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CRUSTACEA.

PART III.

By THOMAS WHITELEGGE,

Zoologist, Australian Museum.

ISOPODA.

Part II.

CRUSTACEA.

PART III.

By Thomas Whitelegge,

Zoologist, Australian Museum.

ISOPODA.

Part II.

The present part deals with the remainder of the family Sphæromidæ. Of the sixteen species herein enumerated, seven belong to known forms and nine are described as new, including one new genus. The new species are as follows :—

Sphæroma australis.
,, *latifrons.*
,, *plumosa.*
Cymodoce inornata.
Cilicœa stylifera.
,, *ornata.*
,, *granulata.*
Cerceis nasuta.
Chitonopis spatulifrons.

The species previously known are :—

Zuzara emarginata, Haswell. (*Hab.*—Griffiths' Point, Western Port, Victoria).
Cymodoce tuberculosa, Stebbing. (*Hab.*—Swan River, Western Australia).
,, *aculeata*, Haswell. (*Hab.*—Port Jackson).
,, *convexa*, Miers. (*Hab.*—New Zealand).
Cilicœa hystrix, Haswell. (*Hab.*—Port Stephens).
,, *spinulosa*, Haswell. (*Hab.*—Port Jackson; Port Stephens).
Bregmocerella grayanus, Woodward. (*Hab.*—Port Jackson; Flinders Island; Bass Strait).

In working out the various species I have been much impressed with the paucity of information relating to this important group. Many structural features have been met with, regarding which little or nothing has been recorded, and numerous little points of generic or specific import have been a source of frequent delay.

Adequate definitions of some of the genera are still required, and the whole group is in great need of revision. As regards the species herein described, I have attempted to supply full descriptions of all the characters of importance, whether generic or specific, hoping such will prove useful in any future revision of the order.

There are many characters presented by the various appendages of the body which have been usually neglected in descriptions; some are of generic and others of specific import. Such, for instance, as the number and relative length of the joints of the flagellum; the presence or absence of denticles on the spines of the first maxillæ. The pleopods are rarely described, yet they afford some excellent and reliable characters: a glance at some of the descriptions and figures will suffice to show how necessary it is to examine these appendages. For example, the outer rami of the first and second pairs of pleopods in *Zuzara emarginata* are armed on their outer distal margin with a series of spines, thus furnishing a character which alone would be almost sufficient to identify the species. The uropods are generally well described, but one feature, namely, the opposed or folding condition of the branches is frequently neglected. In the genus *Cymodoce* the branches are stated to be opposed or imperfectly folding. I have met with two species, namely, *C. aculeata* and *C. convexa*, in which the branches are completely folding, and a third, *C. tuberculosa*, has the branches opposed.

Family SPHÆROMIDÆ.

SPHÆROMA, *Latreille.*

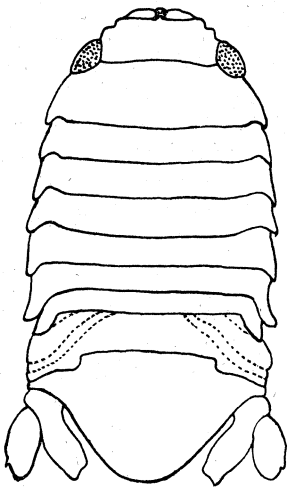
SPHÆROMA AUSTRALIS, sp. nov.

(Figs. 24*a-b.*)

Station 19.

Body smooth, convex, about twice as long as broad, slightly increasing in width posteriorly, cephalon not quite equal in

length to the first segment of the peraeon. Frontal margin with an indistinct median process, lateral margins somewhat thickened and bidentate. The basal joints of the antennæ are visible from above, their inner bases are separated by the inferior and superior frontal processes. First peraeon segment longer than either of the three subequal segments following, seventh segment much the shortest. Pleon equal in length to the six preceding segments; the penultimate segment is short, and the lines indicating coalescence are faintly marked. Ultimate segment strongly convex, the sides are converging, the extremity is broadly rounded and entire. The first epimeral process has the anterior border oblique and produced in front beyond the eye, the posterior border is transverse, and the extremity acute; the second and third are broadly rounded, the fourth is acute, the fifth is broad and obtusely rounded, the sixth is subacute, and the seventh obliquely truncated. Side plates of the pleon rather long, with the anterior margin rounded, and the posterior extremity acute. Eyes lateral, prominent, posteriorly deeply imbedded in the first peraeon segment. First joint of the anterior antennæ one-third longer than broad; the second is not so long as the width of the first; third joint slender, nearly as long as the first. Flagellum longer than the peduncle, consisting of ten joints, the second being the shortest. Peduncle of second antennæ shorter than the flagellum; the first two joints of the former are equal; the fourth is equal to the second and third combined. The flagellum has thirteen joints, the third of which is much the longest. Mandibles slender, the apical half narrow and suberect, cutting edge with four denticles; there is a large tridentate process below and a bunch of denticulated spines. Molar tubercle small, distinct, and situated close to the masticatory lobe. Lobes of the first maxillæ rather widely separated, the inner narrow and tipped with four pectinated setæ, the outer lobe is curved and diminishes in width towards the apex; the latter bears eight or nine strongly denticulated spines. The lobes of the second maxillæ are rather unequal in length and breadth. Palp of maxillipedes short and comparatively broad, with the setiferous lobes well developed;

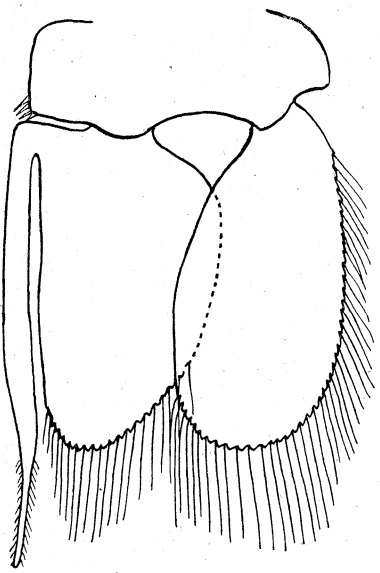


BODY VIEWED FROM ABOVE.
Fig. 24*a*.

the third and fourth joints are subequal, the last is short and about equal to the width of the first.

The first and second pairs of legs are subequal, the following pairs are rather stouter and longer. The fourth, fifth, and sixth joints are armed inferiorly with spines, which are more or less pectinated; the spines of the first and last pairs being the most distinct. The superior distal borders of the fourth joints are each furnished with similar spines; the same remark also applies to the fifth joint in all, except that of the first. The seventh joint is stout, curved, and very unequally didactyle.

Inner ramus of the first pair of pleopods elongate and subtriangular, outer ramus oblong. The inner ramus of the second pair is rather broader, and the outer narrower, than those of the first. The stylet is cylindrical, the apical fifth much attenuated, and bears numerous setæ along its distal margins. Outer rami of the following three pairs with sutural lines, the last exhibits five lobes, covered with rasp-like teeth; there are two near the apex, one in the middle of the border above the sutural line, and two immediately below it. Uropods subequal, the basal joint oblong and truncated at the extremity, the second joint is ovate, with a single small denticle on its outer distal margin.



SECOND PLEOPOD.

Fig. 24*b*.

Total length of body	10 mm
Breadth...	5·5 „

Four specimens obtained off Port Stephens. A large number of examples is in the collection from the same locality.

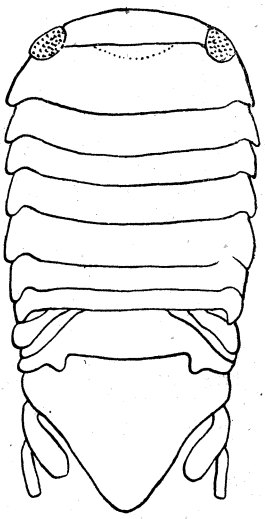
SPHÆROMA LATIFRONS, sp. nov.

(Figs. 25*a-b*.)

Station 33.

Body strongly convex, smooth, more than twice as long as broad, much wider in front than behind. Cephalon short—over one-

third shorter than the first segment of the peraeon; the latter is about one-third longer than the second or fourth; the third is equal to the fifth; the sixth and seventh are short, and subequal. Pleon a little longer than the six preceding segments, penultimate segment with the lateral sutural lines well defined. Ultimate segment large, strongly convex and subacute at the extremity. First epimeral process long, and produced in front of the eye, second to fourth acute, fifth truncated, sixth and seventh rounded; side plates of the pleon broadly rounded.



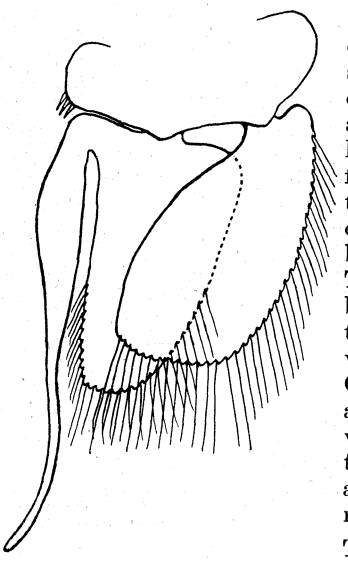
BODY VIEWED FROM ABOVE.
Fig. 25*a*.

Eyes rather prominent and lateral.

