ART. XVII.—*On some Species of* Psyllidæ *in New Zealand.*

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Plates X.–XII.

THE *Psyllidæ* are a family of insects, of the order *Homoptera*, more nearly allied to the *Aphididæ* than to *Coccididæ*, though in many cases, where they are fixed and stationary in their earlier stages, they exhibit much of the appearance of the latter family—so much so, indeed, that sometimes close examination only can detect the difference. They seem to be cosmopolitan, but up to the present the European species have been chiefly studied. From New Zealand, so far, no species have been reported, but at least four or five appear to exist here. Several entomologists in Europe have studied this family since the time of Linnæus and Réaumur: the principal modern authorities are Dr. F. Löw, in Germany, and Mr. J. Scott, in England.

The *Psyllidæ* are, in the adult state of both sexes, pretty little four-winged flies, variously coloured. They are very well adapted for leaping, whence they have derived their Greek name, and also their trivial name of "leaf-hoppers." In their earlier states they often exhibit colours and forms of singular beauty. They live altogether on various plants, extracting from these their food by means of a rostrum and setæ, as do the Aphides and Coccids.

The *Psyllidæ* belong to the dimerous subdivision of the *Homoptera*—that is, insects with two-jointed tarsi. They may be further distinguished from Coccids by the presence of four wings and a double claw in both adult sexes. The different subdivisions of Psyllids are separated by systematists on characters which are very minute and often difficult of detection. Colour is to some extent taken into account, although for my part I would lay very little stress upon this (and the remark may extend to other orders of insects besides *Homoptera*); for not only are there several variations in the insects themselves, but I doubt whether any two men agree exactly in the nomenclature and appreciation of colour: shades of green and blue, of red and purple or violet, and so on, might lead (and I think have led) entomologists into much diffuseness of description and useless multiplication of species. There are, however, several minute differences noticeable amongst *Psyllidæ* which are of greater value, and from the principal amongst these the sub-families may be separated as follows:—

Sub-family *Liviinæ*, F. Löw: Front of head not prolonged into conical processes; eyes not prominent; the stalk of the lower branch (cubitus) of the furcation of the primary vein in the forewing much longer than the stalk of the upper branch (subcosta).

Sub-family *Aphalarinæ*, F. Löw: Front of head either swollen, or prolonged into two conical processes, or roughly ragged; eyes prominent; stalk of the cubitus in forewing as long as, or longer than, the stalk of the subcosta in almost all cases.

Sub-family *Psyllinæ*, F. Löw: Front of head either swollen or produced into two conical processes; eyes prominent; stalk of the cubitus in forewing shorter than the stalk of the subcosta.

Sub-family *Triozinæ*, F. Löw: Front of head either swollen or produced into two conical processes; eyes more or less prominent; stalk of the cubitus in forewing wanting (the vein forking directly from the junction with the subcosta).

Sub-family *Prionocnemidæ*, Scott: Front produced into conical processes; eyes prominent; stalk of the cubitus in forewing very short; tibiæ slightly serrated. (Are these sufficient distinctions?)

It will be seen that the first principal character for differentiation here is a point in the venation of the forewing. As this point cannot well be made clear by any written description, I give diagrams (Pl. X., figs. 1, 2) of a wing of *Psylla* and one of *Trioza*, in which *bd* is the stalk of the subcosta, and *bc* (which exists only in the former) the stalk of the cubitus. In fig. 4, belonging to the sub-family *Aphalarinæ*, it will be seen that *bc* is a good deal longer than *bd;* in fig. 1 it is shorter; in fig. 2 it is altogether wanting.

There is a further feature in *Psyllidæ* which is common to all the sub-families, but of which the variations may be employed for generic and specific differentiation—it is the character of the genital apparatus in either sex. That of the adult female has always the form of more or less sharp-pointed valves produced in a direct line with the abdomen, and within these is the ovipositor. That of the adult male consists of a number of appendages erect on the last segment of the abdomen, and having between them the penis; these appendages are on the dorsal side, and it is not clear what may be their use. The anterior one is usually the largest, sometimes as if with two broad wings or with two lateral slender processes: this is called the "genital plate;" and on the variations of this and the posterior appendages it is possible to separate species and even genera. The difference between the genitalia of the male and the female is very easily

made out, so that an observer has no difficulty in knowing the sex of the insect under examination.

I have found no notice in published descriptions of a feature which is especially noticeable in the larval and pupal stages of *Psyllidæ;* yet I am not sure that this may not be at least a character to be employed for differentiation of species. I mean a distinctly-marked ring which surrounds the anal orifice. This is situated close to the abdominal extremity, and the ring is of an elongated form, its edge somewhat wide and having the appearance of being closely corrugated, or perhaps formed of a series of small elongated pores set close together. The ring seems to represent what in Coccids is termed the anogenital ring. It is present in the adult, but less conspicuously than in the larva and pupa; and in these two earlier stages it is always transverse, while in the adult (at least, frequently) it is longitudinally placed above the genitalia. I find that in all the species observed by me in New Zealand the form of this ring varies, as shown in the accompanying figures; and I incline to the belief that it may perhaps be more usefully employed for specific differentiation, at least, than, say, colour or size, or even the food-plant.

Order HOMOPTERA.

