

Assuming, then, that these mites are identical with, or very slight variations from, the European form, they must be recorded as follows :—

Order ARACHNOIDEA.

Fam. GAMASINÆ.

Sub-fam. GAMASIDÆ.

Gen. UROPODA, Latreille.

Species *Uropoda vegetans*, De Geer.

Minute mites, parasitic upon Coleoptera (*Elater*) and Crustacea (*Oniscus*) in New Zealand. Form flattish, sub-circular; colour yellowish-brown; attached in clusters by fine threads to the host. Characters generally of *Gamasinæ*: Eyes none, mandibles chelate, feet eight, each with a double claw and a minute caruncle or pad.

Localities, up to the present: Christchurch (on *Oniscus*); Wellington (on *Elater*). The Wellington specimens were sent to the Museum lately by Colonel Humfrey, of the Hutt.

ART. XXVI. — *Further Coccid Notes: with Descriptions of New Species from Australia, India, Sandwich Islands, Demerara, and South Pacific.*

By W. M. MASKELL, Corr. Memb. Roy. Society of South Australia, Registrar of the University of New Zealand.

[Read before the Wellington Philosophical Society, 18th January, 1893.]

Plates XI.-XVIII.

THE widely-separated localities from which come the insects referred to in the following pages are evidence of the increased interest taken nowadays in Coccids all over the world. I was once told by an entomological friend, as an excuse for his not attempting to collect or study this family, that there were so few species in it and so little was known about them. Apart from the fact that, to most people, rarity and want of information would be rather incentives to study than reasons for neglect, the first statement is scarcely accurate, and the second becomes less so every year. I do not myself think that the multiplication of species tends to render a family either more interesting or more important; and probably some judicious pruning amongst the many thousands of species of Coleoptera or Lepidoptera would bring about a most useful reduction of their numbers, as some naturalists seem to

have a craze for the making of species on the slightest provocation. Still, any one who would imagine the Homoptera to be a small or unimportant order would be much mistaken. Coccids are but one family of that order, and have only been really studied for some thirty years; but of that alone nearly seven hundred species are now known (1892), and scores of others are sure to be discovered every year. The Aphids, Psyllids, and Aleurodids have as yet been scarcely touched; the Cicadids and other families are constantly receiving additions. It would probably not be an exaggeration to estimate that there are from twenty to thirty thousand species of Homoptera existing in various countries, not more than a seventh of which, perhaps, have been made known to science up to the present day.

There would seem to be a quite sufficient field here for the entomological student. As regards New Zealand, I have myself described eighty species of Coccids, four of Psyllids, and five of Aleurodids, all of which may be considered as indigenous, besides several exotic introduced species. Certainly the two last families, and probably the first, are still more largely represented in this country, and nobody has yet made any investigation of the Aphids. I hope therefore that ere long the New Zealand Homoptera will receive the attention to which their importance clearly entitles them.

It is satisfactory to note that since 1870 the number of homopterologists has been steadily increasing. At that time, with the exception of Signoret, Lichtenstein, Bouché, and Fitch, scarcely anybody studied the order. Now the workers are numerous, either as collectors or describers, and they are spread all over the world. In Europe excellent work has been done by Douglas, Morgan, Löw, Newstead, Buckton, Targioni; in America, by Riley, Howard, Koebele, Comstock, Coquillett, &c.; in India, by Atkinson, Cotes, Nietner, Green; in Australia, by French, Olliff, Tepper; and in New Zealand I have received great help from Messrs. Raithby, Smith, and others. Some of these have turned their attention chiefly to that very important branch, the economic relations of the Homoptera to agriculture; others confine themselves to the purely scientific side of entomology. But the result is that the order is being better studied every year, and I look forward to the time when it will receive its due share of attention in New Zealand also.

The following pages contain notes upon several insects already described, and also descriptions of more than thirty new species. The majority I owe to an occurrence which deserves particular mention. It will be remembered that after my publication in 1878 of an account of *Icerya purchasi* that pest became so obnoxious in various countries that uni-

versal attention was drawn to it. My late friend Mr. Crawford, of Adelaide, was the first to discover the "natural enemy," in the shape of a rather large parasitic fly, which he called *Lestophonus iceryæ*. The pest having become exceedingly injurious in California, the United States Agricultural Department at Washington, which is presided over by scientific experts, determined to leave no stone unturned to put a stop to the damage, which was being done to the extent of millions of dollars, and threatened to increase. An officer of the department, Mr. Albert Koebele, was sent to Australia in 1888 to procure supplies of the *Lestophonus* from Mr. Crawford, for the purpose of introducing them into California. Calling on his way at New Zealand, where, in the North, *Icerya* was dreadfully prevalent, Mr. Koebele was fortunate enough to find a much better enemy to *Icerya*, in the form of *Vedalia cardinalis*, one of the *Coccinellidæ* (ladybirds), and, recognising at once the full importance of this insect, he carried away with him to California a large number of *Vedalia*, with the result that in two or three years' time that State was practically cleared of *Icerya*, and its fruit industry saved. Since then *Vedalia* has been sent about the world wherever *Icerya* prevails, with a similar good result in every case.

The foregoing is perhaps only a "twice-told tale," known to many people, although even so it cannot be too often repeated. The public of New Zealand are not so well acquainted with the sequel. The Washington Department, finding that Mr. Koebele's first trip had been so successful, despatched him on a second journey to Australia and New Zealand, "on a search for beneficial insects." The State of California appropriated 5,000 dollars towards his expenses; the department supplemented the sum as required. The object this time was not to fight against *Icerya*, but to obtain the natural enemies of other insect pests very injurious to fruit and other trees, such as *Aspidiotus aurantii* on orange and lemon, or *Lecanium oleæ* on various plants. Mr. Koebele reached New Zealand in October, 1891, spent a day or two with Mr. Wight and Mr. Cheeseman in Auckland, stayed also a day or two with me in Wellington, passed on to Australia, where he remained till July, 1892, and then returned to California. During this time he was successful in discovering a large number of parasitic insects and in despatching supplies of them to America. I have not yet heard what is the final result of his journey. We can only hope that it will be as useful as in 1888.

As far as regards myself, I am indebted to Mr. Koebele for, as stated just now, a large number of the insects referred to in this paper, whether new species or known insects from

new localities ; and I am greatly obliged to him for permission to describe them here. But the people of New Zealand owe to him and to the Agricultural Department of Washington a greater debt. For, on this his second journey, recognising perhaps that he received *Vedalia* practically from New Zealand, he attempted to repay us as far as possible by introducing into this country some of the insects known to be very useful in America. His first port of call being Auckland, he at once came into communication with Mr. R. Allan Wight, so well known in the colony as an excellent economic entomologist, and immediately placed in his charge, or, rather, liberated in conjunction with him, several parasitic insects. Of course, these being let loose, it is not possible yet awhile to say positively whether they have made much impression against our various pests ; yet I understand from both Mr. Koebele and Mr. Wight that they very quickly set to work, and seemed quite ready to acclimatise themselves, and that in all probability their introduction will be, as far as it goes, successful. The importance of this fact will be readily recognised when it is stated that they included some ladybirds, which are special enemies to what we call the "American apple-blight" (*Schizoneura*), some *Syrphidæ*, and some *Neuroptera* (lacewings), enemies to all sorts of aphides and blights, and some larvæ of *Raphidia*, which feed greedily on codlin-moth. Surely, as I said just now, the people of New Zealand owe a debt to the American scientists who have thus tried to help them.

The introduction of these insect friends is, as I said, satisfactory as far as it goes. I mean by this that, of course, Mr. Koebele on this occasion could not bring a sufficiently large supply ; and perhaps it may be a very long time (even with the experience of *Vedalia* before us) ere any beneficial results are visible. But, besides the kindly feeling which prompted Professor Riley and his colleagues in America to send us these things, they have taught us a lesson which I fear will be thrown away. The appropriation, mentioned above, of the Californian State Legislature is surely an example which the Parliament of New Zealand might profitably follow. And the visit of Mr. Koebele, and his well-meant gift, point out to us the necessity (if, indeed, some of us had not seen it before) of some real and practical work being done in New Zealand to help the farmer and the fruit-grower. From every part of the colony come frequently-repeated complaints. Hessian-flies, bot-flies, codlin-moths, wireworms, grass-grubs, snails, aphids, blights, scale-insects, all sorts of pests riot and flourish in every district and in every orchard ; and they do so because those who have most at stake make no thorough efforts to prevent them. What is required is an Agricultural Depart-

ment, organized like that of the United States of America. We might then hope for some good result. I might multiply instances; but, to confine the question to one point now, Mr. Koebele should never have been allowed to leave New Zealand without making arrangements for further supplies of insect friends to man. He showed by his first consignment that the thing is possible. Had there been here an expert scientist managing a proper department, he would have seen the full value of the experiment, and would have taken care to have it repeated. Our debt to our American friends is, as I said, large; the lesson they have tried to teach us is a good one: all that we want is some man of common-sense and right feeling to acquit the first and learn the second.

This is a matter on which, as this Society knows, I have for a long time endeavoured to induce the rulers of the colony to be reasonable, and to establish a properly-equipped Agricultural Department (or "Bureau," if the term is preferred), under the charge of a properly-qualified scientific expert. Constant dropping of water, they say, will in time wear away a stone. Let me still hope for final success at some future time.

I have also to record my thanks to Messrs. French, Olliff, and Tepper for their Australian insects; to Mr. Cotes for those from India; and to Messrs. Douglas, Cockerell, and others for help, and specimens from different countries. Lastly, I must acknowledge the very friendly terms in which many correspondents have referred to the work on Homoptera contained in my papers of the last fifteen years.

Group DIASPIDINÆ.

Genus ASPIDIOTUS, Bouché.

Aspidiotus cladii, Maskell. N.Z. Trans., vol. xxiii., 1890, p. 3.

This species has been sent to me by Mr. Koebele from Semaphore, South Australia, on *Lepidosperma*. The specimens are much finer, larger, and darker-coloured than those originally described by me from Victoria, but I cannot otherwise separate them.

Aspidiotus acaciæ, Morgan. Ent. Mo. Mag., Aug., 1889, p. 353.

Mr. Koebele has sent me specimens which are so near to this species that I will not separate them: they occur on *Eucalyptus* sp. at Whitton, New South Wales.

Aspidiotus acaciæ, Morgan, var. **propinqua**.

On *Acacia* sp. at Mount Victoria, New South Wales, occurs an insect very near to *A. acaciæ*, differing only in the deeper

red colour of the pellicles, and in the fact that the puparium is almost always very brittle, falling off in the centre, and leaving only a ring with the pellicles exposed. Mr. Olliff has sent me the same insect on *Hakea saligna*, Sydney.

Mr. Morgan did not describe the male of his species. I have the male of var. *propinqua*, which is dark-red, pupating under a white elliptical non-carinated puparium. Length of the insect, exclusive of the spike, about $\frac{1}{50}$ in. The feet are rather thick; the ten-jointed antenna is normal.

Aspidiotus aurantii, Maskell. N.Z. Trans., 1878, p. 199.
Asp. coccineus (Gennad.), Maskell; Scale-Ins. of N.Z., p. 42.

This species is not confined to the orange. I have received it from Australia on *Eucalyptus*, on pear and plum, and on *Laurus nobilis* and *Buxus sempervirens*. Mr. Cockerell has sent me specimens from Jamaica on *Lignum vitæ*, and informs me that in that island it does not seem to attack *citrus* trees. Mr. D. W. Coquillett states that in California it is found on many plants, the most important of which seem to be rose, pear, grape, and *Eucalyptus*.

In my experience the puparia of *A. aurantii* differ slightly according to the food-plant. On orange and lemon there is a rich, fat, juicy appearance about the puparium, which is reddish-brown. On *Eucalyptus*, *Laurus*, *Buxus*, and *Lignum vitæ* the puparia are lighter-coloured and more solid. Mr. Coquillett, who, like all the American observers, refers to the species as the "red scale," mentions (U.S. Dept. of Agric. Entom. Bulletin No. 23, p. 36, 1891) an insect to which he gives the name "yellow scale (*Aspidiotus citrinus*)" occurring on orange-trees in California. I do not know where the description of this species is to be found, or in what the species differs from *A. aurantii*.

Aspidiotus eucalypti, Maskell. Trans. Roy. Soc. South Australia, 1887-88, p. 102. Plate XI., figs. 1, 2.

I have received specimens of this species from New South Wales (Mr. Koebele) on *Casuarina* sp. Although the puparia were covered with much black fungus, the characteristic deep groove of the female insect was clearly present. I regret that in the illustration of this insect in the South Australian Transactions (pl. xii., fig. 1d) this feature is not properly shown, and I have thought it well to give a fresh figure with this paper. A similar groove, though deeper, occurs in *A. articulatus*, Morgan, 1889; but that species differs sufficiently in other respects.

The epidermis of *A. eucalypti* is very distinctly marked with great numbers of minute lines which resemble closely

the marks made on paper by the wetted human finger-tip. In many *Aspidioti* the abdominal segment presents a sort of velvety appearance, from very faint and numerous fine striæ which may be detected upon it; but I do not know any species which exhibits all over the body such conspicuous striations as in *A. eucalypti*, with the exception perhaps of *A. theæ*, as noticed presently.

Aspidiotus rossi (Crawford), Maskell. N.Z. Trans., vol. xxiv., 1891, p. 11.

Mr. Tepper informs me that the specific name of this insect was given by Mr. Crawford in honour of Sir A. Ross, Speaker of the House of Assembly, Adelaide, who first collected it. I have received specimens from Mr. Olliff on *Xanthorrhæa*.

Aspidiotus subrubescens, Maskell. N.Z. Trans., vol. xxiv., 1891, p. 9.

The adult male of this species does not present any remarkable features, except that a fair proportion of the specimens which I have examined this year have been apterous. I have preserved a specimen of the male pupa which shows in a very interesting manner the transformation of the insect. The general form is elongated-oval, with a projection at the posterior extremity simulating the abdominal segment and pygidium of the female; at the cephalic end a commencement may be detected of the separation of the head from the thorax, and at the sides the rudiments of wings can also be made out; the eyes are distinctly being formed: but there is not yet any trace of antennæ or feet; and in the middle the larval rostrum still remains attached.

These male specimens were sent by Mr. Koebele, on *Banksia* sp., Sydney.

Aspidiotus theæ, Maskell. Indian Museum Notes, vol. ii., 1891, p. 59. Plate XI., fig. 3.

I give a figure illustrative of the "lattice-work" pattern visible on the dorsal abdominal surface of this insect; the smaller spaces making up the whole patch may differ slightly in arrangement in various specimens.