First antennæ separated at their bases by a small process of the front, the peduncle has the basal pair of joints dilated, the third joint is slender and nearly twice as long as the second. Flagellum a little shorter than the peduncle, consisting of eighteen joints; the fifth joint is rather stouter and longer than those preceding or following. Second antennæ with the peduncle and flagellum equal in length; the first two joints of the former are short and equal, the third and fourth are each almost equal to the first and second combined; first and third joints of the flagellum subequal, second joint longer than the fifth, the remaining twelve joints are of equal length.

Mandibles angularly bent in their upper third, cutting edge unidentate obtuse with a bifid tooth below, subtended by a few curved denticulated spines, molar tubercle prominent, with the lower border acute; palp with three subequal joints. First maxillæ with the lobes of equal length, the inner narrow and tipped with four pectinated setæ, the outer broad, curved and surmounted with about ten denticulated spines. Inner branch of the second maxillæ rather longer and broader than either of the two outer lobes. Palp of maxillipedes short, the superior lobes well developed, third joint about equal in length to the width of the first. Legs increasing in length as the end of the body is approached. The fourth, fifth, and sixth joints of the first and last pairs are armed inferiorly with long spines, the same joints in the intermediate pairs have their inferior margins densely hairy. The seventh joint is comparatively elongate, and terminates in two unequal spines; the larger spine is situated at

the superior distally extremity, and the smaller one arises from the end of the lower border. The third joint of all the legs is angulated about the middle of the upper border, and the angle is ornamented with several long setæ. The superior distal margins of the two following joints are also furnished with tufts of long hairs. The inner ramus of the first pair of pleopods is narrowly triangular, the outer ramus is oblong-ovate ; rami of second pair broader than those of the first. The stylet in the male is rather broad in its basal fourth, from thence it tapers gradually to the very slender apical portion. Outer rami of the uropods linear about six times as long as broad ; when folded they extend beyond the processes of the first joints, and they arise from about the middle of their supporting joint.



SECOND PLEOPOD.
Fig. 25*b*.

Total length of body ... 10 mm.
Breadth ... ... 6 mm.

Three specimens obtained off Newcastle Bight.

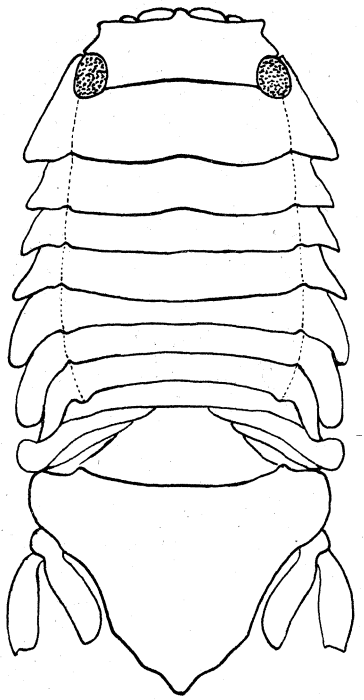
SPHÆROMA PLUMOSA, sp. nov.

(Figs. 26*a-b-c*.)

Stations 44, 48.

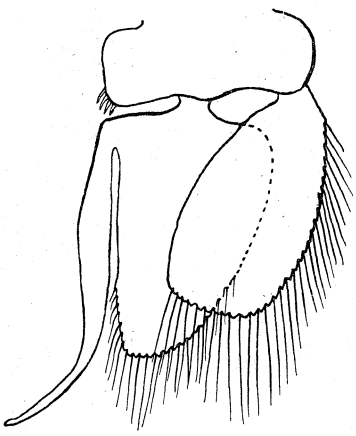
Body depressed, gradually increasing in height to the penultimate segment of the pleon ; fromt he later point it decreases rapidly to its termination. The whole of the surface and the margins of the body are closely covered with plumose hairs. Cephalon small, much narrower and a little shorter than the first peraeon segment. Frontal margin subtruncate, with a small median lobe; sides slightly excavated, each with a pair of denticles, one at the anterior external angle and the other immediately in front of the eye. First segment of the peraeon nearly equal in length to the two following; second to fourth subequal, each being about one-third longer than any of the three succeeding segments, which are also of about equal length. Pleon nearly equal to the peraeon ; the penultimate segment is convex, with the sutural

lines well defined. Terminal segment large; the sides are sinuous and the extremity rather narrow, rounded and entire. The first epimeral process is produced in front to the anterior margin of the eye; the posterior border is transverse and the posterior angle is subacute; the second, third, and fourth, when viewed from the side, are narrow, wide apart, and obtusely pointed; the fifth and sixth have their apices broadly rounded; the seventh is short, and acutely pointed. Side plates of the pleon curved and subspatulate. Eyes lateral, not prominent, with their posterior two-thirds imbedded in the anterior part of the first peraeon segment. Basal joints of the first antennæ moderately stout, visible from above, and projecting beyond the front; their inner bases are separated by the median cephalic process; the second joint is received into an excavation of the end of the first. Flagellum much shorter than the peduncle, consisting of eight joints; the second is a little shorter than the first or third, fourth and fifth equal, longer than those preceding or following. First and second joints of second antennæ equal, both of which are widened distally; third joint of nearly equal width throughout, and as long as the two preceding joints combined; fourth joint a little longer than the third, with the base narrower than the apex. Flagellum equal to the peduncle, with ten subequal joints. Mandibles strongly bent distally, the cutting edge tridentate, with a blade-like lobe at its inner base, tipped with three teeth, the median one being small; a few denticulated spines are also present. Molar tubercle prominent, and apically encircled with short, stout, simple spines. Palp consisting of three equal joints. Inner lobe of first maxillæ narrow, tipped with four pectinated setæ. Outer lobe gradually tapering from the basal third to the apex: the latter bears about fourteen denticulated spines. The



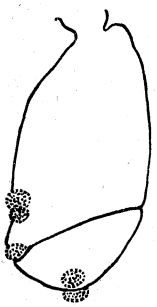
BODY VIEWED FROM ABOVE.
Fig. 26*a*.

second maxillæ are subequal in width, and attain to the same level. Palp of maxillipedes short, with the superior setiferous lobes well defined. The third joint is much shorter than the second or either of the two following. First pair of legs shorter and less robust than any of those following; the last pair are rather long and slender. The inferior borders of the fourth, fifth, and sixth joints are armed with numerous stout pectinated spines; there is a well-defined series on the borders, and a number scattered on the lower lateral surfaces. The third joint of all the legs except the last have the superior border prominently angulated in the middle, and tipped with a stoutish spine. Fourth and fifth joints of the second to the fifth legs nearly as broad as long, with the superior borders prominent, and ornamented with one or two spines at the distal extremity; seventh joint terminating distally with two very unequal spines, the superior one large, strong, and curved, the inferior one short and stout.



SECOND PLEOPOD.
Fig. 26*b*.

Inner ramus of the first pair of pleopods rather narrow, tapering from the base to an obtuse apex; outer ramus ovate. Inner ramus of the second pair about twice as long as broad; the stylet is subfusiform in its lower two-thirds, the apical fourth is long, curved and slender. Outer rami of the three succeeding pairs, with a sutural line, both rami of these are ciliated at their distal extremity. The outer ramus of the fifth pair bears five bead-like lobes covered with rasp-like teeth; there is a pair at the distal end, one on the sutural line, and two situated at the distal fourth of the inner border. Uropods oblong, equal and folding, the outer truncated at the extremity.



FIFTH PLEOPOD.
Fig. 26*c*.

Total length of body, 9 mm.; breadth, 4.5 mm.

This species is allied to *Sphæroma aspera*, Haswell.

One specimen obtained off Coogee and two off Wollongong.

ZUZARA, *Leach.*

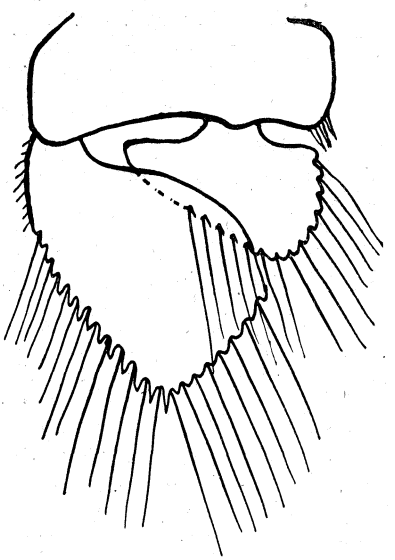
ZUZARA EMARGINATA, *Haswell.*

Zuzara emarginata, Haswell, Proc. Linn. Soc. N.S.W., vi., 1882, p. 188, pl. iii., fig. 6.

(Fig. 27.)

Station 57.

Two young females of this species were obtained off Wata Mooli. The examples differ considerably from the adults, and could scarcely have been identified without the aid of Haswell's types. The pleopods furnish excellent specific characters, which are probably sufficient to recognise this species by at any age. The inner ramus of the first pair is twice as broad as long, the outer rami of both the first and second pairs are armed on the outer distal border with ten or twelve spines, together with the usual plumose setæ. The outer ramus of the third pair has a well-marked sutural line. Both rami of the succeeding pairs possess branchial pleats, and the outer ramus of the last is provided with three small teeth-bearing lobes, one at the summit, another about the middle of the apical part of the lamina, and the third is on the inner border below the sutural line. The stylets of the male in Haswell's type are broken off, they arise from the middle of the inner margin of the ramus. The mandibles are moderate in size, the cutting edge is thin and dentate, the inferior tooth is tridentate and attended by an inferior bunch of curved denticulate spines. Molar tubercle well defined, and encircled with spinules. Palp consisting of three subequal joints. First maxillæ tipped with denticulated spines. Second maxillæ short, broad, and subequal in size. Maxillipedes small, the superior setiferous lobes are well developed, the third joint is much shorter than the second, fourth, or fifth. The flagellum of the first antennæ is ten-jointed, the



First Pleopod.
Fig. 27.

first of which is much the longest. The flagellum of the second antennæ consists of fourteen articulations, the third is rather shorter than those preceding or following, the sixth, seventh, and eighth are equal in length to that of the first.

