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I.—ZOOLOGY.

ART. I.—*Further Coccid Notes: with Descriptions of New Species from New Zealand, Australia, and Fiji.*

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Plates I.–VII.

OF the eighteen or twenty new species and varieties mentioned in the following paper, five are Australian. These have been very kindly furnished to me by Mr. C. French, Government Entomologist of Victoria, who has allowed me to trespass largely upon his good-nature for supplies of specimens. I regret that I have not been able to include in this paper a most remarkable Coccid, of which Mr. French has sent me several examples, and which forms on *Casuarina*, in the neighbourhood of Melbourne, large galls, through which protrude hard and horny cylindro-conical tubes forming the insect's particular domicile. This species belongs, as far as I can make out, to none of the genera at present known of Coccids; but, as I have not yet a sufficiently complete series of all its stages of growth, in view of its very curious features its description must be postponed for the present. I am again indebted to Mr. R. L. Holmes, of Bua, Fiji, who has sent me a Diaspid described in this paper; and the remainder of my new species, with the exception of *Lecanium cassiniæ*, are due to the assiduous industry of Messrs. Raithby and Cavell, of Inangahua, in this country, who have been, as last year, of the greatest assistance to me.

Two of the genera herein given—*Parlatoria* and *Leachia*—are new to the South Seas. Our New Zealand example of the latter is decidedly interesting from the peculiar eyes of

the male, probably unique in the family. There is also a special interest in the adult form of *Cœlostoma assimile*, and its curious and not easily explicable mode of burrowing into the wood of its food-plant.

A fire in the Government Printing Office storehouse lately destroyed, as I understand, nearly all the remaining copies of my book on the scale-insects of New Zealand, 1887. I have therefore, in dealing herein with species mentioned in this paper, added a reference to the original descriptions of them in volumes of the New Zealand Transactions.

Group DIASPIDINÆ.

Genus ASPIDIOTUS, Bouché.

Aspidiotus corokiæ, sp. nov. Plate II., figs. 1–4.

Female puparium circular, rather solid, slightly convex, with the pellicles in the centre; colour varying from yellow to (less frequently) white, pellicles yellow; diameter about $\frac{1}{24}$in.

Male puparium rather more elongated than that of the female, not carinated; texture thinner; colour whitish; pellicle yellow, near the middle.

Adult female yellow, of the normal peg-top shape of the genus; length about $\frac{1}{35}$in. Abdomen ending in two conspicuous floriated lobes, with one smaller lobe on each side of them, and another small lobe a little distance along the margin; margin numerously indented; between the terminal lobes, and as far as the single small lobes, are several fine short serrated or forked hairs. Pygidium exhibiting no regular groups of spinnerets, but there are two pairs in the region where the upper laterals usually are, and a considerable number of single spinnerets near the margins. In some individuals traces may be detected of a lattice-work pattern above the anal orifice, which last is placed near the extremity; but this lattice-work is not constant.

Adult male unknown.

Hab. In New Zealand, on *Corokia cotoneaster*, in the Reefton district.

Only a few species of *Aspidiotus* have been reported without groups of spinnerets, and the present does not seem to agree with any of them, as far as I know. A species, *A. phormii*, Brème, is reported by Signoret as living on *Phormium tenax*, and therefore presumably a New Zealand insect; but I have not seen it: moreover, the description of it does not state whether the "groups" are present or not. *A. acaciæ*, Morgan (Ent. Mo. Mag., Aug., 1889), a Tasmanian species, differs from ours in several particulars. *A. camelliæ* has not even the two pairs of orifices noticeable in *A. corokiæ*.

Aspidiotus camelliæ, Signoret. Scale-Ins. of N.Z., p. 41; N.Z. Trans., vol. xi., p. 200.

I think that Mr. Morgan (Ent. Mo. Mag., Aug., 1889) is correct in separating this from *Kermes camelliæ*, Boisduval; or, rather, perhaps, it should be said that Boisduval's description is so vague and uncharacteristic that it is best to assign the species to Signoret, who at least placed it correctly.

I also agree with Mr. Morgan in considering *A. rapax*, Comstock, as identical with *A. camelliæ;* and I believe that the insect which is so common here upon *Euonymus*, and which I have identified as *A. camelliæ*, is the same as Comstock's species.

Euonymus japonicus is much infested by this insect, and is often not worth the trouble of cultivation on this account.

Aspidiotus cladii, sp. nov. Plate I., figs. 1–4.

Female puparium rich dark-brown, the margin orange-red and the pellicles dark-yellow. Form circular, rather convex; pellicles central; diameter about $\frac{1}{16}$in.

Male puparium similar in colour, but narrower and elongated: length about $\frac{1}{20}$in.; not carinated.

Female dark-brown, almost black, the abdominal extremity lighter-coloured. Form of the usual peg-top shape of the genus, shrivelling at gestation. Abdomen acuminate, ending in four small terminal lobes and another pair rather higher up; margin serrated, bearing at each side two rather long hairs. A few hairs also on the cephalic segments. No groups of spinnerets, but a few small single orifices.

Adult male unknown.

Hab. In Australia, on *Cladium*, a species of rush. My specimens were sent to me by Mr. French.

This is a handsome species, the colours of the puparia being unusually bright. I do not think that it is at all like any described species.

Aspidiotus rossi, Crawford MS.

I have very frequently had specimens sent to me from Australia which I believe to be this species. The female puparium is large, intensely black, flat, and usually circular (but I have seen some, on small narrow leaves, elongated). It appears to be very common about Adelaide, Melbourne, and Sydney, on almost every kind of plant. I have not found it yet occurring in New Zealand. Mr. Crawford has not yet published a description of this insect, but I believe it is deposited in the Museum of Adelaide under the name here attached to it.

Genus Diaspis, Costa.

Diaspis pinnulifera, sp. nov. Plate I., figs. 13–16.

Female puparium circular or sub-circular, reddish-brown, flat; the pellicles sub-central, yellow. Diameter about $\frac{1}{16}$in.

Male puparium elongated, white, distinctly carinated. Length about $\frac{1}{20}$in.

Adult female brown, pegtop-shaped, shrivelling at gestation. Abdomen somewhat acuminate, ending in six terminal lobes, of which the two median are the largest, the outer pair the smallest. Between the lobes are some small scaly hairs. Margin slightly crenulated: two of the crenulations on each side, just beyond the outer pair of lobes, bear longish feather-shaped processes or scales, slender and pointed, one to each crenulation. Four groups of spinnerets, of which the upper laterals have 5–8 orifices, the lower pair 2–4. Several single spinnerets.

Adult male unknown.

Hab. In Fiji. Mr. R. L. Holmes has sent me specimens on some large smooth leaf; but I do not know the plant.

The female puparium of this species resembles somewhat, to the naked eye, that of *Aspidiotus coccineus* (*aurantii*), although close inspection shows that it is less regularly circular. But the carinated male puparium fixes it in *Diaspis*. The two pairs of feathery processes on the margin of the last abdominal segment are quite distinct and characteristic.

Genus Mytilaspis, Targioni-Tozzetti.

I think it advisable here to enter somewhat into detail as to my plan of including in the genus *Mytilaspis* a number of insects which, in the outward appearance of the female shield, do not present exactly the "mussel" shape of the type, but rather resemble the broad scale of *Chionaspis*. These insects, in my various papers, I have named *M. epiphytidis*, *M. leptospermi*, *M. metrosideri*, *M. pallens*, *M. phymatodidis*, and *M. pyriformis*, and in this paper *M. intermedia*.

Professor Comstock, in the Second Report of the Department of Entomology, Cornell University Experiment Station, 1883, p. 97, states that the two genera *Chionaspis* and *Mytilaspis* "can in almost all cases be distinguished by the colour of the scale;" and says that he knows of no species of *Mytilaspis* in which the scale of either sex is white. In his "Introduction to Entomology," 1888, p. 149, he, however, only gives as the distinguishing mark of *Mytilaspis* "scale of male similar in form to that of the female." I confess that, to me, colour plays a very unimportant part in the matter. I look on colour as an accident not only of the organisms themselves, but also of the observer's eyes. Men rarely, I think, agree

entirely as to shades of colour, and what to one may seem a distinct brown may to another appear dark-grey. Writers on Coccids have not, luckily, plunged as deeply as the lepidopterists into the mysteries of "fuscous-ochreous," "fuscous-blackish," "piceous-fulvous," and so on. We are spared that infliction so far; and undoubtedly I would not argue that most men cannot tell the difference between "brown" and "white." But, if we begin to consider colour as an important distinction, especially for *generic* differentiation, I fear the result will be endless confusion. Moreover, as a fact, colour in Coccids is not a constant character. Not only do the insects themselves change with age, but very frequently their shields vary with the food-plant or other conditions. For example, in my species *Mytilaspis pyriformis*, in many cases, the enclosed female, up to gestation, is light "yellowish-brown or greyish" (Scale-Ins. of N.Z., p. 53); but after gestation I find it frequently a very dark-brown, almost black. Again, the same insect, on a soft and succulent leaf of *Dysoxylon*, has a light-brown shield; on *Rhipogonum* it is often nearly black; on the hard bark of a pine-tree it is frequently a very pale yellow. Again, *Mytilaspis pomorum*, according to Signoret, has a shield "dark-brown;" Professor Comstock (Ag. Rep., 1880) calls it "ash-grey;" I have seen often some quite white mixed with the brown ones. I believe that hares in Scotland are sometimes brown and sometimes white; but we could not separate the two genetically.

Professor Comstock's second character—"Scale of male similar in form to that of the female"—is much more reliable; but it does not go quite far enough, and requires the additional words "not carinated," as I shall point out presently.

In the *Entomologist's Monthly Magazine* for July, 1888, Mr. A. Morgan proposes a classification of the Diaspid group based upon what he terms a "tendency" to certain shapes in the puparia. I freely confess that I feel the greatest possible horror of accepting as the basis of anything at all a "tendency;" nor do I sympathize in the least with the prevailing modern fashion of philosophy in this respect. Moreover, in systematic observation it would seem to be extraordinarily difficult, in examining some newly-found insect, to affirm whether it is, or merely "tends to be," something or other: it would be better to take it at once for what it appears to be in fact. But I venture to think also that Mr. Morgan's theory leads him into a want of definiteness and clearness. For example, he separates *Aspidiotus* from *Diaspis* as follows: "*Aspidiotus* female and male circular, male tends to linear form; *Diaspis* female circular, male linear." It would be puzzling to make out a "circular" object "tending to linear form:" why not say "elliptical" at once? Again, his

distinctions of *Mytilaspis* and *Chionaspis* are: "*Mytilaspis* female elongated-circular; *Chionaspis* elongate but sometimes much rounded." There is here certainly something wanting.

In point of fact, the outline of the puparium is not a sufficient generic distinction, as between *Mytilaspis* and *Chionaspis*, any more than colour. Instances of variation are innumerable: position on a leaf or twig often alters the shape. In the numerous cases where insects are found in hundreds together, their consequent crowding and pressing on each other, or on the hollows of the plant, often produce most variable contours. For example, in the New Zealand species *Chionaspis dysoxyli*, although the normal female puparium is regularly pyriform, the insects are often so jammed together that specimens occur quite narrow, or mussel-shaped, or irregular. Again, *Mytilaspis pyriformis* on a slender twig becomes often very convex, even nearly globular, and I have seen some very like a *Diaspis*. On the whole, therefore, I have been led to lay little stress on mere outline, and consequently to include in *Mytilaspis* several species much resembling *Chionaspis*.

The distinction upon which I have relied has been the absence or the presence of carinations or grooves in the male shield. I consider all species in which these grooves appear as belonging (*cæteris paribus*) to *Chionaspis;* all species from which the grooves are absent as belonging (*cæteris paribus*) to *Mytilaspis*. In like manner, dealing with the genera having circular or sub-circular female puparia, the presence of carinations in the male puparium points to *Diaspis*, the absence of them to *Aspidiotus*. So, a few months ago, when my friend Mr. E. T. Atkinson sent me from Calcutta for identification an insect attacking the Assam tea-plant, I found the female puparium sub-circular, convex, with the pellicles not central. Had I not seen anything more I should have placed it in *Diaspis;* but, the male shield having no grooves, I unhesitatingly advised Mr. Atkinson to name it *Aspidiotus theæ*. Similarly, as none of the species mentioned at the beginning of this note exhibit carinations, I have placed them all under *Mytilaspis*, disregarding the widened and pyriform shape of the female puparium.

On the other hand, I have also included in the same genus *Mytilaspis cordylinidis*, where both female and male puparia are snowy-white, because they are not only similar, but free from grooves.

If I am asked what would be the proper course in cases where the female puparia only are observed, I should say, suspend the judgment, or, if required to pronounce, let it be provisionally until examination of the male. But, as a rule, some specimen of the male is pretty sure to accompany a number of the females.

Since the foregoing was written I have received from Mr. French some specimens of *Aspidiotus rossi*, on leaves of *Ricinocarpus*. These leaves being exceedingly narrow, the usual circular form of the puparia has been changed to oblong, almost rectangular; but I should certainly not consider them as specifically distinct.

