

Baker, W. H.
1926. Australian
Sphaeromidae

INVERTEBRATE
ZOOLOGY
Crustacea

SPECIES OF THE ISOPOD FAMILY SPHAEROMIDAE, FROM THE
EASTERN, SOUTHERN, AND WESTERN COASTS OF AUSTRALIA.

By W. H. BAKER.

[Read September 9, 1926.]

PLATES XXXVIII. TO LIII.

Owing to the kindness of the authorities of the Australian Museum, Sydney, I have been enabled to examine the Sphaeromids in that institution. The paper deals with this material and with examples recently added to the South Australian Museum collection, as well as a few that have been forwarded from Western Australian Museum. Naturally, most of the specimens in the Australian Museum series are shallow water forms from the eastern coast, many of the species which are common on the southern coast not being represented.

The now well-known marked sexual dimorphism occurring in this group has induced authors to recommend that species should be established on adult males only. I have kept this in view, describing females only when they exhibit some striking characters.

Although the group has much resemblance to the Cymothoidae, none of the species seem to be addicted to parasitism; apparently Sphaeromids are, in the main, scavengers, and are thus of economic importance. Although some swim actively, most are rather sluggish; many live in sponges, etc., where the two sexes are often taken together, thus helping to confirm relationship in doubtful cases. The Australian Sphaeromids are not well known, and systematic collecting—which is much needed—has been neglected; as a result, one very often has only single specimens to deal with, which are frequently females.

It is with great diffidence that I introduce the new genus *Cymodopsis*, chiefly to relieve the very large genus *Cymodoce*, and I claim for it the same value as *Cilicaea*, *Cilicaeopsis*, and *Paracilicaea*. Six species are allotted here, and *Cymodoce aspera*, Haswell, which might otherwise be included, I have left out, believing that species to be nearer to *Bregmocerella*.

Subfamily SPHAEROMINAE.

Group HEMIBRANCHIATAE, Hansen.

SPHAEROMA TEREBRANS, Bate.

Pl. xxxviii., figs. 11, 12.

- Sphaeroma terebrans*, Bate, Ann. Mag. Nat. Hist. (3), vol. 17, p. 28, pl. 2.
S. vastator, *ibid*, p. 28, pl. 2, fig. 4.
S. destructor, Richardson, Bull. U.S. Nat. Mus., No. 54, p. 282, and figs.
S. terebrans, Stebbing, Spolia Zeylan, vol. 2, pt. 5, p. 16, pl. 4.
S. terebrans, Barnard, Ann. S. Afr. Mus., vol. xvii., pt. v., p. 358.
S. terebrans, Calman, P.Z.S., 1921, Crust., ii., p. 217.
S. terebrans, Chilton, N.Z. Jnl. Sci. and Tech., 1919, p. 12, note.

There are a large number of specimens in the collection, the largest about 8 mm. in length. In some the tubercles are quite small and the pubescence varies considerably. In some specimens identified by Dr. Chilton the posterior extremity of the abdomen is much more pointed, the primary tubercles of the thorax and abdomen more distinct, except the two submedian on the anterior division of the abdomen. The margin of the end of abdomen is turned upward, and below still

close to the tip is a distinct swelling. In some examples the end of abdomen appears to be turned downward. In nearly all specimens examined there is a distinct tubercle or dipping of an inner fold on the margin of the epimeron of the 1st thoracic segment. Sometimes the lines marking the coalesced segments of the anterior division of abdomen are very obscure, at others, as in Stebbing's figure, the same statement applies to the transverse ridge on 4th segment of thorax, and there are frequently similar ridges on 3rd and 5th segments as observed by Barnard.

The 3rd joint of antennule seems to vary, it is often as long or longer than the two preceding joints together. Most specimens have 4 teeth on outer ramus of uropod.

With a large number of dry specimens from Queensland, there was one differing, the posterior region of which is shown in pl. xxxviii., fig. 13. I find in some earlier notes on a large number of specimens from the eastern coast, the remark, "These seem to be all juveniles," made on account of the absence of *appendix masculina*. I am glad to find the explanation in the above paper of Dr. Calman's.

SPHAEROMA QUOYANA, Ml. Edw.

Pl. xxxviii., figs. 1-10.

Sphaeroma quoyana, Ml. Edw., Hist. Nat. Crust., t. iii., p. 206.

S. quoyana, Heller, Reise de Novara Crust., p. 137.

S. quoyana, Haswell, Cat. Austr. Crust., p. 287.

S. quoyana, Hedley, Austr. Assn. Adv. Sci., vol. 8, 1901.

S. pentodon (?), Richardson, U.S. Nat. Mus. Bull. 54, p. 286.

S. verrucauda, Dana, U.S. Expl. Exp. Crust., ii., p. 779, pl. lii., fig. 6.

S. verrucauda, Chilton, N.Z. Jnl. Sci. and Tech., 1919, p. 12.

The body has many black dendritic markings and is obscurely granulate. The head is anteriorly depressed, there is a well-marked rostrum with a transverse ridge behind it. The eyes are large.

A distinct transverse ridge is found on the 4th, 5th, 6th, and 7th segments of thorax.

The sides of the posterior division of abdomen slope inwards sufficiently to allow the uropods to be almost completely hidden.

The anterior portion of epistome is slightly excavate.

The flagellum of the antennule has 11 joints.

The antennal flagellum has 14 joints.

The left mandible has a small secondary plate, the spines are 9 in number, the incisory plate is narrow obscurely divided into 3 lobes or teeth, the joints of the palp are broad and compressed.

The 2nd maxilla has broad plates densely fringed.

In the maxillipeds a large portion of the 2nd joint and its plate is folded longitudinally; the hairs on the plate are dense and some plumose; the coupling spine is a long curved setum.

The legs are in 3 series, the 7th pair the longest.

The 2nd pleopod has the appendix slightly exceeding the length of endopod. The exopod of the 3rd is without division. The 5th has the exopod with 3 shagreenate lobes on the distal division and one on the proximal.

The uropods are rather small, lanceolate, the inner ramus reaches to the end of abdomen, the outer ramus is 4- or 5-toothed—sometimes the teeth are obsolete—it has a longitudinal keel below; both rami are fringed with fine hairs.

This species is very common on the east and south coasts of Australia and is credited with wood destruction, but sometimes found burrowing in mud probably containing decaying wood or seaweed.

Exosphaeroma intermedia, n. sp.

Pl. xxxix., figs. 1-8.

Body rather smooth, punctate, with obscure rounded areolae like fish scales and some minute setules.

Head short, with a transverse ridge on the forehead. Eyes large.

1st thoracic segment longest; the following subequal in length. The epimera of 2nd, 3rd, and 4th segments are subacute, those of 5th, 6th, and 7th rounded, the 7th not so deep.

The posterior division of abdomen is widely dome-shaped all over, the end is somewhat truncate and entire.

The two basal antennal joints are contiguous, these are short, triangulate, the base of triangle being the distal end, there they are a little bilobed by a small sulcus about the middle, 2nd joints small and short, 3rd joints narrow, flagellum short with 12 joints.

Antenna moderately robust, flagellum of 13 joints, the first 5 or 6 short, the others becoming longer.

Epistome somewhat quadrate, anteriorly with a mucronate apex or partially covered by basal antennal joints, the limbs recede.

The right mandible is slender, not salient, the incisory plate 4-lobed, then follow a number of curved branched spines. The molar is prominent with margin fringed with numerous denticles. The palp is large, its distal joint falcate.

1st maxilla with inner branch short, ending in 5 large branched spines. The outer branch has 8 or 9 strong spines, some of which have lateral branches, the shaft is setose on each side.

The 2nd maxilla has broad leaf-like lobes; their margins with many serrate spines.

The maxilliped has the basal joints narrow, the plate of the 2nd joint ends in a mass of branched spines with a row of similar ones on inner margin for some distance. The 2nd joint of palp is only separated from the 3rd by a small shallow cleft and is scarcely lobed, the 3rd and 4th are strongly lobed bearing setae, and are as in *Cymodoce* and other genera.

The legs are all robust, provided with furry pads on 4th, 5th, and 6th joints, the first 3 pairs carry long setae on 3rd and 4th joints, but they are not so long or numerous as in *Sphaeroma*. In the remaining legs the basos and ischium bear longish fine hair and also some strong spines in the usual positions on those limbs.

The pleopods are very sphaeroma-like, broad, the peduncles of the first 3 pairs have each 3 coupling spines on inner sides and furry hairs on outer. In the 2nd pair the appendix much outreaches the endopod to which it is attached.

The exopods of the 3rd and 4th pairs have each a division. There is a distal gap on the respiratory ramus of the 4th pair. The exopod of the 5th pair has prominent setuliferous lobes with fine hair on the outer margin.

The uropods are subequal, the inner ramus is ovate-lanceolate, the outer with 2 teeth on the external margin with slight indications of 2 more above these.

One male specimen, 8 mm. long, found on a clump of live coral, Vanderlin Island, Sir Edward Pellew Group, Gulf of Carpentaria, June, 1923, collected and presented by Dr. W. E. J. Paradiice, Royal Australian Navy, to Australian Museum; it being the type.

Exosphaeroma bicolor, n. sp.

Pl. lii., figs. 1-5; also pl. li., figs. 8, 10.

Body surface nearly smooth, glabrous. The segments of thorax do not differ much in length. The epimera are marked off from the tergites by a faint groove on each side. The epimeron of 1st thoracic segment projects anteriorly beneath

the eye but the posterior angle is abrupt, the lower margin is straight, the following 3 epimera are rounded, separate, and rather sinuate; the last 3 are deeper and broader rounded, that of the 7th segment reaches down to near the level of the 6th. The anterior division of abdomen is a little longer than the 1st thoracic segment; obscurely divided by lines into 4 segments; the lateral margins of this division reach to the level of the 6th thoracic epimera. The head is short, steeply declivous in front; a faint swelling marks the place of the rostrum. The eyes are large and prominent with many ocelli. The posterior division of abdomen is moderately domed, declivous behind with a reduction in steepness near the end which is obtusely pointed; the margin here is a little insinuate in vertical direction.

The peduncular joints of the antennule are subequal in length; the 1st has a shallow distal notch; the flagellum has 10 joints. The joints of the antennal peduncle are short and stout; the flagellum carries 11 joints.

The epistome is elongate, rounded anteriorly, its lateral limbs receding. The upper lip is prominent.

The right mandible has the incisory plate rather slender, tridentate, no definite secondary plate, spine row well marked, with strong molar, and palp with compressed joints, the last narrow, falcate, it and the middle joint comb-like.

The 1st maxilla is strong, the inner branch with 4 curved plumose setae, the outer branch with 4 or 5 distal, blunt teeth and a few serrate spines; the outer margin of this branch bears some fine setules. The 2nd maxilla has large lobes bearing strong setae.

The maxilliped has the plate of the second joint rather elongate, the distal setae well developed. There is an inner fold with 3 feather setae. The palp is large, the 2nd, 3rd, and 4th joints are well lobed with rather scanty setae; these joints have each a setum posteriorly (as noticed in *Zusara*, etc.).

The legs are robust, well spined, with moderate furry pads on 4th, 5th, and 6th joints.

The 1st pleopod has the peduncle projecting more than usual on the inner side with 5 coupling spines which are not so crowded as usual, the outer side is bent down in the proximal direction. The rami are rather small. The endopod about as long again as broad, its outer margin slightly concave. The exopod has a large outstanding spine slightly curved. The 2nd pleopod also with rather small rami; the *appendix* is thick, obtuse, and over-reaches the endopod considerably. The peduncle has a strong setum on outer angle. The 3rd pleopod has the exopod with division near the middle of lamina. The peduncle has 3 or 4 longish setae on outer angle. In the 4th pleopod the endopod has few branchial folds (6-7), the apex is rather acute, and there is a broad shallow insinuation near by, and one plumose setum. The exopod carries 3 distal similar setae and a number of setules on the outer margin. The rami of 5th pleopod are rather narrow. The exopod has a distal rasp slightly prominent and 2 lobed with similar thickenings almost continuous on inner margin for some distance as in *E. calcareus*. The endopod has few branchial folds (6-7) and is distally truncate with a small elevation on the inner angle.

Uropods have the inner ramus rather broad not reaching the end of abdomen, subacute at end. The exopod is narrower, longer, lanceolate, very acute, reaching beyond end of abdomen.

Length, 10 mm.

This species is near *Exosphaeroma calcareus*, Dana, and *E. falcatum*, Tattersall. It has the habit of rolling into a ball with the outer rami of the uropods outstanding. The female has a less projecting abdomen than the male and the rami of uropods are equal in length. The specimens (8 males and 2 females) are from shore between tide limits, Kangaroo Island, and were collected by Mr. H.

M. Hale, Zoologist of the South Australian Museum. Type, C. 1050, South Austr. Mus.

Exosphaeroma alli, n. sp.

Pl. li., figs. 6, 7, 9.

The body is smooth and glabrous. The head is rounded in front and very short. The eyes are large. The 1st segment of thorax is longest, the remaining are subequal in length except the last, which is shorter. The 1st epimeron has the lower margin nearly straight, abrupt behind, the remaining ones are nearly uniform in size, except 2nd and 7th, the 7th is a little smaller than and not reaching down to quite the level of the 6th; they are not distinctly marked off from their respective tergites. The anterior division of abdomen is very short, the coalesced segments well marked laterally. The posterior division is not strongly domed, is smooth and shovel-shaped at end, and thin-walled.

The antennule is rather large, 1st joint broad and not much produced at inner distal angle, 2nd joint almost half as long as 1st, 3rd a little longer than this, 1st joint of flagellum longer than the rest, flagellum of 8 longish joints. The antenna has a few setae on 5th joint of peduncle, the flagellum is rather long, of 13 joints.

The epistome is rather long, apically retiring and acute; the limbs are retiring; the upper lip is large.

The right mandible has a rather slender incisory process almost entire at apex, there is a minute secondary process and a spine cluster which springs from a common base; the molar is large.

The inner ramus of 1st maxilla with 4 recurved setae, the outer ramus is rather narrow and the distal teeth much worn in specimen.

The 2nd maxilla is robust with spines on the outer and middle lobes more robust than on the inner lobe, which reaches a little beyond the other.

The maxilliped has narrow basal joints, the plate of the 2nd being also narrow; there are 2 setae on the hinder end of 3rd joint of palp and one on the 4th. The lobes of these joints are moderately long and setose.

The legs are rather slender, 1st pair with rather long fine setae on usual joints; the rest of the legs are sparsely spined and setose.

The peduncle of 1st pleopod has 5 coupling spines on the inner angle, the outer side has numerous setules, the exopod has the usual outstanding spine on the outer proximal angle, the outer margin of endopod is straight or slightly convex. The 2nd pleopod has a large endopod; the *appendix* is moderately robust tapering towards the end, and reaches nearly to the end of the fringe of the endopod. The peduncle has a long setum on the outer angle as well as the usual setules. The 3rd pleopod has large rami; there are a few longish setae on the outer angle of the peduncle. The dividing line on the exopod is nearer the middle than the end, but not so much so as in the previous species. The endopod of the 4th pleopod has a very shallow, wide emargination and 3 plumose setae on the end with 2 on the end of the exopod. The rami of 5th pleopods are rather narrow, the exopod is subacute distally with 2 outstanding rasp-like lobes, the other lobes are not well marked but are similar to those of preceding species. The endopod is distally truncate with small prominence on the inner angle. Branchial folds are few on both 4th and 5th pleopods.

The uropods have laminate rami, the inner ramus has the inner margin nearly straight, the outer very convex, not quite reaching the end of abdomen, distally subacute. The outer ramus is shorter, narrower, distally rounded, and on distal margin slightly serrate.

Length, 7 mm.

The body is whitish with much dark dendritic marking. Several specimens were collected at Victor Harbour in shallow water by Miss Ali.
Type, C. 1055, South Austr. Mus.

Exosphaeroma alata, n. sp.

Pl. xxxix., figs. 9-11; pl. xl., figs. 1-3.

The body, especially the head, is rough with rather scanty tubercles which arrange themselves more definitely on the posterior margins of thoracic segments.

The head has a transverse, low ridge just behind the antennular region; behind this there are two indistinct submedian tubercles. The eyes are large.

The 1st segment of thorax is longest, the 2nd, 3rd, and 4th subequal in length, the last 3 shorter. The epimera, except the 1st and last, are subequal, the last not so deep, the penultimate one with an oblique ridge on the outer side.

The anterior division of abdomen is short, its lateral margins are slightly turned up. The posterior division is at first domed, but soon shelves away to a long posterior triangular projection with very acute apex; the posterior margin of the cavity of the abdomen is broken by a wide notch or channel opening, this is roofed over by the projecting end.

The basal antennular joints are short with rather corroded surfaces, they touch each other medianly; there is a small notch on the posterior border which holds a small lateral portion of the epistome. The 2nd joint of peduncle is short, the 3rd long, the flagellum of 9 longish joints. Antennal peduncle is robust, flagellum of 17 short joints. The epistome is short with well projecting lateral angles.

The mandibles are normal; the left with incisory plate 3 or 4 divided, secondary plate trifold, very small spine row and strong molar; palp of moderate size.

The 1st maxilla has a small tuft of setae on the middle of the shaft besides the terminal setae.

The lobes of the palp of the maxilliped are short and close together, the terminal joint is also short, at the posterior angles of the 2nd, 3rd, and 4th joints there is a long setum as in *Zuzara venosa*.

The legs are slender, very sparsely spined, the last pair in the male are very long and appear to have a prehensile function; the propodus is long and curved.

The 1st pleopod has a peduncle with 3 coupling spines on the inner angle, the outer side slopes away obliquely and is destitute of fine hair. The exopod has a small outer proximal spine. The endopod is slightly longer than broad. The appendix of the 2nd pleopod reaches as far as the fringe of the endopod. The exopods of the 3rd, 4th, and 5th have oblique divisions.

