

NOTES ON THE SUBFAMILY *BRACHYSCELINÆ*, WITH
 DESCRIPTIONS OF NEW SPECIES.—PART V.

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(Plates VIII.-IX.)

Since the publication of my last contribution to the study of gall-making coccids, several important papers dealing with this subject have appeared. Among them is a rather extensive one upon Australian Galls* by C. H. Rübсаamen, illustrated with many plates, in which he describes a number of new species; whereas if he had been able to examine more material he would have found that most of them were only variable forms of species already described. Maskell's *Cylindrococcus amplior* he has renamed *Crocidocysta froggatti*, forming a new genus for its reception, though, as Maskell† points out, there can be no doubt about the identity of this common gall. Comparing his descriptions and plates I consider that three or four of his new species are identical with others already described. I also refer my readers to Maskell's remarks upon Rübсаamen's proposed alteration of the name of our well-known genus *Brachyscelis* to *Apiomorpha*.

Towards the end of 1893 Tepper,‡ in a paper read before the Royal Society of South Australia, described a number of coccids, some of which had been given MS. names by Olliff before that date, but as it was not until 1896 that this MS. was published by Fuller§ in which these names were retained, Olliff's specific names will in several instances have to rank as synonyms.

* "Ueber Australische Zoocecidien und deren Erzeuger," Berliner Entomolog. Zeitschrift, Bd. xxxix. 1894, Heft 2, pp. 199-234.

† Further Coccid Notes, &c., Trans. New Zealand Inst. 1896, pp. 293-331.

‡ Trans. Royal Society, S.A. 1893.

§ Forest Insects : Some Gall-making Coccids, Agri. Gazette, N.S.W. 1896.

It is remarkable that until the last few years no gall-making coccid had been discovered outside Australia. Lately a curious udder-shaped gall has been described by Cockerell* upon the leaves of an oak (*Quercus wrighti*) at Pinos Altos, New Mexico.

In the present paper I have described several new species from different parts of Australia, added a few notes upon imperfectly described species, extended the range of others, and described the larvæ.

BRACHYSCELIS URNALIS, Tepper.

B. Schraderi, Olliff, MS.

The galls of this species were described and figured by Tepper in clusters upon *Eucalyptus uncinata* and *E. gracilis* growing at Murray Bridge, S.A. Specimens growing singly upon an undetermined Eucalypt from the neighbourhood of Tamworth, N.S.W., were described by Olliff (MS. Notes) under the name of *B. Schraderi* and published after his death by Fuller in the Agricultural Gazette, N.S.W.

I had collected specimens of this gall growing on a large scrub eucalypt, near Wellington, in 1891; they were afterwards collected growing singly upon *E. meliodora* at Goulburn; again some very fine specimens in clustering masses radiating round the branchlets, comprising upwards of a hundred galls, somewhat more slender on account of the compression than the typical form, were received from Uralla growing upon *E. polyanthema*.

The specimens from Goulburn agree with Olliff's species, and those from Uralla with Tepper's, but the difference is due to the habit of growth; a careful examination of the enclosed coccid shows that there is no specific difference.

As the descriptions given both by Fuller and by Tepper are very brief, I take the opportunity of adding a further description of the female coccid after examining a fine collection of specimens.

* Cockerell, Science, 1896, Vol. iv. p. 299.

♀. Coccid pale ochreous-yellow, anal appendages black; 5 lines in length, $1\frac{1}{2}$ in diameter; dorsal surface rounded, swelling out on the sides in a line with the middle pair of legs, covered with scattered spiny hairs: first to fourth abdominal segments of uniform length, tapering sharply towards the apex; fifth to eighth armed with a row of stout spines along the apical margin; ninth more than twice the length of the preceding ones; anal appendages slender, half as long again as the anal segment, closed at the base, but opening out at the apex. Ventral surface of the head and thoracic segments very much wrinkled; legs ferruginous, stout, claws large; thoracic segments bisected by an impressed line to the hind pair of legs; abdominal segments fringed with fine hairs.

Hab.—Uralla (Mr. G. McD. Adamson); Kenmore, near Goulburn (Mr. J. H. Maiden); Myrniong, Vic. (Mr. James Lidgett); Wellington, N.S.W. (W. W. Froggatt).

BRACHYSCELIS PILEATA, Schrader.

(Pl. VIII., fig. 1.)