Mytilaspis intermedia, sp. nov. Plate II., figs. 5–9.

Female puparium yellowish-brown, the posterior end usually exhibiting a narrow border of white. Being placed transversely on small twigs of the plant, and coiling round them, it frequently appears very convex, the two ends meeting: the proper shape would probably be flat and pyriform. Pellicles small, dark-yellow. The length may be taken at about $\frac{1}{16}$in.; but this, again, is difficult to determine.

Male puparium of similar colour to that of the female, elongated, without carinations. It also is placed on small twigs, but longitudinally, so that the form is not affected: it is usually found near a bud. Length about $\frac{1}{25}$in.

Adult female before gestation greyish, the pygidium yellow. Form normal of the genus. Abdomen ending in four lobes, of which the two median are large and floriated, the other two very small. Five groups of spinnerets, the uppermost three almost forming an arch; upper group 10–15 orifices, upper laterals 12, lower laterals 10–12. In some specimens the arch appears to be complete. Several single spinnerets. Between the lobes, and along nearly all the terminal margin, are several spiny hairs. Length of the insect about $\frac{1}{20}$in.

Adult male unknown.

Hab. In New Zealand, on *Leptospermum scoparium*, as yet only from Reefton. The insect affects the small terminal twigs, and the female is very inconspicuous from its small size and from its mode of coiling transversely round the twig. The male is still more difficult of detection, as it is usually placed amongst the loose bud-scales, which it much resembles in colour and size.

I look on this insect as a link between *M. pyriformis* and *M. leptospermi;* and, indeed, it is possibly rather a variety of this last than really distinct. The female differs slightly from both in the terminal lobes, and the abdominal segments want usually the spiny hairs of *M. pyriformis*. In the character of the puparium, however, as there is no trace of the bark-cells so characteristic of that of *M. leptospermi*, it differs also from that species; at the same time, this may be accounted for by its position on the small, hard, smooth-barked twigs of the plant instead of the loose scaly bark of the trunk, which can be so easily employed as a shield by *M. leptospermi*. On the whole, whilst not entirely satisfied as to its independent status,

I shall leave it now as distinct, though much nearer to *M. leptospermi* than anything else, and a probable link between that and *M. pyriformis*.

On account of the bent shape which this insect takes, from curling round very small twigs, it is very difficult to extract it from its puparium without damage.

Mytilaspis gloverii, Packard.

M. gloverii, Packard (Comstock, Ag. Rep. 1880, p. 323).

This insect has been sent to me from Melbourne, on a leaf of orange. I doubt its being really specifically distinct from *M. citricola*, Packard, the only difference apparently being in the narrower form of the female puparium. Professor Comstock, however, so definitely urges the separation of the two that I do not venture here to disturb his arrangement. Mr. Douglas (Ent. Mo. Mag., March, 1886, p. 249) considers *M. citricola* as identical with *M. flavescens*, Targioni.

Genus CHIONASPIS, Signoret.

Chionaspis dubia, Maskell. Scale-Ins. of N.Z., p. 54; N.Z. Trans., vol. xiv., p. 216.

An insect which I consider to be only a small form of this species occurs at Reefton on leaves of *Leptospermum*, and at Wellington on *Asplenium* and *Cyathodes*. I find nothing except size which can be taken as a clear distinction: the female puparium averages about $\frac{1}{24}$in. in length, and the pellicles are proportionately larger than in the type. The segments of the body are certainly more conspicuously prominent; but there is no character on which I feel justified in considering this form as even a variety.

Chionaspis dysoxyli, Maskell. Scale-Ins. of N.Z., p. 55; N.Z. Trans., vol. xvii., p. 22.

In my paper of 1889 (vol. xxii., p. 135) I mentioned the fact that the males of this species are frequently entirely apterous. I shall presently (*vide post*) have to report the same phenomenon in *Eriococcus hoheriæ*, and an almost similar condition in *Leachia zealandica*. There are thus three of our New Zealand Coccids having males abnormally developed.

I regret that when writing last year I overlooked a paper by Dr. F. Löw (1883) on *Leucaspis pusilla*, in which that species is mentioned, together with *Chionaspis salicis* and *Eriococcus* (*Acanthococcus*) *aceris*, as having apterous males. My only excuse is that I read German with great difficulty. However, I see no harm in recording now a list of the few Coccid species reported as exhibiting this abnormal character. They are less than a dozen out of several hundreds of species known in different parts of the world: and the point is not

without some interest. What is the object of these apterous individuals? In most cases it would appear that their organs, excepting the wings, are fully developed: in *Eriococcus hoheriæ* there seems to be something wanting, but its generative organs are apparently perfect. *Leachia zealandica* and *Gossyparia ulmi* exhibit very small rudimentary wings, which must be quite useless for flight. I have included both in the following list, which gives all the apterous males that I know of at present; also *Lecanium hesperidum*, although I have not yet been able to procure the full text of M. Moniez's paper, and have only gathered from a summary of it that the male is never winged.

Species.	References.
A. Sometimes totally apterous:	
Aspidiotus (?) *sabalis*, Comst. ..	Comstock, 2nd Cornell University Report, 1883, p. 67.
Chionaspis salicis, Linn. ..	Bouché, Stett. Ent. Zeit., 1884, p. 294. Löw, Wiener Ent. Zeit., II., 1883.
Chionaspis fraxini, Signoret (= *C. salicis* ?)	R. Newstead, in lit.
Chionaspis alni, Sign. ..	R. Newstead, in lit.
Chionaspis dysoxyli, Mask. ..	Maskell, N.Z. Trans., vol. xxii., p. 136
Leucaspis pusilla, Löw ..	Löw, Wiener Ent. Zeit., II., 1883.
Lecanium hesperidum ..	Moniez, Comptes Rendus de l'Acad. des Sciences, Feb., 1887.
Eriococcus (*Acanthococcus*) *aceris*, Sign.	Löw, Wiener Ent. Zeit., II., 1883.
Eriococcus hoheriæ, Mask. ..	The present paper.
B. Sometimes with rudimentary wings:	
Gossyparia ulmi, Geoffroy ..	Signoret, Essai, p. 320. Howard, "Insect Life," Aug., 1889.
Leachia zealandica, Mask. ..	The present paper.

As regards the time of the year at which these apterous males emerge, I find that it varies considerably. Mr. Newstead tells me that *C. salicis* and *C. alni* came out in England in July (summer); Mr. Howard states that *G. ulmi* appeared about the 1st May at Washington (spring); here in New Zealand *E. hoheriæ* appeared in May (autumn), *C. dysoxyli* from February to August (autumn and winter), and *L. zealandica* in October (spring). Our winter in this country is, of course, not nearly as severe as that of England or Northern America. But, so far, I have not met with any apterous males in our summer season.

Genus POLIASPIS, Maskell.

Scale-Ins. of N.Z., p. 56; N.Z. Trans., vol. xiv., p. 293.

I venture to put in a few considerations in favour of the retention of *Poliaspis* as a separate genus. Professor Comstock, in his Second Report of the Cornell University Department of

Entomology, 1883, whilst adding to the genus a new species, *P. cycadis*, remarks that he is "far from feeling sure that the genus will prove to be a natural one;" but he gives no reason for this opinion, and, in fact, reverses it by including a species in the genus. Mr. A. Morgan, in the Entom. Monthly Mag. for October, 1888, follows the lead of Professor Comstock (as, indeed, he seems to do all through), and adds two reasons for doubting the generic position of *Poliaspis:* first, that it included only one species when first established, and, secondly, that the chief generic character regarded the abdominal features of the female, and not the shape of the scale or puparium. With reference to his first reason, it is evident that the discovery by Comstock of *P. cycadis* at once destroys it; and the mere fact that originally only one species was known does not in the least prevent the addition hereafter of any number of others. But, besides, it does not seem to me altogether satisfactorily established that, because, in three or four instances quoted by Mr. Morgan, Professor Comstock eliminated genera formed by Signoret, Targioni, &c., which genera only included single species, it must therefore be taken that this must be always agreed to. If it had been said that the formation of a genus, or even of a species, on a single *specimen*, is wrong, I should entirely agree. Moreover, I would advocate simplification as far as it can possibly be carried. But, when a large number of individuals are found occurring plentifully on certain plants, and year after year, and these individuals exhibit some *organic* character (not such trivial things as size, colour, and the like) not found in known genera, I conceive that an entomologist is justified in erecting them into a genus, even of only one species. I have never formed either a species or a genus without very careful examination of as many specimens (sometimes several scores) as I could get hold of; but, having established on single species such genera as *Poliaspis*, *Lecanochiton*, *Inglisia*, *Cœlostoma*, I have had the satisfaction of finding my judgment confirmed by the discovery of other species clearly cognate. Of course, if, after the most careful study, an observer is to be made liable to the overthrow of his work on the ground that somebody else has not seen anything similar to that which he has observed, it will become very difficult to systematize in any branch of science.

Mr. Morgan's second reason is of another class. He says that differences in the abdominal characters of Diaspid females ought not to "subserve generic purposes, as in that case the uniformity of the rule on which the genera of Diaspids have been established becomes imperfect." I am not aware of any "rule" properly so called. Signoret, I observe, remarks that differences in the forms of the puparia may be con-

veniently employed; and, in common with other students of the *Diaspidæ*, I have adopted his plan in most cases. But I would not agree with Mr. Morgan if he intends to say that the forms of the puparia are to be our only generic guides: and I notice that Signoret himself adds that such characters as the arrangement and numbers of the spinnerets may be usefully taken into account. Indeed, I would not venture to use the term "rule" at all in connection with such a study as that of Coccids, which even yet is scarcely more than grazed, as it were, and certainly not deeply broken into. But, rule or no rule, it would still be a question whether uniformity were a necessity. It is good, doubtless, and that is all. In the present case an exception does no harm; especially as the generic separation of *Poliaspis* has been made to depend upon an organic difference requiring for detection close microscopic observation, and not merely a trivial external character which might very possibly be fallacious.

On the whole, therefore, whilst desiring as much as anybody simplification, and deprecating entirely any hasty and superficial eagerness to extend the list of genera, I venture to maintain the separation of *Poliaspis*.

Genus PARLATORIA, Targioni-Tozzetti.

Female puparia elongated or sub-circular, the pellicles terminal or sub-central. Male puparia elongated. Abdomen of female as if crenulated and largely fringed.

This genus has not hither to been reported from this part of the world. Three species are known in Europe and America.

Parlatoria pittospori, sp. nov. Plate I., figs. 5–9.

Female puparium dull dark greenish-grey, sometimes almost black; pellicles green, sub-central. Form sub-elliptical, flattish. Length about $\frac{1}{25}$in.

Male puparium elongated, not carinated. Pellicle terminal. Length about $\frac{1}{30}$in.

Female dark-brown, segmented, sub-elliptical but shrivelling at gestation to globular. Posterior extremity broadly rounded, ending in six trifoliate lobes not close together, and with equal spaces between them. Margin conspicuously crenulated, and bearing in each crenulation and between the lobes a fringe of broad scaly hairs which are deeply serrated at the ends only. This fringe extends along the margin nearly as high up as the rostral region. The margin is considerably thickened on the last segment, and just within it is a row of curved narrow markings which may be elongated spinnerets. There are four spinneret-groups: the upper laterals have 13–16 orifices, the lower pair 11–13: many single tubular spinnerets on the dorsal surface.

Adult male unknown.

Hab. In Australia, on *Pittosporum undulatum.* Mr. French has furnished me with a large number of specimens.

The females of each species of this genus differ only very slightly indeed in the character of their lobes and fringe. In *P. proteus,* Curtis, the scaly hairs are serrated on the sides and not at the ends. *P. zizyphi,* Lucas, has an oblong, distinctly black puparium, not at all like that of our species. *P. pergandii,* Comstock, seems much nearer; but, apart from the colour of the insect and of its puparium, the numbers of spinnerets in the groups differ; its puparium is also more widely expanded posteriorly, and its pellicles are at one end.

Parlatoria myrtus, sp. nov. Plate I., figs. 10–12.

Female puparium light yellowish-brown, or whitish; pellicles dark-green. Form pyriform, flat, the pellicles terminal. Length about $\frac{1}{20}$in.

Male puparium of similar colour, but smaller and narrower; not carinated.

Adult female brown, more or less elongated, shrivelling at gestation. Abdominal extremity broadly rounded, conspicuously crenulated, ending in six lobes, and bearing the usual fringe of scaly hairs which are serrated at the ends. These scales are broader than those of the last species, especially the anterior ones, which are frequently also serrated at the sides. The fringe extends along the margin not quite as far as the rostral region. Four groups of spinnerets: upper laterals with 12–14 orifices, lower pair 10–12.

Adult male unknown.

Hab. In Australia, on *Myrtus communis* and *Viburnum* sp. Mr. French has sent me several specimens.

