

shell where the nuchal region of the animal plays upon the shell." In his 'Letters from New Guinea,' Quart. Journ. Micro. Sci., vol. 39, p. 145, 1896, he wrote as follows:—"Ectoparasites. In my previous note [Natural Science, vol. 6, June, 1895] I accidentally omitted to mention the occurrence of numerous Copepod parasites in the mantle-chamber of the Nautilus. They are present in nearly every individual that I have examined, and are found attached to the branchiae, the internal surface of the funnel, and in other regions of the pallial chamber. The parasites are a species of the genus *Caligus* and possess the characteristic semi-lunar suckers on the first pair of antennae. When Nautili are placed in jars the Caligids emerge in large numbers from the mantle-chamber, and swim about actively in the water, usually in close proximity to the sides of the vessels, from which they can be removed only with some difficulty, owing to the great adhering power of the above-mentioned suckers." A foot-note gave the name *C. nautili*, pending a more detailed description. It well deserves to be retained.

GEN. GLOIOPOTES, Steenstrup and Lütken.

1861. *Gloiopotes*, Steenstrup and Lütken, K. Danske Vid. Selsk. Skr., Ser. 5, vol. 5, p. 363 (23).

1868. *Gloiopotes*, Heller, Crustaceen der Novara, p. 161.

1889. *Lepeophtheirus*, G. M. Thomson, Trans. N. Zealand Inst., vol. 22, p. 354.

1889. *Gloiopotes*, Bassett-Smith, Proc. Zool. Soc. London, p. 458.

Bassett-Smith gives the definition in the following form:—"Carapace large, oval, scutiform. No lunulae on the frontal border. Fourth thoracic segment with two dorsal plates partly covering the genital segment, the latter being produced backwards by two elongated curved processes having a styliform appendage projecting from the outer border, serrated at the edge. Abdomen long. Caudal plates lanciform. First and fourth thoracic limbs single-branched, second and third double."

Of the two species known, the type *G. hygomianus* has the two dorsal plates of the fourth thoracic segment irregularly oblong and the stiliform appendages of the genital segment not reaching the apices of the processes from which they project, whereas in *G. huttoni* (Thomson) the dorsal plates are semi-lunate, and the stiliform appendages project beyond the apices of the prolongations of the genital segment.

The terminal caudal appendages might rather be called filiform than lanceolate; there is nothing leaf-like or laminar about them. The definition, as explained further on, requires some modification now that the male of the type species is known.

GLOIOPOTES HYGOMIANUS, Steenstrup and Lütken. Plate LXXIV A.

1861. *Gloiopotes Hygomianus*, Steenstrup and Lütken, K. Danske Vid. Selsk. Skr., Ser. 5, vol. 5, p. 363 (23), pl. 5, fig. 9.

1899. *Gloiopotes hygomianus*, Bassett-Smith, Proc. Zool. Soc. London, p. 458.

Only the female of this species was described by Steenstrup and Lütken. The specimen was taken in the Atlantic from some unnamed fish. Dr Willey's specimens

were labelled "Rubiana, New Georgia, from tail of Albicore." The females with egg-strings attached agree with the figures and description given by the authors above-mentioned. The male differs from the female seemingly much more than is the case with Mr Thomson's New Zealand species, and in a manner that will not suit the generic definition drawn up from the female alone. The genital segment is rounded oblong, not produced into lappets, but having lappets attached at its sides. These lappets are not articulated but marked off by a slight constriction and extend along about two-thirds of the abdomen or pleon; their outer margin is folded under and ends in two spines, the much more convex inner margin ending separately in a single spine. I am inclined to suppose that they correspond not to the lappets in the female, but to the appendages which project laterally from those lappets and which have the inner margin fringed with twelve or more spinules or denticles. The dorsal plates of the fourth segment of the trunk have their inner margins more divergent and oblique in the male than in the female. In both sexes the pleon is two-jointed as described by Thomson, not unjointed as described and figured by Steenstrup and Lütken. The filiform caudal appendages, which in the female are considerably shorter than the pleon, in the male nearly equal it in length; at a point between a quarter and a third of their length they become narrower and have a spinule at the outer margin; at the apex are three unequal spines.

Length of female, 12 mm.; of egg-strings, 12 mm.; of specimen including egg-strings, 22 mm.; of male, 10 mm.

The agreement in habitat and general details leaves no doubt that the males and females belong to the same species. A single specimen, like the males in size, but with dorsal plates as in the female, had very short lappets carrying lateral appendages as large as the normal ones in the female but with only two or three denticles as in those of the male. This may be either a monstrosity or a developing female.

FAM. DICHELESTIIDAE.

1898. *Dichelesthina*, Bassett-Smith, Ann. Nat. Hist., Ser. 7, vol. 2, p. 91.
 1899. *Dichelestiidae*, Bassett-Smith, Proc. Zool. Soc. London, p. 468.
 1900. *Dichelestiidae*, T. Scott, 18th Annual Rep. Fishery Scotland, pt. 3, p. 159.

Mr Bassett-Smith in 1898 quotes from Gerstaecker a synoptic table of sixteen genera in this family, and then modifies the table to include two new genera of his own. In 1899 he withdraws the genus *Baculus*, Mrázek having shown that *Baculus* Lubbock, and *Hessella* Brady, are only represented by young forms of the Lernaeid *Pennella* Oken. At the same time he transfers *Philichthys* Steenstrup, to a new family Philichthyidae.

BASSETTIA, n. gen.

Head globose. Body narrowed behind the head, with little or no demarcation of the pedigerous segments, the genital segment oblong oval, wider and longer than all the rest of the animal, having closely connected with it a much narrower short terminal segment, carrying two short and narrow appendages, tipped with minute spinules. First

antennae nine-jointed. Second antennae having a hooked unguis attached to a strong basal joint. Mouth-parts extremely small, apparently suctorial. First three pairs of legs unjointed, rounded, tubercular; fourth pair at the base like the rest, but also carrying two small narrow rami or prolongations.

This genus makes an approach to *Cycnus*, Milne-Edwards (Hist. Nat. Crust., vol. 3, p. 495, 1840). That name being preoccupied must give way to *Congericola*, van Beneden (Bull. Ac. Roy. Belgique, vol. 21, pt. 2, p. 583, 1854), which is distinguished from the present genus by having all four pairs of legs two-branched.

BASSETTIA CONGRI, n. sp.

Plate LXX F.

The first antennae have the first two and the last three joints distinct, the intermediate part being faintly divided into four small joints. In the second antennae there may be a short basal joint in addition to the long one which carries the unguis. The small oral cavity seems to contain some minute pointed organs. The tubercles representing the second pair of legs are close to the first pair, but are larger and more prominent. The egg-strings attached to the distal corners of the long genital segment are somewhat longer than the animal.

Length, 3 mm.

Habitat. Blanche Bay, New Britain, parasitic on gills of Conger.

The generic name is chosen in compliment to Mr P. W. Bassett-Smith, R. N., whose contributions to our knowledge of parasitic Copepoda are of high value.

GEN. PSEUDOCYCNUS, Heller.

1868. *Pseudocycnus*, Heller, Reise der Novara, Crustacea, p. 218.

1899. *Pseudocycnus*, Bassett-Smith, Proc. Zool. Soc. London, p. 475.

To this genus only one species has as yet been assigned.

PSEUDOCYCNUS APPENDICULATUS, Heller.

1868. *Pseudocycnus appendiculatus*, Heller, Reise der Novara, Crustacea, p. 218, pl. 22, fig. 7.

1898. *Pseudocycnus appendiculatus*, Bassett-Smith, Ann. Nat. Hist., Ser. 7, vol. 2, p. 368.

1899. *Pseudocycnus appendiculatus*, Bassett-Smith, Proc. Zool. Soc. London, p. 475.

So far as could be seen without dissection, the single specimen in the present collection conforms with the accounts given by Heller and Bassett-Smith. The latter writer, however, in 1899, includes in the generic account the character, "caudal appendages very small, simple," whereas Heller says "cauda brevis, appendicibus valde elongatis." The pair of long tapering appendages underneath the egg-sacs are indeed a prominent feature of the species. Heller figures nineteen pairs of indents along the back of the genital segment, the series stopping at some distance from its apex. In the

present specimen the flattened back of the segment in question has twenty-three pairs of indents, not quite evenly or symmetrically spaced, but covering the whole length.

The specimen is 13.5 mm. in length, the genital segment being about thrice as long as the anterior part, and about twice as long as the terminal appendages. The segment preceding the genital overlaps it with its lateral lobes and is dorsally coalesced with it, so that it is difficult to give exact proportionate measurements. The egg-sacs reach a length of 25 mm. or more.

Heller's specimens, 12 mm. long, were from the gills of an Atlantic *Coryphaena*; Bassett-Smith's, 10 mm. long, were found attached to the gills of *Thynnus macropterus* at Aden; the labels with the present specimen explained it to be a Lernaeid from the gills of Bonito, Uvea, Loyalty Islands.

THYROSTRACA.

(CIRRIPEDIA.)

FAM. LEPADIDAE.

GEN. POECILASMA, Darwin.

1851. *Paecilasma*, Darwin, Lepadidae, Ray Soc., p. 99.
 1883. *Poecilasma*, Hoek, Challenger Reports, vol. 8, Cirripedia, p. 44.
 1893. *Poecilasma*, Aurivillius, K. Svenska Vet.-Akad. Handl., vol. 26, No. 7, p. 9.

Darwin, who rejected *Trilasmis*, Hinds, 1844, as an impossible name for a genus in which the valves might be five or seven as well as only three, spells the new name *Paecilasma*, but, as he derives it from *ποικίλος* (printed *ποκιλος*), the change of diphthong subsequently adopted is obviously proper.

POECILASMA VAGANS, Aurivillius.

1892. *Poecilasma vagans*, Öfversigt af K. Svenska Vet.-Akad. Förh., No. 3, p. 123.
 1893. *Poecilasma vagans*, Aurivillius, K. Svenska Vet.-Akad. Handl., vol. 26, No. 7, p. 9, pl. 1, figs. 9—12; pl. 8, figs. 10, 16, 22.

Of Darwin's species only one, *Poecilasma fissum*, has seven valves. All the four added to the genus by Aurivillius in 1892 and 1893 were so provided. The species to which Dr Willey's specimens are referable is distinguished from the others by the circumstance that the occludent margin of the terga does not reach the orifice of the capitulum, so that the apex of the latter is uncalcified. Also the basal edge of the scuta is more emarginate than in other species.

Length, of the largest specimen, 12.5 mm., by a breadth of 6.25 mm., with the wrinkled peduncle constituting 2.5 mm. of the total length, but absolutely a little longer by reason of interlapping. Aurivillius speaks of the peduncle as $\frac{2}{3}$ of length of capitulum, but gives total length 12 mm., capitulum 7 mm., peduncle 4 mm., and further says that 'the peduncle is short and thick,' and figures it in the proportion of 2:5. As a matter of fact the proportions vary considerably in the spirit specimens, but whether Aurivillius intended to convey that idea I cannot say.

Habitat. Sandal Bay, Lifu, Loyalty Islands, and New Britain. Aurivillius' specimen was found attached to the umbilicus of *Nautilus umbilicatus*.

GEN. MEGALASMA, Hoek.

1883. *Megalasma*, Hoek, Challenger Reports, vol. 8, Cirripedia, p. 50.

Hoek defines the genus as follows:—Valves five, approximate; carina extending only to the basal points of the terga, with its lower end truncated and very wide. Scuta triangular, with their umbones at a considerable distance from the rostral angle. Mandibles with four teeth; maxillae slightly notched, with the lower part of the edge slightly prominent; anterior ramus of the first cirrus much thicker than the posterior ramus; the two rami of the second cirrus nearly equal; caudal appendages uniarticulate, short and spinose at the extremity.

MEGALASMA STRIATUM, Hoek.

1883. *Megalasma striatum*, Hoek, Challenger Reports, vol. 8, Cirripedia, p. 51, pl. 2, figs. 5—9; pl. 7, figs. 8, 9.

A notable character of this species is that 'the short peduncle is quite covered by the capitulum,' producing the impression at the first glance of our having to do with a pedunculate cirripede devoid of a peduncle. The species is fully described and figured by Dr Hoek. According to his description of the mouth-organs, these show a near resemblance to those of *Oxynaspis aurivillii* described in this report.

Length, 9.5 mm. One of Dr Hoek's specimens was 11 mm. long.

Habitat. Blanche Bay, New Britain, on Echinus-spines measuring two to three inches in length, and carrying also some small Balanids, Foraminifera, etc.

GEN. OXYNASPIS, Darwin.

1851. *Oxynaspis*, Darwin, Lepadidae, Ray Soc., p. 133.

1893. *Oxynaspis*, Aurivillius, K. Svenska Vet.-Akad. Handl., vol. 26, No. 7, p. 38.

