

XIV. *Notes and Descriptions of some Species of Western Australian Coccidæ.* By CLAUDE FULLER, F.E.S., Government Entomologist, Pietermaritzburg, Natal.

[Read October 4th, 1899.]

PLATE XV.

THE following Notes and Descriptions are the outcome of some months' residence at Perth, on the Swan River, Western Australia, where in the immediate vicinity of the city I collected the majority of the specimens. For many, particularly those from other localities, I am, however, indebted to my friends and their colleagues Messrs. Richard Helms, A. M. Lea, and A. E. Lankaster. A catalogue of the greater number of the species was published in 1897, in the Journal of the W. A. Bureau of Agriculture. The diagnoses given therein were very brief, and intended only as preliminary to the publication of the full descriptions; which were then almost in the same form as that in which they are now presented. It has been impossible, owing to many vicissitudes, to take full advantage of the time that has since elapsed, and little more has been done than to modify the arrangement to some extent, correct a few obvious errors, and add remarks to those species which have since been discussed by other authors.

Family COCCIDÆ.

MONOPHLEBINÆ.

Genus CALLIPAPPUS,* Guérin-Ménéville.

Since 1849, when Guérin-Ménéville† formed this genus for the reception of a single species *C. westwoodii* from the Swan River, Western Australia, no further additions have been made to it. I have, however, been very fortunate in securing many specimens of his species, and two others as

* Mr. T. D. A. Cockerell has, I understand, recently placed this genus in the sub-family *Margarodinæ*, tribe *Xylococcini*.

† Revue Zoologique, p. 129, 1849.

well, the study of which enables me to establish, somewhat at the expense of Mr. Maskell's genus *Cælostoma*, a genus of six numbers.

1. *Callipappus westwoodii*, Guérin-Ménéville.
2. *Callipappus australis*, Maskell.
(*Cælostoma australe*, Maskell, 1890.)
3. *Callipappus immanis*, Maskell.
(*Cælostoma immane*, Maskell, 1891.)
4. *Callipappus rubiginosus*, Maskell.
(*Cælostoma rubiginosum*, Maskell, 1893.)
5. *Callipappus, farinosus* Full.
6. *Callipappus, bufo* Full.

Having a large amount of material at my disposal I have been able to examine the three West Australian species fairly thoroughly, and have found in their structure a most interesting and distinctive feature—the complete intussusception of several of the abdominal segments of the mature ♀s, in the form of a marsupium, in which the eggs are laid and incubated. This feature could have only been overlooked by the former students of the genus for want of material, and Signoret, though he figures five abdominal segments, says that only two are visible. Maskell in placing the three species mentioned above in his genus *Cælostoma*, must have been guided by that part of Signoret's definition where he says: "Rostrum and mouth-parts between the bases of the anterior legs, and a little below their insertion." Maskell found that the insects sent him from Australia were without mouths, and that enlarging the characters of *Cælostoma* placed them therein. The members of the genus *Callipappus* are however mouthless, and one must conclude that Signoret has referred to the small buccal nipple or obsolete mouth sometimes seen, as the rostrum; for it is evident that he could not have made out the rostrum, as he says that he was unable to see or study the genital orifice and anus for, "notwithstanding a maceration of several days, the tegument was not rendered transparent."

Characters:—♂, Antennæ 10- or 11-jointed, tapering from base to apex: first 2 joints short, the rest longer. Eyes faceted. Abdomen slightly lobed at the sides, the last segments bearing a caudal brush of long, glassy filaments. Penis very long. Legs long; tibia longer than tarsus, the latter bearing a single claw. Balancers large and wide, with a hook to one side of the extremity.

♀, adult. Viewed from above, the body is usually more or less triangular in outline; from the side it is seen to be thin and pointed in front, and truncate and much inflated behind, with a decided keel extending around the head and along each side, but not behind. Abdomen intussuscepted, only the first two or three segments being visible. The intussuscepted portion forming an ample pouch with a comparatively small entrance, and extending inwards almost to the cephalic region. Sexual orifice and anus situated at the back of the pouch. Eggs deposited in the pouch, the young escaping when hatched through the opening unaided by any maternal exertion. Antennæ 10-jointed; the basal joint wider than long; the apical the longest and slightest. Rostrum and mentum entirely absent. Legs thick, the anterior pair not differing from the posterior.

Larva red, oval; abdomen rounded, the extremity truncate and projecting slightly, and exhibiting a short anal tube; there are several strong spines and four floriform pores in the anal region. Legs ample; tarsus longer than tibia; coxa large; claw simple. Antennæ of 6 joints, of which the apical and the basal are the thickest, giving a constricted appearance; apical joint oval and wider than 3, 4, or 5; joints 1 and 2 stout and wide. Rostrum ample. Mentum monomerous, spined.

1. *Callipappus westwoodii*, Guérin-Ménéville. (Pl. XV, figs. 3, 3 a.)

Adult ♀ of the usual form of the genus, though not much inflated; bluntly rounded behind; sides of the thoracic region parallel, those of the head tapering acutely; a distinct keel runs round the apex and terminates on either side of the extremity. Legs ample and stout, with strong, spine-like hairs; tarsus curved, with a comb of spines on the inner margin. Rostrum and mentum obsolete. Antennæ 10-jointed. Epidermis mammillate. Colour dark purple, with an obscure patch of chestnut on the last thoracic segment. Opening of pouch ventral; from the folds around it long glassy filaments are secreted. Length one inch; width one-half inch.

♂ purple. Antennæ 10-jointed. Length of body 0·25 inch, length of caudal brush 0·5 inch. (For full descriptions of ♀ and ♂ Signoret's notes should be consulted.)

The adult ♀s were found beneath the dead bark scales of various *Eucalypti*. The ♂s are often captured on the wing.

2. *Callipappus farinosus*, sp. n. (Pl. XV, figs. 1, 1 a, 1 b, 1 c.)

Adult ♀ of the usual form and much inflated, being at times

almost cylindrical. When viewed from above, the body is elongate-ovate with a marginal keel. Colour of dorsum claret-brown, sometimes mottled; ventrum chestnut. Thoracic segmentation indicated by transverse bands of red. Antennæ 10-jointed, tapering, joints of a dark brown colour, except the 3 basal, which are red. Legs stout, and when the insect is *in situ* always extended; those of *Westwoodii* are drawn under the body. Opening of pouch in the form of a transverse slit, terminal. Intussusception extending in to the region of the mesothorax. The species is more easily distinguished from the foregoing by the nature of its secretion. This appears mealy, and besides covering the whole body, is strewn widely around it. When highly magnified the meal is seen to consist of particles of glassy cylinders bent almost into the form of a circle. Length of majority of specimens one inch, width one-half inch.

On *Casuarina* sp. Perth.

3. *Callipappus bufo*, sp. n. (Pl. XV, figs. 2, 2 a, 2 b, 2 c.)

Adult ♀ stationary, found in exposed positions on twigs or leaves, to which it is affixed by a silky pad lying between the bases of the posterior legs. The legs appear to grasp the twig or leaf, but do not in reality. Length of several specimens 0.5 inch. Viewed from above, the body tapers to a point at the head and is abruptly truncate behind; contour almost triangular. Cephalic region thin and flat; thoracic inflated above and below; dorsum with two median humps. Where attached to twig or leaf there is a depression in the ventral surface. A decided keel runs round the head and terminates on either side of the base. The colour of the dorsum is not uniform; it is purple-brown, with reddish patches on either side of the median line above the intermediate and posterior legs. The colour of the ventral surface is a purple-brown. The whole of the body thinly covered with a fine meal, which is more plentiful in the region of the abdominal segments. Opening of the pouch in the centre of the posterior end, almost circular.

Taken on *Casuarina humilis*, *Banksia menziesii* and *B. ilicifolia*. The species approaches *Callipappus* (*Cælostoma*) *rubiginosus* reported by Maskell from South Australia; it differs chiefly in having 10-jointed antennæ.

Genus ICERYA, Signoret.

4. *Icerya purchasi*, Maskell.

This species occurs in small colonies on *Acacias* and *Citrus*, etc., but is kept completely in check by *Novius cardinalis* and other natural enemies.

COCCINÆ.

Genus COCCUS, Linné.

5. *Coccus acaciæ*, Maskell.

This insect occurs on *Acacia pulchella* and another small "wattle" much resembling it. I think I may safely say that it is the prettiest and most highly coloured Coccid that I have ever seen, vying in brilliancy with the gaudy *Chrysomelidæ*. Maskell's description having been made from dried material, the following colour notes from living insects are added :—

Adult ♀ very convex, almost globose, slightly elongate behind. Dorsum shining and distinctly segmented, ornamented with four longitudinal rows of vermilion, and five rows of lemon-yellow spots. The spots are upon each segment and are separated by transverse bars of shining black, which occur in the constrictions. The median line consists of small yellow spots ; on either side are large red spots, and beyond these a wider row of yellow ones ; the spots in the remaining rows are much smaller. The transverse bars of black, lying in the constrictions, are not of even breadth, but are narrowed at several intervals, the red spots being sometimes confluent. Length 0·13 inch.

Genus ERIOCOCCUS, Targioni-Tozzetti.

6. *Eriococcus agonis*, sp. n.

♀ sac of apparently a loose texture, the accumulation of fumagine being always so thick that the colour and true nature are quite obscured.

Adult ♀ elongate, convex, segmented ; colour purple ; length 0·06 inch. Antennæ tapering, 7-jointed ; 7 the longest, 2 and 3 sub-equal and next in size ; 7 is constricted and occasionally appears as two joints ; sequence 7 (2, 3) (1, 4) (5, 6). Mentum elongate-cordate, trimerous. Tarsus twice the length of tibia, digitules normal. Anal tubercles normal with 5 spines on each, one on either side of the apex and 3 at the base ; the spine upon the inner margin is very conspicuous and thorn-like ; apex of tubercle with a long spine. Anal ring probably 8-haired. There are a very few inconspicuous spines on the dorsum and two upon the margins of each segment.

On *Agonis flexuosa* ("Native Peppermint").

7. *Eriococcus apiomorphæ*, sp. n. (Plate XV, fig. 8.)

♀ sac white, thick, complete, very convex ; contour elliptical ; length 0·2, width 0·1, height 0·1 inch.