The differentiating characters of this species are not much clearer than those of the last, but I think them sufficient. *P. proteus,* Curtis, has the same lateral serrations on the scaly hairs of the abdomen, but the spinneret orifices are less numerous, and the puparium differs considerably. I have satisfied myself by comparison that *P. pergandii* is quite different. Mr. Douglas says of *P. proteus* that the "second exuviæ are long-oval, and conspicuously large." This character might possibly apply to *P. pittospori,* but certainly not to *P. myrtus.*

Group LECANIDINÆ.

Subdivision LECANODIASPIDÆ.

Genus LECANOCHITON, Maskell.

Lecanochiton minor, sp. nov. Plate III., figs. 1–14.

Test of adult female brown, hard, horny, and tough; rather thick; nearly circular; upper surface flat; form cylindrical,

with sloping sides. Upper surface formed almost entirely of the pellicle of the second stage. Diameter of test at the base about $\frac{1}{18}$in.

Test of male elongated, white or yellow, glassy, convex, divided into segments as in most *Lecanidinæ*, and with a posterior hinged plate for egress of the insect. In some specimens a quantity of white cotton is visible over the test. Length about $\frac{1}{24}$in.

Adult female convex, filling the test, brown; base circular. Antennæ with apparently only four joints, of which the third is very long, the others very short; on the last joint are a few hairs. Feet absent. Some very minute hairs are placed in a circle near the margin. Abdominal cleft conspicuous; lobes adjacent, sub-conical. Anogenital ring with numerous hairs. Mentum short and thick, dimerous.

Female of second stage light-brown, flattish, elliptical, naked, active; length about $\frac{1}{30}$in. Abdominal cleft and lobes present. Antennæ of six joints. Feet present, slender.

Larva flat, elliptical, brown, naked, active. Form normal of *Lecanidinæ*, with conspicuous abdominal cleft and lobes. Antennæ rather long, with six joints, the third the longest; on the last are a few hairs, of which one is a good deal longer than the rest. The anal ring appears to have six hairs. Length of larva abbut $\frac{1}{40}$in.

Adult male reddish-brown, the wings rather thick. Antennæ with ten joints, the last five of which are not moniliform, but elongated. The abdominal spike is long and curved. Length of the insect, exclusive of the spike, about $\frac{1}{25}$in.

Hab. In New Zealand, on *Metrosideros robusta*, in the Reefton district.

This is much smaller than *Lecanochiton metrosideri*, Mask., and is easily distinguished by its very regular sub-cylindrical female test. Indeed, at first sight the test may be easily mistaken for a pupa of some Aleurodid; but the pellicle of the second stage, as well as the antennæ and lobes of the enclosed insect, at once proves its Lecanid character. The antennæ of the adult are peculiar, and perhaps the long third joint may really be made up of three or four atrophied and confused joints. The male antenna differs from that of *L. metrosideri* in not having the last five joints moniliform.

Genus INGLISIA, Maskell.

Inglisia fagi, sp. nov. Plate III., figs. 15–25.

Test of adult female usually conical, less frequently elongato-convex, open beneath, with a distinct fringe of small segments which are often sharply triangular; main segments large, patched with brownish-green, or often altogether light-green, sometimes white, distinctly striated with air-cells,

which are generally largest near the margins of the segments. Length of test often reaching $\frac{1}{5}$in., height from $\frac{1}{10}$in. to $\frac{1}{7}$in. Texture glassy, very thin and brittle.

Test of male elongated, elliptical, only slightly convex; segments large, striated; fringe conspicuous; colour greenish; texture glassy, very thin and brittle: length about $\frac{1}{12}$in.

Adult female greenish or brownish, filling the test previous to gestation, afterwards shrivelling. Margin set rather closely with conical spines. Antennae of six joints, the first two short, the third almost half as long as the whole antenna, the fourth and fifth equal and rather longer than the first, the sixth rather more than half as long as the third. On the sixth joint several hairs, of which one is much longer than the rest. Foot normal: digitules four, the lower pair being rather widely dilated. Anogenital ring with six hairs. Abdominal lobes rather large. On the dorsum are a great number of tubular spinnerets, and also (mostly on the posterior region) groups of large, simple, circular orifices. Mentum dimerous.

Female of second stage light-brown or with a greenish tinge. General form elongate-elliptical, the dorsum raised to a narrow ridge. Abdominal cleft and lobes conspicuous. Spiracular spines rather long, and there are a few other small marginal spines. Length about $\frac{1}{15}$in.

Larva greenish-yellow, elliptical, naked, active; length about $\frac{1}{50}$in. Antennæ of six joints, the first five short and sub-equal, the sixth nearly as long as the rest together. Feet rather thick; tibia rather more than half as long as the tarsus. Abdominal cleft short, with a small brush-like group of hairs from the anal ring; dorsal lobes rather large, with long setæ. Mentum large, dimerous.

Adult male brown, patched with green. Length of body (exclusive of abdominal spike) about $\frac{1}{16}$in. Antennæ of ten joints, the first two very short, the rest long and slender; the fourth, fifth, and sixth are the longest, the tenth fusiform; all the joints bear several hairs, and on the last there are three long hairs bearing knobs at the end. Dorsal eyes, four; ventral eyes, four: ocelli, two. Abdominal spike long, and slightly dilated at three-fourths of its length; the basal tubercle bears four short setæ.

Hab. On *Fagus* var. sp., Reefton district, New Zealand.

This insect exhibits some characters of both *I. leptospermi* and *I. ornata*, chiefly in the varying form of its test. I do not lay much stress on colour, although I have never seen *I. leptospermi* otherwise than pure white or very faint pink, or *I. ornata* otherwise than brown. More reliable differences are in the six-jointed antenna of the female and the much longer abdominal spike of the male. The large green tests of this insect

are very handsome, but so brittle that they scarcely bear any handling.

Subdivision LECANIDÆ.

Genus LECANIUM, Illiger.

Lecanium cassiniæ, sp. nov. Plate II., figs. 10–19.

Adult female naked, red-brown in colour, semi-globular, hollow beneath, attached to the plant by its edges, which are not recurved outwards; diameter averaging about $\frac{1}{16}$in. Antennæ of eight joints, the third and fourth the longest, the seventh the shortest; a few longish hairs on the last joint. Feet normal; tarsus nearly as long as the tibia; upper digitules fine hairs, lower pair rather thick and dilated. Mentum dimerous. Anogenital ring with numerous hairs; lobes roundly triangular, adjacent. Epidermis marked with great numbers of irregularly-shaped semi-translucent cells. Margin bearing slender spiny hairs. On the dorsum there are several minute spines. At the spiracles are pairs of conical spines with a group of simple circular spinneret-orifices at the base of each; and close to the abdominal cleft a great many similar orifices are visible, but not in groups. On the dorsum, in most specimens, may be made out obscurely one longitudinal and two transverse carinations; but the insect often appears smooth.

Female of second stage naked, active, flattish, elliptical; colour red-brown; length about $\frac{1}{35}$in. Dorsal carinations distinct and usually conspicuous. Antennæ of six joints. Marginal hairs as in the adult; the spiracular spines are rather long.

Larva dull-yellow, of the normal elliptical flattish form, naked, active; length about $\frac{1}{60}$in. Antennæ of six joints. Abdominal cleft and lobes normal.

Hab. In New Zealand, on *Cassinia leptophylla*, Wellington, Wairarapa, Hawke's Bay, and probably elsewhere. As *Cassinia* is in many parts of this country a great nuisance and a useless encumbrance, the occurrence on it of a Lecanid, often in great numbers, may be considered as a satisfactory thing; but, although sometimes the plants over a large area are quite blackened with the fungus induced by the "honeydew" of the insect, I cannot find that any good results have followed from its visitation.

L. cassiniæ is nearly allied to *L. oleæ*, Bernard, and I at one time thought that it might be identical, so that I added *Cassinia* to the list of food-plants of that species in my book on scale-insects in 1887. I believe, however, that it must be separated: it differs from *L. oleæ* not only in colour (which is not of great importance), but considerably in size, and principally in the markings of the skin. These, in *L. oleæ*, are regularly oval, or round; in *L. cassiniæ* they are quite irregular, approaching in-

deed those of *L. depressum*, Targioni, though they are more translucent than in the latter. In point of fact, there would seem to be much similarity in the markings of several species of Lecanium, and identification is not easy. Comstock (Ag. Report, 1880, p. 336) says that the anogenital ring of *L. oleæ* has only six hairs: this may serve to further distinguish *L. cassiniæ*, where, as in most insects of the genus, these hairs are very numerous.

Lecanium longulum, Douglas.

Lecanium chirimoliæ, mihi, N.Z. Trans., vol. xxii., 1889, p. 137.

In the *Entomologist's Monthly Magazine*, vol. xxiv., 1887, p. 97, Mr. J. W. Douglas describes a species, *L. longulum*, with food-plant (amongst others) *Annona muricata*. I had not seen his description when writing last year on *L. chirimoliæ*, but have since not only read it but had the opportunity of examining two specimens which Mr. Douglas has been good enough to send me. I am compelled to consider the two species as identical, and to abandon mine. The extremities of *L. longulum* are rather more broadly rounded than in my own types, but I do not consider the difference as important. Mr. Douglas is inclined to think that *L. longulum* has antennæ of eight joints, but he is doubtful on the point. In my Fijian species the antenna has certainly seven joints, and I believe this will also be the case with the other. The same genus of plants furnishes a food-plant for both insects. I think that the abdominal cleft and the distance of the antennæ from the cephalic extremity are perhaps a little longer in my specimens than in those of Mr. Douglas. The dorsal "long pale clear oval spot" mentioned in the description of *L. longulum* is not to be detected in the dead dried specimens before me. But, on the whole, I deem it best to identify the two species, and therefore to abandon *L. chirimoliæ* in favour of Mr. Douglas.

Lecanium ribis, Fitch, Trans. of New York Agric. Soc., 1856; Signoret, Essai, p. 462.

Adult female dark-brown in colour, or with a slight reddish tinge. Form semi-globular, attached to the plant by the edges, which are not broadly flattened; becoming hollow at gestation, with eggs and larvæ beneath. Diameter averaging about $\frac{1}{3}$in., but sometimes reaching $\frac{1}{6}$in. Epidermis not carinated, nor exhibiting any oval perforations or tessellated markings; but near the margins there are many fine transverse corrugations or small wrinkles.

Female of second stage yellow or yellowish-brown, flattish, elongated, elliptical. Length about $\frac{1}{18}$in. It is not cari-

nated, but there is often a median very slight dorsal elevation, and the margins are finely corrugated as in the adult.

Hab. On gooseberries, black and red currants, in New Zealand, Europe, and America. My New Zealand specimens were received from Mr. W. W. Smith, of Ashburton, who informs me that the insect is common at that place in gardens. This is to be regretted, as it is likely to spread with rapidity and to do much damage.

This species is closely allied to *L. hemisphæricum*, Targioni, to *L. hibernaculorum*, Boisduval, and to *L. rugosum*, Signoret. It differs from the two first in the absence of markings on the skin, and from the last (which attacks peach-trees) in its general smoothness, and a few other particulars.

Lecanium frenchii, sp. nov. Plate IV., figs. 1–8.

Adult female very dark-brown, or rich glossy black; form sub-circular, very slightly convex; diameter about $\frac{1}{8}$in. Dorsal epidermis covered with numerous minute pits, and divided into irregular tessellations by smooth narrow bands, of which one is median and longitudinal, the others ramifying from it towards the margin. If the insect is macerated in potash the small dorsal pit-like marks appear as oval spots; the median band is not noticeable, but the transverse ones appear like cracks or slits in the body. Margin fringed with numerous very small fan-like processes, attached by a very short stalk, and with a short tubular canal extending from each into the body; this fringe is usually yellow. Antennæ slender, with eight joints. Feet very slender; upper digitules fine knobbed hairs, lower pair slightly dilated; on the trochanter a longish hair, and I think a spine on the tibia. The spiracular spines are very short, placed in small depressions, and not extending beyond the margin; they are somewhat club-shaped and thick. The abdominal cleft is rather deep; the lobes are triangular, small, adjacent. Anogenital ring with numerous hairs. At gestation the body becomes slightly hollow beneath. I think the insect is oviparous: at least, empty egg-shells are to be found beneath the body, and I have not seen any larvæ within the abdomen.

Female of the second stage yellow or light-brown, flat, elongated; length reaching sometimes $\frac{1}{11}$in. On the dorsum, in some specimens, fragments of a white, glassy test may be seen; but there is no fringe, except the small fan-like processes as in the adult, and these are not noticeable until towards the end of this stage. Antennæ of six joints. Feet, spines, and anogenital ring as in the adult.

Larva and male unknown: the male pupa has a white waxy test.

Hab. In Australia, on *Banksia australis*. My specimens

are from Melbourne, sent by Mr. French, whose name I am glad to attach to this very handsome species.

The rich black colour and the curious fringe of small fans on the margin very clearly distinguish this insect. Viewed with a low power of the microscope, the tessellations and pitted surface of the dorsum are very curious. It would belong probably to Dr. Signoret's first series of the genus *Lecanium* (Essai, p. 226), though exceptional in its oviparous habit, and nearest, possibly, to *L. tessellatum*, Sign. But no species hitherto reported (as far as I know) exhibits a similar fringe.