Darwin's account of this genus is:—'Valves 5, approximate; scuta with their umbones in the middle of the occludent margin; carina rectangularly bent, extending up between the terga, with the basal end simply concave. Mandibles with four teeth; maxillae notched, with the lower part of edge nearly straight, prominent; anterior ramus of the second cirrus thicker than the posterior ramus; caudal appendages, uniarticulate, spinose.'

The single species assigned to the genus by Darwin was *Oxynaspis celata*, found attached to an *Antipathes*, from Madeira. In 1892 Aurivillius introduced a new species, *Oxynaspis patens*, also attached to an *Antipathes*, taken at a considerable depth off the Island of Anguilla, in the sea of the Antilles. Besides a much larger size and differences in the shape of the valves, this species is distinguished from Darwin's by entire absence of caudal appendages, so that in regard to these the generic account must be modified. Also to some extent the first maxillae differ in the two species. Darwin says of the capitulum of his species, that "it seems always entirely covered

by the horny muricated bark of the *Antipathes*, and hence externally is coloured rich brown and covered with little horny spines. The membrane over the valves is very thin, and is with difficulty separated from the *Antipathes*." But in *Oxynaspis patens* the little horny spines belong to the cirripede itself, and are a kind of mimicry of the similar spines of the *Antipathes*. Aurivillius is strongly inclined to believe that in reality the same is the case with *Oxynaspis celata*. It is clearly true of the new species about to be described.

OXYNASPIS AURIVILLII, n. sp.

Plate LXXIV c.

The capitulum and peduncle are beset, though not very closely, with little spines, somewhat similar to those of the host. The peduncle is considerably less than half the length of the capitulum.

The scuta are between three and four times as long as broad, widest at the middle, the ends rounded, the upper end adjacent to the middle of the tergum, the lower not far from the base of the carina. The terga are semi-oval, about three times as long as broad, the convex margin adjacent to the orifice at its upper end. The carina reaches half way between the terga, is strongly bent at the opposite extremity, and has its apex deeply emarginate. The five valves together leave a large part of the capitulum unoccupied.

The labrum has a convex margin, smooth in the middle, a little furred at the sides; the palps are rather narrow, conical, armed with several setae or slender spines. The mandibles are setulose on surface and margins, the distal border consisting of a moderately large separate tooth and a cutting plate divided into four smaller teeth, of which the lowest two are nearer together than the rest, and in one mandible the lowest has a subsidiary denticle outside. The first maxillae are setose on the outer margin, carry four unequal spines on the blunt outer lobe, and have the broadly conical inner lobe fringed with spines of varying slenderness. The second maxillae have their rotundo-quadrate distal margin fringed with slender spines or spinules. The cirri are nearly as in Darwin's typical species, with the important exception that the second pair, like all but the first, have the rami apparently of equal thickness. Caudal appendages seem to consist of two little, adjacent rounded plates, and therefore not to be wanting as in *O. patens*. The penis is long, and has a tuft of setae on the narrow apex.

Colour, in spirit, pale, with brown streaks adjacent to lower part of scuta and terga and along the peduncle.

Length, 3 mm. and sometimes a little over, the capitulum between two and a half and three times the length of the peduncle.

Habitat. New Britain, taken at 40 fathoms depth. The specimens are firmly attached, at various angles, to the light brown scabrous branches of an Antipatharian.

The specific name is given out of respect to C. W. S. Aurivillius. By the scuta and terga the new species is easily distinguished from the two earlier members of the genus.

GEN. CONCHODERMA, Olfers.

1814. *Conchoderma*, Olfers, Mag. Gesellsch. Nat. Freunde zu Berlin, Drittes Quartel.
 1851. *Conchoderma*, Darwin, Lepadidae, Ray Soc., p. 136.
 1883. *Conchoderma*, Hoek, Challenger Reports, vol. 8, Cirripedia, p. 53.

The date and synonymy of this genus are discussed in Darwin's work.

CONCHODERMA HUNTERI, Darwin.

1851. *Conchoderma Hunteri*, Darwin, Lepadidae, Ray Soc., p. 153, pl. 3, fig. 3.

The specimens in the present collection agree so fully with Darwin's description and figure that it is unnecessary to do more than mention the salient features of the species. All three lobes of the scuta are narrow. The carina in two of the specimens runs up between the terga, which are abruptly bent at the top as in Darwin's figure, rather than in his description, for the angle formed is much, instead of little, greater than a right angle.

Darwin gives length of the capitulum in his largest specimen as four-tenths of an inch. The largest of Dr Willey's specimens is 21 mm. long, of which length 7.5 mm. belongs to the peduncle, the capitulum being rather over five-tenths of an inch long.

Habitat. Blanche Bay, New Britain. Attached to cables. The specimens described by Darwin were attached to the skin of a snake, for which the specimens here noticed perhaps regarded submarine cables as a satisfactory equivalent. They do not seem to have suffered from settlement on a stationary host.

Hoek says (*loc. cit.*), "This may be a different species [from *C. virgatum*, Spengler]; but I think on account of its strong resemblance to the variety *Conchoderma virgatum*, var. *chelonophilus*, Leach, and the complete conformity of all its interior characters to those of *Conchoderma virgatum*, it would be a great deal more rational to regard it also as a variety of *Conchoderma virgatum*." I have not materials for comparison, to justify my offering an opinion on this point.

GEN. SCALPELLUM, Leach.

1817. *Scalpellum*, Leach, Journ. de Physique, vol. 85, July, 1817.
 1851. *Scalpellum*, Darwin, Lepadidae, Ray Soc., p. 215.
 1883. *Scalpellum*, Hoek, Challenger Reports, vol. 8, Cirripedia, p. 59.

SCALPELLUM sp.

A single specimen agrees in general outline with *Scalpellum rubrum*, Hoek, is coloured red and white like that species, and has like it a capitulum 5 mm. long. Also it occurs on a spine evidently of the same Echinoderm dredged in Blanche Bay as that on the spines of which *Megalasma striatum*, Hoek, was found, and it may be remarked that Hoek's two species were taken by the Challenger at one and the same station, namely, near Luzon, in 100—115 fathoms. On the other hand the Blanche Bay *Scalpellum* has a peduncle half, instead of 'about one-third,' as long as

the capitulum, and the scales of the capitulum are not very prominent. Also it is a hairy species like *Scalpellum hirsutum*, Hoek, with which it agrees in having the upper latus triangular, instead of quadrangular as it is in *Scalpellum rubrum*. But the apex is not considerably produced as in *Scalpellum hirsutum*. Each of Dr Hoek's species was represented by a single specimen, and as there is only a single specimen at my disposal, I abstain from establishing a third of these small species, without further opportunity for comparison and examination.

KOLEOLEPAS, n. g.

Capitulum without valves. Adhesive disk forming with the basis of attachment a sheath for the elastic peduncle. Labrum large, with denticulate deep emargination. Palpi strong. Mandibles with cutting edge quadripartite. First pair of cirri longer than the rest, the rami in all six pairs shorter than the peduncle.

The same is from *κολεός*, a sheath, and *Lepas*, a kindred genus.

By the absence of valves this genus is associated with *Anelasma*, Darwin, *Alcippe*, Hancock, and *Gymnolepas*, Aurivillius, 1894, the last of which, having a preoccupied title, has been re-named *Eremolepas* by Weltner in 1897. Species of *Alepas*, Sander Rang, may also be entirely destitute of valves. From all of these genera the present genus is decisively separated by the combination of characters above given. The typical species was found in symbiosis with a Pagurid, and the fact that the mollusc-shell inhabited by the two in common had in some way been broken into or out of in the immediate neighbourhood of the cirripede's position may imply that this genus belongs to the boring groups. To these Aurivillius has lately added the family Lithoglyptidae, with one genus and three species, which he places in the order Abdominalia, originally founded by Darwin for the single genus and single species *Cryptophtialus minutus*, but subsequently augmented by inclusion of *Kochlorine hamata*, Noll, 1872. H. J. Hansen in 1899 (*Die Cladoceren und Cirripeden der Plankton-Expedition*, p. 52) considers that the group Abdominalia is untenable, as having been based by Darwin on an entire misconception of the homologies of the cirri in the type species.

KOLEOLEPAS WILLEYI, n. sp.

Plates LXXIII and LXXIV D.

Dr Willey's notes on the single specimen obtained supply several important details. He describes it as a 'Sheathed and crested Cirripede living in a Turbo shell in which was a Pagurid and on surface of which were many Actinians (seven large ones). There was a hole in the shell exposing the end of the abdomen of the Pagurid, and inside this hole was the cirripede attached, as shown above, to inside of shell.' The illustration referred to (Pl. LXXIV D) gives an outline of the animal with the sheath reposing in the shallow cavity of a piece of shell, just as it came into my hands, but the capitulum and the part of the peduncle outside of the sheath together reach a length twice that of the sheath, without the twisting which has befallen the specimen in spirit. Of the living form Dr Willey observes that 'It can retract itself rapidly

and extend itself slowly again.' The notes on colour will be given in the course of the general description.

The adherent disk is oval, with the narrower end towards the capitulum. On the upper surface its skin appears to be smooth, but roughened on the lower adhesive side. Between the two surfaces there is a pulpy mass containing numerous short muscles. Over the peduncle, however, the sheath forms only a thin transparent skin, and on the side next the shell this seems to be wanting or else of extreme tenacity. The colour of the disk in life is described as light reddish brown, a thin red line (nigrescent in spirit) running round the translucent part which covers the base of the peduncle, which itself is faintly roseate in life (greyish in spirit). On the under surface, though the boundary between disk and peduncle is strongly marked, laterally by separation and apically where they meet by colouring, yet the longitudinal muscles of the peduncle run without flexure or any sort of interruption through the coloured band into the disk.

The capitulum is distinguished from the peduncle by a slightly greater thickness and by its rigidity, these characters being obviously due to its containing the chief mass of the animal's body. The hue in life may be gathered from its description as a white mass with a deep chocolate-brown band at its base. It is not quite cylindrical, being laterally somewhat compressed and becoming distally carinate with a pellucid, crest-like border, which overarches the fissure-like orifice. The sides of the fissure close tightly together, not meeting edge to edge but with lateral compression. They rest at the base upon a projecting bulb, and appear to be comparable with the corresponding part of *Alcippe lampas*, in which, however, there are two sharp projections at the base, instead of a single bulb. Of this latter the function may be to give some support to the long first cirri when protruded.

The upper lip or labrum has the free margin rather deeply concave, and fringed with forty-six denticles. From the rounded angles two rows of fine hairs converge backward on the surface. It has points of resemblance to the corresponding appendage in *Eremolepas pellucida* (Aurivillius) and to that in *Alcippe lampas*, but the bullate or swollen part extending beyond the transverse crest escaped my observation, perhaps through a mishap in the dissection, rather than from the absence of a feature said by Darwin to be common to all the Lepadidae. It is not shown in the figure of the labrum of *E. pellucida* by Aurivillius.

The palps are firmly connected with the labrum, the free lobe of each projecting in advance of or beside the rounded angle of the labrum, and having the forward margin fringed with seta-like spines, as also the inner margin for half the depth, behind which the lobe is emarginate. These 'palps,' though attached to the labrum, are regarded as really palps of the mandibles. One may suppose that from the extreme compression of the mouth-organs in the cirripedes there has resulted an anastomosis between labrum and mandibles which has ended in the mandibular palp having a firmer attachment to the labrum than to its own stock. (See Darwin, Balanidae, pp. 75, 78.)

The mandibles are rather peculiar. The upper tooth and the longer lower tooth of the cutting edge are as usual acute, but the two intermediate processes are convex

projections, the upper, which is the shorter, but the more prominent, being cut into five denticles, the lower into ten. Between the upper tooth and the upper process there is a close-set row of short, unequal, delicate spines, and there is similar but less conspicuous armature at other points of the cutting edge. In one mandible the lower tooth has a subsidiary denticle to the rear.

The first maxillae have a broad front edge, narrowing backward to a kind of neck. The front edge has three strong spines at the upper corner, which is separated by a notch from the rest of the margin, the spines of which are slighter, but numerous and broken up into slightly separated groups. The cavity formed by the neck is occupied by a thin, smooth plate. As to this the suggestion may be hazarded that it represents the missing lower lip of the cirripedes.

Second maxillae. These appendages are represented by a pair of oblong plates completely coalescent at the base, their outer ends rounded and fringed with spinules, both surfaces scabrous, but the inner protruding and spinose.

Cirri. The first pair is the longest, and set at some distance from the rest. It is sinuous in shape, the first joint of the peduncle narrow, much longer than the second. The rami are a little shorter than the peduncle, of five or six joints respectively, of which the basal and the penultimate are the longest, the articulations not very distinct and much obscured in the crowd of slender setae. The other five pairs are nearly alike, except that the sixth appears to be rather the longest and to have a narrower peduncle, this having in the others a very broad basal joint. The rami have seven or occasionally eight joints, and are shorter than the peduncle. The upper ramus is the narrower, armed only with a scanty supply of seta-like spines. The lower ramus has here and there a slender spine, but is chiefly remarkable for the short spines on the upper or hind margin of the last four joints, one on the short rounded terminal joint and on the others from three to five, which are short and stout. Dr Willey mentions that the cirri had a white spot on each.