Zuzara integra, Haswell,* is identical with *Cycloidura venosa*, Stebbing.†

Obtained off Wata Mooli.

CYMODOCE, *Leach.*

CYMODOCE TUBERCULOSA, *Stebbing.*

Cymodoce tuberculosa, Stebbing, Ann. Mag. Nat. Hist., (4), xii., 1873, p. 95, pl. iii., fig. 1.

(Fig. 28.)

Stations 31, 44.

Anteriorly, the body of the adult male is somewhat narrowed, the frontal margin being a little more than half the posterior width of the first peraeon segment; from this point the body gradually increases in width to the sixth segment. The cephalon is about one-third longer than the first segment of the peraeon, the latter is equal to any two of those succeeding. The whole upper surface of the body, including the uropods, is minutely granulose; the second and following segments have a transverse series of subconical tubercles seated on the anterior margin; the third to sixth with similar but smaller series, which are somewhat unequal in size and in distance apart, and nearer to the hinder margin than to the middle. The pleon exhibits two or three lateral sutures indicating the coalesced segments, each of which is marked by a more or less distinct row of granules.

The terminal segment has a slight longitudinal median depression, which is also indicated on the preceding segment, laterally, the sides are convex, and ornamented with two clusters of small tubercles, those situated distally are seated on a slight oblique ridge, posterior margin with three blunt processes, the median one is somewhat elevated superiorly and shorter than lateral pair. First antennæ with the basal joint stout, about three times as long as broad, without the marginal denticles; the latter are four or five in number, they project along the anterior border and gradually increase in size outwardly. Second joint about equal in length and breadth to half the width of the first; third joint slender, five times as long as broad.

* Haswell—Proc. Linn. Soc. N.S.W., vi., 1882, p. 186, pl. iii., fig. 6.

† Stebbing—Jour. Linn. Soc., xii., 1874, p. 146, pl. 6.

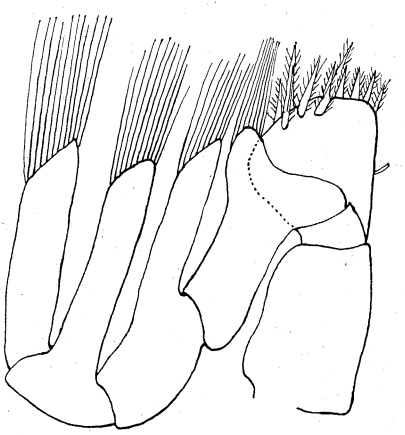
The flagellum consists of fourteen articulations, each of which carries three or four setæ on the upper distal margin.

The second antennæ have the first joint stout, and about twice as long as broad; second and third narrower, but equal in length to the first; fourth joint nearly equal in length to the two preceding combined. Flagellum with nineteen articulations; the third joint is much shorter than those preceding or following, excepting the last two at the tip.

Mandibles short, stout, the upper third strongly bent inward, cutting margin with four or five denticles, which are subtended below by a series of flat, broad based spines, they taper gradually to acute points. Molar tubercle close to the denticles well defined, especially below. Palp about equal in length to the mandible, with three subequal joints.

First maxillæ with inner lobe rather stout and tipped with four long pectinated spines, the outer lobe carries twelve or more rather slender simple spines, which taper rapidly to acute points. Second maxillæ with the inner lobe twice as long as broad; the upper inner margin and the distal extremity are armed with pectinate spines; the outer lobes are tipped with long unbranched setæ.

Upper portion of the second joint of the maxillipedes shorter and broader than the lower, the outer margin is strongly convex, the inner straight with a short filament about the middle; the apical margin and the external distal surface carry numerous short pectinate spines; the joints of the palp are peculiar in shape, as will be seen in the accompanying figure.



RIGHT MAXILLIPEDE.
Fig. 28.

The first three pairs of pleopods have the peduncle armed on the interno-distal angle with three or four spines. The inner ramus of the first is conical in outline and shorter than the outer; the latter is oblong with almost straight sides, pointed proximally and slightly convex distally. Outer ramus of second pair oval; inner similar in shape to that of the first, but longer and broader. The stylet is a little longer than the ramus; it is comparatively broad and of equal

width to within a short distance of the summit; the outer margin is straight throughout; the inner distal border is oblique and slopes to the subacute apex; both margins are minutely ciliate. Apex of the outer ramus of the fifth pair tumid; there is a pyriform lobe in the middle of the inferior surface just above the suture; the latter is thickened on the inner angle, and there is a small tubercle at some distance below; the inner aspect of the distal margin and the tubercles are clothed with rasp-like denticles.

Outer ramus of uropods very small; when closed its internal border is opposed to that of the inner branch.

Length of adult male	11 mm.
Width of frontal margin	3 ,,
Greatest breadth of first peraeon segment ...	5 ,,
,, ,, ,, body at the sixth segment	6 ,,

Eight examples were obtained off Cape Hawke, and ten off Coogee Bay, in 25 to 50 fathoms.

CYMODOCE CONVEXA, *Miers.*

Cymodoce convexa, Miers, Cat. Crustacea, Col. Mus. & Geol. Surv. N. Zealand, 1876, p. 114, pl. iii., fig. 6.

(Fig. 29.)

Stations 21, 50, 55.

This species is represented by about seventy specimens. The tubercles on the terminal segment vary greatly; in some examples they are scarcely visible, in others often prominent, ridge-like and frequently three instead of two are present on each side of the median line.

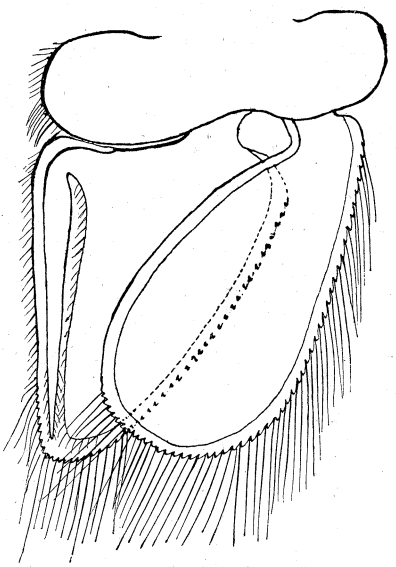
Mandibles moderate, about three times as long as broad; apical denticle with a slight rounded lobe inferiorly; secondary tooth subtrilobate at the summit; the stouter accompanying setæ have several seriate spinules on the upper surface. Molar tubercle fairly well defined; a small broadly conical process is present between it and the dental setæ. Palp rather short, with compressed joints, of which the first is broader but of equal length to the second.

The first maxillæ have the inner lobe stout and tipped with four strong pectinated spines; the outer lobe bears about twelve simple curved spines; another larger set is plainly visible within the lobe about the middle, ready for use at the next moult.

The maxillipedes have the upper portion of second joint a little longer and broader than the lower; the former has the usual

curved filament at the distal third of the inner margin, and the apex bears a series of short pectinate spines ; a few are subapical and arise from a point opposite the marginal filament. The second, third, and fourth joints of the palp are provided with setæ tipped lobes, the fifth joint is subcylindrical and terminates in a tuft of setæ.

The first two pairs of pleopods have a few spines on the interno-distal angle of the peduncle ; the inner ramus of the first is subtriangular, with inner margin straight ; outer ramus obovate and rather narrow at the base ; outer ramus of second pair similar to that of the first, the inner is longer and slightly broader than the first. With a view of describing the stylets I examined nearly the whole of the specimens without finding a single fully developed male. I considered this rather strange and determined to make further examination. After dissecting out the inner rami from many specimens I found several immature males, some with only the slightest trace of stylets, and one with the stylets almost fully formed, but these could not be functional until after casting the integument, inasmuch as they are completely inclosed in the lamina of the inner rami (see fig. 29). Outer ramus of fifth pair of pleopods with two equal tubercles at the apex, and one on the inner distal extremity of the suture with a small accessory tubercle as its base ; the inner distal margin, as well as the tubercles, are closely covered with rasp-like denticles. Outer ramus of uropods nearly hidden when closed.



Second Pleopod.
Fig. 29.

Length of largest male	...	...	...	15	mm.
Breadth „ „	...	...	...	6	„
Length of female	...	...	...	12	„
Breadth „	...	...	...	5	„

The specimens were obtained in Newcastle Bight, off Shoalhaven River, in Jervis Bay, and off Crookhaven River, in 11 to 27 fathoms.

CYMODOCE ACULEATA, *Haswell.*

Cymodoce aculeata, Haswell, Proc. Linn. Soc. N.S.W., 1880, v., p. 474, pl. xvi., fig. 6; *Id.*, Aust. Mus. Cat. v., Crustacea, 1882, p. 291.

Stations 33, 50.