The uropods are very large, wing-like, both rami are somewhat wedge-shaped and subequal, the outer have the external margins thickened and upturned, both rami are minutely serrate at the distal margins and reach beyond the apex of abdomen.

Length of male, 11 mm.

The female is of typical *Exosphaeroma* form, mouth parts are unmodified, marsupial plates overlap slightly, the abdomen is not produced, the uropods are of ordinary size, the body is much smoother.

This species is close to *E. amplicauda*, Stimpson, it is also near *Isocladus*, and if that genus is of subgeneric value, as Hansen suggests, then this also should bear a subgeneric designation.

The specimens are from Mullumbimby, New South Wales, in fresh water in the river, L. Kesteven, Riddlemore Bridge, Parramatta River, also Miller's Point, Pt. Jackson. Types in Australian Museum, Sydney.

Neosphaeroma, n. gen.

Characters mainly as in *Exosphaeroma*, but pleopod 3 with some branchial folds on the endopod.

A small number of plumose setae on both exopod and endopod of pleopod 4. Endopods of pleopods 1 and 2 sometimes becoming very elongate, and that of No. 1 being modified in the male into an appendage of probably sexual use (*N. laticauda*).

Exopods of pleopods 3, 4, and 5 with divisions.

Type of genus, *Neosphaeroma laticauda*, Whitelegge.

NEOSPHAEROMA LATICAUDA, Whitelegge.

Pl. xli., figs. 1-5.

Cassidina laticauda, Whitelegge, "Thetis" Scientific Results N.S. Wales Isopoda, pt. i., p. 238.

Hansen (Quart. Journal Microscopic Science, Oct., 1905) at page 130 says: "It is impossible for me to refer—*Cassidina laticauda*, Whitelegge—this species not only to any genus, but to any section or group of the Sphaerominae." A specimen occurs in the collection of the South Australian Museum, a female from Gulf St. Vincent, which is referable to Whitelegge's species, a fact which I have been able to confirm by the kind loan of cotypes male and female from the Australian Museum.

The following additions to Whitelegge's description—"Thetis" Scientific Results, page 238—are here given:—

The body of the southern specimen is about twice the size of the cotypes.

The marsupial laminae overlap and the mouth parts are unmodified.

The 1st and 2nd pleopods are normal, but in the 3rd the exopod has a division and the endopod carries 8 branchial folds; both rami carry many marginal plumose setae.

In the 4th pleopod the exopod is 2-jointed, the endopod branchial, both rami with a few plumose marginal setae.

The 5th pleopod also has a division on the exopod with 2 setuliferous lobes on the proximal portion at its inner distal angle and 3 on the terminal division.

In the adult male (cotype of Whitelegge's) the appendages on the 7th sternum are well developed.

The 1st pleopod has the endopod narrow-elongate about $2\frac{1}{2}$ times as long as broad with its inner margin modified into a peculiar sheath-like apparatus, thus from near the middle of the lamina there arise 4 long setae unlike the marginal ones in having short pinnae; these lie in the cavity of the sheath extending to its distal end.

In the 2nd pleopod the endopod is also narrow-elongate with the appendix long and folded on itself with a recess or ledge on the lamina.

The 3rd pleopod has the branchial folds on the endopod.

Except for these differences the sexes are similar.

NEOSPHAEROMA AUSTRALE, Whitelegge.

Pl. xli., figs. 6-11.

Sphaeroma australis, "Thetis" Scientific Results N.S. Wales Isopoda, pt. ii., p. 250.

The following may be added to Whitelegge's description:—

Posterior division of abdomen is broad and dome-shaped, gradually declivous to the end, the margin of which is broad, entire, and minutely serrate; from a posterior view, this has a broad insinuation in vertical direction.

The epistome is elongate, the apex rather broadly rounded, the upper lip is large.

The appendages on 7th sternum of thorax are stout, blunt, but becoming attenuated in older specimens.

The 1st pleopod has a narrow endopod not quite twice as long as broad with a strong ridge on the inner margin, the exopod is about as long as the endopod with a small proximal outstanding spine. Peduncle with 3 coupling spines on inner side and furry hairs on the outer.

The endopod of the 3rd pleopod has 3 or 4 distinct branchial folds; the exopod has a very oblique division ending inwardly with a small emargination.

Exopod of 4th pleopod carries 16 long plumose setae on the distal margin; the endopod carries 6 similar setae.

The uropods are robust; the inner ramus truncate at the end with a slight insinuation of the margin, the outer ramus is a little shorter with distal and inner margins serrate.

The female resembles the male with an end of abdomen slightly broadly rounded. The mouth parts are unmodified with the brood in the body. In another specimen there were marsupial plates meeting medianly.

Some specimens were presented by Mr. M. Ward, Sydney, to the South Australian Museum. Others in the collection of the Australian Museum are from Nelson's Bay, Port Stephens, New South Wales.

Neosphaeroma (?) *pentaspina*, n. sp.

Pl. li., figs. 1-5.

The body is rather broad and rather flat, glabrous, integument obscurely areolate like sand grains. Head narrow and short, first 4 segments of thorax not differing much in length, 3 remaining ones becoming shorter; all the epimera reaching downwards to about the same level, as also do the side plates of the anterior division of abdomen. Anterior division of abdomen short, the coalesced segments almost becoming free at their lateral extremities. The posterior division also is rather short, evenly arched, or domed; the posterior margin is rounded obtuse.

The antennule is short, its 1st joint scarcely produced at the posterior distal angle, 2nd joint about half the length of the 1st, 3rd joint a little longer than the 2nd, flagellum of 14 very short joints. In the antenna the peduncular joints are short, the 5th bears a small longitudinal row of setules, flagellum of 15 short joints.

Epistome much shorter than in many species of *Exosphaeroma*, its apical portion retiring towards the rostral region, its lateral limbs retiring and becoming attenuate.

The left mandible has the incisory plate rather short, robust, 4-toothed, the secondary plate is tridentate, the spine row is represented by a brush of setae united at the base. The molar and palp are strong.

The inner branch of 1st maxilla has 4 feather-form curved setae, the outer branch with 6 or 7 curved teeth, the outer ones pectinate. The three plates of the second maxilla are well marked, setose, and reach the same level. The maxilliped has a rather broad distal plate to the second joint, it is distally well spined, and has a row of feather setae on the inner fold. The palp is large, the lobes of joints well supplied with setae, there are no conspicuous setae on the distal ends of posterior margins of 3rd and 4th joints.

1st leg short, robust, basos with tuft of setules behind near proximal end, ischium with long setae, some of which are feather-form, merus with posterior process bearing long setae, also setose distally, carpus and propodus also provided with long fine setae, dactylus short, 2-clawed. 7th leg long, sparsely spined on setose. The pleopods are broad and large, the 1st has a rather narrow endopod with slight fold on inner margin, exopod broad with 5 conspicuous outstanding

spines near the outer proximal angle, peduncle with 4 slender coupling spines. 2nd pleopod with rather thick *appendix* reaching beyond the end of endopod. In the 3rd pleopod both exopod and endopod are broad, the exopod has the distal division occupying about one-third of the whole lamina. The 4th pleopod has well-developed plumose setae on both exopod and endopod. The exopod of 5th pleopod broadly rounded distally with one outstanding shagreenate apical lobe, another not outstanding lower down on the distal division, while just below is a smaller lobe on the proximal division.

The uropods are lamellar, the inner ramus reaching to end of abdomen, the endopod is shorter, distally rounded.

The specimens (2 males) were received dry, consequently the branchial folds of the pleopods were destroyed. My reason for placing the species in *Neosphaeroma* (?) is on account of the fringed state of the 4th pleopod rami.

Length, 10 mm.; breadth, 7 mm.

Locality, off coast of New South Wales. Presented by Mr. M. Ward, of Sydney.

Type in South Austr. Mus., Reg. No. C. 1054.

Isocladus howensis, n. sp.

Pl. 1., figs. 7, 8.

The body is short, glabrous, obscurely granular on the abdomen. Head short. 1st segment of thorax a little longer than those which follow, except the last, which has a long process reaching to the extremity of the abdomen; there is a small tubercle on each side of this. The eyes are of moderate size. The epimera are abruptly turned in the vertical direction, the last being a little deeper than those preceding. The anterior division of the abdomen is hidden by the 7th segment of thorax, the posterior division is moderately domed and tapers to an obtuse point, while below there is a shallow exit or channel to the cavity of the abdomen.

The epistome is long, rounded anteriorly, and rather tumid, the upper lip is large and distally squared or truncate. The 1st antennular joint is short, the 2nd a little longer than usual, the 3rd subequal to it in length, the flagellum has 10 joints. The antenna is robust with a flagellum of 10 joints. The mandibles have incisory plates entire, the left has a secondary plate bifid and as large as the primary, the molar process is large. The legs are robust, sparsely spined, but with furry pads on the usual joints.

The 2nd pleopod has an *appendix* reaching beyond the lamina of the endopod; this is not much longer than broad, and is very convex on its outer margin. The exopod is about the same length, is very narrow at base, with the distal fringe of setae long. The 3rd pleopod has a broad endopod exceeding the exopod slightly in length, the exopod is also broad, the division being nearer the middle than the distal end. The exopod of the 4th pleopod has a few distal setae and some setules on the outer margin; the endopod has a distal shallow insinuation and an apical setum. The exopod of the 5th pleopod has 2 distal outstanding lobes, the others obscure.

The uropods are moderate in size, rather thick, reaching further than the end of abdomen; the rami are subequal, the outer rather sigmoid in shape.

Length of male, 5 mm.

The female is without dorsal process, has a more domed and less produced posterior division of abdomen, with 2 small submedian tubercles. The uropods are much smaller than in the male.

The two specimens are from Lord Howe Island, found under stones, collected by G. P. Whitley. The type is in the Australian Museum, Sydney.

This species is very near to *I. armatus*, Ml. Edw. (see Tattersall, Brit. Ant. Exp., p. 217, pl. vi., figs. 9-17).

ISOCLADUS (?) LAEVIS, Haswell.

Pl. 1., figs. 9-12.

Sphaeroma laevis, Proc. Linn. Soc. N.S. Wales, vol. 5, pl. 16, p. 473.This is probably the female of a species of *Zuzara* or *Isocladus*.

The posterior end of abdomen is somewhat produced; there is an insinuation in the vertical direction below, but no notch or channel of any definiteness.

The mandibles are normal (though the female examined seemed post ovigerous), incisory plates entire, molar large.

The 2nd joint of the antennular peduncle is rather large, about half as long as the 1st, the 3rd is equal to the 2nd in length. The flagellum has 9 joints. The peduncular joints of the antennae are laterally compressed with 2 stiff bristles at the distal end of the 5th. The flagellum has 9 or 10 joints, which are long. The epistome is elongate.

The maxilliped has the lobes of 2nd, 3rd, and 4th joints of palp rather short, and a long setum is situated at the posterior angle of the 2nd and 3rd joints, as seen in *Z. venosa*, Stebbing.

The legs are strongly spined.

The pleopods have short rami as a whole. In the 1st the endopod is broader than long, the exopod with rather long outstanding spine; there are 3 or 4 coupling spines on the inner angle of peduncle. In the 2nd pleopod the endopod is rather longer than broad and very convex on the outer margin. The 3rd pleopod has a similar endopod, distally obtuse; the division on the exopod is quite near the middle. The exopod of the 4th pleopod has the division near the end, and a few plumose setae. Exopod of 5th pleopod also with a division.

The rami of uropods are laminate, narrow, obtuse distally, subequal, not reaching quite to end of abdomen.

Two examples from Bondi beach, New South Wales.

Length, 6 mm., of larger specimen.

CYMODOCE GAIMARDII, Ml. Edw.

Pl. xlii., fig. 2.

Sphaeroma gaimardii, Ml. Edw., Hist. Nat. Crust., t. iii., p. 209.

There are several representatives of this fine species in the collection. As it does not seem to have been figured, I have illustrated an example which is probably a young male.

The first 3 pairs of legs are somewhat more robust than those which follow. The epistome is tumid anteriorly; the two basal antennular joints almost touch at its apex, but further forward are separated by the small pointed rostrum.

The female (non-ovigerous) is like the male, but the posterior notch is not so deeply cut either in transverse or vertical direction, and the median process is distally rounded instead of square cut as in the male.

Length of male, 25 mm.; breadth, 14 mm.

This seems to be a southern species, it has been collected at Port Phillip (F. E. Grant) and by Professor Cleland at Encounter Bay, South Australia. It has been also reported from Tasmania and Gulf St. Vincent, South Australia. There is a small variety of this species.

CYMODOCE ASPERA, Haswell.

Pl. xlii., fig. 1; pl. xl., figs. 9-11.

Sphaeroma aspera, Proc. Linn. Soc. N.S. Wales, vol. v., pl. 16, p. 472.*S. aspera*, Richardson, Proc. U.S. Nat. Mus., 1909, vol. 37, p. 94.

The body is thick-set and broad. The head is short, steeply declivous in front, with a dorsal slight prominence and a few small tubercles. The eyes are

moderately large. The segments of thorax are also obscurely tuberculate on posterior margins; these segments become much shorter behind the 1st. The epimera have a downward direction, the more anterior ones more acute. The anterior division of abdomen has two submedian tubercles or prominences behind. The posterior division has two bosses, which are clear cut on the sides; there are two small tubercles below each, then it tapers to an obtusely pointed end with a slight incision on each side, below there is a deep channel in the vertical direction.

The epistome is prominent at its middle third, recedes anteriorly, the upper lip is large.

The 1st antennular joint is broad with a small sulcus near the distal end; the flagellum has 10-12 joints, as also has the flagellum of the antenna.

The mandibles have the incisory plates entire and strongly chitinised. On the left mandible the secondary plate is well developed, the molar process is strong.

The maxillipeds have a rather narrow basal portion, the palp has long lobes.

The legs are slender, of usual pattern, and sparsely spined.

The endopod of the 1st pleopod is at base a little shorter than its length. The exopod has a projecting spine at its outer proximal angle. The endopod of the 2nd pleopod is slightly insinuate on its outer margin; this feature is more pronounced on the endopod of the 3rd pleopod. Two small plumose setae are at the distal end of exopod of the 4th pleopod, and its much thickened endopod has distally a semicircular notch. The exopod of the 5th pleopod has two projecting setuliferous lobes on the proximal division and three on the distal, and is ciliate on its outer margin.

The uropod is slightly fringed with hair, the rami do not reach nearly to the end of abdomen, the inner ramus is rather broad and distally truncate, the outer is much smaller and is umbonate at the end.

There is in the collection a specimen of 6 mm. and another of 11 mm. by 7 mm.; the larger is not nearly so tuberculate.

The male is unknown.

The specimens are from Shell Harbour, New South Wales, collected by G. McAndrew, July, 1923.

CYMODOCE ACULEATA, Haswell.

Pl. xl., figs. 7, 8.

Cymodoce aculeata, Haswell, Cat. Austr. Crust., p. 291.

The body of the male is minutely granular with a thick pubescence towards the posterior end. There is a well-defined ridge across the forehead. The abdomen is highly sculptured, on the anterior division a 1st segment is distinct, as also are the lines indicating the other coalesced segments. There is a transverse row of 6 rather obscure tubercles in the median region, and the hinder margin has two submedian projections. The posterior division of the abdomen has 6 transversely arranged tubercles, and at the end the median process is elevated above the sides of the deep notch; the 3 distal ends here are obtuse and reach the same level.

The 1st joint of the antennular peduncle is short and broad, its hinder distal process not reaching the end of the 2nd joint, which also is short; the flagellum has 15 joints. The antenna is longer, its flagellum has 17 joints.

The epistome is anteriorly rounded and tumid.

The incisory plate of the right mandible is strong and is obscurely bifid or trifid, a spine row is present, and the molar is rather weak.

The legs are well spined and provided with the furry pads on meri, carpi and propodi in each.

The endopod of the 1st pleopod is rather longer than broad, its inner margin has a partial fold forming an open channel, the exopod has a strong outstanding spine, the peduncle has 3 coupling spines on the inner margin and fine hairs on the outer.

On the 2nd pleopod the appendix is straight, slender, and reaches beyond the fringe of the endopod; its base is scarcely bulbous and does not project below over the peduncle.

The 3rd pleopod is large with the exopod divided rather near the end.

The uropod has subequal rami, the inner is obliquely truncated, with a small tubercle near the distal end. The outer ramus is distally acute, its outer margin straight and strongly ridged; there are small teeth on the inner margin. There is a small tubercle on the peduncle.

Length of male, 19 mm.

The female has a much less sculptured abdomen. On the posterior division there are two obscure submedian bosses, and the posterior notch is very much less cut, but with the median lobe projecting a little beyond the sides of notch.

In a tube containing 64 specimens there were no ovigerous females, but young of both sexes were plentiful.

From Jervis Bay, New South Wales.

CYMODOCE BIDENTATA, Haswell.

Pl. xl., figs. 4-6.

Cymodoce bidentata, Proc. Linn. Soc. N.S. Wales, vol. vi., p. 189.

C. bidentata, Cat. Austr. Crust., p. 291.

The sides of the body in the regions of the thorax and abdomen are nearly straight, granulate, and with a rather scanty coarse pubescence, both of which are more pronounced posteriorly.

The head is long, rounded anteriorly where it shows from above parts of the antennules and rostrum when extended. The eyes are moderate, and there is a small oblong indentation on the vertex. The 1st segment of thorax is not much longer than those which follow. The epimera project downwards, the last 3 being wider than the others.

The anterior division of the abdomen has on its posterior border 2 submedian projections, flanked by 2 lateral tubercles, with 2 or 3 on each side more lateral and more obscure, from which spring tufts of longer setae. The posterior division which descends rather abruptly bears 2 tubercles, each nearly under the projections of the anterior portion; below these are two submedian spiniform tubercles turned upwards at their tips, and below these a median spiniform tubercle also upturned. The posterior notch is wide, its median process is lingulate, slightly bifid at the tip, and projects a little beyond the sides of the notch.