The pleon is minute.

An immense number of small fusiform eggs were present in the specimen.

It was taken in a fish-basket, at Sandal Bay, Lifu, Loyalty Islands.

The disk measured 15 mm. in length by 11 mm. in breadth. The portion of the animal outside of the disk was about 15 mm. long, of which the capitulum occupied 8 mm., with a breadth at the crest of 5 mm. But from Dr Willey's drawing it may be assumed that the animal can extend itself beyond the sheath to about twice the length of the disk.

It is only fair that Dr Willey's own name should be associated with this highly interesting discovery.

DESCRIPTION OF PLATES LXIV—LXXIV.

PLATE LXIV A.

Nannastacus ossiani, n. sp. ♂.

- n.s.* Natural size of specimen, with enlarged lateral view above, and dorsal view below.
a.s., a.i. First and second antennae.
m. Mandible, distal portion.
m.xp. 1. First maxilliped, without respiratory apparatus (epipod and exopod).
m.xp. 2. Second maxilliped.
Prp. 1, 2, 3, 5. First, second, third, and fifth peraeopods.

PLATE LXIV B.

Nannastacus georgi, n. sp. ♂.

- n.s.* Natural size of specimen, with enlarged lateral, and less enlarged dorsal view below. To the latter is appended a figure showing shape of the antero-lateral corner and the pseudo-rostral projection with protruding respiratory plate of first maxilliped.
Pl. Dorsal view of pleon.
a.s., a.i. First and second antennae.
m. Mandible.
m.xp. 2, 3. Second and third maxillipeds.
prp. 1, 2, 4, 5. First, second, fourth, and fifth peraeopods, fifth in attachment to the terminal segment of the peraeon.

PLATE LXIV c.

Leptocheilia lifuensis, n. sp. ♀.

- n.s.* Natural size of female, with dorsal view above.
oc. Eye.
a.s., a.i. First and second antennae.
m.m. Mandibles; the right mandible above, the left below, with molar seen end on.
li. Lower lip.
mx. 1. First maxilla, with apex still more magnified.

max. Maxillipeds.
gnp. 1, 2. First and second gnathopods.
prp. 2, 5. Second and fifth peraeopods.
T., urp. Telson and uropods.

PLATE LXIV D.

Leptocheilia lifuensis, n. sp. ♂.

n.s. Natural size of a male specimen.
a.s., a.i. First and second antennae of the specimen.
gnp. 1. First gnathopod.
prp. 5. Fifth peraeopod.

PLATE LXV A.

Apanthura sandalensis, n. sp.

n.s. Line showing natural size, with lateral view of specimen below.
c. Dorsal view of cephalon.
Pl. Dorsal view of pleon.
a.s., a.i. First and second antennae.
l.s. Epistome and upper lip.
m. Mandible.
l.i., mx. 2. Lower lip and second maxillae in combination. The much more highly magnified figure at the lower right-hand corner is from a second specimen.
mx. 1. First maxilla.
maxp. Maxillipeds.
gnp. 1, *gnp.* 2. First and second gnathopods.
prp. 5. Fifth peraeopod.
urp. Uropods in connection with pleon. Upper and lower divisions of the same shown separately (somewhat broken).

PLATE LXV B.

Leptocheilia lifuensis, n. sp. ♂.

n.s. Line representing length, natural size, with dorsal view of animal just below.
a.s. First antenna.
a.i. Second antenna.
l.s. Upper lip.
or. p. Oral parts below the upper lip.
gnp. 1, 2. First and second gnathopods.
prp. 1, 2, 4, 5. First, second, fourth and fifth peraeopods.
plp. One of the pleopods.
urp. Uropod.
T. Telson.

PLATE LXVI A.

Gnathia aureola, n. sp.

n.s., *n.s. juv.* Lines indicating actual length of full-grown and younger larvae, of which enlarged dorsal views are given above the respective lines.

L. Lateral view of full-grown larva.

Per. segm. 7. Seventh peraeon segment, embedded in the sixth.

a.s., *a.i.* First and second antennae.

ep. Supposed epistome and upper lip.

m. Mandible.

mx. 1, *mx. 2.* First and second maxillae.

mxp. Maxilliped.

gnp. 1, *2.* First and second gnathopods.

prp. 4. Fourth peraeopod.

plp. Pair of pleopods (the fifth).

urp. Uropod.

T. Telson.

PLATE LXVI B.

Paranthura lifuensis, n. sp.

n.s. Line showing natural size, with lateral view of specimen below.

c. Dorsal view of cephalon, tips of first maxillae showing between the second antennae.

Pl. Dorsal view of pleon.

a.s., *a.i.* First and second antennae.

l.s. Upper lip.

m. Mandible.

l.i., *mx. 2.* Lower lip and second maxillae, the latter pulled aside from their natural position facing the lip.

mx. 1. First maxilla.

mxp. Maxillipeds.

gnp. 1, *gnp. 2.* First and second gnathopods.

prp. 5. Fifth peraeopod.

plp. 1. First pleopods.

urp. T. Telson and uropods in position on the pleon.

PLATE LXVII A.

Cirolana pleonastica, n. sp. ♂.

n.s. Lines showing natural size, underneath the enlarged dorsal view of a specimen.

a.s., *a.i.* First and second antennae.

l.s. Upper lip or labrum.

m.m. Mandibles, inner surface, the left mandible on the left hand, portion of right mandible on the right.

mx. 1, *mx. 2.* First and second maxillae.

mæp. Maxilliped, inner surface.

gnp. 1, 2. First and second gnathopods.

Prp. 5. Fifth peraeopod.

Plp. 2, 5. Second and fifth pleopods.

urp. Uropod.

T. Dorsal view of telson, with one uropod attached, and fourth and fifth segments of the pleon.

The pleopods, uropod, and pleon, from the specimen figured in full, the other detail figures from a different specimen. The mouth-organs more highly magnified than the other details, each set to a uniform scale.

PLATE LXVII B.

Cirolana albicaudata, n. sp.

n.s. Lines showing natural size, underneath enlarged dorsal view of a specimen.

oc. Eye in profile view.

a.s., a.i. First and second antennae.

m.m. Mandibles, inner surface, right mandible complete, only cutting edge of left.

mæ. 1, mæ. 2. First and second maxillae.

mæp. Maxilliped, inner surface.

gnp. 1, 2. First and second gnathopods.

prp. 3, 5. Third and fifth peraeopods.

plp. 2, 5. Second and fifth pleopods.

T., urp. Telson (or caudal segment) and uropod.

Mouth-organs magnified to the same scale; other details less highly magnified, but to a uniform scale, except the lateral view of the eye.

PLATE LXVIII A.

Hansenolana anisopous, n. sp.

n.s. Lines showing natural size of the animal figured in dorsal view at the top of the plate.

C.D. Dorsal view of the head.

C.V. Ventral view of head (with left gnathopod attached) showing second antennae, frontal lamina, epistome, upper lip, right mandible and part of left, spines of first maxillae, and right maxilliped.

a.s., a.i. First and second antennae.

m.m. Mandibles—the right mandible on the left hand, the left on the right.

mæ. 1, mæ. 2. First and second maxillae.

mæp. Maxilliped.

gnp. 1, 2. First and second gnathopods.

prp. 5. Fifth peraeopod.

urp. Uropod.

The mouth-organs are drawn to a uniform scale, and the more highly magnified details also to a uniform scale; the other appendages are less magnified than the mouth-organs, but these likewise uniformly.

PLATE LXVIII B.

Renocila periophthalmi, n. sp.

n.s. Natural size of specimen, of which much enlarged dorsal view is given at the top of the plate.

C.D. Head and first peraeon segment, in dorsal view, after separation from the rest of the trunk.

C.V. The same in ventral view, one of the first gnathopods removed from the peraeon segment to show the mouth-organs.

a.s., a.i. First and second antennae.

l.s. Upper lip.

m.m. Mandibles.

mx. 1, 2. First and second maxillae.

map. Maxillipeds.

gnp. 1, 2. First and second gnathopods.

prp. 5. Fifth peraeopod.

plp. 2. Second pleopod.

The mouth-organs are magnified to a higher scale than the other details.

PLATE LXIX A.

Cubaris cinctutus (Kinahan).

n.s. Lines indicating natural size of specimen of which a magnified dorsal view is given above.

C.V. Ventral view of anterior part of head, with first antennae and upper lip in position.

Per. s. 1. Ventral view of first peraeon segment, with first gnathopod in position.

T.D. Dorsal view of pleon from the fourth segment to the telson and uropods.

T.V. Ventral view of uropods and telson.

a.s., a.i. First and second antennae to the same scale, and higher-magnification of first.

l.s., l.i. Upper lip, and lower.

m. Mandible, with distal part more magnified.

mx. 1, *mx.* 2. First and second maxillae partially shown, with distal extremity more magnified.

map. Maxilliped, with distal part more magnified.

gnp. 1, *prp.* 5. First gnathopod and fifth peraeopod, distal part of former more magnified.

C.D. Dorsal view of head with part of first peraeon segment, from a second specimen.

In this and in the fig. *T.D.* the colour pattern is shown.

The two scales of magnification used for the mouth-organs are respectively higher than those used for the other details.

PLATE LXIX B.

Philoscia lifuensis, n. sp.

n.s. Lines showing natural size of specimen figured above.

m. Mandible.

mx. 1. First maxilla, without inner plate.

map. Maxillipeds.

gnp. 1. First gnathopod.

prp. 4. Terminal portion of fourth peraeopod or sixth trunk-leg.

T., urp. Caudal segment with one of the uropods.

PLATE LXIX c.

Paraphiloscia stenosoma, n. g. et sp.

- n.s.* Lines showing natural size of specimen figured above.
oc. One of the eyes.
a.s., a.i. First and second antennae.
m. Mandible.
mx. 1, mx. 2. First and second maxillae.
maxp. Maxillipeds.
gnp. 1, gnp. 2. First and second gnathopods.
prp. 5. Fifth peraeopod, or seventh trunk-leg.
plp. 2. Male organ of second pleopod.
T., urp. Caudal segment with one of the uropods, inner ramus of uropod also shown breadthwise.

PLATE LXX.

A. *Cubaris lifuensis*, n. sp.

- n.s.* Length of specimen from which the figures were taken.
C.F. Frontal view of head, showing small first antenna on the right, and second antenna (*a.i.*) on the left, with upper lip (*l.s.*) *in situ* below.
Per. s. 1. V. Ventral view of part of first segment of peraeon.
T., urp. Dorsal and ventral views of caudal (telson) segment and uropods.

B. *Cubaris dollfusi*, n. sp.

- n.s.* Lines showing natural size of specimen partly figured.
C.F. Frontal view of head, with upper-lip (*l.s.*), and portion of second antenna.
Per. s. 1. V. Ventral view of part of first segment of peraeon.
T., urp. Dorsal and ventral views of caudal segment and uropods.

C. *Cubaris lundii*, n. sp.

- n.s.* Lines showing natural size of specimen partly figured in lateral view.
C.D. Dorsal view of head.
Per. s. 1. V. Ventral view of part of first segment of peraeon.
a.s., a.i. First and second antennae.
T., urp. Dorsal and ventral views of caudal segment and uropods.

D. *Cubaris zebicolor*, n. sp.

- n.s.* Lines showing natural size of specimen from which the figures were taken.
C.F. Frontal view of head, with second antenna (*a.i.*) and upper lip (*l.s.*) in position.
Per. s. 1. V. Ventral view of part of first segment of peraeon.
T., urp. Dorsal and ventral views of caudal segment and uropods.
Par. D., Par. L. Dorsal and lateral views of parasite, with the apex more enlarged.

E. *Panaietis incamerata*, n. g. et sp.

- n.s.* Length of specimen, of which enlarged dorsal (*D*) and ventral (*V*) figures are given.
a.s., a.i. First and second antennae.
os. Complex of oral parts, as seen without dissection.
ped. 2. Second foot.

F. *Bassettia congra*, n. g. et sp.

- n.s.* Length of specimen, of which ventral (*V*) and lateral (*L*) views are given.
a.s., *a.i.* First and second antennae.
os. Complex of oral parts.
ped. 4. Fourth pair of legs.
c.a. Caudal appendages, attached to terminal segment.

PLATE LXXI.

Anchicaligus (n. g.) *nautili* (Willey).

- ♂, ♀. Male and female in dorsal view.
n.s. Lines indicating the natural size.
♂, *V*. Male, more highly magnified, in ventral view.
r. Rostrum of the female specimen.
c.p. Caudal plates of the female specimen.
l., *a.s.*, *a.i.* Lunula, with first and second antennae. These and the following figures, drawn all to one scale, from another female specimen.
m.x.p. 1, 2. First and second maxillipeds.
ped. 1, 2, 3, 4. First, second, third, and fourth thoracic feet; of the first and second pairs both limbs are shown with their ventral attachment.

