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**GREGARIOUS CRUSTACEA FROM
CEYLON.**

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SPOLIA ZEYLANICA.

GREGARIOUS CRUSTACEA FROM CEYLON.

By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S.

With six Plates and one text-figure.

THE following paper was prepared in response to the request of my friend Dr. Arthur Willey, D.Sc., F.R.S., who sent me the group of specimens. Writing from the Colombo Museum in August, 1902, he says :—

“While collecting in a salt water lake having both fluviatile and marine connections I came across some piles of cocoanut driven into the water by fishermen, which harboured great numbers of small organisms, tubicolous amphipods and boring isopods, and in amongst the tubes several errant species, isopods, amphipods, and what I took to be tanaids, &c. I thought this was a very interesting example of association of animals, and it occurred to me to send samples of the specimens to you I only obtained one specimen of the *Alpheus*, the one sent.

“The tubicolous amphipods were mostly on the inner surface of the bark stripped off the piles. The boring isopods were mostly above the water line. I cut off the top of the block and had it photographed and send copy. It looks like a bee or a wasp nest, each cell containing an isopod when fresh and several with young.

“The tubicolous amphipods (when they leave their tubes) move about with a straight motion like a caterpillar or grub. The errant amphipods which were amongst the tubes were dark gray in colour, and had the familiar sidelong motion. The tanaids crept out from the innermost recesses, often appearing to emerge from the tubes themselves.

“Some of the empty holes of the boring isopods at the top of the pile actually contained dipterous larvæ.”

Appended was a list of the sorted specimens :—

- “ 1. Twelve errant isopods, epizootic upon the colonies of boring isopods and tubicolous amphipods.
- “ 2. Boring isopods.
- “ 3. Tubicolous amphipods.
- “ 4. Four crabs.
- “ 5. Dark gray errant ‘epizootic’ amphipods.
- “ 6. One blue-green alpheid.
- “ 7. ‘Epizootic’ tanaids, with some gravid ♀.”

The accompanying labels gave the locality as Lake Negombo. The collection proved upon examination to contain altogether ten species. In English waters a comparable society of crustaceans that penetrate the fibres of submarine timber includes the amphipod *Chebura terebrans*, Philippi; the tanaid now known as *Tanais cavolinii*, Milne-Edwards; and the isopod *Limnoria lignorum* (J. Rathke), with which others are from time to time found in company. Monsieur Chevreux has found no less than twenty-three species of amphipods residential upon the crab *Mamia* squinado*, though probably nothing like that number on any one individual. To Dr. Willey’s timber-haunting group I assign the following names :—No. 4, *Baruna socialis*, n.sp.; No. 6, *Alpheus heterochelis*, Say; No. 7, *Cyathura pusilla*, n.sp., accompanied by a single *Tanais philetærus*, n.sp. another specimen of which occurred with No. 3; No. 1, *Cirolana willeyi*, n.sp., accompanied by a single specimen of *Corallana nodosa*, Schiödte and Meinert; No. 2, *Sphaeroma terebrans*, Bate, accompanied by specimens of the minute *Iais pubescens*, Dana; No. 5, *Melita zeylanica*, n.sp.; No. 3, *Corophium triænonyx*, n.sp. The ten species accordingly represent ten genera, distributed over ten families in four principal divisions of the Malacostraca.

BRACHYURA.

CATOMETOPA.

Family : GRAPSIDÆ.

1886. *Grapsidæ*, Miers, Challenger Brachyura, Reports, vol. XVII., p. 252.
1900. Alcock, Journ. Asiatic Soc. Bengal, vol. LXIX., pt. 2, pp. 283, 389.

Alcock remarks that this family consists of “littoral (rock-haunting), or pelagic (drift weed- and timber-haunting), or estuarine and paludine, or fluviatile, or rarely terrene Catometopes.”

* For explaining this change from a pre-occupied name use is being made of an opportunity more suitable than the present.

BARUNA, n.g.

Carapace broader than long, flattened, with short transverse median groove, front slightly depressed, antero-lateral margins tridentate. Third maxillipeds completely opercular, exopod broad but narrower than the third joint, which itself is narrower and shorter than the fourth, the connection between the two being angular between points at the same level; the fifth joint, implanted at the middle of the somewhat irregular apical margin of the distally widened fourth joint, is also distally widened, and carries feathered setæ on its outer border; enormously long feathered setæ proceed from the inner surface of the fourth and from the apices of the three following joints. Chelipeds of the male subequal, very large, with a gap between the closed fingers, the other legs hirsute on the back, the last pair the shortest. Pleon of seven segments in both sexes, in the female broad with densely hirsute margins, in the male with the last segment longest, subparallel-sided.

This genus appears to approach *Varuna* and *Pseudograpsus*, established by Milne-Edwards, and Stimpson's *Platygrapsus*, but in *Varuna* the third maxillipeds have the fourth joint smaller than the third, in *Pseudograpsus* (at least as defined by Miers) they have the exopod as broad or nearly as broad as the third joint, and in *Platygrapsus* the third joint meets the fourth in a singularly oblique line of junction. The definition of *Pseudograpsus* given by Milne-Edwards in 1837 would include the species about to be described, but it is evidently quite distinct from either *P. penicilliger* (Latreille) or *P. pallipes*, Milne-Edwards, the only two species referred to *Pseudograpsus* at its institution.

BARUNA SOCIALIS, n. sp.

Pl. 1A.

The carapace is punctate, apparently a little depressed transversely behind the front and at this part furry, some long hairs being distributed over other parts of the back. The front is a third of the extreme breadth. The antero-lateral margins are shorter than the postero-lateral, and are divided into three lobes, that nearest the orbit being the largest and subdivided into six or seven small teeth, the next into three or four, while the last is simple, rather a blunt tooth than a lobe. Both sexes have seven distinct segments in the pleon, which in the male narrows rather abruptly at the fifth segment, and has the last segment the longest, apically rounded. The pleon in the female is very broad, especially

in respect to the last four segments, densely fringed with long hairs which assist in retaining the very numerous eggs. The second antennæ are tipped with an elongate seta.

The first maxillipeds have the little process which De Haan appears to be describing in regard to his genera *Trichopus* (= *Varuna*) and *Eriocheir* by the words, in the first case, "lacinia externæ lamella ex medio margine interiore producta, neque transversa, auctæ," and in the second with omission of the word "medio" and substitution of "ovata" for "neque transversa." In modern language this would be interpreted as a reduction of "the endopodite to a minute projection of the inner margin of the exopodite." The second maxillipeds have the penultimate joint densely lined with long setæ. The third pair have the peduncle of the exopod large, but not as broad as the third joint of the main stem. This in turn is neither so wide nor so long as the great fourth joint, which has the fifth joint inserted at the middle of its broad apical margin.

The chelipeds (or first peræopods) are very large in the male, subequal, with the inner distal margin of the wrist finely serrate, the hand very bulky, the thumb having two rows of fine denticles along its inner margin, receiving at its broad apex the point of the movable finger, which is similarly serrate, but also has a prominent stout tooth near the base. There is a large gap between the closed finger and thumb. In the female the chelipeds are quite small, and the small thumb and finger close their straight margins together without a gap. The second peræopods have the last four joints densely setose on the inner surface towards the outer margin, and the first of these joints furnished with unequal teeth or spines about the inner margin, the apex of which is acute in the wrist. The fifth peræopods are rather smaller than the three preceding pairs, but similarly hirsute.

The larger of the two male specimens was 7.4 mm. broad at the widest part of the carapace and 5.25 mm. long at the centre of it. The two females were both laden with eggs. In this sex the carapace was as long as that of the male, but not quite so broad.

The specific name alludes to the part taken by this little species in the group of crustaceans here under discussion.

MACRURA.

Family: ALPHEIDÆ.

1888. *Alpheidæ*, Bate, Challenger Macrura, Reports, vol. XXIV., p. 528.
 1893. *Alpheidæ*, Stebbing, History of Crustacea, p. 230.
 1899. *Alpheidæ*, Coutière, Ann. Sci. Nat., sér. 8, vol. IX.

1902. *Alpheidæ*, De Man, Kükenthal's Ergebnisse, Abh. Senckenb. Gesellschaft, vol. XXV., pt. 3, p. 861.
1903. *Alpheidæ*, G. M. Thomson, Trans. Linn. Soc. London, Zool., vol. VIII., pt. 11, p. 436.

ALPHEUS, Fabricius.

1798. *Alpheus*, Fabricius, Supplementum Ent. Syst., p. 404.

The species *Alpheus socialis*, Heller, as described and figured by Mr. G. M. Thomson in the work above-mentioned, shows remarkable variability in regard to the frontal portion of the carapace and the shape of the large cheliped. It is a question, however, whether the specimens examined may not have belonged to more than one species.

ALPHEUS HETEROCHELIS, Say.

1818. *Alpheus heterochelis*, Say, Journ. Acad. Nat. Sci. Philad., vol. I., p. 243.
1825. *Athanasus edwardsii*, Audouin, Explic. planches de Savigny, pl. 10, fig. 1.
1884. *Alpheus edwardsii*, Miers, Voyage of H.M.S. Alert, 1881-1882, p. 284.
1888. *Alpheus edwardsii*, Bate, Challenger Macrura, Reports, vol. XXIV., p. 542, pl. 97, fig. 1.

The solitary specimen obtained of this species was described by Dr. Willey as a blue-green *Alpheus*, taken among the tubes of the tubicolous amphipods at Lake Negombo. The blue-green tint on its arrival in England was no longer visible, the general colouring being quite pallid, but diversified by a large squarish patch of bright orange in the middle of the carapace, and a similar hue along the back of the pleon. The larger cheliped is on the left; both limbs are of a dusky orange, with a faint bluish line here and there. The length of the specimen is about 25 mm.

It cannot, I think, be distinguished from the species described by Miers in the reference given above, and the name here assigned to it really rests on his authority. Otherwise I should have been inclined to adopt for it the name *Alpheus avarus*, Fabricius, in agreement with Spence Bate's observation that "*Alpheus avarus*, Fabricius, appears to have no strongly marked features separating it from *Alpheus edwardsii*." But Miers,

while including in his long list of synonyms *Alpheus avarus*, De Haan, expressly distinguishes that species from the homonymous Fabrician species. That Miers gave the preference to Audouin's name over the earlier one by Say is obviously due to his error in dating Audouin's "Explication" in the year 1809. That date may apply to Savigny's unnamed figure, but the name was not given by Audouin till 1825, and was evidently unknown to Desmarest when he published his "Considérations générales sur les Crustacés" in that year. The synonymy given by Miers is criticized by Coutière in his valuable treatise on the *Alpheidae* (p. 35), with the result that, apart from detailed description, the term *Alpheus edwardsii* (or its equivalent here adopted) becomes rather the designation of a group than the name of a species.