The epistome is rather broad, a little tumid anteriorly, with acute apex.

The 1st antennular joint is of moderate length, the 2nd small and partially embraced by the 1st, the 3rd joint is long, the 1st joint of the flagellum is half as long as it; the remaining joints are short and number 18, as also does the flagellum of the antenna.

The mandibles are normal, incisory plates entire, as also is the secondary plate on the left; spine row is well developed.

Maxilliped is rather small, the lobes of palp of moderate length.

The legs are rather sparsely spined, the spines being stronger on 1st pair.

The 1st pleopod has endopod slightly longer than broad, a little insinuate on its inner margin towards the end, with the more proximal part of margin folded inwards. Exopod with proximal outstanding spine turned up at tip, 4 coupling spines are on the inner angle of the peduncle, and the usual furry mass of hair

on the outer side. 2nd pleopod with the *appendix* exceeding the endopod by about half. Exopod of 3rd pleopod with division rather near the end.

The uropods are indurated and thickened, very setose and granular to spinuliform. The inner ramus is large and somewhat sigmoid, terminating in two acute teeth, one of which is subterminal and below. The outer ramus is small and much shorter, also with a terminal and subterminal tooth. There is a small tubercle on the peduncle above.

One male specimen from 100 faths. off Tasmania was collected by Mr. C. Hedley, and is in the Australian Museum, Sydney.

CYMODOCE UNGUICULATA, Barnard.

Cymodoce unguiculata, Barnard, Ann. S. Afr. Mus., vol. x., pt. xi., p. 394, pl. xxxiv.B.

There are in the collection three immature specimens which appear to belong to this species. They were taken by Mr. H. M. Hale in 5 faths. at Beachport, South Australia, accompanied by a species so close to *Exosphaeroma varicolor*, Barnard, that I hesitate to separate it. It is interesting to note that these two species are from the same locality in South Africa.

CILICAEA CRASSA, Haswell.

Pl. xliii., figs. 1, 2.

Cilicæa crassa, Proc. Linn. Soc., N.S. Wales, vi., p. 186.

The posterior division of abdomen, including the space between the two bosses, is so steep that it projects beyond the end, and between the two bosses the process of the anterior portion is seen on an inferior view. The end of the abdomen itself is trilobed, the notch widening inwardly; the median process of this is lingulate and directed downwards.

The exopod of uropod is best shown by the figures in two positions.

The legs are robust, the basal (basos) joints of the more posterior ones carry small strong teeth on their posterior margins.

The epistome is short and small.

CILICAEA SPINULOSA, Haswell.

Pl. xlii., fig. 4.

Cilicæa spinulosa, Haswell, Proc. Linn. Soc. N.S. Wales, vi., 1882, p. 184, pl. iii., fig. 3; *id.*, Cat. Austr. Crust., 1882, p. 297.

C. spinulosa, Whitelegge, "Thetis" Scientific Results Isopoda, pt. ii., p. 265.

This species has a very deep posterior notch visible from above with two denticles in it; a median process in this notch is very small.

The epistome is short, small, slightly tumid medianly, with a large labrum.

The body is covered with a coarse pubescence which becomes thicker behind.

The eyes are large and ovate.

The legs are very spinose.

CILICAEOPSIS STYLIFERA, Whitelegge.

Pl. xlii., fig. 7.

Cilicæa stylifera, Whitelegge, "Thetis" Scientific Results Isopoda, pt. ii., p. 267.

The end of abdomen has a deep exit channel (of a type very common, as will be seen), a median lobe is perhaps very obscurely indicated.

The epistome is short and rather broad with a small obtusely pointed knob on its anterior part which projects obliquely downwards.

The eyes are small, rounded, and prominent.

Cilicaeopsis corpulentis, n. sp.

Pl. xlv., figs. 1-7.

Body very convex transversely and longitudinally, covered with a fine woolly tomentum which in some specimens is scanty.

The head is broad, gradually declivous in front, with a sulcation across the forehead, it is about as long as the 1st thoracic segment; the antennular and rostral region projects a little. The segments of thorax do not differ much in length after the 1st. The epimera are vertical in direction, obtuse, and marked off by distinct sutural lines; those of the 7th segment are not so deep.

The anterior division of the abdomen is produced behind as a process which is adherent and curved to the general surface and does not reach its end; below this in the median region is a depression which divides the posterior division into 2 lobes which, though well marked, are not tumid. The posterior margin is broad, obtuse, with a broad shallow insinuation shown below and visible from behind. The cavity of the abdomen has thick walls.

The epistome is rather small, anteriorly truncate, the upper lip large.

The 1st antennular joint is broad and short, the 2nd joint not much embraced by the 1st, the 3rd joint is long. Flagellum of 18 joints. The antennal flagellum has 15 joints.

The mandibles show a concentration of strength in the incisory processes; these are highly chitinised and distally overlap. There is a strong spine row on the right mandible, but the molar is small and the palp very small. The secondary plate on left mandible is trifold.

1st maxilla of moderate size, distal spines of outer ramus highly chitinised, inner ramus is comparatively feeble.

The maxilliped is rather slender.

The legs are robust and strongly spined with strong dactyli.

The pleopods are broad in general aspect. The endopod of the 1st is triangular, about as long as broad, with a fold on the inner margin and a small distal emargination like as shown by Stebbing in *C. latreillei* (Ceylon Fisheries). Exopod with strong outstanding spine, inner angle of peduncle with 3 coupling spines.

The appendix on the 2nd pleopod is long and whip-like, its base is strong and downward depressed, its distal portion channelled with marginal setules.

The 3rd pleopod has broad rami as in *Paracilicaea*.

The 4th pleopod bears two distal plumose setae on the exopod, the endopod is thick and much folded.

The uropods are much reduced, the outer ramus is subcylindrical, the inner is also thick and reaches to end of abdomen.

This species is near *C. dakini*, Tattersall; it also much resembles the two species of *Paracilicaea* of this account, especially *P. pubescens*, Ml. Edw. In epistome, antennules, antennae, legs, pleopods, etc., it is difficult to distinguish from those of *Cilicaea latreillei*, Leach.

Length, 14 mm.; breadth, 9 mm.

There are three specimens from Port Stephens, New South Wales.

The type is in the Australian Museum, Sydney.

Cilicaeopsis halei, n. sp.

Pl. xlii., figs. 6, 8, 9.

Body almost glabrous; there are a few longish hairs on the uropods.

The head is rather long, a little umbonate above. The eyes are large. The 1st segment of thorax is a little longer than those which follow, the last is shorter and narrower, faintly sinuous on posterior margin. The epimera have each a small prominence and the lower lateral margin of 1st segment is turned up.

The anterior division of abdomen has the median region raised and is produced behind to 2 small projections with another median, and above, which is flanked by 2 obscure ones near its sides; this division also carries 2 obscure lateral tubercles. The posterior division has two submedian bosses; medianly it becomes abruptly declivous, then gradually so to the pointed end. There is an insinuation in the vertical direction which medianly is a channel, but there is no notch.

The 1st joint of the antennule has its distal angles not much produced. The flagellum has 10 joints. The antenna is robust with longish peduncular joints and a flagellum of 11 joints.

The epistome is anteriorly broad with a small tubercle on each side.

The right mandible has incisory plate 2 or 3 dentate. The left is entire with a long bifid secondary plate. The molars are very large.

The palp of maxilliped has long lobed joints nearly as in *Cymodoce tuberculosa*, Stebbing.

The legs are sparsely spined, not differing much from each other except that the 1st pair is a little weaker.

The 1st pleopod is more thickened than those that follow, the external spine of the exopod is small and non-projecting. There are 3 coupling spines in the peduncle, and externally it is destitute of the group of soft hairs. The exopod of the 3rd pleopod has the division well towards the middle of lamina, the endopod is broad and its outer margin slightly insinuate. The next 2 pleopods are hemibranchiate, the 4th having broad rami. On the exopod of the 5th there are 4 setuliferous lobes, one of which is outstanding; the external margin of this lamina has fine hairs.

The uropod is as in *Cilicæa*, a short inner ramus with the external ramus much longer, slender and a little curved.

Length, 6 mm.

The type, which is placed in the Australian Museum, Sydney, is one female specimen from Port Jackson.

This species seems to be near *C. dakini*, Tattersall, and *C. ornata*, Whitelegge.

PARACILICÆA (?) PUBESCENS, Ml. Edw.

Pl. xliii., figs. 8-11; pl. xlvi., fig. 1.

Sphacroma pubescens, Ml. Edw., Hist. Nat. Crust., t. iii., p. 209, 1840.

Cymodoce pubescens, Haswell, Proc. Linn. Soc. N.S. Wales, vol. v., p. 473 pl. xvi., fig. 1, 1881.

C. latreillei, Miers, Zool. H.M.S. "Alert," pp. 308-310, 1884.

C. pubescens, Hansen, Quat. Jnl. Micro. Sci., vol. xlix., pt. i., p. 122, 1905.

C. pubescens, Stebbing, Trans. Linn. Soc., vol. xiv., pt. i., p. 104, 1910.

C. pubescens, Stebbing, Ceylon Pearl Fisheries, Sup Repts. No. xxiii., p. 38, 1902.

The adult male of this species does not seem heretofore to be known. The following characters are taken from a specimen which, I believe, to have that standing:—

The pubescence of the body is very distinctive, short, thick, the individual hairs are like scales on stalks; the surface of the body is also granulate. In the abdomen the mesial lobe of the notch falls short of the sides.

The mandibles are normal, rather short, with incisory processes entire, secondary plate and spine row on the left well developed, the molar strong.

On the 1st leg on the 3rd, 4th, 5th, and 6th joints the spines are numerous; on the others the spines, although small, are also numerous on 4th, 5th, and 6th joints. The dactyli are short.

The pleopods resemble closely those of *C. latreillei*, including the very slight insinuation on the distal end of endopod of 1st pair.

The uropods have the cilicæiform characters.

The female of this species is of a more ovate shape, the anterior division of the abdomen is shorter and not so much produced backwards, the bosses on the posterior division are not so large. The mouth parts are much altered and the brood is internal. These females are also scarcely to be distinguished from those of *C. latreillei*, Leach; the pubescence, of course, is very different.

In the collection of the South Australian Museum are some specimens which I refer to this species somewhat doubtfully, a juvenile (see pl. xliii., fig. 11; pl. xlvi., fig. 1).

The New South Wales specimens are from Port Jackson and Port Stephens, and are common on the eastern coast.

Since writing the above I have observed two male specimens which, although preserving closely the structure of the female, yet, by the development of the *appendix masculina*—which has the long whip-like character—it would indicate their at least nearness to the adult state. Alternatively the inference might be drawn that there are 2 forms of the male. Further observation it will be seen is necessary. I must say that I have not seen the above *Cilicæa* form of male among specimens from the southern coast.

Paracilicæa stebbingi, n. sp.

Pl. xliii., figs. 3-7.

The body is smooth, glabrous. Head rounded anteriorly, rather short. Eyes of moderate size.

The 1st segment of thorax is the longest, the following 3 subequal in length, the last 2 are shorter, the last is obscurely tuberculate on posterior margin with 2 lateral tubercles more pronounced. Anterior division of abdomen short, with 6 distinct tubercles on the posterior margin, with 2 above laterally placed, and between the 2 submedian there are 2 very small ones away from the posterior margin and 2 lateral tubercles on each side. The suppressed segments are distinctly marked. The posterior division is marked by 8 longitudinal ridges; there are two short submedian, two long outward from these, these end posteriorly in 2 large bosses which project beyond the end of abdomen, another pair of short ridges, then a pair of strong longer ones whose posterior ends project a little over the peduncles of the uropods. The bosses are separated by a median sulcation which descends abruptly to the posterior notch, which is deep, widening inwardly with a median lobe which only slightly projects but which nearly fills the widened basal part. The sides of the notch and the median process are slightly raised.

The epistome is of moderate size, its apical portion forms a continuous surface with the head and basal antennular joints. The upper lip is large.

The basal joint of the antennule has its lower distal angle produced to a point but falling short of the end of 2nd joint. The flagellum has 19 joints. The antenna is moderately robust, its flagellum has 19 joints.

Mandibles with incisory processes entire, and strong molars; the right spine row, the left with bifid secondary process besides.

The legs are of the usual pattern, the 7th bears long spines in the usual positions.

The appendages of the 7th thoracic sternum are long and slender.

The endopod of the 1st pleopod about as broad as long with a strong fold on inner margin; exopod with strong proximal outstanding spine. There are 5 coupling spines on the inner side of the peduncle and dense hairs on the outer side. The 2nd pleopod has the *appendix* slender exceeding the endopod in length, its basal portion moderately bulbous. In the 3rd pleopod the rami are very broad; the exopod division is near the end. Exopod of 5th pleopod with 5 outstanding setuliferous lobes.

The exopod of uropod is large, curved, and subcylindrical. The endopod is short, not wholly visible from above.

The female differs from the male as the figure shows. The mouth parts are modified and the marsupial plates overlap.

Length of male, 11 mm.

The specimens—two—were collected by Mr. A. R. McCulloch, from Cairns Reef, Cooktown, Queensland.

Type is in the Australian Museum, Sydney.

Cymodopsis, n. gen.

Epistome variable, sometimes elongate, with a small but distinct forward projecting free portion.

End of abdomen pointed obtusely, with a more or less deep exit channel to cavity of abdomen cut in vertical direction, the end of abdomen in a lateral view often projecting slightly above and beyond the immediate exit; or it may be regarded thus, the end of abdomen is a pointed median process which has completely obliterated a notch.

The endopod of 1st pleopod is usually rather narrow-elongate.

Uropods variable, scarcely foliate, often not reaching as far as end of abdomen. Exopod reduced, much altered or rudimentary, the endopod remaining normal:

Type of genus, *Cymodopsis latifrons*, Whitelegge.

CYMODOPSIS LATIFRONS, Whitelegge.

Pl xlv., figs. 1-5.

Sphaeroma latifrons, Whitelegge, "Thetis" Scientific Results Isopoda, pt. ii., p. 252.

The following characters may be added to those of Whitelegge:—

The epimeral portion of the 1st thoracic segment is thickened with a swelling on the lower margin. All the epimera are vertical in direction and, except the 1st, are marked off by suture lines.

The posterior division of the abdomen is gradually declivous to an obtuse point where the deep channel exit is in the vertical direction.

The epistome is of unusual shape, it has a free obtuse upper portion which projects obliquely downward.

The pleopods as a whole are narrow. In the 1st the endopod is twice as long as broad, ciliate, and slightly folded on its inner margin. The exopod has a very long outstanding spine on the proximal external angle. The peduncle has 4 coupling spines on the inner angle and the outer side has a bent appearance noticed in other species and is furry. The plumose setae of both rami are very long.

In the 2nd pleopod the endopod is also narrow with a slight ledge near the inner margin, the *appendix* is very attenuate at the end. In the 3rd pleopod the endopod is more obtuse at the distal end, the plumose setae on the exopod reach thickly to the base of the lamina on the outer side, as also do those of the 1st and 2nd pairs. The distal division of the exopod of the 5th pleopod has 3 outstanding lobes.

The inner ramus of uropod is rather broad, distally truncate with a faint emargination, the exopod is awl-shaped in outline but is a little flattened with a slight ridge on the underside and reaches well beyond the inner ramus.

The female has much more slender legs than the male. The outer ramus of uropod is small, ovate, and much shorter than the inner.

In the single female specimen there is no sign of brood, the marsupial plates are not formed, and mouth parts are normal.

CYMODOPSIS PLUMOSA, Whitelegge.

Pl. xlv., figs. 6-9.

Sphaeroma plumosa, Whitelegge, "Thetis" Scientific Results Isopoda, pt. ii., p. 254.

Body slightly hairy in tufts (the hairs plumose), convex.

Head with a rostral prominence seen from above and another behind on the forehead. Eyes large, rounded, protruding. 1st segment of thorax a little longer than each of those that follow except the last. The epimera of 2nd, 3rd, 4th, and 6th segments rather acute; all are well separated from each other. The last segment of thorax is much shorter. Anterior division of abdomen short, rather tumid medianly near posterior border. The posterior division is dome-shaped and has 2 obscure tubercles medianly, behind this the surface shelves away to an obtusely pointed end slightly insinuate at the sides, below there is a short channel which is rather deep. A transverse ridge near the exit of cavity of abdomen carries a row of curious setules with knobbed heads.

The epistome is very long with large upper lip and a rounded apex not visible in a view from above.

1st joint of antennule broad and short, minutely granular with flagellum of 7 joints. Antennal flagellum of 10 joints.

The mandibles are weak, incisory process 3 or 4 dentate; a secondary plate is on the left mandible; a molar is present.

The maxilliped has its palp with moderately long lobes.

The legs are strong and uniform with strong dactyli, sparsely spined and furred.

The pleopods have the endopod of the 1st not quite twice as long as broad; the exopod is broad with its proximal spine weak and not projecting. There are 3 coupling spines on the inner angle of the peduncle and the outer side is cut away and non-setose. In the 2nd pleopods the *appendix* is indicated but not separate from the lamina of the endopod (this condition also occurs in a cotype specimen). There are only indistinct folds on the endopod of the 4th, but the lamina itself is large and evidently respiratory, there is a division on the exopod and both rami are tipped with a few plumose setae, the distal emargination of the endopod is shallow. The 5th pleopod has endopod with oblique folds faintly discernable, the setuliferous lobes on the exopod are not well defined.

The rami of the uropods are subequal in length, both distally truncate, and not reaching end of abdomen.

In a female (damaged cotype) the young were in the body, the mouth parts were normal. In another male specimen examined, the respiratory folds were more developed, but the appendix was quite as much undetached as in the above, although the appendages of the 7th sternum were more developed. The sexes are similar. Length, 7 mm.

From trawl net "Goonambee," 70-80 faths., off Port Jackson, C. W. Mulvey; also one cotype, 39-46 faths., off Green Cape, New South Wales, A. A. Livingstone and H. A. Fletcher. A specimen is in the Adelaide Museum from Mr. M. Ward, Sydney.

