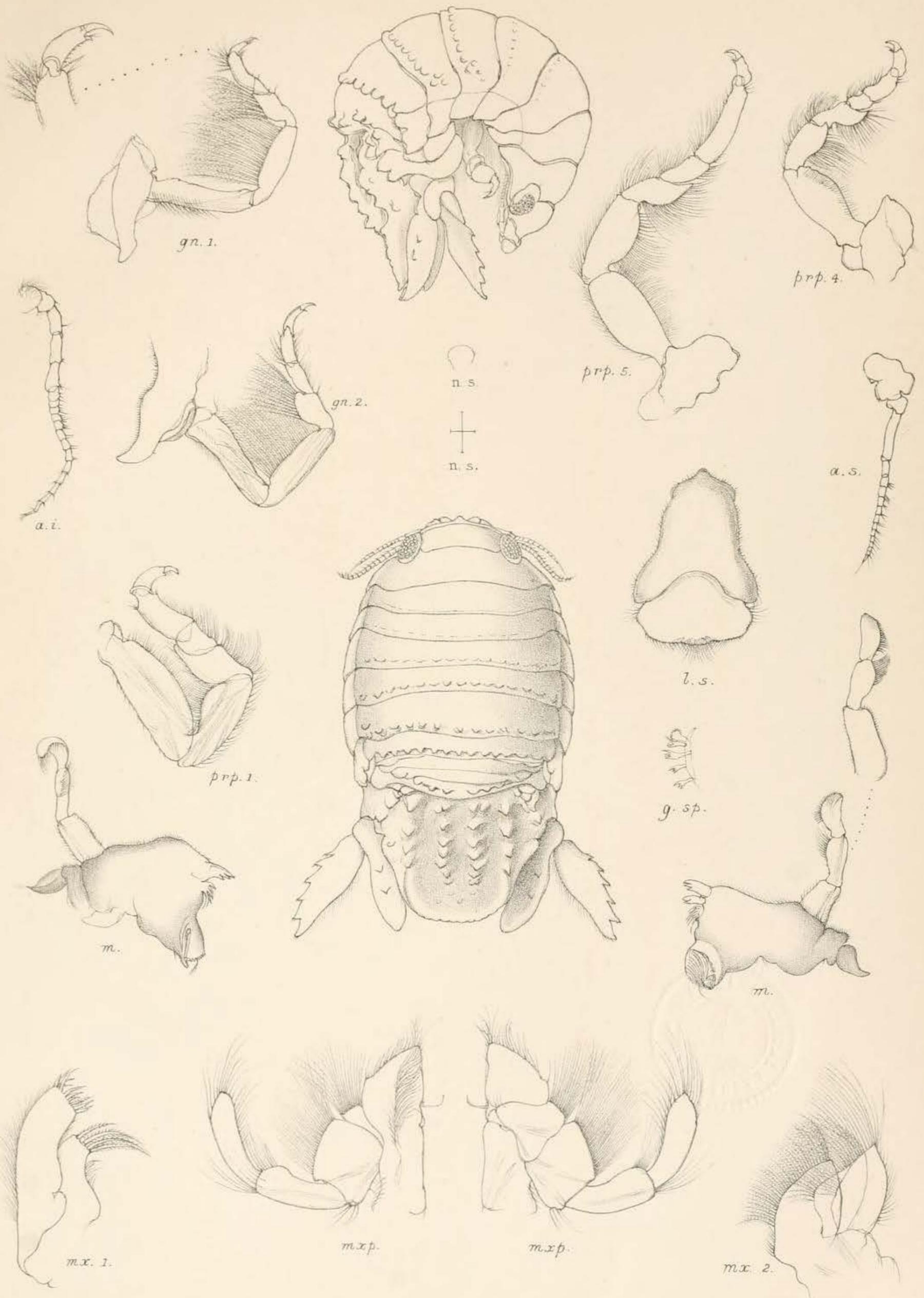




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J. T. R. Reid, Lith. Edin'