ISOPODA ANOMALA.

Family : TANAIIDÆ.

1853. *Tanaidæ* (part), Dana, U. S. Expl. Exp., vol. XIII., p. 792.
 1899. *Tanaidæ*, Norman, Ann. and Mag. Nat. Hist., ser. 7, vol. III., p. 332.
 1900. *Tanaidæ*, Stebbing, Willey's Zoological Results, pt. 5, p. 613.
 1901. *Tanaidæ*, H. Richardson, Proc., Washington Acad. Sci., vol. III., p. 565.
 1902. *Tanaidæ*, H. Richardson, Trans. Connect. Acad. Sci., vol. XI., p. 278.

Under the head of the above references numerous others relating to this family will be found.

TANAIS, Milne-Edwards.

1828. *Tanais*, Milne-Edwards, Ann. Sci. Nat., sér. 1, vol. XIII., p. 288, and in Précis d'Entomologie par Audouin et Edw.
 1840. *Tanais*, Milne-Edwards, Hist. Nat. Crust., vol. III., p. 141.

Other references are easy to find under those which deal with the family. The typical species *Tanais cavolinii*, Milne-Edwards, under the name *Tanais tomentosus*, Kröyer, is figured with admirable detail by Sars in the Crustacea of Norway, vol. II., pl. 5. According to Dollfus, the date of the Précis d'Entomologie is 1828, not 1829 as I have supposed in "Willey's Zoological Results." In addition to the species above-mentioned, in which the uropods

are three-jointed, as they are also in *T. stanfordi*, H. Richardson (1901), the genus contains the following species, in all of which the joints of the uropods are more than three :—

<i>Tanais hirsutus</i> , Beddard, with uropods about 12-jointed, established in 1886.			
<i>Tanais willemoësi</i> , Studer, with uropods	8-jointed,	do.	1884.
<i>Tanais alascensis</i> , H. Richardson, with uropods	7-jointed,	do.	1899.
<i>Tanais novæ-zealandiæ</i> , G. M. Thomson	5-jointed,	do.	1880.
<i>Tanais robustus</i> , Moore, with uropods	4-jointed,	do.	1894.
<i>Tanais grimaldii</i> , Dollfus, with uropods	4-jointed,	do.	1897.
<i>Tanais chevreuxi</i> , Dollfus, with uropods	4-jointed,	do.	1898.
<i>Tanais testudinicola</i> , Dollfus, with uropods	4-jointed,	do.	1898.

TANAIIS PHILETÆRUS, n. sp.

Pl. 2.

Among numerous examples of *Cyathura pusilla* there occurred a single example of this much smaller species, a female with a pair of small ovisacs attached beneath the fifth peræon segment. Its features will be most easily understood by comparison with those of the best known *Tanais*, *T. cavolinii*, which in general character the present species closely resembles, though it is considerably shorter and much more slender.

The cephalic segment is a good deal longer than broad, the front rounded, the eye-pieces acute in dorsal view, but in fact having rounded margins. The first two pleon segments have the dorsal fringe of plumose setæ. The telsonic segment has a produced bluntly triangular apex, with a pair of unequal setæ on each side at the base and an apical pair.

The two pairs of antennæ, the mandibles, and second maxillæ show no substantial differences from those in the earlier known species. The lower lip has the small process at the outer apex devoid of setules. The first maxillæ have the backward-bent "palp" ending in only two, not several, setæ. The maxillipeds in dissection came away in two halves as if not coalesced at the base, but as the epipods were lost, the dissection may have been a cause of disruption. The subsidiary plate, which reaches to the distal end of the ante-penultimate joint, appears to have a distal joint, process, or group of setæ, set on at right angles to its main stem; but as this part in both members was clogged with obscuring material, I can only mention the appearance and figure it by conjecture.

The first gnathopods have the hand and finger somewhat more robust than in the female of *T. cavolinii*. It is in the male that these limbs are generally distinctive. The slender straight-fingered second gnathopods agree with those of the species just mentioned; the first and second peræopods in the hand

and not uncinuate finger approach the second gnathopods, but in the spiny armature of the ante-penultimate joint and the greater proportionate length of that which precedes it they are nearer to the three following pairs. These have the penultimate joint slightly curved and distally bulging, with the finger strongly hooked, but this hook is not, as it is in *T. cavolinii*, armed inside with a comb of denticles.

The pleopods differ in armature markedly from those of the species compared, for there the branch which is the smaller and attached to the upper part of the stem has its outer margin well fringed with setæ, whereas in the new species this margin has a single seta near the base. Both species alike have a little tooth-like spine at the apex of this branch.

The uropods are four-jointed. On one side the penultimate joint is decidedly the largest of the four, but its superiority in length is less marked in the other member of this pair of appendages.

The colour was light mottled brownish gray in spirit. The length from front of head to end of telson was 3 mm.

The specific name, from a Greek word meaning "lover of comrades," alludes to the discovery of this little animal in the great association of pile-dwellers which Dr. Willey has brought to light.

From other members of the genus which have four-jointed uropods the new species is readily distinguished. *T. robustus*, Moore, and *T. testudinicola*, Dollfus, have the pleon distinctly six-segmented, and the bands of setæ on the first two of those segments wanting or feebly represented. The second of these has the front of the head sharply produced. In *T. grimaldii*, Dollfus, the cephalic segment is almost (in the figure quite) as broad as long. In *T. chevreauxi*, Dollfus, the first joint of the uropods is decidedly the longest.

ISOPODA GENUINA.

Family: ANTHURIDÆ.

1814. *Anthuridæ*, Leach, Edinb. Encycl., vol. VII., p. 433.
 1900. *Anthuridæ*, Stebbing, Willey's Zoological Results, pt. 5, p. 618.
 1901. *Anthuridæ*, H. Richardson, Proc. U. S. Nat. Mus., vol. XXIII., pp. 505, 507.
 1902. *Anthuridæ* H. Richardson, Trans. Connect., Acad. Sci., vol. XI., p. 284.

Under the second reference will be found a tolerably sufficient guide to the previous literature of the family.

CYATHURA, Norman and Stebbing.

1886. *Cyathura*, Norman and Stebbing, Trans. Zool. Soc. London, vol. XII., pt. 4, p. 121.

1900. *Cyathura*, Stebbing, Willey's Zoological Results, pt. 5, pp. 619, 620.

1901. *Cyathura*, H. Richardson, Proc. U. S. Nat. Mus., vol. XXIII., p. 508.

The relations of this genus to other genera in the same family are discussed in "Willey's Zoological Results," but the opinion there expressed, that in "the maxillipeds the epipod-bearing first joint always seems to be indistinguishably coalesced with the wall of the head," must be modified at least so far as regards the species now to be described. A genus *Colanthura*, in which the fifth peræopods are wanting, as in *Hyssura* and *Cruregens*, was established by Miss Richardson in 1902.

CYATHURA PUSILLA, n. sp.

Pl. 6B.

This species agrees in so many points with *Cyathura carinata* (Krøyer) that the description of that species by Krøyer, Harger, and others, when compared with the figures here given and the points of difference about to be mentioned, will cover all that is essential to be said.

In the present species no eyes could be detected. The sixth segment of the peræon, instead of being scarcely longer than the seventh, is as a rule very decidedly longer, and the longest males and the females laden with young do not exceed a length of 7.5 mm., whereas the length of *Cyathura carinata* reaches from 15 to 20 mm.

The distinct first joint of the maxillipeds might have been added as a specific character, but although Krøyer, Schiödte, Harger (in his text), and Norman and Stebbing all appear to be agreed as to the disappearance of this joint from *C. carinata*, Harger, in figuring the maxillipeds of that species (under the name *Anthura polita*, Stimpson), quite distinctly represents the missing joint. That so careful a writer as Harger should have left the discrepancy between his text and figure unexplained is difficult to understand, but the question remains open whether the connection between this joint and the large second one may not be open to individual variation. It is perhaps more probable that the joint, when missing, is in coalescence with the second joint than with the wall of the head.

The young ones, when ready for escape from the maternal pouch, are seen in the neatest possible longitudinal rows, each individual as straight as an arrow. At this stage the head is longer than the first segment of the pereon, instead of much shorter as in the adult. The seventh segment of the pereon is very short and totally devoid of limbs, which the other segments have almost of the full-grown character.

The name of the species refers to its comparatively small size.

Family : JANIRIDÆ.

1897. *Janirida*, Sars, Crustacea of Norway, vol. II., pt. 5, p. 98.

1900. *Janirida*, H. Richardson, American Naturalist, vol. XXXIV., p. 298.

1902. *Janirida*, H. Richardson, Trans. Connect. Acad. Sci., vol. XI., p. 294.

IAIS. Bovallius.

1886. *Iais*, Bovallius, Bihang K. Svenska Vet.-Akad. Handl., vol. XI., No. 15.

1900. *Iais*, Stebbing, Proc. Zool. Soc. London, p. 548.

IAIS PUBESCENS, Dana.

1853. *Jera pubescens*, Dana, U. S. Expl. Exp., vol. XIII., p. 744, pl. 49, fig. 9.

1903. *Iais pubescens*, Stebbing, Proc. Zool. Soc. London, p. 549, pl. 38.

As this minute species was rather fully discussed under the second of the above references, it is scarcely necessary to add anything here, except to note its occurrence in association with yet another sphaeromid. It was not actually observed upon *Sphaeroma terebrans*, but was associated in the same tube with the specimens of that species.

Family : CIROLANIDÆ.

1880. *Cirolanidæ*, Harger, Rep. U. S. Comm. Fisheries for 1878, pt. 6, pp. 304, 376.

1890. *Cirolanidæ*, Hansen, Vid. Selsk. Skr., ser. 6, vol. III., pp. 275, 310, 317, 318.

1900. *Cirolanidæ*, Stebbing, Willey's Zoological Results, pt. 5, p. 628.

1902. *Cirolanidæ*, H. Richardson, Trans. Connecticut Acad. Sci., vol. XI., p. 289.

1902. *Cirolanidæ*, Stebbing, South African Crustacea, pt. 2, p. 49.

1904. *Cirolanida*, II. Richardson, Proc. U. S. Nat. Mus., vol. XXVII., p. 35.