Larva pale yellow, oval, rounded in front, slightly pointed at the tip of the abdomen. Antennæ 6-jointed, 1st joint conical, broad at the base, the remainder smaller and oval, thrice the length of the marginal fringe and furnished with two long hairs at the tip, nearly as long as the antennæ; eyes black, situated at the edge, behind the base of the antennæ; dorsal surface of the head, thorax and sides of the abdominal segments covered with fine short hairs. The flanged spines forming the marginal fringe as long as the thighs of the larva, close and unbroken round to the anal tip, which forms a truncate cylindrical point, with a fine hair-like filament more than half the length of the insect floating out behind on either side; tarsal claws very small, sharp, with the two digitals extending beyond on either side.

Larva No. 2.—Another form crawling about among the others had the abdomen more elongated, and the marginal fringe only flanged at the base instead of being broadly flanged and truncated at the outer edge, each spine being sharp at the extremity; anal

tip shorter, and a spine on either side, with the same slender anal filaments.

Hab.—Port Macquarie, N.S.W. Larvæ found in galls growing upon the "swamp mahogany" (*Eucalyptus robusta*) in September (Mr. G. R. Brown); Southport, Queensland. The gall was collected by myself in May, upon *Eucalyptus* sp.

BRACHYSCELIS SLOANEI, n.sp.

(Pl. VIII., figs. 2-4.)

♀. Gall slender; $2\frac{1}{2}$ inches in length, 6 lines in diameter in the centre, at the base and apex 3 lines. When young greyish-green, matured galls dull brown; cylindrical, tapering at the extremities, apex truncate with the centre produced into a small projecting nipple, bearing a minute anal orifice at the tip. Gall-chamber cylindrical, tapering to a fine point at the extremities, much longer than the adult coccid, which is generally found in the upper half of the chamber with the anal appendages close to the apical orifice. The texture of the gall is peculiar, being formed of three layers of vegetable tissue, the outer one slightly ridged or ribbed, and the inner one smooth and shining. Growing singly upon the smaller twigs, and variable both in length and thickness, but all with the same typical cylindrical form, though sometimes the gall is quite cylindrical and of the same diameter from base to apex, yet at the other end of the series the base may be slender and the gall very much thickened in the centre.

♀. Coccid 1 inch in length, very slender, the last abdominal segment with the anal appendages combined $\frac{2}{3}$ of an inch long. Cephalic segment dark orange, flattened on the summit, the centre circular marked with a ring of shallow depressions round the edge; thoracic segments corrugated at the apex: first to fourth abdominal segments cylindrical; fifth cylindrical with a transverse row of fine spines along the apical margin; sixth and seventh longer, more slender than preceding ones, fringed with fine spines; eighth longer than the rest of the preceding segments combined, lightly covered with fine spines; anal appendages black, close

together at the base, widening out at the tips. Antennæ small, fore legs minute, situated in a slight depression on either side; last pair of legs longest, claws large.

Larva pale yellow, elongate-oval, flattened on the back, antennæ composed of 6 or 7 elongate oval joints, bearing irregular longish hairs, terminating with several stout hairs nearly as long as the antennæ. Outer margins of the segments fringed with delicate spines, each of which is flanged on either side like a feather, truncated at the tips and nearly in contact, forming a fringe round the insect except on each side of the anal extremity, which is ornamented on either side with a long slender white filament trailing out behind; on either side of the filaments the marginal spines are bifid. Legs stout and hairy, with two stout claws.

♂. Gall and coccid unknown.

This species is allied to *B. pedunculata*, Olliff, MS.; but besides the differences in the coccid, there is a very distinctive one in the gall, namely, that the apical orifice is upon a projecting tip, while in the former the tip is distinctly truncated, and the apical orifice is situated in a depression.

Hab.—Clear Hills, N.S.W. (Wagga district) on "White Gum," *Eucalyptus* sp. (Mr. T. G. Sloane, to whom I am indebted for a fine series of specimens.)

BRACHYSCELIS VARIABILIS, Froggatt.

Larva bright canary-yellow, with the marginal fringe silvery and transparent, the central spines very distinct. Broadly oval; marginal fringe unbroken round to the anal tip which has a detached more rounded spine projecting on either side, with slender white filaments trailing out behind between the marginal fringe and the detached spines. The dorsal surface shows 10 distinct segments of uniform size except the last, which is narrow and rounded. Antennæ 6-jointed, short, cylindrical, uniform in size, furnished at the tip with two slender hairs of unequal length. Eyes black, outside the base of the antennæ. Legs hairy; tarsal claws long.