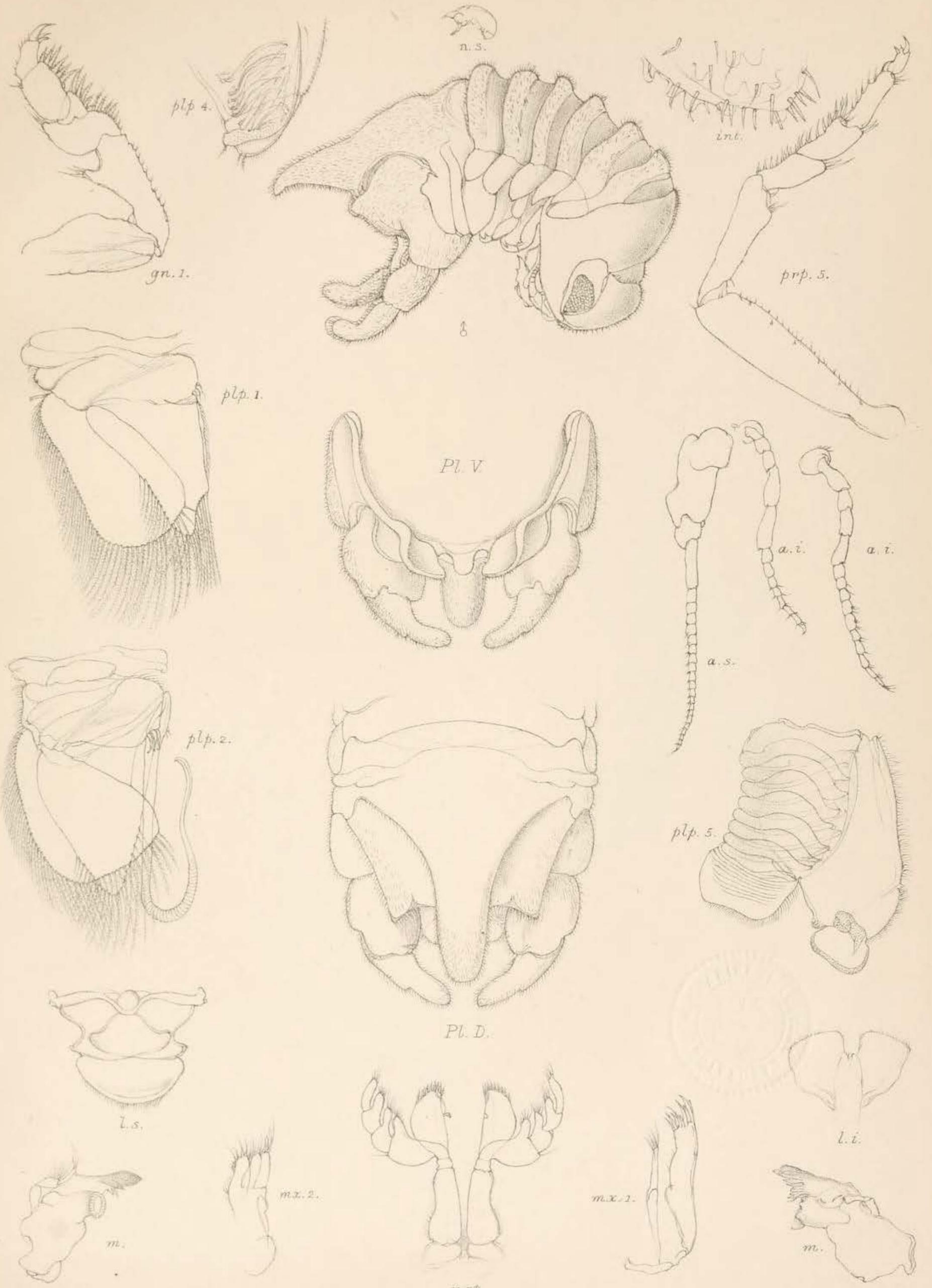
A. RHIOTHRA CALLIPIA, Schödte & Meinert. B. IRONA NANOIDES, n. sp. C. ROCINELA ORIENTALIS, Schödte & Meinert.



Del. T. R. R. Stebbing

SPHAEROMA WALKERI, n. sp.

J. T. Rennie Reid. Lith. Edinr.



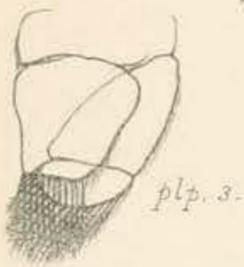
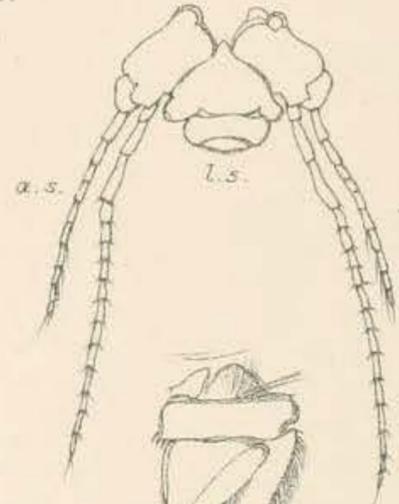
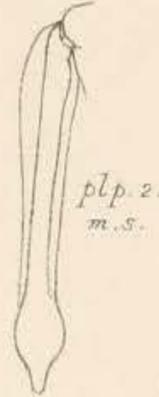
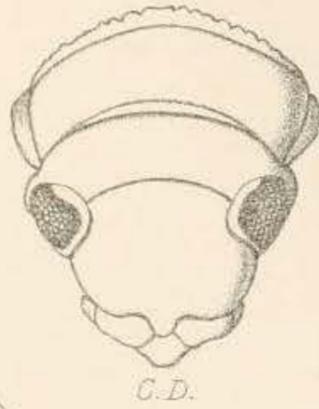
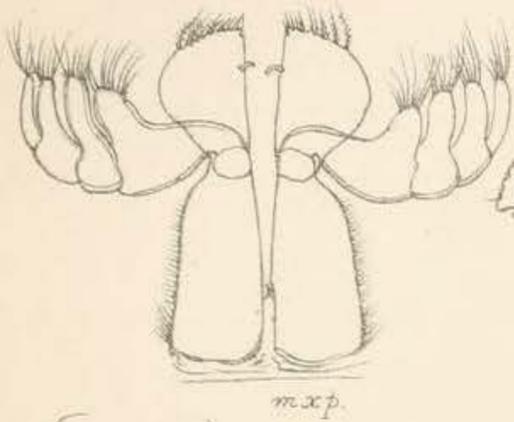
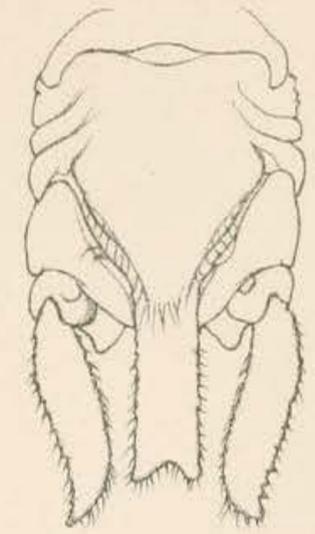
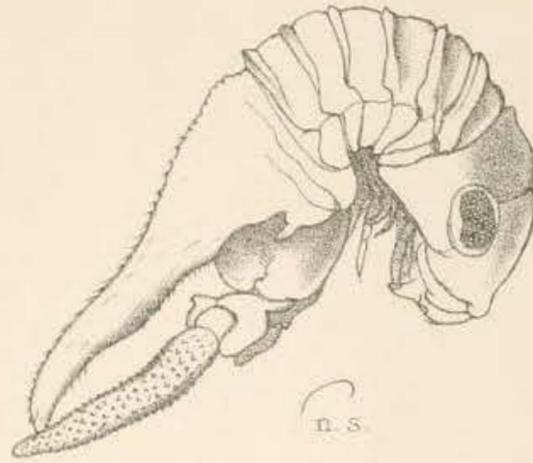
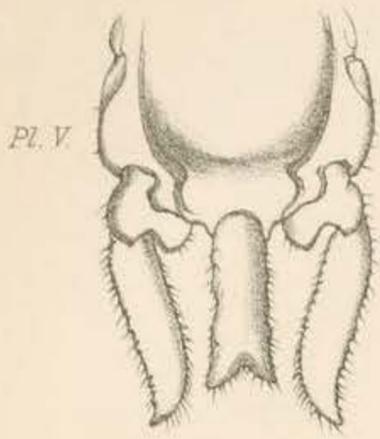
Del. T.R.R. Stebbing