Other references for the family and information upon it may be obtained from the above selection.

CIROLANA, Leach.

1818. *Cirolana*. Leach, Dict. Sci. Nat., vol. XII., p. 347.

1902. *Cirolana*, Dollfus, Bull. Soc. Zool. France, vol. XXVIII., p. 5.

Many other references for the genus will be found under those for the family. In regard to the last but one of these it may be convenient to mention that the species described by Ives in the Proc. Ac. Philad., p. 187, 1891, is *Cirolana mayana* (not *magara*), and that Miss H. Richardson's new genus is *Colopisthus* (not *Calopisthus*).

CIROLANA WILLEYYI, n. sp.

PL. 3.

The broadly convex front of the head has a small triangular rostrum between two slight depressions. The head's dorsal surface is smooth in the female, but in the male carries about five tubercles distributed in two rows. The segments of the pereon have each about eleven tubercles on the hind margin, those on the first three segments scarcely or not at all perceptible until the segments have been separated. The first, which is the largest, segment is tuberculate on the medio-dorsal surface in the male, but not in the female. Of the pleon the first segment is concealed and smooth, the second to the fifth have fewer but more conspicuous tubercles than the pereon segments, the median tubercle of the fifth segment forming a large tooth. The fifth segment is laterally completely overlapped by the fourth, and that again by the third. The telsonic segment is more or less triangular, incised near the base for the insertion of the peduncles of the uropods, the apex blunt, fringed with setules and eight spines, the dorsal surface carrying two little curved submedian ridges.

The eyes are dark, wide apart.

The first antennæ have the first two joints coalesced, the third rather longer than this combination, the flagellum of ten or twelve joints being scarcely as long as the peduncle.

The second antennæ fold back beyond the third pereon segment, with the many-jointed flagellum considerably longer than the peduncle, and furnished densely with setæ along the proximal half in the male, but not in the female. Both the male and female from which the figures are drawn happened to have the

antennæ unsymmetrical, the first antennæ of the female being so to a conspicuous degree, the second of the male having several more joints in the flagellum of one antenna than in that of the other.

The frontal lamina surmounting the epistome is pentagonal. The upper lip and mandibles do not sensibly differ from those of *Cirolana pleonastica*.* The first maxillæ have the usual three plumose setæ on the inner plate, the inner margin of which has a small projection. As shown by the figures, in the male the fourth joint of the maxillipeds is a little narrower than the fifth, whereas in the female it is a little broader. The vibratory lamina of the second joint in the female is of considerable size, of much greater length than breadth.

The first gnathopods are short and stout, the fourth joint fringed with six spines, which look as if worn down by use; the fifth joint is almost completely overlapped by the fourth; the sixth joint is characterized by a projection of the distal part of the inner margin, which carries two spines and some setules.

The second gnathopods have four spines on the inner margin of the third joint, eight or nine on that of the fourth, which also has an oblique row of spines on the distal part of the inner surface.

The pereopods are furnished with strong spines on the distal and inner margins of the third, fourth, and fifth joints, some but not all of these spines having the multifid structure noted by Schiödte and Meinert and by H. J. Hansen in some species of *Corallana* and *Excorallana*.

In the second pleopods of the male the masculine appendage is apically acute, reaching scarcely beyond the rami.

The uropods have the inner branch apically broad, rounded, serrate, with twelve spines in the serrations and numerous hairs, a longer tuft occupying one serration which has no spine. The much narrower outer branch has eight or nine spines on the outer margin, four or five on the inner, and a spine-like apex. This also is setose.

A specimen flattened out measured 8.75 mm. The colour in spirit is dark brown upon light, forming generally a symmetrical pattern, of which the darkest portion is in the dorsal centre of the fourth to the sixth pereon segments, to which follows a light piece shaped like a spearhead and reaching with its point to the base of the telsonic segment.

The species is named out of respect to the discoverer, Dr. Arthur Willey. From *Cirolana sculpta*, Milne-Edwards, found on the coast of Malabar, the present form is distinguished by having

* See Willey's Zoological Results, part 5, pl. 67A.

a large median tooth not on "the last segment of the abdomen," the telsonic segment, but on the preceding division of the pleon, as also by having all the segments of the peræon, instead of only the hinder ones, tuberculate. If we could suppose Milne-Edwards to have been deceived in regard to these particulars, there remains an important difference in the uropods, which in *C. sculpta* have the two branches nearly equal and both pointed, whereas in our species the inner is much the larger and broadly rounded. The length also of the form from Malabar is more than double of that from Ceylon.

Family : CORALLANIDÆ.

In their essay "De Cirolanis Ægassimulantibus," 1879, Schiödte and Meinert grouped together two new genera, *Barybrotos* and *Tachæa*, with Dana's *Corallana*. In 1890 H. J. Hansen assigned *Barybrotos* to a family Barybrotidæ, *Tachæa* along with two new genera, *Alcirona* and *Lanocira*, to a family Alcironidæ, and placed *Corallana* by itself in a family Corallanidæ. To the last genus he referred seven new species from the West Indies, and to these Miss Harriet Richardson in 1899 added an eighth species from California and in 1901 a ninth from Florida. Hansen records eleven species earlier than his own as with more or less probability belonging to the genus or at least to the family. Among these eleven stands *Corallana hirticauda*, Dana, with which the fortunes of both family and genus are bound up, since the genus was originally founded for this species alone. Recently I have had an opportunity of examining specimens of *Corallana hirsuta*, Schiödte and Meinert. As this is certainly in the most intimate alliance with Dana's species, the conviction is forced upon me that the nine species assigned to *Corallana* by Hansen and Richardson must be removed to a new genus *Excorallana*, to which Hansen's definition of *Corallana* applies, and that the six species of *Corallana* described by Schiödte and Meinert will properly remain in that genus, which, with *Alcirona*, *Lanocira*, and *Tachæa*, will form the family Corallanidæ. To this Hansen's definition of the Alcironidæ will apply, with the slight modification that the palp of the maxillipeds must be described not as four-jointed, but as four- or five-jointed.

Genus : CORALLANA, Dana.

1853. *Corallana*, Dana, U. S. Expl. Exp., vol. XIII., pp. 748, 773.

1879. *Corallana*, Schiödte and Meinert, Naturhist. Tidsskr., ser. 3, vol. XII., p. 286.

CORALLANA NODOSA,* Schiödte and Meinert.

1879. *Corallana nodosa*, Schiödte and Meinert, Naturhist. Tidskr., ser. 3, vol. XII., p. 294, pl. 5, figs. 8, 9.

1890. *Corallana nodosa*, Hansen, Vid. Selsk. Skr., ser. 6, vol. III., p. 389.

Pl. 1B.

Among several examples of *Urolana willeyi* there occurred a single specimen undoubtedly belonging to the form figured and described by Schiödte and Meinert as *Corallana nodosa*, mas adultus. They describe and figure also the femina ovigera and the virgo, but Hansen suspects that two or possibly three species have been grouped together under one designation. A single specimen does not lend itself to the discussion of that question. So far as the male is concerned the superficial characters are very unmistakable. The projecting lobe of the first joint of the upper antennæ attracts attention. The two little cephalic eminences between and slightly in advance of the eyes are indeed not shown in the figure which the collaborating authors supply, but they are well described in their text as a pair of short high carinæ with short sharp apex. The nodules on the last three segments of the peræon are, as they represent them, a large and small one close together on each side of the fifth and sixth segments, and on each side of the seventh a solitary large nodule.

The eyes are large, distinctly faceted.

The first joint of the upper antennæ, so remarkable by its upward curved lobe, no doubt represents two joints in coalescence, the following much shorter and narrower joint being the true third joint of the peduncle. The flagellum in our specimen consisted of thirteen unequal joints, none elongate. The much longer second antennæ had in one member of the pair a 17-jointed, in the other a 22-jointed, flagellum.

The mandibles are elongate, differing greatly from those of *Excorallana*, both in the apical part and in the palp, this having not the first but the second joint longest, as in the other true Corallanidæ. They agree in general structure with the mandibles of *Tachæa crassipes*, but the apical part, instead of being simple, has subsidiary teeth as in *Alciroa*. The spine-row is represented by a single spine.

The lower lip has each division apically bilobed, the lobes being approximately equal and very slightly separated.

The first maxillæ agree in much with those of *Tachæa crassipes* but quite as well with those of *Excorallana tricornis* (Hansen).

* On plate 1B this species is named *Tachæa nodosa* by error.

The second maxillæ are of delicate structure, tapering to a pointed apex.

The maxillipeds decisively remove this species from the Exco-rallanidæ, besides distinguishing it from *Alcirona* and *Lanocira* in its own family. The first joint is very small, the second fully as long as the remaining five joints combined. No one of these is very large, but the antepenultimate is the largest, exceeding the rest both in its breadth and length, which are subequal. The terminal joint is very small, but distinct. In *Tachæa crassipes* the original authorities for that species figure the maxillipeds, but leave it obscure whether they are representing a seventh joint or not. In Hansen's more precise figure there is no seventh joint, but a nodular cap to the sixth joint which may very well be the small seventh joint in coalescence. If this be the right interpretation, it will follow that the long second joint of the maxillipeds is simple, not the result of two joints coalesced.

The dilatation of the sixth joint of the limbs appears to be legitimately included among the generic characters of *Tachæa*, since the joint is not dilated either in *Alcirona* or *Lanocira* or in the known species of the present genus.

In the second pleopods the masculine appendage reached just to the extremity of the rami.

The telsonic segment is armed round the broad apex with fourteen spines and many plumose setæ.

The specimen, which was somewhat difficult to flatten for exact measurement, equalled about 8.5 mm. in length, with a breadth about half the length.

Its colour in spirit may be described as orange, lightly sprinkled with darker tree-markings.

Family : SPHÆROMIDÆ.

1847. *Sphæromida*. White, List of Crustacea in Brit. Mus., p. 102.

1900. *Sphæromida*, Stebbing, Willey's Zoological Results, pt. 5, p. 643.

1902. *Sphæromidæ*, Stebbing, South African Crustacea, pt. 2, p. 64.

1904. *Sphæromidæ*. H. Richardson, Proc. U. S. Nat. Mus., vol. XXVII., pp. 24, 38.

The last reference but one will give a key for finding others.

SPHÆROMA, Bosc.

1802. *Sphæroma*, Bosc., Hist. Nat. des Crustacés, vol. II., p. 182.

1900. *Sphæroma* (sensu restricto). Stebbing, Proc. Zool. Soc., London, p. 552.