This species is represented by twelve examples; in the original diagnosis the fixed ramus of the uropod is stated to be emarginate; the emargination is scarcely discernible in the types; the distal extremity is obliquely truncated, and apparent emargination is due to a slight median depression on the superior surface. Fourth, fifth and sixth joints of the first pair of legs armed with spines; the same joints in the succeeding pairs are densely covered with numerous short hairs and a few stiff setæ. The mandibles are moderately robust, the apical denticle is blunt, the lateral one is subtrilobate at the apex, and the accompanying spines are mostly simple; a few of the larger have two or three irregularly disposed spinules. Palp three-jointed, with the basal joint the longest. Inner process of first maxillæ slender, armed at the tip with four spines, each of which bears numerous long spinules. Outer process with about twelve or fourteen stout, smooth, curved spines. Lobes of the second maxillæ armed with pectinate spines; the inner lobe is rather broad, and the fringe of spines extends some distance along the oblique inner border. Upper and lower portions of the second joint of the maxillipedes subequal; there is a short curved filament at about the distal third on the inner border, and the truncated apex bears about fourteen or more short, stout, strongly-pectinated spines. Second, third and fourth joints with well-developed superior lobes; fifth joint cylindrical, tipped as well as the lobes with long, simple setæ; there are also a few long hairs at the inferior distal extremities of the joints. Peduncles of the first three pairs of pleopods with three to five spines situated at the interno-distal angle. Inner ramus of the first pair nearly triangular. Outer ramus much longer than the inner, more than twice as long as broad, and twice as wide distally as proximally, with the outer margin straight. Rami of the second pair equal in length, and proportionately broader than those of the first; the outer ramus is obovate, and the inner cone-shaped in outline, with a slender stylet about one-third longer than the ramus; in its basal two-thirds the stylet is fusiform, and the terminal third is cylindrical, and bears numerous hairs, which become more evident as the acute apex is approached. Outer rami of the third, fourth, and fifth pairs with a subapical suture; the fifth has several distal tubercles, which, as well as the margin, exhibit a closely-placed series of rasp-like teeth. There is a rounded tubercle at the summit, a compressed one on

the middle of the upper inferior surface and two small and bead-like on the inner border—one at the suture, and the other at a short distance below it. Outer ramus of uropods folding under the inner, and almost concealed when closed.

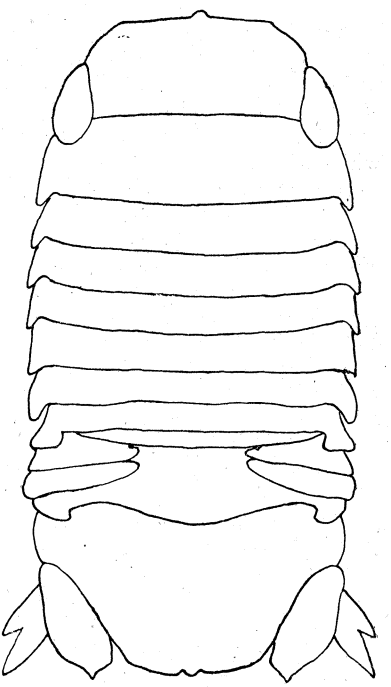
Obtained at Newcastle Bight, and off Shoalhaven in 15 to 27 fathoms.

CYMODOCE INORNATA, sp. nov.

(Fig. 30.)

Station 48.

Body minutely hairy, and very finely granulose. Frontal margin of the cephalon rather broad, with a small median process. First segment of the peraeon as long as the cephalon, second to seventh short, gradually decreasing in length. Epimera of the first segment acutely produced in front, angular behind; on the second, third, and fourth they are narrow, acute, with their apices directed downwards, and inclined towards the posterior end of the body; the fifth is obtuse; the sixth and seventh are subfalcate and acute. The pleon exhibits four segments—the first is short and continued from side to side, the second and third are only indicated laterally, the fourth is the longest, its posterior border is convex and slightly thickened. The epimeral processes of the pleon are longer than those of the peraeon; the first has a rounded lobe on the anterior border. The sutures indicating the union of the epimera with the body are well defined on the peraeon, but absent on the pleon. Terminal segment convex, somewhat flat at the vertex, and there is a slight semicircular depression which extends from one uropod to the other; posterior



BODY VIEWED FROM ABOVE.
Fig. 30.

margin subtruncate, with three small denticles; the median is rounded, and as long as the lateral ones.

Eyes longer than broad; the pigmented area is cuneate in outline, with the narrow end directed backwards. Basal joint of first antennæ stout, twice as long as broad; second joint short—its length is about equal to two-thirds the width of the first; third joint slender, half the length of the first. Flagellum consisting of twenty-three articulations; the first joint is equal in length to the three following, the rest are subequal; each has a few setæ on the inferior distal margin. First joint of the second antennæ a little longer than broad, not wider than those succeeding; second joint one-third longer than the first, and about the same shorter than the third; fourth joint equal in length to the two preceding combined. Flagellum with seventeen joints, the first being equal to the two following, third, fourth, and fifth equal, the rest gradually increase in length to near the apex.

Mandibles stout, nearly straight, cutting edge entire, with an accessory trilobate denticle and a series of spines, the larger of which bear one or two spinules. Molar tubercle ill-defined, and rather remote from the cutting edge. Palp one-third shorter than the mandible, the first joint longer than the second or third, which are equal. Inner lobe of first maxillæ slender, tipped with four pectinate spines; outer lobe with twelve simple curved spines on the distal extremity. The lobes of the second maxillæ have their apices armed with pectinate setæ or spines; those on the outer lobes have the spinules forming the pectination very minute.

Maxillipedes with distal and proximal portions of the second joint equal in size; the former bears on the distal margin, and also on the external surface, a dense series of stout pectinated setæ, and a short curved filament on the inner border. Second joint of palp very broad distally, equal in length to the two succeeding; fifth joint short, about equal to the fourth, and also to the superior lobes of third and fourth. The first pair of legs is imperfect, the succeeding pairs have the fourth, fifth, and sixth joints covered inferiorly with numerous short, closely-placed yellow hairs. Peduncles of the first three pairs of pleopods with three or four spines on the interno-distal angle; the inner ramus of the first is triangular, the outer is narrowly obovate. Inner ramus of the fifth pair a little tumid at the apex, with an elongate papilliform lobe on the middle of the inferior distal surface, and a bead-like tubercle on the inner margin below the suture; each process and the inner aspect of the distal border are clothed with rather large rasp-like denticles. Uropods a little unequal, inner branch ovate-oblong, widest at the distal third, the outer distal angle pointed, the apical margin obliquely truncated on its inner

aspect. Outer ramus bidentate, as long or a little longer than the inner when closed ; the outer denticle is short, and separated from the inner by a V-shaped space. The outer ramus can be folded under the inner.

Length of adult female	...	...	...	16 mm.
Breadth „ „	...	...	...	8 mm.

A single example was obtained off Wollongong in 55-56 fathoms.

CILICŒA, *Leach.*

CILICŒA HYSTRIX, *Haswell.*

Cilicœa hystrix, Haswell, Proc. Linn. Soc. N.S.W., vi., 1881, p. 183, pl. iii., fig. 1 ; *Id.*, Aust. Mus. Cat., v., Crust., 1882, p. 296.

Station 13.

This species was described from male examples, of which there are two in the collection labelled as types. A note following the diagnosis of *C. spinulosa*, Haswell, casts a doubt on the identity of the form depicted in figure 2 on plate iii.* The "Thetis" material affords two specimens, both of which are undoubtedly females of *C. hystrix*. It is highly probable that Haswell's figure (Pl. iii., fig. 2) represents the female of *C. spinulosa*.

The sexual differences in *C. hystrix* are very slight. The spines in the female are fewer, shorter, and the forked process of the first pleon segment is wanting.

Two specimens obtained off Cape Three Points in 41-50 fathoms.

CILICŒA SPINULOSA, *Haswell.*

Cilicœa spinulosa, Haswell, Proc. Linn. Soc. N.S.W., vi., 1882, p. 184, pl. iii., fig. 3 ; *Id.*, Aust. Mus. Cat., v., Crustacea, 1882, p. 297.

(Fig. 31.)

Station 25.

A single male example was obtained off Cape Three Points. It differs somewhat from the types, and also from the other examples, in being much less spinose. The flagellum of the first

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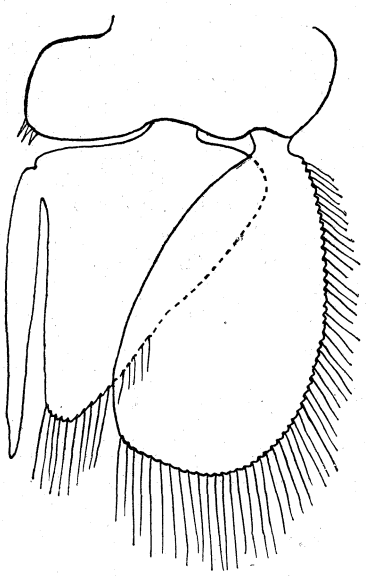
Haswell—Proc. Linn. Soc. N.S.W., vi., 1881, pl. iii., fig. 2.

antennæ is shorter than the peduncle; it consists of sixteen articulations, the first joint is equal to the two following combined. The second antennæ have the basal joints equal to, but stouter than the second; third joint one-third longer; fourth is longer than the two preceding. Flagellum slightly longer than the peduncle, with sixteen joints, the second is shorter than the first, the third is much the longest in the basal series. Mandibles nearly erect, with the outer border straight, cutting edge with a blunt denticle, and subtended below by a bunch of uniserially branched spines and a well-developed molar tubercle. Palp small, three-jointed, the last joint shorter than those preceding. First maxillæ with the masticatory lobe stout, and surmounted with seven or eight simple spines; inner lobe rather small, tipped with four stout branched setæ. Second maxillæ equal in height, the inner lobe rather broad. Maxillipedes with the second joint stout, palp short with prominent setiferous lobes, the third joint shorter than second or fourth. Legs subequal, the last pair somewhat slender; the fourth joint of the first pair bears six spines on the inferior border; the same joints in the succeeding legs have four spines, and the same number occurs on the fifth and sixth joints; they are very unequally didactyle at the extremity. First pair of pleopods with inner ramus triangulate, much smaller than the ovate-oblong outer branch; the rami of the second are similar in outline to those of the first; the cylindrical stylet is a little longer than its support, and suddenly norrowed near the apex.