Group COCCIDINÆ.

Subdivision ACANTHOCOCCIDÆ.

Genus SOLENOPHORA, Maskell.

Solenophora corokiæ, Maskell. N.Z. Trans., vol. xxii., p. 141. Plate V., figs. 1–7.

I had not last year seen anything but the adult female of this species; I can now add the second stage and the male.

Female of second stage covered with a dirty-yellow or brownish loose test, convex, elliptical, from which protrude usually six or seven whitish, rather thick, cottony processes. The insect is red, elliptical in the cephalic and thoracic regions, tapering to a short, thick, abdominal prolongation terminating in two anal tubercles, each bearing a seta. Anal ring with six hairs. Feet entirely absent. Antennæ atrophied, a single conical joint, bearing a few hairs. Body covered with great number of spinneret-tubes with figure-of-8 orifices, and some circular. Length of insect about $\frac{1}{26}$in.

Male pupa enclosed in a cylindrical, yellow, felted sac, of which the extremity is somewhat flattened; length about $\frac{1}{20}$in.

Adult male red-brown in colour; length about $\frac{1}{40}$in. The thorax is rather large, the abdomen somewhat short and squat. Antennæ of nine joints, the first two very short, the third and fourth the longest, the rest sub-equal; all the joints bear hairs, and on the last are three long hairs knobbed at the end. Dorsal eyes, two; ventral eyes, two: ocelli, two. Abdominal spike short, conical, with the curved appendage noticeable amongst *Acanthococcidæ*.

As the second-stage female in this species is apodous, as in *S. fagi*, the character becomes important enough to be generic, and *Solenophora* is thus, I believe, a quite exceptional genus in the group. *Nidularia*, Targioni, and *Antonina*, Signoret, lose the feet in the adult state, but retain them in the second stage. The male of *S. corokiæ* offers no particular characters.

Genus RHIZOCOCCUS, Signoret.

Rhizococcus totaræ, Maskell. N.Z. Trans., vol. xxii., p. 142.

The male sac of this species is snowy-white, very loose in texture, and formed of rather coarse threads; length about $\frac{1}{20}$in.

The adult male is of normal form, orange-red in colour, the abdomen yellow; the two cottony "tails" are rather longer than usual; the spike exhibits a curved appendage. Antennæ of nine joints, of which the last three are moniliform; the ninth is very small. Dorsal eyes, two; ventral eyes, two: ocelli, two.

There is no particularly distinguishing character about this male.

Rhizococcus intermedius, sp. nov. Plate V., figs. 8–11.

Adult female sub-globular, naked; sometimes conspicuously segmented, sometimes nearly smooth; colour yellow, or red, or sometimes greenish. It affects generally the axils, or the terminal buds, of young shoots of the plant. The epidermis has a somewhat rough appearance. Anal tubercles rather large, but not usually visible, owing to the position of the insect on the twig. On the dorsum there are three pairs of small spines, and on the margin a double row of spines not set very close together; from all the spines spring glassy filaments which on the margin are sometimes rather long. The anogenital ring has eight hairs. Mentum dimerous. Antennæ of six joints, of which the fourth and fifth are the shortest. Feet normal; the tibia is rather more than half as long as the tarsus; all the digitules are fine hairs.

Larva reddish-yellow, active, naked, flattish, elliptical, tapering posteriorly, segmented. Length about $\frac{1}{70}$in. Antennæ of six joints. Margin bearing several conical spines. On the dorsum there are five pairs of very large spines, one pair near the cephalic extremity, the other four pairs on the thoracic segments; also a few other smaller single spines.

Male pupa in a dull-white closely-felted sac.

Adult male brown; length about $\frac{1}{24}$in. Thorax rather large; abdomen somewhat thick, the last segment bearing two rather dilated tubercles, each with two longish setæ bearing the usual long cottony "tails." Antennæ of ten joints, the first two very short, the next three very long, the sixth shorter, the last three the shortest and sub-equal; all bearing several hairs. Haltere sub-cylindrical, with one long curved seta. Abdominal spike short.

Hab. In New Zealand, on *Fagus menziesii*, Reefton.

This insect is not far removed from *R. maculatus*, mihi,

and when smooth its colour is nearly all that there is to distinguish it to the naked eye, at least in the adult and larval stages; I have not been able to observe the second female stage. But on close examination the arrangement of the dorsal spines is sufficient to separate it. The three pairs on the adult, and the five pairs on the larva, which I have found to be constant in a large number of specimens examined, are good characters. In *R. maculatus* the adult has no dorsal spines, while the larva has twenty. As both of these species affect the same genus of food-plant (though seemingly not the same species), I am unable to look upon the variation of habitat as sufficient to account for the differences observable. At the same time I am not so clear on the point as to positively insist on a specific separation of the two insects.

Genus Eriococcus, Targioni-Tozzetti.

Eriococcus hoheriæ, Maskell. Scale-Ins. of N.Z., p. 93; N.Z. Trans., vol. xii., p. 298.

Two apterous forms of the male of this species emerged in May last from amongst a number of sacs, male and female, sent to me by Mr. Raithby.

This apterous form is deep-red in colour, rather less than $\frac{1}{30}$in. in length, being thus smaller than the winged form. The antennæ have only nine joints, the head is not fully separate from the thorax, and there seem to be only two simple eyes. The abdominal spike is normal, though rather long, and when the insect was alive I could detect the penis; the tubercle at each side of the base of the spike is perhaps more pronounced than in the winged form, and I could see no cottony "tails." The feet appear to be rather thick and swollen. Both specimens observed were very active, and as far as could be seen were sufficiently apt for generation.

I have already discussed (*ante*, under *C. dysoxyli*) the general question of apterous males. There is this difference between the present species and (I believe) all the others: that in *E. hoheriæ* the whole form is, so to speak, intermediate. The junction of the head with the thorax, the nine-jointed antenna, and the two simple eyes, are clearly imperfections; whereas in other apterous species the only organs and characters wanting are the wings. I am unable to add to the present paper a figure of this interesting and peculiar insect; but will endeavour to do so next year if I then publish a paper.

Eriococcus multispinus, Maskell, var. *lævigatus*, var. nov.

Mr. French has sent me an Australian insect which seems to be only a variety of *E. multispinus*, distinguished by having a smooth sac without the processes characterizing the New Zealand species on *Knightia*. I attach it to the above species

on account of the short blunt conical form of the very numerous dorsal spines and the short antennæ with six sub-equal joints, characters distinguishing *E. multispinus* from *E. pallidus*, in which the spines are slender and the third antennal joint long, and from *E. raithbyi*, which has no dorsal spines, and seven-jointed antennæ.

Hab. In Australia, on *Acacia armata*.

Eriococcus pallidus, Maskell. Scale-Ins. of N.Z., p. 95; N.Z. Trans., vol. xvii., p. 29.

This species exhibits several variations in the arrangement of the dorsal spines, and slightly in the size and colour of the sac.

On *Elæocarpus dentatus* the type-form occurs, in which the sac is large (about $\frac{1}{9}$in.) and light-coloured, and the dorsal spines are arranged in a single transverse row on each segment. On *Myoporum lætum* the sac is also large and light, the spines being usually as in the type, but frequently almost wanting on the abdominal segments. On *Atherosperma novæ-zealandiæ* and on *Fagus menziesii* the sac is smaller (about $\frac{1}{15}$in.) and dark-coloured; the enclosed insect is also rather dark, and the dorsal spines are more numerous than in the type, each segment exhibiting several scattered spines. On *Fagus menziesii*, again, occurs another variety with a small, dark, rather solid sac; the dorsal spines being less numerous than in the last form, and more approaching to longitudinal rows on the abdomen.

I leave all these as variations of one species chiefly on account of the antenna, which I find similar in all, with six joints, of which five are sub-equal, but the third joint is longer, usually equal to any two of the others. This character, together with the slenderness of the spines, distinguishes *E. pallidus* from *E. multispinus*, irrespective of the variations in the sac, which are not indeed so important.

The varieties here mentioned occur at Wellington and Reefton. Doubtless forms nearly similar may be found elsewhere and on other trees.

Eriococcus danthoniæ, sp. nov. Plate V., figs. 12–17.

Sac of adult female pure-white in colour, very loose in texture; form elliptical; length about $\frac{1}{10}$in.

Sac of male pure-white, similar to that of the female, but smaller; length about $\frac{1}{20}$in.

Larva brownish-yellow; elongated, flattish, active, naked; length about $\frac{1}{40}$in. Antennæ short, thick, of six sub-equal joints; the last joint bears some longish hairs, one a good deal longer than the others. Feet rather thick; all the digitules are fine hairs. Anal tubercles large and prominent.

On the margins a row of strong conical spines, usually bearing tubular cottony filaments. On the dorsum a median longitudinal double row of conical spines, much smaller than those at the margin.

Adult female dull brownish-yellow, or sometimes dull-pink; elongated; segmented; length averaging about $\frac{1}{11}$in., width about $\frac{1}{40}$in., the insect being thus rather unusually long and slender. Antennæ of seven sub-equal joints, the last bearing numerous hairs. The feet, as usual in the genus, have the tarsus longer than the tibia; all the digitules are fine hairs, the lower pair rather long. Anal tubercles conspicuous; anogenital ring with eight hairs. Margins bearing a row of strong conical spines, three on each side, on each segment; from these spring usually cottony filaments. On the dorsum a large number of simple circular spinneret-orifices, and several very slender spines.

Adult male pinkish or light-red, the dorsal part of the thorax yellowish; length of body about $\frac{1}{25}$in. Abdomen rather slender; spike short; terminal segment bearing on each side two longish setæ, from which spring the usual long cottony "tails." Antennæ of ten joints, the third much the longest and somewhat dilated at its tip; all the joints, especially the last three, are hairy. Dorsal eyes, two; ventral eyes, two: ocelli, two. The wings are perhaps rather more solid than usual.

Hab. On *Danthonia cunninghamii*, Reefton district, New Zealand, frequently clustered thickly between the culms and sheathing-leaves of the grass.

The snow-white, loosely-constructed sac and the elongated slender form of the female in this species readily distinguish it. The seven-jointed antenna is abnormal, but I have already, in the case of *E. raithbyi* (Trans., vol. xxii., p. 146), said that I do not consider this point, taken by itself, as sufficient to remove an insect from the genus. There is no species indigenous to this country which can be mistaken for it, and it is not at all likely to have been introduced.

Eriococcus paradoxus, Maskell. Trans. Roy. Soc. South Australia, 1888, p. 104.

In my description of this insect I mentioned as its food-plant *Pittosporum undulatum*. Mr. French has sent me from Melbourne specimens on *Eucalyptus goniocalyx:* these specimens are larger than those which I received from South Australia.

Eriococcus leptospermi, sp. nov. Plate IV., figs. 9–14.

Sac of female dirty-white, or yellowish, usually accompanied by much black fungus; felted, elliptical; length about $\frac{1}{12}$in.

Sac of male white, smaller than that of the female.

Larva yellow, flattish, naked, active, elliptical; length about $\frac{1}{70}$in. Margin bearing spines set rather closely together; and on the dorsum are two median longitudinal rows of similar spines. Antennæ of six joints. Feet rather thick, normal of the genus. Anal tubercles scarcely prominent, with long setæ.

Female of second stage red or dark-brown, flattish, active, elliptical; length about $\frac{1}{45}$ in. Marginal spines stronger than in the larva, and bearing glassy tubes forming an irregular fringe. Anal tubercles large and conspicuous. Antennæ of six joints.

Adult female red; elliptical in the cephalic and thoracic regions, and tapering posteriorly. Length about $\frac{1}{18}$in. Margins bearing double rows of spines; dorsum with two median longitudinal series of spines, and several others singly. Antennæ of six joints, the third the longest. Feet normal of the genus, the tibia much shorter than the tarsus; all the digitules are fine knobbed hairs. Anal tubercles two, conspicuous, with short setæ. Anogenital ring with eight hairs.

Adult male reddish-brown; length about $\frac{1}{35}$in. It appears to exhibit no special features.

Hab. In Australia, on bark of *Leptospermum lævigatum*. My specimens were sent to me by Mr. French.

This insect, in the general peg-top shape of the adult female, resembles *E. hoheriæ*, Mask., a New Zealand species which also constructs similar sacs on the bark of its food-plant. The Australian form differs in the character of the spines, in having only two anal tubercles, and in not having its feet atrophied in the adult stage. Both species seem to be alike in their tendency to be covered with black fungus, which renders them very inconspicuous on the bark of the tree.

Subdivision DACTYLOPIDÆ.

Genus DACTYLOPIUS, Costa.

Dactylopius poæ, Maskell. Scale-Ins. of N.Z., p. 101; N.Z. Trans., vol. xi., p. 220.