PLATE LXXII A.

Asterope arthuri, n. sp.

- n.s.* Natural size of specimen, ♀, of which the much enlarged lateral view is given above.
n.s..* Natural size of one of the largest specimens.
f.t. Frontal tentacle.
oc. Eye.
a.s., *a.i.* First and second antennae, with two spines of first antenna much more highly magnified.
m. Mandibular foot.
mx. 1, *mx.* 2, *m.x.p.* First and second maxillae and maxillipeds.
app. v. Appendix vermiformis, with apex much more highly magnified.
c.l. Caudal laminae.

All the details are magnified to the same scale, except the extra enlargements of parts of the first antenna and the vermiform appendage. This last organ is from the specimen of which the full figure is given, the other details are from another specimen.

v.d. Right valve, with body of the animal displayed by removal of the left valve. Below are seen the branchial laminae, with the vermiform limb immediately above, followed on the right by the eye and the second antenna, while on the left are successively the maxilliped, the second and first maxillae. To the extreme left are seen protruding the ungues of the caudal furca. Almost in the centre are the ends of the adductor muscle.

PLATE LXXII B.

Cypridina baravoni, n. sp.

- n.s.* Natural size of specimen, with enlarged lateral view above.
oc. Eye.
a.s., *a.i.* First and second antennae.
m. Mandible.
mx. 1, 2, *m.x.p.* First and second maxillae and maxilliped.

- app. v.* Vermiform appendage.
c.l. Caudal laminae.
v.d. Dexter valve, with second maxilla *in situ*.

PLATE LXXIII.

Koleolepas willeyi, n. g. et sp.

Fig. at the top of plate represents the whole animal as seen attached to the internal surface of the mollusc-shell; *or.* orifice; *cr.* crest.

n.s. Natural size of the animal, when dislodged; the under surface of the disk is shown; the twisting of the peduncle exhibits the upturned orifice of the capitulum.

Cap. Fig. to the right, lateral view of upper part of capitulum; fig. to the left, three-quarter front view of the same.

l. Labrum; *pp.* palps.

m. Mandible.

mx. 1, *mx.* 2. One of the first and both of the second maxillae.

Cir. 1, 2, 5, 6. First, second, and sixth cirri; terminal portions from first, fifth, and sixth more highly magnified.

T. Telson or pleon.

d. Portion of inner skin of disk.

The mouth-organs are to the same scale, more highly magnified than the cirri.

PLATE LXXIV A.

Gloiopotes hygomianus, Steenstrup and Lütken.

n.s. Natural size of the male, of which an enlarged dorsal view is given.

PLATE LXXIV B.

Linckiomolgus caeruleus, n. g. et sp.

n.s. Natural size of female, of which dorsal view in full is given in the centre, and, to the same scale on the right, terminal part of the thorax, with male attached over the pleon.

a.s., a.i. First and second antennae. These and the following details are from the female.

m., mx. 1. Mandible and first maxilla, or perhaps together representing the mandible only.

ped. 1, 2, 3, 4, 5. The five thoracic feet; in *ped.* 4, both members of the pair are shown.

PLATE LXXIV C.

Oxynaspis aurivillii, n. sp.

Specimen in lateral view much magnified.

m., mx. 1. Mandible and first maxilla.

PLATE LXXIV D.

Koleolepas willeyi, n. g. et sp.

A sketch of the animal from life, made by Dr Willey in the East.

PLATE LXXIV E.

Gnathia aureola, n. sp.

The animal in dorsal and lateral view, sketched from life by Dr Willey, chiefly to indicate colour markings in the living condition.

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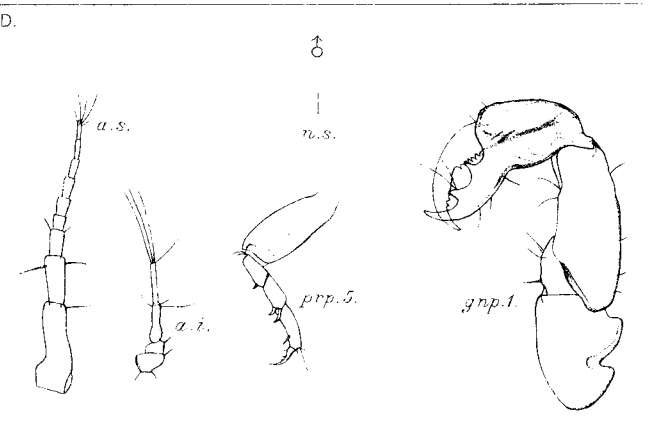
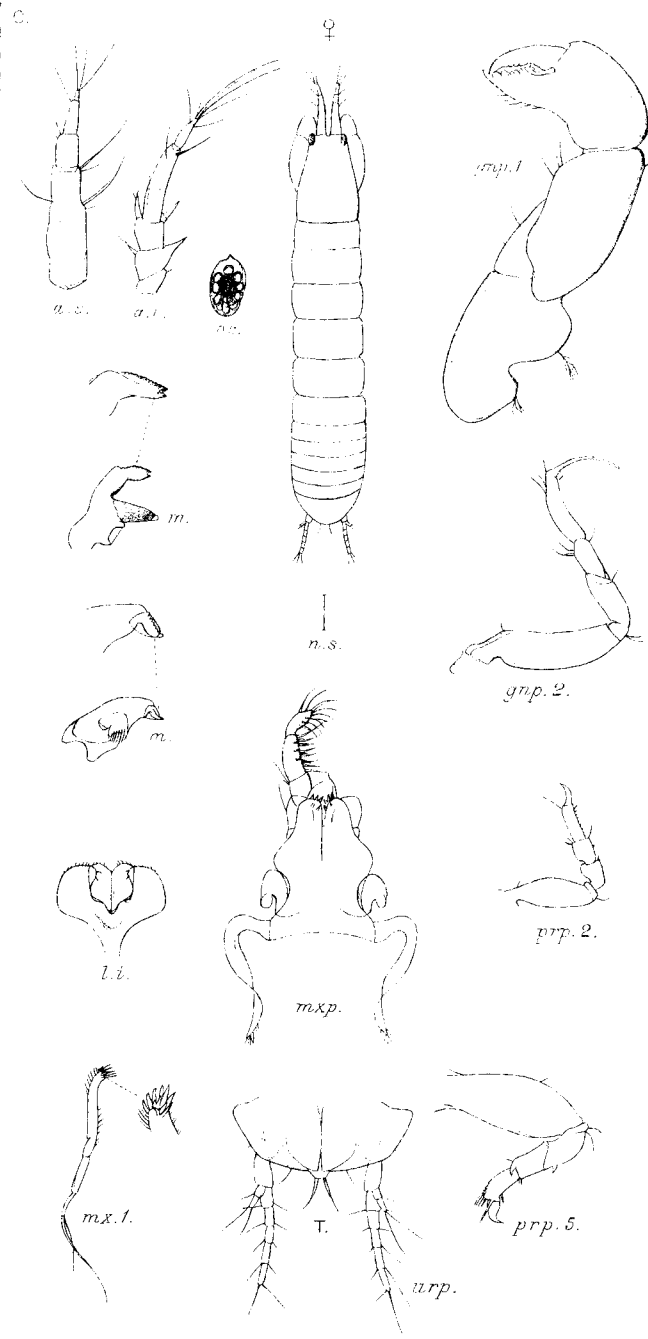
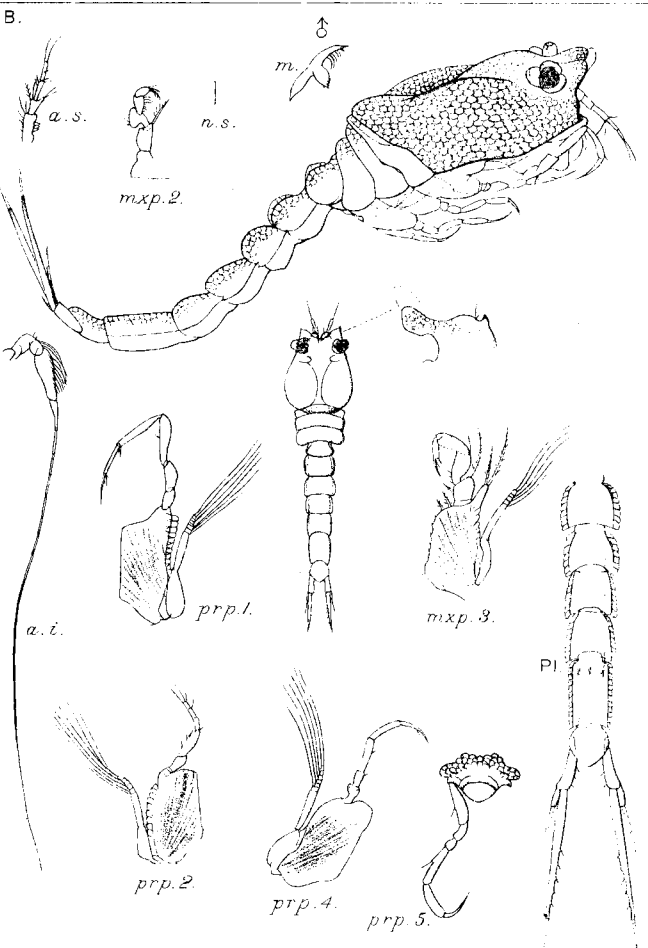
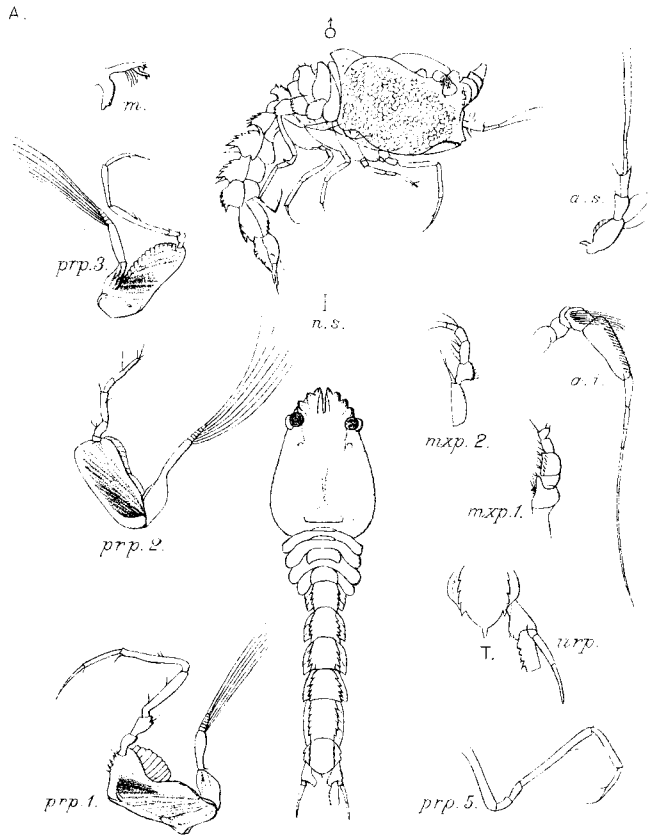
¹ For "Copepoda semiparasitica" on pp. 607 and 664 read "Podoplea semiparasitica" and for "Copepoda parasitica" on pp. 608 and 667 read "Podoplea parasitica."