CILICAEA LATREILLII, Leach.

J. T. Reunis Reid, Lith. Edin'

A.

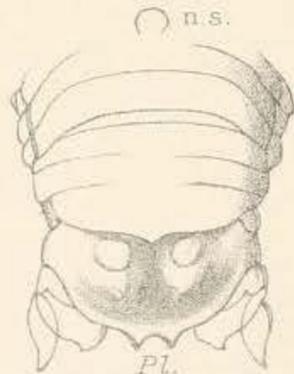
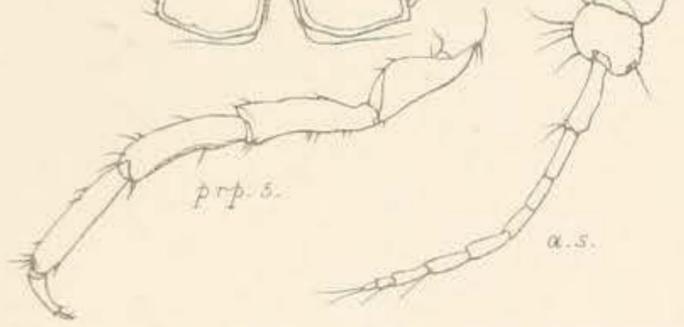
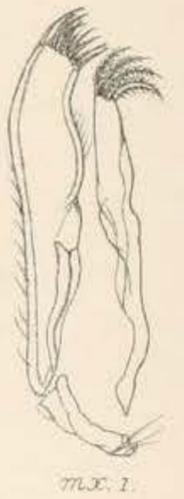
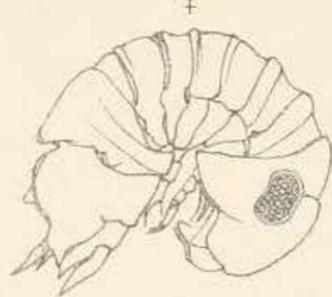
♂



a. 1.

B.

♀

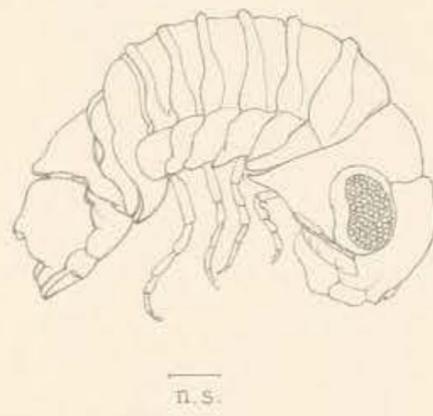
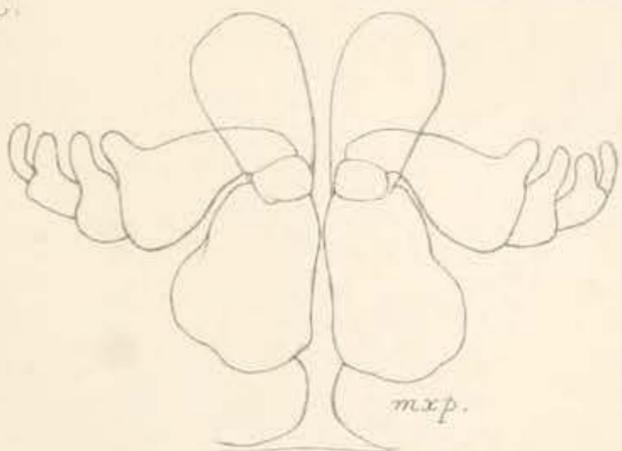