Family PSYLLIDÆ.

Sub-family APHALARINÆ, F. Löw.

Genus RHINOCOLA, Forster.

Front of head prolonged into two conical processes; eyes prominent; forewing with a long stigma (Pl. X., fig. 4, *ss*); stalk of the cubitus longer than that of the subcosta; radius quite or almost straight; genital plate of the male not produced posteriorly into slender processes.

The distinctions between this and the kindred genera *Aphalara*, Forster, and *Psyllopsis*, Löw, depend upon very minute characters. In *Aphalara* the radial vein (fig. 4, *df*) is usually much curved, and the genital plate of the male is prolonged into two slender processes which encircle the penis as in a loop. In *Psyllopsis* the genitalia of the male are more like those of *Rhinocola*, but the stalk of the cubitus is only as long as that of the subcosta. *Rhinocola*, in fact, holds an intermediate position; but it would seem that some day the extreme minuteness and delicacy of the characters now relied on for differentiating genera and species of *Psyllidæ* must bring about a simplification of the system. The progress of observation in many new countries will probably make known individuals combining so many features now considered important that the present classification cannot be kept up.

Rhinocola eucalypti, sp. nov. Plate X., figs. 3–16.

Adult female of a general dark-purple colour, almost black; length of body about $\frac{1}{16}$in. When viewed dorsally, the head and thorax are dark-purple, the wing-attachments yellow; there is a very thin whitish meal on the thorax; abdomen dark-purple, banded transversely with yellow; antennæ yellow, turning to black at the tips; genitalia black; eyes dark-brown, prominent; wings membranaceous, greyish-white, veins yellow. Viewed ventrally, the head and thorax are purple, with yellow stripes; legs dark-yellow. Head broader than long, rather deeply depressed in front, and prolonged into two short, roundly conical processes. Ocelli two, close to the eyes. Rostrum short, cylindrical, and bearing three moderately long setæ. Forewings elongate, length about two and a half times the breadth. Margins somewhat straight and parallel, ends broadly rounded; the veins are almost all nearly straight. The costal vein runs all round the margin; the stalk of the cubitus (fig. 4, *bc*) is almost twice as long as the stalk of the subcosta (fig. 4, *bd*); the cubitus forks twice, the second furcation being close to the apex of the wing, the lower main branch forking again near the middle of the margin, with one long and one short secondary branch; the subcosta also forks twice, the main branch (the radius, fig. 4, *df*) being straight and nearly parallel to the cubitus, the other branch forking very close to the margin with one very short reflex branch, and one very long, which meets the costa at a point as far from the radius as the latter is from the cubitus; the whole area enclosed between the costa and the two secondary branches of the subcosta is occupied by the stigma (fig. 4, *ss*), which is thus very long and narrow, but not very distinctly marked. Hindwings elongate, broadly rounded at the tips, with three longitudinal veins not clearly reaching the margin, and only the posterior one is forked. Antennæ of ten joints—the first two rather short, thick, and smooth, the rest very slender, and numerously ringed; the third joint is the longest, the sixth and eighth subequal and nearly two-thirds as long as the third, the rest rather shorter and subequal; the last joint is slightly dilated, and bears two unequal spines at the tip. Legs moderately slender; tarsi dimerous; claw double; several short hairs on all the joints. Genitalia bivalve, somewhat sharply pointed; the lower valve is as long as the abdomen, the upper a very little shorter; several short hairs on both valves.

Adult male very similar to the female, excepting in the genitalia, which consist of several appendages carried erect, dorsally, on the last segment of the abdomen. The figure 8 of Plate X. gives a clearer idea of these appendages than any written description could do: *a* is the "genital plate," which

is very slightly swollen in the middle, but does not bear any lateral processes; *b* are two terminal processes set close together; *c* is the penis. All these appendages bear several short hairs.

Pupæ active, gregarious, naked, except for a slight mealy covering, and for the loose cottony threads in which they move; length about $\frac{1}{20}$in. Viewed dorsally, the head is dark-purple, almost black, with a narrow median longitudinal stripe of yellow; thorax yellow, with dark-purple rectangular patches on each side; abdomen in the anterior half yellow with two narrow transverse purple stripes interrupted in the middle, and in the whole of the posterior half dark-purple; rudimentary wing-covers dark-purple; antennæ yellow, darkening nearly to black at the tips. Viewed ventrally, the head and thorax are yellow, the abdomen yellow with rectangular purple patches; legs dark-yellow. Eyes dark-brown, scarcely at all prominent. Head broadly rounded in front, without conical processes. Antennæ of nine joints, the first two short and thick, the third and seventh the longest; the last three joints are ringed, and the last bears a short spine. Legs thick and clumsy; claw double. Rostrum short. Rudimentary wing-covers attached to the thorax, not extending to the head, and the hinder one only just reaches the second segment of the abdomen. There is no conspicuous fringe round the body, but the abdomen exhibits some lanceolate spines (fig. 13). If the pupa is macerated in potash the purple portions of the epidermis, on the dorsal surface only, are seen to be covered with a number of small oval puncta or orifices; and at the extremity of the abdomen there are a good many larger orifices which are multilocular; all of these markings appear to be "spinnerets" similar to those of Coccids, for from those at the extremity proceed slender cottony threads forming the loose mass in which the pupæ move. At the extremity of the abdomen the elongate transverse ring (fig. 16) is slightly concave on the anterior edge, and rather wide at the ends.