Adult ♀ globose ; length 0·12 inch. Antennæ 7-jointed, joints 2, 3 and 4 subequal, 7 smaller but larger than 5 and 6 which are subequal. Mentum long, conical, trimerous. Legs slender ; tarsus longer than tibia ; upper digitules knobbed, lower fine hairs ; claws sharp. Anal tubercles small, cylindrical, each with 2 spines at the base and one on the lateral margin ; apex almost truncate bearing a long seta. Anal ring 8-haired. Dorsum bearing very small acuminate spines, the margin with a fringe of much larger spines arranged at regular intervals.

Larva cinnamon-colour, segmented, ovate.

♂ puparium white, elliptical, convex ; length 0·06, width 0·03 inch.

This species has only been found in the empty chambers of the female gall of *Apiomorpha maliformis* and in the galleries formed in its walls by boring beetles, and was invariably associated with ants.

8. *Eriococcus cypræiformis*, sp. n. (Plate XV, fig. 5.)

♀ sac elongate-oval, very convex, smooth, shining ; sides prehensile ; colour light brown ; length 0·15, width 0·11 inch.

Adult ♀ filling sac. Antennæ 7-jointed, joint 1 globose, 2 shorter and stout, 3 and 4 subequal and stout, 6 and 7 narrow and subequal. Mentum short, cordate. Legs long. Anal tubercles large, very chitinous, rough and tapering ; each is furnished with 2 spines, one upon the outer margin at half the length, the other on the outer side of the apex. Dorsum pitted with irregular oval and circular pores and clothed with many spines.

Second stage ♀ naked, green, distinctly segmented, almost flat. Tubercles conspicuous and similar to adult. Antennæ cylindrical, 6-jointed ; the second and third joints fused together ; sequence (2, 3) (1, 6) (4, 5). On the margins of each of the last three segments of the abdomen there are 3 small spines.

Larva with tapering antennæ of 6 joints, apical joint conical. Abdomen ending in two long tubercles.

On *Casuarina* sp. The sac of the adult ♀ very much resembles a small "snake-head" shell, particularly when at all old and bleached.

9. *Eriococcus elegans*, n. sp. (Plate XV, fig. 4.)

Adult ♀ segmented, convex, elongate and narrow ; stationary, and covered above by a secretion of a number of white filaments which are arranged in 3 distinct rows of well-defined, curling, pyramidal tufts. Colour red-brown. Length 0·1 inch. Antennæ rather long, 6-jointed, apex haired, sequence 3, 2, 4, 7 (5, 6) 1. Legs ample, tarsus

longer than tibia and bearing long upper digitules, and a long sharp claw. Anal ring 8-haired. Tubercles almost conical, spined and bearing setæ. Dorsum densely clothed with short, conical spines and many protruding spinnerets.

On *Casuarina humilis* (?). The species is clearly an *Eriococcus*, but the dorsal covering could never be regarded as a sac, although, as the insects affect the axils of the branch and branchlets, they are completely enveloped.

10. *Eriococcus Gurneyi*, sp. n. (Plate XV, fig. 9.)

♀ sac complete above but not extending completely beneath the insect, tough, felted, rather flat, elliptical.

Adult ♀ filling sac, white, elongate, segmented: dorsum clothed with innumerable, closely set, short, stout, conical spines. Antennæ 8-jointed, joints 7 and 8 fused. Legs slender, tarsus longer than tibia, upper and lower digitules knobbed. Mentum dimerous. Anal tubercles cylindrical, black, spined and with setæ. Anal ring large, 8-haired.

Second stage ♀ active, pink or lemon-yellow. Antennæ, legs and tubercles as in adult. Dorsum clothed with long, cylindrical, glassy tubes, surmounted with conical caps; those on the abdomen being the longest. The insect in this stage is a very elegant little creature, and highly suggestive of a hedgehog.

On a Rhamnaceous plant, in company with *Inglisia fossilis*, Mask. The name of my friend Mr. E. H. Gurney, of the N. S. W. Department of Agriculture, is attached to this species.

11. *Eriococcus hakeæ*, sp. n. (Plate XV, fig. 7.)

♀ sac of a tough, felted nature, white or buff colour and very convex; length 0.2, width 0.13, height 0.1 inch.

Adult ♀ pink; length 0.15—0.2 inch. Antennæ 7-jointed, 3 the longest, 6 the shortest; sequence 3, 4, 1, 2, 7, 5, 6. Mentum dimerous, conical, hairy. Legs ample, furnished with several spines, tibia and tarsus subequal, digitules present. Anal tubercles large, stout, tapering and spined; the median margins with 4 to 6 conspicuous spines, laterals with 3; with setæ. Anal ring conspicuous, with 8 long hairs. Dorsum with many conspicuous, conical spines, a few being larger than the majority; the margins of each segment bear a pair of much longer acuminate spines, those on the posterior segments being the longest.

On *Hakea ilicifolia*. The sac of this species much

resembles that of *E. apiomorphæ*. The insects frequent the deepest crevices of the bark, but are easily dislodged.

12. *Eriococcus imperfectus*, sp. n.

♀ sac thick white, elliptical, slightly convex, incomplete beneath; length 0·1, width 0·6 inch.

Adult ♀ fawn-coloured, filling sac, segmented, margin fringed with short conical spines set at regular intervals. Antennæ 7-jointed, 3 the longest, 2 and 4 subequal, 5 and 6 short, small and equal, 7 twice the length of 6 and bearing a few hairs. Rostrum large; mentum conical, dimerous. Legs well developed, tarsus longer than tibia, claws slender, upper digitules conspicuous. Anal tubercles large, cylindrical, bearing several longish spines and setæ; apex conical.

Second stage ♀ active and without sac.*

On *Melaleuca* sp. This species has been noticed to leave its food-plant occasionally before secreting the sac, and was first discovered on a paling fence, against which the host-plant was growing.

13. *Eriococcus simplex*, var. *dealbatus*, Maskell.

Eriococcus tricarinatus, sp. n. (Plate XV, figs. 6, 6 a.)

♀ sac elongate-oval, narrow behind, convex, with 3 longitudinal, dorsal ridges; one median, the others placed half way between it and the margins and so dividing the dorsum into 4 subequal regions; perforated behind, orifice small and circular. Length 0·08 inch.

Adult ♀ filling sac, purple or brown, convex above, flat beneath, tapering behind. Antennæ 7-jointed, tapering, apical joint large, globose and hairy; sequence (12) 3 (74) (56). Mentum dimerous, conical, haired at apex. Legs slender, tarsus twice as long as tibia; upper digitules knobbed, lower dilated. Anal tubercles cylindrical with 5 spines, 3 near the base and 2 at the apex; apex tapering and bearing a long seta. Anal ring large with 8 rather long flat hairs.

On *Eucalyptus gomphocephala*, on the galls of *Maskellia globosa*, Fuller.

Genus OLLIFFIA, gen. nov.

Characters:—Adult ♀s stationary, with somewhat conspicuous anal tubercles which approach those of an *Eriococcus*, but differ in having a chitinised prolongation of the dorsal arc of the anal opening, between them. Antennæ 7-jointed, atrophied. Legs atrophied or absent. The name of the late Mr. A. S. Olliff has been respectfully attached to this genus.

14. *Olliffia eucalypti*, sp. n. (Plate XV, fig. 10.)

Adult ♀ stationary, hidden beneath bark scales and covered completely with fumagine; slightly elongate. Abdomen a little prolonged and ending in two stout, blunt, spined tubercles, without setæ. Anal ring situated between the bases of the tubercles, and bearing 6 stout hairs, the dorsal arc is prolonged in the form of a chitinous, conical point. Antennæ small atrophied, tapering, apex haired, apparently 7-jointed. Rostrum large; mentum 3-jointed. Spiracles conspicuous. Legs absent, the last pair represented by inconspicuous thickenings of the epidermis. Epidermis with scattered, compound spinnerets. Length 0.04 inch.

On *Eucalyptus* sp. From ten prepared specimens.

Genus RHIZOCOCCUS, Signoret.

15. *Rhizococcus tripartitus*, sp. n. (Plate XV, figs. 11, 11 a, 11 b.)

Adult ♀ naked, at first of an obscure green (olive), becoming light brown or buff-coloured with maturity; there are 3 median, parallel, longitudinal markings of dark brown. Dorsum punctate, spined and divided into 3 well-defined regions by two transverse ridges, the median region is rectangular, the terminals triangular. Body elongate, wedge-shaped, tapering and prehensile at both ends. Antennæ 7-jointed, often joints 6 and 7 are fused and appear as one. 3 is the longest joint and equal in length to all the more apical ones, 1 and 2 are subequal in length, but 1 is the wider. Abdomen with a slight cleft, tubercles small triangular and Lecanid-like. Anal ring with 8 hairs. Viviparous. Length 0.2—0.25 inch.

Larva elongate, segmented; with very distinct anal tubercles which are spined and bear long setæ. Margin of body fringed with spines of which there are also 4 longitudinal and more conspicuous rows on the dorsum. Antennæ 6-jointed. Tarsus longer than tibia.

On *Casuarina*. Like *R. casuarinæ*, Maskell, this species affects the axils of the branch and branchlets. It is generally found in company with *Fiorinia casuarinæ*, Mask.

SCHRADERIÆ, Fuller.

The term *Schraderiæ* was proposed for a section of the *Coccinæ* to include the genus *Apiomorpha*. This genus has until recently been known by Schröder's name *Brachyscelis*, which, though well known to have been previously occupied, has been left undisturbed by the more recent

students, until changed to *Apiomorpha* by Rübsaamen in 1894. The sectional name has therefore been chosen as some small tribute to the first worker,—the father of Australian gall-study.

In placing the genus here, as a sub-family between the *Coccinæ* and *Dactylopiinæ*, I have been guided by the analogy of the anal tubercles of the adult ♀s to those of the ♀s of *Eriococcus*, and the 6-haired anal ring (only noticeable in the pre-adult stages, owing to the subsequent chitininising of the surrounding region) to the *Dactylopiinæ*. The larvæ also are not far removed in their characters; the fringe of spines around the margin of the body are analogous to those of some larvæ of the genera *Sphærococcus* and *Cylindrococcus*, whilst the suppressed anal tubercles connect with *Dactylopius*.*

Unfortunately the genus is the type of the sub-family *Brachyscelinæ*, and, therefore, in removing it I propose to let that sub-family remain with *Ascelis* as the type genus.

Genus APIOMORPHA, Rübsaamen.

Characters:—Adult ♀s pear-shaped, the abdomen tapering, and ending in 2 strongly chitinous tubercles. Mouth parts small, more or less atrophied. Feet and antennæ present in all stages, but more or less atrophied in the adult. Anal ring with 6 hairs. Inhabiting woody galls of characteristic shapes, whose growth, at the expense of their host, they cause and direct.