Hab.—Port Macquarie (Mr. G. R. Brown; the larvæ were taken from galls collected in April).

BRACHYSCELIS ATTENUATA, n.sp.

(Pl. VIII., figs. 5-7.)

♀. Gall green, with greyish pubescence; length $1\frac{1}{2}$ inches, diameter at greatest girth 2 lines; spindle-shaped, slender, cylindrical, tapering at the base, rounded to a blunt tip at the apex; apical orifice small, circular, with a slight rim surrounding it; walls of chamber very thin, the chamber extending from the extreme base of the foot-stalk to the apical orifice. Growing erect in bunches among the flower buds, sometimes from the side of the bud, but generally from between them.

♀. Coccid dull yellow; apex of the 5th and 6th segments and anal appendages black; legs reddish-brown; length $\frac{1}{2}$ an inch; rounded at the summit, swelling out on the sides and tapering sharply to the tip of the abdomen, from the apex of the thoracic segments; third thoracic and all the abdominal segments deeply constricted. Dorsal surface smooth to the 2nd abdominal segment, 3rd segment with marginal row of fine spines, 4th more thickly covered with spines; 5th and 6th broadly margined with coarser spines; anal appendages short and thick at the base, opening out at the apex with a short spur-like spine on the inner margin on either side. Ventral surface flattened and corrugated on the cephalic and thoracic segments; fore pair of legs and antennæ small; second pair short; hind legs large; femora thick and rounded; tibiæ cylindrical; tarsal claw large, curved; last four abdominal segments and anal appendages clothed with fine hairs.

♂. Gall small, 3 lines in length, slender, cylindrical, with bell-shaped extremity, springing from the sides of the flower buds or among them.

Hab.—South Australia (on *Eucalyptus* sp.; Mr. A. Molineaux).

I am indebted to Mr. Molineaux, of the Agricultural Bureau, S.A., for this fine species, but am unable to give the exact locality, as the type specimen was left at his office by a visitor without any information.

BRACHYSCELIS FLORALIS, n.sp.

(Pl. VIII., fig. 8; Pl. IX., figs. 9-10.)

♀. Gall dull green, $1\frac{1}{4}$ inches in length, diameter 9 lines, broadly rounded at the base, oval, tapering into a cone-shaped apex, truncated, with a slightly thickened edge. forming a rim round the small rounded apical orifice, which is situated in a convex depression; walls of chamber thick; gall-chamber $5\frac{1}{2}$ lines in diameter, elongate at the apex.

This gall springs from a cluster of flower buds, and grows alone like *B. ovicola*.

♀. Coccid pale yellow, 1 inch in length, $\frac{1}{2}$ inch in diameter, broadly turbinate; cephalic and thoracic segments rounded; abdominal ones very distinctly divided, tapering off sharply from the third to the tip. Dorsal surface covered with fine, short, ferruginous spines, forming a broad, irregular, parallel band from the head to the tip of the abdomen, broadest and more scattered upon the abdominal segments, but forming a regular fringe on the apical edge of the last two; anal appendages short and stout, close together, forming a close blunt point, slightly opening out at the tip with two short spines on either side. Ventral surface of the cephalic segment rugose, the mouth projecting in a rounded, raised tubercle; femora of fore legs broad; tibiæ short; claws black; middle and hind legs larger, short, and broad at the base; abdominal segments lightly fringed on the sides with long hairs.

♂. Gall and coccid unknown.

Hab.—Central Australia (on *Eucalyptus* sp.; Mr. Chas. French).

OPISTHOSCELIS NIGRA, n.sp.

(Pl. IX., figs. 11-15.)

♀. Gall slender, thorn- or spur-shaped, springing from an enlarged growth or swelling upon the branchlet, broadest at the base, curving round at the tip, varying from half an inch to two lines in length when growing in a mass; gall-chamber circular at

the base, tapering to a minute apical orifice at the tip; walls of chamber thick at the base, but thin towards the extremity.

When the branches are slightly infested the galls are large and regular in form, varying from pale green to brown, but when numerous they twist the foliage and twigs into an irregular mass as large as a man's head, and tinted with red and brown.

♀. Coccid a minute pear-shaped creature, purplish-brown, semi-transparent at the apex, legs and antennæ indistinct.