The second of these references will supply a sufficient clue to the extensive literature of this genus in the wider acceptation.

SPHÆROMA TEREBRANS, Bate.

PL. 4.

1866. *Sphæroma terebrans*, Bate, *Annals and Magazine Nat. Hist.*, ser. 3, vol. XVII., p. 28, pl. 2, fig. 5.

1866. *Sphæroma vastator*, Bate, *Annals and Magazine Nat. Hist.*, ser. 3, vol. XVII., p. 28, pl. 2, fig. 4.

1897. *Sphæroma destructor*, H. Richardson, *Proc. Biol. Soc. Washington*, vol. XI., p. 105, figs. in text.

Common sense continually justifies Bishop Butler's axiom that probability is the guide of life. But about the name and synonymy of the present species conflicting probabilities range themselves in a disturbing manner. There can be no doubt that an intimate relationship exists between—(1) *Sphæroma terebrans*, named by Fritz Müller, who procured it in Brazil from timber that had been immersed in the sea; (2) *Sphæroma vastator*, Bate; (3) *Sphæroma destructor*, Harriet Richardson; and (4) the form about to be described.

Bate's species was sent to him from Madras by Captain Mitchell, according to whom it was procured "from a piece of wood which had formed part of a railway bridge over one of the backwaters on the west coast of the Indian Peninsula. The wood was honey-combed with cylindrical holes, from about $\frac{1}{16}$ to $\frac{2}{16}$ of an inch in diameter, placed close together. In many of these holes the animal was rolled up like a ball."^{*}

In Bate's description we may notice the following statements:—"The animal is of a long oval shape, without any distinct coxæ, and furnished with four longitudinal parallel rows of tubercles or blunt teeth on the three posterior somites of the pereion and the anterior portion of the pleon." "The superior antennæ have the first joint of the peduncle broader than the second, which is very short and round; the third is twice as long as the second, but much shorter than the first, and the flagellum gradually tapers to an obtuse point, and is formed of several articuli, of which the first is much the longest." The second antennæ are "perhaps slightly longer." "The mandibles are robust, and furnished with strong pointed incisor teeth as well as a powerful molar tubercle, between which exists a process armed with six or seven strong equal-lengthed serrated spines, which are probably used in the tearing down of the wood into which the animal burrows. The

^{*} *Annals and Magazine, loc. cit.*, p. 30.



TOP OF COCOANUT PILE FROM NEGOMBO LAKE HONEYCOMBED BY
"SPHÆROMA TEREBRANS."

[To face p. 16

secondary appendage to this organ is short and three-jointed; the third joint is the shortest, and is nearly as broad as long; it is ciliated upon the flexile margin with hairs, which gradually increase in length towards the apex of the appendage." The maxilliped "consists of five joints, of which the basal is longest and broadest, and carries the other four as an appendage." "The two pairs of gnathopoda and the first pair of pereopoda resemble each other in form and size. They are slender and comparatively feeble appendages, and furnished on the anterior margin with long plumose hairs." "The coxa is fused with the dorsal portion of the somite, and forms an overhanging plate-like process." The second and third joints are long and slender, the third and fourth each furnished on the front margin with a thick row of plumose hairs, standing at right angles with the joint; the fourth joint is short, anteriorly produced to a point; the fifth and sixth joints are short, slender, with short cilia on each margin: the finger "short, curved, unguiculated, and armed with a small subapical tooth or secondary unguis." "The last four pairs of pereopoda resemble each other in general form; they are very robust and strong, and are furnished on the anterior and posterior margins with rows of stout bushy hairs, which appear to increase in number and strength posteriorly, and some of which take a spinous character in the last two pairs, as on the distal extremity of the propodos, where they become spines with serrated margins." The uropods are marginal, consisting "of a single branch on a strong and fixed peduncle, which is produced to a point directed inwardly; to the under surface of this, near the middle, articulates the solitary ramus; this is slightly curved and produced to a pointed apex, and is furnished with five or six sharp teeth on the outer margin; the inner margin is smooth, and so is the inferior, both of which last are furnished with short fine cilia, in this offering perhaps the readiest distinguishable feature from the South American species, which has this appendage fringed with long and coarse hairs." The colour of the animal in spirit "was a subdued sage green." The length is about $\frac{1}{3}$ inch, and the breadth about half as much.

The specimens which Miss Harriet Richardson described in 1897 as *Sphæroma destructor* were "found boring the piers on St. John's river at Palatka, Florida." Their close resemblance in habits and appearance to the species described and figured by Bate is admitted, but differences are adduced under the four following heads: (1) "the number and arrangement of the tubercles;" (2) "the structure of the feet;" (3) "the upcurved margin of the posterior half of the terminal segment of the abdomen;" (4) "the presence of numerous tubercles furnished with bristle-like hairs upon the

abdomen." The third and fourth particulars, however, are only claimed as differences, because they are not mentioned in the description of *Sphæroma vastator*. But no inference can be drawn from the absence of mention to the absence of a character. Writers leave many points unmentioned from carelessness, for fear of being prolix, or through failing to observe them. The features here in question are not of the highest importance and in some specimens cannot easily be discerned. In the dorsal view of *Sphæroma destructor* itself they are not indicated.

Our knowledge of *Sphæroma terebrans* is derived from the figures which Bate gives of the uropod and the mandibular palp, and two comparative statements which those figures are designed to illustrate. He does not allege that the outer ramus of the uropod differs by its shape in the two species, but appeals to the "short fine cilia" in *S. vastator* as offering a ready contrast to the "long and coarse hairs" in *S. terebrans*. The small importance of such a distinction may be judged from the circumstance that Miss Richardson mentions neither the occurrence nor the absence of either cilia or hairs in this part of *S. destructor*. The remaining contrast is of a higher grade. To justify a discriminating name for the isopods from Madras, Bate says: "A close examination is required to distinguish a specific character separating these from the Brazilian specimens; and I think that the only one to be relied upon is that the pointed and hook-shaped termination of the appendage of the mandible in Müller's specimens is represented in those from Madras by a flat broad joint. I therefore think that, minor variations being taken into consideration, together with the distance of the two habitats, we do not err in considering the following a distinct species from that found by Fritz Müller." For *S. vastator* he figures a normal mandibular palp, fairly in agreement with what is found in the specimens from Ceylon and with the figure which Miss Richardson gives of this appendage in *S. destructor*. But for *S. terebrans* the figure exhibits a four-jointed palp, which can only be accepted by one who is willing to cry *credo, quia impossibile*. There cannot be the slightest doubt that the artist has been the victim of some ocular deception, "the pointed and hook-shaped termination" not being a joint at all, but merely the terminal spine or spines of the third joint, the true shape of which has been obscured by the angle at which it was viewed.

Passing now to the specimens from Ceylon, I find them in so close an agreement with the description and figures given by Miss Richardson for *S. destructor*, that they might certainly fall to that designation but for the high probability that *S. destructor*

is identical with *S. terebrans*. It would be singular to have the same wood-boring isopod in Florida and Ceylon, and an almost identical but distinct species in Brazil and Madras.

The sharp transverse ridge on the fourth segment of the peræon is worthy of notice. There are generally four pairs of submedian dorsal tubercles, successively on the sixth and seventh segments of the peræon, on the proximal sutured combination segment of the pleon and on the telsonic segment, the pair on the seventh pleon segment and the telsonic segment being flanked by another tubercle or tuft of setæ on either side. But there seems to be some variation, and a definite determination of the tubercles is made difficult by the colouring which is often dark and by the clogging of the pubescence with extraneous material. The side plates of the second and following peræon segments are distinct.

The eyes are dark and wide apart.

The first antennæ have a stout first joint which may represent the true first and second coalesced. The following joint is short, scarcely longer than broad. The next is sometimes regarded as the third of the peduncle, but may be the first of the flagellum. It is as long as the basal joint, and is followed by eight small unequal joints. The second antennæ have the last three joints of the peduncle subequal, the flagellum rather longer than the peduncle, tapering, of twelve to thirteen joints, many of them tufted.

The strongly projecting mandibles are well described by Bate, though it is not easy to agree with his supposition that the feeble little tuft of serrated spines is employed "in the tearing down of the wood into which the animal burrows." As Miss Richardson intimates, the projecting incisor tooth provides a suitable equipment for this destructive work. The first joint of the small palp is the longest.

The first maxillæ have the inner plate tipped with three strong plumose setæ and one that is feeble; on the outer plate there are nine spines, all or most of them denticulate. Of the second maxillæ the three plates are fringed along two-thirds of the inner margin, the armature of the innermost plate being very distinctly plumose.

The maxillipeds, which Bate speaks of as five-jointed, really have the full complement of seven joints, though the first and third are not very conspicuous. It should be noticed that these organs are built like those of *Sphæroma serratum*, but differ much from those in the genus *Exosphæroma*.

Mr. Bate and Miss Richardson agree in describing the first three pairs of trunk legs (the first and second gnathopods and first

peraeopods) as being alike. Bate speaks of the fifth and sixth joints in these limbs as "short, slender;" Miss Richardson regards the same joints as "long and slender." But, to judge by the figure which the latter naturalist gives as "leg of first pair" (that is, the first gnathopod), the joints in question are long or short indifferently according to the standard of comparison, short compared with the second and third joints of the first three pairs of limbs, long compared with the homologous joints in the two following pairs. It is not, however, the case that the first three pairs of limbs are all alike. At least in the Ceylon specimens the first pair have the fifth joint extremely short, with the hind margin longer than the front, so that it *under-rides* the sixth joint. This differentiation of the first gnathopods is so habitual in the Sphaeromidae that its absence from the specimens collected in Brazil, Madras, and Florida is quite improbable. On the other hand, the general resemblance in the three pairs of slender limbs, with their striking armature of long setae close-set in double rows, is very great, so that when detached from the body they may easily be confused.

The second and third peraeopods are somewhat similar in pattern one to the other, but the second joint is longer and more slender in the third pair than in the second, and the third joint is larger in the second pair than in the third.

The fifth peraeopods again resemble the fourth in pattern, but have all the joints except the finger more elongate. These pairs by their broad but laminar joints are strongly distinguished from the two preceding pairs, which are short and stout. They have a fringe of serrated spines on the apex of the fifth joint, which Bate transfers to the sixth joint, though his figure pretty clearly shows that he meant the fifth. He also says that the last four pairs of limbs "resemble each other in general form," which is quite contrary to the fact in the Ceylon specimens, and, to judge by his figures, also in those from Madras.