Larvæ ovate, segmented; abdomen ending in 2 suppressed tubercles, each bearing a long seta. Margin of the body surrounded with a fringe of uniform acuminate spines, each of which bears for a little while after birth, on either side, thin, hyaline, wing-like appendages; each species apparently bearing the same number.

♂s undergoing their transformations in separate cylindrical galls.

16. *Apiomorpha karschi*, Rübsaamen (1894); *Brachyscelis fletcheri*, Fuller (1896).

This species occurs over the greater part of Australia; I have collected it in several parts of New South Wales, in Victoria and Western Australia (Blackwood and Swan Rivers), and have seen specimens collected in South Australia. The species is referred to as var. *Fletcheri*, by Mr. Froggatt (*Ayr Gazette*, N. S. W.); but I have found the

* Since writing the above, I notice that Mr. Pergandé, who examined specimens of the genus in connection with his study of *Xylococcus betulæ*, considers it closely related to the *Coccinæ*.

galls varying to so great an extent, singly and confluent, that I am convinced that *Fletcheri* is synonymous with *Karschi*. On several species of *Eucalyptus*.

17. *Apiomorpha munita*, Schröder. I have this species from Geraldton, W. A., the galls being 4-sided, with the typical ridges at each corner.

18. *Apiomorpha munita*, Schröder, var. *munitior*, var. nov. This is a very common variation of the gall of *munita*, found near the Swan River; it also occurs in N. S. W., and differs from the type in having a smooth, round wall without the four corner-ridges.

19. *Apiomorpha munita*, Schröder, var. *tricornis*, Froggatt. In company with the foregoing variation of the type, in fact often upon the same twig, I have several times obtained perfect 3-horned specimens. These were perfect galls, and presented no indication of an arrest in the development of a fourth horn; and as the inmates were alike, there was no doubt but that the variation was in the galls alone.

20. *Apiomorpha pomiformis*, Froggatt. (Plate XV, fig. 15.) I have a specimen of this species, which is also reported from North Western Australia by Mr. Froggatt.

21. *Apiomorpha ovicola*, Schröder. Taken in company with *A. Helmsii*.

22. *Apiomorpha glabra*. I have many galls answering to the description of this species as given by Mr. Tepper, but out of more than fifty, none contained Coccids. The warts referred to in Tepper's description were quite common upon the galls, and are not those of the ♂, but of a Hymenopteron.

23. *Apiomorpha strombylosa*, Tepper (1893) = *Brachyscelis crispa*, Fuller (1896). Taken near the mouth of the Swan River (A. M. Lea). As with *A. karschi*, this is another species described by me in which the name chosen by the late A. S. Olliff and myself was retained. Owing to the persistence with which Mr. W. W. Froggatt refers to my notes as Olliff's published manuscript, I feel bound to repudiate the statement, and to reluctantly point out that no MS. notes whatever, bearing upon Coccids, were left by Mr. Olliff.

24. *Apiomorpha cucurbita*, sp. n. (Plate XV, figs. 13, 13 a.)

In the catalogue of *Coccidæ* given in the Journal of the Bureau of Agriculture, W. A., I referred to this gall as a variety of *regularis*, Tepper. I have since come to regard it as distinct. The ♀ gall is smooth, pendulous, ellipsoidal, and narrow at the base; the apex is truncate, and slightly dilated, the orifice being in the centre of a counter-sunk depression. When fresh the galls are green in colour, and usually striped with white, resembling a small gourd. Length $1\frac{1}{4}$ inch, greatest diameter 0.9 inch.

Adult ♀ not observed.

I am indebted for this species to Mr. R. Helms, Kimberley, N. W. A.

25. *Apiomorpha maliformis*, sp. n. (Plate XV, fig. 14.)

Adult ♀ pyriform, white or yellow, except the last 3 abdominal segments, which are reddish-brown; coated with a mealy, white secretion; length $\frac{2}{3}$ to $\frac{3}{4}$ inch; greatest width $\frac{3}{16}$ inch. Epidermis with many minute floriform pores, and clothed with short, hairy spines. Facial furrow semi-circular. Median depression of mesothorax transverse and deep. Anal appendages stout, horny, rough, and clothed with stout, yellow spines; parallel, bending outwards at the apex, which is surmounted by two short, truncate tubes. Antennæ atrophied, small, tapering, truncate, apparently 5-jointed. Legs, anterior small and inconspicuous, posterior 4, prominent, but small. Posterior margins of abdominal segments bearing a row of thorn-like spines; those on the last 4 being stronger than those preceding. Mouth small.

♂ unobserved.

♀ gall sessile, sub-spherical, smooth; length 1 to 1.3 inch, diameter 1.3 to 1.5 inch. Apex flat, orifice small, usually with 4 short cracks radiating out from it. Colour blue or greenish-grey. ♀ chamber balloon-shaped; length $\frac{2}{3}$ inch; width $\frac{2}{3}$ inch. Walls thick, hard, and woody.

♂ gall small, green, cylindrical; apex dilated; length $\frac{1}{3}$ inch. Growing upon the leaves.

The ♀ gall of this species is usually though not always found growing upon the fruit of *Eucalyptus patens* (?), which in point of fact, it somewhat resembles. This is not the only instance in which I have seen the galls of this genus upon the fruit, and their existence there quite upsets the theory that the galls are modified fruits, etc. It may be of interest to add that, out of some hundred odd

galls collected, many had been eaten into by *Sigastus fascicularis*, Pasc., and in several cases the beetle was found hiding in the chamber of the gall. In every instance an entrance had been made at the apex of the gall, where the wall is thinnest; from the circumstances under which the beetles were found, there is no doubt that they sought the Coccid. Swan River, W. A.

26. *Apiomorpha helmsii*, sp. n. (Plate XV, figs. 12, 12 a, 12 b.)

Adult ♀ orange-yellow; last 3 abdominal segments red-brown; appendages dark brown; median portion of the dorsum appearing to the naked eye as if stippled with fine red-brown dots. Body elongate, cephalic region rounded off, but slightly tapering, and narrower than the thorax; metathorax narrower than mesothorax. Abdomen long, tapering. Anal appendages long, rough, tapering to a point, adjacent, with the tips deflexed outwards and upwards, and bearing a short, stout spine on the inner margin. Antennæ atrophied, basal joint much swollen, apex truncate and surmounted with 5 hairs. Legs atrophied; first pair small, without claws; second pair stout and clawless; third pair large and clawed. Rostral setæ short, mentum simple. The hinder margins of the segments are fringed upon the dorsum with a row of sharp, thorn-like spines, and the median region of the whole of the dorsum is densely clothed with short, stout, thorn-like spines. Epidermis with many small, multiocular pores, and clothed with numerous short hairs.

♂ unobserved.

♀ gall, bright green, narrow at the base and widest near the apex, sessile or shortly stalked; summit truncate, with a central cone rising from it, the point of which is perforated by the small entrance to the chamber. Usually 4—5-sided, with prominent longitudinal ridges at each corner extending from the base up, and ending abruptly with the summit. Length 1 to 1½ inch. The twig to which the gall is attached is always much swollen around its base, so that the gall grows from a small pit. ♀ chamber elongate, almost fusiform, the widest portion being toward the apex.

Immature ♀ galls sessile, somewhat pyramidal, swollen at the base; apex conical; sides strongly ribbed; orifice closed.

♂ gall growing upon the leaves, cylindrical, longitudinally ribbed; summit dilated, and deeply serrate; colour light yellow. Length $\frac{3}{16}$ inch.

Midland Junction, Swan River, W. A.

I have much pleasure in attaching the name of Mr. Richard Helms to this species. The "direction of the

axis" is remarkably constant in the growth of the ♀ galls, there being nearly always some indication of an effort towards upward growth. The majority of the galls are found growing out from the twig at an angle of about 45° , when they arise from the upper side of the twig, and its growth is natural; when upon the lower side they often bend right round and grow up. When they are upon a twig that is growing downwards they grow back, so that the apex is towards the sky. There are, of course, exceptions, it being possible to find galls at all angles with the twig; they are, however, but the exceptions proving the rule. The species is a very common one in the neighbourhood in which it was found, and there are acres of Eucalypts laden with the galls, and in some places the ground is strewn with dead galls. The Coccids seem to be much sought after by birds, the galls being found torn open and the inmates gone; curiously enough, however, they are not, to my knowledge, subject to parasites, and the gall-walls harbour no inquilines; facts which without doubt account for the numbers in which the galls were found. Another interesting habit noticed is, that although the ♂ galls never grow upon the ♀ galls, as is the case with two or three other species, it is quite a common thing to find ♀ galls growing upon each other, and in these cases it is curious to notice that the gall which supports others is never swollen at the point of attachment, as is the case with the twigs.

DACTYLOPIINÆ.

Genus SPHÆROCOCCLUS, Maskell.

Adult ♀s naked, or covered with cottony or waxy secretion, or inhabiting woody galls. Anal tubercles small or absent. Antennæ usually atrophied. Legs absent or atrophied. Larvæ exhibiting anal tubercles.

27. *Sphærococcus pulchellus*, Maskell.

This handsome species is particularly common on *Hypolymma angustifolium* and also on *Melaleuca* sp. Its general colour is white; Maskell's figure is not quite correct.

28. *Sphærococcus leaii*, sp. n. (Plate XV, fig. 21.)

Adult ♀ occupying a small, elegant, somewhat spherical gall, with fluted sides; growing at the apex of the branchlets of *Casuarina*, sp. Viewed externally the gall appears to be formed of many separate

panels, which when viewed from the inside are seen to be united to one-half their height. ♀ chamber balloon-shaped.

Adult ♀ segmented, sub-globose; abdomen not prolonged into a tail; almost filling chamber. Colour pink. Antennæ atrophied, close, short, and tapering, surmounted with a few hairs; 6 or 7 joints. Legs short, stout; tibia longer than tarsus; tarsus clawed. Rostrum large; mentum conical, trimerous (?), apex haired. Anal tubercles absent. Anal ring not conspicuous. Dorsum clothed with numerous, acuminate, yellow spines. Viviparous.

Larva elongate, fringed with spines. Anal tubercles bearing setæ and spines. Antennæ of 6 joints. Legs thick, tarsus slightly longer than tibia, upper and lower digitules knobbed. Colour crimson.

The galls of this species are formed by the insects attacking and diverting the apical growth of the branchlets. In appearance they much resemble the galls of *Cylindrococcus*. The young galls, which are almost as large as those containing the adults, are soft, and three or four young are usually found in them; what becomes of the additional inmates I am unable to say, but it is probably a case of the "survival of the fittest." Named after Mr. A. M. Lea, Government Entomologist of Tasmania.