This insect exhibits conspicuous fine transverse striations of the epidermis, as in *A. eucalypti*. Also, in many specimens, though not in all which I have seen, there is a deepish groove nearer to the cephalic than to the abdominal extremity: as this is not absolutely constant I did not include it in the specific characters.

Genus DIASPIS, Costa.

Diaspis pinnulifera, Maskell. N.Z. Trans., vol. xxiii., 1890, p. 4.

Mr. J. W. Douglas has sent me some insects, clearly belonging to this species, on *Croton* sp., from Demerara. They agree closely with my specimens from Fiji in the very small number of orifices in the groups of spinnerets, and in the two feathery processes on the abdominal margin immediately beyond the lobes.

Diaspis (?) **fimbriata**, sp. nov. Plate XI., figs. 4-6.

Female puparium circular, flat, very thin and papery, whitish or grey or brownish; pellicles subcentral, yellow or greenish. Diameter of puparium averaging about $\frac{1}{13}$ in.

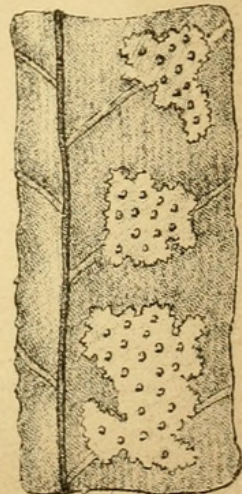
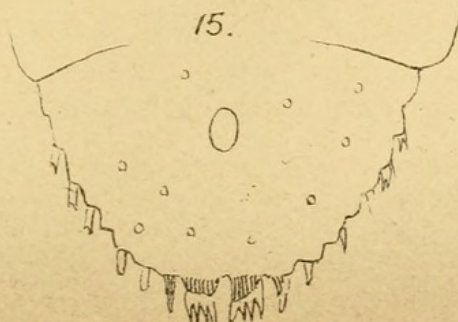
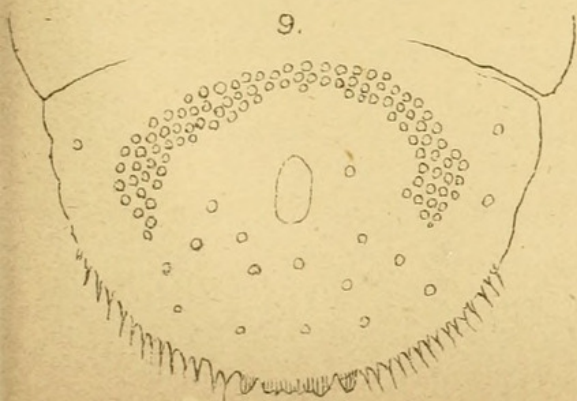
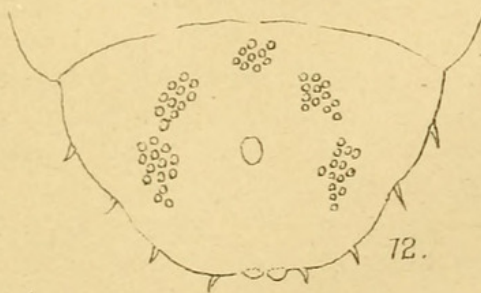
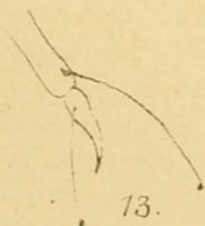
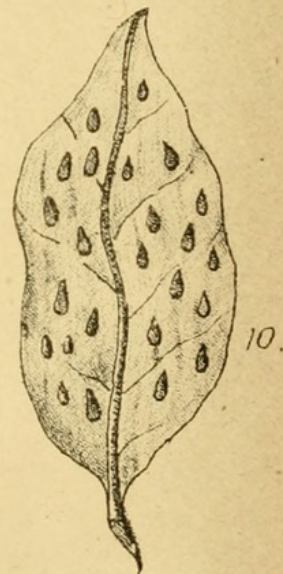
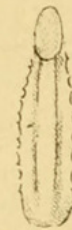
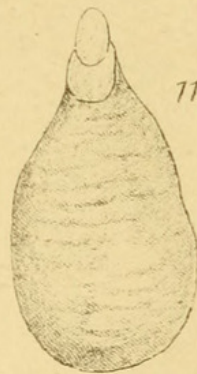
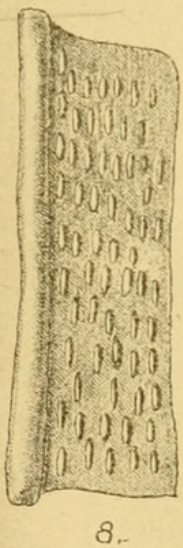
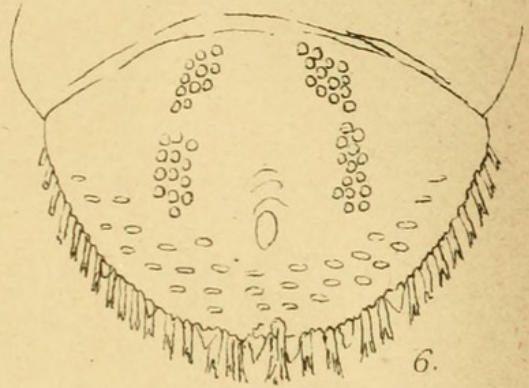
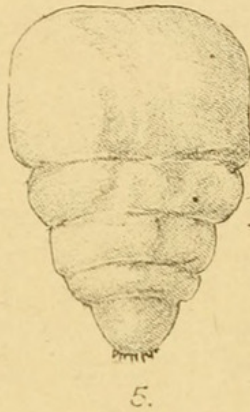
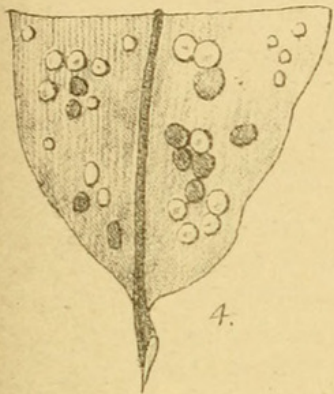
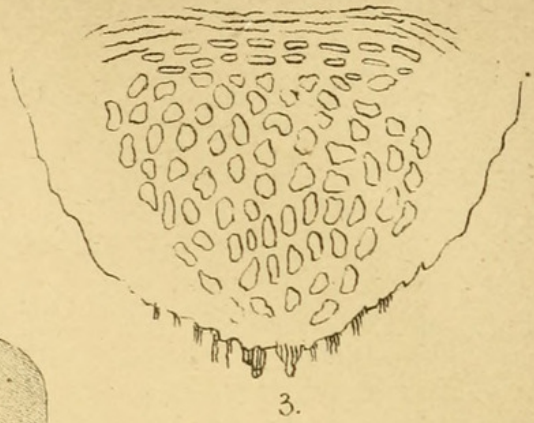
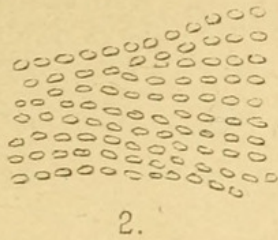
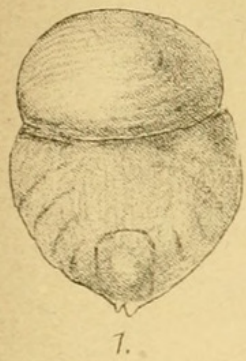
Male puparium unknown.

Adult female yellow, elongated; the cephalic region rather large, separated from the rest by a distinct groove; the abdominal segments tapering posteriorly, and conspicuously segmented. Length of female, about $\frac{1}{17}$ in. Abdomen ending in six small lobes, not adjacent, the two median ones being rather larger than the rest. Margin of abdomen without any median depression, minutely crenulated, and bearing conspicuous broad, scaly hairs with serrated extremities, forming a fringe; two of these are between the median lobes, two on each side between the median and the next lobes, three between the second and third lobes, and about ten beyond. Between the fringe and the last distinct abdominal segment there are a few spines. The pygidium exhibits four groups of spinnerets; in each group there are from ten to fourteen orifices; a large number of single spinnerets.

Adult male unknown.

Hab. In Australia, on *Eugenia smithii*. My specimens were sent by Mr. Koebele from Sydney.

I believe that this insect is here correctly assigned to the genus *Diaspis*, although, in the absence of the male puparium, I do not positively assert it. I know of no *Aspidiotus* which has such an elongated form; and, indeed, the insect in its general shape resembles very much *Diaspis rosæ*, Sandberg, though it differs entirely from that species not only in colour, but principally in the absence of a medial terminal depression, in the six abdominal lobes, and in the scaly fringe. As for *Parlatoria*, the case is different, and the fringe might possibly make it approach that genus. But here, again, the form is much more elongated than that of any *Parlatoria* known to me. *P. proteus*, Curtis, varies somewhat, but never seems to get beyond an oval form, and all the specimens which I have seen of it agree with Signoret's statement that it is "widest pos-



W. M. M. del^t ad nat.

COCCIDIDÆ.

A. K. lith.

teriorly"; whereas *D. fimbriata*, like *D. rosæ*, tapers posteriorly. Further, in *Parlatoria* the fringe extends not only over all the pygidial region, but also to the anterior abdominal segments, while in *D. fimbriata* it is very short. I observe, also, that in Löw's description of *D. visci*, Schrank (according to Comstock, Second Cornell Report, 1883), the scaly hairs in that species are "unusually numerous—seventeen on one side and twenty on the other": evidently a terminal fringe. I must remark that no species of *Diaspis* hitherto described has less than five groups of spinnerets, except *D. zamiae*, Morgan (Ent. Mo. Mag., Feb., 1890), which has none at all. *Parlatoria* appears to have always four. On the whole, I shall leave this insect at present in the genus *Diaspis*, subject to future correction.

Genus MYTILASPIS, Targioni-Tozzetti.

Mytilaspis casuarinæ, sp. nov. Plate XI., fig. 7.

Female puparium snowy-white, convex, elongated, narrow; length, about $\frac{1}{11}$ in. Pellicles terminal, orange-red.

Male puparium narrow, elongated, flatter than that of the female, but with no sign of carination; colour greyish, pellicle yellow. Length about $\frac{1}{20}$ in.

Adult female brown, elongated; length about $\frac{1}{20}$ in. before gestation. Abdomen exhibiting a median depression, the median lobes being represented by thickening of the margin; margin on each side much crenulated, and bearing four or five short hairs far apart. The spinnerets are very numerous, both single and in groups; but I have not been able to make out clearly whether there are five groups or an arch.

Adult male unknown.

Hab. In Australia, on *Casuarina* sp. Specimens from Mr. Koebele.

The non-carinated male puparium separates this species from *Chionaspis*, and the absence of a terminal fringe from *Leucaspis*.

Genus LEUCASPIS, Targioni-Tozzetti.

This genus resembles *Mytilaspis* very closely as far as the form of the puparium is concerned, and the only distinguishing character of the female insect is the presence of a fringe of spines on the abdominal extremity. As a similar fringe is considered sufficient to separate *Parlatoria* from *Aspidiotus*, I presume that it must be sufficient also in this case, and I shall not attempt to disturb Targioni's arrangement.

Leucaspis cordylinidis, sp. nov. Plate XI., figs. 8, 9.

Female puparium rather convex, narrow, elongated, and straight; colour white; pellicles terminal, small, greenish-

brown. Length of puparium about $\frac{1}{13}$ in. Frequently covering the leaves of the plant in immense numbers.

Male puparium similar, but smaller.

Adult female brown, elongated; length about $\frac{1}{25}$ in. Abdomen ending in a single median lobe, which is broader than long, and minutely crenulated on the posterior edge; at each side of this are two small conical lobules. Margin of abdomen divided into numerous minute teeth, some of which have single points, while others appear to be double; all bear short hairs, forming a fringe. Spinnerets in a continuous arch with very numerous orifices (more than a hundred); and some scattered single circular spinnerets.

Adult male unknown.

Hab. In Australia, on *Cordyline* sp. Mr. Olliff has sent me specimens from Sydney.

The only other Diaspid exhibiting a broad median terminal lobe is, I think, *Chionaspis quercus*, Comstock (Agric. Rept., 1880, p. 319). The two European species of *Leucaspis*, *L. signoreti* and *L. pini*, have no terminal lobes at all. This Australian insect is not to be confounded with *Mytilaspis cordylinidis*, Mask., a New Zealand species, which it resembles somewhat in outward appearance. Not only do the greenish-brown pellicles distinguish it, but also the abdominal extremity of the female. The male puparium of *Fiorinia stricta*, Mask., is also similar in outward appearance, but of course the female of that species is entirely distinct.

Genus CHIONASPIS, Signoret.

Chionaspis brasiliensis, Signoret. Essai, p. 126. Plate XI., figs. 10–13.

Female puparium reddish-brown, flat, thin, broadly pyriform; length about $\frac{1}{20}$ in. Pellicles terminal, yellowish-brown, small in comparison with the rest of the puparium.

Male puparium white, narrow, very distinctly carinated, much smaller than that of the female; length three or four times the breadth.

Adult female brown, distinctly segmented, the two last distinct abdominal segments bearing a few spiny hairs. Abdomen ending in two very minute and inconspicuous lobes; the margin is crenulated, and bears at each side three or four spines. Five groups of spinnerets; upper group with 6 to 10 orifices, lateral groups with 14 to 20.

Adult male very small, yellow; length, exclusive of the spike, about $\frac{1}{60}$ in.; the spike is about as long as the abdomen. Antennæ of ten joints, with longish hairs. Feet also rather pubescent; there seem to be only two digitules, one on the claw and one on the tarsus.

Hab. In Australia, on *Orchid* sp., Tweed River; specimens sent by Mr. Koebele and Mr. Olliff. In Ceylon, on "cultivated fern"; specimens from Mr. E. E. Green, through the Indian Museum, Calcutta.

The resemblance between this and Signoret's species is so close that I do not hesitate to identify it as such. The characteristic features of the female are the reddish-brown puparium, the extreme smallness of the two abdominal lobes and the smallness of the pellicles. The male (now for the first time discovered) is remarkable for its small size and for the two digitules of the foot: I am obliged to Mr. Green for drawing my attention to this character. The species is very near to *C. theæ*, Mask. (Indian Museum Notes, vol. ii., p. 60), differing chiefly by the greater proportional length and more solid texture of the male puparium.

Chionaspis citri, Comstock. 2nd Cornell Report, 1883, p. 100. Maskell, N.Z. Trans., vol. xvii., 1884, p. 23.