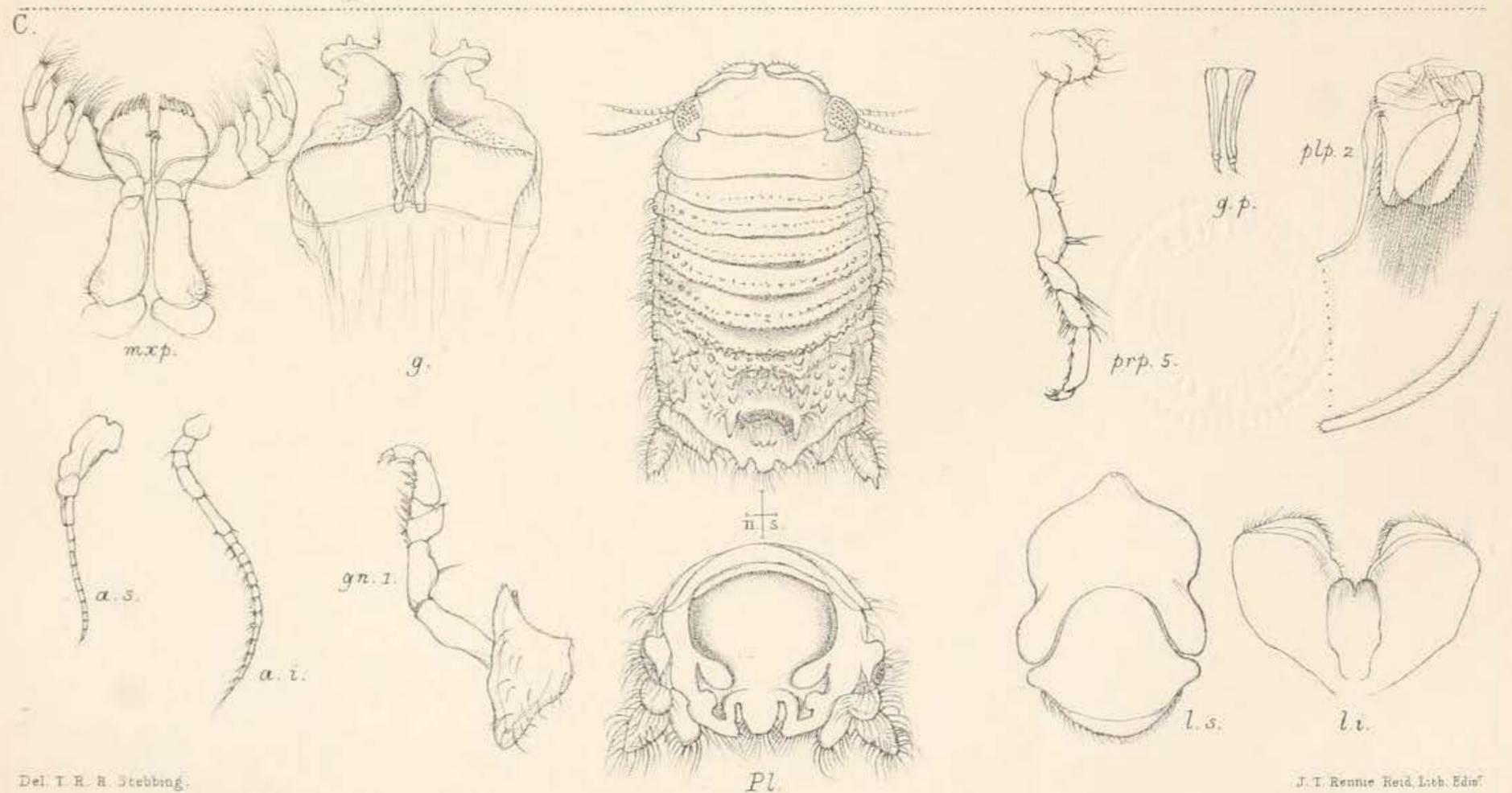
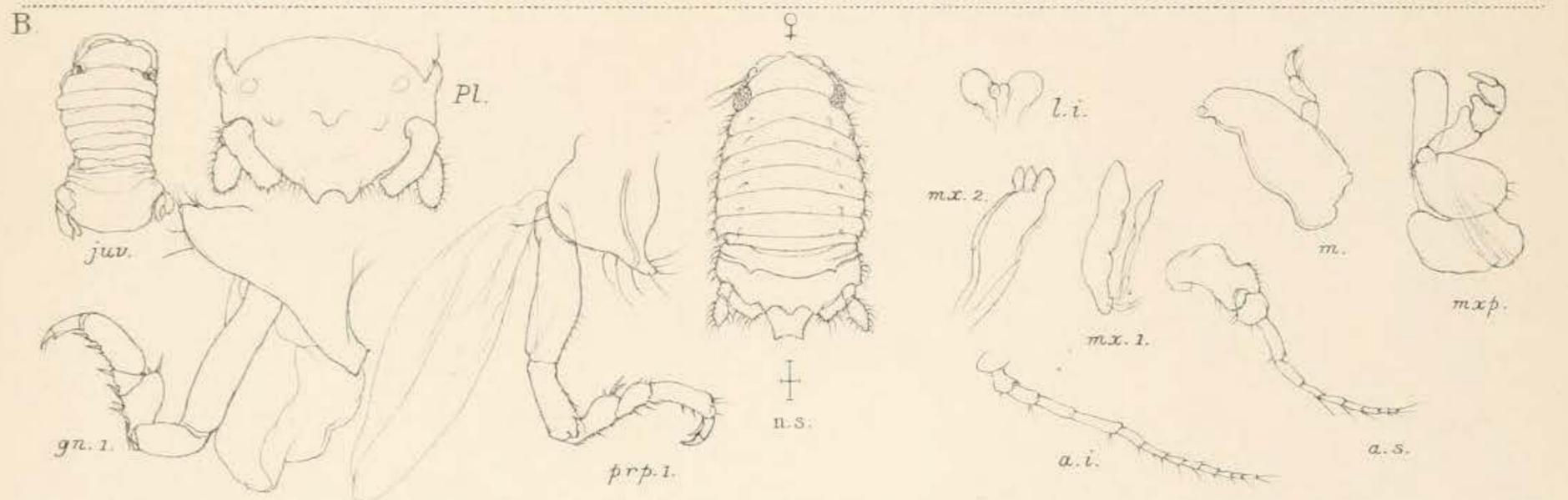