Larvæ active, gregarious, naked in loose masses of thin meal and cottony threads; length about $\frac{1}{36}$in. General colour and arrangement of the darker patches similar to those in the pupæ, but much lighter, the larvæ having thus a generally yellower appearance. Head broadly rounded in front and rather deeply depressed. Antennæ of four joints, the third much the longest, the fourth bearing two unequal spines. Legs thick and fat; tarsus very small and its joints hardly to be made out; there are two rather long tarsal digitules. Several short hairs round the body-margin, and on the abdomen some lanceolate spines. Anal ring as in the pupa, and at the extremity of the abdomen many multilocular orifices, whence issue slender cottony threads.

Hab. On *Eucalyptus globulus*, throughout New Zealand. The insects are found in numerous colonies, adults, pupæ, and larvæ intermingled, on the youngest shoots only of the tree, congregated between the stem and the immature leaflets, the spaces filled with their loose white cotton and meal. They do not seem to do any damage to the tree. The leaves of *E. globulus* in their very young state are quite different from the older ones (which latter, indeed, are not, I believe, strictly speaking, real leaves) — they have a distinct bluish tinge, whence the tree has derived its trivial name of "blue-gum," and they exude a quantity of white aromatic gummy matter, on which apparently *Rhinocola eucalypti* feeds, so that the leaves themselves are not damaged. The insects are not particular about the seasons; all stages may be found at any time of the year in colonies, though in cold weather the winged adults seem sleepy and sluggish.

Eucalyptus globulus is a Tasmanian tree, and Tasmania may therefore be the original home of this *Rhinocola*. I have not found the insect on any other tree in New Zealand, but on *E. globulus* it is very common.

I have attached this insect to the genus *Rhinocola* on account of the straightness of the veins in the forewing (in *Aphalara* they are usually much curved) and the absence of processes from the genital plate of the male. There are some minute differences from the genus, and the genitalia of the male, taken by themselves, might relegate it to the genus *Psylla* (compare *P. viburni*, Löw, or *P. salicicola*, Forster), but the wing-venation fixes it amongst the *Aphalarinæ*.

The late Mr. J. Scott informed me that in the British Museum there are no specimens of *Psyllidæ* from this part of the world, but that in one of the drawers there is "a label relating to a species feeding on the Eucalyptus." I cannot say whether this may refer to our species; but probably it is rather one of the three described by Mr. Dobson ("Proc. of Roy. Soc. of Tasmania," 1850, p. 235). These insects form little waxy conical or scallop-shaped tests on various Eucalypti in Australia, which tests are often aggregated in great masses of "manna," used as food by the aborigines, and very sweet to the taste; indeed, a hungry European explorer lived awhile, on one occasion, on this "lerp," as it was called. The adults of Mr. Dobson's species differ slightly from our *Rhinocola*. In their wax-producing habit they are entirely distinct.

Rhinocola fuchsiæ, sp. nov. Plate XII., figs. 13–25.

Adult female when first emerging from the pupa-case very light yellow, almost white. Later, the head and dorsal surface of the thorax become patched with black, the abdomen remaining yellowish. Eyes brownish-red, ocelli dark-yellow.

Antennæ and feet hyaline. Genitalia yellow, with brown extremities. Length of body $\frac{1}{23}$in.; expanse of wings about $\frac{1}{20}$in. Head broader than long, very slightly depressed in front, and prolonged beneath into two short conical processes. Thorax considerably elevated. Eyes exceptionally prominent projecting at each side nearly half the width of the head, and somewhat recurved posteriorly, the anterior portion with rather large facets, the hinder part smooth. Antennæ of ten joints—the first two short, rather thick, equal and smooth, the rest slender; the third rather longer than the two first together, the others subequal, and about half as long as the third; all except the two first are numerously ringed, and the last bears two unequal spines. Forewings very short, scarcely extending beyond the genitalia; margins slightly and regularly convex, ends rounded; length of wing two-and-a-half times the breadth. All the veins are nearly straight, being very slightly convex towards the costal margin; primary stalk of veins rather short, about one-ninth of the length of the wing; stalk of the cubitus not quite twice as long as the stalk of the subcosta, and only a little longer than the primary stalk; the first furcation of the cubitus forks again close to the dorsal margin, with one short branch and one long; the upper secondary branch of the second furcation reaches the margin a very little below the apex; the clavus is somewhat strong; stigma existing, and filling the area between the margin and the longer secondary branch of the subcosta, but very faint. Wing sparsely punctate. Hindwing rounded, punctate. Feet presenting no special features. Genitalia, viewed dorsally, apparently ending in a single acute point; viewed sideways, after slight pressure, they exhibit four very acute valves, of which two have serratulate margins, and also bear some short hairs.

Adult male similar in general form and colour to the female, but the elytra are rather longer, extending a little beyond the genitalia. Genital plate broadly rounded posteriorly, and tapering to a bluntly-rounded tip with a few short hairs; posterior processes cylindrical, about three-quarters the length of the genital plate, and bearing several strong, longish hairs, and a great number of black, thick, tubercular papillæ, like strong teeth, arranged in three longitudinal rows.