Cymodopsis gorgoniae, n. sp.

Pl. xlv., figs. 10-13

28

The body is granulate on exposed parts, the smooth areas on segments indicating that the animal is capable of bending in opposition to the usual direction, especially about the middle of the body. There are few scattered setae on the abdomen and epimera. It is highly calcareous.

The head abruptly descends in front, the basal joints of the antennules and rostrum being quite underneath; on the forehead are two low tubercles with a smaller one behind. The eyes are medium in size and projecting. The 1st

thoracic segment is nearly as long as the 3 which follow together, the others are short, especially the last. The epimera are marked off by distinct suture lines and are a little turned in below, those of the 2nd, 3rd, and 4th are subacute, those of the 5th, 6th, and 7th obtuse and rounded, that of the 7th not reaching the level of the preceding. The anterior division of abdomen is short, medianly a little projecting behind, and there inclined to divide into 2 tubercles. The posterior division has 2 submedian bosses somewhat pointed behind with a rather deep sulcation between them. The end is obtusely pointed, below it shows an exit of channel which is rather narrow, the end being a ledge sloping upward.

The basal antennular joint is broad and short, the 2nd joint is rather quadrate in shape, the 3rd is longish; the flagellum has 6 joints. The antennal flagellum has 10 joints.

The epistome is rather tumid in the middle with small labrum.

The mandibles and other mouth part are metamorphosed.

The legs are long and moderately spined.

The 1st pleopod has the rami marked with minute areolae, the exopod has a small outstanding spine. The endopod is a little longer than broad; the peduncle has 4 long coupling spines on the inner angle and the usual mass of hair on the outer side. In the 2nd and 3rd pleopods the endopods are broad and distally truncate, in the 3rd the division is near the end of exopod and the endopod is very convex on its outer margin. In the 4th the exopod is tipped with 2 or 3 setae, the endopod has a distal gap which is rather wide and one setum. The exopod of the 5th is narrow with 3 or 4 outstanding lobes.

The uropod is small, indurated, and does not reach the end of abdomen, the inner ramus is distally rounded, as also is the outer.

The single specimen is an ovigerous female with marsupial plates and young in the body.

In a smaller non-ovigerous female in the same tube, the ledge-like termination of abdomen is not developed, so that there is a simple notch visible from behind forming the exit to channel; also in this specimen the end of inner ramus of uropod is truncate and the outer is more ovate and a little serrate on margin. The tip of epistome is also more acute.

Length of type specimen, 6 mm., placed in Australian Museum, Sydney.

From Long Reef, New South Wales, associated with *Gorgonias*.

There may be noted two deviations in the same sex; more may be expected in the undiscovered male. The species is here placed in the genus *Cymodopsis* provisionally.

Cymodopsis crassa, n. sp.

Pl. xlvii, figs. 1-11.

The body of the female is almost glabrous, dorso ventrally thick, especially in the region of the 1st thoracic segment, strongly declivous anteriorly from the 2nd thoracic segment and gradually declivous posteriorly. Epimeral portions of segments deep, nearly vertical in direction, the 2nd to 7th marked by distinct sutural lines.

Head short, with a very slight transverse depression between the eyes.

The segments of thorax become shorter in posterior direction, the 7th being very short.

The anterior portion of abdomen is short without any projections, the posterior bears 2 conical bosses, the depression between them being shallow; behind these the surface is abruptly declivous, then gradually so to the very obtusely pointed end which has a wide, rounded, shallow insinuation in the vertical direction.

The epistome is rounded and rather tumid anteriorly, bearing a large upper lip.

The 1st antennular joint is short and broad, its distal end moderately embracing the 2nd joint, the 3rd joint is as long again as the 2nd. The flagellum has about 27 short setose joints, the 1st of which is half as long as the preceding peduncular joint.

The peduncle of the antenna is longer than that of the antennule, its 5th joint reaching its whole length beyond the peduncle of the antennule, its flagellum has about 20 joints sparingly setose.

The maxillipeds have rather long palpal joints sparingly setose.

The legs are of the usual type with strong dactyli and sparingly spined.

The inner ramus of uropod is slightly falcate, not reaching the end of abdomen; it has a slight groove or slit at the end. The outer ramus is rudimentary.

The following details refer to the male:—

The right mandible has incisory plate obliquely entire, there follow 7 stout curved pectinate spines, the molar is short and strong.

The 1st pleopod is large, with exopod longer than broad with a strong projecting spine at the exerted proximal angle. The endopod is twice as long as broad. The peduncle is narrow and carries 4 coupling spines on the inner angle; the outer side has a dropped-down appearance and does not reach the angle of the exopod; it is sparingly hairy.

The endopod of the 2nd pleopod has a long whip-like appendix.

The exopods of 3rd, 4th, and 5th pleopods have each a division, that of the 4th acuminate to an acute point and that of the 5th is rather narrow with 1 setuliferous lobe on the inner distal angle of the proximal portion and 2 on the terminal.

The uropod is as in the female.

In the female, though of large size, there are no marsupial plates and the mouth parts are normal. The male specimen was much damaged, and except for some mounted parts has, unfortunately, been lost. The larger female measures 12 by 8 mm.; it was pink in colour with very small dark spots when fresh.

Dredged in about 6 faths., Gulf St. Vincent, by H. M. Hale.

Type in South Australian Museum, Reg. No., C. 573.

Cymodopsis wardii, n. sp.

Pl. xlvii., fig. 12; pl. xlviii., figs. 1, 2.

The body is rather broad. The head has a transverse ridge anteriorly which forms on each side a subacute angle. The eyes are large and prominent. The segments of thorax do not differ much in length except the last, which is very short. The epimera are well defined from the tergites, obliquely projecting; those of the 2nd, 3rd, and 4th are subacute, the others more obtuse, the last is quite short. The anterior division of the abdomen is short and unarmed. The posterior division is dome-shaped with 2 submedian bosses not very strongly marked, and from these the surface descends rather abruptly to the pointed end which below is widely insinuate, in the vertical direction medianly there is a very short exit channel but no notch in the usual sense. The cavity of the abdomen is deep and the uropods are capable of a vertical position, thus acting as props.

The epistome is very long, especially in its anterior part; broadly rounded anteriorly and projects a little beyond the front of the head.

The antennular peduncle is robust, its 1st joint broad and granular, the 1st joint of flagellum is half as long as 3rd joint of peduncle; it is composed of 4 long joints. The antenna also is unusually robust, its 1st joint of flagellum is subequal in length to the last peduncular joint; there are 11 joints.

The right mandible has incisory process entire, is rather slender, the spine row and molar are well developed. The molar has some longish denticles on the margin. The palp is large.

The maxilliped has the distal plate of 2nd joint large and the palp has long lobes to joints.

The legs are sparsely spined, a conspicuous plumose setum is found at the end of propodus of some.

The pleopods have unusually long peduncles. 1st pleopod has endopod much longer than broad, the exopod with small, scarcely projecting proximal spine turned up at tip. Peduncle with 2 or 3 coupling spines on inner angle and sparsely hairy on the outer side. In the 3rd pleopod the exopod is without division—that I could detect—and the endopod is curiously folded obliquely—this occurs on both. The exopod of the 5th pleopod has 3 lobes on the distal division and 2 on the proximal; the distal division is triangular in shape, and on the outer side there is a group of bristles at the end of the division line.

The uropod has a strong inner ramus which is obliquely truncate at the end with the inner angle produced to a point; it does not reach the end of abdomen. The external ramus is very small.

Length, 4 mm. One non-ovigerous female in bad preservation, collected by C. W. Mulvey, trawler "Goonambee," 78-80 faths., off Port Jackson.

Type placed in Australian Museum, Sydney.

Cymodopsis albanensis, n. sp.

Pl. xlvii, figs. 3-7.

The body is short, deep, with a very coarse and scanty tomentum. The head is short, the eyes of moderate size. The 1st segment of thorax is longest, the rest becoming shorter posteriorly. The anterior division of abdomen is short, the suppressed segments faintly marked above but distinctly cut on the lateral margin. The posterior division is marked by two domes not very prominent and not deeply divided from each other medianly, the surface then has an abrupt descent to the scarcely produced and obtusely pointed end, which is very obscurely trilobed, the lateral lobes only visible from a side view; the exit channel from the cavity of abdomen is moderately deep.

Basal antennular joint is broad, 2nd joint small, 3rd rather short, flagellum of 10 joints. Antenna slender, flagellum of 10 joints.

The epistome is arcuate and a little tumid anteriorly; this portion stands out from the head and projects downward, so that there is a small excavation between it and the rostrum.

Mandibles with incisory plates entire, the secondary plate on the left mandible is slightly bifid, the spines in the spine row are strong, and there is a large molar.

The maxilliped is rather large, the distal plate of 2nd joint large with some strong dark-tipped spines on its inner fold below the apical spines, which are crowded; the palp is large with lobes rather long, the terminal one slender.

The legs are robust. The 1st with very strong spines on merus, carpus, and propodus, the 5th with some thorn-like spines on the basos.

The first 2 pleopods are very similar to those of *C. latreillei* and *P. pubescens*. There is a distal insinuation on the endopod of the 1st, which is longer than broad and slightly insinuate on the outer margin; the exopod is narrow with a strong out-standing proximal spine; there are 4 coupling spines on the peduncle. The 2nd pleopod has a long whip-like appendix.

The uropod has a large peduncular portion, the endopod is broad at the base, where it is fused to this, tapering to a truncate end, which does not reach

as far as the end of the abdomen; the exopod is much narrower and shorter with a strong tooth on the outer side, the terminal half is minutely serrate on the margin.

This species is like *C. aspera*, Haswell; it also is like the young female of *C. latreillei*, also female of *P. pubescens*.

Length, 7 mm., one specimen from Albany Island, not in good preservation.

The type is in the Australian Museum, Sydney.

CASSIDINELLA INCISA, Whitelegge.

Pl. xlviii, figs. 2, 3.

Cassidinella incisa, Whitelegge, "Thetis" Scientific Results Isopoda, pt. i., p. 242.

The median region of the anterior division of abdomen is tumid; the posterior division has 2 rather obscure bosses above; the acute end is raised above the lateral processes, forming a partial channel or exit to the abdomen below. The acute epimera are thickened, as also are the uropods.

The 3rd joint of the antennular peduncle is very short, and the 1st joint of the flagellum is subequal to it; the flagellum is short with 8 joints. The flagellum of the antenna has the same number of long joints; both are scarcely setose.

The pleopods, which are those of a female, are in rather bad condition; both exopod and endopod of the 4th are tipped with a few plumose setae; the exopod of this has a division, as also has the exopod of the 3rd pleopod. The pleopods themselves are narrow, but otherwise do not differ from those of Hemibranchiatae.

Length, about 5 mm.

There are in the collection three rather damaged specimens with one slide of pleopods.

Collected by C. W. Mulvey, trawler "Goonambee," 75-80 faths., off Port Jackson.

Group EUBRANCHIATAE, Hansen.

Dynamenella rubida, n. sp.

Pl. xlviii, figs. 4-7.

The body is slightly granular or punctate, glabrous.

Head short and rather narrow. The eyes are large.

The 1st segment of thorax is longer than those which follow, these being subequal in length.

The epimera are vertical in direction, not showing distinct sutural lines.

Anterior division of abdomen is quite short, the markings of coalesced segments obscure.

The posterior division of abdomen is moderately dome-shaped, shelving away gradually to an obtusely pointed end, and which bears a small \wedge -shaped notch which is partially tubular, the exit of a channel which widens inwardly.

The epistome is elongate, apically obtuse, carrying a very broad and long upper lip.

The 2nd joint of the antennule is half as long as the 1st, the 3rd nearly as long as the 2nd, tumid; the flagellum has 8 short joints. The antenna is stout, the peduncle with short joints, flagellum of 12 short moniliform joints.

In the maxilliped the plate of 2nd joint is subequal to the joint itself.

The legs are short and stout, not differing much in length, with furry pads in the usual positions, few spines and strong dactyli. In the 7th the merus and carpus are subequal in length, the propodus equal to merus and carpus together; the ischium is also subequal to the propodus. The fringing plumose setae on the pleopods are unusually long.

The exopod of the 1st pleopod is much larger than the endopod; it, as well as a portion of the endopod, is indurated and areolate, there is a ledge on the endopod on which the contiguous part of the exopod rests. This structure is seen in other related species and has been noted by Barnard and others. There is no outstanding spine on the exopod. The endopod of the 2nd pleopod also has a ledge on which rests the *appendix*; this is thick, and reaches to the end of the lamina, in this case the endopod is much larger than the exopod, being about as long as broad. There are 4 coupling spines on the peduncle. The exopod of the 3rd pleopod is unjointed. Any divisions that may be on the exopods of the 4th and 5th pleopods are obscured by branchial folds.

The uropod has subequal rami; they are ovate-laminar with entire margins. One male specimen from Maroubra, New South Wales. The colour is pinkish with scattered dark markings. Length, 5 mm.

The type is in the Australian Museum, Sydney.

CERCEIS TRIDENTATA, Ml. Edw., var. *intermedia*, n. var.

Pl. 1., figs. 1, 2.

Cerceis tridentata, Ml. Edw., Hist. Nat. Crust., t. iii., p. 221.

C. tridentata, Baker, Trans. Roy. Soc. S. Austr., vol. xxxii, 1908, p. 153

The posterior division of abdomen has 2 very obscure bosses, each capped with an obscure tubercle. The posterior notch is deep, and there is a median process whose free part is small, but there are indications on the integument of a much larger uncut base. The channel below is long and deep, the abdominal walls being turned in below, as also are the epimera of the thoracic segments.

The epistome acuminate to an acute point. The upper lip has a setose fringe which, with the setae on the plates of the maxillipeds, covers the mandibles.

The inner distal angle of the 1st antennular joint is produced to the end of the 2nd joint, which itself is also distally pointed; the outer angle is scarcely produced, the flagellum carries 8 or 9 joints. The antenna is slender, its flagellum has 12 joints.

There are five females in the collection and one male, which apparently is not quite mature, as the *appendix masculina* is still undetached from its lamina. All are much smaller than the southern specimens of *C. tridentata*; they are devoid of pubescence on the abdomen, which is sometimes the case with that species from southern waters.

From floating sargasso weed, south-west of Vanderlin Island, Sir E. Pellew Group, Gulf of Carpentaria, June, 1923, Dr. N. G. J. Paradice, R.A.N., 4 females, 1 male; also 1 female, Bowen Jetty, Queensland, E. H. Rainford.

Australian Museum, Sydney.

Cerceis ovata, n. sp.

Pl. xlix., figs. 1-5.

The body is ovate, strongly convex, almost glabrous.

The head is short, anteriorly there is a transverse ridge and a faint indication of 2 lobes, posteriorly there is a distinct median boss near the border in the female.

The eyes are moderate in size.

The first segment of thorax is a little longer than those which follow and these do not vary much in length; they are marked by some obscure, short, longitudinal ridges towards the sides.

The epimeral plates of thorax project obliquely, the 2nd, 3rd, and 4th are narrower than the following two, the last a little shorter.

The anterior portion of the pleon is short and squared laterally, the coalesced segments well marked at the sides. The posterior portion is dome-shaped, then tapers to an obscure end, on which is a rounded simple notch, shallow, and not conspicuous from above; this is the exit of a rather deep channel.

In the male the anterior portion of the pleon has an obscure median tubercle, and the dome on the posterior portion is very obscurely divided into 3 lobes.

The 1st antennular joint is broad, its outer distal angle is acute and a little turned outwards, the inner embraces the 2nd joint for the whole of the joint's length. The 3rd peduncular joint is rather longer than the 2nd. The flagellum carries about 13 joints.

The peduncle of the antenna is longer than that of the antennule by the length of the 5th joint, its flagellum also has 13 joints.

The epistome is elongate and tapers anteriorly to an obtuse point which stands out a little from the obscure rostrum.

The right mandible is moderately robust, and has a prominent incisory process cut into 4 dark teeth; the secondary plate is small, also dark, and is followed by 4 curved spines. The molar is long, robust, and edged with small teeth. The left mandible has the secondary process stronger.

The hypopharynx is more prominent than usual.

The outer branch of the 1st maxilla has 7 strong simple spines.

The maxilliped has the plate of the 2nd joint rather broad with few terminal spines; the palp is large with joints lobed and well spined.

The legs are robust and moderately spined and of usual type.

The 1st pleopod has the exopod more than twice as broad as long, distally truncate, bearing 7 strong teeth on its external border; there is only a small projecting spine on the proximal external angle. The endopod is about twice as broad as long. The inner angle of peduncle has 3 coupling spines.

In the 2nd pleopods the rami are similarly proportioned with *appendix masculina* attached to the endopod at about the middle of its inner margin, and it reaches beyond the plumose setae. The exopod has 12 teeth on the outer margin.

The endopod of the 3rd pleopod reaches nearly as long as the exopod, which has a division line nearer the middle of the lamina than the end.

In the 4th pleopod the exopod has a distal emargination, but a division could not be seen.

The exopod of the 5th pleopod has 3 distal lobes with the division line rather near the end; there is another small lobe and a few setules on the inner margin.

The inner ramus of the uropod is broad, reaches to the end of the pleon, and is terminally truncate with a rounded inner angle. The outer ramus is shorter and distally very obtusely rounded and toothed.

The female is much larger than the male with the posterior channel not quite so deep. The mouth parts are modified. The brood seems to be deep in the body.

There are three specimens in the collection from 6 faths., Gulf St. Vincent—an ovigerous female and a non-ovigerous, and a male.

Length of male, 7 mm.; female, 12 mm. long, 7 mm. broad.

Types, with two slides, are in the South Australian Museum.

Exocerceis, n. gen.

Head narrowing much anteriorly.

Posterior division of abdomen with a notch and raised median process in the notch in the male.

1st joint of antennule with distal angles not prolonged.