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Pines, Isle of		629	uropods, Chilton, Dohrn, Gerstaecker,			
pleonastica (Cirolana)	LXVII A	673	on		620	
Poecilasma		619	Uvea (Loyalty Is.).....		673	
polita (Anthura).....		625				
Praniza.....		611	vagans (Poecilasma)		673	
Procampylaspis		672	virgatum (Conchoderma)		676	
Pseudocycnus		619	vitiensis (Ligia)		646	
Ptilanthura		663	weberi (Philoscia)		648	
punctata (Cypridina).....		663	whitei (Rhabdosoma).....		658	
punctatum (Eupathistoma)		651	willeyi (Koleolepas)	LXXIII, LXXIV D	677	
Pyrgoniscus		662				
Pyrocypris		645	zebricolor (Cubaris)	LXX D	656	
quadrata (Ligia).....		640				
Renocila						

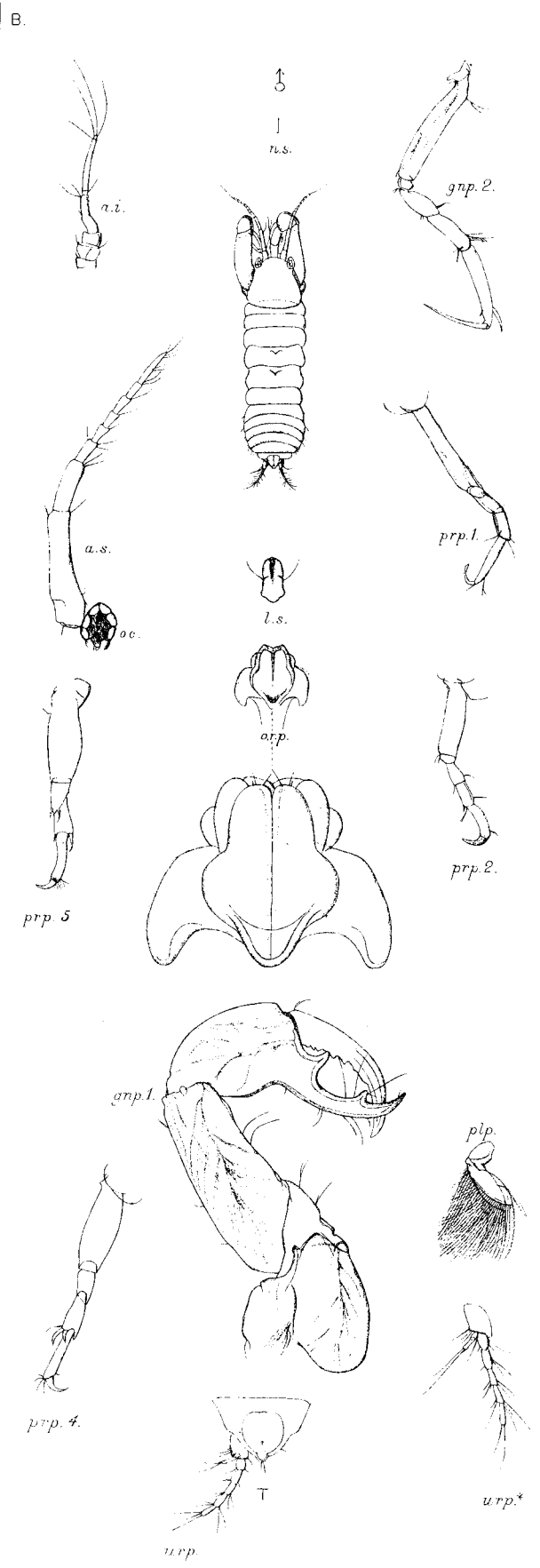
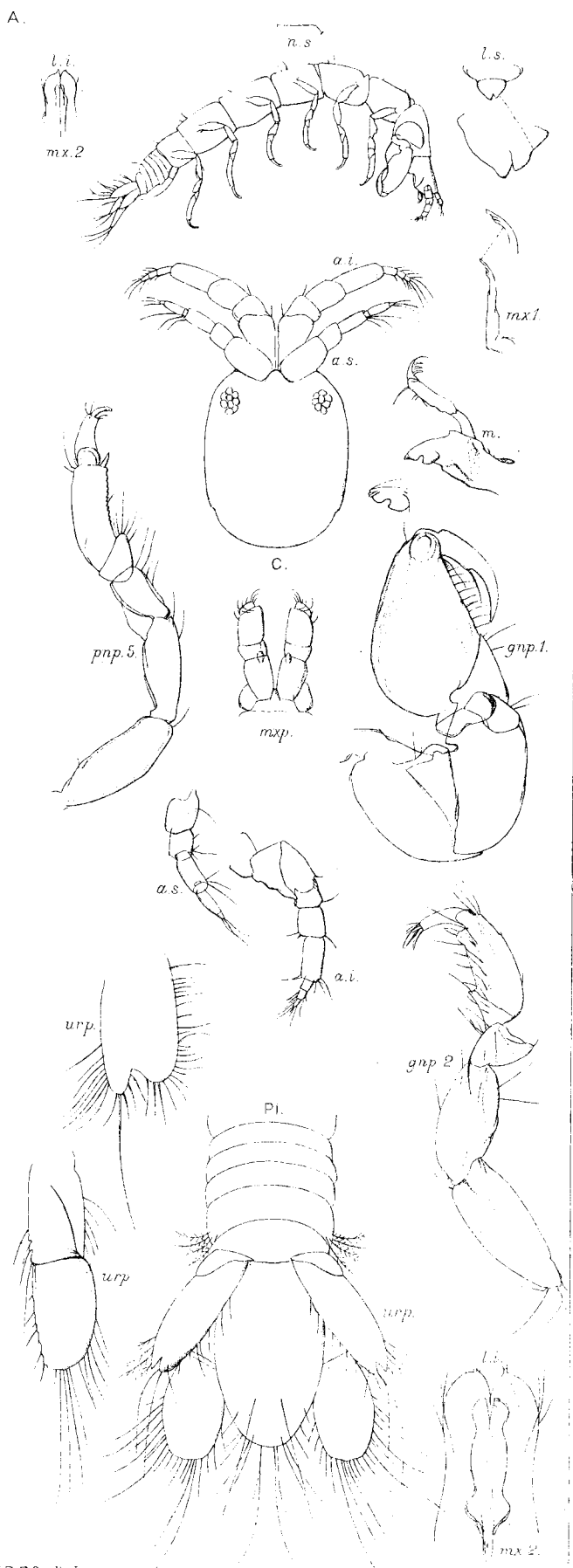


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A *Nannastacus ossiani* n. sp.
 B *Nannastacus georgi*.

C *Leptocheilia bifuensisi*. ♀
 D *Leptocheilia bifuensisi*. ♂

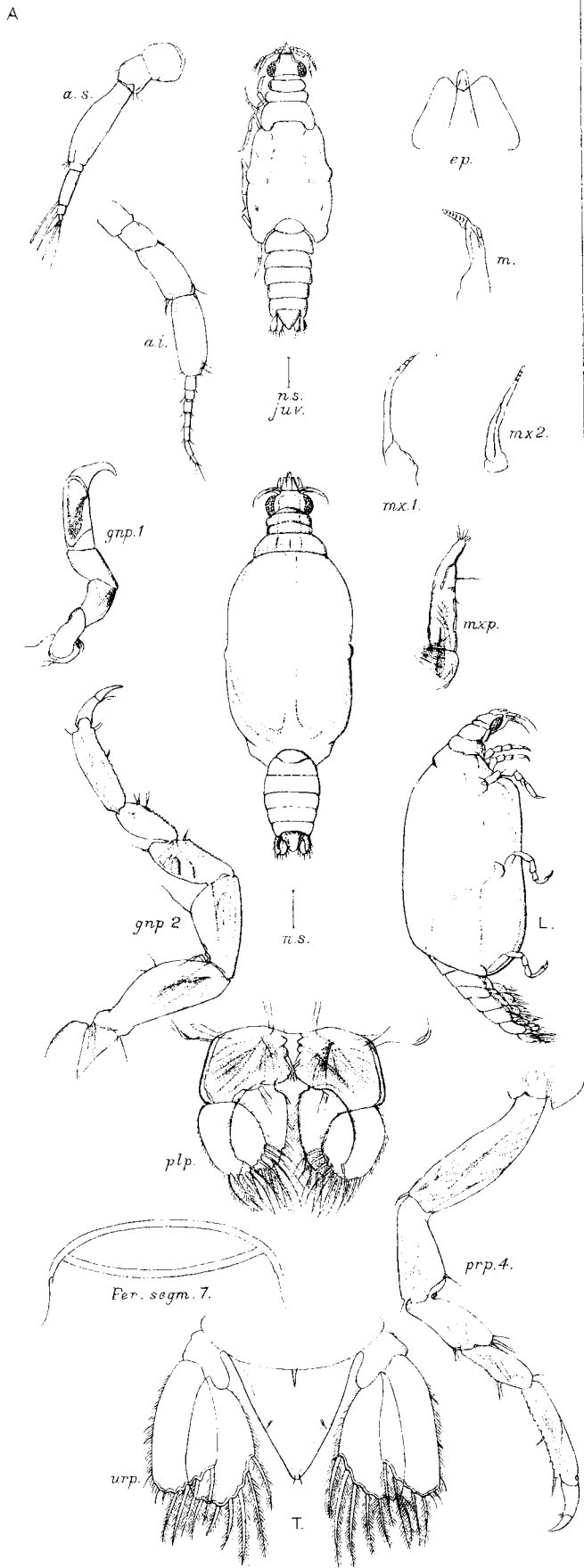


T.R.R.S. Del.

Edwin Wilson Cambridge

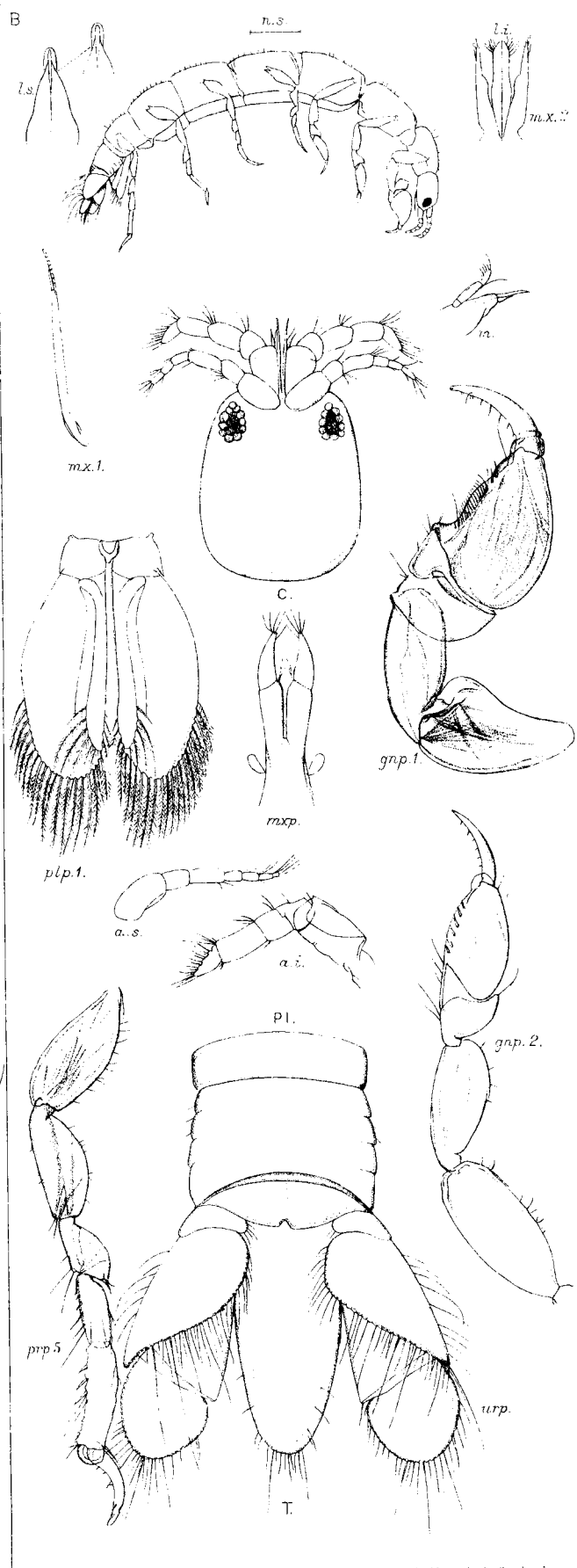
Apanthura sandalensis, n. sp.

Leptocheila lifuensis, n. sp.