Pupa usually stationary, but capable of motion; whitish and somewhat translucent, the abdomen exhibiting a faint yellow patch; eyes red; wing-cases, antennæ, and feet white. Length about $\frac{1}{16}$in. Head rounded, slightly produced in front; eyes scarcely prominent; ocelli two. Antennæ of eight short, rather thick, subequal joints, the last black, conical, and bearing two unequal spines. Rudimentary wing-covers reaching only to the second segment of the abdomen. Feet normal, with a pulvillus and two tarsal digitules. Abdomen elongate-

ovate, bearing at the extremity some small spines, which bear short white cotton, producing a brush-like appearance. Anal ring with a regularly convex posterior edge, the anterior edge rather deeply depressed on each side of a median projection, and the ends rather angular. Several minute spines on the abdomen and feet.

Hab. In New Zealand, on *Fuchsia excorticata*.

I place this insect in the genus *Rhinocola* because, in the wing-venation (straight veins) and in the form of the male genital plate, it agrees with that genus. The excessive prominence of the eyes in the adult, the quadri-valve female genitalia, and the angular ends of the anal ring are distinguishing characters; and the strong black papillæ on the male genital processes are, as far as my information extends, unique in the family. But I do not take these as anything more than specific distinctions, especially abominating (except on the clearest grounds) the erection of new genera on single species. *R. fuchsiæ* is the smallest of the New Zealand *Psyllidæ* which I have yet seen; and its very delicate colour, both in the adult and in the pupal states, makes it difficult of detection on the white under-surface of the leaves of the tree-fuchsia, its favourite plant.

Sub-family TRIOZINÆ, Löw.

Genus TRIOZA, Forster.

Front of head produced into two conical processes; stalk of the cubitus in forewing wanting; third joint of the antenna not thicker than the fourth.

The last character here mentioned serves to separate *Trioza* from *Bactericera*, Forster, in which the third joint of the antenna is as thick as the first two. I am not sure that so minute a difference is sufficient for generic distinction. *Bactericera* appears also to have the front of the head only "swollen" anteriorly; but a similar fact is not considered of great importance in the *Aphalarinæ*, and the swelling may be so near to the short conical processes of *Trioza* that perhaps future systematists may unite the two genera.

Trioza pellucida, sp. nov. Plate XI.

Powellia vitreoradiata, mihi, "Trans. N.Z. Inst.," 1878, p. 223.

Adult female of a generally light-brownish colour with green shades, becoming slightly darker with age; length, inclusive of genital valves, about $\frac{1}{14}$in.; expanse of wings $\frac{2}{9}$in. Viewed dorsally the head is yellow, thorax generally yellow (rather darker than the head), prothorax brown; eyes prominent, rich dark-brown; ocelli light-brown; abdomen yellow, with

transverse bands of brown; genitalia dark-brown, almost black; wings hyaline, colourless. Viewed ventrally, the general colour is yellow, with patches of light-brown. Legs yellow; antennæ brown. Head broader than long, depressed in front and produced beneath into two moderately long conical processes. Ocelli two, close to the eyes. Rostrum cylindro-conical, black at the tip; setæ short. Forewings elongate, slightly apiculate; costal margin regularly convex, dorsal margin slightly concave; primary stalk of veins (fig. 2, *ab*) one-fourth the length of the whole wing; stalk of the subcosta (fig. 2, *bd*) one-third as long as the primary stalk; radius (*df*) convex in its middle part towards the costal margin, and reaching the costal vein at rather more than five-sixths of the length of the wing; cubitus forking directly from the subcosta, its upper main branch convex and forking a little before reaching the margin; the upper secondary branch joining the costal vein a little above the apex; the lower main branch forking close to the middle of the dorsal margin, with one short and one long and very convex secondary branches; in the areas formed by the branches of the cubitus are three short markings springing from the costal vein and having the appearance of nervelets, but which on close examination are seen to be composed of a number of minute oval spots (fig. 3); on all the veins of the wing are some very short fine hairs; but there are no puncta on the surface. Hindwings with the anterior margin somewhat straight, but a little convex at nearly half its length; posterior margin deeply and regularly convex; ends rounded; a single vein runs along almost half the anterior margin, and there are three other exceedingly fine and delicate longitudinal veins, of which the anterior is slightly concave to the anterior margin, which it joins rather above the apex; the second, also concave, joins the margin below the apex; the third forks near the middle of the posterior margin, with one short and one long branch; the whole hindwing is sparsely but clearly punctate. Antennæ of ten joints—the first two short, thick, and smooth, the rest slender and numerously ringed; the third joint is the longest, the fourth, fifth, sixth, and seventh subequal and nearly half as long as the third; the last three subequal, a little more than half as long as the fourth, the last joint slightly dilated and bearing two unequal spines. Legs slender; tarsi dimerous; claw double; there are a few short spines at the tip of the tibia. Genitalia bivalve; viewed sideways the lower valve is rather longer than the upper; both are rather sharply pointed, and bear several hairs.

Adult male similar to the female, but in most cases much lighter in colour, having a generally yellow appearance. Genitalia consisting of a genital plate (fig. 9, *a*) which has two

broad lateral wings, or lobes, swollen posteriorly; of a posterior appendage (*b*) divided at the end into three recurved hooks; and of a short penis (*c*) a little dilated at the tip. Many short hairs on all the appendages.