Maxillipeds with long lobes on palpal joints.

Exopod of 3rd pleopod not jointed.

111

Otherwise as in *Cerceis*.

Type of genus, *Exocerceis nasuta*, Whitelegge.

EXOCERCEIS NASUTA, Whitelegge.

Pl. xlviii., figs. 10-12.

Cerceis nasuta, "Thetis" Scientific Results Isopoda, pt. ii., p. 276.

The posterior division of abdomen has a median tubercle rather obscure with a small furrow below it. The submedian tubercles are keel-like.

The epistome is convex and the very setose upper lip covers the mandibles.

The *appendix masculina* on the 2nd pleopod is as in *Cerceis*, but the exopod in both sexes carries several strong subterminal comb-like spines.

The exopods of pleopods 4 and 5 are unjointed.

The rami of the uropods are broadly lamellar, serrate on margins, nearly equal, the outer one is slightly spoon-excavate.

Platycerceis hyalina, n. subgen. and sp.

Pl. lii., figs. 6-11.

The body is much compressed dorso-ventrally, smooth, almost glabrous, in the living state hyaline. The head is somewhat triangular, produced laterally to acute angles in front of the eyes; these are large with many ocelli. The segments of thorax are all laterally produced to acute outstanding processes, which become more curved backwards towards the posterior region. The 7th segment is shorter and laterally not so much outstanding. Faint lines mark off the epimera. The abdomen is little convex; the anterior division is marked in the usual way by the coalesced segments, and laterally is acute and projecting; the posterior division also acute at the sides terminates in two spiniform projections.

The epistome is rather large, the anterior portion a little swollen, the apex is acute.

The antennule has the 1st joint moderately expanded, distally it is produced at the inner angle, but not so far as the end of 2nd joint, 2nd joint less than half the length of the 1st, the 3rd joint is narrow. The 10-jointed flagellum has the 1st joint nearly equal in length to the 3rd peduncular joint. The antenna has the last joint of peduncle longest, the flagellum of 12 joints.

The mandibles have slender incisory plates divided into 4 teeth, the molars and palps are large.

The 1st maxilla has the inner branch with 4 curved feather setae and a small cluster of setules on its inner side; the outer branch, which is robust, has also some setules on its inner margin.

The lobes of the maxilliped palp are rather short and are sparsely setose.

The legs, except the 1st pair, are slender; there are no furry pads and spines are not numerous.

The 1st pleopod has a rather broad peduncle with 3 coupling spines, which are broad and different from those found in such genera as *Cymodoce*, etc. The exopod is much broader than long and has no outstanding proximal spine; besides the plumose setae there are 6 strong teeth on the distal margin, as in *Cerceis*, etc. The endopod is small, about twice as broad as long. The 2nd pleopod is larger than the 1st; there are 17 strong teeth on the exopod, the endopod is larger than the exopod. There is a curious hump near the inner angle of the peduncle. The 3rd pleopod has a narrow divided exopod with several distal teeth. The 4th and 5th pleopods are narrow; all rami of these are branchial, the exopod of the 5th has two outstanding rasp-like lobes.

The uropods have subequal rami, long, narrow-lanceolate, spreading, slightly curved outwards much exceeding the end of abdomen, strengthened by ridges above and below, the outer rami slightly serrate.

Length, 7 mm.; breadth, 4 mm. One female, Gulf St. Vincent, 4 faths., taken by H. M. Hale.

The type is in the South Australian Museum. Since the above was written a male specimen has been taken. The following points have been noticed:—The epistome is apically much more attenuate. The antennule has a flagellum of 18 joints and is much more robust than in the female. The legs have strong spines on the propodal joints, except in the last pair, which is more slender. The appendages on the 7th sternum are short and thick. The exopod of the 1st pleopod has only 3 teeth. In the 2nd pleopod the exopod has 9 teeth. The *appendix masculina* is very long, reaching nearly to the end of the abdomen, and capable of forming, with its fellow of the opposite side, a cylindrical tube whose wall becomes very thin distally. The colour of this elegant species has been observed in the fresh state:—As a ground translucent, or nearly so, with brownish spots and small blue elongate areas, as follows, 1 median on the head, 4 submedian on 1st thoracic segment, 2 lateral on the 3rd, 2 submedian on the 4th, 2 lateral on the 5th, 2 lateral on the 6th, 2 on each side of the anterior division of abdomen, 2 submedian and 2 lateral on the posterior division of abdomen. There is also a median concentration of brown and yellow, more conspicuous on the posterior division of abdomen, which besides has a mottled appearance.

HASWELLIA ANOMALA, Haswell.

Pl. xlviii., figs. 8, 9.

Sphaeroma anomala, Haswell, Trans. Linn. Soc. N.S. Wales, p. 473, pl. xvi., fig. 4; also Cat. Austr. Crust., p. 288.

This is the female or young of some species of *Haswellia*. The produced 7th segment of thorax is very pronounced, its apex extending to the posterior margin of the first division of abdomen.

The pleopods are as in *H. carnea* and *H. emarginata*; the general aspect is like the female of *H. emarginata*, except for the produced 7th segment of thorax.

HASWELLIA CARNEA, Haswell.

Pl. xlix., figs. 8-11.

Calyptura carnea, Trans. Linn. Soc. N.S. Wales, p. 476, pl. xvii., fig. 4; also Cat. Austr. Crust., p. 302.

The apex of process from 7th segment of thorax is slightly depressed, and below there is a broad shelf behind the cavity of the abdomen; the abdomen itself is very short and steep behind, its upper surface is very obscurely trilobed.

The antennular joint has a furrow for about half its length, the inner margin has a recess into which the side of the anterior portion of epistome rests. The epistome itself is unusually sculptured.

The tooth on inner margin of endopod of uropod is strong and rests in a small recess on the abdomen close to the side of the posterior notch. The uropods end in dense ciliae.

The legs are stout and very sparsely spined.

The pleopods are of *Cerceis* form, the 1st has endopod broader than long, exopod with small outstanding spine curved backwards, and scale-like markings on the surface; on its margin are 6 strong teeth, and the distal end is truncate; outer distal angle rather acute, inner rounded. On the inner side of the broad peduncle are 3 coupling spines and the outer side is furry.

The margin of exopod of 2nd pair carries 14 or 15 teeth, the union of the short *appendix* to the endopod is nearer the distal end.

The exopod of the 3rd pleopod has a division and 5 or 6 teeth on margin. The exopod of 4th pleopod has a blunt tooth or lobe on its outer margin near the base.

The exopod of the 5th pleopod has two long lobes on the distal part, a very obscure division quite near the end, and a small lobe on the proximal part on the inner side.

The species seems to be fairly plentiful on the New South Wales coast.

Haswellia juxtacarnea, n. sp.

Pl. xlix., figs. 6, 7.

There is a dried specimen in the collection from Lord Howe Island very much like *H. carnea*.

The process from 7th segment of thorax is minutely rugose and there are depressed areas on the same; this process completely covers the uropods as well as the abdomen. In an inferior view the exopods of uropods are seen, the endopods being largely concealed. This curious structure of end of abdomen is very different from that of *H. carnea*, as the figure shows. There is a similar sculpturing of the epistome and the antennular joints as in that species.

Length, 10 mm. Type in Australian Museum, Sydney.

Haswellia intermedia, n. sp.

Pl. liii., figs. 1-5.

The body is rough and becomes distinctly granulate behind, while the abdomen is coarsely granulate.

The head is long with a small rounded projection in front visible from above. There is a strong ridge on each side, being the outer margins of the channels, which probably have a respiratory function when the animal is rolled up; these reach nearly to the eyes, which are rather large.

Of the segments of thorax the 1st and 6th are subequal in length, the 7th is produced to a long process reaching beyond the end of abdomen, and its base almost completely covers the anterior division of the abdomen. The epimera are downward and backward directed, each with a slight excavation at the extremity. The posterior division of abdomen has a median tubercle ill-defined and narrows considerably to the end, where there is a deep notch widening inwardly with a median process which fills it, leaving only lateral slits scarcely visible from below; the process itself is distally truncate with 1 or 2 denticles reaching to the opening of the notch.

The epistome is rather long.

The distal angles of the 1st antennular joint only partially embrace the 2nd joint, which is short, the 3rd a little longer than it; the flagellum has about 15 short joints. The flagellum of the antenna has 12 joints.

The right mandible has a slender incisory process which is obscurely dentate, a small secondary process, row of spines, and molar fringed with denticles. The 1st maxilla with inner branch shorter than the outer, terminating in 4 feather-curved setae with a few setules on the inner margin. The outer branch terminates in several stout spines, none of which appear to be branched. The 2nd maxilla is well developed with its 3 lobes reaching to the same level. The maxilliped has narrow basal joints, the plate of the 2nd has 1 or 2 large-bodied setae along with those of usual size; the lobes of palp are rather sparsely setose.

The legs are robust, are sparsely spined, and do not show any notable characters except that the dactyles are short.

The pleopods are of the usual *Cercois* type. The 1st pair are rather small, the peduncle short and square cut on outer and inner margins with 3 coupling spines, both rami are transverse in position, and thus are much broader than long, they are about the same size; the exopod with 6 distal teeth. In the 2nd pleopod the peduncle has a small gap or insinuation near the inner margin. The

endopod is a little larger than the exopod, the *appendix* is small and joins the endopod about the middle of the lamina. The exopod has 12 teeth on the distal margin. The exopod of the 3rd pleopod has a division, the endopod is larger and has a slight insinuation of the outer margin; there is a small tuft of setae on the outer distal angle of the peduncle. The 4th and 5th pleopods are rather narrow; the respiratory folds are numerous and well developed; the exopod of the 5th has 3 setuliferous lobes all outstanding.

The uropods are rather broad, moderately indurated, the inner ramus more so than the outer, granulate on the surface and reaching a little beyond the end of abdomen, the outer ramus reaching not so far as the inner, both are truncate and denticulate on the distal margins.

Length, 11 mm.

A female of this species has young well showing in the marsupium and the mouth parts are modified. The 7th segment of thorax is only slightly produced not covering the anterior division of abdomen, the posterior notch is very shallow and obscurely trilobed, but there is a very deep exit channel below. The uropods are reduced.

This species is from Garden Island, Western Australia, and the type is deposited in the Western Australian Museum.

Cassidinopsis tasmaniae, n. sp.

Plate liii., figs. 6-10.

Body glabrous, not very convex, with obliquely directed epimera visible from above, rather smooth or faintly granulate anteriorly, capable of folding together with the hinge about the 5th segment of thorax.

The head is small, there is a transverse furrow between the eyes which are rather small. The 1st segment of thorax is largest, considerably broader than the head; the 5 following segments are short, subequal in length, the 7th a little shorter. The anterior division of abdomen is short, projecting laterally as the segments of thorax. The posterior division of abdomen is convex, there is a median lobe with 2 converging submedian lobes not very salient, then the surface is gradually declivous to the pointed end, which has a shallow channel below but no notch.

The epistome is broad, the apex receding between the two basal antennular joints viewed from below.

The anterior parts of the 1st and 2nd antennular joints are visible from above; the distal angles of the 1st joint do not much embrace the 2nd, which is rather small, the 3rd being a little longer than it, the flagellum has its 1st joint longer than the rest, which are very short, numbering about 23. The antenna is very robust, the last 2 joints of peduncle are long, the last bent back, the flagellum has 20 short joints with the 1st the longest.

The mandibles have cutting plates nearly entire, the left one with a small secondary plate also entire. The spine rows bear few spines, the molars being quite near the cutting plates. The 1st maxilla has the distal spines of the outer ramus very much worn, the inner ramus bears 4 strong feather spines, and there is a distinct articulation at about half its length. The 2nd maxilla is robust, the 3 lobes reach to an equal level, the spines on the 2 more outer lobes are more robust than those of the inner lobe, whose attachment to the body of the limb is much more proximal. The maxilliped is rather slender, the lobe of the 2nd joint bears coarse spines, some of which are branched. The lobes of the palpal joints are rather crowded together.

The 1st leg is more robust than the rest, it is without spines, but the propodus has a tubercle on the inner side bearing 2 small teeth. The remaining legs are sparsely spined but provided with furry pads on the usual joints.

The 1st pleopod has the peduncle rather short and crowded against the rami. The inner ramus is rather longer than broad and the outer about the same length; there are no marginal teeth as in *Cerceis*, etc., but there is an outstanding proximal spine as in so many Hemibranchiatae. In the 2nd pleopod the peduncle is also crowded up, the rami are similar to those of the 1st pair, the *appendix* is longer than the endopod and originates at its base. In the 3rd pleopod the endopod is very convex on its outer margin, the exopod has an oblique division line rather near the end, on the 4th and 5th pleopods the branchial rugae are very strongly developed, the outer ramus of the 4th with a proximal lobe has an increase of surface, the inner ramus also has large rugae and it is tipped with 2 plumose setae. The outer ramus of the 5th pleopod is also provided with a proximal lobe; distally there are 2 outstanding spinuliferous lobes with a small group on the inner side close to the division line.

The uropods are lamellar, the inner ramus the larger not reaching the end of abdomen, the outer ramus is ovate with a slight insinuation of the margin on the outer side near the end.

A female of this species is smaller and without visible brood. The mouth parts are normal, there is only a median lobe on the posterior division of abdomen, and this part is not so strongly pointed at the end. The 2nd antenna is not quite so robust. The 1st leg bears a few spines and there is no tubercle on the propodus.

Length of male, 18 mm.; breadth, 10 mm.

Collected by Dr. Torr at Port Arthur, Tasmania.

The type is in the South Australian Museum, C. 1258.

In 1908 (Trans. Roy. Soc. S. Austr., vol. xxxii.) I established a genus, *Moruloidea*, knowing very little of its affinity. I now believe it to be very close to the present genus, and may have to be united to it in the future. I am also of opinion that the genera *Cassidias*, Richardson, and *Euvallentinia*, Stebbing, are closely related to *Cassidinopsis*, Hansen, and that these 4 genera form a group at least with very close affinities.

Group PLATYBRANCHIATAE, Hansen.

Waiteolana, n. gen.

The body is narrow. The eyes are large. The epimera are uniform, vertical in direction, the 5th and 6th a little larger than the others. The abdomen is laterally contracted.

The basal antennular joints only very partially lodge in excavations of the head, the anterior portions of the 1st and 2nd joints project and are visible from above, as also projects the free apex of epistome.

The mandibles and maxillipeds are of the usual structure.

The legs are stout and uniform.

The endopod of 1st pleopod is nearly three times as long as broad. The 3rd pleopod has a division line on the exopod, both rami with many marginal plumose setae. The exopod of the 4th pleopod has a division with a few terminal setae. The exopod of the 5th is also divided with 4 lobes on inner margin scarcely salient. The endopods of 4th and 5th pleopods are more membranous than their exopods, and there are vertical or oblique wrinkles but no transverse branchial folds.

It will be seen that this genus makes a new group in the Platybranchiatae. I have pleasure in dedicating it to the Director of the South Australian Museum, Mr. E. R. Waite, who collected a single specimen of the genotype.

Waiteolana rugosa, n. sp.

Pl. I., figs. 3-6.

The body is convex, glabrous, narrow, eroded with small sculpturings difficult to define, including a row of very small tubercles on the posterior margins of the segments of thorax. The abdomen is contracted and granulate.

The head is transverse with a strong ridge in front with a less defined one behind it. The eyes are large. The small rounded tip of epistome, which is free, and anterior portions of basal joints of antennules are visible from above. The segments of thorax have their exposed parts in relief and do not differ much in length, except the last, which is shortest. The epimera are vertical in direction, are not visible from above, and except the 1st are uniform and obtusely rounded below, that of the last reaching down as much as the preceding. The anterior division of abdomen projects a little convexly on its posterior margin; the suppressed segments are well marked. The posterior division is moderately domed and tapers behind to an obtuse point which carries a \wedge -notch; below there is a slight insinuation in the vertical direction (in the specimen, which is somewhat damaged, the notch is malformed).

The 1st antennular joint is strongly indurated, the 1st and 2nd joints have slight sulcations parallel to their anterior margins, the 2nd joint is half as long as the 1st, the 3rd is a little longer than the 2nd, the flagellum has 7 joints. The antenna is robust, its peduncular joints are laterally compressed, the joints of the flagellum are 7, which are strongly ciliated.

The epistome is conical and has a small labrum.

The left mandible has a strong entire incisory process, strong secondary plate, also spine row; the molar process is small.

The maxilliped has the 2nd joint rather large at the base, the plate is also broad, the palp is strong with lobes of joints moderately produced.

The legs are stout, rather short; there are some short teeth on merus, carpus, and propodus of 1st and 2nd pairs, the others are poorly spined, the dactyles are strong.

The pleopods as a whole are narrow.

The endopod of 1st pleopod is nearly three times as long as broad with a folded inner margin and subacute apex reaching beyond the exopod, the exopod is ovate and has a small proximal outstanding spine. The appendix of the 2nd pleopod is slender and longer than its endopod. The exopod of the 3rd pleopod has a division, the endopod is longer than broad with a thickened convex outer margin. Both rami of the 4th pleopod have a few distal plumose setae. The exopod of the 5th pleopod has 4 setuliferous lobes on the inner margin. The exopods of the 4th and 5th pleopods are divided. The endopods of 3rd, 4th, and 5th pleopods are membrane-like, somewhat wrinkled in oblique direction, but there are no branchial folds.

The uropod is indurated, the inner ramus is rather large and distally emarginate, the outer is small with a deep cleft.

Length, 8 mm.

One specimen, from "Thetis" Expedition Station 57.

The type is placed in Australian Museum, Sydney.

DESCRIPTION OF PLATES XXXVIII. to LIII.

PLATE XXXVIII.