The pleopods are satisfactorily described by Bate. To the uropods he allots a single branch, but it is quite clear that what he speaks of as the produced part of the peduncle is the inner branch in coalescence. The articulated outer branch has, he says, five or six teeth on the outer margin. This agrees with the Ceylon specimen figured herewith, the teeth being in fact spines, six in number if the apical one be included. Miss Richardson mentions four teeth on the outer edge, but as this number is also found in the Ceylon specimens, the precise number is immaterial.

The colour, which Bate gives as sage green, and Miss Richardson as "a dark brown, shaded on the edges with a lighter brown," is in

the Ceylon specimens in various tints of mottled brown or gray, the margins light. The light margins have sometimes points of orange, producing a deceptive appearance of tubercles.

The length of the large specimens is from 7.5 to 8 mm., with a breadth half the length. The proportion of the pleon to the rest of the body is not nearly so great as depicted in Bate's dorsal view of the animal.

Since Bate supplies no trustworthy distinction between *S. terebrans* and *S. vastator*, and since both in the "Annals and Magazine" and subsequently in the "Zoological Record" he gives what is called page precedence to *S. terebrans*, that appears to be the name deserving adoption. It was chosen indeed by Fritz Müller, but as the description was given by Spence Bate, he must be recognized as the authority, and in this instance it will be seen from the foregoing discussion that the personal equation counts for much.

Sphæroma verrucauda, White, from the accounts of Dana and Miers, appears to have some affinity with this species, but though found in rotten wood, the cavities were bored by *Teredo*. It has also been found in sandstone, the hollows of which it is not likely to have produced. *Sphæroma felix*, Lanchester, described from the "Skeat" expedition to the Malay Peninsula (Proc. Zool. Soc. London, 1902, p. 379), shows also a rather near agreement, but there the outer ramus of the uropod has eight small teeth on the outer margin.

AMPHIPODA.

GAMMARIDEA.

Family : GAMMARIDÆ.

MELITA, Leach.

1813. *Melita*, Leach, Edinb. Encycl., vol. VII., p. 403.
 1853. *Melita*, Dana, U.S. Expl. Exp., vol. XIII., pp. 911, 962.
 1862. *Melita*, Bate, Catal. Brit. Mus. Amph., p. 181.
 1888. *Melita*, Stebbing, Challenger Amphipoda, Reports, vol. XXIX., pp. 263, 1710.
 1893. *Melita*, Della Valle, Gammarini, Fauna und Flora des Golfes von Neapel., mon. 20, p. 707.
 1894. *Melita*, Sars, Crustacea of Norway, vol. I., pt. 23, p. 507.
 1900. *Melita*, Chevreux, Amphipodes de l' Hirondelle, p. 78.

The genus was originally founded upon *Melita palmata*, Montagu. Dana rashly made it part of the generic character that the upper antennæ were without an accessory appendage, though confessing that he was still in doubt whether in Montagu's species they had one or not. With equal rashness Bate transferred

Dana's *Melita tenuicornis*, in which the third uropods were supposed to have only one branch, to *Mæra*, in which the two branches are undoubtedly both well developed. Miers in 1875 founded a genus *Paramæra* for a species supposed to have uniramous uropods, but in which he subsequently found that they were biramous. This species he transferred to *Atylus*, while retaining the genus for *Melita tenuicornis*. In 1878, however, G. M. Thomson stated that this New Zealand species, of which he claimed to have examined perfect specimens, "must be replaced in the genus proposed by its original describer, Dana, viz., *Melita*." The conclusion rests on the supposition that Dana overlooked the secondary appendage of the antennæ and the small inner ramus of the uropods. It is by no means an improbable conclusion, although Dana's specimens from the Bay of Islands were "found along the shores between high and low water level," whereas Thomson's "were taken in the Taieri river in fresh water, but they had probably come up with the tide, which is felt 15 miles from the mouth." (Trans. New Zealand Inst., vol. XI., p. 241). The case is somewhat complicated by the circumstance that Dana describes as *female?* the form which has second gnathopods characteristic of a male and figures for the *male* gnathopods of a shape to be expected in the female. In the latter form the third uropods were broken off. Professor Della Valle in 1893 enters *Melita tenuicornis* as one of the synonyms of *M. palmata*, but without discussing the absence of a feature conspicuous in the latter species, namely, the medio-dorsal tooth on the fourth pleon segment. Dana had previously established two species in the Proc. Amer. Acad. Sci., vol. II., pp. 214, 215, on the earlier page naming *Amphitoe (Melita) inequistylis* for the supposed female, but, as I think, true male, and on the later page *Amphitoe (Melita) tenuicornis* for the other sex. If the two sexes belong together, the rule of page precedence will make the name *Melita inequistylis*.

MELITA ZEYLANICA, n. sp.

Pl. 5.

Body compressed, segments smooth, except that the short fifth segment of the pleon is a little medio-dorsally notched and carries some small inconspicuous spinules. In the female the side plates of the sixth peræon segment are hooked as in *Melita palmata*, but less strongly.

The eyes are round, dark, rather small.

The first antennæ have the long second joint a little longer than the first and fully twice the length of the third, the flagellum of about twenty joints in the male and fourteen in the female, the

latter in the specimen examined with accessory flagellum of three joints, the former having this appendage four-jointed. It is only to the female that Dana's name *tenuicornis* would be applicable.

Second antennæ with gland-cone strongly produced, acute, fourth and fifth joints subequal, or sometimes the fifth the shorter, elongate in the male, the flagellum about eight-jointed, the first joint (especially in the male) much the longest, the end joints in that sex almost abruptly narrower.

Upper lip with distal margin evenly rounded.

Mandibles with slight quinquedentate cutting edge, secondary plate with four teeth on the left mandible, laminar and scarcely dentate on the right, spine row on left with four, on right with three spines, molar powerful with small lateral plate; palp with third joint as long as second, neither densely fringed.

First maxillæ with five setæ on broad apex of inner plate, palp with short first joint, the second long, carrying spine teeth and setules at the apex and overtopping the inner plate. In Dana's figures of these maxillæ for both sexes of *M. inaequistylis* the first joint of the palp is two-thirds the length of the second.

Second maxillæ. Inner plate having a dozen setæ on inner margin. Dana's figures show only three.

Maxillipeds narrow, both inner and outer plates carrying numerous spines, the outer plates much overtopped by the long second joint of the palp, its third joint distally widened and apically fringed, the fourth finger-like, the whole agreeing well with Dana's figure.

The first gnathopods of the male have the hind margin of the fourth joint densely furred, the fifth joint considerably longer than the sixth, beset on both margins and inner surface with numerous groups of spine-like setæ, the sixth joint similarly but less densely setose, oblong, with the finger attached at the middle of the apex as in Dana's figure of the *male*, its thin distal part resting on a slightly convex setulose palm margin. In the female there is less difference in length between fifth and sixth joints, and the finger is normally attached at the front of the apex, not at the middle as in Dana's *female*.

The second gnathopods in the male are very large, the fifth joint cup-like, with seven groups of setæ about the hind margin, the sixth joint massive, oblong, not distally widened as in *Melita palmata*, with the outer surface smooth, but inner surface and hind margin densely setiferous, the strong finger half the length of the sixth joint over the distally rounded hind margin of which it closes, past a smooth tract of the inner surface to a strong recumbent ridge near the middle of that surface. In the female

there is no such ridge, the hand is comparatively insignificant, not greatly longer than its breadth, with a very oblique palm, the end of which is not reached by the finger, the tip of that joint closing against a palmar spine a little within the margin on the inner surface of the sixth joint.

The endeavour to reconcile the Ceylon specimens with Dana's species broke down under the comparison of the gnathopods with his figures and descriptions. It was possible to suppose that Dana had inadvertently transposed the sexes. But in speaking of his supposed female specimen he says, "Hand of second pair of moderate size, long obovate, apex sparingly oblique, finger short, shutting against lateral surface of hand," and subsequently he says "the hand is naked." Of the supposed male he says, "Hand of second pair oblong, sub-elliptical, back much flattened, densely hirsute below, palm not excavate, finger rather large," and subsequently, "Hand of second pair about twice longer than broad." According to his figures also the hand of the second gnathopod in the supposed female is quite small compared with that of the supposed male. But in the Ceylon form, just as in *Melita palmata*, it is the male that has the finger of the second gnathopod shutting against the surface of the hand, and it is these male gnathopods that are enormously larger than those of the female and much more hirsute.

The first and second peræopods are slender in both sexes, and in the female the three following pairs are not stout, but in the male they are decidedly robust, the fourth joint especially being much broader than the two following, all three being spinose. This robustness is not indicated in Dana's figure of either sex. The finger is short, robust, with fine upward curved apex. The sixth joint of the fifth peræopod is usually longer than that in the limb which happened to sit for its portrait.

The inner branch of the third uropods is a little oval plate, flattened on one side, and carrying a spine at one corner.

The small telson consists of two quite separated plates, which taper each to a blunt apex, the sides carrying four spines or spinules.

The length of the male, not counting the antennæ, is 7.5 mm.

The colour in spirit is a light greenish brown, with a darker transverse stripe along the hind margin of each segment.

The specific name refers to the place of capture. Though the suspicion may linger that Dana had before him this very species, or one closely allied to it, his name could only be applied on the supposition that under stress of circumstances he misrepresented by pen or pencil almost every one of its salient features.

Family : COROPHIIDÆ.

COROPHIUM, Latreille.

1806. *Corophium*, Latreille, Genera Crustaceorum, vol. I., p. 58.
 1888. *Corophium*, Stebbing. Challenger Amphipoda, Reports, vol. XXIX., pp. 79, 1670.
 1893. *Corophium*, Della Valle, Gammarini, p. 362.
 1894. *Corophium*, Sars, Crustacea of Norway, vol. I., pt. 27, p. 612.
 1900. *Corophium*, Chevreux, Amphipodes de l'Hirondelle, p. 109.

The species now known of this genus are rather numerous, all possessing in common marked features of general resemblance, yet separable into two groups by the circumstance that in some the fourth, fifth, and sixth segments of the pleon are distinct, and in others consolidated into a single piece.

COROPHIUM TRLENONYX, n. sp.

Pl. 6A.

The rostral point is little produced. The side plates of the first peræon segment are apically fringed with six plumose setæ. The pleon is fully segmented, and has the lateral margins of the first two segments fringed with plumose setæ.

The eyes are small and dark.