Pupa flat, stationary; length about $\frac{1}{16}$in. Viewed dorsally the general colour is yellowish, but from the transparency of the body the green chlorophyll-food may be easily seen; head darker yellow; eyes obscurely facetted, red; rudimentary wing-covers greyish-white; antennæ yellow, darker at the tips; all round the margin is a fringe of long, white, glassy tubes set very close together. Head broader than long, slightly depressed in front. Eyes scarcely prominent. Antennæ of six joints—the first two short, the third equal to the first two together, fourth and fifth short, the sixth almost as long as all the rest together, tapering to a point and bearing at the tip two unequal spines. Rudimentary wing-covers attached to the thorax, but immediately widening anteriorly, so that they have the appearance of being joined also to the head; the hinder one reaches almost to the second segment of the abdomen. Legs thick; the second joint of the tarsus is exceedingly small; on the first joint is one long seta bent at the end; claw double, with a large pulvillus. Abdomen as broad as long, margin semicircular, with a very slight median depression; near the extremity the anal elongated ring is very slightly concave anteriorly, the ends compressed and somewhat acute. Rostrum short, cylindro-conical. The fringe of the body and wing-covers is formed of very delicate, glassy, straight tubes issuing from cup-like bases set close together.

Larva active; length about $\frac{1}{30}$in.; general colour yellow. Viewed dorsally the head exhibits a darkish patch on each side of a median longitudinal yellow stripe; the thorax two patches on each side; the abdomen has four narrow transverse bands and a dark patch covering the posterior half. Antennæ of four joints—the first two short, the fourth about equal to the first two, the third as long as the others together; on the last joint are two unequal spines. Legs thick; second joint of the tarsus extremely small; two moderately long tarsal digitules. On the abdomen are some lanceolate spines. There is no tuft of cottony fibres on the abdomen.

Hab. On *Pittosporum eugenioides*, *Discaria toumatou*, and *Geniostoma ligustrifolium*, throughout New Zealand; probably most frequently on *Pittosporum*.

This very handsome species seems clearly to belong to the genus *Trioza*, but differs in various points from described species. The genital plate of the male bears some resemblance to those of *T. horvathi*, Löw, *T. walkeri*, Löw, and some others; but the posterior process, with its three hooks, seems

distinctive. The pupa is not unlike that of *T. flavipennis*, Forster, but the wing-venation differs from that species.

In 1878, having then no knowledge of *Psyllidæ*, I mistook the pupa of *T. pellucida* for some new kind of Coccid, although I recognised some characters removing it from that family. I now restore it to its proper place.

Trioza panacis, sp. nov. Plate XII., figs. 1–12.

Adult female of a bright, vivid, green colour, the thorax slightly patched with light-yellow; eyes red, ocelli yellow; genitalia tipped with light-brown; femora green, tibiæ and tarsi yellow; antennæ yellow, the last joint and the extreme tips of the others brown; wings hyaline, with the faintest possible brown tinge. Length of body rather less than $\frac{1}{8}$in.; expanse of wings $\frac{2}{7}$in. Head broader than long, depressed in front and produced beneath into two moderate roundly-conical processes. Eyes prominent, minutely facetted; ocelli two. Rostrum cylindro-conical. Forewings elongated, the ends rounded; costal margin regularly convex, dorsal margin very slightly concave as far as the junction with the cubital vein; primary stalk of veins one-fourth the length of the wing; stalk of the subcosta (fig. 3, *bd*) two-fifths of the length of the primary stalk; radius convex at two-thirds of its length towards the costal margin, and reaching the margin at about seven-eighths of the length of the wing; cubitus forking directly from the subcosta, its upper main branch convex towards the costal margin, and forking at rather more than three-fourths the length of the wing, the upper secondary branch joining the margin exactly at the tip, the lower at rather less distance than the radius; the lower main branch of the cubitus forks a little below the middle of the wing, with one longish, very convex branch, and one shorter and nearly straight; the distances between the points of junction of the margin with the radius and with the cubital branches are about equal. In the three areas formed by the cubital branches there are three short triangular marks springing from the margin, and composed of minute oval spots. There are some exceedingly minute spiny hairs on all the veins. Hindwings normal, presenting no special features, but slightly punctate. Antennæ of ten joints—the first two short, thick, smooth, and equal; the rest very slender, and numerously ringed; the third is the longest, the remainder gradually decreasing; the last is widely dilated, and bears two unequal spines. Legs slender; the tibia bears a few spines at the tip. Genitalia bivalve, the valves not contiguous at their tips; the tips are rather bluntly rounded, and the hairs on the dorsal side are longer than those on the ventral surface; ovipositor slender.

Adult male similar to the female in colour and in general form. Genitalia consisting of a rather long bilobed genital plate, the lobes dilated posteriorly, the apex bluntly conical, the hairs on the lobes rather long; posterior processes cylindrical, without hooks, nearly two-thirds as long as the genital plate.