Fig. 1: *Sphaeroma quoyana*, male. Fig. 2: *id.*, lateral view. Fig. 3: *id.*, anterior region from below. Fig. 4: *id.*, left mandible. Fig. 5: *id.*, 1st maxilla. Fig. 6: *id.*, maxilliped. Fig. 7: *id.*, 1st leg. Fig. 8: *id.*, 3rd leg. Fig. 9: *id.*, 5th leg. Fig. 10: *id.*, 7th leg. Fig. 11: *Sphaeroma terebrans*, anterior region from below. Fig. 12: *id.*, posterior division of abdomen, inferior view. Fig. 13: abdomen of dry specimen found with *S. terebrans*, Queensland.

PLATE XXXIX.

Fig. 1: *Exosphaeroma intermedia*, n. sp., male. Fig. 2: *id.*, lateral view. Fig. 3: *id.*, anterior region from below. Fig. 4: *id.*, end of abdomen and uropod from below. Fig. 5: *id.*, 7th leg. Fig. 6: *id.*, 5th leg. Fig. 7: *id.*, maxilliped. Fig. 8: *id.*, 1st leg. Fig. 9: *Exosphaeroma alata*, male, 1st leg. Fig. 10: *id.*, abdomen of female. Fig. 11: *id.*, anterior region from below, male.

PLATE XL.

Fig. 1: *Exosphaeroma alata*, male. Fig. 2: *id.*, 7th leg. Fig. 3: *id.*, end of abdomen and uropod from below. Fig. 4: *Cymodoce bidentata*, male. Fig. 5: *id.*, side view of abdomen. Fig. 6: *id.*, end of abdomen and uropod. Fig. 7: *Cymodoce aculeata*, male. Fig. 8: *id.*, anterior region from below. Fig. 9: *Cymodoce aspera*, anterior region from below. Fig. 10: *id.*, end of abdomen and uropod. Fig. 11: *id.*, side view of abdomen.

PLATE XLI.

Fig. 1: *Neosphaeroma laticauda*, anterior region from below. Fig. 2: *id.*, end of abdomen and uropod. Fig. 3: *id.*, 1st pleopod, male. Fig. 4: *id.*, 2nd pleopod, male. Fig. 5: *id.*, 3rd pleopod. Fig. 6: *Neosphaeroma australe*, male. Fig. 7: *id.*, antennule, antenna, and epistome. Fig. 8: *id.*, end of abdomen and uropod, male. Fig. 9: *id.*, 1st pleopod. Fig. 10: *id.*, endopod of 2nd pleopod. Fig. 11: *id.*, 3rd pleopod.

PLATE XLII.

Fig. 1: *Cymodoce aspera*, female. Fig. 2: *Cymodoce gaimardii*, male. Fig. 3: *Cilicacopsis ornata*, male. Fig. 4: *Cilicaca spinulosa*, male. Fig. 5: *Cilicacopsis ornata*, end of abdomen and uropod from below. Fig. 6: *Cilicacopsis halei*, female. Fig. 7: *Cilicacopsis stylifera*, end of abdomen and uropod from below. Fig. 8: *Cilicacopsis halei*, end of abdomen and uropod from below. Fig. 9: *id.*, antennule, antenna, and epistome.

PLATE XLIII.

Fig. 1: *Cilicaca crassa*, male. Fig. 2: *id.*, end of abdomen and uropod from below. Fig. 3: *Paracilicaca stebbingi*, male. Fig. 4: *id.*, abdomen, female. Fig. 5: *id.*, anterior region from below. Fig. 6: *id.*, end of abdomen and uropod from below, male. Fig. 7: *id.*, 1st pleopod, male. Fig. 8: *Paracilicaca pubescens*, male. Fig. 9: *id.*, anterior region from below. Fig. 10: *id.*, end of abdomen and uropod, female. Fig. 11: *id.*, end of abdomen and uropod, male, immature.

PLATE XLIV.

Fig. 1: *Cilicacopsis corpulentis*, male. Fig. 2: *id.*, antennule, antenna, and epistome. Fig. 3: *id.*, right mandible. Fig. 4: *id.*, end of abdomen and uropod from below. Fig. 5: *id.*, 1st leg. Fig. 6: *id.*, 1st pleopod, male. Fig. 7: *id.*, 2nd pleopod, male. Fig. 8: *Cilicacopsis obesa*, female. Fig. 9: *id.*, maxilliped. Fig. 10: *id.*, anterior region from below. Fig. 11: *id.*, end of abdomen and uropod from below.

PLATE XLV.

Fig. 1: *Cymodopsis latifrons*, male. Fig. 2: *id.*, anterior region from below. Fig. 3: *id.*, end of abdomen and uropod. Fig. 4: *id.*, 2nd leg. Fig. 5: *id.*, 7th leg. Fig. 6: *Cymodopsis plumosa*. Fig. 7: *id.*, anterior region from below. Fig. 8: *id.*, end of abdomen and uropod from below. Fig. 9: *id.*, 1st pleopod. Fig. 10: *Cymodopsis gorgoniae*. Fig. 11: *id.*, anterior region from below. Fig. 12: *id.*, side view of abdomen. Fig. 13: *id.*, end of abdomen and uropod from below.

PLATE XLVI.

Fig. 1: *Cymodopsis crassa*, female. Fig. 2: *id.*, lateral view. Fig. 3: *id.*, anterior region from below. Fig. 4: *id.*, 1st maxilla. Fig. 5: *id.*, 2nd maxilla. Fig. 6: *id.*, maxilliped. Fig. 7: *id.*, 1st leg. Fig. 8: *id.*, 7th leg. Fig. 9: *id.*, end of abdomen and uropod from below. Fig. 10: *id.*, 1st pleopod. Fig. 11: *id.*, 2nd pleopod. Fig. 12: *Cymodopsis wardi*, antennal region and epistome.

PLATE XLVII.

Fig. 1: *Cymodopsis wardi*, female. Fig. 2: *id.*, end of abdomen and uropod. Fig. 3: *Cymodopsis albaniensis*, male. Fig. 4: *id.*, 1st leg. Fig. 5: *id.*, 5th leg. Fig. 6: *id.*, end of abdomen and uropod from below. Fig. 7: *id.*, epistome. Fig. 8: *Bregmocrella grayana*, 1st pleopod. Fig. 9: *id.*, 3rd pleopod. Figs. 10 and 11 represent a sphaeromid from Mast Head Island, Great Barrier Reef, 17 faths.; it was dry and partially rolled up, not lending itself to description—Col. A. R. McCulloch.

PLATE XLVIII.

Fig. 1 (*Paracilicaca pubescens*, 2nd pleopod, young male?). Fig. 2: *Cassidinella incisa*, antennae and epistomial region. Fig. 3: *id.*, end of abdomen and uropod from below. Fig. 4: *Dynamenella rubida*, male. Fig. 5: *id.*, epistome and antenna. Fig. 6: *id.*, end of abdomen and uropod. Fig. 7: *id.*, 1st pleopod. Fig. 8: *Haswellia anomala*, female. Fig. 9: *id.*, end of abdomen and uropod. Fig. 10: *Exocerceis nasuta*, male, posterior region. Fig. 11: *id.*, anterior region from below. Fig. 12: *id.*, 2nd pleopod.

PLATE XLIX.

Fig. 1: *Cerceis ovata*, female. Fig. 2: *id.*, anterior region from below. Fig. 3: *id.*, end of abdomen and uropod. Fig. 4: *id.*, 1st pleopod, male. Fig. 5: *id.*, 2nd pleopod. Fig. 6: *Haswellia juxtacarnea*. Fig. 7: *id.*, posterior region from below. Fig. 8: *Haswellia carnea*, anterior region from below. Fig. 9: *id.*, posterior region from below. Fig. 10: *id.*, posterior region from above, process of 7th segment of thorax removed. Fig. 11: *id.*, end of 7th segment of thorax from below.

PLATE L.

Fig. 1: *Cerceis tridentata*, var. *intermedia*, male. Fig. 2: *id.*, anterior region from below. Fig. 3: *Waiteolana rugosa*, male. Fig. 4: *id.*, anterior region from below. Fig. 5: *id.*, 2nd pleopod. Fig. 6: *id.*, 1st pleopod. Fig. 7: *Isocladus howensis*, male. Fig. 8: *id.*, antennae and epistome. Fig. 9: *Isocladus ? laevis*, female, anterior region from below. Fig. 10: *id.*, end of abdomen and uropod from below. Fig. 11: *id.*, 1st leg. Fig. 12: *id.*, 7th leg.

PLATE LI.

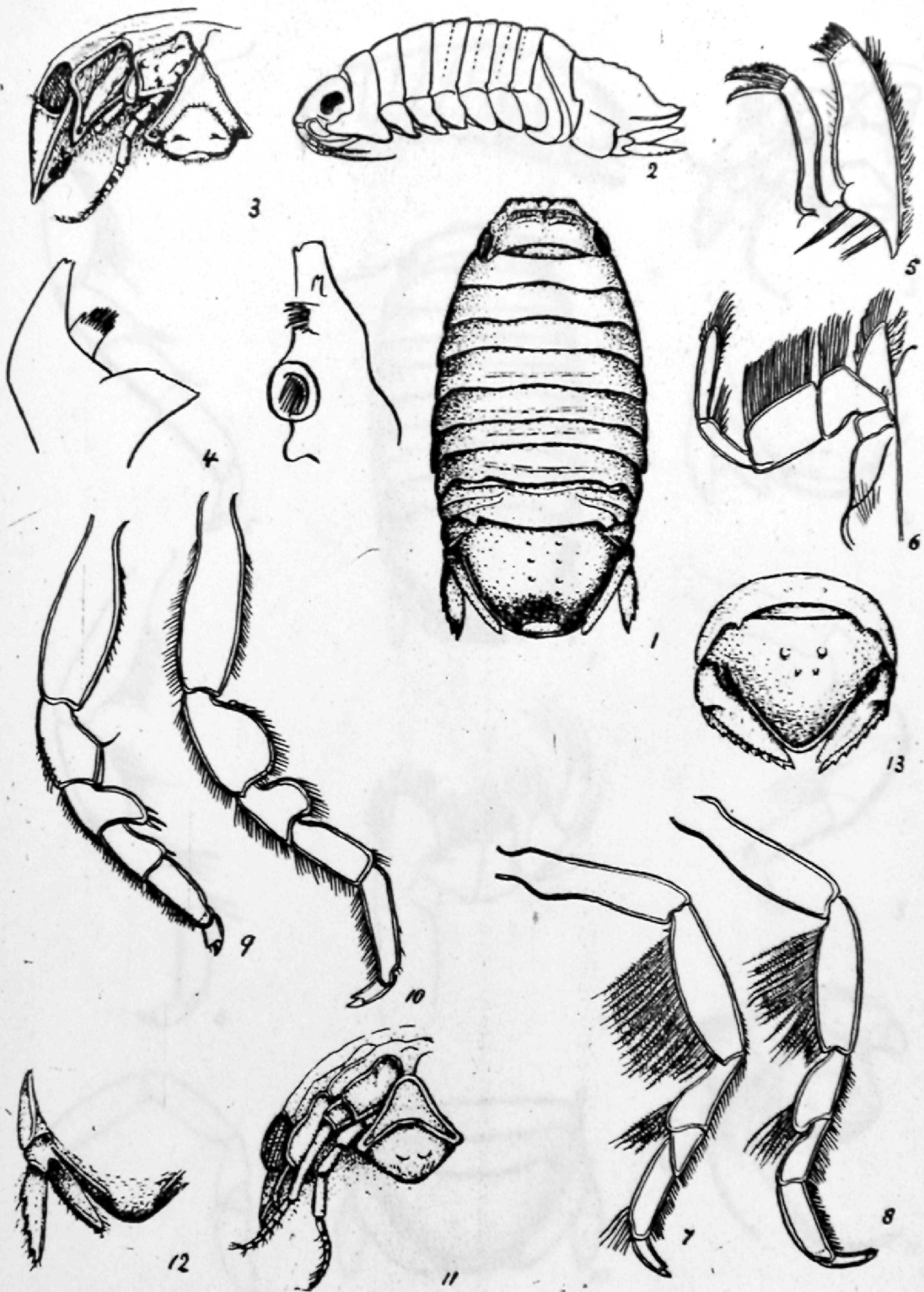
Fig. 1: *Neosphaeroma ? pentaspina*, male. Fig. 2: *id.*, anterior region from below. Fig. 3: *id.*, 5 joints of 1st leg. Fig. 4: *id.*, 1st pleopod. Fig. 5: *id.*, 2nd pleopod. Fig. 6: *Exosphaeroma alii*, male. Fig. 7: *id.*, epistome, 1st and 2nd antenna. Fig. 8: *Exosphaeroma bicolor*, 1st pleopod. Fig. 9: *Exosphaeroma alii*, 2nd pleopod. Fig. 10: *Exosphaeroma bicolor*, 7th leg.

PLATE LII.

Fig. 1: *Exosphaeroma bicolor*. Fig. 2: *id.*, side view. Fig. 3: *id.*, uropods adjacent region from below. Fig. 4: *id.*, epistome and 1st and 2nd antennae. Fig. 5: *id.*, 2nd pleopod. Fig. 6: *Platycerceis hyalina*, male. Fig. 7: *id.*, uropod, etc. Fig. 8: *id.*, anterior region from below. Fig. 9: *id.*, 1st leg, female. Fig. 10: *id.*, 1st pleopod, female. Fig. 11: *id.*, 2nd pleopod, male.

PLATE LIII.

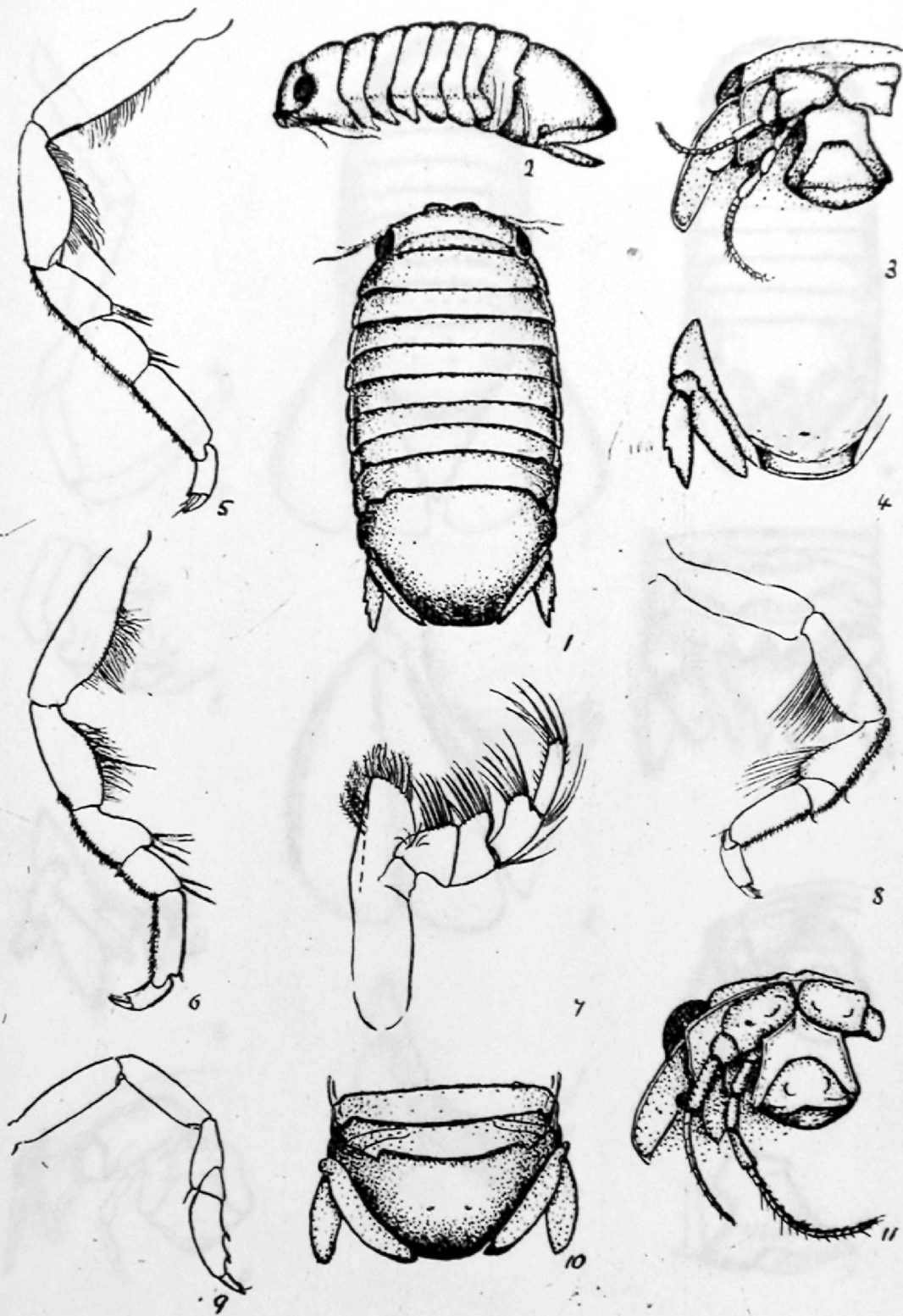
Fig. 1: *Haswellia intermedia*. Fig. 2: *id.*, front view. Fig. 3: *id.*, anterior region from below. Fig. 4: *id.*, uropod, etc., from below. Fig. 5: *id.*, abdomen, etc., of female from above. Fig. 6: *Cassidinopsis tasmaniae*. Fig. 7: *id.*, anterior region from below. Fig. 8: *id.*, 1st leg of male. Fig. 9: *id.*, uropod and abdomen from below. Fig. 10: *id.*, 2nd pleopod.