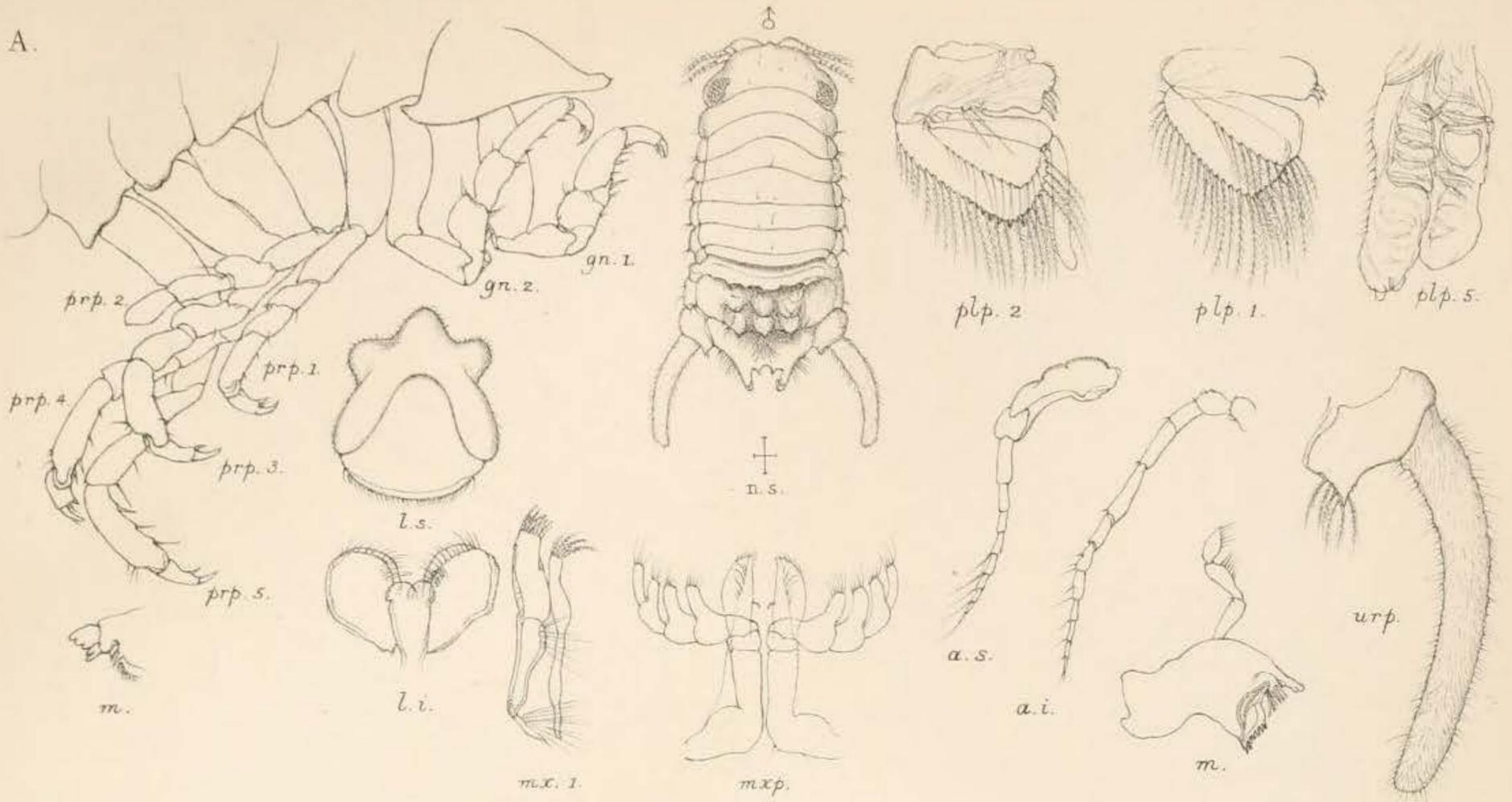
gn. 1.