Pupa as a rule stationary, but capable of moving at will. In its earlier state, just after leaving the larval exuviæ, it is flat, elliptical, light-brown. In the later state the general outline is elliptical, the rudimentary wing-covers clearly distinct; form very convex above, flat or concave beneath. Colour of the dorsal surface a rich dark-brown, the edges yellowish; wing-covers light-brown; on the thorax are eight small yellow tubercular swellings; all round the margin is a very short, white, delicate fringe. Viewed ventrally the pupa is greenish, the legs and antennæ yellow. The abdominal region of the pupa-case is clearly divided from the thorax, and on the cephalic region is a trapezoidal plate slightly raised posteriorly. Antennæ of pupa with six joints—the first five subequal (the third the shortest); the last joint much longer, fusiform, bearing at the end two unequal spines. Legs thick; second joint of the tarsus very small; claw, pulvillus, and tarsal seta as in *T. pellucida*. Anal ring elongate, ends rounded, not very acute, slightly recurved. The marginal fringe consists of very minute cups set closely together, from which spring very short glassy sub-cylindrical tubes. Length of pupa-case varying with age: at the latest stage about $\frac{1}{11}$in.

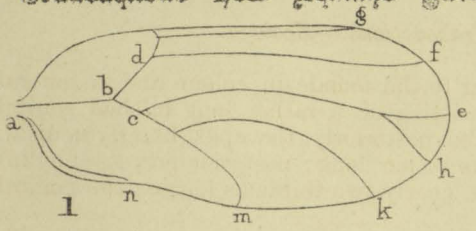
Larva active; general colour dark-brown, the abdomen banded transversely with yellow, and the thorax exhibiting a number (six to eight) of yellow tubercles as in the pupa. Length about $\frac{1}{20}$in. Antennæ of four joints, rather thick. Margin bearing a very short fringe. Epidermis exhibiting a very large number of minute oval pores, and several groups of curly setæ.

The larval skin very often remains attached, like a tail, to the pupa after the latter has emerged.

When the adult is being hatched from the pupa a translucent watery fluid escapes on the leaf.

Hab. In New Zealand, on *Panax*, sp. var., *Pseudopanax ferox* (lancewood), &c.

This is clearly, from the wing-venation and the colours and forms of the larvæ and pupæ, a distinct species. It is larger than *T. pellucida*, and in all its stages is an extremely pretty insect.



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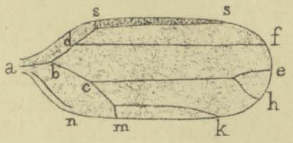

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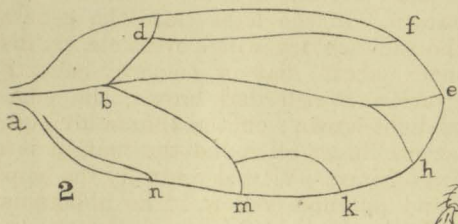

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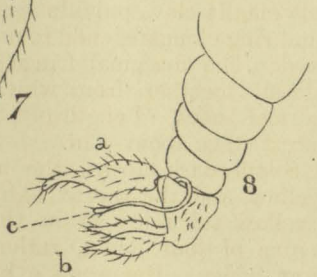

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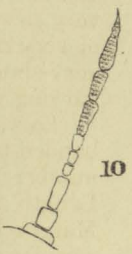

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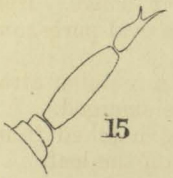

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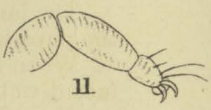

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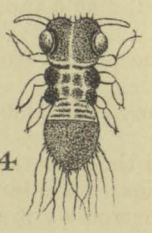

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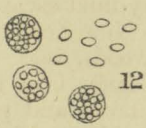

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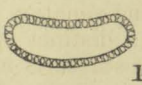

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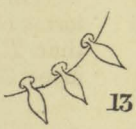