Second Stage. — Similar in colour, broad at base, lobed on either side, with the abdominal segments tapering to the tip; cephalic segment folding over in front, above the small yellow antennæ: thoracic segments of uniform length; fore legs distinct, mid and hind pair minute; first six abdominal segments of uniform length, rounded on the sides, 7th to 9th longer, not so deeply constricted at the sides, anal appendage forming a lance-shaped tip, with the outer margins finely serrate.

♀. Adult a black irregular rounded mass, ridged on the sides, the remains of the abdominal segments forming a series of rings round the conical-pointed anal appendage standing upright in the centre.

♂. Gall from $1\frac{1}{2}$ lines to much smaller; smooth, blunt cylindrical tubes, broadest at the base, often brightly tinted with red or pink, produced upon the leaves and often growing in a regular row reducing the foliage to miniature leaves: opening on the under surface of the leaf covered with a white silken skin protecting the enclosed male pupa.

♂. Coccid brown, testaceous, with ochreous tints upon the abdomen: antennæ of the latter colour 9-jointed; 1st joint oblong, large; 2nd-8th long, rounded at the extremities; 9th shortest of all, fringed with long hairs; head broad; eyes large, black, projecting; thorax broad, with the pronotum large, rounded, convex, broadest in centre of thorax; wings opaline, broad in proportion to length, and rounded at the tips; costal and subcostal nervures thick; legs slender; coxæ large, thighs short and stout; tibiae cylindrical, long; tarsi very hairy. Abdomen broad at the base, the segments of uniform length; anal one bell-shaped, armed with a long flexible penis, as long as the combined segments of the abdomen.

Hab.—Sydney (on *Eucalyptus* sp.; W. W. Froggatt); Port Macquarie (on *Eucalyptus* sp.; Mr. G. R. Brown).

SPHEROCOCCUS FERRUGINEUS, n.sp.

(Pl. ix., figs. 16-20.)

♀. Coccid dark reddish-brown on the dorsal surface, dull yellow on the ventral surface; length $1\frac{1}{4}$ lines; ventral surface flat; circular; dorsal surface conical, with the anal tip showing an elongate oval mark.

♀. Gall varying from dark reddish-brown when full grown to pale green when immature, 10 lines in diameter. Ball-shaped, formed by a number of leaf-like bracts springing out from the tip or side of a twig. The coccid imbeds itself in the tip of the twig, the head being attached to the tissue which rises up on either side, forming a regular cleft. The central gall commences as a woody excrescence on the leaf bud in which the coccid is half imbedded, the tissue rising up over the coccid into a loose thin shell.

The leaf-like tufts forming the outer portion of the gall are each composed of a number of smaller bracts springing from a common centre like flowerets, forming a regular loose rounded mass. When this gall is produced upon the tip of the twig it contains a single coccid, but if it grows out on the side of a twig it often shelters two.

♂. Coccid unknown.

Hab.—Southport, Queensland, to Richmond River, N.S.W. (on *Melaleuca* sp.; W. W. Froggatt).

EXPLANATION OF PLATES.

Plate VIII.

Brachyscelis pileata, Sch.

Fig. 1.—Larva (enlarged).

Brachyscelis sloanei, n.sp.

Fig. 2.—Group of three galls.

Fig. 3.—Adult female.

Fig. 4.—Anal appendages.

Brachyscelis attenuata, n.sp.

- Fig. 5.—Male and female galls.
Fig. 6.—Adult female.
Fig. 7.—Anal appendages.

Brachyscelis floralis, n.sp.

- Fig. 8.—Galls.

Plate IX.

Brachyscelis floralis, n.sp.

- Fig. 9.—Female coccid.
Fig. 10.—Anal appendages.

Opisthoscelis nigra, n.sp.

- Fig. 11.—Male coccid.
Fig. 12.—Female coccid, 2nd stage.
Fig. 13.—Anal appendage.
Fig. 14.—Adult female coccid.
Fig. 15.—Galls showing male and female galls, one of the latter in section.

Sphaerococcus ferrugineus, n.sp.

- Fig. 16.—Young gall.
Fig. 17.—Adult gall.
Fig. 18.—Section of gall.
Fig. 19.—Side view of female coccid.
Fig. 20.—Female viewed from above.

NEW MARINE AND LAND MOLLUSCA FROM FIJI,
CEYLON AND QUEENSLAND.

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