Mr. Koebele brought to me from the Island of Tonga, South Pacific, some twigs of *Citrus* thickly covered with this species. I had already reported it as occurring in New Zealand. I observe that the aborted antennæ of the adult female of *C. citri* are rather more conspicuous than in other *Diaspidina*, and each of them bears two rather strong, curved, short setæ. The "ridge" on the puparium mentioned by Comstock is not well marked in these Tongan specimens; nevertheless, as the pygidium of the female (a much more important character) is identical, I do not hesitate as to the species. Mr. Olliff has sent me a twig of "mandarin orange" from Sydney covered with hundreds of males and a much smaller number of females; and in these last the ridge is conspicuous.

Chionaspis eugeniæ, Maskell. N.Z. Trans., vol. xxiv., 1891, p. 14.

I have received from Mr. French some insects which I consider as only a variety of this species. They resemble the type in all characters, except that the abdominal margin bears more spines—seven or eight at each side instead of four, and in one specimen examined ten on each side. Possibly also the pellicles are of a deeper orange colour, but that is of no importance.

Hab. On *Eucalyptus*, var. sp., Goulburn, Victoria.

Genus **FIORINIA**, Targioni-Tozzetti.

Fiorinia camelliæ, Comstock, 1880. *Uhleria camelliæ*, Comstock, 1883.

I reported this insect last year (vol. xxiv., p. 16) as occurring on palms in Australia. Since then I have obtained

several males, and subjoin their description, which is not given by Comstock.

Male puparium white, narrow, flattish, indistinctly carinated; length about $\frac{1}{30}$ in.

Adult male yellow, of the normal Diaspid form; length of body about $\frac{1}{50}$ in. Antennæ of ten joints. The abdominal spike is almost as long as the body of the insect.

My specimens are from Mr. Koebele, on palm, Australia, and also on *Leptospermum* sp., growing apparently close to the palms.

Fiorinia syncarpia, sp. nov. Plate XI., figs. 14, 15.

Females not excreting any definite and separate puparium, but congregated in numbers under a general mass of thin, whitish, curling, cottony threads, in which the yellow oval pellicles appear scattered. The two pellicles form an elliptical, somewhat convex, scale; length of second pellicle about $\frac{1}{50}$ in. When viewed by transmitted light it is seen that at each end of the oval scale there are antennæ and a rostrum; it would seem, therefore, that in the metamorphosis from the larval stage the insect becomes reversed, and also that the second-stage female preserves her antennæ. No abdominal lobes are to be made out on the second pellicle.

Male puparium rather more definitely formed than that of the female; form subcircular, flattish, consisting of loose white cottony fibres; average diameter about $\frac{1}{30}$ in. Pellicle of larva central, yellow.

Adult female brownish-yellow, elongated; length about $\frac{1}{70}$ in. Abdominal margin deeply serrated and irregular, terminating in two conspicuous median lobes separated by a depression, with one smaller lobe on each side. The median lobes are prolonged into scaly processes with deeply-serrated extremities, and on the other lobes, and here and there on the margin, are smaller similar scales, and also a few spiny hairs; the whole abdominal region has thus a very irregular and jagged outline. No groups of spinnerets, but a few scattered single ones. The rostral setæ are very long, and consist of six separate tubes.

Male pupa elongated-oval, the abdomen terminating in two median rectangular lobes with foliated extremities, and one very small lobule at each side; several scaly hairs on the margin. Towards the end of the pupal stage the rudimentary eyes, antennæ, and wings may be detected in process of formation.

Adult male brown, presenting no special features; length of body about $\frac{1}{40}$ in. The abdominal spike is rather more than half as long as the body.

Hab. In Australia, on *Syncarpia laurifolia*. Sent by Mr. Koebele.

I attach this insect to the genus *Fiorinia* because the second female pellicle is so much larger than the adult; at the same time, if the female puparium is to be considered as probably similar to that of the male, or subcircular, it would rather be an *Aonidia*. It presents some curious characters, notably the "double-ended" pellicles and the peculiar abdominal extremity of the female, and the loose cottony threads in which the insect lives, instead of under a puparium. I do not know any other species which exhibits so many tubes in the rostral setæ.

Genus PARLATORIA, Targioni-Tozzetti.

Parlatoria proteus, Curtis.

This species occurs plentifully on some twigs of apple sent to me from Brisbane, Queensland, by Mr. Koebele. Although there is much difficulty in separating the species of this genus, yet I think my identifications are correct, as I have made careful comparison of all those hitherto described. *Parlatoria* appears to be chiefly found in hot countries—at least, out-of-doors, the insects belonging to it in cold climates being always mentioned as under glass or on tropical plants.

Group LECANIDINÆ.

Subdivision LECANODIASPIDÆ.

Genus INGLISIA, Maskell.

Inglisia foraminifer, sp. nov. Plate XII., figs. 1-5.

Test of adult female very convex, elliptical; reddish-brown at the base, fading to yellowish towards the apex; glassy and brittle; conspicuously striated from apex to base with air-cells; length averaging $\frac{1}{13}$ in., but one specimen seen reached $\frac{1}{8}$ in. A slightly-elevated ridge runs longitudinally from each end, widening a little towards the apex, where there is a deep transverse depression, with often an orifice at the centre through which the body of the insect can be seen. Frequently the interrupted median ends of the ridge project slightly over this depression. The test is very apt to split in two along the line of the longitudinal ridge. There is often visible a whitish fringe of short irregularly-semicircular segments, not set close together, along the basal margin, but this fringe is by no means constant.

Test of male glassy, yellow, convex, brittle; form irregularly elliptical, tapering slightly posteriorly, but cut off rather abruptly at the abdominal extremity by a flat hinged plate which the insect lifts up for egress. The apex consists of a subrectangular region, which is sometimes smooth, sometimes

transversely striated, and separated by a shallow depression from the sides, which are conspicuously striated to the base. Length of test about $\frac{1}{17}$ in.

Adult female filling the test. Colour a rich dark-brown, fading to orange towards the edges. At gestation the under-surface becomes concave. On the dorsal region there is a central depression corresponding with that of the test, and a longitudinal ridge whose median ends project over the depression. Antennæ, thick, conical, with six short joints, the first and sixth being rather longer than the others. Feet very small and inconspicuous, almost atrophied, the femur, tibia, and tarsus apparently confused, with a very small short claw. Mentum doubtfully dimerous. Along the basal margin is a row of short thick conical spines, with four rather longer spines opposite the thoracic spiracles; and a similar row of short spines runs longitudinally along the middle of the dorsum. Abdominal cleft conspicuous; the lobes large, acuminate, setiferous; anogenital ring with many hairs.

Larva not observed; but under some of the females were eggshells, so that the insect is probably not viviparous.

Adult male unknown.

Hab. In Australia, on *Santalum acuminatum*. Mr. Tepper has sent me a number of specimens from Semaphore, near Adelaide.

This is an extremely pretty little species, and the forms and colours of the male and female tests are very elegant. It is the first of the genus which I have had from anywhere outside New Zealand; the Lecanid characters and the glassy striated test fix its position quite clearly. I am unable to conjecture what may be the meaning or use of the peculiar depression both in the female insect itself and in the test; the male test shows no sign of it, but the depression is constant in all the females observed—perhaps nearly a hundred.

Genus CEROPLASTES, Gray.

Female insects covered with waxy tests, which present, in the adult state, no radiating marginal processes or marginal fringe, but exhibiting in the earlier stages tuberosities or projections which usually coalesce at maturity.

Male unknown.

Ceroplastes rubens, sp. nov. Plate XII., figs. 6–10.

Test of adult female waxy, rather thick, dull-red or pinkish throughout; form subcircular, quite flat beneath, with an orifice for attachment to the plant, the upper surface with irregular sloping sides and flattish top, in the centre of which there is sometimes a minute indistinct orifice; from the orifice very faint lines may be made out in some specimens, radiating

to the margin; and the lateral irregularities may sometimes be resolved into seven or eight indistinct tuberosities. Diameter of test variable: specimens observed range from $\frac{1}{11}$ in. to $\frac{1}{4}$ in.

The test of the second stage appears to be similar to that of the adult, but smaller; it is very difficult to make out the lateral tuberosities, which sometimes seem to be only five.

Test of the larva in its latest period before the first metamorphosis whitish, waxy, stelliform, having usually eight lateral radiating processes and a dorsal convex mass of wax: average length of the whole about $\frac{1}{40}$ in.

Adult female extracted from the test yellowish-brown or dark-brown; subcircular, convex above and concave beneath; form normally *Lecanid*; anal cleft small, lobes triangular, each bearing a short seta; anal ring with six strong hairs. At the cephalic extremity there is a dorsal elevation or tuberosity, which bears several small subconical papillæ. Antennæ of six joints, of which the third is much the longest. Feet nearly atrophied, short, thick; tarsus very short, claw small, digitules slender knobbed hairs. Rostrum rather large; mentum monomerous. On the margin, near the four spiracles, is on each side a patch containing one large thick conical spine and about twenty other smaller ones. Dorsal epidermis bearing some small circular spinneret-orifices.

Larva dark-yellow, flattish, elongated, distinctly *Lecanid*. Eyes large, brown. Antennæ of apparently six joints, but the fourth and fifth are not easily separable. Length of insect in this stage about $\frac{1}{80}$ in. at first, increasing to about $\frac{1}{50}$ in. with age.

Male unknown.

Hab. On *Mangifera indica* (mango), and on *Ficus* (*F. macrophylla* ?), the Moreton Bay fig, Brisbane, Australia. Mr. Koebele sent me several specimens.

I have ventured to consider this as a new species, although I am not sure that it is not at least closely allied to *C. myricæ*, Linn., a species originally from the Cape of Good Hope on *Myrica cerifera*; and, indeed, my first idea was to attach it to that species, the latest description of which (as far as I know) is given by Fabricius (Ent. Syst., 1794, iv., 227). But, after careful consideration, I find that *C. myricæ* is not only white in colour towards the edges (the centre being reddish), but also convex—"vertice obtuse acuminatus"—and that the margin bears seven distinct tuberosities. The flat vertex and agglomerated margin of *C. rubens* do not answer to such a description, and I therefore place it as a separate species, subject of course to future correction.

The wax of *C. rubens* dissolves readily in potash: on cooling it recoalesces, and I have always found it lose its red colour and become white.

Ceroplastes ceriferus, Anderson. Plate XII., figs. 11–16.

Test of adult female white or yellowish-white, waxy, convex, thick; frequently agglomerated in large masses covering the twigs of the food-plant. Separate individuals may range in size from $\frac{1}{5}$ in. to $\frac{1}{2}$ in. Marginal tuberosities not distinguishable, though the margin is sometimes slightly flattened and irregular. The apex of the test is sometimes produced in a short pointed horn, not erect, but bent over the test. The wax is rather soft and greasy.

Test of the second stage slightly convex, elliptical; colour greyish-white; median dorsal region usually smooth, separated by a shallow depression from the marginal region, which exhibits eight tuberosities, three on each side and two terminal. Average length of test about $\frac{1}{7}$ in.

Adult female brown, very convex, elliptical, hollow beneath. Form Lecanid; but the anal cleft and lobes are not easily made out, being contained in a conspicuous cylindrical "tail," or prolongation of the abdomen. Antennæ of six joints, of which the third is much the longest. Feet rather thick, but not at all atrophied; tibia scarcely longer than the tarsus; upper, or tarsal, digitules slender knobbed hairs, lower pair on the claw rather long, thick, and expanded at the end. Rostrum rather large; mentum doubtfully dimerous. Near the spiracles, on each margin, is a group containing eight large conical spines and about twenty-four smaller ones. Epidermis bearing many circular spinneret-orifices. When the "tail" is subjected to the action of potash and subsequent pressure it is seen to contain at its extremity the abdominal lobes and the anogenital ring, which has six rather strong hairs.

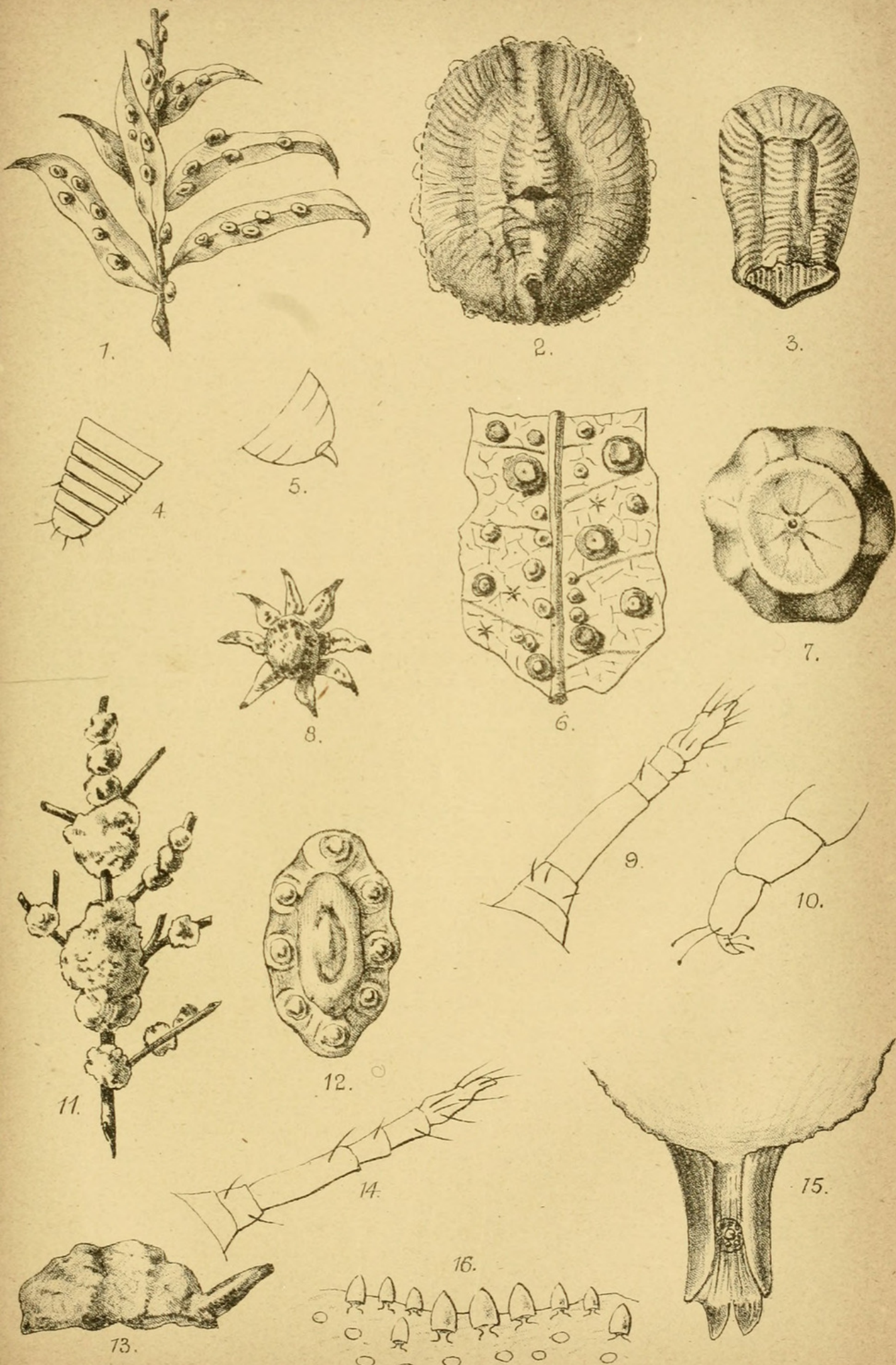
Female of the second stage brown, elliptical, slightly convex. Form Lecanid, exhibiting the normal cleft and lobes; there is no "tail," but the region surrounding the lobes is thickened. Antennæ and feet as in the adult, but the feet are more slender. The margin bears a row of fine spiny hairs, and four spiracular groups of large conical spines. There are many small circular spinnerets on the epidermis.