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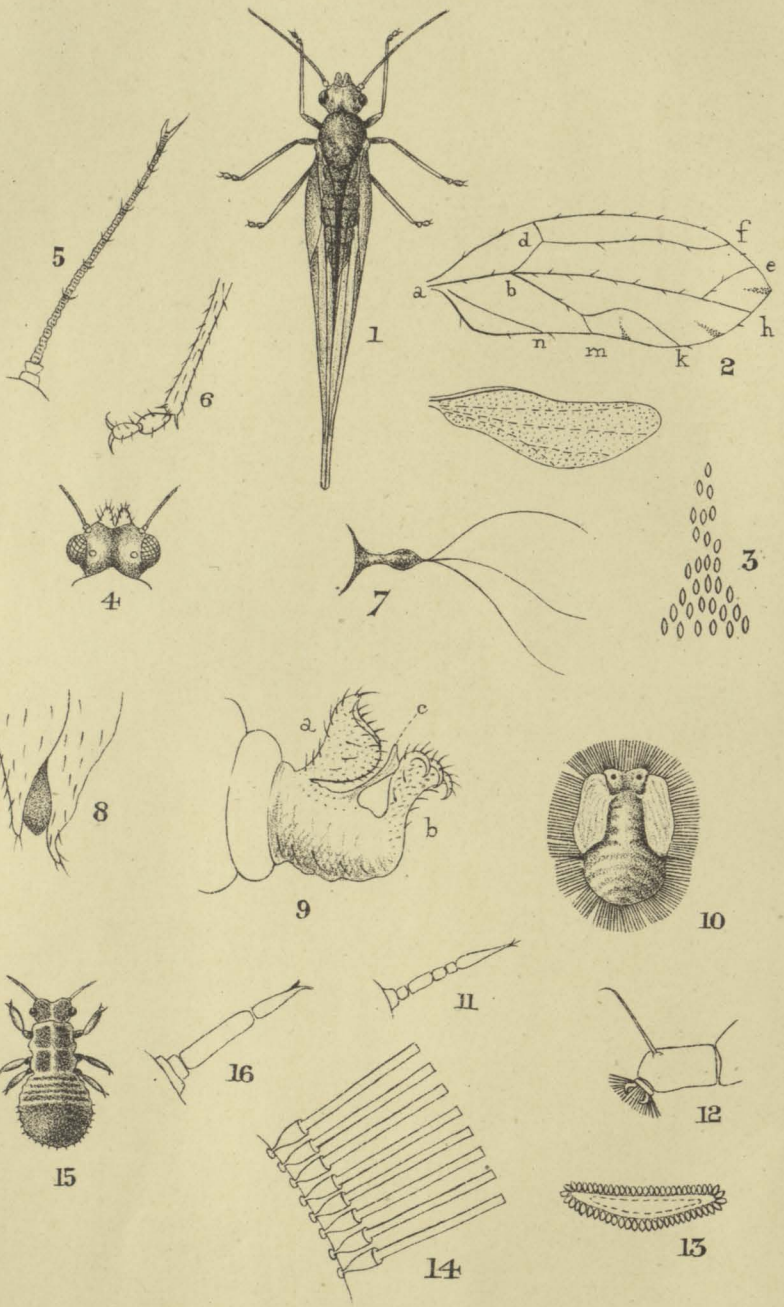
W.M.M. delt ad nat. PSYLLIDÆ. C.H.P. lith.



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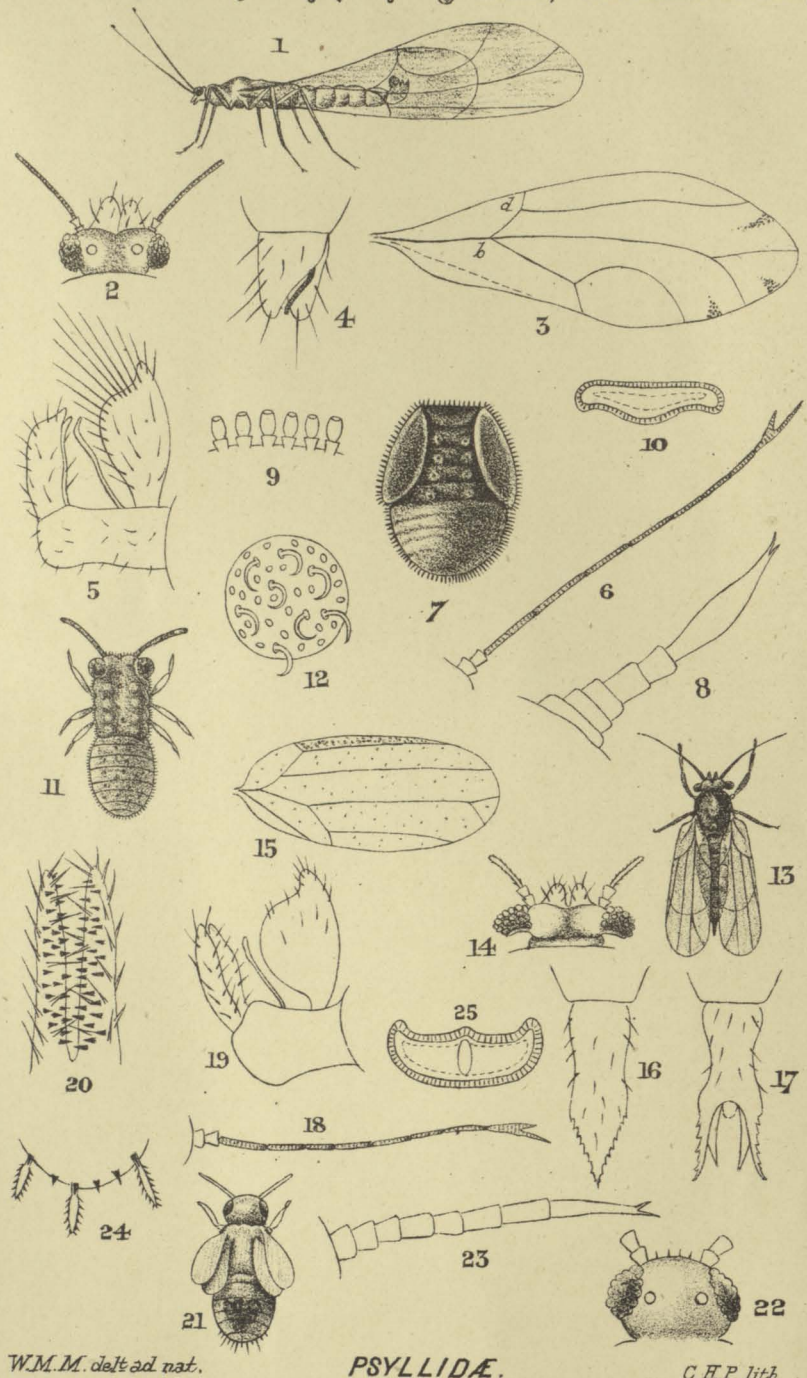

W.M.M. delt ad nat. PSYLLIDÆ. C.H.P. lith.