SECOND PLEOPOD.
Fig. 31.

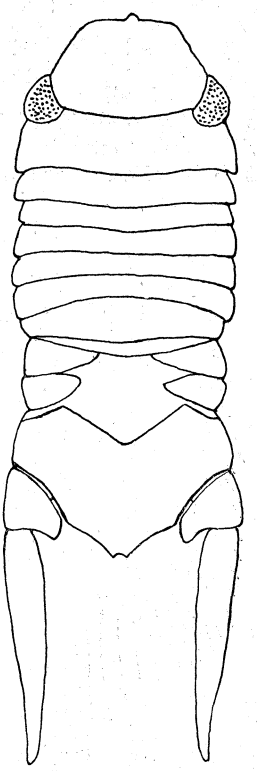
This species is fairly common on the coast; I have found it occupying oscula-like openings in sponges. In one instance, in a sponge from Maroubra Bay (*Chalina finitima*), the cavities occupied by the Isopod are lined with a very compact layer of fine fibres, which are much more closely arranged and denser than any other part of the sponge.

CILICŒA STYLIFERA, sp. nov.

(Figs. 32*a-b.*)

Stations 13, 37, 57.

Adult male.—Body granular, convex, more than twice as broad as long, narrowest at the juncture of the peraeon with the pleon. Cephalon about one-third wider than long. Frontal margin truncated, with a prominent median lobe and the sides oblique. First segment of the peraeon longer than the two following segments combined. Pleon nearly equal to the peraeon in length. The coalesced segments are well defined. Terminal segment convex; the posterior third is almost free from granules, and the extremity has an inferior median semicircular notch bounded by a pair of minute denticles. Epimeral process of the first segment of the peraeon with a thickened oblique margin and a truncated inferior border, the second is cuspidate, the third minute, fourth elongate, fifth to seventh broadly pointed. Epimera of the pleon very large, the margins thickened and semicircular in outline.



BODY VIEWED FROM ABOVE.
Fig. 32*a*.

Eyes lateral and rather prominent. Basal joints of first antennæ dilated, separated at their bases by the frontal lobe. First joint more than three times longer than the second, with the external surface granulated. Flagellum twice as long as the peduncle; the first joint equal in length to the three following; the remaining nine are about of equal length. Second antennæ slender; the first and second joints subequal, third nearly equal to the two preceding, fourth joint much longer than the third. Flagellum equal in length to the peduncle, consisting of ten joints; the first pair is equal and the third the shortest.

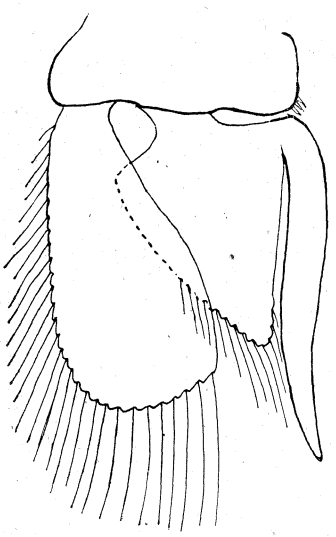
Mandibles stout, the width at the summit being equal to half the length, cutting edge broad, simple, subtended below with a few spines and several spinules. Molar tubercle obtusely conical, apically furnished with branched and simple spinules. Palp three-jointed, the first short and stout, the two following are equal.

Anterior maxillæ with masticatory lobe, elongated, tipped with simple curved spines; inner lobe with four branched setæ, the internal one being much the longest.

Posterior maxillæ with the inner lobe rather broader than either of the two outer.

Maxillipedes slender.

First pair of legs shorter and stouter than those succeeding. The fourth, fifth and sixth joints are each armed on the inferior border with three stout spines, which are very unequally bi- or trispinose at their apices. Seventh joint terminated in two unequal spines, separated by a long stiff setæ. Peduncles of pleopods armed on their inner distal angles with several spines. Outer ramus of the second pair obovate; inner ramus triangular; the stylet is fusiform in shape, one-third longer than the ramus, and quite glabrous. The outer ramus of the last pair terminates in a broad rounded lobe covered with rasp-like teeth; another similar lobe is present on the inner aspect below the sutural line. Basal joint of the uropods broader than long, obtusely pointed on the inner side; last joint styliform, about equal to the peraeon in length; colour white, and in strong contrast to the rest of the body. The female does not differ materially from the male.



SECOND PLEOPOD.
Fig. 32*b*.

Length of body ...	...	...	5 mm.; total 7 mm.
Breadth ,, ...	...	...	3 mm.

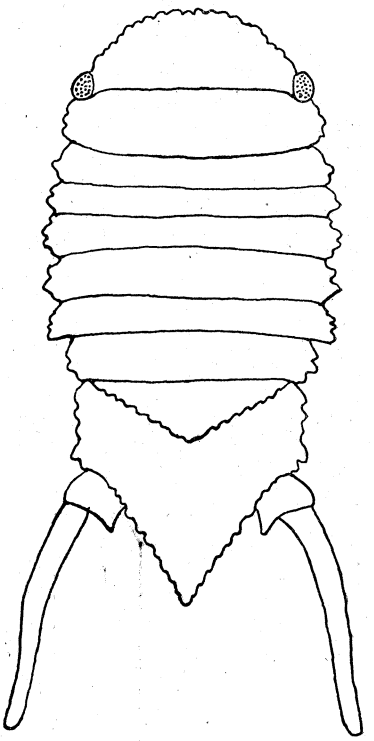
Obtained off Cape Three Points, Botany Bay, and Wata Mooli.

CILICŒA ORNATA, sp. nov.

(Figs. 33*a-b*.)

Stations 13, 28, 37, 38.

Adult male. Body strongly convex, about twice as long as broad, closely covered with very prominent subspiniform granules, the larger of which are 0·1 mm. in height and 0·05 mm. in diameter. Cephalon with the frontal border rounded, about three times as wide as long, and equal in length to the first segment of the peraeon; the latter is equal to the two segments following; the fourth to the seventh segments are subequal. The pleon is about equal to the six preceding segments combined. The median process on the penultimate segment is small, and but little prominent. The sutural lines indicating the coalesced segments are obscured by the peculiar character of the granulation. The terminal segment is large, convex, and acutely produced at the extremity, with a small semicircular notch, which is not visible from above; the sides are converging. The first epimeral process of the peræon is twice as long as any of those following, with a slight lobe on the posterior third of the broad inferior border. Second to fourth equal, subacute, and directed backwards; fifth to seventh broadly rounded, and decreasing in size posteriorly.



BODY VIEWED FROM ABOVE.
Fig. 33*a*.

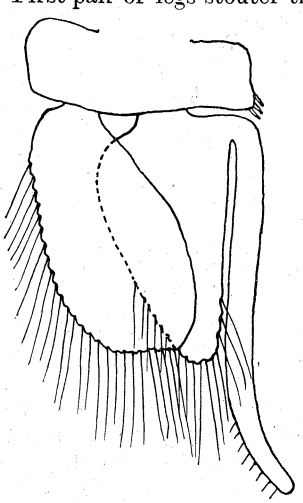
The second to the seventh segments of the peraeon are each ornamented with a single transverse row of granules, and the bases of the epimeral processes are marked by two or three blunt, conical granules; the rest of the upper surface of the body is studded with scattered granules and short, stiff setæ.

Eyes subreniform, prominent, dark brownish black in colour.

The first antennæ have their inner bases separated by an ill-defined process of the front The basal joint is stout, with anterior surface coarsely granulose; second joint smooth, its length being equal to the greater diameter of the first; third joint slender, more than one-fourth longer than the second. Flagellum with ten articulations; the second and third are equal, and shorter than any of the others; the first, fourth, and fifth joints are equal.

Second antennæ with the peduncle about one-fifth shorter than the flagellum; the last joint of the former is equal to the two preceding combined. The flagellum consists of eleven joints, the first and second subequal, and longer than any following; the third, fourth, and fifth are the shorter; the sixth and seventh are a little shorter than the second. Mandibles moderate, with the cutting edge unidentate; accompanied below by two or three stout spines, and some slender ones with spinulose borders. Molar tubercle well defined. Palp three-joint, the first stout, and much longer than those succeeding. The inner lobe of the first maxillæ is tipped with four curved spines; the inner pair is almost smooth and swollen at the apices, the outer pair is pectinated. The outer lobe bears eight or ten simple curved spines at its summit, and its inner border is fringed with distant hairs. Maxillipedes rather small; the third joint of the palp is shorter than the fourth or fifth; the superior lobes are elongate and setiferous at their apices.