a. 2.

mx. 1.

C.



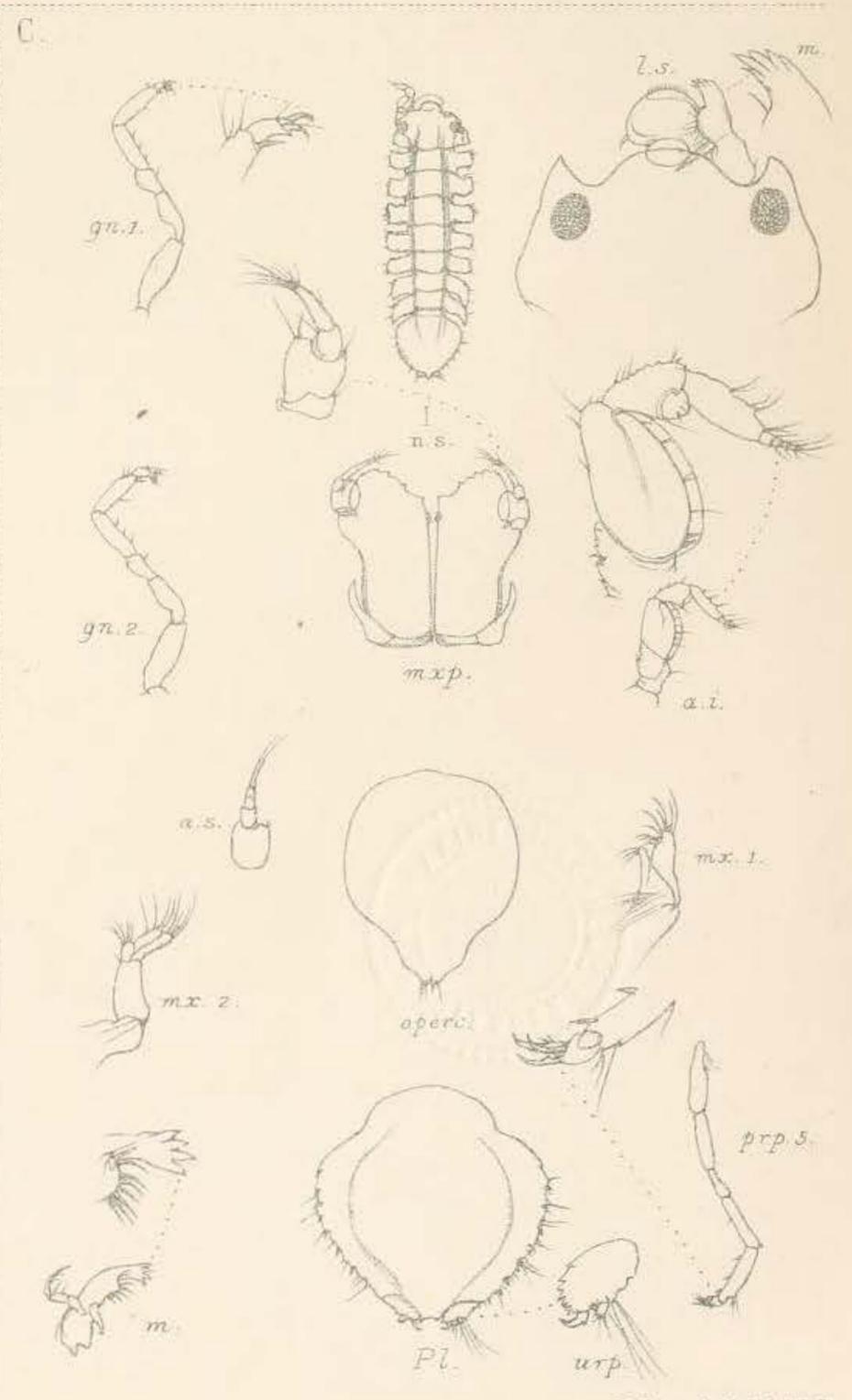