The first antennæ have the flagellum shorter than the peduncle, about twelve-jointed in the male and nine-jointed in the female. In the latter the third joint of the peduncle is half as long as the second, and the second half the first, but in the male the third is less than half the second, and the second more than half the third.

The second antennæ are robust, in the male strongly setose, with the penultimate joint of the peduncle produced into a large curved tooth, with a small one beside it at the base on the inner side; in the female this joint is as usual much shorter, furnished with numerous spines, but without teeth.

In the mouth organs it may be noticed that the narrow inner plates of the maxillipeds are fringed with spines, fifteen in number, along the whole inner margin.

The first gnathopods are of the usual pattern, with the third and fifth joints densely setose, the fifth tapering distally, the shorter oblong sixth fully as wide at the rounded spinulose palm as at the base, its front margin fringed with slender spines; the finger smooth, small, curved, acute.

The second gnathopods have the fourth joint fringed with the customary double row of extremely long setæ, the boundary line between it and the fifth joint clearly marked, the sixth joint narrowly oblong with a slight curve, a slightly oblique series of long setæ fringing it near the base; the short robust finger is tridentate, the teeth not recumbent as in *Corophium acherusicum*, Costa, but upturned, the third being the largest and forming the unguis.

The peræopods show no characters distinguishing them from those of *Corophium rotulator*, Pallas, as figured by Sars, except that in the first and second pairs the fifth joint is not longer than broad.

The pleopods have two coupling spines at the inner angle of the broad peduncle. The third uropods have the small oval setose ramus subequal in length to the somewhat stouter peduncle.

The telson, which is broader than long, apically rounded, has a tubercular widening at each corner of the base.

The colour in spirit is a light mottled brownish gray, the eyes occupying the extremities of a narrow black band on the front of the head, the limbs of trunk and pleopods colourless.

Some of the specimens at full stretch, a position they do not easily assume, measured, antennæ included, about 5 mm.

The specific name alludes to the trident-like finger of the second gnathopods.

EXPLANATION OF PLATES.

Plate 1A.

Baruna socialis, n. sp.

n.s.—Natural size of carapace in specimen figured at the top of the plate, indicated by lines showing the greatest length and breadth.

prp. 1.—Chaliped or first peræopod in position.

prp. 2.—Second trunk leg or peræopod of the same specimen. The following figures are drawn from a smaller specimen, also a male.

mx. 2.—Second maxilla.

mxp. 1, 2, 3.—First, second, and third maxillipeds.

Pl.—The pleon.

Plate 1B.

*Corallana** *nodosa*, Schiödte and Meinert.

n.s.—Lines indicating the natural size of the specimen examined.

C.—Cephalon, with first segment of peræon, viewed a little sideways to show the prominences; first and second antennæ on the left side removed.

a.s., a.i.—First and second antennæ.

l.i.—Lower lip.

m.m.—The mandibles.

mx. 1, *mx.* 2.—The first and second maxillæ.

mxp.—The maxillipeds.

gn. 1, 2.—The first and second gnathopods.

Plate 2.

Tanais philetærus, n. sp.

n.s.—Line showing length of specimen figured above in lateral and in dorsal view.

a.s., a.i.—The first and second antennæ.

m.—Mandible.

l.i.—Lower lip.

mx. 1, *mx.* 2.—First and second maxillæ.

mxp.—Maxillipeds. One from the outer, one from the inner side.

gn. 1, *gn.* 2.—First and second gnathopods.

prp. 1, 3, 5.—First, third, and fifth peræopods.

plp. 2.—Second pleopod.

T. urp.—End of pleon with the uropods.

* See footnote on page 14.

Plate 3.

Cirolana willeyi, n. sp.

n.s.—Lines indicating natural size of male specimen figured above.

T. wrp.—Pleon much more highly magnified.

a.s., a.i.—First and second antennæ.

m.m.—Mandibles in position as seen from below, with upper lip, epistome, and frontal lamina.

m.xp.—Maxillipeds.

gn. 1, gn. 2.—First and second gnathopods, with part of first gnathopod more highly magnified.

prp. 5.—Fifth peræopod with some of the spines highly magnified.

plp. 2.—Second pleopods. These and the preceding details all drawn from the male.

C. ♀—Cephalon, with first antennæ of female.

m.xp. ♀—Maxillipeds of female.

Plate 4.

Sphæroma terebrans, Bate.

n.s.—Lines indicating natural size of specimen, figured in dorsal view above, and in lateral view below.

Pl.—Pleon much more highly magnified.

a.s., a.i.—First and second antenna.

m.—Mandible.

l.i.—Lower lip.

m.x. 1.—First maxilla.

m.xp.—Maxillipeds from inner surface, and one from outer surface.

gn. 1.—First gnathopod.

prp. 1, 2, 3, 4, 5.—The five peræopods.

Plate 5.

Melita zeylanica, n. sp.

n.s.—Line indicating natural size of male specimen figured above.

a.s., a.i.—First and second antennæ, flagellum of first incomplete.

m.m.—Mandibles.

l.s., l.i.—Upper and lower lip.

m.x. 1, m.x. 2.—First and second maxillæ.

m.xp.—Maxillipeds.

gn. 1, gn. 2.—First and second gnathopods, with parts of first more highly magnified.

prp. 2, 4, 5.—Second, fourth, and fifth peræopods.

urp. 1, 2, 3.—First, second, and third uropods.

T.—Telson, this and the preceding details being from a male specimen.

gn. 1 ♀, *gn.* 2 ♀—First and second gnathopods of the female.

prp. 4. ♀—Fourth peræopod of female, with the side plate more highly magnified.

Plate 6A.

Corophium triænonyx, n. sp.

n.s.—Line indicating natural size of male specimen figured above.

urp. 1, 2, 3.—Pleon much more highly magnified.

a.s., *a.i.*—First and second antennæ.

gn. 1, *gn.* 2.—First and second gnathopods. These and the preceding details are from the male.

Per. s. 1 ♀—Side plate of first peræon segment in the female.

a.i. ♀—Second antennæ of the female.

maxp. ♀—Maxillipeds of the female.

urp. 1, 2.—Part of pleon of female, showing first and second uropods.

Plate 6B.

Cyathura pusilla, n. sp.

n.s., *n.s.*, *juv.*—Lines indicating natural size, respectively, of adult female figured above and of young one at the side, fourth and fifth peræon segments of young incomplete for want of space.

n.s. ♂ gives the natural size of the male specimen from which the following details are drawn.

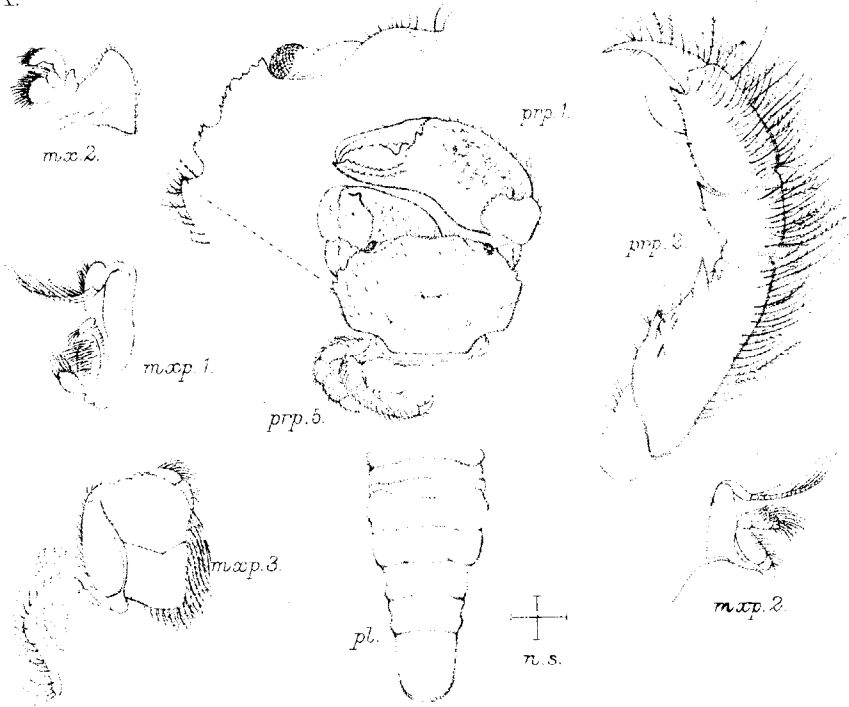
Pl. ♂—Pleon.

maxp. ♂—Maxillipeds.

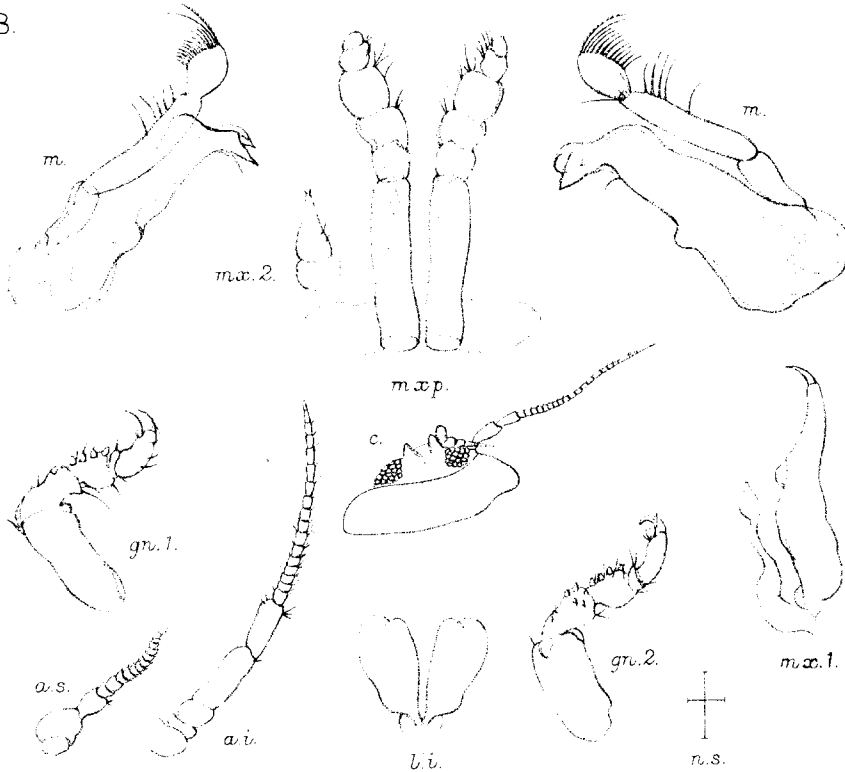
gn. 1 ♂, *gn.* 2 ♂—First and second gnathopods.

prp. 5 ♂—Fifth peræopod.