First pair of legs stouter than any of the following pairs; the fourth, fifth, and sixth joints are each armed inferiorly with two spines; they are situated near the distal extremity, and their apices are furnished with one or two accessory spinules.



SECOND PLEOPOD.
Fig. 33*b*.

Inner ramus of first pair of pleopods subtriangular, and about one-third longer than wide. Outer ramus ovate-oblong. The inner ramus of the second pair carries a subcylindrical stylet on its inner base; it is curved inwards distally, and bears a series of very short setæ on the outer aspect of the terminal fourth. The outer ramus of the last pleopods has two bead-like teeth bearing lobes at the distal extremity, and another on the inner margin below the sutural line.

Inner branch of the uropods small, with a slight inwardly-directed denticle. Outer branch smooth, cylindrical, tapering distally, slightly curved, and equal to or exceeding the pleon in length.

The granulation in the female is much less prominent than in the male; the uropods are wanting in the only female specimen available.

Length of body	... ...	8 mm.
Breadth „	... ...	3·5 mm.

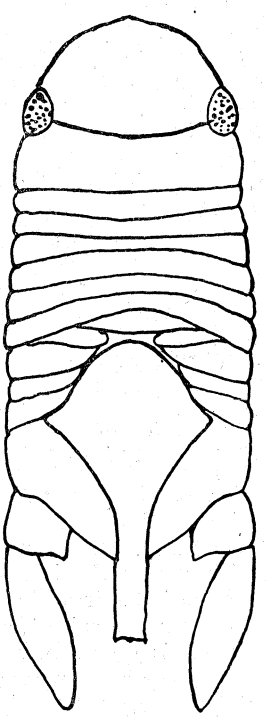
Obtained off Cape Three Points, Manning River, and Botany Bay.

CILICŒA GRANULATA, sp. nov.

(Figs. 34*a-b*.)

Stations 37, 38, 49, 55, 57.

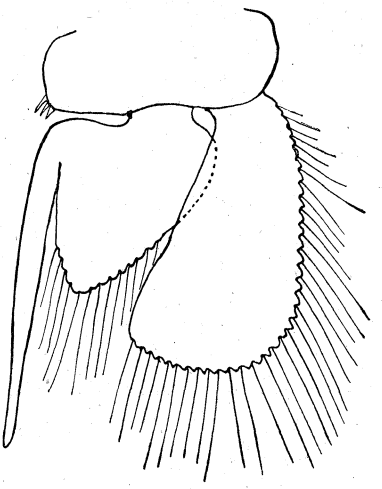
Adult male—Body strongly convex, about twice as long as broad, upper surface closely covered with moderately prominent granules; those occurring on the pleon and uropods are subspiniform, and have numerous short, stiff setæ interspersed between them. There are faint indications of four longitudinal rows of larger granules, of which two are submedian, and two laterally situated; these larger granules are more pronounced in the male than in the female. Cephalon one-third broader than long, front unevenly rounded, with a distinct median lobe. First segment of the peraeon one-third shorter than the cephalon, and about equal in length to the three following segments; the remaining three segments are subequal in length, the last being much longer at the sides than in the middle. Total length of the pleon slightly longer than the peraeon and cephalon combined. The coalesced segments are well defined, the median process is large, convex at the base, and dorso-ventrally compressed at the extremity, with three small terminal subspiniform granules; it extends beyond the end of the last segment, but is much shorter than the extended outer branches of the uropods. Terminal segment of pleon with a well-defined semicircular notch bounded at the sides by a pair of small denticles, and above by a thickened border, anterior to which is a well-marked trans-



BODY VIEWED FROM ABOVE.
Fig. 34*a*.

verse groove extending to the insertion of the uropods. First epimeral process of the peraeon large, with the anterior border obliquely curved and reflexed; the posterior border is acute, and directed backwards; the second to fourth are about twice as deep as long, and obtusely pointed; the fifth, sixth and seventh are broadly rounded. Side plates of the pleon large, with the anterior border rounded. Eyes oblong, the pigmented area is surrounded by a slightly raised granular border. First antennæ with the basal joint stout, its anterior surface strongly granulose, and sparsely setose; second joint as long as the width of the first, a few granules are presented on its anterior surface; third joint slender, one-fourth longer than the second. The flagellum is equal to the peduncle in length, and consists of eleven articulations, the first joint is the longest, the fourth, fifth and sixth are equal, and nearly one-third longer than the second, third, eighth, or ninth. The second antennæ have the first and second joints equal; the third is a little longer than the first, the fourth is as long as the two preceding combined. Flagellum longer than the peduncle, consisting of thirteen joints, the second is shorter than first or third, the fourth is shorter than any preceding or following. All the joints have a superior transverse row of setæ on the distal margin; the second and third joints have, in addition, a second row of setæ situated in the middle of the external surface. Mandibles stout, angularly bent near the summit; cutting edge unidentate, obtusely rounded, with one stout, and four or five slender spines at its base; molar tubercle well defined but not prominent. Palp three-jointed, the first stouter and longer than the second or third. Outer branch of the first maxillæ rather broad, tipped with about ten simple curved spines, the inner border bears a series of long hairs, which are confined to the middle third; inner branch short, with four curved branched setæ at the summit. Palp of the maxillipedes with the superior lobes elongated and clothed at their apices with long setæ, the third and fourth joints are about one-third shorter than the fifth. First pair of legs rather slender; the fourth joint is armed inferiorly with four stoutish spines, two near the middle and two at the distal extremity; the fifth joint has three spines, and the sixth four, the distal one being stouter than those preceding; the seventh joint has a pair of unequal spinules arising from the base of the large terminal spine. The inner ramus of the first pleopods is triangular, with the sides equal; the outer ramus is oblong, and becomes wider as the subtruncated summit is approached. The rami of the second pair are similar to the first in shape, the inner ramus bears a subfusiform stylet at its base, the distal half projects beyond the ramus, and is suddenly narrowed and quite glabrous. Outer ramus of the fifth pair with a dome-shaped apex and a papilliform process near the middle of the lamina above the sutural line;

below the latter, on the inner margin, is another lobe; the whole border above the suture and the raised processes are furnished with rasp-like denticles. Inner joint of the uropods one-fourth longer than broad, with a small backwardly directed denticle on the inner angle. Outer joint seven times longer than broad, narrowly lanceolate in outline, the inner border is compressed and acute.

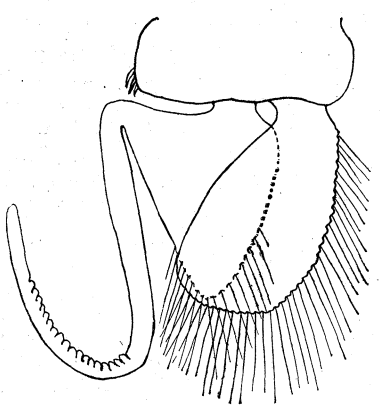


Second Pleopod.
Fig. 34*b*.

The female differs from the male in having a submedian pair of tubercles transversely disposed behind the middle of the terminal segment and in wanting the long process on the penultimate segment, its evidence in the female being a short conical tubercle.

Total length of male (uropods included) ... 13 mm.
Breadth ... ... 5 „

This species has a superficial resemblance to *Cilicœa crassicaudata*, Haswell, in the contour of the body, and also in size. The type, however—a solitary male example—proves to be very distinct from the species described above. In *Cilicœa crassicaudata* the granulation is very fine and scarcely visible to the unaided eye, the cephalon shorter than in *C. granulata*, and the segments of the peraeon longer. The dorsal process is much wider at its origin and thicker at its rounded extremity, and the terminal segment has a well defined denticle in the centre of the notch. The inner branch of the uropods has an inwardly directed, subtruncated denticle, and the outer ramus is of even width throughout; the apex is a little more obtuse than indicated in the figure.



Second Pleopod.
Fig. 35.

The differences in the second pleopod are very marked; in *C. crassicaudata* (fig. 35) they are much larger, the stylet being very remarkable for its length, curvature, and corrugated muscular band; the latter is situated on the inner side of its distal half, and in its present contracted condition prevents the stylet from being straightened out.

Obtained off Botany, Jibbon, Port Kembla, Crookhaven River, and Wata Mooli.

BREGMOCERELLA, *Haswell.*

BREGMOCERELLA GRAYANUS, *Woodward.*

New Isopod, Woodward, Rep. Brit. Assoc. for 1869 (1870), trans. sect., p. 118 (title only).

Ceratocephalus grayanus, Woodward, Encyc. Brit., ninth edit., vi., p. 659, fig. 72.

Ceratocephalus grayanus, Beddard, Chall. Report, Zool., xvii., 1886, p. 148.

Bregmocerella tricornis, Haswell, Proc. Linn. Soc. N.S.W., ix., 1885, p. 1004, pl. liii., fig. 1.

Stations 33, 35.

In the year 1869 Mr. H. Woodward read a paper "On a new Isopod from Flinders Island." The same author briefly describes and figures the species in the Encyclopædia Britannica under the name of *Ceratocephalus grayanus*, a MS. name given by Adam White.

In 1885 Mr. (now Prof.) W. A. Haswell redescribed it as *Bregmocerella tricornis*. Mr. Woodward, in publishing A. White's MS. name, apparently overlooked the genus *Ceratocephala*, which was erected by Warder in 1838 for the reception of a Trilobite.* Under the circumstances the equally expressive *Bregmocerella* must replace *Ceratocephalus* as the generic name.