I received some months ago from Mr. Raithby a number of insects which I cannot distinguish from this species, but which inhabited, instead of the roots of grasses underground, the tangled moss and small climbing-plants clothing the roots and stems of various trees in the forests of the Reefton district. Like the insects from grass, as mentioned in my last paper (Trans., vol. xxii., p. 150), these from trees seemed not to excrete a great quantity of cotton in their natural habitation, but on being removed to tubes covered themselves at once with large tufts of cotton.

Genus Ripersia, Signoret.

Female insects of the general form of *Dactylopius*, but having antennæ of six joints: naked, or covered with cotton or meal.

Ripersia fagi, sp. nov. Plate IV., figs. 15–20.

Adult female sub-globular or slightly elongated, naked; generally distinctly segmented, but in specimens which have been parasitised the segments become very indistinct; colour dark-red or brown; length about $\frac{1}{15}$in. It appears to affect chiefly the *upper* surface of the leaves. Anal tubercles two, very inconspicuous, and just above them are two small tubercular lobules; all the four bear setæ and also short hairs, and these bear white cottony excretion, which is sometimes amalgamated in a mass, sometimes in the form of separate pencils; and from the anogenital ring springs another cottony pencil. Anogenital ring with six hairs. Antennæ somewhat slender, with six joints which have the form of those of *Dactylopius:* the first two are short, the third about as long as the first and second together, fourth and fifth equal to the second, sixth rather longer than the third, fusiform, with a few short hairs. Feet rather strong and thick: in the two anterior pairs the tarsus is almost as long as the tibia, but in the posterior pair the tibia is nearly twice as long as the tarsus; the digitules are all fine hairs. Mentum trimerous. There are no dorsal or marginal spines, but a great number of circular simple spinnerets: these are particularly numerous on the anal tubercles and lobules.

Female of the second stage flattish, elongated, slightly segmented; colour varying from yellow to brown, red, or dark-green; length about $\frac{1}{30}$in. The extremities are truncate. Anal tubercles inconspicuous, but a little more prominent than in the adult, and with a pair of lobules anterior to them; all these bear setæ and short hairs. Antennæ of six rather thick joints: the first five are sub-equal, the third being rather the longest; the sixth is about half as long as all the rest together. Feet rather thick; the posterior tarsi are as long as the tibiæ. Anal ring with six hairs.

Larva active, elongated, distinctly segmented, flattish, usually expanded posteriorly; colour yellow; length about $\frac{1}{45}$in. Anal tubercles very inconspicuous, setiferous; the anterior lobules are not noticeable. Antennæ with six rather thick joints, sub-equal, except the last which is nearly as long as the rest together. Feet thick; all the tarsi are about as long as the tibiæ. Anal ring large, with six hairs.

Male unknown.

Hab. In New Zealand, on *Fagus menziesii*, Reefton district.

Only two species of this genus have been hitherto reported —*R. corynephori*, Sign., in Europe, and *R. leptospermi*, Mask., from Australia. The present insect is so evidently a Dactylopid, from the very inconspicuous anal tubercles and the form of the antennæ, that, although in outward appearance it may easily be mistaken for a *Rhizococcus*, it cannot be placed in that genus. Moreover, the tibiæ of the adult, being equal to or longer than the tarsi, remove it from the *Acanthococcidæ*; and, as Signoret established the genus *Ripersia* to include *Dactylopidæ* having six-jointed antennæ, I have no hesitation in ascribing to that genus this insect.

Subdivision MONOPHLEBIDÆ.

Genus LEACHIA, Signoret.

Adult females naked, or producing not much cotton; antennæ of eleven joints, each of which is more or less cylindrical, the base not being smaller than the tip.

Adult males presenting no lateral tassels on the abdominal segments, but at the extremity tubercular lobes bearing bunches of setæ.

Signoret distinguishes this genus from *Guerinia*, Targioni, by the form of the joints in the female antenna, which in *Leachia* are cylindrical, and in *Guerinia* narrowed at the base. Seeing that he also makes this character the *only* one separating *Guerinia* from *Monophlebus*, and considering that it seemed by no means to be of great importance, I united the genus *Guerinia* to *Monophlebus* in the synopsis of genera given in my "Scale-Insects of New Zealand," p. 90, and I made *Leachia* separate from both these genera on the more important character of the absence of lateral tassels in the male. Whatever may be the right view as regards *Guerinia*, I have no hesitation in maintaining the distinction between *Leachia* and *Monophlebus*, especially since I have now had opportunities of studying both genera in the insect about to be described and in *Monophlebus crawfordi*, mihi, from Australia. This last insect exhibits, in the male, undoubted abdominal tassels; the insect herein given has none.

There is a point given by Signoret (Essai, p. 393) as a character of *Leachia*: "Eyes facetted, surrounding a large portion of the head, or almost pedunculated." It will be seen that our New Zealand insect differs from this in the peculiar form of the eye, divided into eight simple segments, and the pair forming a ring. But in this it differs also from all other Coccids hitherto described, as far as I know; and I do not feel inclined to propose a new genus for it based only on this character, until at least another species is found possessing it.

Yet another character is ascribed to *Leachia* by Signoret, "Male presenting at the extremity of the abdomen tubercular lobes;" and in his descriptions of *L. braziliensis* and *L. fusci-pennis* he mentions these lobes as bearing "bundles of hairs." It will be seen that our insect presents also this character, and thus all the more clearly belongs to this genus.

Leachia zealandica, sp. nov. Plate VI., figs. 1–17.

Adult female red or reddish-brown in colour, excreting white meal and cotton, and also some longish, curling, rather coarse, yellow threads. At the abdominal extremity usually there are two pencils of white cotton, and somewhat thicker quantity of meal; also often on the last segments short white cottony lateral tassels, as in some *Dactylopidæ*. Body elongated, distinctly segmented, elliptical, convex above; length varying—some specimens reach $\frac{1}{5}$in., but most are smaller. Rostrum and mentum very large and long: mentum trimerous, with several hairs at the tip. Antennæ of moderate length, not conical, with eleven cylindrical joints, of which nine are sub-equal, the fourth and fifth being a good deal shorter than the rest; the last joint is fusiform. All the joints bear several hairs, and at the tip of the last there are two strong spiny hairs curving inwards towards each other. Feet rather strong; tibia not quite as long as the tarsus; all the joints are hairy, the hairs on the inner margins stronger than the rest; on the trochanter is a long seta, and on the end of the tibia a strong spine. The claw has a minute tooth on the inner edge; there are no tarsal digitules; at the base of the claw is a sub-conical process with a single rather long digitule with dilated end. The anogenital ring is large, and (unusual in the group) bears elongate pores and several hairs, of which six are much larger than the rest: these hairs bear the pencils of cotton noticed above. Around the ring is a patch containing numbers of circular spinneret-orifices. Epidermis covered with numerous hairs, some pretty long, some small and spiny, interspersed with circular spinnerets: the longer hairs frequently form tufts.

Larva yellowish-red, covered with white meal; active, elongated, segmented; length about $\frac{1}{77}$in. Two thick pencils of cotton at the abdominal extremity, and on the last three or four segments are lateral tassels of cotton as in *Dactylopius*. Antennæ of seven joints—the first and second equal, the third and fourth very short, the fifth and sixth longer but less than the two first, the last large, fusiform, pointed, and half as long as all the rest together; all the joints hairy, and on the last are two curved spines as in the adult. Feet rather thick; tibia shorter than the tarsus; claw toothed, and with a process and digitule as in the adult. Rostrum and mentum large;

setæ very long. Anal ring and terminal hairs as in the adult.

Adult male red or reddish-yellow, rather large; length of body about $\frac{1}{12}$in.; covered with much white meal, which, with the numerous hairs, renders it difficult to examine dead specimens, especially the eyes. No lateral abdominal tassels, but the last segment is somewhat dilated and tubercular, bearing on each side a bundle of from four to six strong and rather long setæ, bearing two very long and very thick white cottony "tails." Wings large, thick, and strong; the nervures brown, strong, and conspicuous; colour of wings darkish-grey, powdered with much white meal. Haltere very large, flat, fusiform, bearing two hooked setæ, not at the extremity, but on the anterior margin. Head slightly produced in front: eyes divided, each formed of eight tubercular segments, almost encircling the head, but not quite meeting dorsally and ventrally; each small tubercle in the ring may possibly be very obscurely facetted. Colour of eyes dark-brown. A small simple ocellus is placed behind the middle of each half-ring. Antennæ almost as long as the body, with ten joints—the first two smooth; the rest, except the last, compressed in the middle, and bearing each two rings of long hairs; the last fusiform, hairy, with two curved spines as in the female. Feet very long and slender, hairy; claw bearing a minute tooth on the inner margin; a single process and digitule, as in the female.

Amongst a large number of winged males received alive from Reefton early in October there were several specimens almost apterous, exhibiting very small, useless, rudimentary wings. With the exception of this character, however, I see nothing to distinguish them from the others: they are similar in the eyes, feet, and antennæ; the head is separate from the thorax; and they are as active as their winged brethren.

Hab. In New Zealand, on several trees—*Podocarpus totara*, *Fagus* var. sp., *Cupressus dacrydioides*, &c.—in the forests of the Reefton district. Mr. Raithby has kindly furnished me with many specimens of both males and females.

As remarked above, the absence of lateral abdominal tassels in the male, with its tubercular extremity bearing more than two setæ, and the eleven-jointed cylindrical antenna of the female, seem to me to bring this insect fairly within the genus *Leachia*. The very peculiar eyes of the male have not their counterpart in any other Coccid with which I am yet acquainted. With regard to the anogenital ring of the female, this is certainly rather abnormal, as the ring in the *Monophlebidæ* is normally a simple orifice, without hairs or pores; but I find Signoret, although in his generic characters he includes a simple ring, stating that in *L. braziliensis* the anus is "surrounded by a large number of spinnerets and long hairs,"

and that in *L. fuscipennis* the ring is "hidden by a good deal of pubescence." The character is therefore one which ought perhaps to be considered generic; but in the absence of information as to such genera as *Porphyrophora*, *Ortonia*, and others, in which I can find no definite statements as to the anogenital ring, I have hesitated to include it above as generic.

In outward appearance, to the naked eye, a live female of *L. zealandica* might be easily taken for a *Cœlostoma;* but the presence of the rostrum and mentum at once distinguishes it from that genus. The winged form of the male, both in colour and size, resembles somewhat that of *Icerya purchasi;* but the character of the eyes is a clear distinction. Another somewhat distinctive character is the claw, with its single digitule, in both sexes.

Genus MONOPHLEBUS, Leach.

Monophlebus crawfordi, Maskell. Trans. of Roy. Soc. South Australia, 1887–88, p. 108.

Mr. A. Koebele, in the account of his "Trip to Australia to investigate the Natural Enemies of the Fluted Scale," published by the United States Department of Agriculture, 1890, mentions that he found at Melbourne many specimens of *M. crawfordi*, and procured from them a number of parasitic flies. He gives a figure of the Coccid, with an enlarged figure of the antenna, in which I notice only eight joints (surely an error?). He states also (p. 20) that the insects were under loose bark of various Eucalypti, "embedded in cottony matter, and the single (often 2in.) long, white, setous, anal hairs sticking out." In a footnote to the same page he observes that these long hairs are not mentioned in the description of the insect which I originally published. Of course, as I have not had the opportunity of observing these insects in their natural home, Australia, I may have missed seeing this particular character: it is possible that these anal setæ may have been broken off from my specimens. Yet in all the number (perhaps forty or fifty) which I examined (both alive and dead) there was not the least indication of anything of the sort. And Mr. Crawford, of Adelaide, tells me that, in some two hundred observed by him, he has seen no long anal setæ. Moreover, I received about April last, from Mr. A. S. Olliff, of Sydney, a very fine specimen, alive, of *M. crawfordi.* This I placed in a glass-covered box, where it has remained ever since, and it is even yet (30th September) not dead, though so long confined. It has excreted a few long, very thin, cottony threads from various parts, and seems as if it would cover itself with cotton. But I have seen no trace of a long anal seta.

Taken in conjunction with the eight-jointed antenna figured by Mr. Koebele, and also the absence from his figure of the longitudinal dark stripes of the adult *M. crawfordi*, his statement about the anal setæ raises the question whether the insects he saw may not have been immature.

Genus CŒLOSTOMA, Maskell.

Cœlostoma pilosum, sp. nov. Plate VII., figs. 1–10.

Adult female dark-red in colour. At first naked; then with a thin covering of white meal, which gradually becomes thicker and more solid, until it assumes the appearance of a hard, granular shell, looking like a coating of lime: at gestation this increases to a snow-white mass of closely-felted cotton covering the insect and the eggs. Length of insect variable, some specimens attaining a length of $\frac{1}{2}$in., shrivelling at gestation. Form elliptical, convex, distinctly segmented. Antennæ of eleven sub-equal joints, each joint except the last very slightly dilated towards the tip, the last joint ovate; all the joints bear hairs, and on the last are two stronger than the rest. Feet strong and thick; on the trochanter a long seta; all the joints bear several hairs, but there seems to be no distinct comb of spines on the inner edge of the tibia and tarsus; the claw has a minute tooth. Upper digitules absent; lower pair fine hairs. Epidermis thickly covered with longish hairs interspersed with small, simple, circular spinneret-orifices. Anogenital ring simple: at the extremity of the abdomen are two very small tubercles, with a shortish seta on each. Rostrum and mentum entirely absent, being replaced by a small orifice between the first pair of feet.