29. *Sphærococcus tepperi*, sp. n. (Pl. XV, fig. 16.)

Galls formed like those of *S. socialis*, Maskell, being composed of aborted leaves and occupied by many Coccids. Spherical, flattened at the base and apex; the points of the aborted leaves protruding. Colour green.

Adult ♀ flat, elongate, pyriform; head pointed; abdomen widely rounded behind; abdominal segments chitinous; colour yellow. Eyes black. Antennæ projecting on each side of the head, short, thick, probably 5-jointed; apex truncate, haired. Mentum dimerous. Legs, anterior 4 absent; posterior pair atrophied, apparently 2-jointed, with circular pores, and resembling in shape those of *S. stypheliæ*, Mask. Anal orifice simple, with 4 spines above and a row behind. Spiracles large. Length 0.04 inch.

Taken on a small *Melaleuca* or *Kunzia*. I have much pleasure in naming this species after Mr. J. G. O. Tepper of Adelaide Museum, S. Australia.

30. *Sphærococcus ethelæ*, sp. n. (Pl. XV, fig. 20.)

Adult ♀s stationary, globular, green, covered by several convex superimposed scales of white wax, congregating together and forming

woody excrescences and wounds which together with the white secretion much resemble the attack of the "woolly aphis" on the apple. Length 0.05 inch. Epidermis with many conspicuous and slightly-protruding pores, and clothed with inconspicuous spines. Spiracles conspicuous, surrounded by groups of multiocular pores. Legs absent. Rostrum large. Mentum conical, apex haired, probably dimerous. Antennæ represented by small chitinous thickenings. Near the regions of the posterior spiracles are semi-circular chitinous lobes, possibly atrophied legs. Anal ring unobserved. Cast skin of earlier stage covering adult.

On *Casuarina*. Swan River.

31. *Sphærococcus tormentosus*, sp. n. (Pl. XV, fig. 18.)

Adult ♀s usually congregating together and secreting quantities of white, woolly matter. When taken singly the tests are sub-globular with a central, longitudinal parting of the filaments. Length of test 0.13 inch. Adult ♀ convex above, flat beneath; brown. Antennæ very small, atrophied, sub-conical not jointed. Mentum dimerous, short. Legs absent. Spiracles large. Epidermis with many minute, multiocular pores and bearing many short, tubular spinnerets. Anal tubercles absent. Setæ absent. Length 0.08 inch.

Larva yellow, very elongate, with 2 conspicuous anal tubercles, bearing spines and setæ. Anal ring with 6 hairs. Antennæ 6-jointed; joints 4 and 5 sub-equal and shortest, 3 and 6 sub-equal and longest. Tarsus longer than tibia; claws slender; upper and lower digitules knobbed. Mentum long, conical, dimerous. Dorsum bearing transverse rows of short conical spines.

Adult ♂, only one observed, brownish-yellow, elongate; abdomen short, not tapering: spike short, with a dorsal curved appendage. Antennæ moniliform, sub-clavate; 10-jointed; joints 1 and 2 large and wide, 2 the longer; 3 clavate and slender; 4, 5, 6, and 7 sub-equal and globose; 8 and 9 larger and sub-equal; 10 sub-conical. Length, including spike, 0.09 inch.

On *Melaleuca* sp. Swan River. This species is close to *S. acaciæ*, Mask. It differs inasmuch as the larva of that species is without tubercles and the adult ♀ without antennæ.

32. *Sphærococcus morrisoni*, sp. n. (Pl. XV, fig. 22, 22 a.)

♀s inhabiting galls. Mature gall ob-ovate, apex truncate, and perforated. Colour light red; outer walls roughened where leaves have fallen off. ♀ chamber divided into two parts, the lower

division being spherical and small, and having a wide circular opening into the upper chamber, which is balloon-shaped.

The ♀ rests upon the ledge at the bottom of the upper chamber, and its abdomen protrudes into the lower chamber, where the larvæ are deposited. Here also the larvæ grow to twice their size before seeking a suitable place to form a gall on their own account, drawing nourishment, without doubt, from the inner walls of their "nest."

Adult ♀ secreting dorsally a tuft of white cottony matter. Dorsum flat and circular, very chitinous and segmented, and densely perforated with small pores, of which very small transverse rows mark the segmentation. Ventrally very convex; epidermis of ventrum thin, bearing a few conical spines and perforated by multiocular pores; some of the spines are apparently arranged in transverse rows. Rostrum ample. Mentum short, cordate. Spiracles conspicuous. Antennæ atrophied, sub-conical, not jointed. Legs absent. Viviparous.

Larva crimson, with a double fringe of spines and two longitudinal rows on dorsum. Antennæ 6-jointed. Rostrum ample. Legs stout; tibia and tarsus sub-equal. Tubercles inconspicuous.

On *Melaleuca* sp. from Pinjarrah, W. A. I have attached to this species the name of Dr. Alex. Morrison, M.D., to whom I am much indebted for the identification of many of the host-plants mentioned in these notes.

33. *Sphærococcus morrisoni*, var. *elongata*, var. nov.
(Pl. XV, fig. 23.)

The adult ♀s differ from the type in being but a little smaller. The galls however are more slender and often longer than those of the type, and are grey-green in colour. In this variety the outer bark of the gall continues to grow for some inches, and fresh twigs form above its apex. Swan River.

Genus CYLINDROCOCCUS, Maskell.

Insects inhabiting galls which appear to be aborted and misshapen forms of the twigs of the plants. Anterior feet present the remainder represented by patches on the epidermis. Anal segment circular, slight convex, not prolonged into a tail. (Maskell.)

34. *Cylindrococcus gracilis*, sp. n. (Pl. XV, fig. 24.)

The gall of this species very much resembles that of *S. spiniferus*, Maskell, but is much more slender and the imbricated bracts do not project like those of *S. spiniferus*. Length from 1 to 1½ inch; width ½ inch. Colour green.

Adult ♀ like *S. spiniferus*, with the remarkable palmate appendages at the extremity of the abdomen. Antennæ atrophied; wide at the base and tapering; apex sharp and slightly curved; apparently 3-jointed. Anterior feet atrophied.

Larva red, active, elongate. Antennæ 6-jointed. Eyes distinct. Legs long and slender; tibia longer than tarsus, only one long upper digitule. Tubercles moderate, apex truncate bearing on the inner margin a strong spine, and on the outer side of the apex a long seta. Six longitudinal rows of spines on the dorsum, the median pair of rows and those on the margins long, the latter conspicuously so; the other two rows small; the spines are borne upon the last 9 segments, 6 to each. The long lateral spines are serrate at the apex, and slightly dilated.

On *Casuarina humilis* (?). Swan River, W. A.

Genus OUROCOCCUS, gen. nov.

Adult ♀s stationary, inhabiting crevices in the bark of their food-plant, and secreting a single long glassy "tail" from between the two more or less distinct tubercles in which the abdomen ends. Abdomen tapering. Antennæ more or less atrophied. Feet absent or atrophied. ♀ and larva unobserved.

35. *Ourococcus eucalypti*, sp. n. (Pl. XV, figs. 28, 29, 30.)

Adult ♀ surrounded by a black waxy secretion and occupying a deep-seated cavity in the bark. Abdomen tapering slightly and ending in two incurved sharp points, which almost meet, enclosing a circular space, through which the long glassy tail is secreted. Body sub-globular, not distinctly segmented; abdominal region strongly chitinous and ventrally much striated with irregular corrugations converging towards the extremity. Rostrum long, mentum conspicuous, dimerous. Antennæ atrophied, short, tapering; apex truncate, with a few short hairs; apparently 3-jointed. Legs absent. Spiracles large. Epidermis with many multiocular pores. Within the abdomen when cleared with *liquor potassæ* there is discernible a peculiar sub-cordate chitinous organ, which is densely covered with tubular processes; the apex of the organ is directed towards the cephalic region, is truncate, and a small circular opening into the organ can be seen; on each side of this opening there is a prominent tube-like process. On either side of this organ are somewhat similar but smaller and circular organs. Behind the central organ a groove extends to the base of the points. A distinct group of pores extends from the base of each antennæ to the posterior spiracle.

On *Eucalyptus* sp. This insect is doubly interesting on account of its peculiar structure and the fact that it was found buried to some depth in the living bark. When I first found it I was much struck by this circumstance, and succeeded in obtaining a clue as to how it had "burrowed" into the bark. A search of the higher branches of the tree revealed many longitudinal slits in the fresh bark which, upon examination, were found to extend into the bark in an upward direction almost to the wood, and to contain the eggs of some large Homopteron. These slits corresponded exactly in direction with those in the older bark occupied by the Coccids, which they must have taken possession of as larvæ. How the young Coccid is able to enlarge the cavity to suit its increasing proportions is rather inexplicable.

36. *Ourococcus casuarinæ*, sp. n. (Pl. XV, figs. 25, 25 a, 26.)

Adult ♀ stationary, chestnut-brown, unsegmented, slightly globose, extremely chitinous and hard, hiding beneath the bract-like leaves of *Casuarina*; accompanied by much fumagine and secreting a single, long, glassy tail. Abdomen tapering slightly and ending in two conspicuous tubercles, which bear 3 stout spines. The margin of the abdomen bears similar spines to those on the tubercles, and on each side of the terminal tubercles there are usually from 2—4 less prominent tubercles. There is a central groove in the abdomen similar to that seen in *O. eucalypti* and *O. cobbii*, and with difficulty a similar form of organ is to be detected. Mentum conical. Antennæ very small, atrophied; 2- or 3-jointed, a few hairs at the apex. Legs absent. Behind the posterior spiracles there are two convex, semi-circular, lobe-like appendages, thickly perforated with circular pores, and having a honeycombed appearance.

Swan River, W. A.

37. *Ourococcus cobbii*, sp. n. (Plate XV, figs. 27, 27 a.)

Adult ♀s found beneath bark scales of *Eucalyptus* sp. and also in wounds in the bark, secreting long, glassy filaments, stationary. Abdomen chitinous, rounded, ending in two inconspicuous chitinous tubercles, each bearing a small spine. Inside the abdomen is to be seen, after preparation, a reniform organ similar in nature to that seen in *O. eucalypti*. Antennæ of 7 joints, atrophied, tapering, apex haired. Mentum long, conical, dimerous. Dorsum with spines and compound and short, tubular spinnerets. Upon the margin of some

of the abdominal segments are short, stout spines, the points of which are directed towards the head.