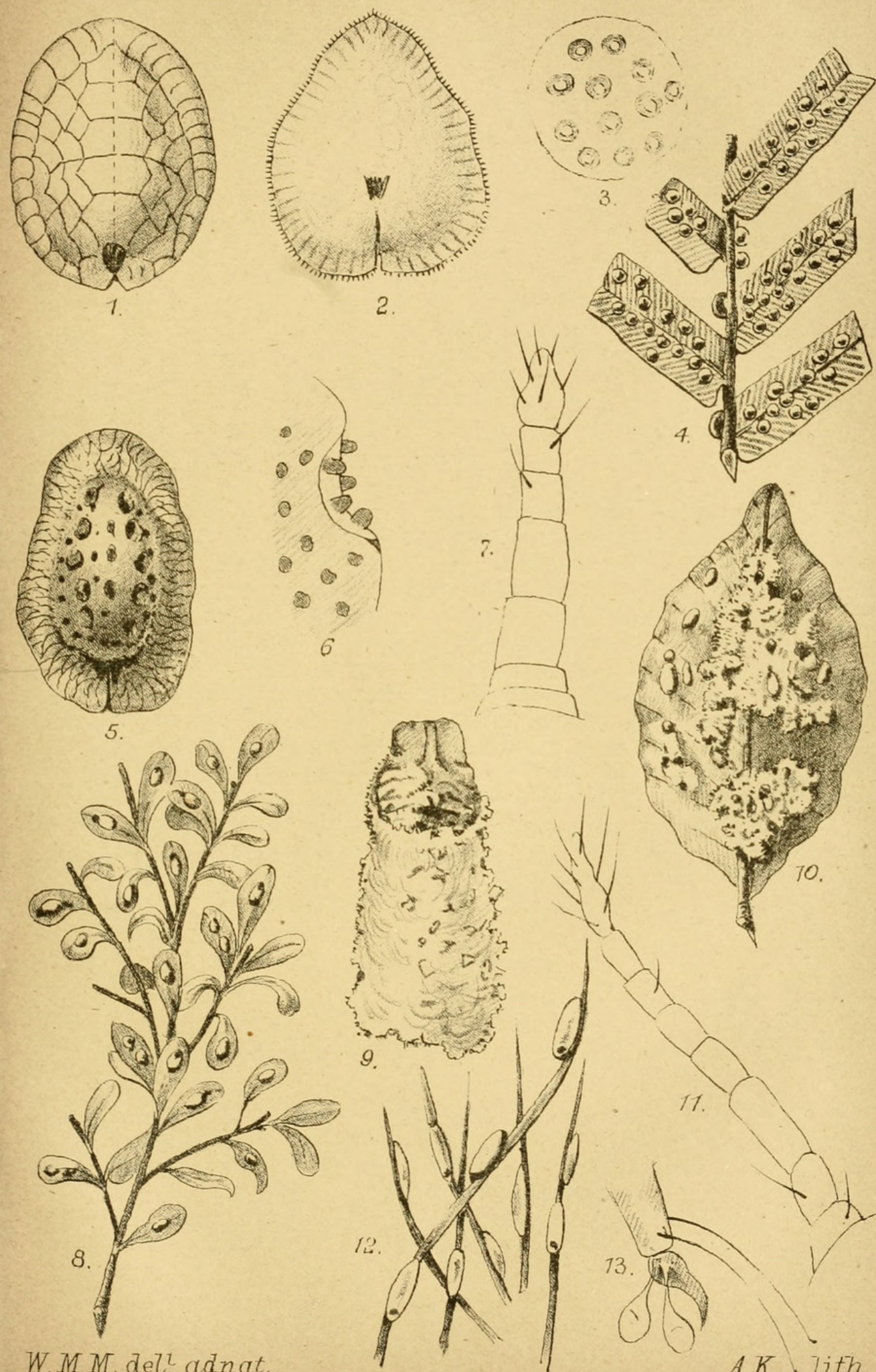
Larva yellow, elliptical, flattish; length about $\frac{1}{10}$ in. Form normally Lecanid, the anal lobes bearing long setæ. Antennæ thick, with six rather confused joints.

Male unknown.

Hab. In Australia, on *Melaleuca hypericifolia*, *Myrica cerifera*, and other plants; in India, on *Celastrus ceriferus*, and on the Assam tea-plant, Kangra Valley. My Australian specimens were sent to me by Mr. Koebele and Mr. Olliff; the Indian ones are from Mr. Cotes.

I have given a detailed description here of this insect





W. M. M. del. adnat.

COCCIDIDÆ.

A. K. lith.

because, although it was first made known by Dr. Anderson in 1790–91, and mentioned since that time by several writers—including Westwood, 1853, and Signoret, 1872—all of these appear to have confined their attention to the waxy tests, and I am not aware that the insect itself has ever yet been fully described. Signoret merely says that it is subglobular, and slightly prolonged posteriorly. Fourteen species of *Ceroplastes* from different countries have received names, but probably several of these are really identical: *e.g.*, *C. chilensis*, Gray, and *C. vinsonii*, Sign., and others, may all be really *C. ceriferus*. The only species in which the adult females have been reported hitherto as exhibiting a prolongation of the abdomen are *C. ceriferus*, *C. psidii*, Chav., *C. cassiæ*, Chav., *C. fairmairei*, Sign., and *C. cirripediformis*, Comstock (an American insect), and all these also have nearly similar conical spiracular spines. I am not sure whether all the last-named species may be really distinct or not.

Mr. Cotes, in the "Indian Museum Notes," vol. ii., No. 3, 1891, gives an excellent account of the wax of this species, and seems to think that the insect is not very common in India. It may, however, be an inhabitant of many tropical or subtropical countries. From Mr. Cotes's account I gather that the wax is not likely to have much commercial value, even if it could be produced in large quantities.

Since writing the foregoing I have more carefully studied Signoret's description of *C. fairmairei*, Targioni (1858), a species from Montevideo, and also his figures, especially of the spiracular spines, and I have come to the conclusion that this species is identical with *C. ceriferus*. The dermal spots and markings shown in Signoret's plate ix., fig. 7, may be faintly detected in some of my Australian insects—early adults—and the other characters also agree. On the whole it seems probable that several species of *Ceroplastes* may be considered as synonyms of Anderson's insect, which was first described in 1791.

Subdivision LECANIDÆ.

Genus LECANIUM, Illiger.

Lecanium baccatum, Maskell. N.Z. Trans., vol. xxiv., 1891, p. 20.

Mr. J. G. O. Tepper, in a letter to me, says, "In South Australia these insects in a young state, yet nearly full-grown, are always of a pure bluish-white, which with advancing age becomes yellowish. The species, though not exactly rare, has been always local, and the various colonies, affecting a single branch or bush, are usually at considerable distances apart."

Lecanium hesperidum, auctorum.

Mr. Douglas and Mr. Newstead, in the Ent. Mo. Magazine for September, 1891, p. 244, make some observations regarding this species and its distinction from *L. lauri*, Boissduval. They give a comparison between the two, based on certain differences observed in the feet, for, as they remark, "the antennæ in both kinds do not appreciably differ." Dr. Signoret (Essai, p. 230) expressed doubts whether the two were not really identical, but the conclusion of Messrs. Douglas and Newstead is that the characters of the feet are sufficiently distinct to separate the two species.

In one of the numbers of "Insect Life" (I cannot just now mention the particular number) Professor Riley asked the question whether the true *L. hesperidum* exists in New Zealand. The question only came in incidentally, if I recollect aright; but presumably its meaning was that probably our New Zealand form might be *L. lauri*; and, considering that it occurs here upon a large number of plants, notably ivy, holly, and the different kinds of *Laurus*, and that citrus trees are uncommon in the colony except in the North, the question was a very natural one.

Mr. Koebele sent to me from Sydney, early in the present year, some leaves of orange infested by a scale very closely resembling *L. hesperidum*, but larger and lighter-coloured than our New Zealand form; and Mr. Olliff later on sent twigs of the same plant infested by the same scale. I have taken the opportunity of comparing carefully the Australian and the New Zealand forms, and the result is that I am unable to establish a sufficient specific difference between *L. hesperidum* and *L. lauri*. I take no account of size or colour in the two—the rich juices of citrus naturally, as I think, induce the insects feeding thereon to be larger and handsomer than those on the hard food of holly or ivy—but I have confined myself to the characters of the feet. I find that the characters as tabulated by Mr. Newstead (Ent. Mo. Mag., Sept., 1891, p. 245) are indiscriminately noticeable both in my specimens (five) examined on citrus, and in the specimens (eight) examined on holly, laurel, &c. Thus, the Australian specimens have short tarsal digitules, two fine terminal tarsal hairs, two coxal hairs—characters of *L. lauri*; and one very long hair on the trochanter—a character of *L. hesperidum*. The New Zealand specimens have long tarsal digitules, a long trochanter hair, and coxa hairless—characters of *L. hesperidum*; and two terminal tarsal hairs—a character of *L. lauri*.

The conclusion, therefore, would seem to be that either *L. hesperidum* lives on laurel, ivy, holly, and other plants in New Zealand, whilst *L. lauri* attacks citrus in Australia—thus

reversing the European arrangement—or else the two species are identical. The latter alternative is that which induced me to report *L. hesperidum* alone in 1878 and 1887 in New Zealand, and which seems to me still to be correct.

Lecanium tessellatum, Signoret. Sign., Essai, p. 231. Plate XIII., fig. 1.

This insect, which, from its flatness and viviparous habit, belongs to Signoret's first series of the genus, is characterized especially by "a marquetry pattern on the epidermis, in which each separate section is unlike the one next to it, but quite similar to the similarly-situated section on the opposite side." Each side, therefore, of the body seems quite irregularly marked, but the two sides are symmetrical. The insect is reddish-brown, flat, rather acuminate anteriorly and broadly rounded posteriorly. The markings are not to be clearly made out until after treatment with reagents. Length about $\frac{1}{8}$ in.

Hab. In Australia, on *Laurus nobilis*, Sydney. My specimens are from Mr. Koebele. Signoret reports the insect as on palms in hothouses in Europe.

Lecanium acuminatum, Signoret. Sign., Essai, p. 227. Plate XIII., figs. 2, 3.

Adult female yellowish-brown, flat, acuminate at the cephalic extremity and very broadly rounded posteriorly. Length about $\frac{1}{8}$ in. Antennæ of seven joints, of which the fourth is the longest, the fifth and sixth the shortest. Tarsus about half as long as the tibia. The epidermis bears a large number of circular marks, each with a central clear space.

Female of second stage broadly elliptical, flat, yellowish; length about $\frac{1}{30}$ in. Antennæ of six joints.

Larva yellowish-brown, flat, broadly elliptical; length about $\frac{1}{80}$ in.

Male unknown.

Hab. In the Sandwich Islands, on guava (*Psidium* sp.). Sent by Mr. Koebele.

I do not doubt my identification of this species. Signoret (whose specimens were on hothouse orchids in Paris) does not mention the dermal markings.

Lecanium anthurii, Boisduval. Signoret, Essai, p. 265.

I have received from Mr. French specimens of an insect on *Asparagus* sp., Melbourne, which appear to me to belong to this species, which belongs to Signoret's fourth series, being very convex, with a dermal pattern of oval marks, not conjoined, and with a median clear space in each. The colour is brown. The original species occurred in Europe on a hothouse orchid.

Lecanium filicum, Boisduval. Signoret, Essai, p. 436. Plate XIII., fig. 4.

Adult female semiglobular, with a flattened margin; colour reddish-brown; diameter about $\frac{1}{13}$ in. Epidermis exhibiting regular oval markings. Antennæ of eight joints. Tarsus showing a distinct articulation with the tibia. Body frequently carinated.

Female of the second stage flattish, elongated-elliptical.

Larva yellowish, flat, elliptical. Length about $\frac{1}{70}$ in.

Hab. In Australia, on a fern, probably *Lomaria* sp., Tweed River. Sent by Mr. Koebele.

Signoret (and after him Douglas) separates this species from *L. hemisphæricum*, which it very closely resembles, by the carinations of the dorsum. I am not sure, however, that the distinction is quite satisfactory. The frond of fern which I received was covered with great numbers of individuals, and whilst some of them exhibited carinations others did not. It is not likely that the two species are mingled on the plant, and, as about half the specimens were not quite smooth, I have felt compelled to place them as *L. filicum*.

Lecanium depressum, Signoret. Sign., Essai, p. 269.

Adult female reddish-brown, darkening with age to nearly black; form elliptical, more or less convex; length variable from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. Antennæ of eight joints, of which the third is the longest. Feet rather long; tarsus almost as long as the tibia. Epidermis marked with many cells of irregular shape, closely conjoined and forming a "marquetry pattern"; in the middle of each cell is a small oval clear spot. At the very latest stage, when the insect is darkest in colour, the cells cannot be seen until after treatment with potash.

Female of the second stage light-brown, flattish, elliptical; length about $\frac{1}{16}$ in. Antennæ of six joints. Dorsum frequently, but not always, exhibiting one longitudinal and two transverse carinæ.

Larva brown, flat, elliptical; length about $\frac{1}{50}$ in. Antennæ of six joints.