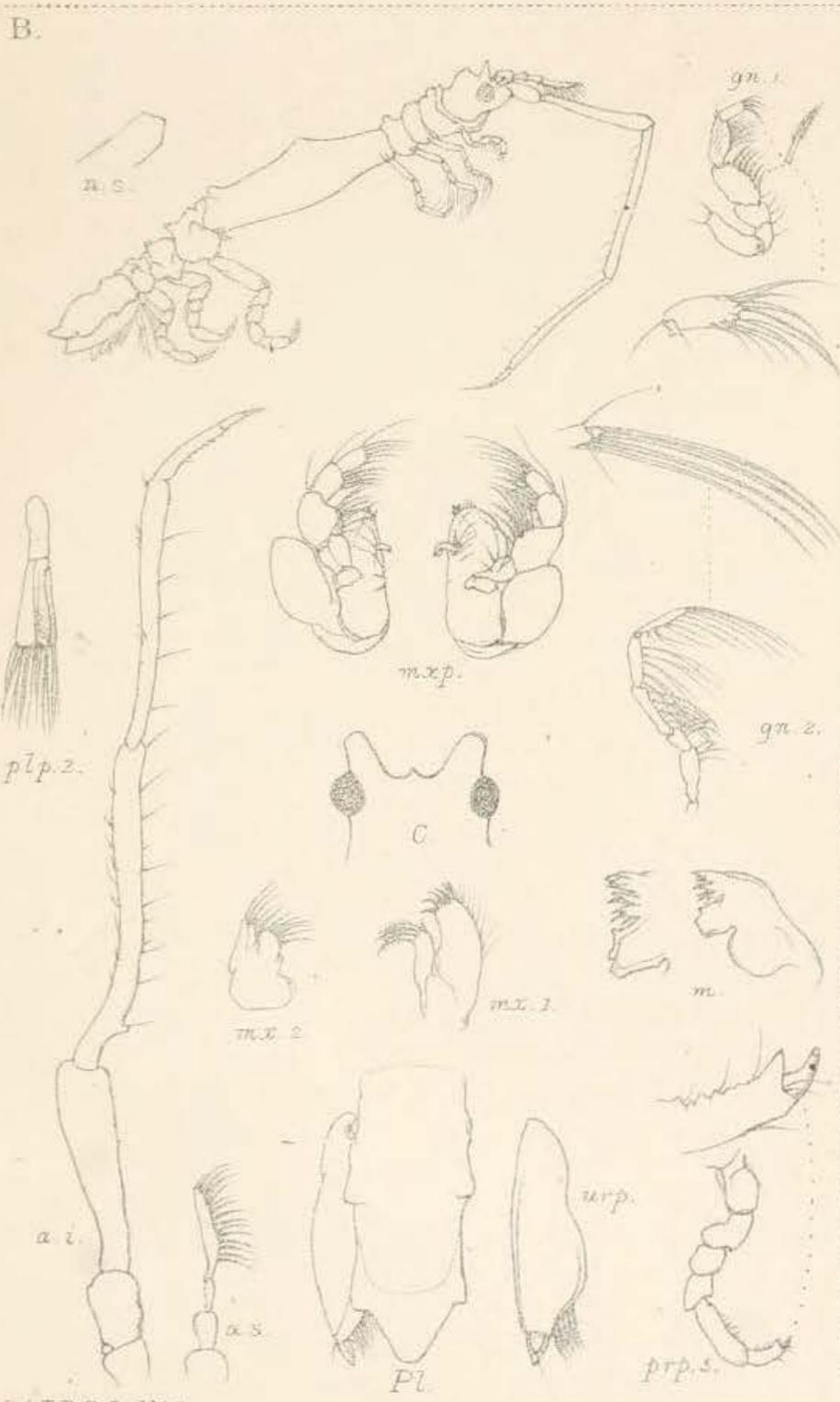
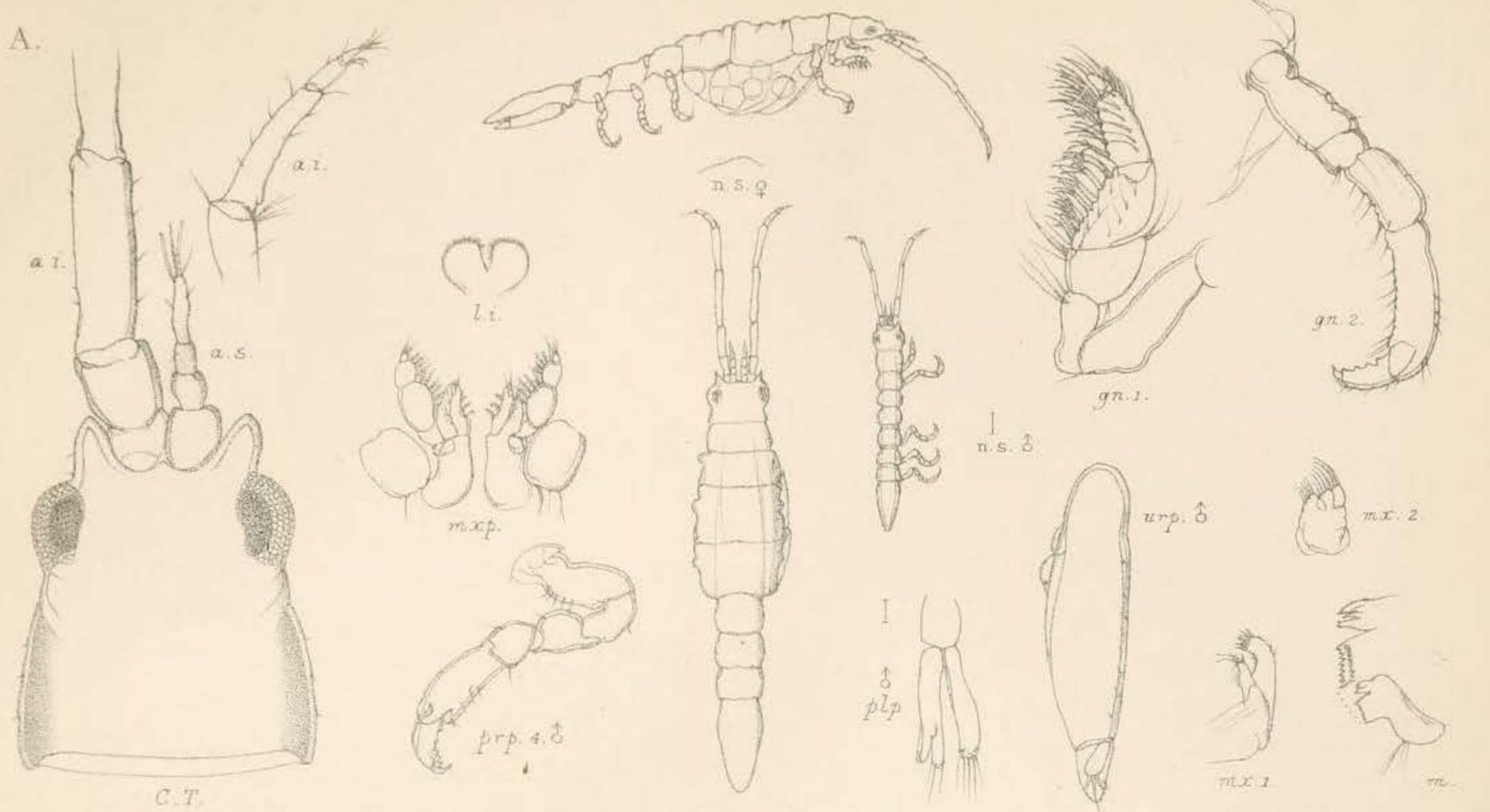