The name of Dr. N. A. Cobb, of the N. S. W. Department of Agriculture, is respectfully attached to this species.

Genus DACTYLOPIUS (Costa).

38. *Dactylopius macrozamiæ*, sp. n.

Adult ♀ active; light yellowish-brown; elongate, flattish, segmented; with dorsal meal and short lateral tassels. Antennæ of 8 joints, basal wide and stout, remainder cylindrical, apical longest and almost fusiform; sequence 812(35)5(67). Legs ample, spined. Tubercles small. Anal ring conspicuous with 6 strong hairs. Dorsum clothed with many hair-like spines and with numerous multiocular pores and raised spinnerets. Mentum conical, apex haired, monomerous(?). Eyes sub-conical. Length 0.16 inch. Eggs yellow, deposited in thin cottony webs.

Larva yellowish-brown. Antennæ 6-jointed, anal tubercles small.

On *Macrozamia frazeri*, Swan River. Generally found at the bases of the fronds.

39. *Dactylopius adonidum*.

On Oleander and *Coleus*.

40. *Dactylopius grevilleæ*, sp. n.

Adult ♀s stationary, sub-globose, distinctly segmented, slightly mealy, inhabiting complete and almost spherical sacs. Colour purple-black. Antennæ 7-jointed; 7 longest, remainder sub-equal, there is seemingly an atrophied joint between joints 5 and 6. Legs short, stout; tibia longer than tarsus, tarsus clawed; upper digitules slight, lower dilated. Epidermis with many spinnerets and small spines. Anal ring with 6 stout hairs. Tubercles small, each with a long seta and four distinct guttate spines. Similar spines occur laterad of each abdominal segment, and extend in a row across the dorsum.

On *Grevillea bipinnatifida*, Swan River.

41. *Dactylopius lanigerus*, sp. n.

Adult ♀s active, sluggish, congregating in colonies upon the branchlets and secreting immense quantities of woolly matter, which becomes matted together and hangs down in shreds. When removed, the adult ♀ is of a yellowish or dirty brown colour with short tassels of cotton laterad of each segment. Antennæ 8-jointed; sequence 81(23)(4,5,6,7). Mentum conical, dimerous. Legs ample; tibia twice

the length of tarsus. Anal tubercles absent, represented by two small chitinous discs. Anal ring granular, with 8 hairs. Epidermis with scattered fine hairs and compound spinnerets. Length 0·9 inch.

Adult ♂ brownish-yellow; antennæ hairy, 9-jointed. Abdomen short not tapering, and bearing several short setæ on either side of the short style.

Larva reddish. Antennæ 6-jointed, sequence 6 (12) (3,4,5). Abdomen truncate, tubercles short and rounded, with two conical spines median of base, each with a long seta.

Eggs red.

On *Acacia pulchella*. Trivial name "Snow scale." The larvæ and eggs are found amongst the secreted matter which adheres loosely to any object brushing against it; in this way the species is no doubt spread about.

ASTEROLECANIÆ.

Genus *LECANIODIASPIS*, Targ. (PROSOPOPHORA, Douglas.)

42. *Lecaniodiaspis acaciæ*, Maskell.

This species occurs quite commonly in Western Australia upon *Acacia cyanophylla* and *A. microbotrya*. The ♀s of the second stage are very Lecanid in general appearance, the abdomen being cleft and the tubercles like small triangular lobes.

43. *Lecaniodiaspis melaleucæ*, sp. n. (Plate XV, fig. 31.)

Adult ♀ enclosed in a thin, complete test of paperlike secretion. Viewed from above, the test is ovate with a faint, median carina and several fainter transverse ridges. The posterior end is the wider, and the extremity is pinched up and projects slightly. Viewed from the side the dorsum is seen to be very convex whilst the ventral surface is concave, so that there is a decided keel all round the margin of the test at the junction of the upper and lower halves. The colour of the test is externally grey, but the inner surface is yellow. Length 0·17 inch; width 0·12 inch.

Adult ♀ filling the test; dorsum convex; segmented. Colour dark grey, brown or tinged with yellow. Antennæ cylindrical, 8- or 10-jointed. Legs small and atrophied. Abdomen ending in a slight depression, on either side of which are somewhat elongate lobes without spines or setæ; each lobe is striated and near the apex there are several small pores. Anal ring with 10 short hairs. The margin of the body bears a few small, stout spines, and the

epidermis many raised "figure of eight" spinnerets, and is marked dorsally with many irregular short lines.

Second stage ♀ naked, resting on a thin pad of papery secretion; almost flat; the dorsum rising in the centre in the form of a low cone, and marked with radiating lines. Colour slate-black. Antennæ of 8 joints; basal short and wide, 2 the longest, 3, 4 and 5 sub-equal, 6 and 7 sub-equal, 8 short, rounded, and bearing a few hairs. Lobes spined. Anal ring with 10 long flat hairs. Spiracles not prominent, with small adjacent groups of simple pores. ♂ puparium yellowish-white; segmented; elliptical. Length 0.05 inch.

On *Melaleuca leucodendron* (?). Swan River, W. A.

Genus ASTEROLECANIUM, Signoret.

(*Planchonia*. p.n. occ.)

44. *Asterolecanium hakeæ*, sp. n.

Test of adult ♀ light transparent green, flat, circular; fringe generally absent, lighter than scale; diameter 0.06 inch.

Adult ♀ almost circular, light green; flat above, slightly convex beneath. Mentum dimerous. Tubercles fairly distinct, bearing longish setæ, and on the inner margin a single spine. Margin with a row of "figure of eight" spinnerets, which is occasionally double, but not regularly so as in *A. ventrousa*, Maskell. There is also a single row of multiocular pores round the margin.

♂ puparium smaller than test of ♀, oval, segmented, light green.

This species is common on the bark of *Hakea ilicifolia*, and is occasionally found on an *Acacia*, Swan River, W. A. Like *A. ventrousa*, the female rests in a small pit, but it does not cause such an abortive growth of the bark as that species, and in general appearance very much resembles *A. quercicola*, a common species in Sydney and Melbourne on oaks.

45. *Asterolecanium petrophilæ*, sp. n.

Test of adult ♀ flat, yellowish-green, circular, sometimes slightly elongate, fringe white. Length 0.045 inch. Owing to the transparency of the test it usually appears dark brown or black, due to the colour of the ♀ showing through.

Adult ♀ never entirely filling the test. Antennæ represented by a pair of chitinous buttons. Mentum monomerous. Margin with a single row of "figure of eight" spinnerets and a row of simple pores. Dorsum without markings. Ventrums flat.

On *Petrophila linearis*, Swan River, W. A. At first sight this species looks *in situ* much like an *Aleurodes*, and is often found in company with *Parlatoria petrophilæ*. Like the foregoing species it rests in a slight depression.

46. *Asterolecanium stypheliæ*, Maskell.

This species is common on *Styphelia* sp. on the banks of the Swan River, and has also been obtained at King George's Sound.

TARCHARDIINÆ.

Genus TARCHARDIA, Blanchard.

47. *Tarchardia convexa*, sp. n.

Test of ♀ dark brown, very convex, smooth, with two lateral filaments protruding from circular orifices. Length 0.15 inch.

Adult ♀ elongate, thoracic tubes conspicuous. Abdomen prolonged, with a chitinous ring at the apex; ring with 10 hairs. Antennæ small atrophied, not jointed. Menthum monomerous. Anterior spiracles larger than the posterior, and surrounded by groups of small pores. Dorsal spine conspicuous, with several adjacent hairs.

On *Hypocalymma* sp. Swan River.

48. *Tarchardia melaleucæ*, Maskell. (Plate XV, fig. 32.)

♂ red, elongate, sides of abdomen parallel, ends lobed. Spike curved downwards. Antennæ cylindrical, not tapering; joints 1 and 2 short and stout, the rest long and narrow; 3 the longest, 4, 5, and 6 diminishing, 6, 7, 8, 9, and 10 sub-equal; apex of 10 rounded and bearing 5 conspicuous knobbed hairs.

On *Kunzia* or *Melaleuca*. Perth, W. A.

LECANIINÆ.

Genus SIGNORETIA, Targioni-Tozzetti.

49. *Signoretia luzulæ*, Dufour, var. *australis*, Maskell.

On various grasses and sedges.

Genus LICHSTENSIA, Signoret.

50. *Lichstensia hakearum*, sp. n. (Plate XV, fig. 37.)

Adult ♀ brown, convex above, flat beneath, stationary, constructing a more or less spherical sac of a pure white, felted secretion, open at the anterior end and exposing the median region of the dorsum. Length 0.15 inch. Of a normal Lecanid form with usual cleft and

small lobes. Anal ring inconspicuous, with 6 hairs. Antennæ rather long, cylindrical, tapering slightly; joint 3 times the length of 2; sequence 3, 2, 1, 4, 5, 6, 7. Tibia longer than tarsus. Epidermis with protruding, multiocular spinnerets.

On *Hakea media* and other species, Pinjarrah (A. M. Lea). The position of the ♀ after egg-laying is *a tergo*, but still within the sac. In my preliminary list this species is mentioned as a *Lecaniodiaspis* (?); I am indebted for its present reference to *Lichstensia* to Mr. T. D. A. Cockerell.

Genus PULVINARIA, Targioni-Tozzetti.

51. *Pulvinaria maskelli*, Olliff, var. *viminariæ*, var. nov.

Adult ♀ almost black, very convex, length 0.35 inch. Egg-sac long and narrow, length including the ♀ *in situ* 0.5 to 0.6 inch. In its anatomical details the ♀ resembles *P. nutysiæ*, Maskell.

On *Viminaria denudata*, Pinjarrah (A. M. Lea), and *Hakea ilicifolia*, Bunbury (C. F.).

52. *Pulvinaria nutysiæ*, Maskell.

On *Nutysia floribunda*. I cannot help regarding this species as a variety of *P. maskelli*. The ♂s were found by me in one case in great numbers upon a tree without the ♀s, and were at first mistaken for a *Ctenochiton*, and mentioned in the list referred to, as *C.* (?) *nutysiæ*.

Genus LECANIUM, Illiger.

53. *Lecanium baccatum*, Maskell.

This species occurs in various parts of Western Australia, and in fact most of the Australian Colonies. It has recently been separated from *Lecanium* by Parrott and Cockerell, and referred to as *Cryptes baccatus*.

54. *Lecanium baccatum*, Maskell, var. *marmoreum*, var. nov.