Hab. In New Zealand, not common, on various greenhouse plants; in Australia, on *Hakea* sp., on "cultivated vine," and on an unnamed plant, Sydney and Tweed River; and in the Sandwich Islands, on *Psidium* (guava) and *Bambusa* (bamboo). Mr. Olliff sent it to me on *Hakea*; my other exotic specimens are from Mr. Koebele.

I reported this insect in New Zealand in 1878, and after examination, and comparison with the Australian and Sandwich Islands specimens, I have no doubt of its identity. Signoret was the first to describe it in detail, although Targioni had previously given it its name. In Signoret's description he

says that, whereas his specimens in hothouses at Paris exhibited dorsal carinæ, those from hothouses in Italy had dorsal depressions. It is clear that in this respect the insect varies, and the dorsal marquetry is really the distinguishing character of it. Targioni's name—*L. depressum*—must, of course, be retained, though the feature to which it refers is of no value. Mr. Douglas reports the species (Ent. Mo. Mag., 1887, p. 28) in England on *Ficus*. The second stage and larva have not been described hitherto.

Lecanium longulum, Douglas; *Lecanium chirimoliæ*, Maskell, 1889.

This insect occurs in the Sandwich Islands, and is there apparently common; for Mr. Koebele brought me thence several plants upon which I found it plentiful—e.g., *Psidium*, *Bambusa*, *Acacia*, *Citrus*, and several unnamed.

I mentioned in 1890 my conviction of the identity of this species with mine from Fiji; and comparison with these specimens from Honolulu confirms that opinion.

Lecanium scrobiculatum, sp. nov. Plate XIII., figs. 5–7.

Adult female brownish-yellow, elliptical; very convex in the median region and slightly flattened towards the margins, having thus a sort of dorsal "hump"; length about $\frac{1}{13}$ in. Epidermis rough, with a network of minute wrinkles on the flatter portions, forming small cell-like divisions; smoother on the dorsal convexity, but marked there with many very minute pit-like depressions. Antennæ of seven joints, of which the third and fourth are the longest, and about equal to each other. Feet rather thick; tarsus as long as the tibia; claw very small; all the digitules appear to be very short. On the margin of the body is a row of small spiny hairs, not set close together. At each of the four spiracular depressions of the margin is a chitinous semicircular band, which bears some short club-shaped spines. Abdominal cleft small; lobes large, conical, setiferous; anogenital ring with many hairs.

Female of the second stage yellow, elliptical, flattish, but with a raised median longitudinal ridge; length about $\frac{1}{18}$ in. Epidermis wrinkled as in the adult, but the pits on the median region are not noticeable. Antennæ of six slender joints; the third and fourth joints in the specimens observed were very long and thin. Feet normal. Spiracular spines long. A row of spiny hairs runs round the margin of the body.

Larva not observed.

Male pupa covered with a white, thin, glassy, elongated test, very shiny and brittle. Many of the specimens observed enclosed hymenopterous parasites, the pupæ of which, showing

through the nearly transparent test, made the latter look almost black. Length of test about $\frac{1}{18}$ in.

Adult male dark-orange or red in colour; length, exclusive of spike, about $\frac{1}{30}$ in. Antennæ of ten joints. Dorsal eyes four, ventral eyes two, ocelli two. Wings brightly iridescent, with strong red nervures. Abdominal spike rather thick at the base, slightly curved, and nearly as long as the abdomen.

Hab. In Australia, on *Acacia* sp., Whitton, New South Wales. Specimens from Mr. Koebele.

This insect belongs to Signoret's second series of the genus, being convex, with (at least, in the second stage) a dorsal longitudinal carina. I cannot identify it with any known species. The male, with its bright wings and their red nervures, is an elegant little insect.

Genus PULVINARIA, Targioni.

Pulvinaria dodonææ, sp. nov. Plate XIII., figs. 8, 9.

Adult female reddish-brown, darkening with age. Before gestation the form is regularly elliptical, flattish or slightly convex, and has the appearance of a full-grown *Lecanium*; as the white cottony ovisac is formed the insect shrivels, becoming corrugated and irregular in outline, and at the last appears only as a small brown speck at the end of the white cottony sac. The size therefore varies, some individuals observed before gestation reaching $\frac{1}{8}$ in., while the females after gestation average only $\frac{1}{20}$ in. The ovisac averages about $\frac{1}{9}$ in. in length, and is of the normal subcylindrical form. Antennæ of eight joints, of which the third is the longest, the last four the shortest and equal to each other. Feet rather long and slender; the tibia is about twice as long as the tarsus, which is slightly curved; the tibia is somewhat expanded at its end; lower digitules long and expanded, upper pair fine hairs. There is a row of spiny hairs round the margin of the body, set rather close together. Abdominal cleft narrow; lobes rather long; anogenital ring with several hairs. Mentum monomerous. Epidermis with great numbers of spinneret-orifices, principally on the abdominal region.

Female of the second stage regularly elliptical, very slightly convex, smooth; colour greenish-yellow; length about $\frac{1}{12}$ in. Antennæ of six joints. Feet as in the adult. This stage is frequently parasitized.

Larva yellowish-brown; flattish, elliptical; length about $\frac{1}{70}$ in. Antennæ of six joints, subequal except the last, which is a little longer, and bears some hairs of which two are rather long. Abdominal setæ long.

Male pupa covered with a white, glassy, elongated test, with sides and ends sloping, and the top covered with a flat

plate of secretion. Length of test about $\frac{1}{13}$ in. The insect escapes by lifting up the posterior end.

Adult male unknown.

Hab. In Australia, on *Dodonæa bursarifolia* and *Myoporum* sp. My specimens are from Mr. Tepper.

The variations in size and colour of this insect render it difficult to identify. Not only is the adult before gestation lighter in colour and much larger than the adult after gestation, but the greenish second stage is not at first sight much like either, and, indeed, has sometimes rather the appearance of some species of *Planchonia*. However, when a number of individuals are observed in which the commencement of the ovisac can be detected behind the large adults, and when the anatomical characters given above are constant in all stages, the adults and the younger individuals being all mingled together on the plant, it is evident that all are really the same species.

Pulvinaria psidii, sp. nov. Plate XIII., figs. 10, 11.

Adult female yellow, or yellowish-brown, sometimes with a greenish tinge; size variable, reaching $\frac{1}{12}$ in. before the ovisac is formed, but shrivelling at gestation. The ovisacs cover the twig or leaf with masses of dirty-white cotton, usually accompanied by black fungus. Antennæ rather long and slender, of eight joints, of which the third is the longest, the eighth next, the rest shorter and subequal. Feet also rather long; the trochanter is large and bears a very long hair; tarsus curved and about half as long as the tibia; upper digitules fine hairs, lower pair long and dilated at the end. Abdominal cleft moderate; anogenital ring with several hairs. The margin of the body bears a row of spiny hairs.

Female of the second stage yellow, flattish, elliptical; length about $\frac{1}{20}$ in. Antennæ of six joints.

Larva yellow, flat, elliptical. Antennæ of six joints.

Male unknown.

Hab. In the Sandwich Islands, on *Psidium* (guava). My specimens are from Mr. Koebele.

This species appears to differ in the feet and antennæ from any of those hitherto described. From the look of the twigs and leaves which have been furnished to me I should imagine that the insect must be rather damaging; at all events, the masses of greyish ovisacs are very unsightly.

Genus SIGNORETIA, Targioni.

Signoretia luzulæ, Dufour. Signoret, Essai, p. 181. Plate XIII., figs. 12, 13.

I have received from Mr. Olliff some specimens which I propose to attach to this species. The adult females are

yellowish-brown, enclosed in a narrow elongated convex sac of pure-white cotton so closely felted as to seem rather solid; and this sac is quite identical (except in size) with my type-specimens of *S. luzulæ* from Europe. In size it is about twice as large as the type, but I do not consider that as important. The enclosed female is, before gestation, of the normal length, about $\frac{1}{8}$ in.; but shrivels considerably at gestation. The antennæ have eight joints, of which the third and fourth are the longest. Signoret makes the fourth and fifth longer than the rest, but Mr. Newstead shows (Ent. Mo. Mag., May, 1892) that this is an error. The digitules of the claw are very large and widely dilated. The margin of the body bears some small spines, and the epidermis is covered with a great number of tubular spinnerets.

Hab. In Australia, on grass, Nevertire, New South Wales.

At first sight I thought that this would turn out to be a Dactylopid, probably *D. herbicola* or *D. graminis*, Mask.; but it is very clearly a Lecanid in all its characters. It would have been easy for me to erect it into a new species on the size of the sac and on some very minute differences which may be detected in the antennæ both of the adult and the larva; but I greatly prefer, wherever it is at all possible, to avoid the multiplication of species. Perhaps a character mentioned by Signoret, and apparent also in this Australian form, may also be conclusive as to the identity: it is that the sac has a small orifice at one end, which is closed by the body of the insect.

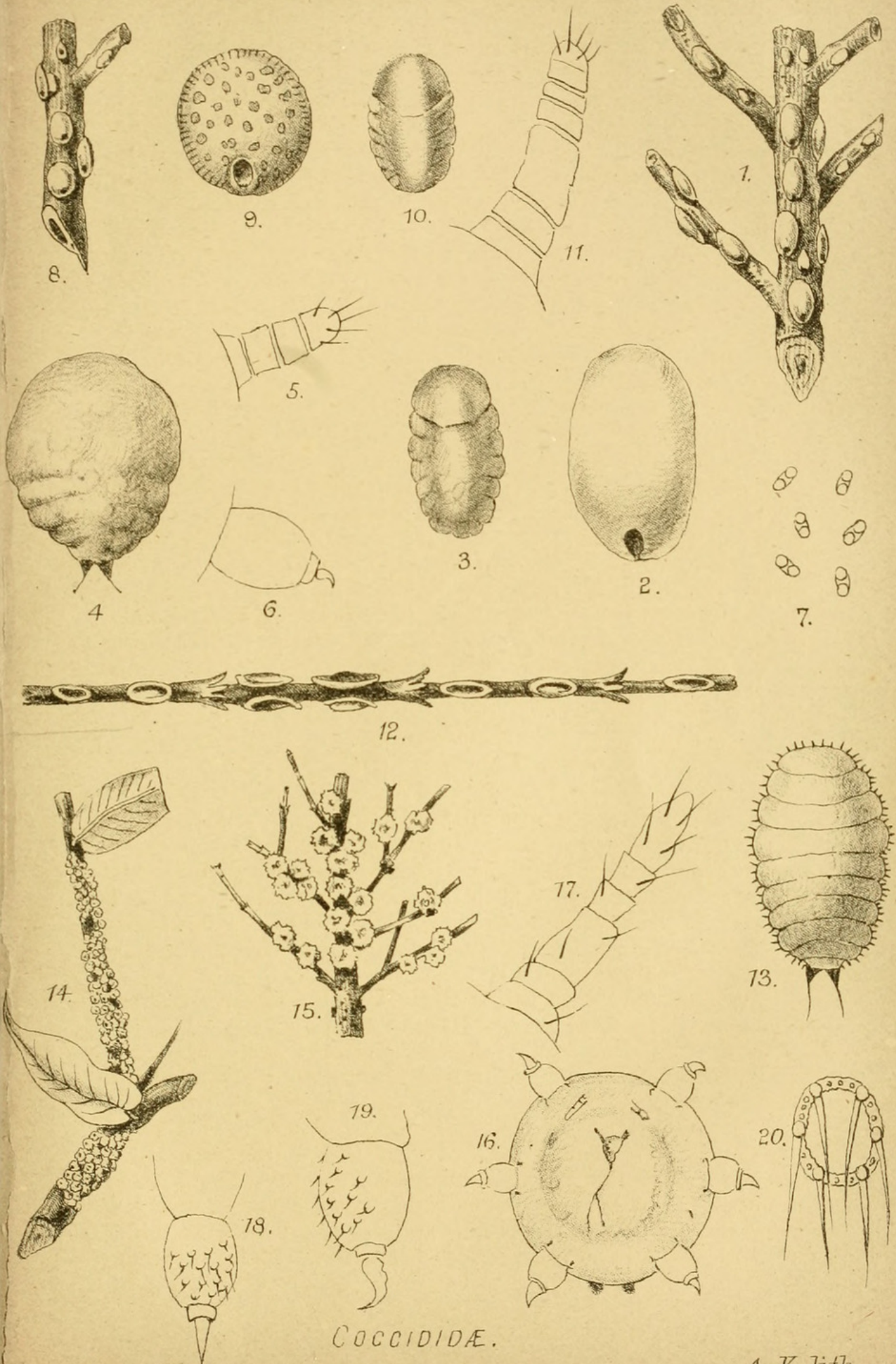
Genus PROSOPOPHORA, Douglas. Ent. Mo. Mag., Aug., 1892, p. 207.

Adult female covered with a test which is either waxy or so closely felted as to appear almost homogeneous. Margin of test without fringe. Antennæ of not more than eight joints. Anal tubercles present, but in the species observed very small. Anogenital ring with more than eight hairs. Feet usually atrophied. Mentum usually monomeric. There is generally a small terminal orifice in the test.

Male pupa covered with a test of similar material to that of the female; antennæ of adult with ten joints.

Larva exhibiting anal tubercles; abdomen not cleft.