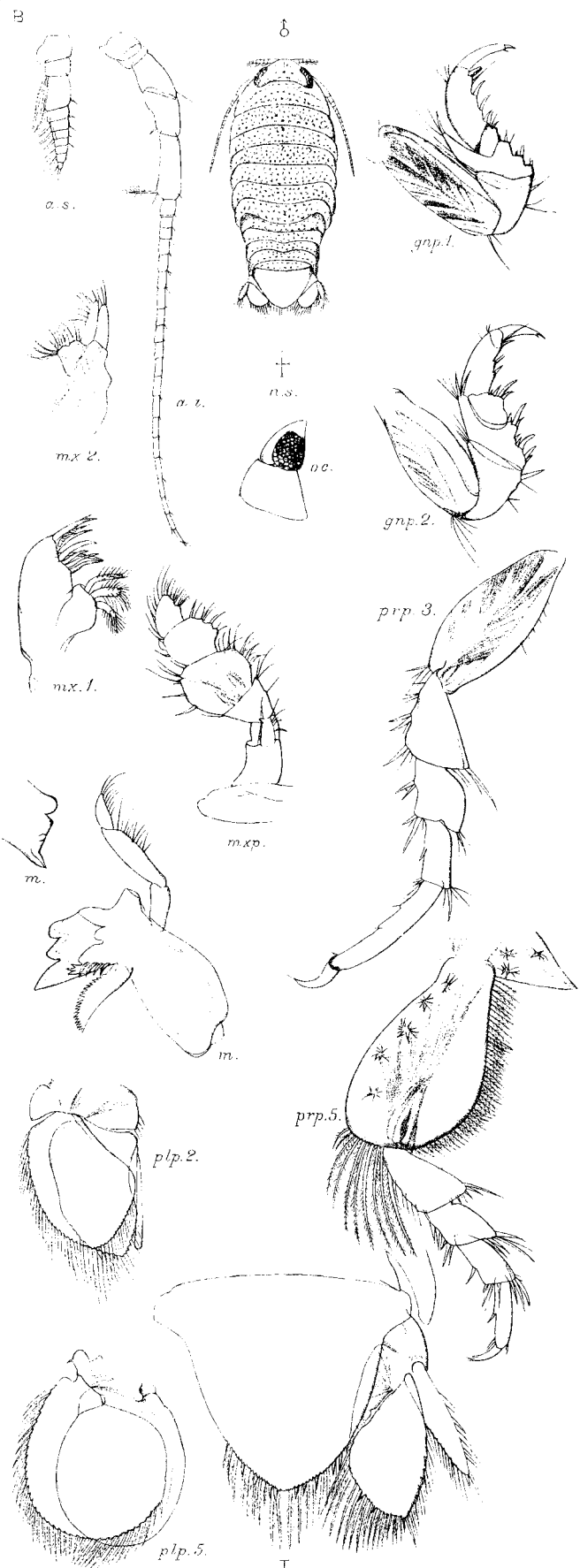
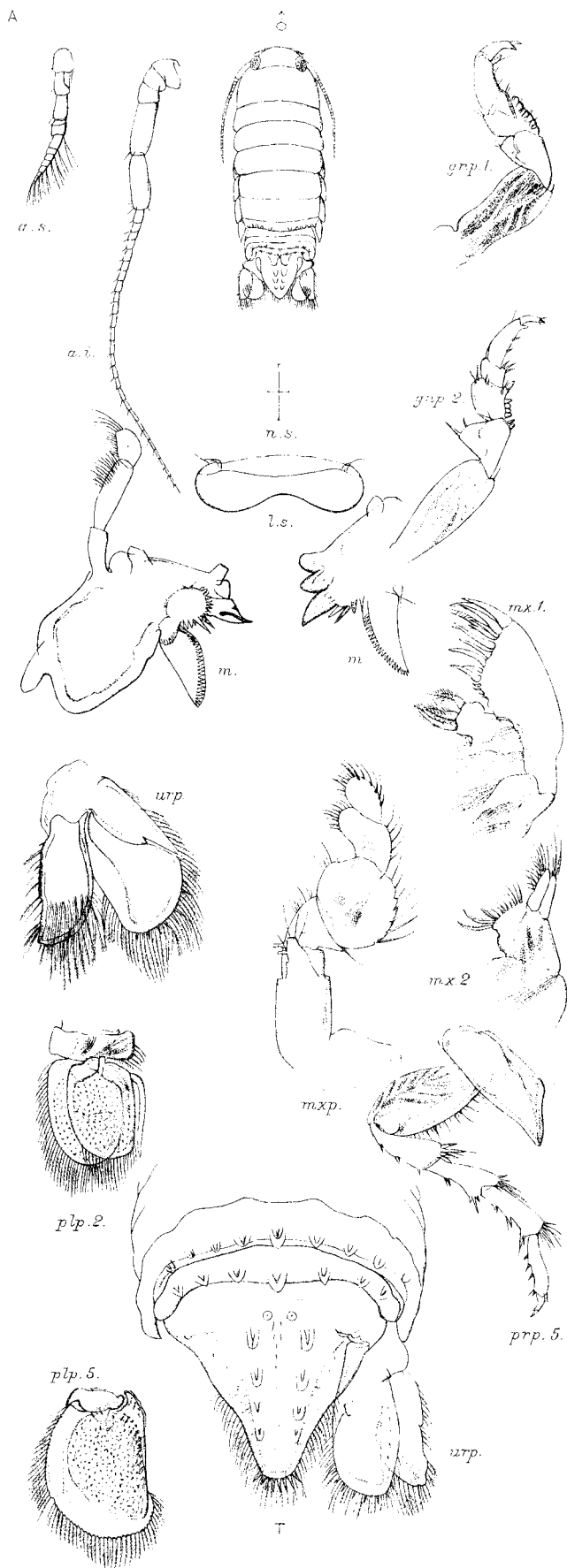
T.R.R.S. Del.

Gnathia aureola, n sp.



E Wilson, Litt. Cambridge

Paranthura lifuensis, n sp.



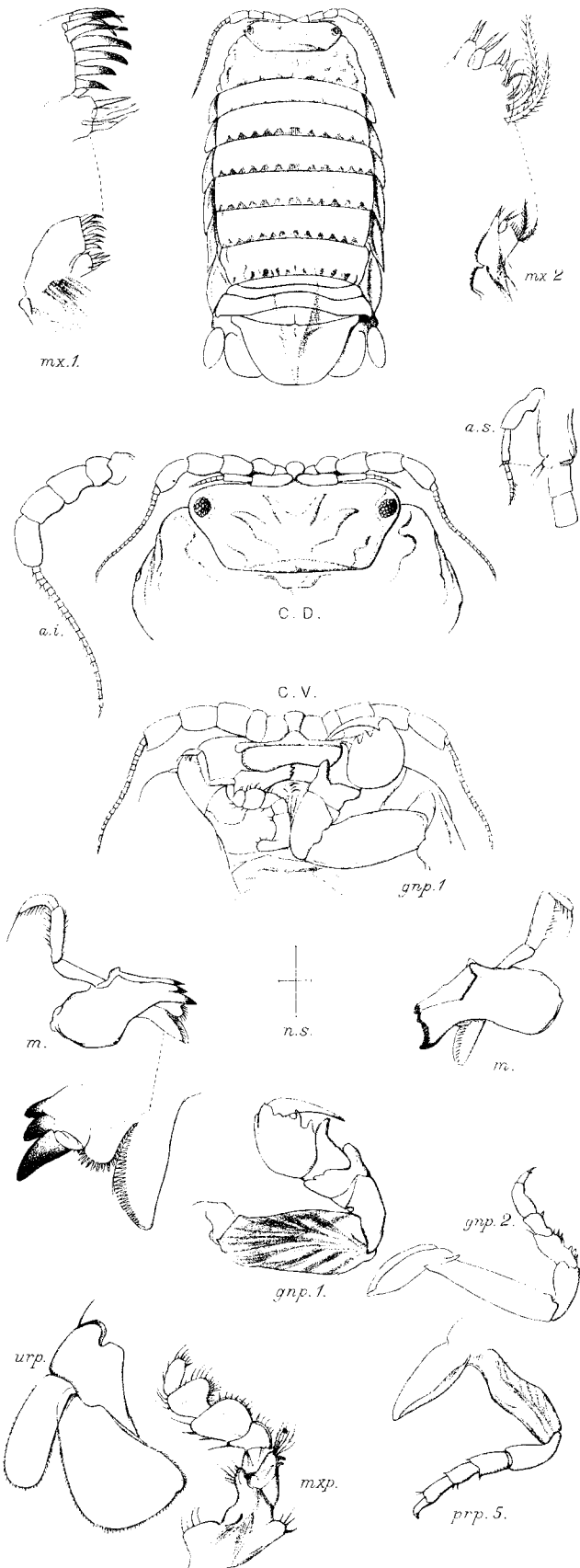
T.R.S. Del.