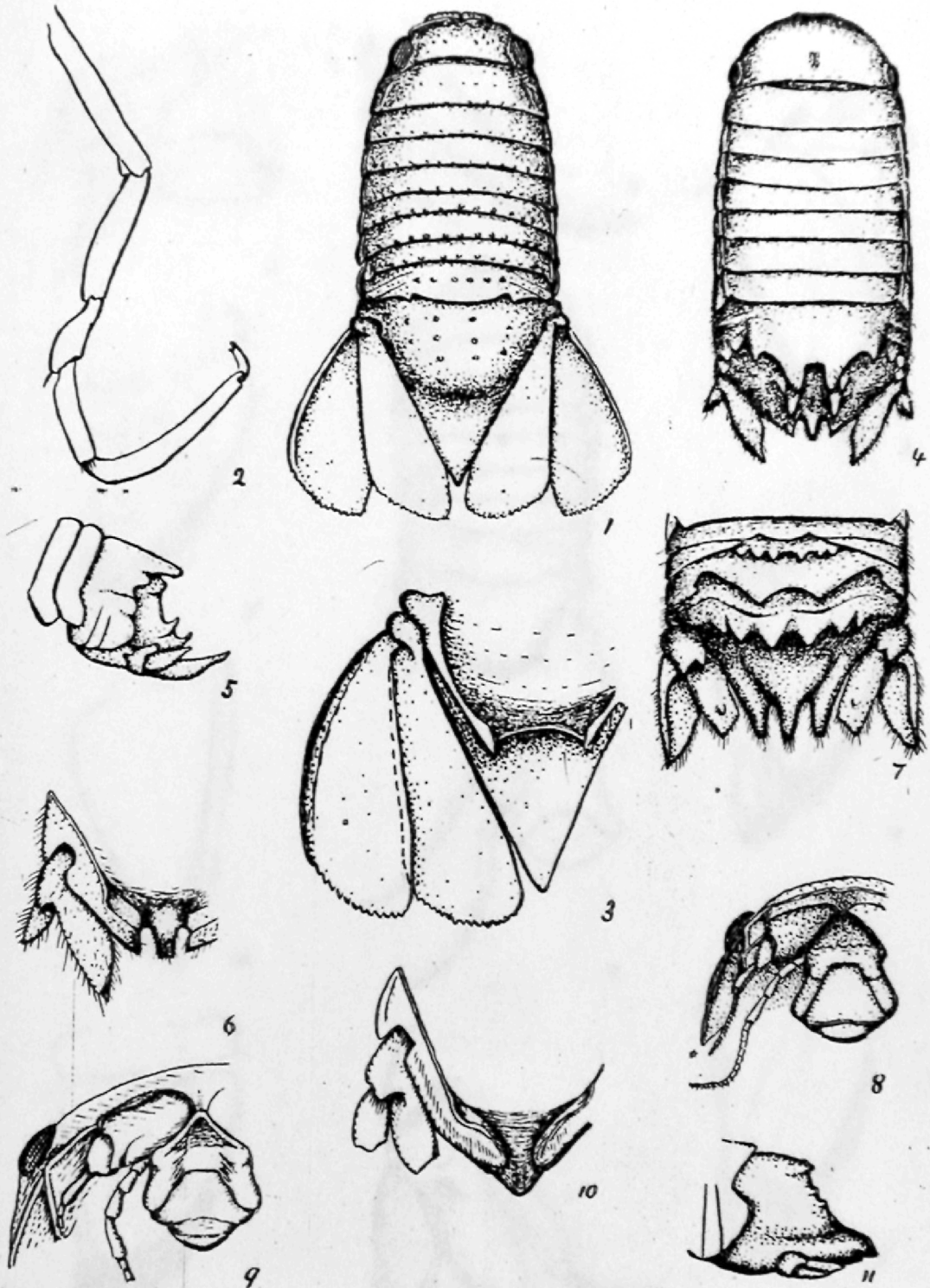


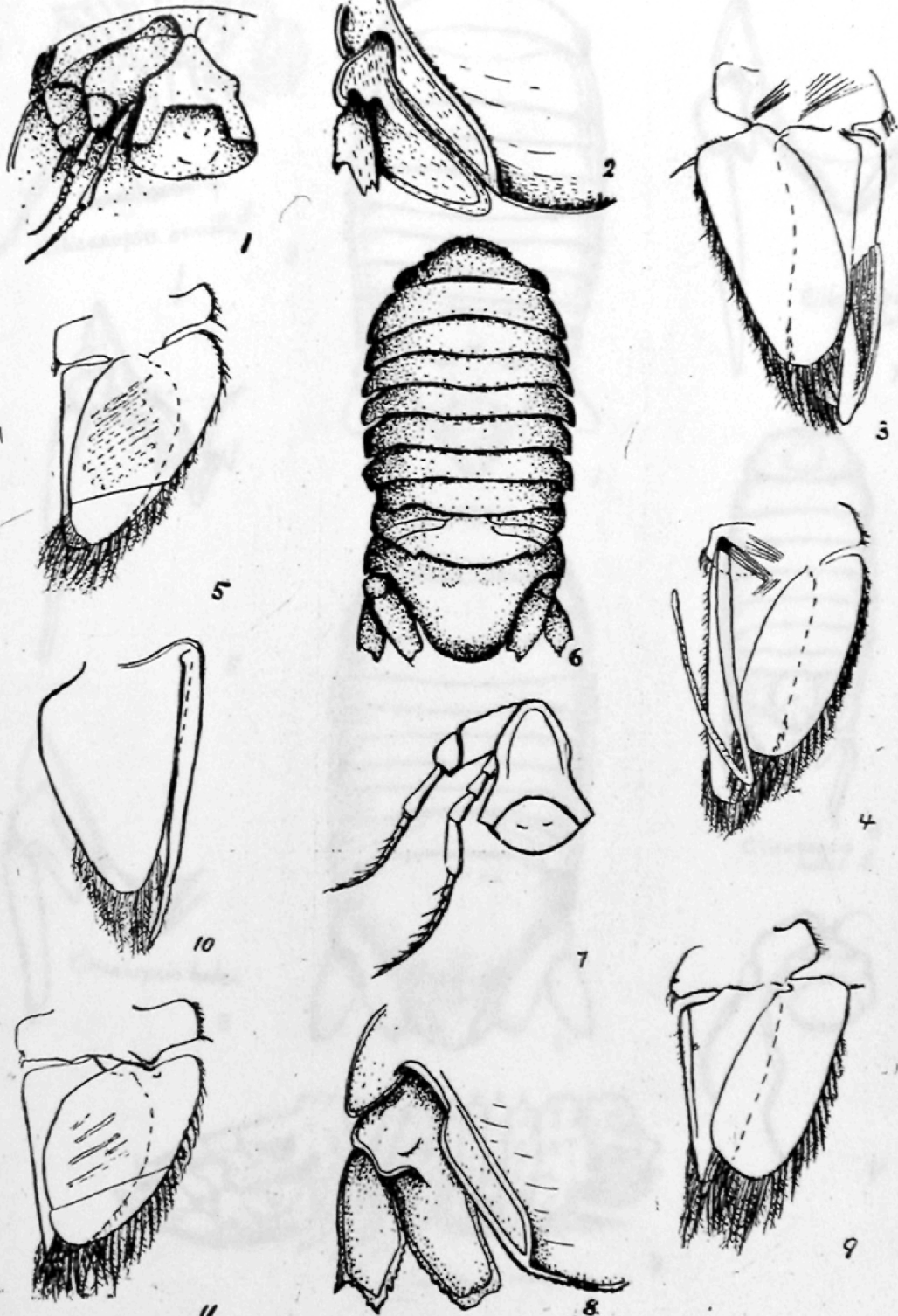
Gillingham & Co. Limited, Printers, Adelaide.

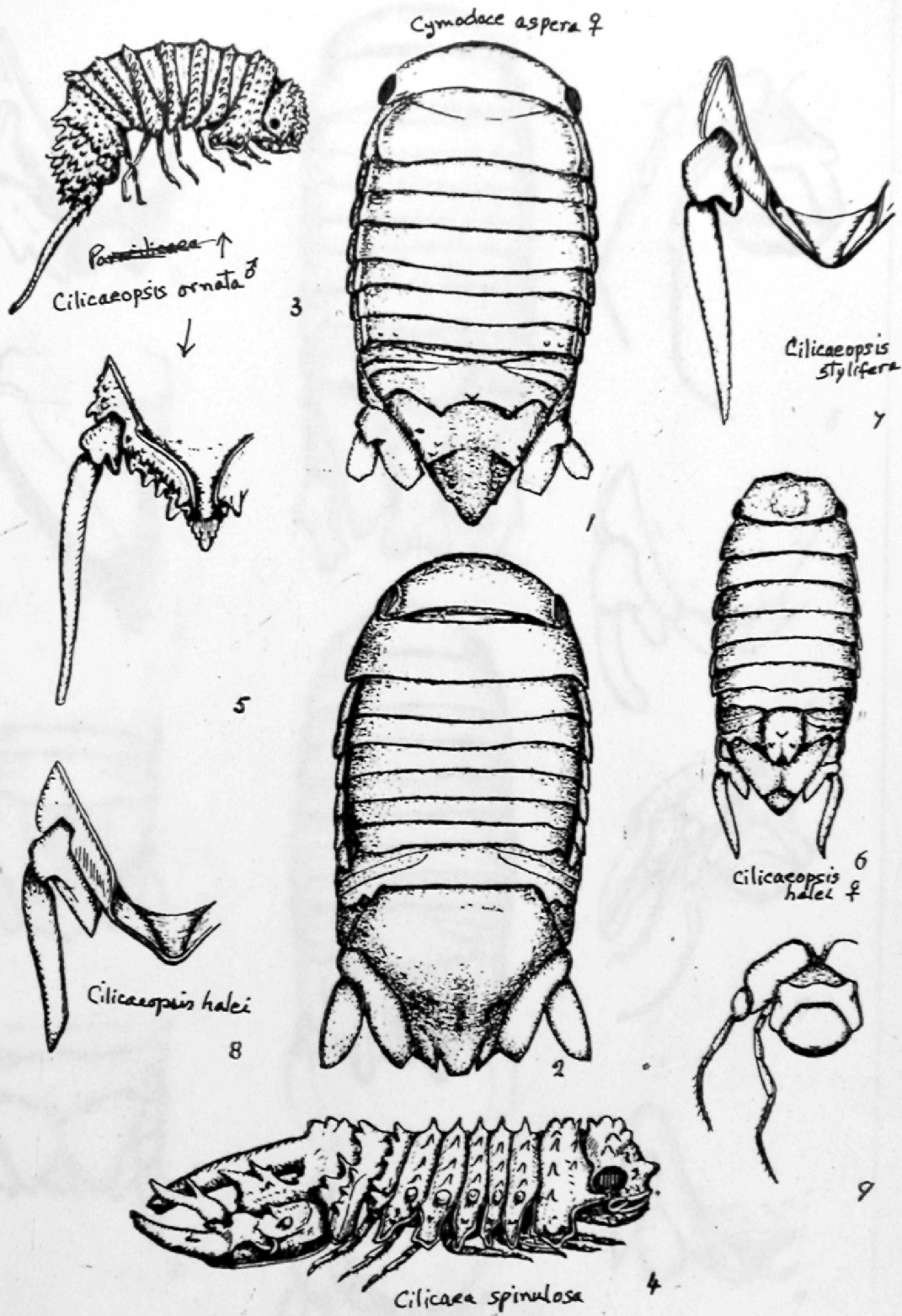
1-10 *Sphaeroma quoyana* ♂

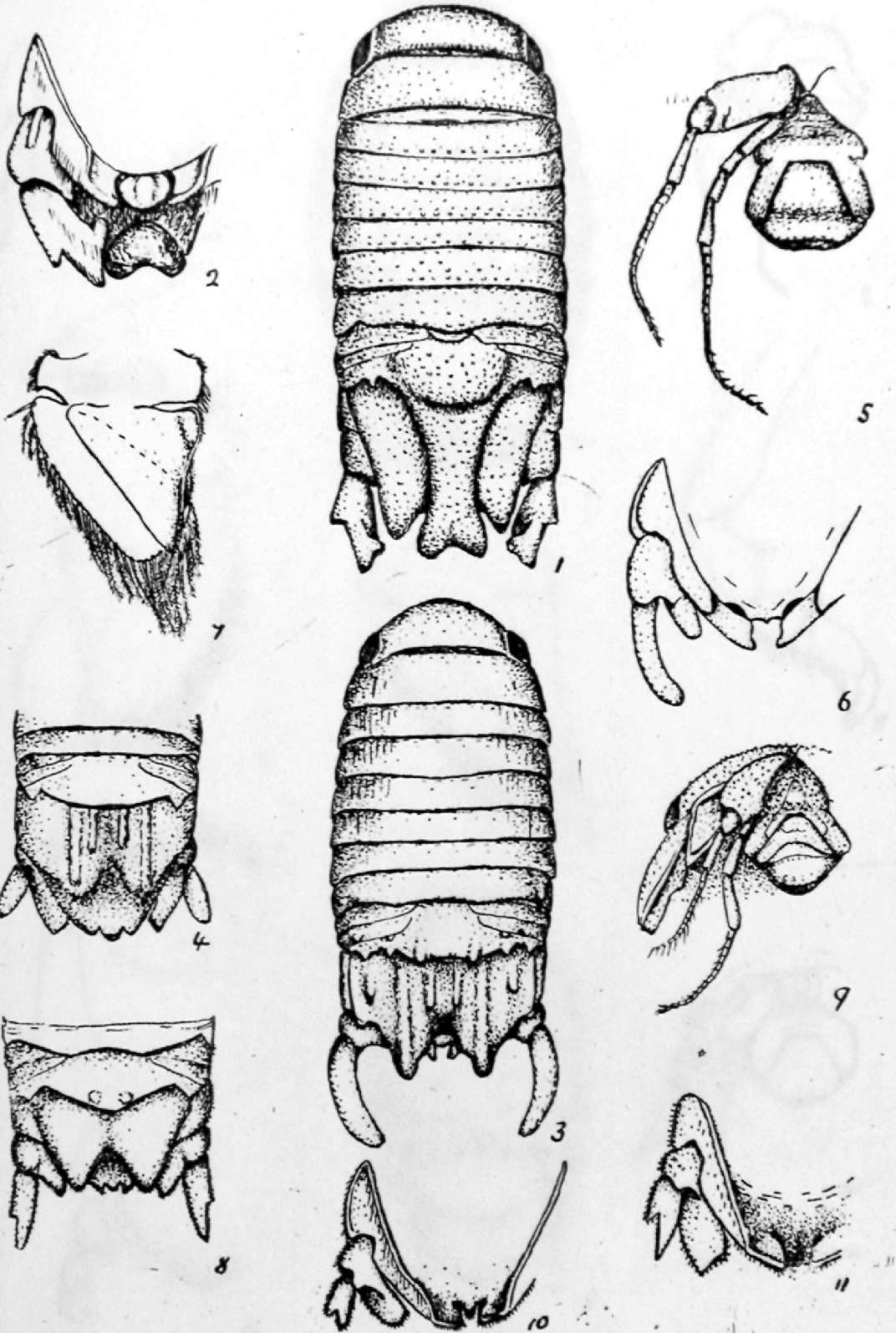
11-13 *Sphaeroma terebrans*



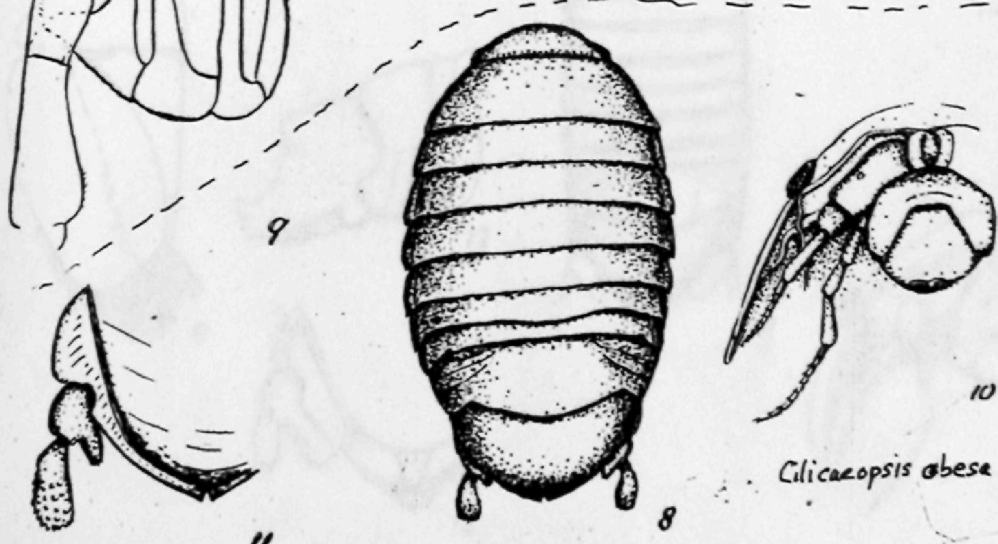
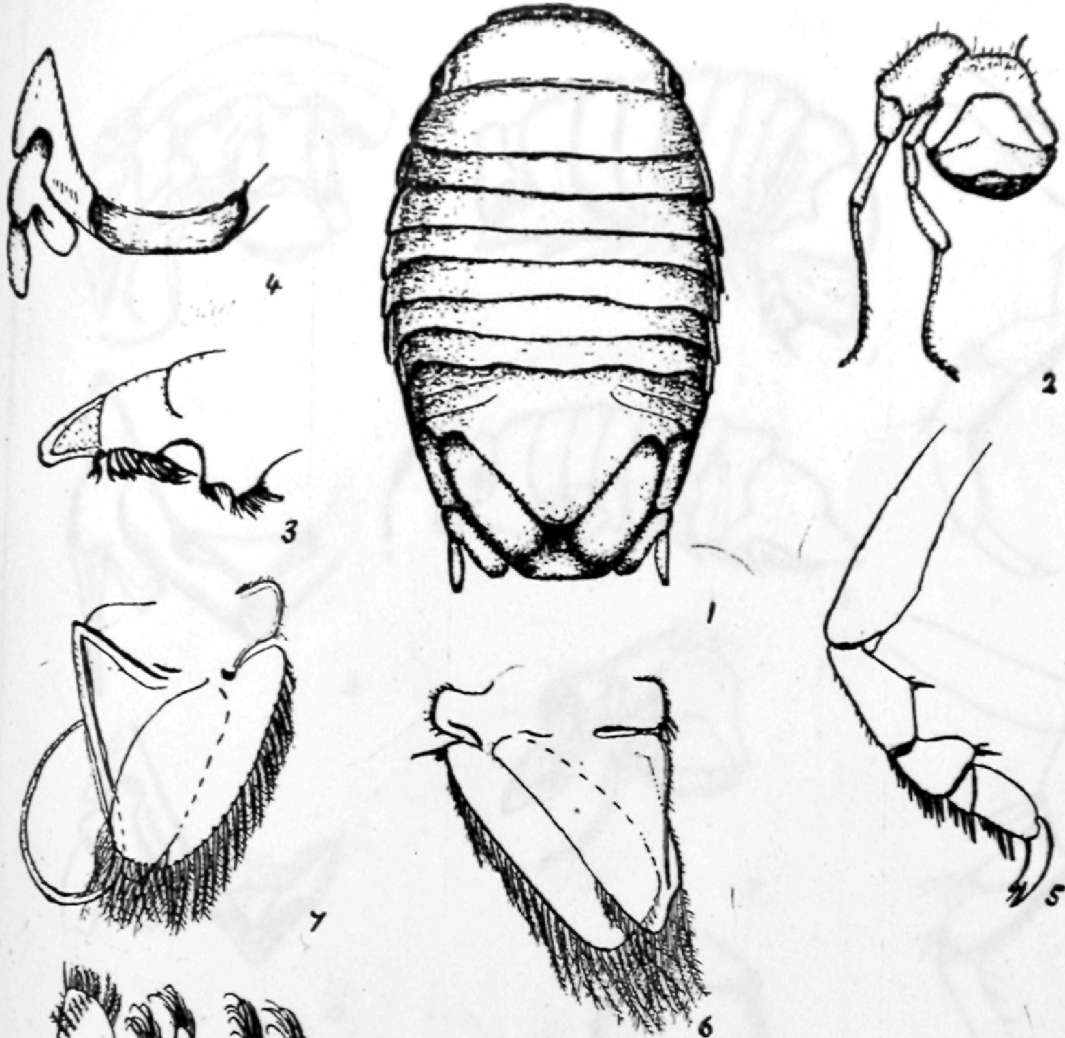