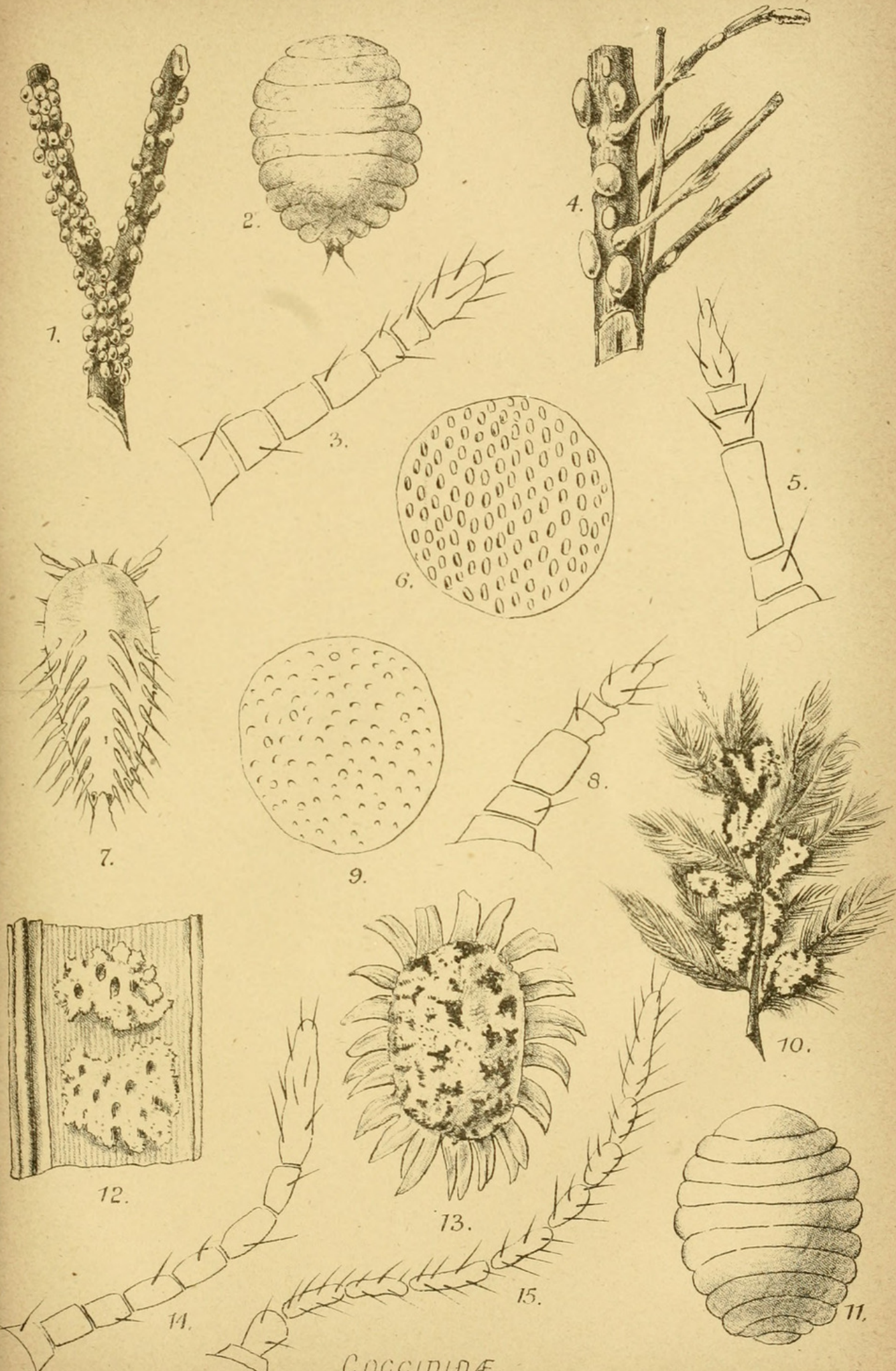
In the foregoing diagnosis I have somewhat extended and less definitely fixed some of the generic characters originally laid down by Mr. Douglas, in order to attach to this genus two Australian species which, with these alterations, will sufficiently agree with it. I have been in great doubt as to the genus to which they might belong, and, although in a few respects they approach *Planchonia*, yet in others they differ from it. If, on the other hand, I left Mr. Douglas's charac-



COCCIDIDÆ.

W. M. M. del^t ad nat.

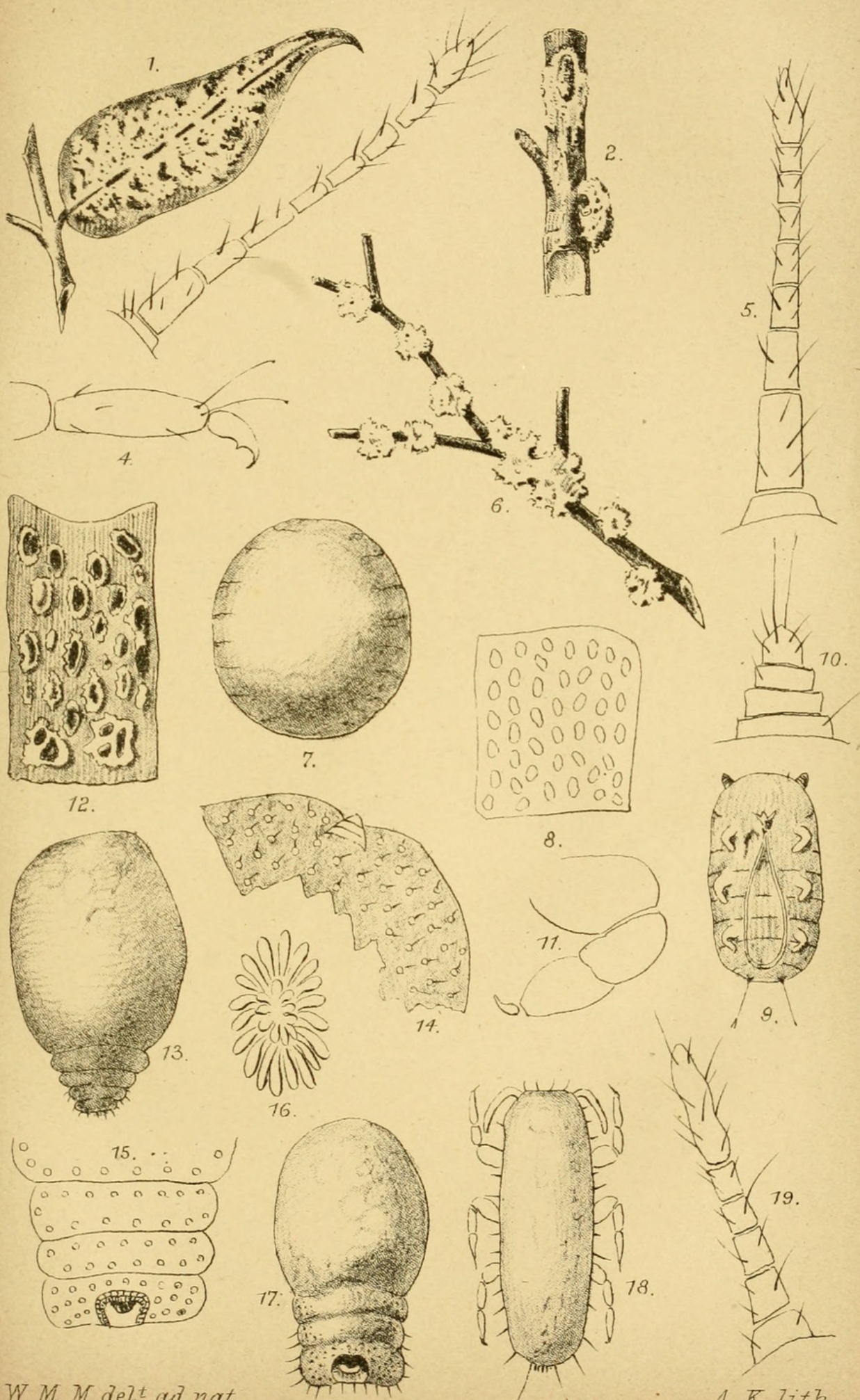
A. K. lith.



COCCIDIDÆ.

W. M. M. del^t ad nat.

A. K. lith.



W. M. M. delt ad nat.

COCCIDIDÆ.

A. K. lith.

ters exactly as he stated them, my species would not come quite into *Prosopophora*: for example, he says, "Surface with granulose raised lines; no anal cleft or tubercles." But the first of these is of no generic importance whatsoever; it may be a fair specific character: the second is manifestly not quite correct, as in his fig. 1f he shows two distinct tubercles. It is therefore not only convenient, but even necessary, to somewhat amend the generic characters; and this being done I can avoid the danger of overloading the study of Coccids with a new genus founded upon insufficient distinctions.

Mr. Douglas, having seen only one species, expresses much doubt as to the group in which *Prosopophora* should be placed. My two Australian species (or varieties) clearly show it to be Acanthococcid, and not far removed from *Planchonia*: indeed, I have hesitated long before separating it from that genus. There seems, indeed, to be no marginal fringe on the test or sac; but the adult female exhibits figure-of-eight orifices which, though much smaller, resemble those of *Planchonia epacridis*.

***Prosopophora acaciæ*, sp. nov.** Plate XIV., figs. 1-7.

Adult female covered by a waxy test; test elliptical, slightly convex, smooth, yellowish-brown; length about $\frac{1}{7}$ in.; margin irregular, but without fringe; there is a small orifice at the posterior extremity. When the test is lifted up the portion of the twig immediately beneath is seen to be depressed and concave, and the space so formed is usually filled with eggs or eggshells.

Male pupa covered by a white, waxy, elliptical test; length of test about $\frac{1}{23}$ in. Anterior portion of test smooth, the posterior region transversely corrugated.

Adult female brown, filling the test, but shrivelling at gestation. Antennæ very short, rather thick, with apparently only four joints, but the joints are much confused, and there may be six; the last joint bears a few hairs. Feet atrophied, very small and thick, the tibia and femur confused, the tarsus very small and very short, followed by a minute claw; digitules probably absent. Anal tubercles moderate, each bearing two or three spiny hairs. The epidermis bears a great number of tubular cylindrical spinnerets, and many very minute figure-of-eight orifices. On the margin there are a few conical spines and a double row of very small figure-of-eight orifices.

Female of the second stage brown, flattish, elliptical; length about $\frac{1}{30}$ in. Antennæ of six rather thick joints. Anal tubercles large, converging at the extremity so as almost to exhibit an abdominal cleft, but close examination shows that there are no dorsal lobes, and that the abdomen is not Lecanid; on each tubercle there is a long terminal seta.

Larva brown, flattish, elliptical; length about $\frac{1}{60}$ in. Antennæ of six joints. Anal tubercles distinct.

Adult male unknown.

Hab. In Australia, on *Acacia calamifolia*. My specimens are from Mr. Tepper.

In the Ent. Mo. Mag., November, 1890, I asked the question, How do Coccids produce cavities in plants? And amongst other instances I mentioned a New Zealand species, *Ctenochiton viridis*, which formed beneath it on its leaf a depression. That insect does its work on soft leaves; *Prosopophora acaciæ* (as well as the next species to be described) lives on twigs of very hard wood; yet it hollows them out somehow, and I cannot discover how the process is effected; for there is no swelling of the bark, or distortion of the twig, or wound of the tissues noticeable in the vicinity.

***Prosopophora eucalypti*, sp. nov.** Plate XIV., figs. 8–11.

Adult female covered by a test which is very closely felted, but which is seen, on careful examination, to be not perfectly homogeneous wax; colour of test yellowish-brown, but frequently covered with black fungus; form subcircular, flattish at the top, rather thick; there is a small orifice in the posterior region. There is a depression in the twig beneath, as in the last species, filled with eggs. Diameter of test about $\frac{1}{13}$ in.

Test of male pupa white, or grey, or yellowish; texture more waxy than that of the female, but not solid; anterior portion smooth, posterior region transversely corrugated. Length about $\frac{1}{25}$ in.

Adult female brown or red, filling the test, but shrivelling at gestation. Antennæ moderately long, of six joints, which sometimes appears to be eight, as there are "false joints" in the third and the sixth; these two joints are consequently rather the longest. Feet completely atrophied. Anal tubercles small. Epidermis bearing great numbers of tubular spinnerets and of minute figure-of-eight orifices.

Female of the second stage brown, flattish, elliptical. Length about $\frac{1}{25}$ in. Antennæ of six rather thick joints. Anal tubercles large and converging, as in the last species, thus simulating an abdominal cleft.

Larva light-brown, flattish, elliptical. Length about $\frac{1}{80}$ in. Antennæ of six joints. Anal tubercles large and converging.

Adult male unknown.

Hab. In Australia, on *Eucalyptus* sp. My specimens were sent by Mr. Koebele from Whitton, New South Wales.

The differences in the feet and antennæ are sufficient to separate this from the last species.

Genus GOSSYPARIA, Signoret.

Adult females lying on a cushion of cotton, the dorsum exposed. Characters of *Acanthococcidæ*; retaining feet and antennæ.

Gossyparia casuarinæ, sp. nov. Plate XIV., figs. 12, 13.

Adult female brown, varying from light to dark, elongated, convex, elliptical, resting on a cushion of grey cotton which leaves almost the whole insect exposed. Length about $\frac{1}{12}$ in. Antennæ of six joints, of which the third is the longest, the fourth and fifth the shortest. Feet with the tarsus longer than the tibia (a frequent character in *Acanthococcidæ*); all the digitules are fine hairs. Anal tubercles conspicuous. Mentum dimerous. On the margin of the body a row of slender spines, not very close together.

Female of second stage not observed.

Larva brown, flattish, elliptical. Length about $\frac{1}{60}$ in. Antennæ of six joints. Anal tubercles large and conspicuous. Margin of the body bearing a row of strong spines, slender, with tubercular bases. These spines are smaller on the thoracic than on the abdominal segments, and increase in length as they approach the extremity.

Male unknown.

Hab. In Australia, on *Casuarina* sp. Specimens from Mr. Koebele, from Sydney.

The cushion of grey cotton in this species is more scanty than is usual in the genus, almost the whole insect being exposed instead of only the dorsum, as is ordinary. A distinctive character of the larva appears to be the varying length of the marginal spines from the cephalic to the abdominal regions.

Gossyparia confluens, sp. nov. Plate XIV., fig. 14.

Adult females excreting a quantity of white cotton, with sometimes a yellowish tinge, aggregated in a mass on the twigs of the plant, and not entirely covering each insect, so that the twig looks as if covered with a honeycombed incrustation, in the interstices of which the bodies of the insects can be perceived. Insect dark-red in colour, subelliptical, convex. Antennæ of six joints, the first three of which are the longest and subequal, the last three short and subequal. Feet rather long; tarsus nearly one and a half times the length of the tibia. Anal tubercles conspicuous. Body covered with numerous slender spines. Mentum dimerous. Anal ring with eight hairs.

Larva and male not observed.

Hab. In Australia, on *Eucalyptus* sp. Specimens from Mr. Koebele, from Sydney.

The appearance of the mass of cotton in which this species is imbedded is rather curious. The insects seem to drop out easily.

Genus *ERIOCOCCUS*, Targioni-Tozzetti.

Eriococcus turgipes, sp. nov. Plate XIV., figs. 15–20.

Sac of adult female white, rather solid, very tough and leathery; form globular, but several sacs are frequently aggregated in a mass. There is in most cases an orifice on the dorsal region, but sometimes the sac is closed. Diameter about $\frac{1}{10}$ in.

Sac of male pupa not certainly observed, but probably of the same material as that of the female, but smaller and more elongated; usually open at the top.

In both female and male sacs there is a small quantity of white loose cotton covering the dorsum of the insect inside the sac, and separated from it.