H. Wilson, Cambridge

Cirolana plecnastica n.sp

Cirolana albicaudata n.sp

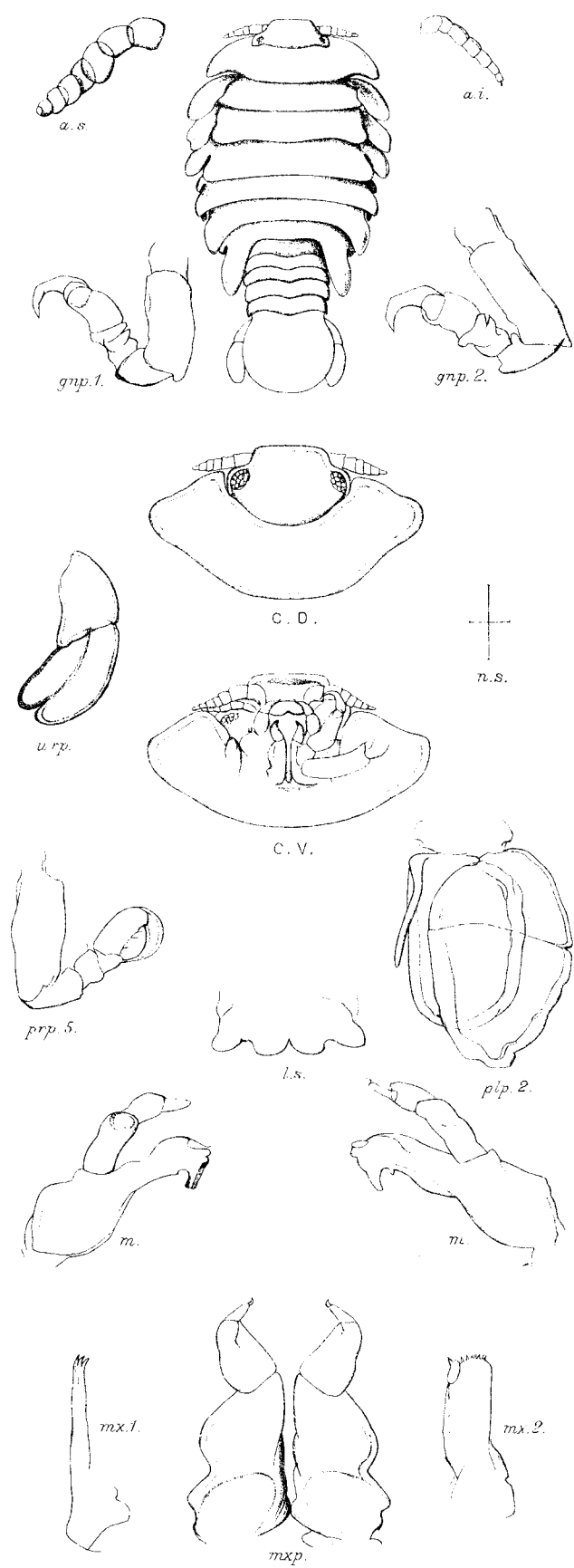
A



T.R.R.S. Del

Hansenolana anisopous, n. g. et sp

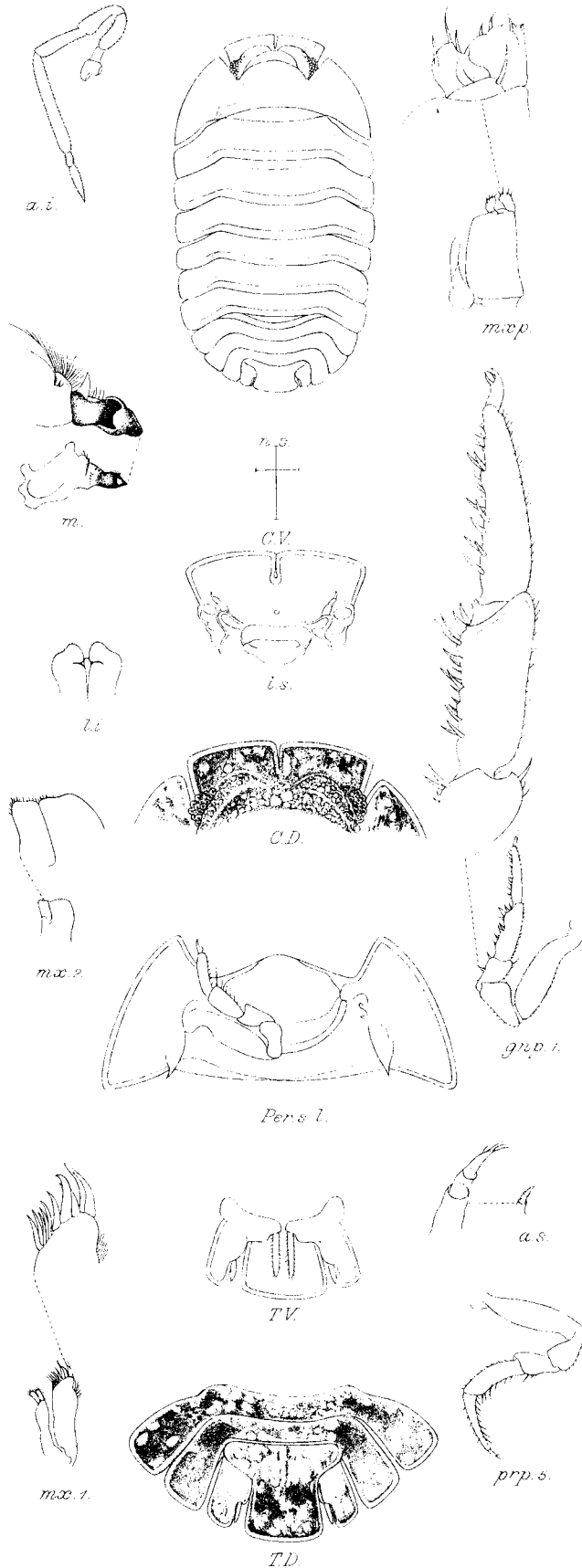
B



F. H. Wilson, Cambridge

Renocila periophthalmi, n. sp

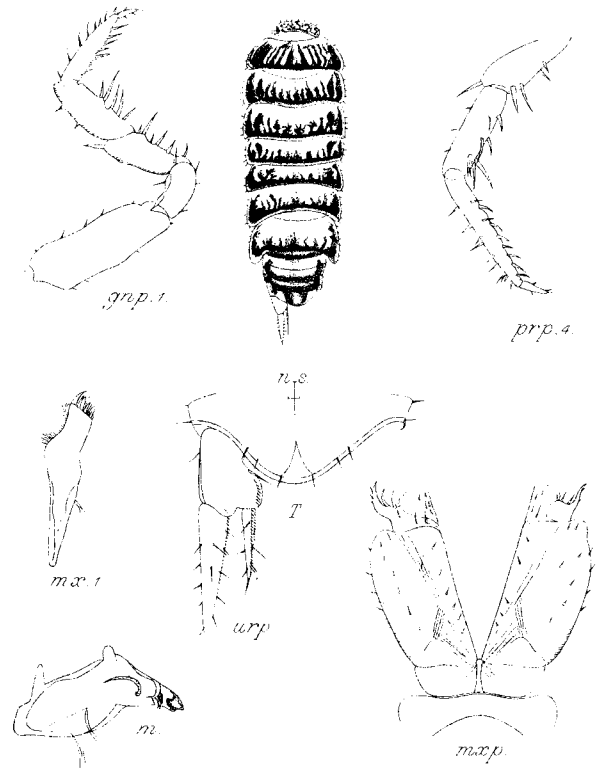
A



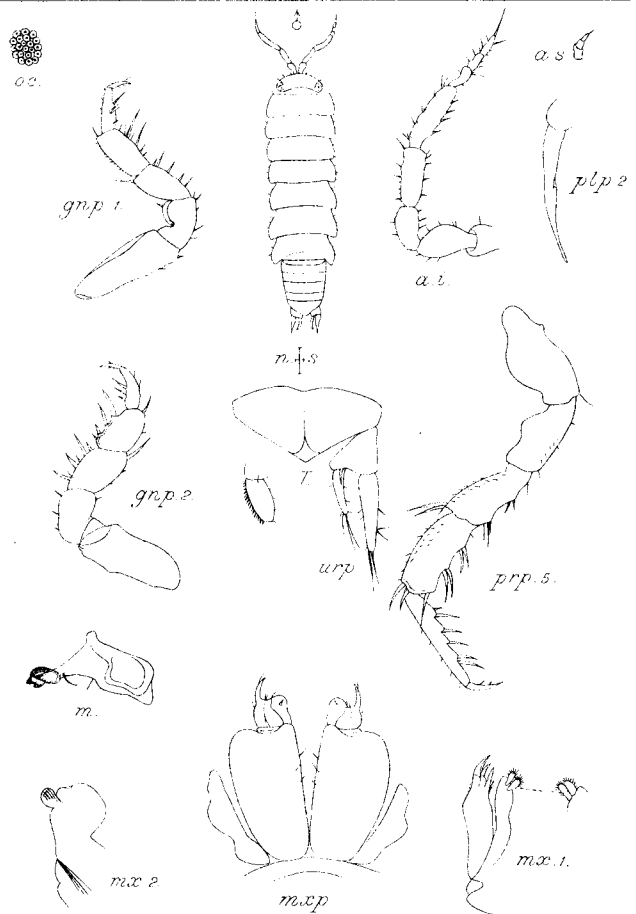
T.R.R.S. Del.

Cubaris cinctulus.
[Kinahan]

B

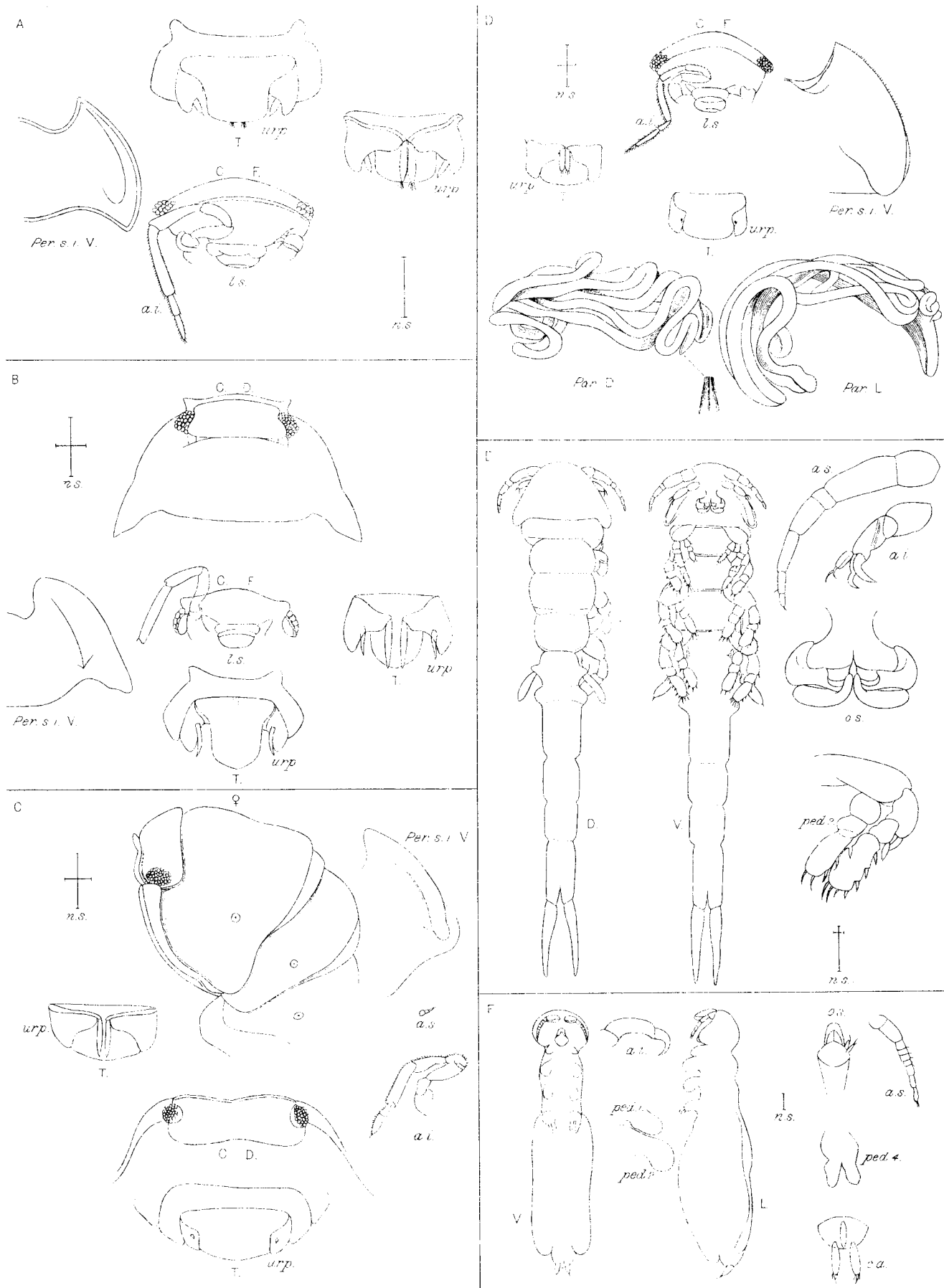


C



P. Wilson Cambridge

Philoscia lifuensis n. sp.
Paraphiloscia stenosoma, n.g. et sp.

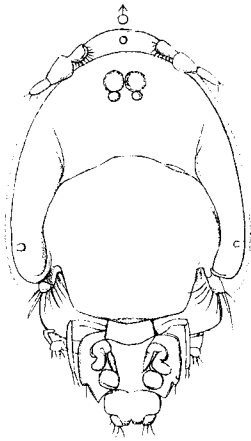
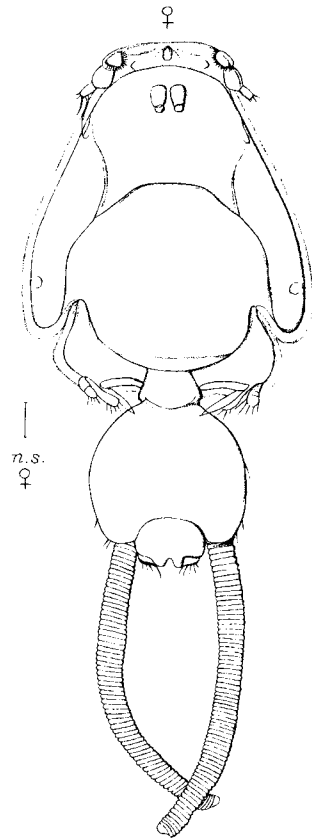
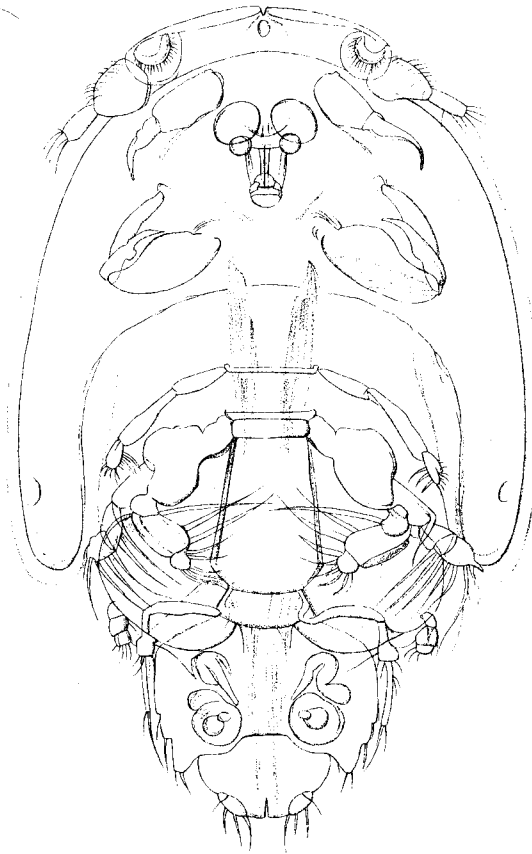
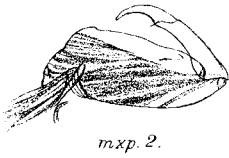
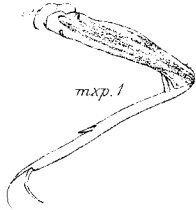
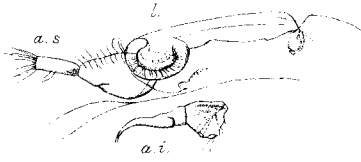


T.K.R.S. Del.

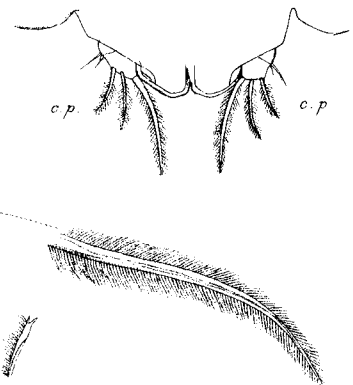
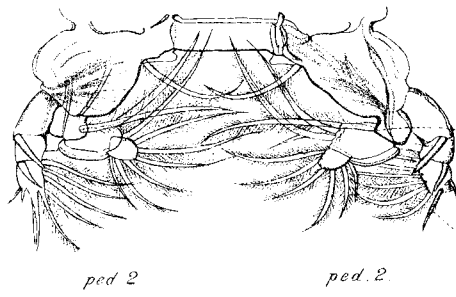
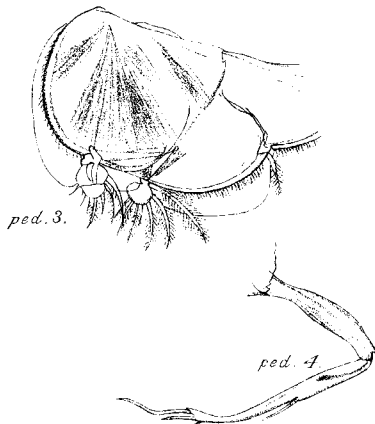
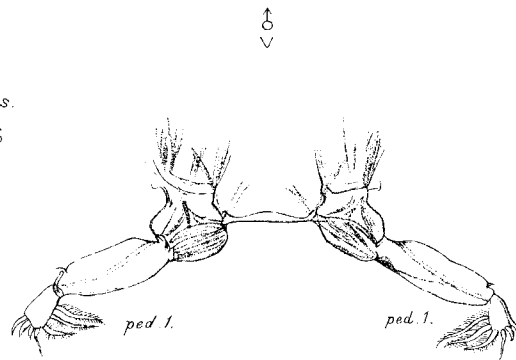
© 1920 Cambridge