♀ naked, quite white and polished, globular, slightly prolonged in front, with a faint, longitudinal, median elevation, which has a row of shallow depressions on either side. Antennæ cylindrical, 8-jointed: joints 1 and 2 the longest; spical joint haired: sequence (13) (24) (5, 6, 7, 8). Mentum short, condete, monomerous; with several spines. Legs ample; femur swollen; tibia and tarsus slender, tibia the longer; tarsus clawed and with 4 long knobbed digitules. Lobes adjacent, taken altogether elliptical; surrounding region chitinous. Anal ring haired, inconspicuous. Epidermis

with very small spinnerets and multiocular pores, which are more numerous near the anal region.

On *Acacia*, Geraldton, W. A.

55. *Lecanium hemisphericum*, Targ.-Tozz.

On ferns, Perth, W. A.

56. *Lecanium hesperidum*, Linn.

On several plants, including the fig:

57. *Lecanium frenchii*, var. *macrozamiæ*, var. nov. (Plate XV, figs. 40, 40 a, b.)

Adult ♀ elliptical, slightly convex, margin of dorsum almost black, medium region red-brown. Fringe white. Length 0.13 inch. After egg-laying the dorsum becomes quite black and extremely chitinous. The marginal region exhibits the many radiating channels and tessellations of the type. The fringe consists of transparent, stalked appendages, which are widest at their middle and have the apex rounded; they originate from circular orifices. Antennæ cylindrical with 6 joints, of these 1, 2, 4, 5, are sub-equal, 3 about three times the length of 2, 6 tapering about twice the length of 5; sequence 3, 6 (1, 2, 4, 5). Spiracular spines slender and swollen at the apex; the central the longest, and reaching a little beyond the margin. Cleft represented by a deep narrow incision, the sides of which are parallel, and the posterior contour of the body unbroken. Anal tube conspicuous, striated.

Immature ♀ yellow, elliptical and flat; larger than when mature, measuring 0.16—0.19 inch in length. Dorsum with regular reticulate pattern.

Larva oval, with cleft, lobes and anal tube similar to adult. Length 0.25 inch. There are several single spines opposite each spiracle and a conspicuous one on either side of the cleft.

Antennæ of 6 joints, long and slender and similar to the adult. Legs slender. Fringe wanting.

♂ puparium waxy, white, transparent, with two longitudinal and many radiating carinæ. Pupa red.

On *Macrozamia frazeri*, Swan River. This insect seemed to differ very much from the type as regards the joints of the antennæ, but as it agrees so closely in all other features I have thought it preferable to regard it as a variety.

58. *Lecanium oleæ*, Bern.

On many cultivated and garden plants, very common on

orange, lemon, olive and oleander, also on *Solanum sodomæum* and the weeping willow. I have also taken it on several native plants including *Macrozamia frazeri*.

59. *Lecanium ribis*, Fitch.

A *Lecanium* taken to be this species was found on an English gooseberry at Albany.

60. *Lecanium tessellatum*, Signoret. On a hot-house plant.
Perth, W. A.

Genus INGLISIA, Maskell.

61. *Inglisia fossilis*, Maskell. (Plate XV, fig. 50.)

On *Templetonia* sp. Swan River. I have given a further figure of this species, as Maskell's is a little misleading.

62. *Inglisia foraminifer*, Maskell, var. *loranthi*, var. nov.
(Plate XV, figs. 50, and 50 a, b, c.)

I received from Mr. A. E. Lankaster specimens of an *Inglisia* found by him at Geraldton which agrees very well with Maskell's description of *I. foraminifer*, except that the adult ♀s are legless. Curiously enough Maskell gives the host of his type as *Santalum*, whilst despite the fact that the West Australian variety is fairly common, it was only found on *Loranthus quandang* (the "quandang" or "native peach"), a "mistletoe" growing on *Santalum acuminatum*.

Genus CERONEMA, Maskell.

63. *Ceronema banksiæ*, Maskell. (Plate XV, fig. 38.)

A species which I take to be *C. banksiæ* is particularly common on *Banksia ilicifolia*, and is also found on *B. attenuata* and *B. menziesii*. The adult ♀ agrees in all particulars with Maskell's description; the tests are, however, compact and without cottony threads, and I have moreover never seen any secreted matter beneath a ♀ as described by him, though a large number were examined with this object.

64. *Ceronema dryandræ*, sp. n. (Plate XV, fig. 39, 39 a, b.)

Test of adult ♀ white, covering the whole of the insect except a small elliptical region of the dorsum towards the posterior extremity, and embracing the anal lobes. The test is narrow behind, broadly rounded in front, and exhibits well-defined convolutions. Length 0.14 inch.

Adult ♀ elliptical, dark brown, tapering behind, closely resembling *C. banksiæ*; the antennæ and dorsum exhibiting the same characters. Abdominal cleft represented by a deep narrow slit; lobes adjacent and tapering. Anal ring apparently hairless, and tube distinct. Region surrounding cleft and lobes conspicuously chitinous. Margin with a regular row of yellow, cylindrical and coronetted spinnerets from which the test is secreted.

Immature ♀ naked, elliptical, with a longitudinal carina. Resembling adult in all anatomical features except the anal lobes, which resemble the tubercles of an *Eriococcus*, tapering and bearing at the apex a long, acuminate spine, also 3 other spines, one upon the upper surface and two upon the inner margin.

♂ puparium, glassy, white, the medium region very much raised.

On *Dryandra nivea*, Darling ranges, and on *Dryandra floribunda*, Perth. The arrangement of the test is not easily described, but is fairly reproduced by the figure; it is particularly neat and pretty, and may be likened to the well-known crest of the Prince of Wales. The genus *Dryandra* is peculiar to West Australia, and its members are closely allied to the *Banksias*.

BRACHYSCCELINÆ, Maskell.

As pointed out in my reference to the Genus *Apimorpha* I propose to replace that as the type genus of this sub-family by *Ascelis*, and include with it the genera *Opisthoscelis* and *Cystococcus*.

Genus ASCELIS, Schröder.

Insects gall-inhabiting. ♂s undergoing their transformations within the ♀ chamber, or gall. Adult ♀s without legs, abdomen somewhat prolonged and ending in a chitinous button.

65. *Ascelis melaleucæ*, sp. n. (Plate XV, fig. 35, 35 a.)

Adult ♀ yellow, sub-globose, abdomen tapering and ending in a hard, chitinous button. Length about $\frac{5}{16}$ inch. Body unsegmented. Mouth somewhat rudimentary. Legs and antennæ absent. When cleared in potash 6 chitinous ribs are seen to extend into the body from the terminal button. Spiracles distinct.

Gall wider than high. Externally of the same nature and colour as the bark of the host plant. Apex of gall conical; perforated by a small orifice, through which a glassy filament occasionally protrudes. Galls divided into two chambers, the lower is occupied by the ♀ and

communicates with the upper by a very small opening through which, and the outer opening immediately above it, the ♀ secretes the glassy filament. The upper chamber usually contains several ♂ pupæ, encased in white, mealy cocoons.

On *Melaleuca* sp. Swan River. This species is placed provisionally in this genus, as all the species hitherto described are from the *Eucalypti* and have single chambered galls.

Genus CYSTOCOCCUS, gen. nov.

Characters:—Gall inhabiting. Adult ♀ cyst-like, body unsegmented, striated longitudinally. Legs and antennæ absent. Mouth almost obsolete. Spiracles large. Epidermis without hairs, spines, or pores. Abdomen at the end conical and capped with a hard chitinous button, which is used to close the entrance to the chamber of the gall. Galls like those of the genus *Apiomorpha*, but of a brittle nature, and with walls of an even thickness throughout. The ♂s probably undergo their transformations within the ♀ gall, judging from the number of wings and remains found at times in the galls collected.

The genus is erected for the reception of a very remarkable Coccid brought from East Kimberley, North West Australia, by Mr. Richard Helms. It is no doubt closely allied to *Ascelis*, but both the Coccid and its gall are sufficiently characteristic to warrant the erection of a new genus.

66. *Cystococcus echiniformis*, sp. n. (Plate XV, fig. 36, a, b, c.)

Adult ♀ almost spherical, and nearly filling the chamber of the gall. Cephalic extremity flat; abdominal conical, the apex terminating in a hard, chitinated button. Body unsegmented, striated longitudinally. Spiracles conspicuous, black, usually with white filaments protruding from them. Mouth parts almost obsolete, form doubtful. Legs and antennæ absent. Length 0·5 to 0·7 inch.

Larva unobserved.

Gall spherical, orifice at apex. Diameter from $\frac{3}{4}$ to $1\frac{1}{4}$ inch. The walls are of an even thickness throughout, comparatively thin, brittle and granulate. Colour dirty white outside, the outer surface much resembling a naked sea-urchin. The inner wall with a smooth papery lining which is veined and bears a slight resemblance to the inner wall of a sea-urchin. The chamber follows the contour of the outer surface. Within, the entrance is surrounded by a wooden rim,

which widens out in the form of a funnel or hollow cone, attached at its apex, and in which the conical end of the ♀'s abdomen rests. At the cephalic end of the gall there is often a small elevation or table to which the cephalic region of the ♀ is slightly attached. Diameter 0·7 to 1 inch.

Perfect specimens of the ♂ have not been observed. The wings are purple and the abdomen is extremely long.

On *Eucalyptus tessellaris*. These insects are edible and much sought after by the natives to whom they are well known as delicacies. Mr. Helms tells me that they are not at all unpalatable, being cool and refreshing on a hot day. The galls are plucked and broken between the teeth and the inmate sucked out. The specific name *echiniformis* was adopted at Mr. Helms' suggestion, and I am also indebted to him for the following interesting information given in his own words:—

“The insect is readily eaten by all natives and whites who know it. It is merely a bladder filling the cavity of the gall; the taste of its juice cannot be referred to any well-known flavour; it is watery and in fact almost tasteless, and in sucking it one naturally perceives the flavour of the gum-tree. I found it on *E. tessellaris* all over East Kimberley, and it is no doubt widely distributed in the Northern Territory of South Australia, as all the natives from those parts were acquainted with it as a choice tit-bit. The Yundi tribe of natives inhabiting the country about Mount Dockrell, West Australia, and the Mulunya tribe, who live near the upper portion of the Victoria River in the Northern Territory, South Australia, know the insect as ‘Ballabi.’ Another Northern Territory tribe living in the Forest River district call it ‘Ballabbi,’ and the Daulananya tribe, on the borders of the Catherine River, Northern Territory, have the two names ‘Durdunga’ and ‘Lador’ for it. The Mungui tribe living between Pine Creek and the Catherine River call it ‘Lordoch,’ and the Osborn River (a tributary of the Ord River) tribe term it ‘Kardaddain.’” This is not the first edible Coccid reported from these parts, as Froggatt says that *Apiomorpha pomiformis* is also eaten by the aborigines. It is, however, extremely probable that in this case the two insects have been confused, as the latter gall is extremely hard and woody and requires considerable force to open it.