Adult female yellowish-brown, becoming nearly black at gestation. Form subglobular, but slightly flattened dorsally, and the median dorsal region is darker in colour than the rest. Antennæ of six joints, of which the third and the sixth are much longer than the other four. Mentum large, dimerous. Feet very thick, swollen, and partly atrophied; the coxa and femur very large; the tibia, tarsus, and claw fused into one and very small, so that when viewed from below they form a single straight subconical joint, whilst if viewed from the side they are irregular and curved; digitules absent. Anal tubercles very small, each bearing one moderate seta and a great number of short conical spines. Anogenital ring compound, with six hairs. Epidermis bearing great numbers of short fine hairs, interspersed with circular orifices and with short conical spines; the spines and the orifices are most numerous on the median dorsal region. There are also several short spines on the femur.

Female of the second stage not observed.

Larva brown, flattish; form elliptical, but only slightly elongated, so that it has a rather squat appearance; length about $\frac{1}{90}$ in. Antennæ long, with six joints, of which the sixth is very long and fusiform, the second being the next longest. Anal tubercles very small, convergent, and only bearing short terminal spines instead of setæ. The rostral setæ are very long. Feet normal; lower digitules fine hairs; the tarsal pair are absent.

Adult male unknown.

Hab. In Australia, on *Casuarina* sp. Specimens sent by Mr. Koebele from New South Wales.

This is a very peculiar species, which possibly I might have rather placed in the genus *Gossyparia*, on account of the

dorsal opening in the sac; but this opening is not, I think, constant, and in no case does it reduce the sac to anything like a mere cushion. The insect is practically enclosed. The six hairs of the anogenital ring are abnormal, the generic number being eight; but, as I remarked in my paper of 1890 (vol. xxiii., p. 32), the student of Coccids must be prepared to look on any character as elastic and variable. The distinctive specific feature of *E. turgipes* is the peculiar form of the feet; and I have found in preparing a number of specimens for microscopic examination that in all cases they assumed the position shown in my figure—they radiate like spokes of a wheel, whereas in other Coccids they are naturally bent downwards. The outline of the insect being circular, the six feet are placed at equal distances, so that the anterior pair are in front of the rostrum, the posterior pair very far towards the anal tubercles. Perhaps, also, the very long sixth joint of the larval antennæ may be looked on as an exceptional character.

Eriococcus coriaceus, sp. nov. Plate XV., figs. 1–3.

Sac of adult female varying in colour from light-yellow or buff to dark-orange or red; form elliptical; sometimes single, sometimes aggregated in masses on a twig. Texture very leathery and tough. There is a small orifice at the posterior extremity. Length about $\frac{1}{15}$ in.

Sac of male pupa of similar material and colours, but smaller.

Adult female dark-red, filling the sac. Antennæ of seven subequal joints, which in a few specimens seen appear like eight. Feet normal, the tibia about half as long as the tarsus. Anal tubercles moderate; anogenital ring with eight hairs. Epidermis bearing many fine short hairs and short slender spines. Mentum dimerous.

Female of the second stage not observed.

Larva red, flattish, elliptical; length about $\frac{1}{55}$ in. Form normal; antennæ of six joints; anal tubercles conspicuous.

Adult male unknown.

Hab. In Australia, on *Eucalyptus* sp. Specimens from Mr. Olliff, New South Wales.

This species, in the form of its sac and in the antenna, approaches *E. eucalypti*, Mask.; but the sac has no glassy tubes on it, and the body of the insect has slender hairs instead of the thick conical spines of that species. It is viviparous, and several specimens seen were so full of lively larvæ that it seemed a wonder how these could find room.

Eriococcus conspersus, sp. nov. Plate XV., figs. 4–6.

Sac of adult female yellow, not closely felted, subglobular; diameter about $\frac{1}{20}$ in.

Sac of male pupa white, cylindrical ; length about $\frac{1}{40}$ in.

Adult female brown ; form normal ; length about $\frac{1}{25}$ in. Antennæ of six joints, of which the third is much longer than the rest. Feet normal ; tibia about three-fourths the length of the tarsus. Anal tubercles conspicuous and large. Epidermis covered very thickly on the dorsal surface with small irregularly oval markings, which are most numerous near the margin, and with some circular spinneret-orifices.

Female of second stage not observed.

Larva brown, flattish, elliptical ; length about $\frac{1}{60}$ in. Antennæ of six joints.

Adult male dark-brown ; length about $\frac{1}{50}$ in. Antennæ of ten joints. The anal "tails" are rather long.

Hab. In Australia, on *Casuarina* sp. Specimens sent by Mr. Koebele, from Harwood, New South Wales.

The minutely-speckled epidermis of this species, which is not properly observable until properly prepared, sufficiently distinguishes it from others of the genus.

Genus RHIZOCOCCUS, Signoret.

Rhizococcus grandis, Maskell, var. **spinosior**.

Adult female of the same colour and form as the type (N.Z. Trans., vol. xxiv., p. 29), but smaller ; length about $\frac{1}{8}$ in. It resembles *R. grandis* in the antennæ, in the smallness of the anal tubercles, and in the characters of the larva. The principal difference is in the dorsal spines, which are more numerous ; perhaps, also, the lower pair of digitules are less dilated. It would be easy, no doubt, to make a new species of it : I prefer to consider it merely as a variety, especially as the food-plants of the two belong to the same genus.

Hab. In Australia, on *Acacia implexa*. Specimens sent by Mr. J. Lidgett, of Myrniong, Victoria.

Rhizococcus casuarinæ, sp. nov. Plate XV., fig. 7.

Adult female varying in colour from yellow to dark-red ; form normal, but the segments are scarcely noticeable. Length about $\frac{1}{9}$ in. Antennæ of six joints, of which the third is nearly as long as all the rest together. Feet normal ; tibia about half as long as the tarsus. Anal tubercles moderate, but not observable in the natural state, being hidden by the convexity of the abdomen. Dorsum bearing some slender spines, some of which are very long.

Larva red, flattish, elliptical ; length about $\frac{1}{45}$ in. Antennæ of six joints. On the dorsum are four median longitudinal rows of very strong and long spines, and four other rows of smaller spines, two of which are marginal.

Male unknown.

Hab. In Australia, on *Casuarina suberosa*. Specimens sent by Mr. Lidgett.

This is another species allied to *R. grandis*; but it appears to differ from that sufficiently in the antenna, and principally in the rows of very strong spines on the dorsum of the larva.

Rhizococcus pustulatus, sp. nov. Plate XV., figs. 8, 9.

Adult female dark-red in colour, convex, subelliptical and tapering somewhat posteriorly; the dorsum exhibits two longitudinal grooves on the upper surface and two others more shallow near the margins, and in these grooves are some rather large shallow depressions or pits; the epidermis is rough with great numbers of very minute pustules. Length of insect about $\frac{1}{15}$ in. Anal tubercles small, but conspicuous. Antennæ short, with six joints, of which the fourth and fifth are the shortest. Feet absent. Anogenital ring with eight hairs. Mentum dimerous. The dorsal pustules are very noticeable after treatment with potash.

Female of the second stage red, subelliptical, tapering posteriorly, slightly convex; length about $\frac{1}{40}$ in. Antennæ of six joints, of which the sixth is the longest. Feet normal, the tibia a little shorter than the tarsus. Anal tubercles conspicuous, with long setæ. Epidermis rough with minute pustules. Margin irregular, and bearing many slender spines.

Larva yellowish-red, subelliptical, tapering; length about $\frac{1}{70}$ in. Anal tubercles moderate. Antennæ of six joints. The dorsal epidermis is profusely marked with very minute wrinkles, and these are also seen in fewer numbers on the ventral surface. The margin bears a row of small slender spines.

Male unknown.

Hab. In Australia, on *Casuarina* sp. My specimens are from Mr. J. Lidgett, of Myrning, Victoria.

At first sight this insect might be taken for *R. casuarinæ*, or for a small form of *R. grandis*; but it is apodous, and moreover distinguishable by the dorsal corrugations, shallow pits, and minute pustules.

Subdivision DACTYLOPIDÆ.

Genus DACTYLOPIUS, Costa.

Dactylopius arecæ, Maskell. N.Z. Trans., vol. xxii., p. 150.

I have received from Mr. W. W. Smith, of Ashburton, specimens of this insect found amongst roots of gooseberry, red-clover, grass, dock, and other plants, underground. My original specimens were amongst roots of *Areca sapida*. It would appear, therefore, that the insect is not uncommon, and is not confined to any particular plant. My Ashburton speci-

mens have antennæ of seven joints, but otherwise agree with the type, and the antennal difference is not important. The buff-coloured meal covering the dorsum readily distinguishes the species at first sight.

Dactylopius ericicola, sp. nov. Plate XV., figs. 10, 11.

Adult female varying in colour from dark-brown to red; subglobular, with the ventral surface concave at gestation; accompanied, but not covered, by grey or dirty-white cotton, which is frequently aggregated in masses; length of insect about $\frac{1}{20}$ in. Antennæ of seven joints, all subequal except the last, which is as long as any two others. Feet moderate; digitules fine hairs. Anal tubercles very minute and inconspicuous; anogenital ring with six hairs. Epidermis very minutely wrinkled, and bearing some circular spinneret-orifices and some conical spines.

Female of the second stage not observed.

Larva brown, rather elongated and slender; length about $\frac{1}{80}$ in. Antennæ rather thick, with six joints, subequal except the last, which is longer than any two others. Feet also thick. Mentum dimerous.

Adult male dark reddish-brown; length about $\frac{1}{40}$ in. Antennæ of ten joints, all rather thick and subequal. Feet rather long and slender. Abdominal spike very short; setæ very long.

There is usually much black fungus accompanying this insect, and it is also much infested by a minute yellow hymenopterous parasite.

Hab. In Australia, on *Erica autumnalis*. My specimens are from Mr. French.

I am under the impression that *Erica autumnalis* is not a native of Australia, and consequently the insect here described may not be Australian, but perhaps imported there from the Cape of Good Hope. I cannot identify it with any known species, though it comes nearest to *D. globosus*, Mask., from which it differs by not being covered by its cotton, and in the characters of the epidermis.

Dactylopius nipæ, sp. nov. Plate XV., figs. 12–15.

Adult female dark-red in colour, flattish, subcircular; diameter about $\frac{1}{30}$ in. exclusive of the cotton; excreting on the dorsum whitish or yellowish cottony meal, and all round the margin subcylindrical tassels of yellowish cotton, which are sometimes equally long all round, sometimes longer posteriorly; the dorsal meal is often arranged in rows in little granular masses. Antennæ of either seven or eight joints, of which the last is much the longest, the third and the penulti-

mate slightly longer than the rest. Feet rather long, of normal form; lower digitules very slightly dilated. Anal tubercles very minute and inconspicuous; anogenital ring with six hairs. Mentum trimerous. Epidermis with many very minute circular spinneret-orifices. Margin bearing some conical spines not set close together; and some more of these spines are scattered on the cephalic region.

Female of the second stage purplish-red, elongated, flattish; length about $\frac{1}{40}$ in.; not covered with cotton, but with sparse white meal on the dorsum and a few cottony tassels at the posterior extremity. Antennæ of six joints.

Larva purplish-red, flattish, elliptical; length about $\frac{1}{80}$ in. Antennæ of six rather thick joints, the last much the longest, the rest subequal. Anal tubercles very small, convergent, bearing moderate setæ.

Male pupa enclosed in white cotton; usually aggregated in masses on the leaf.

Adult male brownish-red; length about $\frac{1}{40}$ in. Wings not iridescent. Antennæ of ten joints, the third, fourth, and tenth longer than the rest. Dorsal eyes two, ventral eyes two, ocelli two. Abdominal spike short and very broad at the base, having the appearance of two basal lobes with a conical process. Feet moderate; at the extremity of the tibia are several strong spines.

Hab. In Demerara, on an aquatic palm, *Nipa fruticans*. My specimens were sent to me by Mr. J. W. Douglas, who has allowed me to describe the insect here.

In outward appearance this resembles rather a *Ripersia*, from the character of the cottony processes of the adult female; but, some specimens showing seven and others eight joints in the antennæ, I attach it to *Dactylopius*. I believe it to be quite distinct.

Dactylopius eucalypti, Maskell. N.Z. Trans., vol. xxiv., p. 35.

The specimens of this insect which Mr. Crawford sent to me a few years ago were clustered between sheets of bark in a mass of cotton, mingled with larvæ and males. I have lately received from Mr. W. W. Froggatt, of Sydney, a large number on leaves of *Eucalyptus robusta*. These specimens agree entirely with my South Australian types as far as regards the anatomical characters of the antennæ, feet, and anogenital ring, and also the feathery fringe of the larva; but instead of secreting cotton they are naked, each resting in a pit or depression in the leaf which exactly corresponds to its outline. As these specimens were sent to me in alcohol I am unable to say whether in nature they would have any cotton or not; but in any case the point is not important in view of the ana-

tomical characters, and probably the modes of growth on the leaves or under the bark may differ to that extent.

On account of this difference it is necessary to be rather more precise than I was in 1891 in detailing the organic characters of this species. The most important of these is the anogenital ring, which departs entirely from the type of *Dactylopius*, having more than six (usually twenty) hairs. This character, as far as experience goes at present, is sufficient to determine the species at once. With regard to the mentum, I was in doubt last year whether it is monomerous or not: further examination leads me to think it is not, and it would therefore not be exceptional; but certainty as to the mentum is by no means easy. The antenna has seven joints, as mentioned in 1891; it may be recognised by two very long hairs, one on the first and the other on the second joint (with, of course, other shorter hairs). The four digitules are all much longer than the claw.

I shall still leave this species in *Dactylopius*, in spite of the exceptional anal ring. Perhaps some day somebody may find out how it constructs the pit on the leaf in which it lives.

Genus PSEUDOCOCCUS, Westwood.

Pseudococcus nivalis, sp. nov. Plate XVI., figs. 1-4.

Adult female covered with a quantity of white cotton, and excreting also a white cottony ovisac of less dense texture than that on the dorsum. This ovisac is frequently prolonged posteriorly as in the Lecanid genus *Pulvinaria*. Insect yellowish-brown, elliptical, slightly convex; length about $\frac{1}{12}$ in. Antennæ of nine joints, the first short, the second the longest, the rest gradually diminishing to the eighth, the last as long as the fourth; the fourth, fifth, and sixth are more slender than the others. Feet rather long and slender; tarsal digitules fine hairs; there are no digitules on the claw. Anal tubercles very minute and inconspicuous, setiferous; the anogenital ring has six hairs. Margin bearing on each segment a group at each side of large circular spinnerets, and these are also numerous scattered on the dorsal abdominal region. On the cephalic region are groups of conical spines.