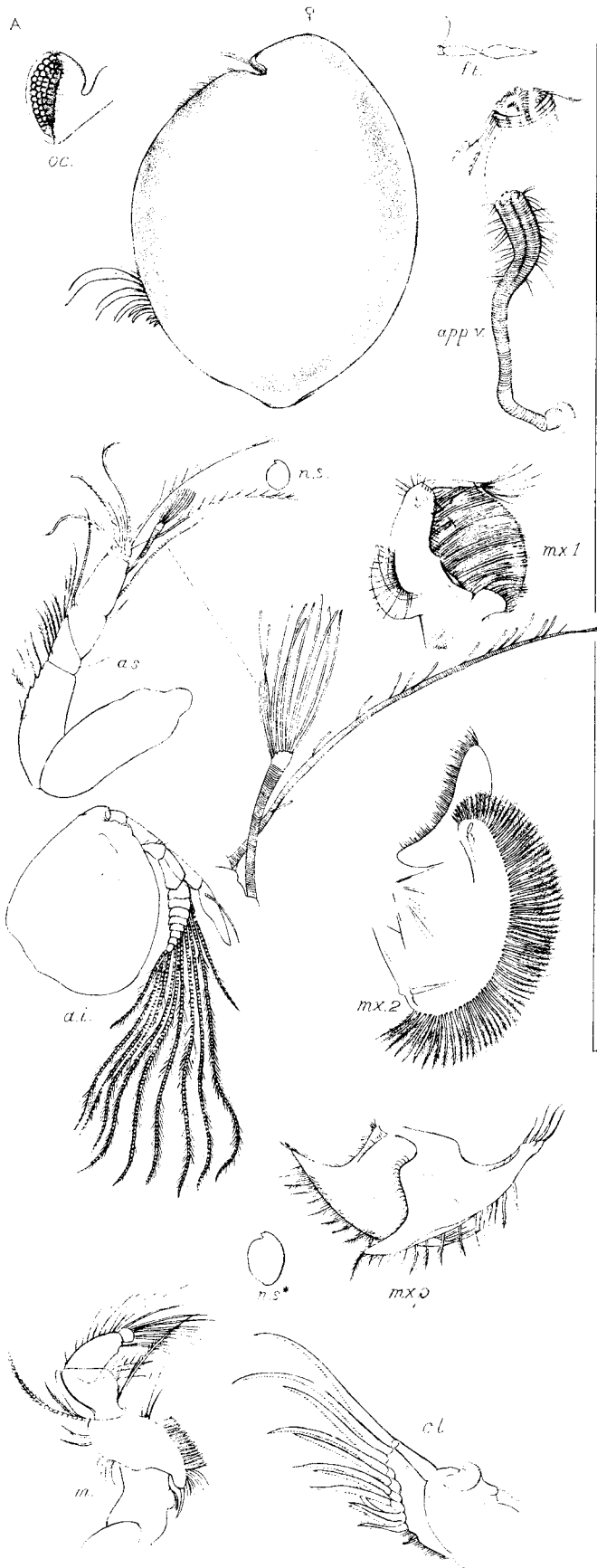
Cubaris lifuensis, n. sp.
C. dollfusi, n. sp. *C. lundii*, n. sp. *C. zebri-color*, n. sp.

Panaretis incoerata, n. g. et sp.
Bassettia dongri, n. g. et sp.



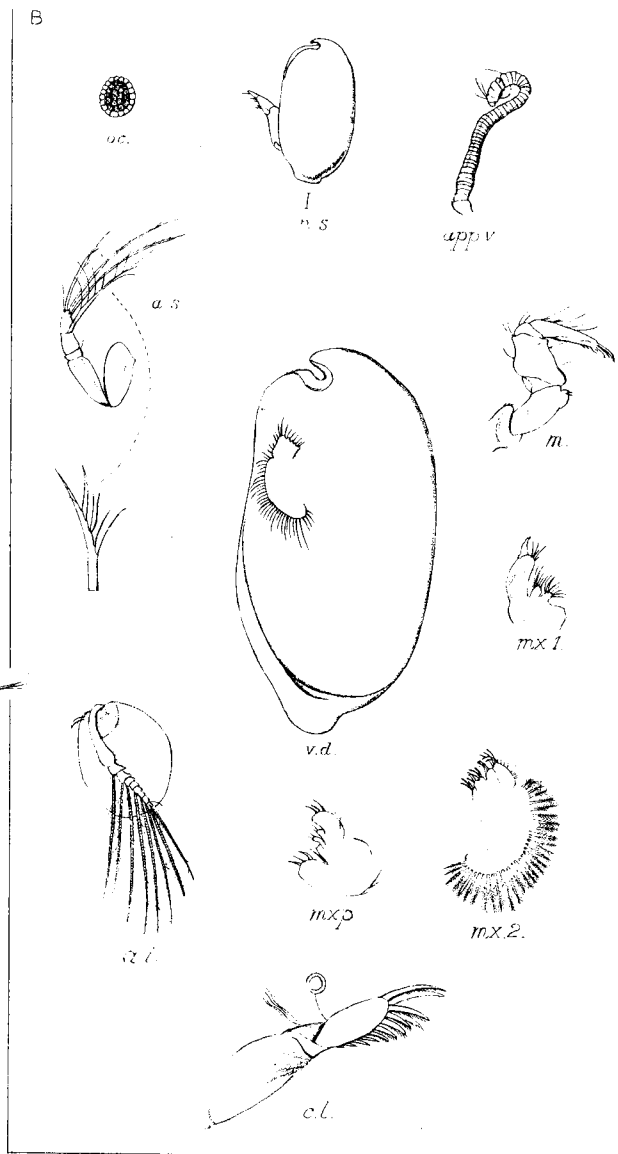
n.s.
♂





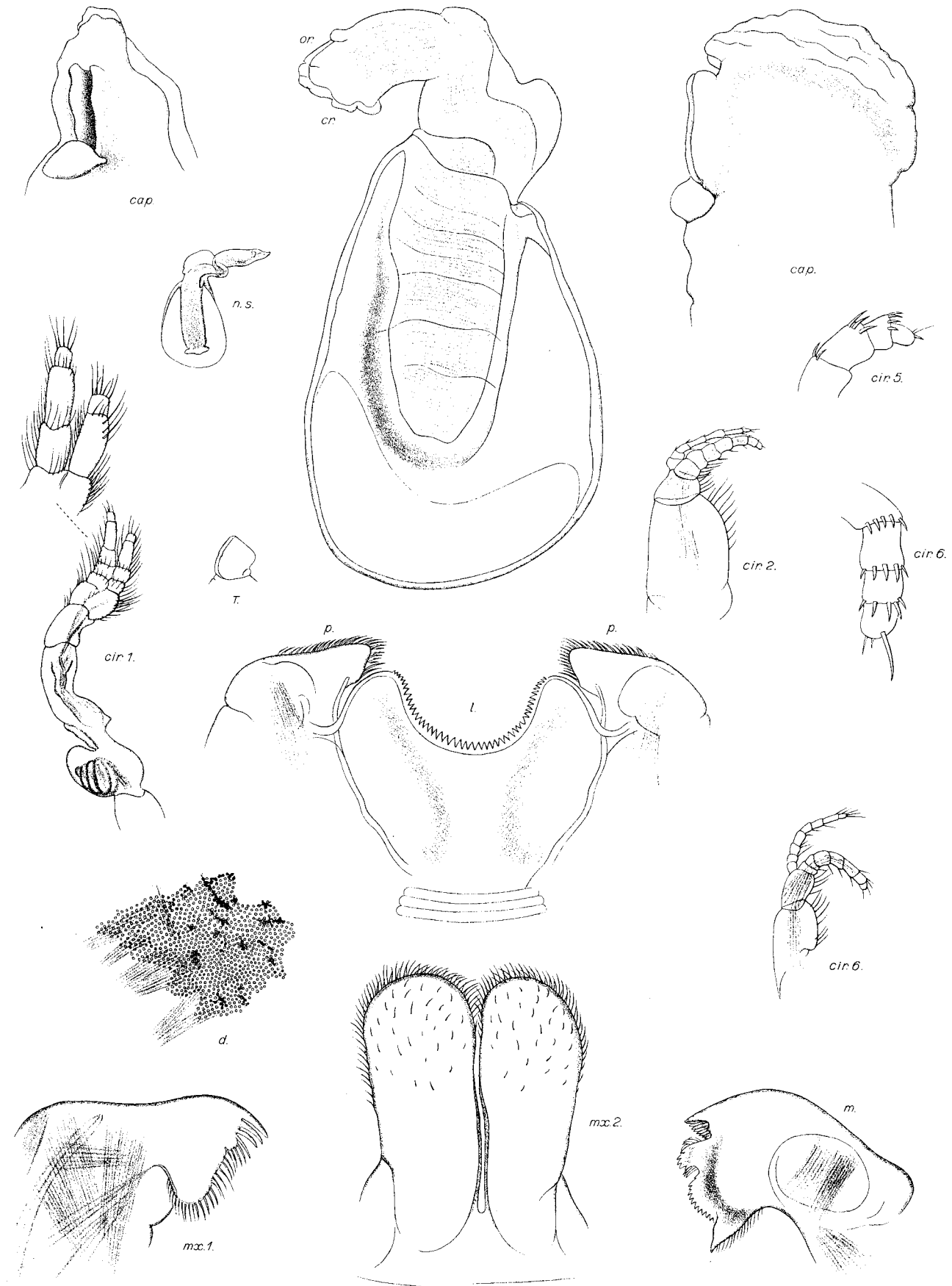
T.R.R.S. Del.

A. *Asterope arthuri* n. sp.



B. Wilson. Cat. Inog.

B. *Cypridina baravoni* n. sp.

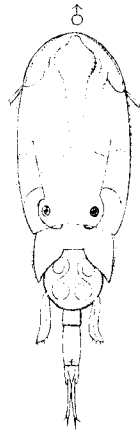


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Koleolepas willeyi, n. g. et sp.

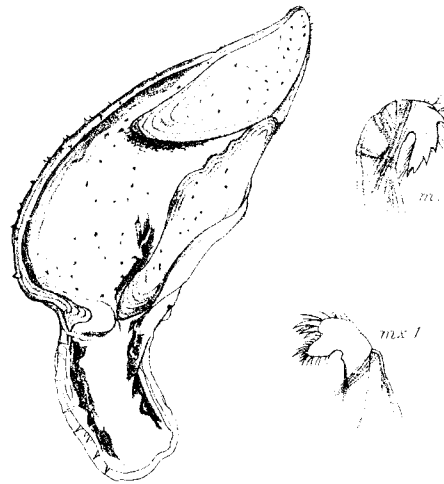
A



n.s.

Gloiopotes hygomianus.

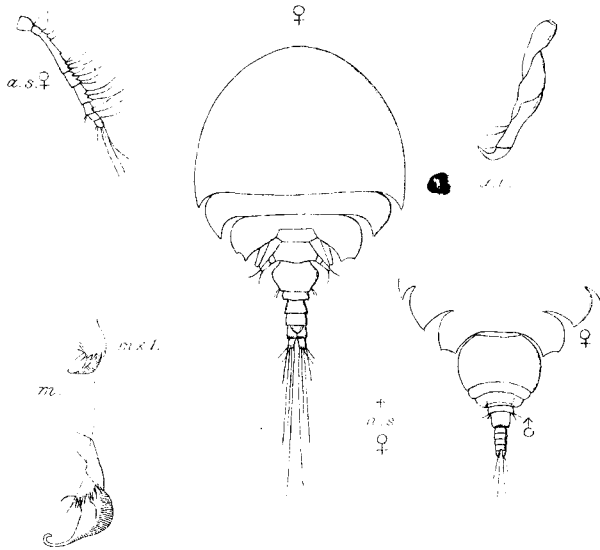
C



Oxyaspis aurivillii, n. sp.

T.R.R.S.

B



n.s.



ped. 1



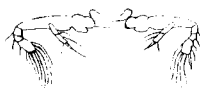
ped. 5



ped. 2

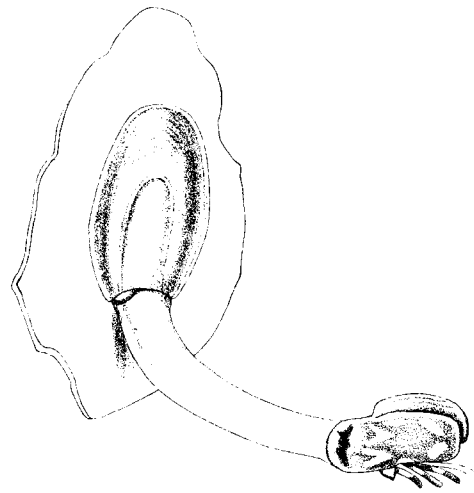


ped. 3



ped. 4

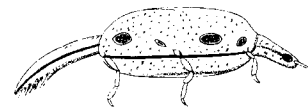
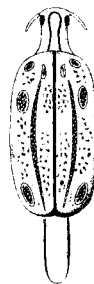
D



Koleolepas willeyi, n. sp.

Ad. Willey, A. W.

E



Gnathia aureoia, n. sp.

T.R.R.S. Del.

Ad. Willey, A. W.

Printed in Cambridge

Linkiomolgus caeruleus, n. g. et sp.