Female of second stage dark-red in colour, covered partially or wholly with a hard, white coating, like lime, which frequently at last exhibits marginal tuberosities forming a kind of thick fringe. Length variable, reaching sometimes $\frac{1}{8}$in. when extracted from the shell. Form elliptical, slightly convex, segmented. Antennæ atrophied: they may have six or eight joints, but these are so confused that it is difficult to determine the number; at the tip are several spiny hairs. Feet also atrophied, the joints apparently reduced to two, with a very small hook-like claw at the end. Rostrum and mentum very large: mentum conical, triarticulate. Epidermis very thickly clothed with longish rather thick hairs, interspersed with small, simple, circular spinneret-orifices. Anal extremity not exhibiting a brown patch; the anal ring simple, with the tubular internal organ usual in the genus, and frequently a long, slender, white, waxy filament.

Larva red, active, naked or with thin white cotton; elliptical, flattish, segmented; length about $\frac{1}{40}$in. Antennæ of six

joints—the third, fourth, and fifth the shortest, the sixth very large, ovate, with a small projection at the tip. Feet rather thick; digitules four, all fine hairs. Mentum large, conical, triarticulate; setæ very long. Abdominal extremity bearing two small tubercles, each with a long seta, and two or three spines; between the tubercles protrude two rather thick pencils of white cotton. Epidermis not thickly clothed with hairs, but on each segment is a single transverse row of small spiny hairs with some small simple circular spinnerets.

Male unknown.

Hab. On various trees in forests, Reefton district, New Zealand. The second stage mostly on *Podocarpus totara* or various species of *Fagus*.

This insect is easily distinguished from *C. zealandicum* by the snow-white shelly covering both in the adult and the second stage, and by the thick coating of hairs on the epidermis. The larva is much smaller than that of *C. zealandicum*, and, curiously, it differs also in being much less hairy, quite the contrary of the second stage. I do not think that this can be the female form of *C. wairoense*, because the peculiar brush of digitules which distinguishes the male of that species has no counterpart in *C. pilosum;* and as far as my experience goes such a character would in all likelihood be shared by both sexes. The female of *C. wairoense* and the male of *C. pilosum* may both be discovered some day.

Cœlostoma assimile, Maskell. N.Z. Trans., vol. xxii., p. 153. Plate VII., figs. 11–17.

In my paper of last year I gave a brief description of the second female stage of this insect; I am able now to complete it, and to add also the adult female and the larva.

Adult female reddish-brown, occupying a deep pit in the twig it lives on (mostly in the axils), the mouth of the pit being covered with the mass of thick yellow wax, of irregularly globular shape, already formed by the second-stage female. The cavity burrowed out is frequently quite deep in the bark, and even seems sometimes to extend into the wood. The dimensions vary: some of the waxy coverings are only about $\frac{1}{15}$in. across; others observed reach $\frac{1}{8}$in. The wax is very hard. The adult female at first, after discarding the pupal skin, occupies the whole space, and is globular, with a diameter of about $\frac{1}{16}$in., obscurely segmented; but at gestation it shrivels up into an extremely small shapeless mass, filling the cavity with red oval eggs, and becoming at last so shrivelled that it is extremely difficult to find her. Antennæ short, thick, atrophied; the joints apparently only five, but the fifth may be made up of several, so that the normal antenna would have

eleven joints, as usual in the genus: the third and fourth joints are very short; the fifth long, sub-conical, with three or four spiny hairs at the tip: as the third and fourth joints are the thickest, the antenna is somewhat elliptical. Feet absent. Rostrum and mentum entirely wanting. Epidermis covered with very slender hairs, which are sparse on the cephalic and thoracic regions but very numerous on the abdomen, and also with many small, simple, circular spinneret-orifices. Spiracles sixteen, four of which, on the cephalic region, are very large. Anogenital ring simple, with a tubular organ leading to it, as usual in the genus; at each side of the ring is a sub-circular scar or orifice of the same dimensions.

Female of the second stage as described in my last paper (vol. xxii., p. 153). I omitted, however, then to state that from the anogenital ring and tubular organ there springs a long, white, slender filament. This filament is sometimes more than an inch long: it protrudes through the waxy covering, and at the extremity there is often seen a minute bubble of honey-dew. The filament is excessively brittle, and pieces broken off are frequently observed on the adjacent twig. At the metamorphosis the exuviæ of this second stage remain in the cavity, and become flattened and disc-like: on breaking open the waxy test in late autumn, when the eggs have been laid, this pupal skin is usually the first object visible, covering the eggs, and, as the adult female (as stated above) has shrivelled up, the skin may be at first mistaken for the adult, but the presence of the very large rostrum and mentum at once shows the real state of the case. The filament already mentioned frequently remains protruding, and is found to be attached to this pupal skin.

Larva red, elongated, sub-elliptical, tapering somewhat posteriorly, active, sparsely covered with thin white cotton; length about $\frac{1}{35}$in. Antennæ of six joints—the first five cylindrical, sub-equal; the sixth very large, ovate. Feet with rather thick femora and tibiæ; tibia shorter than tarsus; claw slender, with a tooth on the inner margin; no tarsal digitules, the lower pair long, fine, with a slightly-dilated tip. Mentum large, conical, triarticulate, with a few hairs at the tip. Epidermis bearing many simple circular spinneret-orifices, which are most numerous in a circular patch at the abdominal extremity, with the usual tubular organ bearing three rings of glands; at the extremity are two very small anal tubercles, each bearing a long seta, and from the tubular organ there protrudes between the tubercles a thickish pencil of white cotton.

Male unknown.

Hab. On *Fagus menziesii*, *Phyllocladus trichomanoides*, and *Fagus fusca*, Reefton district. It appears to be not

uncommon in that region. The waxy tests are very small and inconspicuous.

The finding of the adult female enclosed in the waxy mass formed by the female of the second stage was a surprise to me, being a distinct departure from the normal condition of things, especially in the group *Monophlebidæ*. It affords a good instance of the necessity, as I take it, of thorough examination of all stages before any absolute certainty can be arrived at, even as to the generic position of an insect. Whatever may be the rule amongst other orders and families of insects, Coccids present this difficulty to students: that one must be prepared at any time to find very distinct departures from generic, or even group, types, and to consider any character whatsoever as elastic and variable. Thus, for example, in the *Dactylopidæ*, the insect described in my last paper under the name *D. obtectus* departs entirely from the generic type in employing a portion of the plant it lives on as a shelter or "scale" for the adult female. So, again, in the *Monophlebidæ*, no genus or species has been reported hitherto in which the adult female is not, at least before gestation, free and active, or only covered with loose cotton. *Cœlostoma assimile* departs altogether from the types of the group and the genus in remaining under the thick waxy test in its adult state; and the variation is emphasized, so to speak, by the absence of the feet. The characters, however, of the larva and of the second stage being so clearly those of the genus *Cœlostoma*, and the rostrum and mentum of the adult being entirely absent, I have no hesitation in retaining the insect in that genus despite the form of the antenna; and, indeed, this may be looked on as merely atrophied.

The deep cavity made by this species in the wood of its tree, and its usual position in the axils of the twigs, make it resemble *Xylococcus filiferus*, Löw (Verh. der zool.-bot. Gesellschaft, Wien, 1882), which insect also has a small covering of wax, and a very long slender filament protruding from the abdominal extremity. But the presence in *Xylococcus* of a very distinct rostrum (which, indeed, seems to be the only member preserved by the adult female) clearly distinguishes that genus from *Cœlostoma;* and, indeed, the forms of the larva and of the second stage are also quite different.

The late Dr. Löw, whose death a few months ago deprived entomology of one of its brightest ornaments, devoted some remarks in his description of *Xylococcus filiferus* to the question of the manner in which that Coccid managed to produce a deep cavity in the wood of its food-plant, *Tilia europæa*. He was, however, unable to give any other explanation than that it proceeded "by a most peculiar kind of suction, and besides by a certain influence which these insects exercise on


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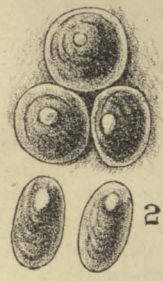
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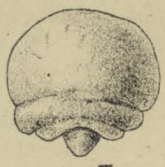
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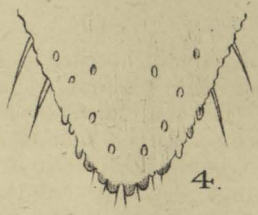
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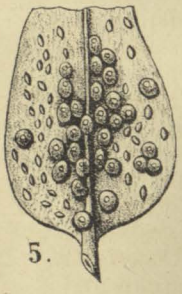
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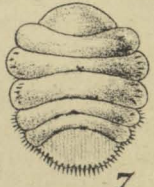
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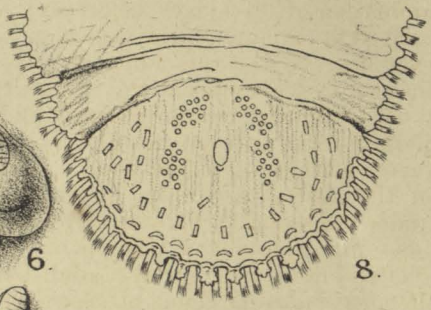
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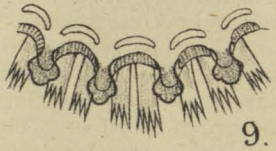
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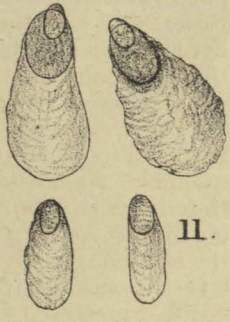
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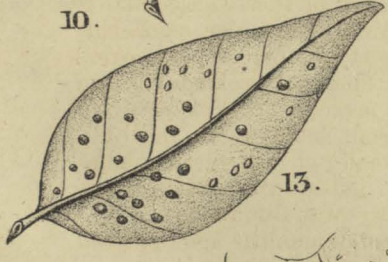
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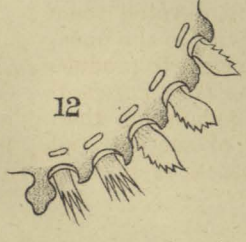
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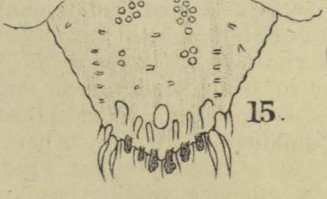
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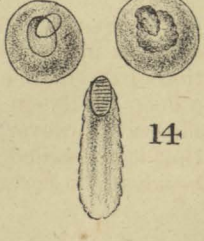
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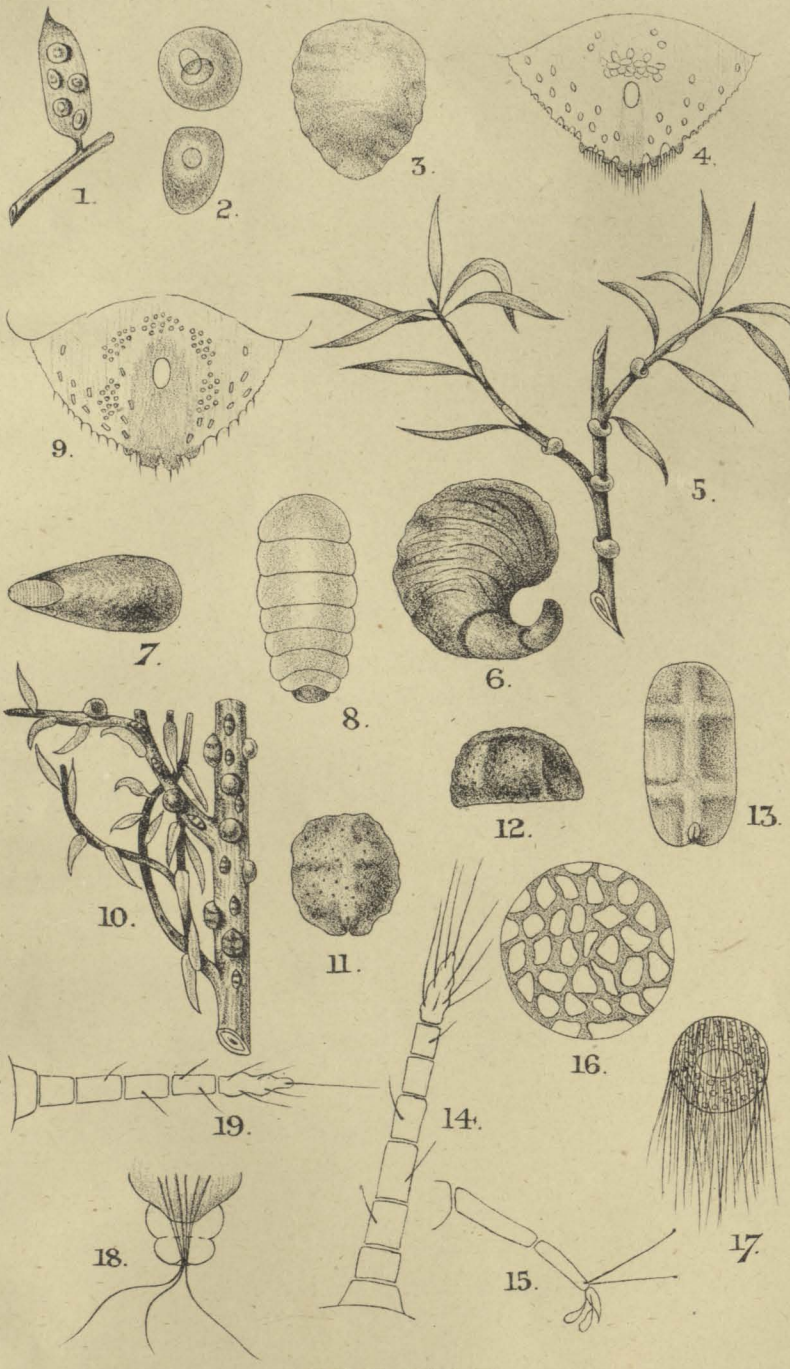