A.



B.

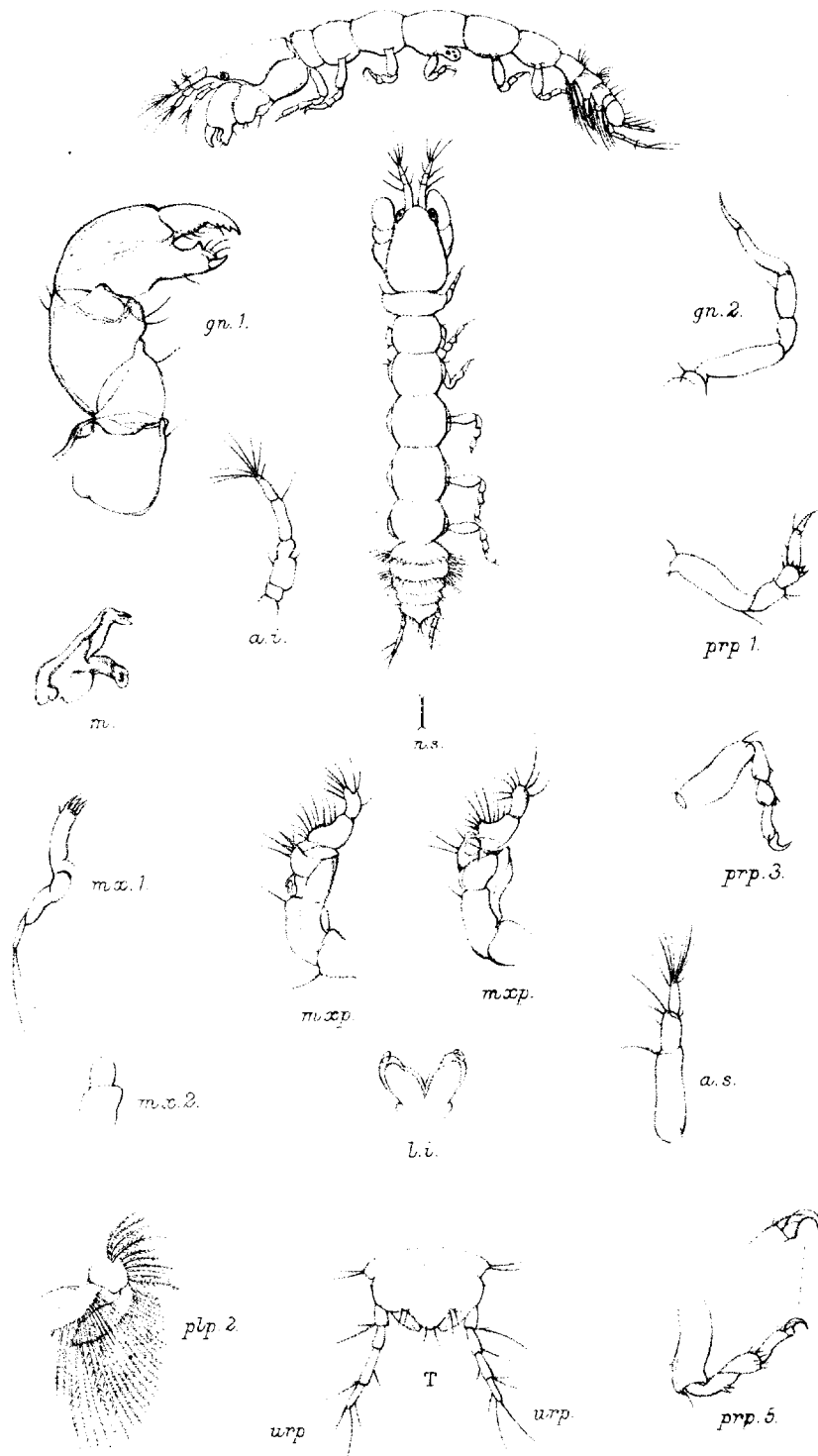


TR R. Stebbing del.

West, Newman lith.

A. *MARUNA SOCIALIS*, n. sp. B *FACHÆA NODOSA*, (Sch. & Mein.)

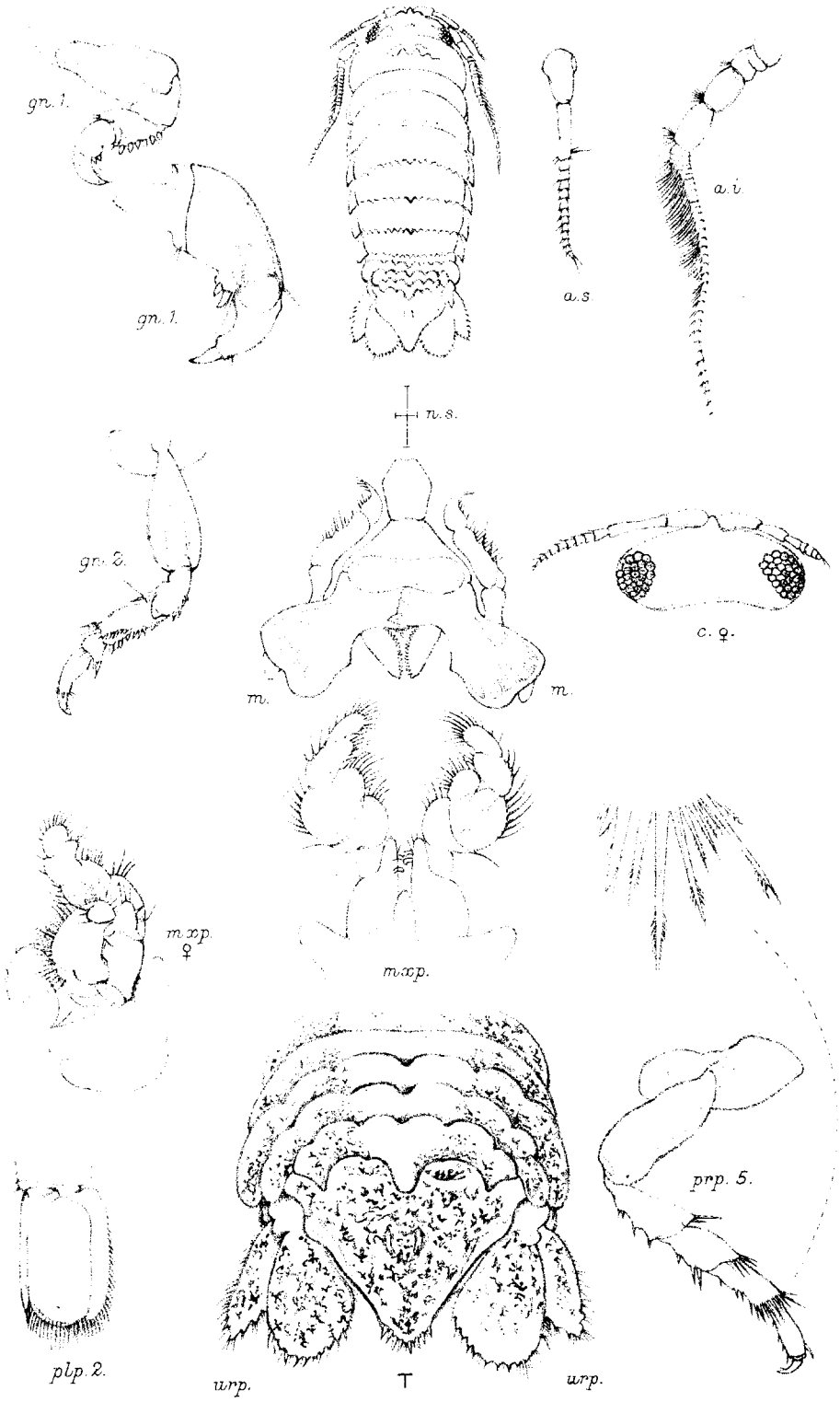
Cnidaria



T.R.R. Stebbing del.

West, Newman lith.

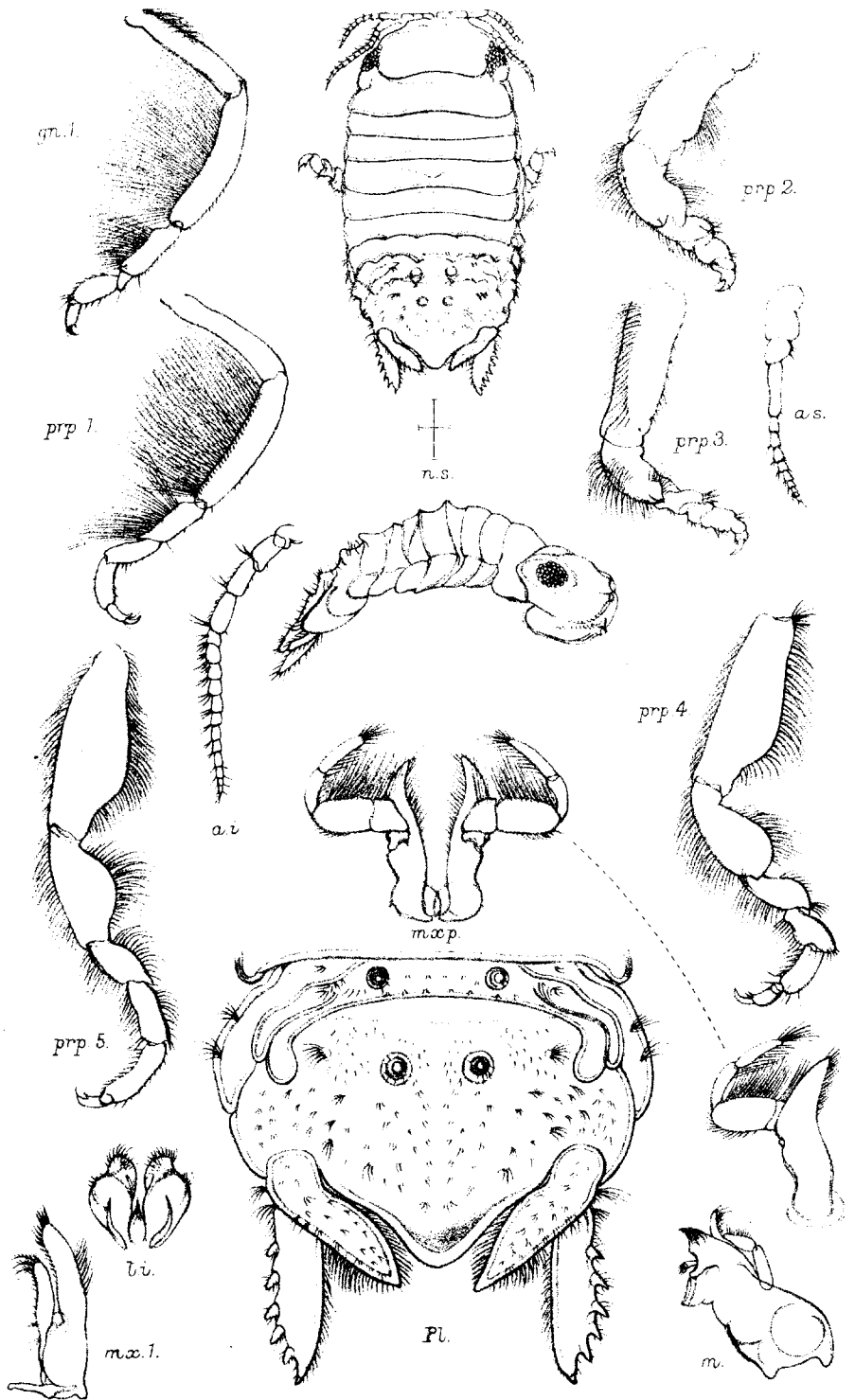
TANAIS PHILETÆRUS, n. sp.