Genus OPISTHOSCELIS, Schröder.

Adult ♀s inhabiting galls formed on leaves or twigs. Abdomen prolonged into a conspicuous tail. Posterior legs very much prolonged, anterior atrophied or absent.

67. *Opisthoscelis conica*, sp. n. (Plate XV, figs. 33 and 34.)

Adult ♀ very convex, distinctly segmented, colour light brown ; covered with meal ; abdomen prolonged ; length 0.15 inch. Antennæ atrophied, short conical not jointed. Anterior legs absent, posterior legs very long, measuring 0.09 inch, the coxa trochanter and femur short and stout ; the tibia very long ; tarsus atrophied, represented by a minute nipple at the extremity of the tibia. Rostrum short, mentum cordate. Epidermis clothed with many long, fine curved spines, which are more numerous about the cephalis region and on the margins of the tail, forming a tuft at its apex.

♀ gall on leaves, orifice upon the upper surface. The gall protrudes on both surfaces of the leaf ; upon the upper in the form of a cone, and upon the lower in the form of a hemisphere. Diameter at base 0.3 to 0.4 inch. Chamber pyriform, length 0.2, width 0.2 inch.

♂ galls unobserved.

The gall of this species approaches those of *O. subrotunda* and *serrata*. The Coccid is quite distinct from the latter species, and differs from the former in the atrophied tarsus, which in *O. subrotunda* is described as "as long or longer than tibia." On *Eucalyptus* sp. Swan River.

DIASPINÆ.

Genus ASPIDIOTUS, Bouché.

68. *Aspidiotus aurantii*, Maskell.

Taken upon many plants including Eucalypt, the Moreton Bay Fig (*Ficus macrophylla*, Desf.), the Grape, Rose, etc.

69. *Aspidiotus caldesii*, Targ.-Tozz.

On *Acacia* sp. Geraldton.

70. *Aspidiotus ceratus*, Maskell.

On *Acacia* sp. and *Templetonia* sp.

71. *Aspidiotus cladii*, Maskell.

On Sedge. Maskell records the species from Eastern Australia and also from Natal, South Africa.

72. *Aspidiotus dryandræ*, sp. n. (Plate XV, fig. 41.)

Scale of ♀ sub-circular, rather flat, diameter about 0·12 inch. Exuviae more or less central and inconspicuous. The scale is externally of a dirty fawn-colour, the inner surface being pure white.

Adult ♀ claret-brown: last segment yellow, with 6 lobes well developed and as wide as long; the median pair adjacent, the largest, notched on either side of the apex, the lateral notch being the deeper; second pair deeply incised once on lateral margin; third pair conical with sinuous sides and more removed from the second than the second from the median pair; with the exception of several small notches the rest of the margin is finely serrate. Plates absent. Median spines inconspicuous; second, third, and fourth pairs distinct. Circumgenital pores absent.

On *Dryandra floribunda*. Swan River.

73. *Aspidiotus niveus*, sp.n.

Scale of ♀ circular, very convex, pure white; diameter 0·04 inch. Exuviae light yellow, central, often hidden by the secretion of first stage.

Adult ♀ bright yellow, somewhat globose, of normal form, abdomen ending in a pair of adjacent, sharply truncate lobes, on either side of which is a small fringe of simple, hairy plates; the spines, with the exception of the median pair, are long and hairlike.

♂ puparium small, white; larval skin yellow.

On *Acacia pulchella*. This species is closely allied to *A. ceratus*, but differs in the form of the lobes and in the absence of the widely forked spine.

74. *Aspidiotus perniciosus*, Comstock.

On peach and apple, in two isolated instances only.

75. *A. perniciosus*, var. *eucalypti*.

Scale of ♀ pyriform, very slightly convex, purple-black when *in situ*, length 0·045, width 0·035 inch. Exuviae bright red, often surrounded by a ring of white secretion. At the posterior end of the scale there is a crescent-shaped piece of grey secretion which gives the pyriform shape.

Adult ♀ with median lobes converging, well-developed and faintly crenulate on their lateral margins; second lobes small, more or less triangular, and notched twice; third lobes almost obsolete; half-way towards the penultimate segment there is a fairly strong, wide,

pointed prolongation of the margin. Plates more or less branched. Spines situated above the lobes. Length 0·03 inch.

♂ puparium grey or grey-black, margin lighter. Larval skin red. Form normal. Length 0·04 inch.

Adult ♂ with 10-jointed antennæ and dark purple eyes. Length 0·0325 inch.

Larva with antennæ of 4 joints, fourth joint as long as first, second and third together. Abdomen ending in two converging and distinct lobes, incised on their lateral margins with a pair of longish setæ between them. Length 0·0075 inch.

On *Eucalyptus globulus*, an introduced species from Tasmania, in the streets of Perth. From the discussion which has arisen concerning the supposed variety of *A. perniciosus* upon *Eucalypti* in several of the colonies, it would appear that I have been in too much haste in attaching this species to *perniciosus*, and was perhaps ill-advised in selecting *eucalypti* as the name for it. The Victorian species is now, according to Froggatt, *A. eucalypti*, var. *comatus*, Maskell, but the Western Australian form is undoubtedly distinct, both in the arrangement of the lobes and in the absence of the transverse groove upon which, in both type and variety, Maskell lays so much stress. It is in fact a very close relation to *A. perniciosus* and differs chiefly in the presence of the chitinated prolongation of the margins, and also in the more serrated plates, which I find are more pronounced in the second stage female than in the adult.

76. *Aspidiotus rapax*, Comstock.

This is a very common species, and occurs upon a large variety of indigenous plants.

Genus PARLATORIA, Targioni-Tozzetti.

Characters:— ♀ scale elongate or subcircular; exuviae terminal or sub-central, large and of a rounded form.

♂ puparium elongate, not carinate; larval skin terminal.

Adult ♀ broad, last segment with 4 groups of circum-genital pores and usually bearing 6 lobes and many plates which extend to the margin of the more anterior segments.

77. *Parlatoria proteus*, Curtis.

On *Pinus insignis* in Perth.

78. *Parlatoria viridis*, sp. n.

Scale of ♀ elongate, rounded behind, form constant; exuviae terminal, naked; the first brown and about $\frac{1}{6}$ the size of the second, which is a viridian green, oval and equal to half the length of the whole scale; secreted portion white, occasionally light brown against the second cast skin. Length 0.06 inch.

Adult ♀ rounded-ovate, brown, shrivelling after egg-laying to half the size of the second of the exuviae. Last segment presenting the following characters:—6 conspicuous tri-lobate lobes, the incisions on either side of the apex being deep and the bases of the lobes much narrowed. Spines inconspicuous. There are two oblong narrow plates, serrate at the apex, between the median lobes; 2 between the first and second lobes, and 3 between the second and third lobes; the plates immediately beyond the third lobes are narrowed at the base, widest near the middle and taper to the apex; they are deeply incised and may be described as palmate. The plates extend only to the penultimate segment. The anterior groups of circum-genital pores are contiguous with the posterior, so that there are apparently only two elongated groups which are constricted at about the middle, 23—26 pores. The merging of the groups into one is a constant feature. Length 0.05 inch.

♂ puparium elongate, slightly convex; larval skin terminal, viridian green; the rest white. Length 0.04 inch.

On *Pittosporum* sp., Perth. This species causes a yellow stain upon the leaves and affects the growth of the infested plants considerably. It approaches *P. pittospori*, Maskell, the scales differ, however, in colour and also in the position of the exuviae. The fringe of plates in *P. pittospori* is also said to extend to the rostral region. In external appearance *viridis* appears to more nearly approach *P. myrtus*, but the second of the exuviae is conspicuously large, whereas in the latter it is not.

79. *Parlatoria zizyphi*, Lucas.

This species has not apparently become acclimatised in West Australia, though it is nearly always present upon lemons brought from the Mediterranean and upon "Pomelos" (*Citrus decumana*) from Singapore.

80. *Parlatoria dryandræ*, sp. n. (Plate XV, fig. 42.)

Scale of ♀ elliptical, exuviae terminal. Length 0.05, width 0.03 inch. Larval skin blackish-brown, cast of second stage dark brown

and $\frac{1}{3}$ the entire length of scale. Secreted portion of scale pinkish-grey, finely punctate.

Adult ♀ brown with usual lobes, spines and plates, the last fairly wide and extending to all but the cephalic segment, those beyond the third lobes are palmate. Four groups of circumgenital pores, upper laterals 10—11, lower laterals 10—11; pores large and multiocular. Antennæ atrophied, each represented by a wide, truncate process with a horny seta arising from one side of its apex.

♂ puparium pinkish-grey, larval skin brown. Length 0.03 inch.

Adult ♂ dark purple; wings large; eyes black. Legs ample, tarsus and tibia sub-equal, tarsus spined and without knobbed digitules. Abdomen short, rounded, without setæ. Spike about $\frac{1}{2}$ the length of the body.

On *Dryandra floribunda*, Swan River (Helms). This is a rather smaller species than either *P. viridis* or *P. myrtus*, and the number of pores in the groups is remarkably constant.

81. *Parlatoria perpusilla*, Maskell. (Plate XV, fig. 43.)

The specimens of this insect which I have examined show a convex cap, the rim of which overhangs the perpendicular walls of the scale, like the eaves of a roof. The scales do not resemble those of *Parlatoria*, and I notice that Messrs. Cockerell and Parrot have recently referred the insect to *Gymnaspis*.

82. *Parlatoria petrophilæ*, sp. n.

♀ scale elongate, slightly convex, very wide, slate-grey; exuviae dark brown, terminal, and comparatively very small. Length 0.08, width 0.05 inch. The second of the exuviae is circular and less than $\frac{1}{4}$ the entire length of the scale.

Adult ♀ with antennæ represented by 2 small chitinous thickenings of the epidermis, each bearing a seta. The lobes are of the usual number and but faintly notched; the third pair have the apex rounded, the sides almost parallel, and taper but slightly to the base. Plates serrate on the lateral margins. Four groups of pores.

On *Petrophila linearis* and *Hakea ilicifolia*. The faintly notched lobes, the small exuviae and the wideness of the scale seem to characterise it.