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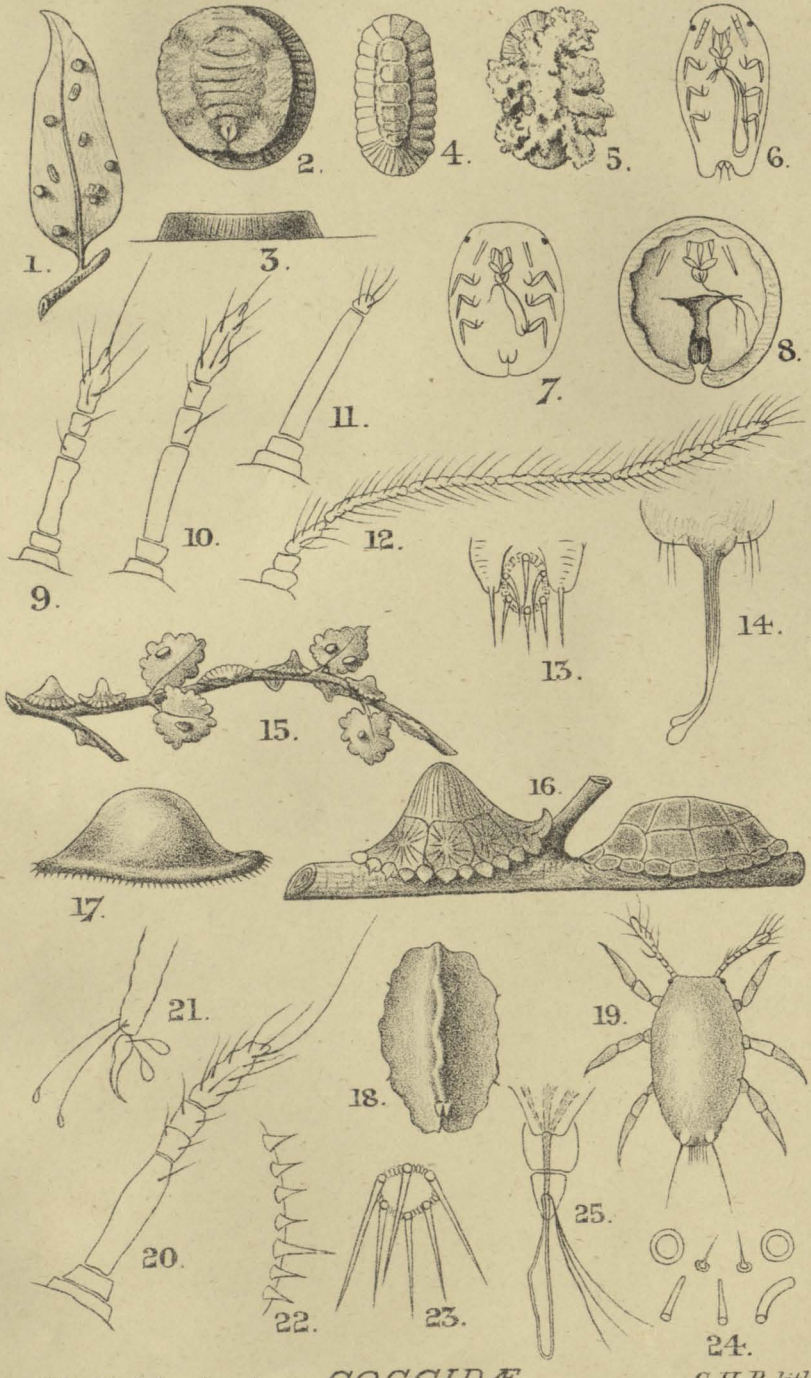

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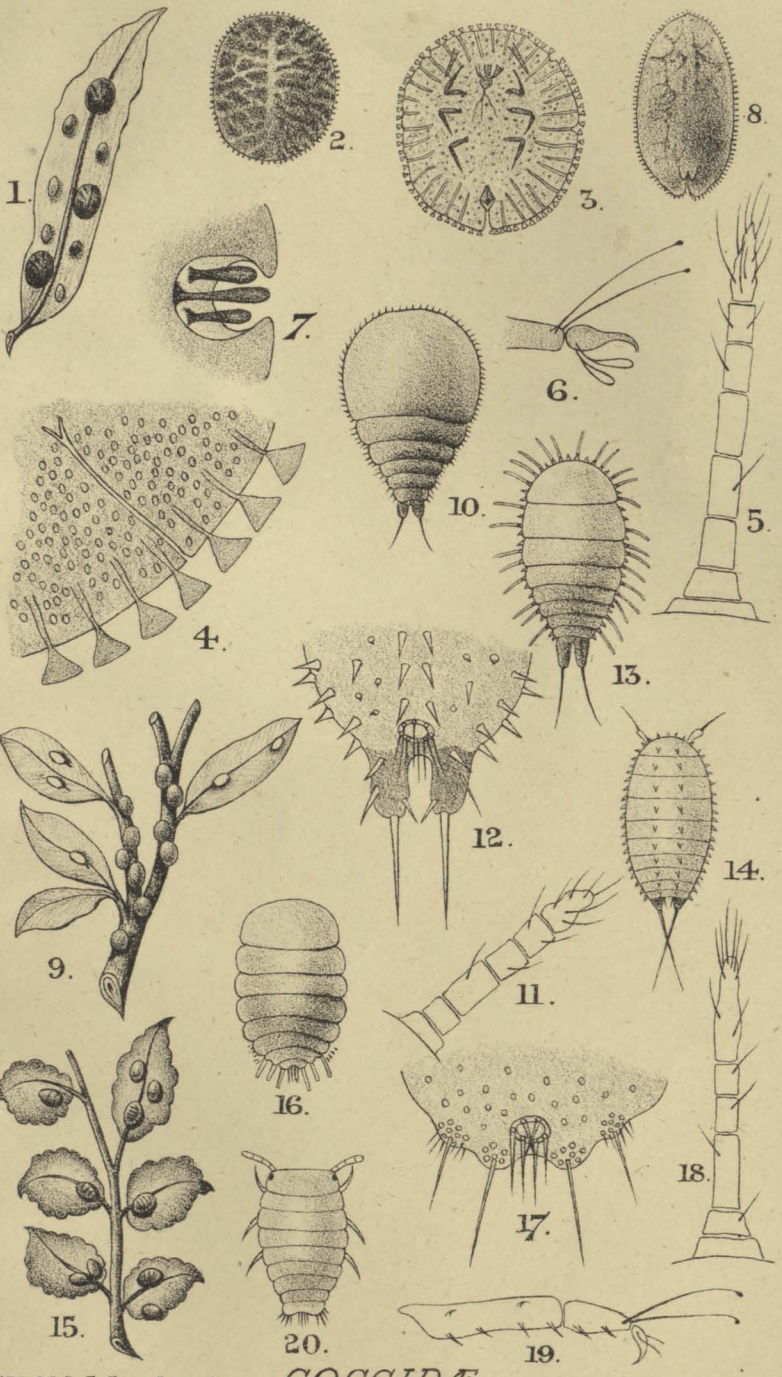

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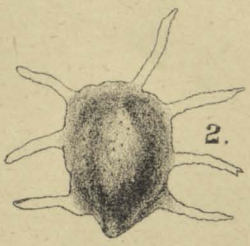
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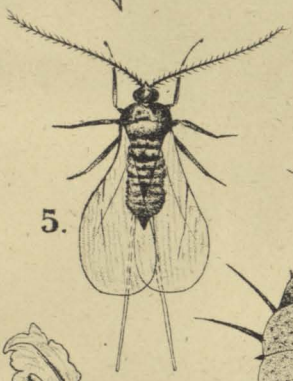
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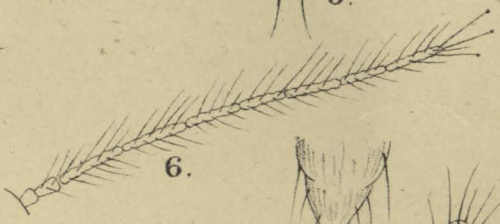
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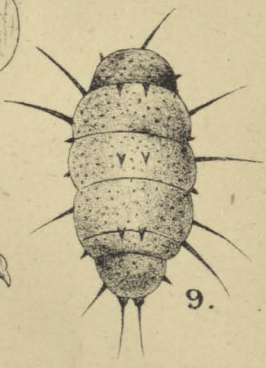
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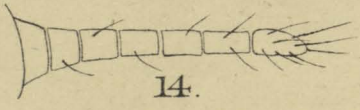
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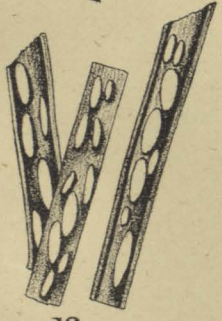
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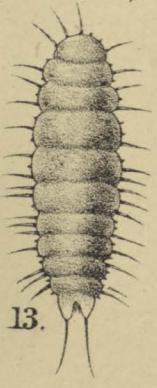
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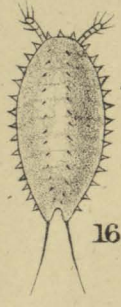
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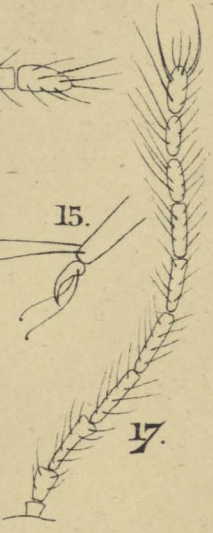
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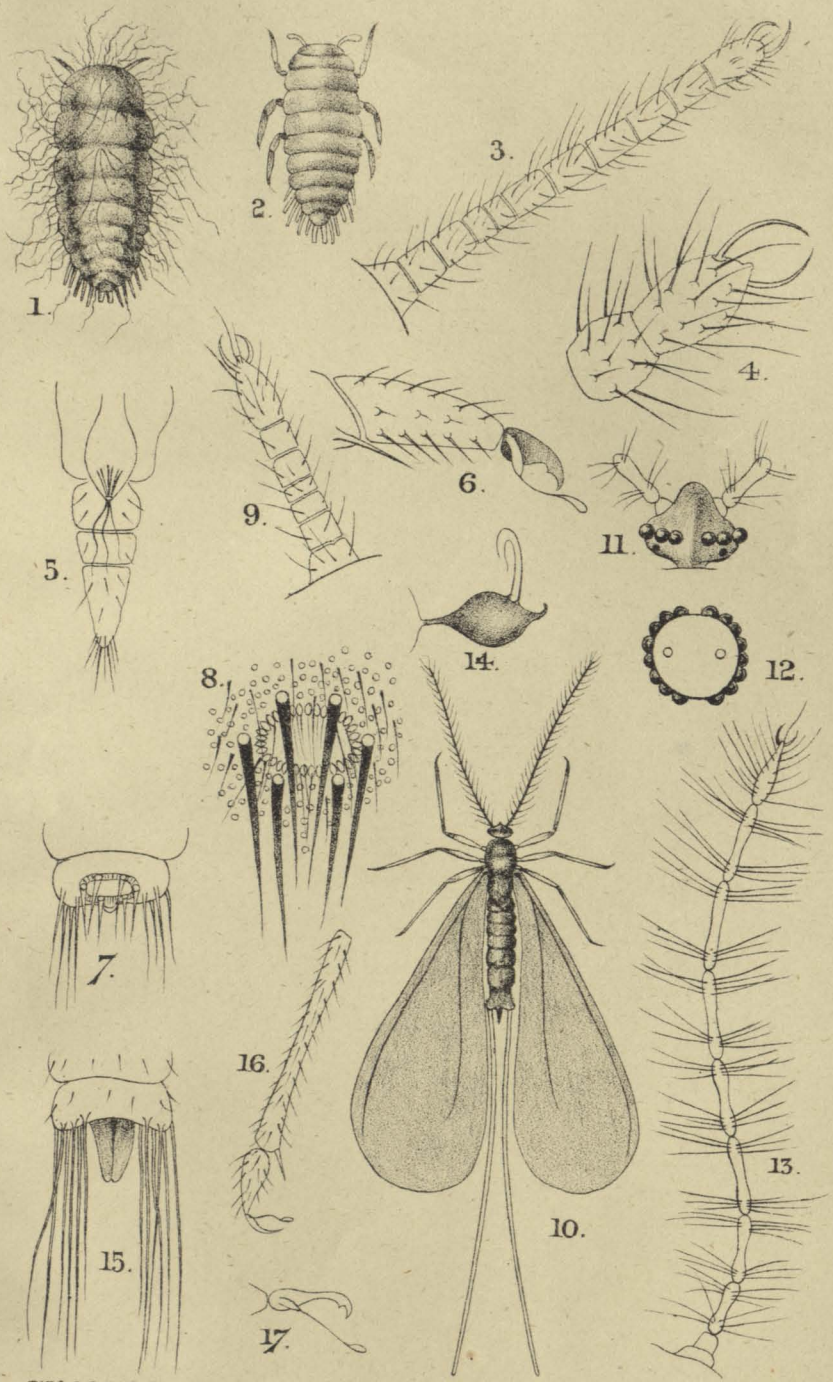
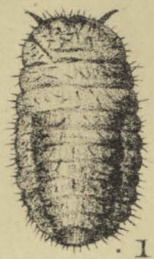
WMM delt ad nat. **COCCIDÆ.** *C.H.P. lith.*