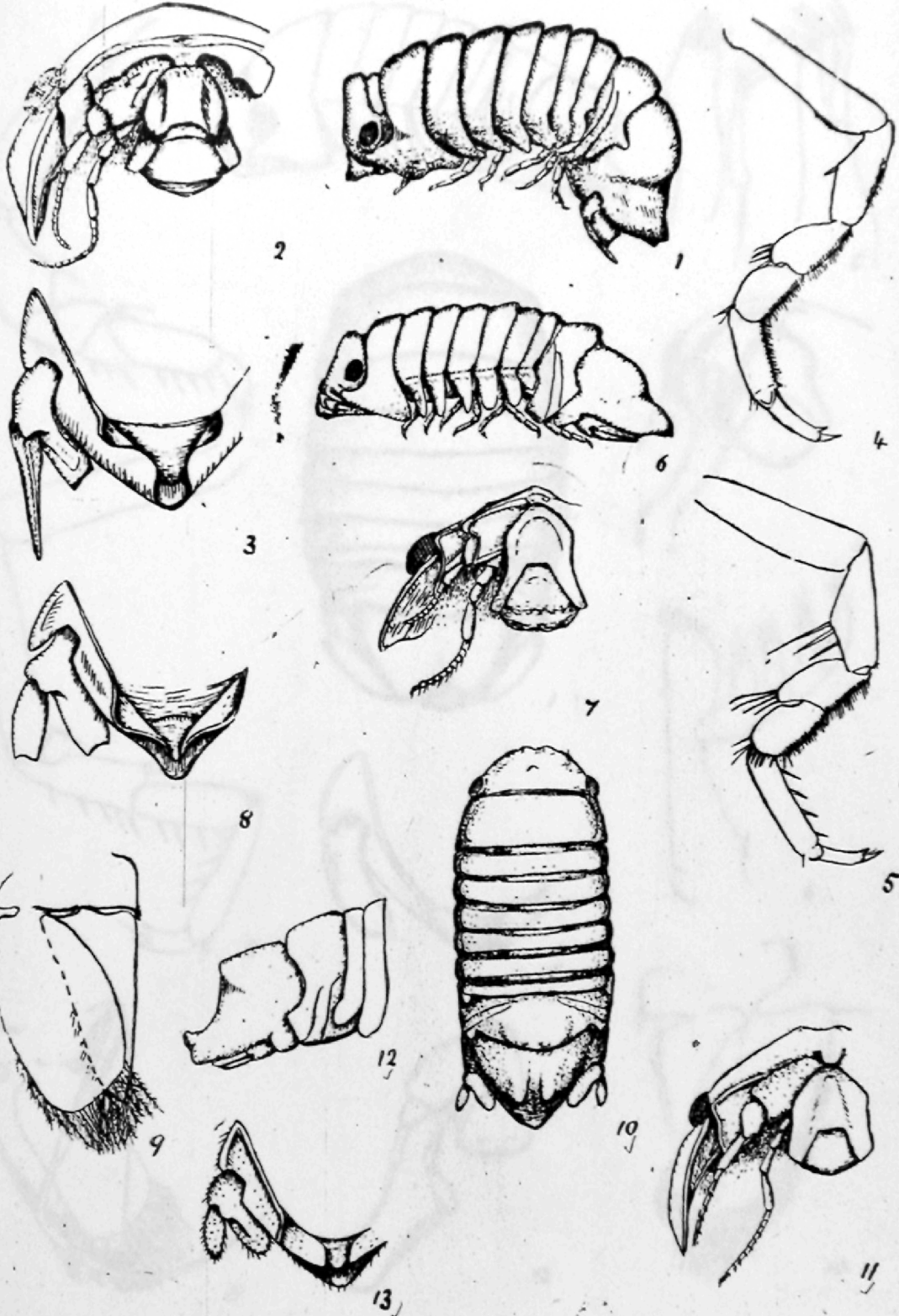


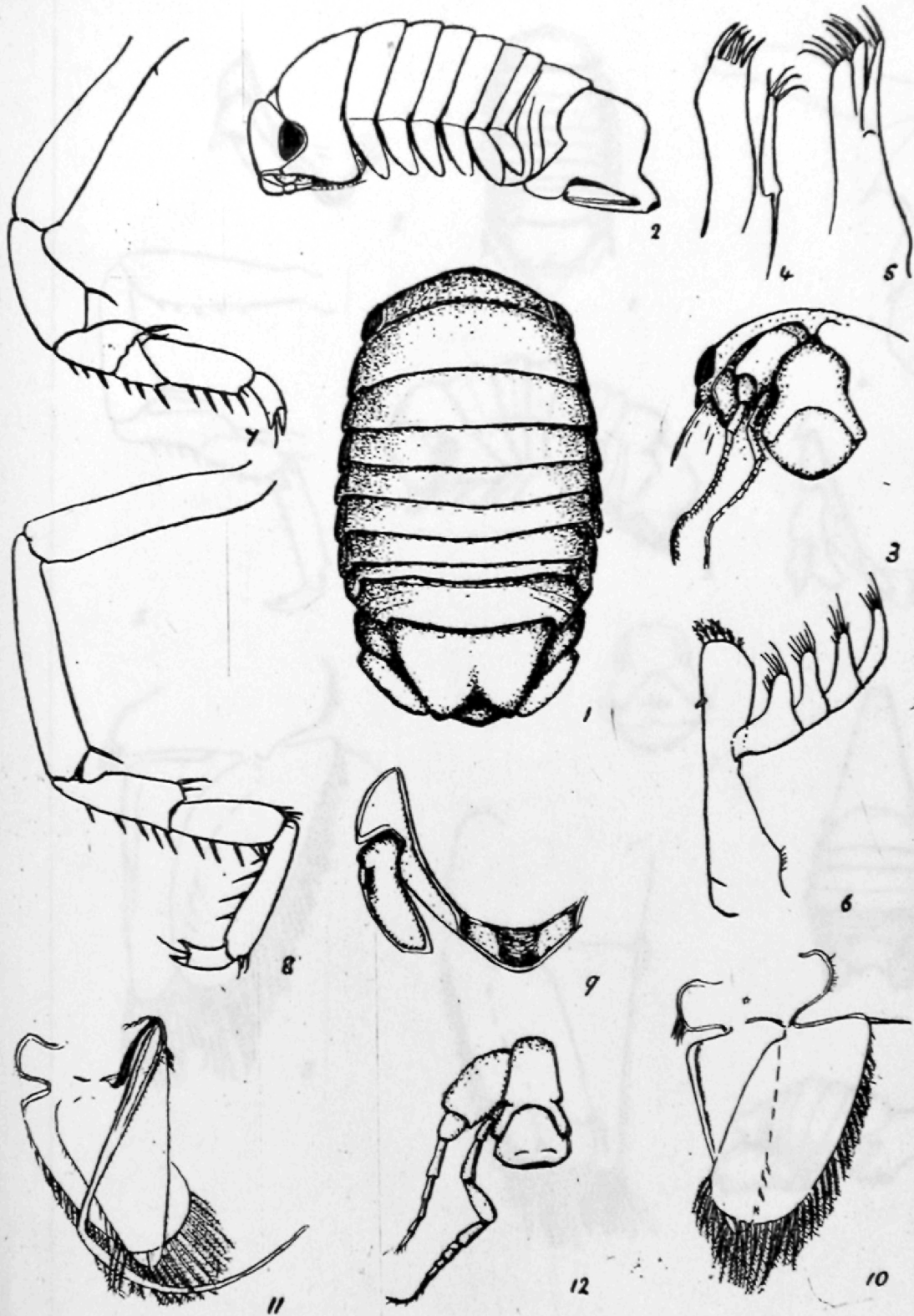


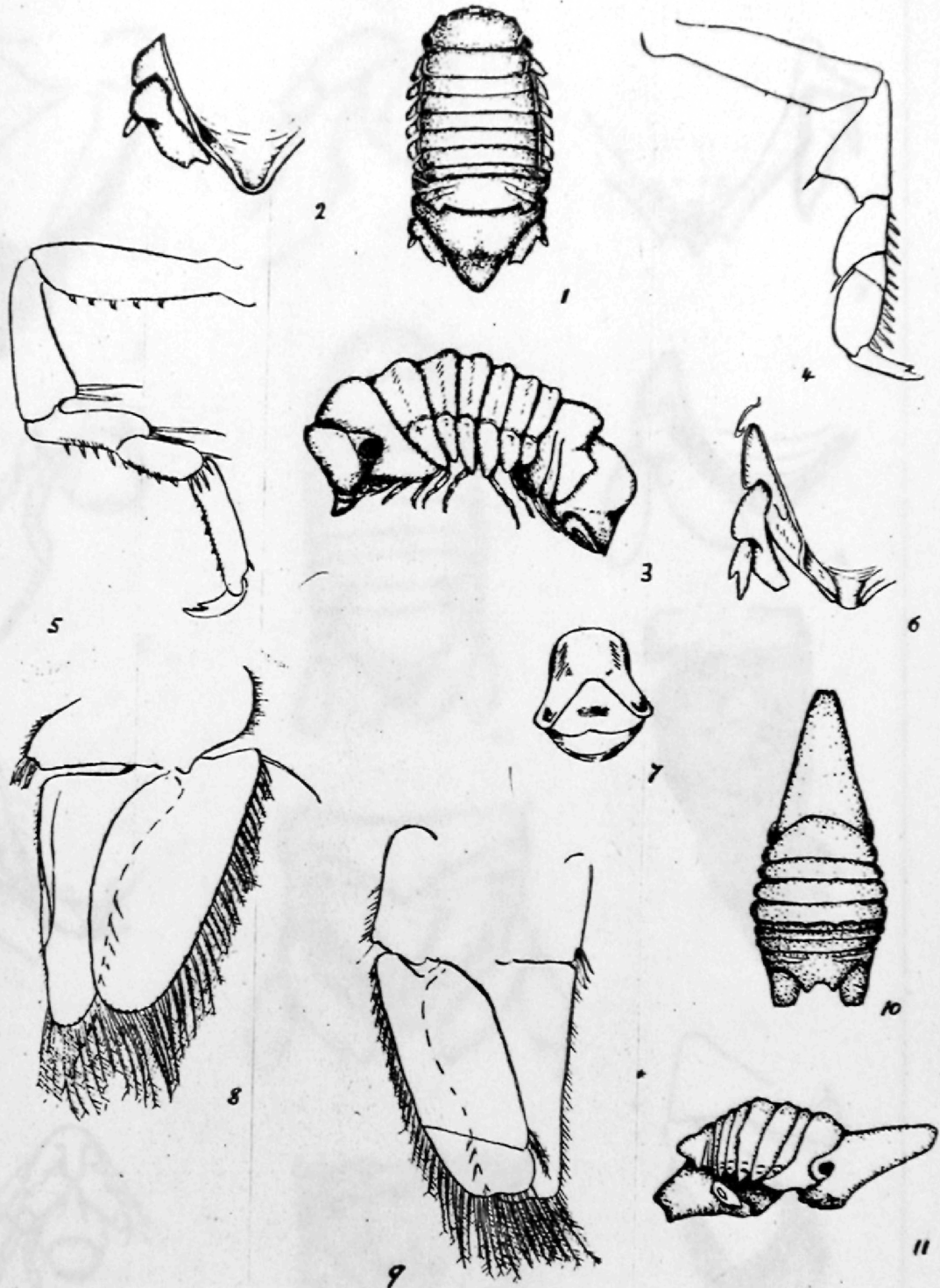
Cilicarpopsis corpulentis



Cilicarpopsis abesa





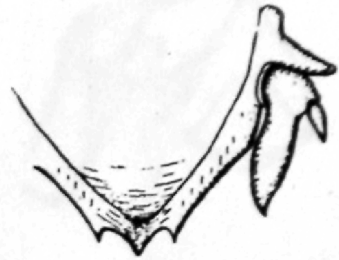




1



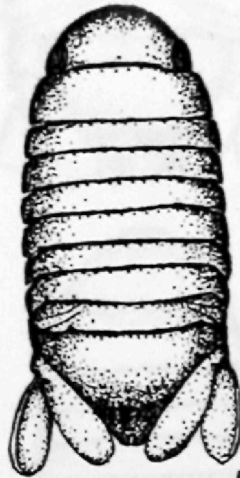
2



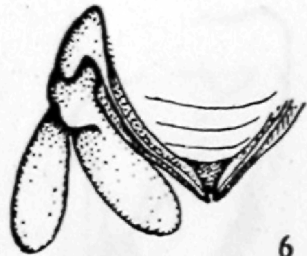
3



5



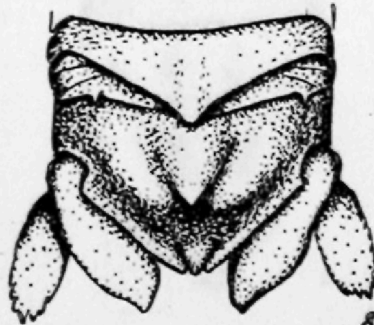
4



6



9



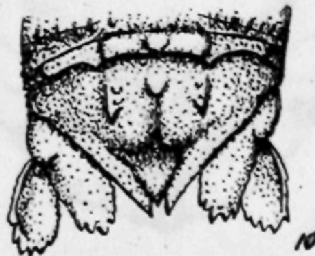
8



7



11



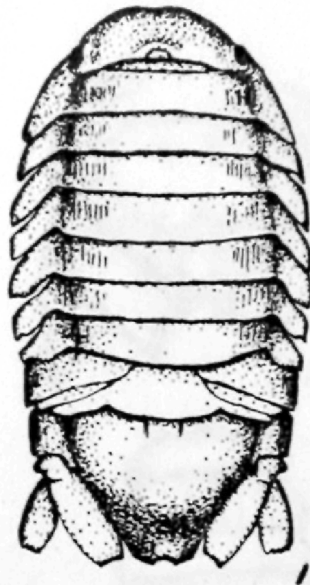
10



12



3



1



2



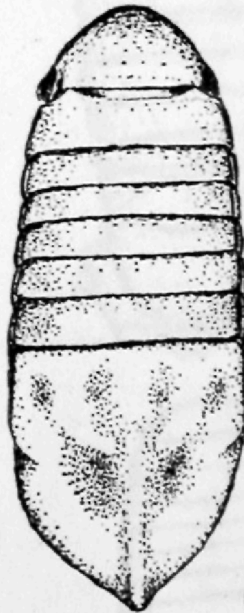
4



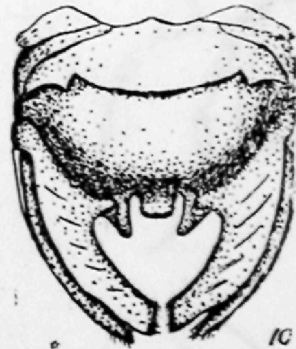
5



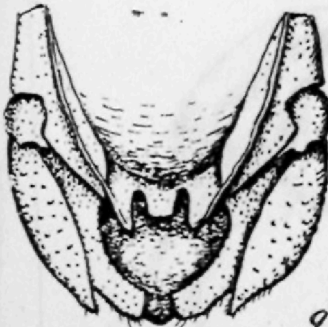
8



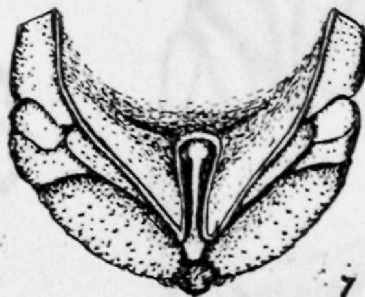
6



10



9



7



11