Female of the second stage, and larva, not observed.

Adult male dark-yellow or orange; length about $\frac{1}{30}$ in. Antennæ of ten joints, diminishing gradually from the third to the tenth. Abdominal spike short; there are two very long "tails" and two shorter median setæ. Dorsal eyes two, ventral eyes two, ocelli two.

Hab. In Australia, on *Acacia* sp. My specimens are from Mr. Koebele; the locality either Sydney or Brisbane.

The form of the antenna of the female, nine-jointed, and more slender in the middle than at either end, is characteristic of the genus. The species differs slightly from any hitherto reported.

Pseudococcus casuarinæ, sp. nov. Plate XVI., fig. 5.

Adult female covered with a quantity of white cotton, which has normally a globular form, but is often aggregated in masses; there seems to be no posterior ovisac. Insect yellowish-brown, elliptical, slightly convex; length about $\frac{1}{5}$ in., but shrivelling at gestation. Antennæ of nine joints, of which the second is much the longest (as long as any two others), the rest gradually diminishing to the eighth, the ninth as long as the sixth. The fourth, fifth, and sixth are the most slender. Feet rather long and strong; tarsal digitules fine hairs. There is no lower pair on the claw. Anal tubercles very small; anogenital ring with six hairs. Epidermis bearing large numbers of small circular spinnerets and short fine hairs, and on the margin of each segment at each side is a group of orifices mingled with conical spines.

Female of the second stage not observed.

Larva brown, flattish, elliptical; length about $\frac{1}{60}$ in. Antennæ of six rather thick joints, the sixth much the longest, the rest subequal. Anal tubercles small, setiferous.

Male unknown.

Hab. In Australia, on *Casuarina* sp. Specimens from Mr. Lidgett, of Myrniong, Victoria.

Genus **RIPERSIA**, Signoret.

Ripersia leptospermi, Maskell. Trans. Roy. Soc. South Australia, 1887-88, p. 106. Plate XVII., fig. 6.

Female of the second stage dark-red, with white cotton and meal; form flattish, elongated, broadest posteriorly; conspicuously segmented; length about $\frac{1}{40}$ in. Antennæ of six joints, of which the third is as long as all the rest together. Feet long; the tibia is longer than the tarsus. Anal tubercles rather small, convergent, setiferous. Margin of body rough with numbers of thick tubular spinnerets with wide bases and slightly tapering, as in the adult, and others similar are scattered on the dorsum.

Male pupa covered with white cotton.

Adult male red; wings grey; length of body about $\frac{1}{40}$ in. Antennæ of ten joints, the last four rather thick and short. Dorsal eyes two, ventral eyes two, ocelli two.

Hab. In Australia, on *Leptospermum* sp. The specimens here described were sent by Mr. Koebele from Sydney.

When I described, in 1887, the adult female and the larva of this species, I had not seen the second stage or the male.

Subdivision IDIOCOCCIDÆ, Subd. Nov.

Last year I had to report two genera as to which I was then unable to decide their proper position. One of these, *Sphærococcus*, included only one species; the other, *Cylindrococcus*, had two, and possibly three. Since then I have received specimens of three species which I propose to place in *Sphærococcus*, and I have been able to fix definitely the affinities of the third species of *Cylindrococcus*. Under these circumstances not only can I maintain the genera established last year, but I find it advisable to erect a new subdivision to include both of them, for it is not possible to attach them to any hitherto known. As for their group affinities, I shall leave them amongst the *Coccidinæ*, because they certainly are more nearly related to the members of that group than to the *Lecanids*; but, even so, their characters are so strange that I have thought it best to indicate the fact by the name of my new subdivision. Moreover, having decided thus much, I propose to characterize the *Idiococcidæ* by such wide and comprehensive features as will permit the future inclusion therein of other genera which may hereafter be discovered: in fact, I mean the subdivision to serve as a receptacle for, perhaps, many insects which cannot possibly enter into the others, and so we may avoid, as far as possible, multiplication of names.

IDIOCOCCIDÆ.

Adult females active or stationary; gall-making, or naked, or producing cotton or wax. Anal tubercles entirely absent; anal ring hairless. Antennæ with usually less than seven joints. Body not prolonged posteriorly.

The insects belonging to this subdivision are separated from the *Monophlebidæ* by the absence of anal tubercles and by the antennæ; from the *Brachyscelidæ* by the absence of any abdominal prolongation or "tail"; from the *Acanthococcidæ* and the *Dactylopidæ* by the absence of anal tubercles, and the hairless anogenital ring. They come nearest, perhaps, to the subdivision *Coccidæ*, which includes only the single genus *Coccus* (cochineal), and in which the anogenital ring is also hairless. But *Coccus cacti* possesses (though very small and inconspicuous) the usual anal tubercles. Moreover, although I do not lay much stress upon external similarity or dissimilarity, I cannot bring myself to consider *Coccus* as really closely allied to either *Sphærococcus* or *Cylindrococcus*. This question has given me an amount of trouble and study which anybody except a systematic entomologist would probably consider excessive; and it is only after several months of hesitation and frequent changes of

mind that I have decided upon erecting this new subdivision, and placing therein the new species discovered during the past year.

Genus SPHÆROCOCCUS, Maskell. N.Z. Trans., vol. xxiv., 1891, p. 39.

Adult females naked, or producing cotton or wax. Anal tubercles absent; anogenital ring hairless. Antennæ of usually less than seven joints, sometimes atrophied. Feet sometimes absent, sometimes atrophied, sometimes deformed.

Adult male unknown.

Last year I was not prepared to attach any definite characters to this genus. Even now, though I am including three more species in it, I am compelled to leave the characters thus vague and general, in order to avoid erecting a new genus to suit each one.

Sphærococcus acaciæ, sp. nov. Plate XVI., figs. 6–11.

Adult female covered with white cotton, which singly is globular, but may be aggregated in masses. Insect globular, dark-brown; diameter about $\frac{1}{5}$ in. Antennæ and feet absent. Anogenital ring very small and difficult to detect, simple, hairless; anal tubercles absent. Epidermis bearing numbers of minute tubular spinnerets; and on the median dorsal region a great many small clear oval markings. Spiracles large.

Female of the second stage not observed.

Larva brown, flattish, elliptical; length about $\frac{1}{6\frac{1}{2}}$ in. When observed within the body of the mother it is seen to have antennæ of four moderately long subequal joints, on the last of which are two long hairs; after emergence the joints become shorter and rather confused, but the joints and hairs may still be made out. Feet thick and clumsy, the joints swollen; claw very small; the digitules seem to be all fine hairs. Margin bearing some very slender spines. Anal tubercles absent or atrophied, but there are the usual two terminal setæ.

Male unknown.

Hab. In Australia, on *Acacia* sp. Specimens sent by Mr. A. S. Olliff, from Queanbeyan, New South Wales.

This insect is allied to *S. casuarinæ*, Mask., reported last year, but differs quite sufficiently for specific separation.

Sphærococcus bambusæ, sp. nov. Plate XVI., figs. 12–19.

Adult female producing white cotton, which forms a cushion under it and sometimes partially covers it; this cotton frequently appears quite hard and solid. Insect dark-brown, elongated, slightly convex, usually tapering somewhat posteriorly; the cephalic region is very large, the abdominal

segments short and compressed. Length about $\frac{1}{3}$ in. The epidermis is very hard and solid, and resists the action of potash even after prolonged boiling. The antennæ are almost completely atrophied, and are exceedingly difficult to detect, being placed close to the anterior margin, where the skin is darkest and hardest, so that it is only by very careful search that they can be seen at all; they are roundly conical, composed of apparently three or four joints much confused; there are a few terminal hairs. Feet entirely absent. Anal tubercles absent; the anogenital ring is difficult to examine owing to the hardness of the epidermis; it is simple and hairless. The abdominal extremity is truncate. Epidermis bearing great numbers of minute fine hairs dorsally, and on the ventral surface on each segment at each side is a group of small elliptical orifices placed close together.

Female of the second stage brown, slightly convex and elongated; length about $\frac{1}{12}$ in.; the cephalic region large and the abdominal segments small, as in the adult; posterior extremity truncate. Antennæ close to the cephalic margin, small, conical, atrophied as in the adult, with three or four confused joints. Feet absent. The anogenital ring seems to have six slender hairs. Epidermis bearing great numbers of circular spinneret-orifices. Margin having a few slender spines, which are more numerous on the abdominal segments.

Larva red, with white cottony meal; elongated, flattish; length about $\frac{1}{40}$ in. The form is narrow and looks disproportionately long. Antennæ rather long, with six joints, of which the sixth is much the longest and largest, the third, fourth, and fifth the shortest and subequal. Feet moderately long; the tibia and tarsus are about equal; the digitules are fine hairs. Abdominal extremity slightly truncate; anal tubercles very small or absent; terminal setæ normal; anal ring with six hairs. Margin with a few cephalic slender spines and one on each side of each abdominal segment. Mentum dimerous.

Male unknown.

Hab. In Sandwich Islands, on bamboo. Specimens sent from Honolulu by Mr. Koebele.

This is a very peculiar and striking insect, which I cannot place elsewhere than in this genus. It is one of the most difficult with which I have had to deal, as regards the various organs, on account of the excessive hardness of the epidermis. Yet I believe that the account here given of it is sufficiently correct.

***Sphærococcus inflatipes*, sp. nov.** Plate XVII., figs. 1-5.

Adult female covered by a waxy test, which is open beneath, convex above; the dorsal region of the test is elevated in a more or less conical manner, sometimes smoothly

rounded, sometimes with the sides corrugated as if with radiating buttresses; the marginal region is spread out rather flat, but often wrinkled, and the margin itself is usually slightly thickened. The normal outline of a test is subcircular or elliptical, but sometimes three or four have the margins conjoined and as if forming one mass. At the dorsal apex there is a small orifice. Colour of the test yellowish- or reddish-brown; the external diameter averages about $\frac{1}{20}$ in. When the test and the insect are removed a small slightly-depressed scar is left in the bark, covered with very thin white meal. Between the test and the dorsum of the insect, and not closely attached to either, there is a small, circular, thin, white, waxy indusium, which covers the central portion of the dorsum. The female insect is reddish-brown, filling the test; diameter about $\frac{1}{30}$ in.; the dorsal region is rather darker than the ventral; the body is rather thick, subcircular, and slightly depressed. Antennæ slightly tapering, of six short subequal joints, on the last of which are some longish hairs. At first sight there seem to be only two feet, but on examination it is found that the four anterior ones are much smaller and shorter than the posterior pair, which thus appear abnormally large. The four anterior feet are themselves rather swollen, the joints rather thick and wrinkled; the claws are not large, and I can only make out the tarsal digitules; on the trochanter is a long hair. The posterior feet, though large, have not entirely the swollen appearance of the others, and the joints are less wrinkled, but the claw is atrophied and can only be made out with difficulty; tarsal digitules rather long fine hairs, the lower pair absent. The dorsal region bears a very large number of irregularly-elliptical cells, amongst which are some fine spiny hairs; and round the margin is a ring of subconical rather thick spines, those at the posterior extremity being the longest and largest. The ventral epidermis bears fine spiny hairs interspersed with some small circular orifices. The mentum appears to be dimerous. Anogenital ring rather large, simple, hairless; close to it there seem to be two very short setæ.

Female of second stage and larva not observed.

Male unknown.

Hab. In Australia, on *Eucalyptus* sp. Specimens sent by Mr. French from Myrning, Victoria. The pieces of bark forwarded are covered with numbers of the little brown tests. I think the normal appearance of the bark would be smooth and light-grey, but the Coccids look like an eruption of pustules on the surface. Mr. French tells me that the insect does much damage to the trees.

I cannot put this insect into any other genus than *Sphaerococcus* at present. Only one Coccid is known to me so far

which exhibits anything like the excessive development of the posterior feet*—that is *Opisthoscelis gracilis*, Schrader, one of the *Brachyscelid* group. But I cannot put *S. inflatipes* among the *Brachyscelidæ*. Moreover, after examination of several specimens of *O. gracilis*, I am by no means quite sure that the very long and slender organs noticeable in that insect are really feet; they are very peculiar and abnormal. However, I cannot discuss that question until my friend Mr. Olliff has published his observations on the *Brachyscelidæ*. Meanwhile, *S. inflatipes* is certainly a strange and abnormal insect.

Genus CYLINDROCOCCUS, Maskell. N.Z. Trans., vol. xxiv., 1891, p. 41.

Cylindrococcus amplior, sp. nov. N.Z. Trans., vol. xxiv., 1891, p. 44.

Last year, having only a photograph of some galls on a twig, I could not decide upon their specific position, even if (as I thought probable) they belonged to Coccids at all. Since then Mr. Tepper has been kind enough to send me more specimens, and I have ascertained clearly that they contain *Cylindrococcus*. Examination of the enclosed females shows that they are very closely allied to *C. casuarinæ*, Mask. Indeed, I cannot positively point to any feature of the insect itself by which it may be definitely separated from that species; and it is equally difficult to differentiate the larva. Still, the form of the gall, which is evidently intermediate between that of *C. casuarinæ* and that of *C. spiniferus*, may be sufficient excuse for my venturing to consider the species as distinct. I am confirmed in this view by some remarks of Professor Riley, who, in "Insect Life," vol. iv., p. 377, says, "A hundred larvæ of *Braconidæ*, indistinguishable from one another structurally, will construct a hundred distinctive cocoons, each characteristic of its own species." If the cocoon of a Hymenopter is considered sufficient for specific separation, the gall of a Coccid may have equal importance. But I should not like to extend this proposition very far; exceptionally it may pass, but all through my Coccid studies, from 1876 till now (whatever may be their value), I have laid stress (as regards species) chiefly on the organic characters of the insects themselves, and only secondarily on the nature of their coverings and excretions.

Hab. In Australia, on *Casuarina quadrivalvis*. Specimens from Mr. Tepper.

* I do not here take notice of *Capulinia sallei*, Sign., as only the larval stage of that species has been described.



Maskell, William Miles. 1893. "Further coccid notes: with descriptions of new species from Australia, India, Sandwich Islands, Demerara, and South Pacific." *Transactions and proceedings of the New Zealand Institute* 25, 201–252.

View This Item Online: <https://www.biodiversitylibrary.org/item/22728>

Permalink: <https://www.biodiversitylibrary.org/partpdf/2398>

Holding Institution

MBLWHOI Library

Sponsored by

MBLWHOI Library

Copyright & Reuse

Copyright Status: NOT_IN_COPYRIGHT

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.