There are a few important characters which have not hitherto been fully described, viz., the mouth parts and the pleopoda. Mandibles stoutish, about twice as long as broad; cutting edge blunt, unidentate, subtended below by a small compressed lobe and a corneous column, upon which a cluster of short simple spines are seated; the spines are about one-third the length of the column. Molar tubercle ill-defined, its transverse diameter is less than the length of the apical denticle. Palp rather short,

* J. A. Warder—Amer. Journ. Science, xxiv., 1838, p. 377.

consisting of three subequal joints; the second has the distal border armed with strong pectinated setæ; the margin of the third joint is fringed with simple setæ, and two or three long pectinated ones at the summit. First maxillæ with the inner lobe long, slender, and about two-fifths as broad as the outer; both are surmounted by curved spines; the latter has twelve and the former four, each of which is slightly ciliate distally. Second maxillæ with three lobes of nearly equal breadth, and attaining to the same level at their summit; each terminates in a series of more or less pectinated spines, those on the outer lobe being the longest.

Superior lobe of the second joint of the maxillipedes equal in breadth and length to the inferior portion; the broad subtruncated apical margin bears about eighteen short spines, each of which bordered laterally by a few small, weak spinules; the inner border carries a stout, curved filament at about its distal third. Palp about equal in length to the preceding joint; first joint very small; second, third and fourth with a superior lobe; fifth cylindrical; the lobes and the last joint are tipped with long simple setæ; the third and fourth joints are subequal in length, and the second is nearly equal in length to the three following joints combined.

The peduncle of the first pleopods is about twice as wide as long, and bears on its inner distal angle a series of stout spines, which have a slight excavation near the apex and a blunt hook-like process at the tip. Inner ramus broad at the base, tapering to an evenly rounded summit. Outer ramus ovate, twice as long as broad, with an angular lobe at the external base. The inner ramus of the second pleopods is a little broader than that of the first, and carries on its inner base a long subulate stylet; the latter is about twice as long as the ramus; the basal third is slightly swollen; the remaining two-thirds is cylindrical and acutely pointed. The rami of the first three pairs of pleopods are clothed at their bases with simple hairs, and their margins with closely placed plumose setæ. The outer rami of the third, fourth and fifth pairs have a sutural line below the apex; the fifth is broad and thickened at the summit; there is a rounded tubercle at the inner distal extremity of the suture, a second one almost in contact, and a third one seated on a short peduncle at some distance below. The swollen distal margin and the tubercles are covered with closely placed rasp-like teeth.

Length of larger specimen (rostrum excluded)...	20 mm.
,, ,, rostral spine	10 ,,
,, ,, lateral spine	6 ,,

Two male examples are in the collection, one obtained at Newcastle Bight and the other off Port Hacking, in 10 to 38 fathoms.

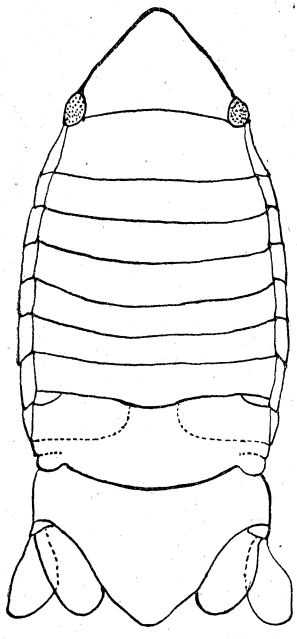
CERCEIS, *H. Milne-Edwards.*

CERCEIS NASUTA, sp. nov.

(Figs. 36*a-b.*)

Stations 55, 57.

Adult female—Body more than twice as long as broad, surface covered with very minute reticulated ridges surmounted with small scattered granules. Cephalon triangular in outline, with a median convex process, which descends in front to between the bases of the first antennæ. The sides of the head are inflexed inferiorly, and gradually converge from the eyes to the base of the descending frontal lobe. First segment of the paraeon about one-third shorter than the length of the cephalon, and almost equal to any two of the six segments following. Pleon equal in length to the peraeon without the first segment; the penultimate segment is well marked from the telson, and bears faint traces of the lines of coalescence; laterally it is ornamented with two broad transverse ridges, each of which bears eight or nine smaller longitudinal ridges, which are studded with granules, the latter increase in size as the ends of the ridges are approached. Terminal segment strongly convex, with three ill-defined granular elevations, the median one often with a rounded notch; sides converging to the extremity, the latter exhibits a small narrow incision, which is not visible from above. Side plates of the peraeon sharply defined and strongly inflexed, the first produced anteriorly to beyond the eyes; the posterior lateral angles of the first to the fourth are subacute with oblique borders; fifth and sixth long, acute, and directed backwards; the seventh has the extremity rounded.



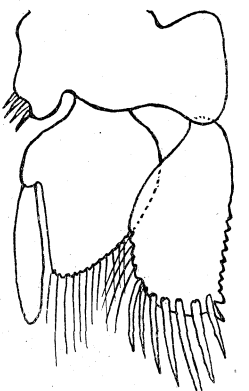
BODY VIEWED FROM ABOVE.

Fig. 36*a*

Eyes small, situated at the postero-lateral angles of the cephalon. First antennæ with the basal joints stout, the first less than twice as long as broad, with the basal half swollen. Second joint a little longer than broad, its length being about equal to the median diameter of the first; third joint narrow and

much longer than the second. Flagellum six articulate, the first and second joints subequal, the third is the longest. Peduncle of second antennæ slightly longer than the flagellum; the first joint stouter, and a little shorter than the second; third joint equal to the two preceding, but much shorter than the fourth. Flagellum with ten joints, the first and second equal; and twice as long as the fourth, which is the shortest in the basal two-thirds. Mandibles stoutish, strongly bent in their distal half. Cutting edge tridentate, with an accessory three-tooth lobe, scarcely inferior in size to the apical process, at the base of which there are seven or more curved spines, bearing uniserial spinules. Molar tubercle well defined, acutely produced below and encircled with spines. Palp three-jointed, the first nearly one-third longer than either of the two succeeding. The first maxillæ have the inner branch narrow and tipped with branched setæ; the outer branch is rather stout, and bears about ten curved spines at its summit; the inner series are furnished with denticles along their apical margins. Second maxillæ with the inner lobe slightly longer and broader than the outer.

First pair of legs short and stouter than those following; second joint of all the legs, except the last, very broad, with a keel-like margin, which is often interrupted in the middle. The propodal joints are long, and exceed any of those preceding, except the second. The last joint has a single stout setæ between the two very unequal spines at its extremity. The fourth and sixth joints of the first pair of legs are armed inferiorly with a series of small spinules; the fifth and sixth has, in addition, a long spine on the distal extremity. The inner ramus of the first pair of pleopods is subtriangular, and much wider than high; the outer ramus oblong, with a subtruncated summit. The inner ramus of the second pair is rather larger than that of the first; the outer ramus is oblong, and tipped with six or seven stout spines, and a spiniform process on the outer distal angle. The marginal setæ of the first three pairs are all strongly developed; there is no sutural line in the outer rami of the third pair, and both rami of the fourth and fifth have branchial pleats. The rami of the uropods are subequal in length and breadth. Since the above was written a single male example has been found. It differs from the female in having the last segment of the peræon longer, with the granuliferous ridges of the pleon more distinctly developed and becoming spinulous. The posterior border of the

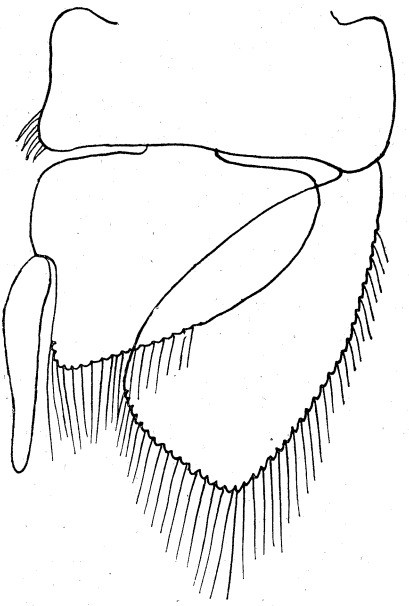


Second Pleopod.
Fig. 36*b*.

last segment exhibits three spiniform denticles, the middle one being the shortest. The outer rami of the uropods are longer than the inner, and both have their distal borders armed with four or five spinules.

Total length of body	6 mm.
Breadth	3 ,,

Obtained off Crookhaven River and Wata Mooli.



SECOND PLEOPOD OF
Cerceis trispinosa, Haswell.
Fig. 37.

CHITONOPSIS, gen. nov.

Body ovate-oblong, slightly convex mesially. The basal joints of the first antennæ, cephalic process, epimera, and uropods are more or less lamellate, and have their contiguous borders adapted to each other, the whole combined forming a thin dilated and subcontinuous border.

Cephalon wider than long, with the antennary sternum produced into a long projecting spatulate plate.

Epimera of the peraeon and pleon greatly produced, with obliquely truncated borders. The anterior margins of the epimera of the first segment are adapted to posterior borders of the expanded sides of the cephalon. Terminal segment of the pleon with a round entire border.

Eyes dorsal, posteriorly imbedded in the first peraeon segment.