INDEX TO PLATES X.–XII.

[All the figures are greatly magnified.]

PLATE X.

Fig. 1. Diagram of forewing of genus *Psylla*: *ab*, primary stalk of veins; *bc*, stalk of cubitus; *bd*, stalk of subcosta; *df*, radius; *cm*, *ck*, *ch*, *ce*, branches of cubitus; *dg*, secondary branch of subcosta; *agek*, costal and marginal vein; *an*, clavus.
Fig. 2. Diagram of forewing of genus *Trioza*: Letters as in fig. 1; the stalk *bc* is absent.
Fig. 3. *Rhinocola eucalypti*, adult female, dorsal view.
Fig. 4. " fore- and hind-wings; letters as in fig. 1; *ss*, stigma.
Fig. 5. " antenna of adult.
Fig. 6. " foot of adult.
Fig. 7. " genitalia of female, side view.
Fig. 8. " genitalia of male, side view.
Fig. 9. " pupa, dorsal view.
Fig. 10. " antenna of pupa.
Fig. 11. " foot of pupa.
Fig. 12. " spinnerets of pupa.
Fig. 13. " abdominal spines of pupa.
Fig. 14. " larva, dorsal view.
Fig. 15. " antenna of larva.
Fig. 16. " anal ring of pupa and larva.

PLATE XI.

Fig. 1. *Trioza pellucida*, adult female, dorsal view.
Fig. 2. " fore- and hind-wings; letters as in Plate X., fig. 2.
Fig. 3. " markings in areas of forewing.
Fig. 4. " head, dorsal view.
Fig. 5. " antenna of adult.
Fig. 6. " foot of adult.
Fig. 7. " rostrum and setæ of adult.
Fig. 8. " genitalia of female, side view.
Fig. 9. " genitalia of male, side view.
Fig. 10. " pupa, dorsal view.
Fig. 11. " antenna of pupa.
Fig. 12. " foot of pupa.
Fig. 13. " anal ring of pupa.
Fig. 14. " fringe of pupa.
Fig. 15. " larva, dorsal view.
Fig. 16. " antenna of larva.

PLATE XII.

Fig. 1. *Trioza panacis*, adult male, side view.
Fig. 2. " head of adult, dorsal view.
Fig. 3. " forewing; *bd*, stalk of subcosta.
Fig. 4. " genitalia of female, side view.
Fig. 5. " genitalia of male, side view.
Fig. 6. " antenna of adult.
Fig. 7. " pupa, dorsal view.
Fig. 8. " antenna of pupa.
Fig. 9. " fringe of pupa.
Fig. 10. " anal ring of pupa.
Fig. 11. " larva, dorsal view.
Fig. 12. " pores and setæ of larva.

Fig. 13. *Rhinocola fuchsiæ*, adult male, dorsal view.
Fig. 14. " head of adult.
Fig. 15. " forewing.
Fig. 16. " genitalia of female, dorsal view.
Fig. 17. " " side view.
Fig. 18. " antenna of adult.
Fig. 19. " genitalia of male, side view.
Fig. 20. " genital processes of male, ventral view.
Fig. 21. " pupa, dorsal view.
Fig. 22. " head of pupa.
Fig. 23. " antenna of pupa.
Fig. 24. " abdominal spines of pupa.
Fig. 25. " anal ring of pupa.

Art. XVIII.—*On some* Aleurodidæ *from New Zealand and Fiji.*

By W. M. Maskell, F.R.M.S., Corr. Mem. Royal Society of South Australia.

[*Read before the Wellington Philosophical Society, 2nd October, 1889.*]

Plate XIII.

The *Aleurodidæ* are a family of homopterous insects which may be considered as intermediate between *Coccididæ* and *Aphidæ*. From both (as also from *Psyllidæ*) they differ in their divided eyes; from Coccids they are easily distinguished by the presence in the adults of both sexes of four wings; from Aphides they differ in the characters of their younger stages, and by the form and venation of their wings.

These insects are almost all very minute. The adults fly somewhat vigorously, and sometimes in summer may be seen hovering in clouds round trees. Their name is derived from the coating of white floury meal (ἀλεύρον = flour) with which the wings in most species are covered. The larvæ and pupæ are always attached to plants; and in these states it is difficult at first sight to distinguish them from Coccids. Indeed, the form of an orifice situated near the abdominal extremity is about the only mark by which, in many cases, to identify an Aleurode pupa. Many of these pupæ are fairly thick and easily seen, but many others are so thin and translucent that when dry they can scarcely be detected on a leaf, and when wetted by rain or otherwise become quite invisible. They are very commonly mistaken for Coccids. I have frequently had them sent to me as such, and in 1878 I included two of them, under the generic name of *Asterochiton*, amongst Coccids ("Trans. N.Z. Inst.," 1878, vol. xi., p. 214). It requires examination under a strong lens or a microscope to make out