T.R.R. Stebbing del.

West, Newman lith.

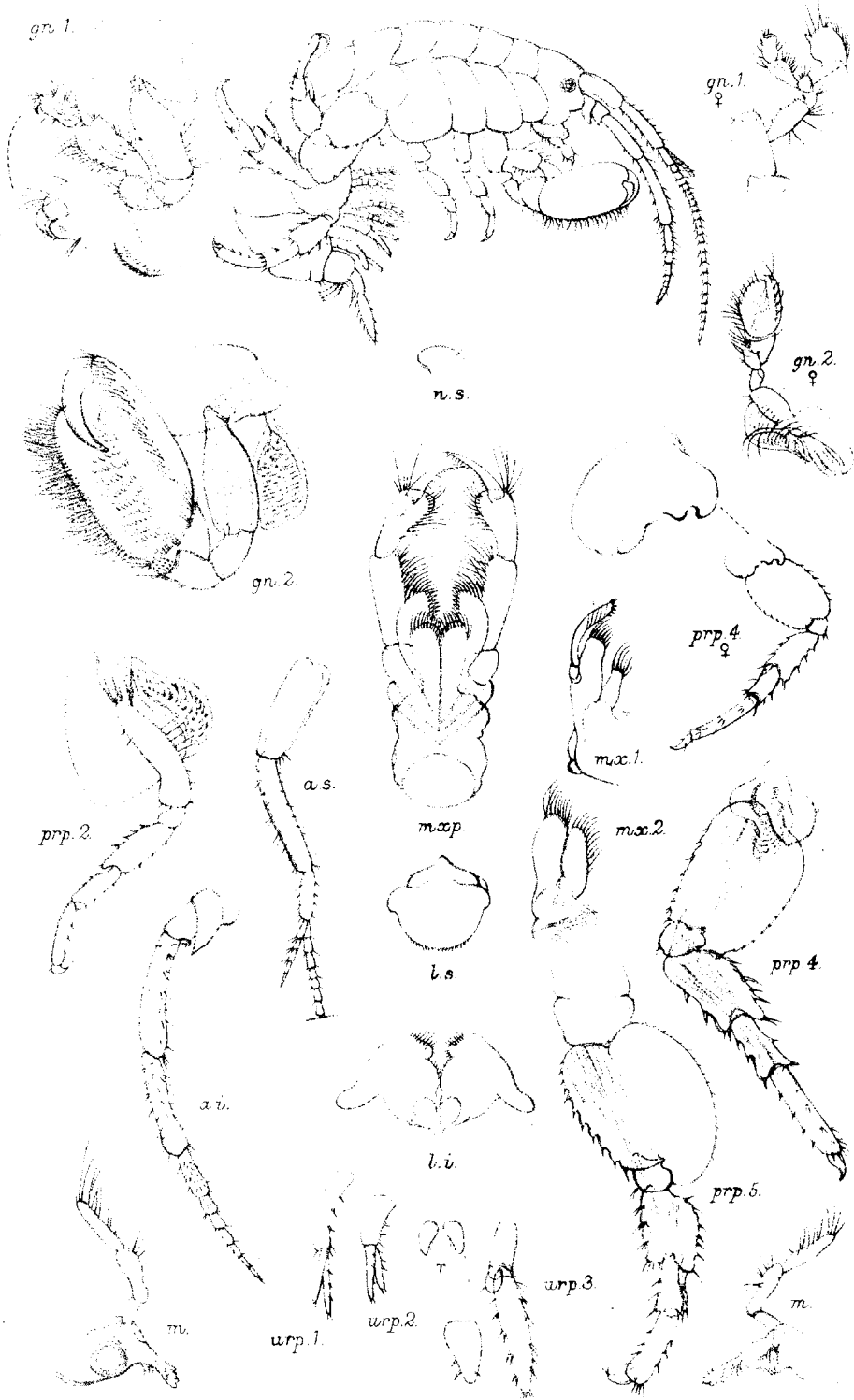
CIROLANA WILLEYI, n. sp.



T.R.R. Stebbing del.

West, Newman lith.

SPHÆROMA TEREBRANS, Bate

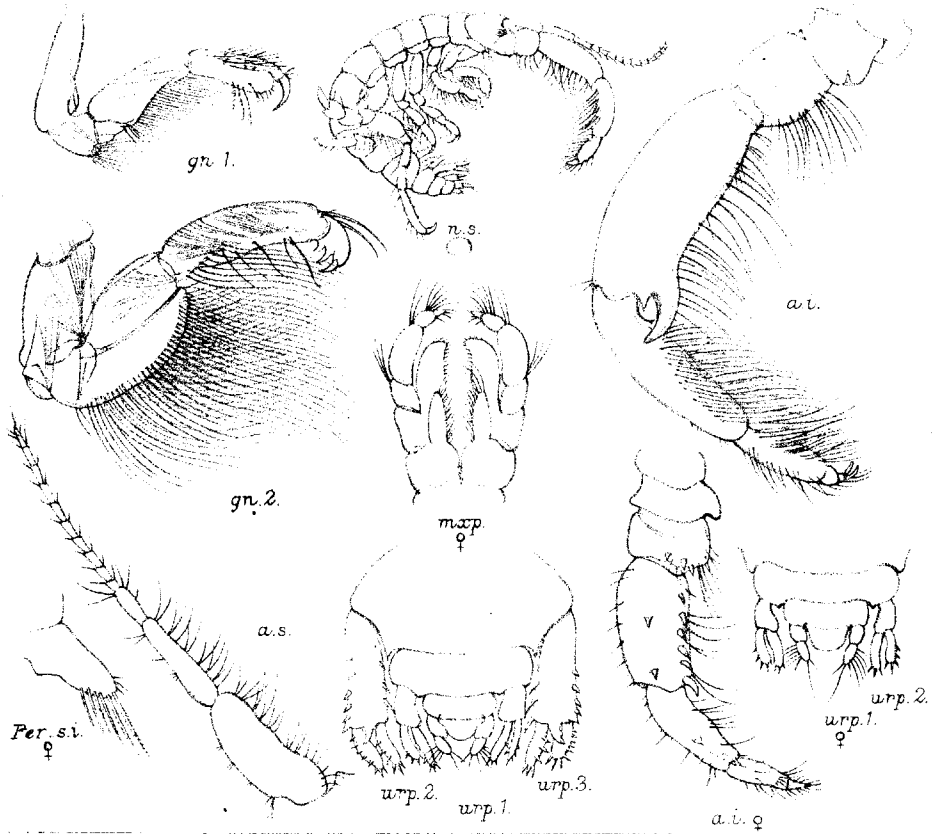


T.R.R. Stebbing del.

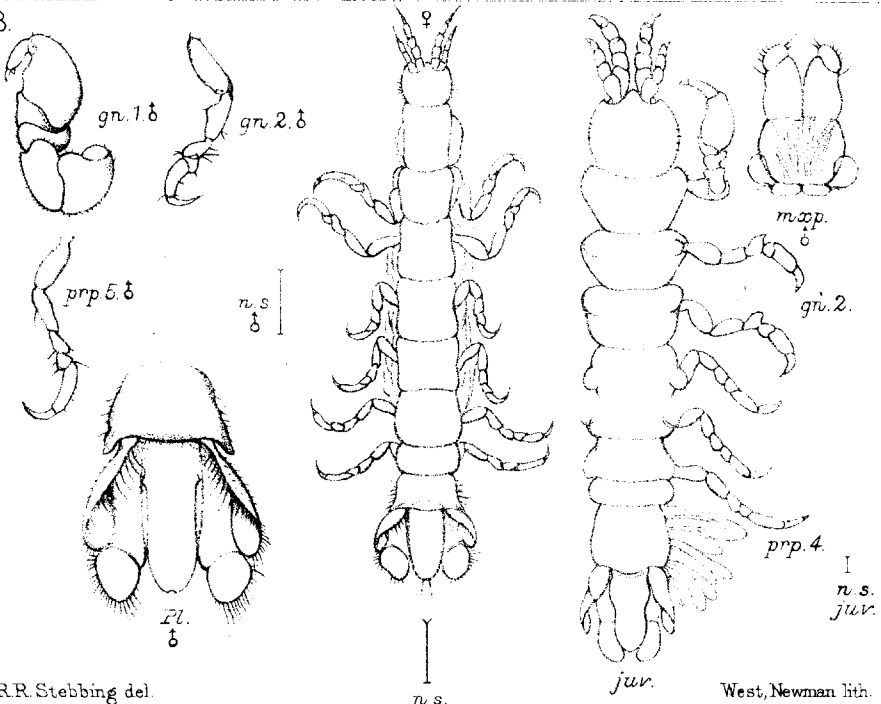
West, Newman lith

MELITA ZEYLANICA, n. sp.

A.



B.



TRR. Stebbing del.

West, Newman lith.

A. COROPHIUM TRILENONYX, n.sp. B. CYATHURA PUSILLA, n.sp.