Genus MYTILASPIS, Targ.-Tozz.

83. *Mytilaspis fulva*, Targ.-Tozz.

Like *Parlatoria zizyphi* this species has never as yet

been found in the orchards of West Australia, though it is particularly common on imported *Citrus* fruits.

84. *Mytilaspis grisea*, Maskell.

Common on various Eucalypts.

85. *Mytilaspis gloveri*, Pack.

The same remark that applies to *M. fulva* applies to this species also.

86. *Mytilaspis pomorum*, Bouché.

The freedom of the orchards of the colony from this species is remarkable, it having been found in only one instance on an apple tree at Mount Barker, an isolated, inland district.

87. *Mytilaspis spinosa*, sp. n. (Plate XV, figs. 4, 5.)

Scale of ♀ white, of a woolly texture, broadly pyriform, generally curved. Exuviae yellow. Length 0·075, width 0·03 inch.

Adult ♀ brown, sub-elliptical; abdomen ending in a slight, median depression upon either side of which is an inconspicuous, conical lobe. Between the lobes there is a pair of small spines and beyond them 3 others. Five groups of circumgenital, multilocular pores; median 2—3, upper laterals 7—9, lower laterals 10—15. Antennæ represented by a pair of small, horny processes. There is a large group of circumrostral pores, and upon the margins between each antennæ and the last segment are 4 groups each of 5 large, conical spines.

On *Melaleuca* sp. Swan River.

88. *Mytilaspis elongata*, sp. n. (Plate XV, fig. 44.)

♀ scale grey, very long and narrow. Length 0·18, width 0·025 inch.

Adult ♀ elongate; last segment broadly rounded and presenting the following characters: 6 conspicuous lobes, median pair wide, sides parallel, somewhat truncate with 2 small notches on the lateral margin near the apex; second pair wide deeply incised on the lateral margin, apex of lobes truncate, lobule conical; third pair short, wide with 2 small notches at the apex; beyond the third lobes two thickenings of the margin; spines small; 2 hairlike plates between the median lobes, one between them and the second lobes, a broader one between the second and third lobes and 2 tapering and conspicuous plates before the thickenings of the margin. On the margin of

each body segment are groups of conical spines. Circumgenital pores arranged in an almost unbroken, horseshoe-shaped arch. Median group of 7, upper laterals 10—12, lower laterals 10—12.

On *Banksia ilicifolia*. Perth.

Genus POLIASPIS, Maskell.

Characters :—♀ scale elongate, exuviae terminal. Adult ♀ with more than 5 groups of circumgenital pores. ♂ puparium narrow, larval skin terminal.

89. *Poliaspis nitens*, sp. n. (Plate XV, fig. 47.)

Scale of ♀ pyriform, broad, convex, generally straight. Exuviae light, reddish-yellow, the second being lighter than the first ; remainder of scale pure, silvery white. Length 0·09, width 0·035 inch.

Adult ♀ elongate, yellow. Last segment broadly rounded ; median lobes very short and wide, forming the sides of a slight depression ; beyond this there is on each side a simple, tapering plate and a somewhat deep incision from the much thickened base of which rises a conical lobule (?) ; beyond this again the margin is crenulate and bears another simple plate. There are 7 distinct groups of circumgenital pores, 6 arranged in opposite pairs, the seventh median and anterior to the more anterior laterals, median of 3—4, anterior laterals 7—8, intermediate laterals 15—17, posterior laterals 16—20. No rudiments of antennæ.

♂ puparium white, with a faint median carina.

On *Davisia* sp., Swan River. The species differs from *P. exocarpi* in the number and arrangement of the group and in the number of pores in each.

90. *Poliaspis intermedia*, sp. n. (Plate XV, fig. 46.)

♀ scale pyriform, generally curved, very convex, white. Length 0·06, width 0·03 inch. Exuviae terminal, light yellow.

Adult ♀ yellow ; last segment bearing two fairly conspicuous, tapering median lobes, and beyond each 3 equal-sized, conical lobules, beyond these are 2 simple plates between which 2 small rounded lobules may be seen. Eight groups of circumgenital pores, 6 arranged in opposite pairs, and 2 median, the more anterior being before the anterior laterals and the second before the intermediate laterals : the first median of 2—4, second median 3—5, anterior laterals 7—8, intermediate laterals 9—14, posterior laterals 20—25.

On a Leguminous plant. The scales are much duller than those of *P. nitens*, and the insects cluster together in

colonies containing great numbers of ♀s. Described from 15 prepared specimens.

Genus CHIONASPIS, Signoret.

91. *Chionaspis agonis*, sp. n.

♀ scale straight, long and narrow, slightly convex. Exuviae pale straw-coloured, remainder of scale dull white. Length 0·13, width 0·03 inch.

Adult ♀ elongate, of a light, yellow colour; pygidium rounded and presenting the following characters; median lobes conspicuous, short, wide, diverging, apex truncate; second lobes much smaller and divided into two lobules, median lobule inconspicuous, narrow at the base and spatulate, outer lobule smaller still and tapering; beyond the second lobes the margin is incised several times; plates simple and tapering, first situated beyond the median lobes, second beyond the second lobes, and a third a short distance beyond that; the spines at the bases of the median lobes are very small, the remainder more conspicuous and adjacent to the plates. Five groups of circumgenital pores, anterior 4 to 8, anterior laterals 13 to 15, posterior laterals 19 to 21.

♂ puparium white with a slight median carina. Larva skin straw-coloured.

On *Agonis flexuosa*.

92. *Chionaspis ethelæ*, sp. n.

♀ scale elongate, broad behind, exuviae red-brown, rest of scale dull white. Length 0·1 inch.

Adult ♀ elongate, distinctly segmented, with lateral groups of spines, particularly prominent on the four abdominal segments. Antennæ spots distinct. Last segment broadly rounded with a pair of conspicuous, apparently diverging, wide and short median lobes, the inner margins of these lobes are joined by a horseshoe-shaped thickening, they are at first parallel, then rounded and widely divergent; the lateral margins appear concave; immediately beyond the median lobes there is a short simple plate; then 3 equal-sized lobules, the first arising from a depression with thickened sides; there is a second much longer simple plate beyond the third lobule, and beyond this again 2 emarginate and almost obsolete lobules, both originating from depressions with club-shaped, thickened sides; beyond this another simple plate, followed by two similar depressions and several serrations, followed again by similar plate, depressions and serrations. The spines are small and situated before the plates.

Five groups of circumgenital pores, anterior of five orifices, anterior laterals 11 to 15, posterior laterals 15 to 21.

♂ puparium white, opalescent, sides parallel, distinctly tricarinate, with 2 additional and faint carinæ between each lateral and the median.

On *Eucalyptus*, spp.

93. *Chionaspis eugeniæ*, Maskell.

On *Ricinus communis*, East Kimberley, North-West Australia. The ♂ puparia clustered together in a woolly mass.

94. *Chionaspis xanthorrhææ*, sp. n.

Scale of ♀ shining white, pyriform; exuviae light yellow.

Adult ♀ yellow. Last segment with a slight, wedge-shaped depression, on either side of which is a short, conical lobule; beyond the lobules at a short interval occur the second lobes, represented by two lobules, the inner being the longer and the larger, the outer short, wide and rounded at the apex. Beyond the second lobes the margin is slightly prolonged and thickened three times. Two very small spines between the median lobules, the others adjacent to the plates which are simple, tapering and very long, and situated subsequent to the lobes and prolongations of the margins. Five groups of circumgenital pores, median usually of 4 orifices, anterior laterals 19 to 20, posterior laterals 25 to 30.

♂ puparium white, not carinated; larva skin yellow.

On *Xanthorrhæa*, sp.

Genus FIORINIA, Targ.-Tozz.

95. *Fiorinia floriniæ*, Targ.-Tozz.

On hot-house plants, Perth.

96. *Fiorinia acaciæ*, Maskell.

On several species of *Acacia*.

97. *Fiorinia rubra*, Maskell.

On *Acacia*, sp.

98. *Fiorinia casuarinæ*, Maskell.

A very common species in the neighbourhood of Perth.

99. *Fiorinia acaciæ*, var. *bilobis*, var. nov.

An insect agreeing sufficiently with *F. acaciæ*, reported from West Australia by Mr. Maskell, with the exception that there are 2 lobes, closely adjacent and at first sight appearing as one semi-circular lobe.

On *Acacia pulchella*.

Genus MASKELLIA, Fuller.

100. *Maskellia globosa*, Fuller.

On *Eucalyptus gomphocephala*. Perth. (Agricultural Gazette of New South Wales, Vol. viii, p. 579, 1897.)

Genus AONIDIA, Targ.-Tozz.

101. *Aonidia banksiæ*, sp. n.

Scale of ♀ circular, convex, grey; the second of the exuviae shows through the secreted portion and gives the whole a deep, orange-red colour. Diameter 0·02 inch.

Adult ♀ almost circular, smaller than second stage. The abdomen ending in a short, wide, chitinous segment with a medium depression on either side of which faint, very short, wide lobes are occasionally to be made out; plates and pores absent; there are 6 pairs of spines, and a distinct fold in the margin of the segment beyond the third pair on each side.

The posterior end of the cast of the second stage seems to bear 6 conspicuous lobes, the sides of which are parallel and the apices obliquely truncate and faintly crenulate. There are 2 plates between the medium lobes, 2 between them and the second lobes, and 3 between the second and third lobes; the sides of the plates are parallel, the apex of each serrate, and they are the length of the lobes.

♂ puparium elongate, white or grey; larval skin terminal, circular and of a bright orange-colour, exhibiting on each side of the centre 2 groups of pores.

Adult ♂ short and wide, dark purple; head small; antennæ 9-jointed; thorax large and wide, with a medium line of white colour; abdomen short; style stout; wings large and wide. Length 0·04 inch.

This is a very common species around Perth. It is particularly abundant on *Banksia attenuata* and *B. menziesii*, less so on *B. prionotes*, and only found in rare instances on *B. ilicifolia*. Where groups of the scales occur they are never crowded upon one another, and the surface of the leaf all around is covered with a thin "bloom" of white secretion.

CLAUDE FULLER,

JUNE 6, 1899.

EXPLANATION OF PLATE XV.

[See explanation facing the PLATE.]



Fuller, Claude. 1899. "XIV. Notes and Descriptions of some Species of Western Australian Coccidæ." *Transactions of the Entomological Society of London* 47, 435–473. <https://doi.org/10.1111/j.1365-2311.1899.tb00988.x>.

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