Del. T. R. R. Stebbing.

J. T. Rennie Reid, Lith. Edin'

A. B. *CILICÆA BEDDARDI*, n. sp.

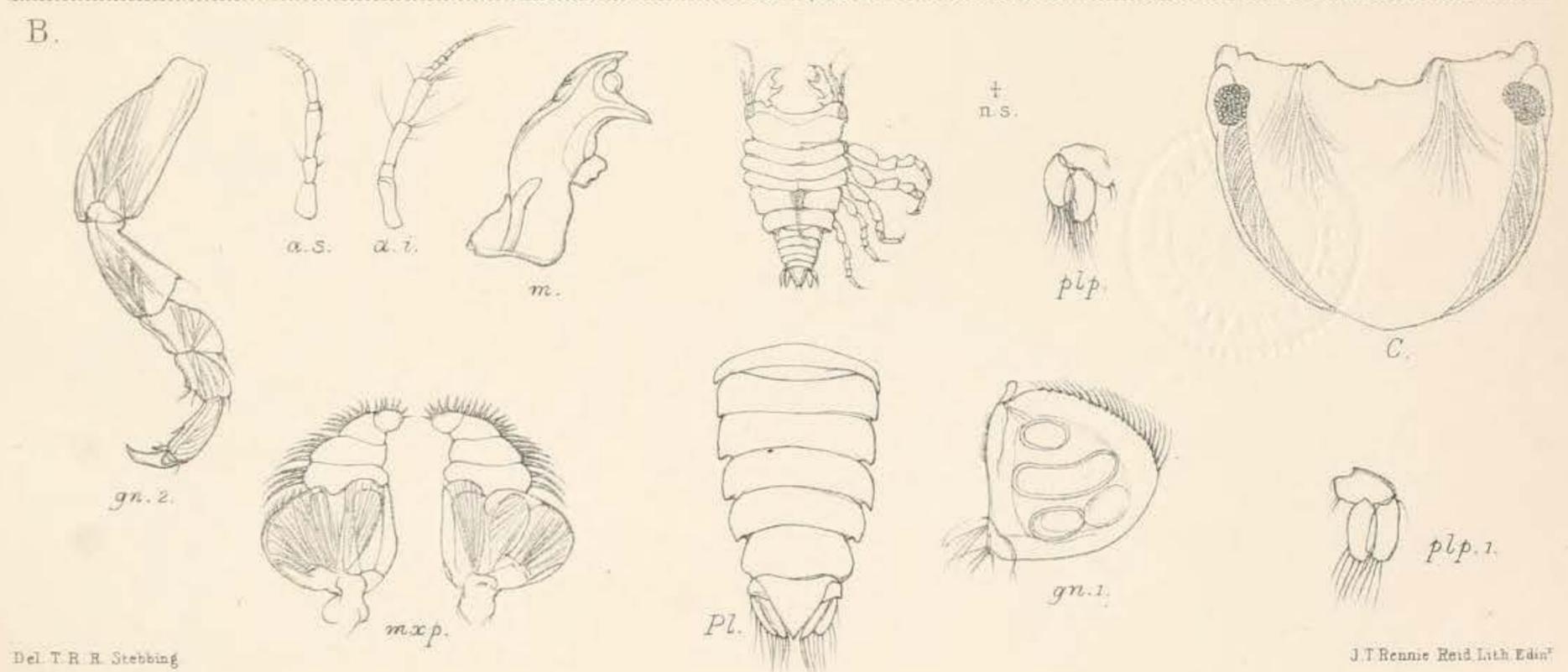
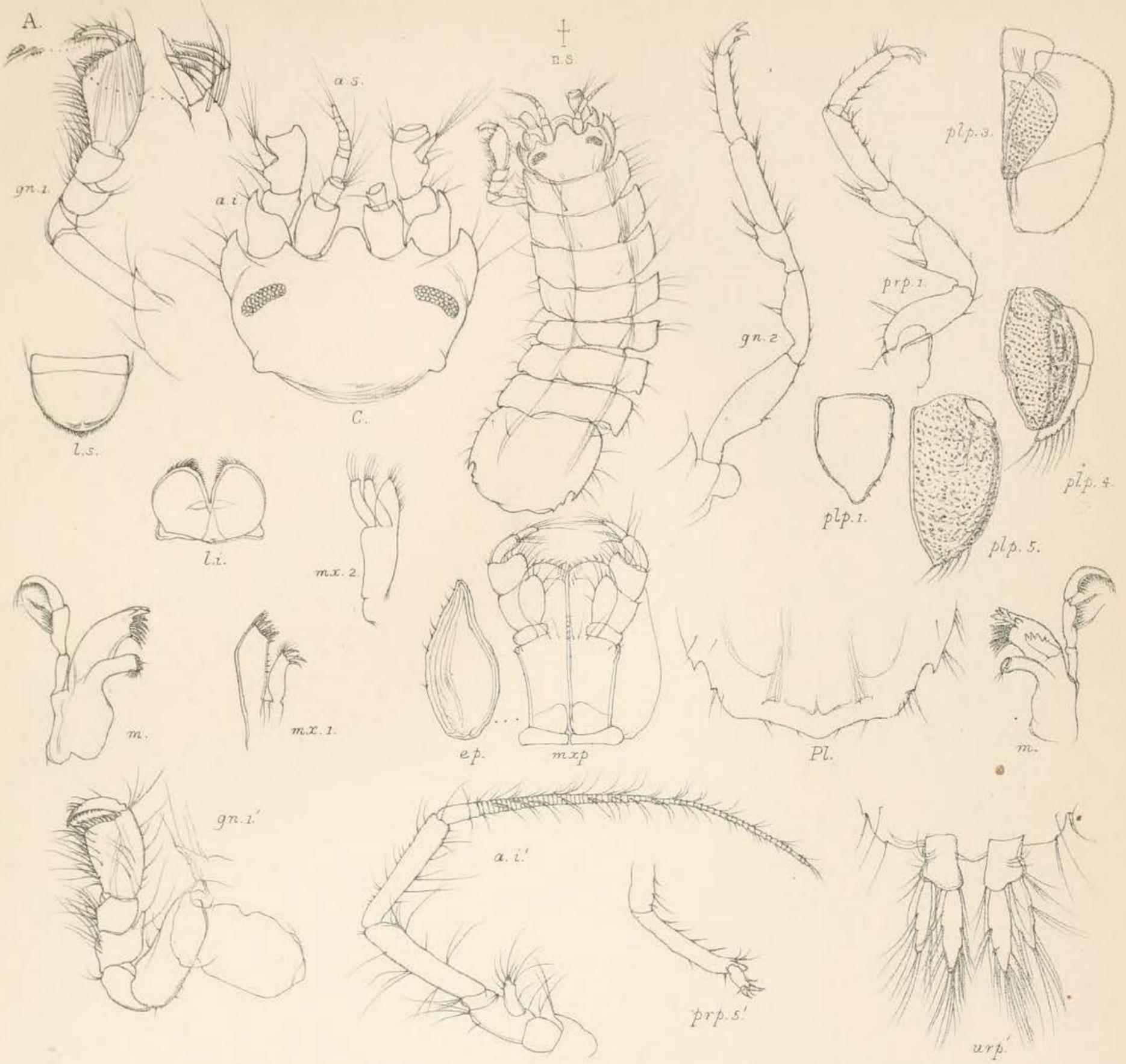
C. *CYMODOCE BICARINATA*, Stebbing.



Del. T. R. H. Stebbing.

J. T. Renne Reid, Lith. Edin'

A. AMESOPOUS RICHARDSONÆ, n. sp. B. ASTACILLA AMBLYURA, n. sp. C. JAEROPSIS CURVICORNIS, (Nicolet).



Del. T. R. R. Stebbing

J. T. Rennie Reid Lith. Edin'

A, STENETRIUM CHILTONI, n. sp. B. GNATHIA INSOLITA, n. sp.