First and second joints of the first antennæ foliate; third joint small, cylindrical, terminating in a minute flagellum.

Second antennæ reaching to the external angle of the first peraeon segment; first and second joints short; third, fourth, and fifth compressed, but not dilated. Flagellum much shorter than the peduncle.

Mandible straight, with the cutting edge dentate; molar tubercle well defined; palp strongly developed, and three-jointed. First maxillæ subequal in width; outer lobe tipped with spines, some of which bear minute spinules; inner lobe furnished with four stout branched setæ. Second maxillæ with the lobes short, broad, and subequal; inner lobe with numerous pectinated spines, and the outer pair clothed apically with simple setæ.

Maxillipedes well developed. Palp with low, superior setiferous lobes. First pair of legs weak, the second and succeeding pairs gradually becoming more robust to the seventh.

Pleopods foliate; the inner rami of the fourth and fifth pairs are without internal pleated folds, and the outer rami are destitute of sutural lines.

Uropods lamellate, second joint small, received into an excavation between the flattened lobes of the first.

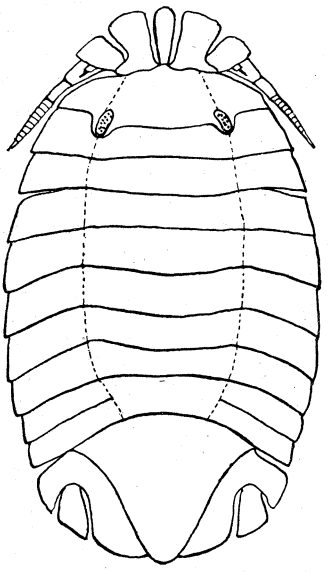
CHITONOPSIS SPATULIFRONS, sp. nov.

(Figs. 38*a-g*.)

Stations 34, 44, 53.

Body depressed; about two-fifths longer than broad. The frontal process, basal joints of the first antennæ, side plates and

uropods are all greatly produced; the whole combined forms a symmetrical oval, with a thin subcontinuous and densely ciliated border.



BODY VIEWED FROM ABOVE.
Fig. 38*a*.

The general appearance of the body is somewhat similar to that of a small *chiton*.

The cephalon is slightly convex centrally, and about two-thirds broader than long. The frontal region exhibits a quadrate median process; the submedian border is sinuate; the antero-external border is evenly curved, and terminates at the pointed extremities of the epimera-like sides of the head.

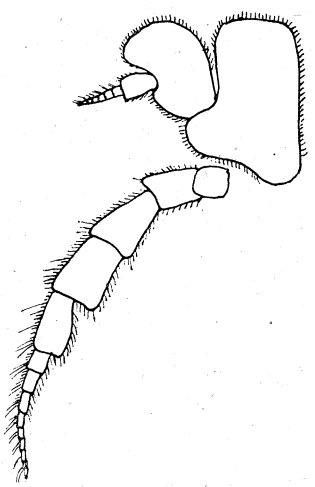
First segment of the peraeon is short in the middle line, but long at the sides; the second to the seventh segments are subequal in length. Pleon as long as the six preceding segments combined. The penultimate segment exhibits on each side a pair of well-defined side plates. The terminal segment is mesially convex, with the antero-lateral angles acute, the sides converging, and the posterior border rounded.

The whole of the epimeral processes are more or less obliquely truncated.

Eyes dorsal, subreniform, the posterior third deeply imbedded in anterior margin of the first peraeon segment.

The first antennæ have the first two joints greatly dilated, and project beyond the frontal margin. The anterior borders are strongly ciliated; the third joint is minute, and terminates in a very short flagellum with six articulations.

Peduncle of superior antennæ compressed, but not dilated; the first two joints are short, third joint widening to the apex; fourth



FIRST AND SECOND ANTENNÆ.
Fig. 38*b*.

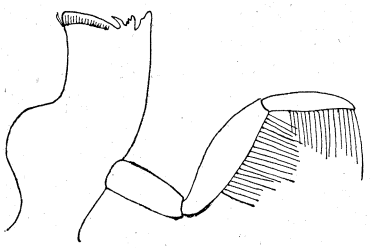
joint about one-third longer than broad ; fifth joint equal to the fourth, and somewhat narrowed at the base.

Flagellum with from nine (female) to twelve (male) articulations, the third being much the longest.

All the joints of the peduncle and the proximal half of the flagellum are densely ciliated, and also exhibit numerous long scattered setæ.

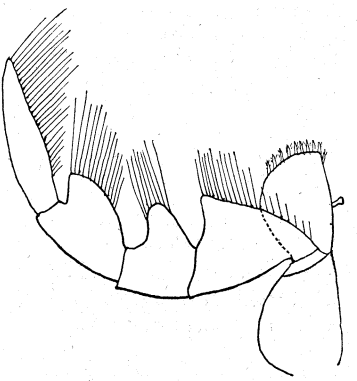
The cephalon is furnished with a spatuliform process ; this is widely bifurcated at its base, and embraces the anterior portion of the epistomial plate ; from the lower third its width gradually increases to near the rounded summit. The process is equal in length to the cephalon, and its projection anteriorly equals that of the basal joint of the first antennæ.

Mandibles straight, moderate in size, the cutting edge bi- or tridentate, with two or three stout denticles and several strongly curved spines at its inner base. Molar tubercle distinct, attaining to the same level as the apical denticles ; the margin is encircled with spinules. Palp three-jointed, the second much the longest. First maxillæ subequal in width; the outer lobe with about ten slightly-curved spines, some of which exhibit from three to five minute lateral denticles. Inner lobe with four stout pectinated setæ at the summit The second maxillæ have the lobes subequal in width, and attain to the same level. The inner lobe is rounded at the apex, and bears twenty or more pectinated setæ; the apices of the outer lobes are obliquely truncated, and tipped with numerous stout setæ.



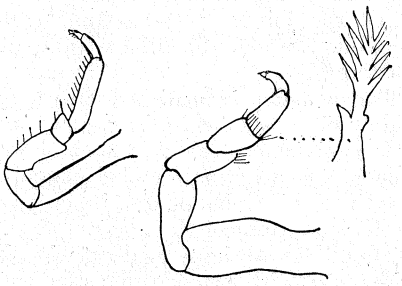
MANDIBLE.
Fig. 38*c*.

The maxilipedes have the second joint tipped with numerous pectinated spines, and the inner border bears a short filament, with a dilated apex. Palpi five-jointed ; the third shorter than the one preceding or following ; the last joint is the longest ; the superior setiferous lobes are rather low.

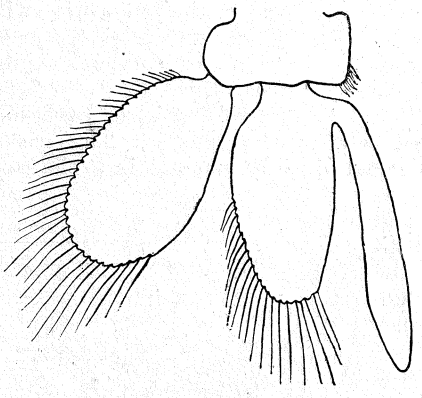


MAXILLIPEDES.
Fig. 38*d*.

First pair of legs slender, the succeeding pairs increasing in size to the seventh. The fourth, fifth and sixth joints of the first pair are armed inferiorly with numerous stoutish pectinated spines; the fourth joint has four or five similar spines on the superior distal border, and the last joint has an accessory spine at the base of the strongly curved claw; the inferior border exhibits a stoutish spine, with a series of uniserial spinules which diminish in size as the base is approached. Stout pectinated spines are present on the superior distal borders of the fourth joint of all the legs; the second to the seventh pairs of legs have an encircling series of similar spines situated on the distal margin of the fifth joint. Peduncles of the pleopods with several prominent spines on the interno-distal angle. The outer rami of the first and second pairs are ovate; the inner rami are oblong, with straight inner margins. The third pair has the outer rami broadly ovate and sparsely ciliate at the distal borders; the sutural line in the outer ramus is faintly indicated at the sides. The fourth and fifth pairs have their rami of subequal size and shape; the outer rami are without sutural lines, and the inner rami are destitute of pleated folds. The outer ramus of the fifth pair has the inner margin armed with three isolated patches of rasp-like teeth, one in the middle, another at the distal third, and the last near the apex.



First and Fourth Legs.
Fig. 38*e*.



Second Pleopod.
Fig. 38*f*.

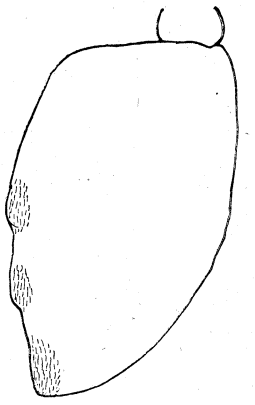
The uropods have the basal joint bifurcate, the external lobe is directed outwards, the inner lobe backwards, the somewhat

cuneate second joint is situated in the V-shaped excavation between the lamellate lobes of the first.

Total length of male	...	13 mm.
Breadth ...	...	8 ,,
Total length of female	...	15 ,,
Breadth ...	...	9 ,,

The male differs from the female in having the second antennæ longer; they reach to the end of the second segment of the peraeon, and the flagellum has twelve joints, whilst the female has only nine.

Obtained off Port Jackson, Coogee, and Crookhaven River.



Outer Ramus of Fifth Pleopod.
Fig 38*g*.