W.M.M. delt ad nat. COCCIDÆ. C.H.P. lith.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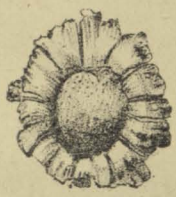
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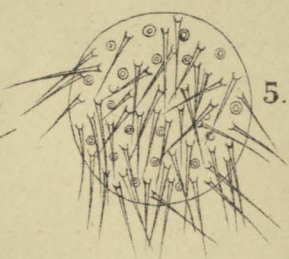
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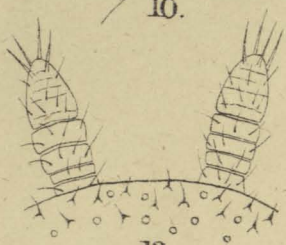
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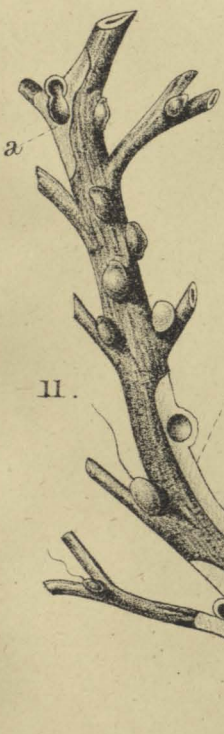
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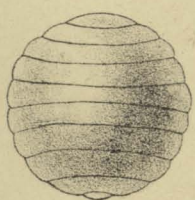
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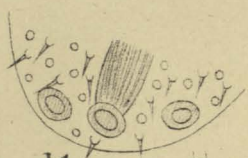
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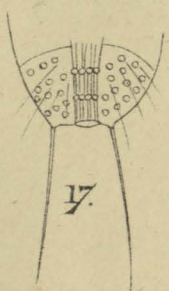
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WM.M delt ad nat.

COCCIDÆ.

C.H.P. lith.

the plant-growth." In fact, when it is considered how entirely devoid Coccids of all genera are of any organs for piercing or cutting, except the rostral suckers, it is difficult to understand how they manage to burrow into plants. Here in New Zealand we have such species as *Ctenochiton viridis*, which does not indeed form a deep cavity, but produces a decided and conspicuous depression beneath its body in the leaf it lives on. *Rhizococcus fossor* forms a peculiarly deep pit in its leaf, pressing out the opposite surface in a distinct swelling, and at last almost disappears sometimes in the pit. *Cœlostoma assimile* burrows a deep hole through the bark of the tree, and even into the wood, fashioning for itself a complete little cavern. How is all this done? In the case of *Ctenochiton* and *Rhizococcus*, living as they do on soft leaves, one might imagine that they use their feet and claws to press out the plant-cells and make the cavities; but *Cœlostoma assimile* loses its feet almost in its infancy, and the explanation would therefore not suffice in this case. I do not think, moreover, that any mechanical action would altogether account for the phenomenon; for in specimens of leaves and (as far as I could) of wood examined I do not see any traces of such pressure on the cells as would render them misshapen. Whatever may be the real action of the Coccid, it seems to me that it must be at the same time mechanical and chemical. There must be some chemical reason why certain species form on plants large galls, which are exactly the opposite of cavities; and in the same way some chemical action must, I think, be exerted to produce the cavities and depressions. But I can offer no plausible explanation myself; and I do not forget that, as far as is known at present, Coccids do not exude any acrid or acid fluid likely to exert active influence on plant-cells.

It may be observed that purely "passive" pressure would not sufficiently account for the phenomenon—that is, I do not think that the cavities can be produced merely by the insect lying motionless on the bark or leaf, and permitting the plant-cells to grow round and over it. Such a proceeding would necessarily, I take it, induce some kind of distortion; but I see no signs of this in the cases referred to. Moreover, in the case of *C. assimile* and *R. fossor*, passive obstruction (as it might be called) is not at all sufficient to produce in so short a time the deep pits observed. Further, such insects as *Lecanium hesperidum*, *Mytilaspis pomorum*, and scores of others, are just as closely attached to plants as any others, and yet produce no cavities in either leaves or bark, or even in the very soft substance of fruit.

INDEX TO PLATES I.–VII.

Plate I.

Fig. 1. *Aspidiotus cladii*, male and female puparia on stem of rush.
Fig. 2. " male and female puparia.
Fig. 3. " female, dorsal view.
Fig. 4. " pygidium of female.
Fig. 5. *Parlatoria pittospori*, male and female puparia on leaf.
Fig. 6. " male and female puparia.
Fig. 7. " female, dorsal view.
Fig. 8. " abdomen and fringe of female.
Fig. 9. " lobes and fringe, enlarged.
Fig. 10. *P. myrtus*, male and female puparia on leaves.
Fig. 11. " male and female puparia.
Fig. 12. " fringe and one lobe, enlarged.
Fig. 13. *Diaspis pinnulifera*, male and female puparia on leaf.
Fig. 14. " male and female puparia.
Fig. 15. " pygidium of female.
Fig. 16. " feathery processes of abdominal margin.

Plate II.

Fig. 1. *Aspidiotus corokiæ*, male and female puparia on leaf.
Fig. 2. " male and female puparia.
Fig. 3. " female, dorsal view.
Fig. 4. " pygidium of female.
Fig. 5. *Mytilaspis intermedia*, male and female puparia on twig.
Fig. 6. " female puparium.
Fig. 7. " male puparium.
Fig. 8. " female, dorsal view.
Fig. 9. " pygidium of female.
Fig. 10. *Lecanium cassiniæ*, females, two stages, on twig.
Fig. 11. " adult female, dorsal view.
Fig. 12. " adult female, side view.
Fig. 13. " female of second stage, dorsal view.
Fig. 14. " antenna of adult female.
Fig. 15. " foot of adult female.
Fig. 16. " markings of epidermis.
Fig. 17. " anogenital ring.
Fig. 18. " rostrum and mentum.
Fig. 19. " antenna of second stage.

Plate III.

Fig. 1. *Lecanochiton minor*, females and males on leaf.
Fig. 2. " test of adult female, dorsal view.
Fig. 3. " test of adult female, side view.
Fig. 4. " test of male, dorsal view.
Fig. 5. " test of male, with excreted cotton.
Fig. 6. " larva, ventral view.
Fig. 7. " female of second stage, ventral view.
Fig. 8. " adult female, ventral view.
Fig. 9. " antenna of larva.
Fig. 10. " antenna of second stage.
Fig. 11. " antenna of adult female.
Fig. 12. " antenna of male.
Fig. 13. " anal ring of larva.
Fig. 14. " abdominal extremity of male.
Fig. 15. *Inglisia fagi*, females and males on twig.
Fig. 16. " tests of adult female.
Fig. 17. " adult female, side view.

Fig. 18. *Inglisia fagi*, female of second stage, dorsal view.
Fig. 19. " larva, dorsal view.
Fig. 20. " antenna of adult female.
Fig. 21. " foot of adult female.
Fig. 22. " marginal spines.
Fig. 23. " anogenital ring.
Fig. 24. " spines and spinnerets.
Fig. 25. " rostrum and mentum.

PLATE IV.

Fig. 1. *Lecanium frenchii*, females, two stages, on leaf.
Fig. 2. " adult female, dorsal view.
Fig. 3. " adult female, ventral view, after treatment with potash.
Fig. 4. " marginal fringe.
Fig. 5. " antenna of adult female.
Fig. 6. " foot of adult female.
Fig. 7. " spiracular spines.
Fig. 8. " female, second stage, dorsal view.
Fig. 9. *Eriococcus leptospermi*, female and male sacs on twig.
Fig. 10. " adult female, dorsal view.
Fig. 11. " antenna of adult female.
Fig. 12. " abdominal extremity of adult female.
Fig. 13. " female of second stage, dorsal view.
Fig. 14. " larva, dorsal view.
Fig. 15. *Ripersia fagi*, females on twig.
Fig. 16. " adult female, dorsal view.
Fig. 17. " abdominal extremity of adult female.
Fig. 18. " antenna of adult female.
Fig. 19. " foot of adult female.
Fig. 20. " female of second stage, dorsal view.

PLATE V.

Fig. 1. *Solenophora corokiæ*, females of second stage on twig.
Fig. 2. " test of female, second stage.
Fig. 3. " female of second stage, dorsal view.
Fig. 4. " antenna of second stage.
Fig. 5. " male, dorsal view.
Fig. 6. " antenna of male.
Fig. 7. " abdominal extremity of male.
Fig. 8. *Rhizococcus intermedius*, females and males on twig.
Fig. 9. " adult female, dorsal view.
Fig. 10. " larva, dorsal view.
Fig. 11. " antenna of adult female.
Fig. 12. *Eriococcus danthoniæ*, females and males on grass.
Fig. 13. " adult female, dorsal view.
Fig. 14. " antenna of adult female.
Fig. 15. " foot of adult female.
Fig. 16. " larva, dorsal view.
Fig. 17. " antenna of male.

PLATE VI.

Fig. 1. *Leachia zealandica*, adult female, dorsal view.
Fig. 2. " larva, dorsal view.
Fig. 3. " antenna of adult female.
Fig. 4. " last two joints of antenna.
Fig. 5. " rostrum and mentum.
Fig. 6. " foot of adult female.
Fig. 7. " abdominal extremity of adult female.

Fig. 8. *Leachia zealandica*, anogenital ring.
Fig. 9. " antenna of larva.
Fig. 10. " male, dorsal view.
Fig. 11. " head of male, dorsal view.
Fig. 12. " head of male, posterior view.
Fig. 13. " antenna of male.
Fig. 14. " haltere of male.
Fig. 15. " abdominal extremity of male.
Fig. 16. " foot of male.
Fig. 17. " claw and digitule of male.

PLATE VII.

Fig. 1. *Cœlostoma pilosum*, adult female, dorsal view.
Fig. 2. " test of adult female.
Fig. 3. " antenna of adult female.
Fig. 4. " foot of adult female.
Fig. 5. " epidermal hairs and spinnerets.
Fig. 6. " test of female, second stage.
Fig. 7. " female of second stage, ventral view.
Fig. 8. " antenna of female, second stage.
Fig. 9. " foot of female, second stage.
Fig. 10. " antenna of larva.
Fig. 11. *C. assimile*, adult females on twig. At *a* the bark is cut away to show the cavities formed.
Fig. 12. " adult female, dorsal view before gestation, unshrivelled.
Fig. 13. " antennæ of adult female.
Fig. 14. " abdominal extremity of adult female.
Fig. 15. " antenna of larva.
Fig. 16. " foot of larva.
Fig. 17. " abdominal extremity of larva.

ART. II.—*An Exhibition of New and Interesting Forms of New Zealand Birds, with Remarks thereon.*

By Sir WALTER L. BULLER, K.C.M.G., F.R.S.

[*Read before the Wellington Philosophical Society, 29th October, 1890.*]

PROBABLY no section of New Zealand zoology has received such careful attention or been so thoroughly worked as the birds. Their beauty of form and colour, and the peculiar interest attaching to their life-history—their natural habits, their song, their wonderful modes of nidification—and their general ministration to the requirements and caprices of man, all tend to make the study of our birds more attractive than that of any other branch of natural history. So much has already been written on this subject that it might reasonably be looked upon as a well-nigh exhausted field. So far, however, from this being the case, new forms and characters of bird-life, and new facts in the history of even our commonest species, are being continually brought to light; and it seems