

THE ALEYRODIDÆ OF SOUTH AMERICA  
with description of four new chilean species

BY

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INTRODUCTION

The following paper presents a review of the present knowledge of the white flies, or Aleyrodidae, of South America. The study is based not only upon the work of other students of the South American fauna, but also upon the extensive collections of the Bureau of Entomology and the U. S. National Museum. These collections have made available, in the past two decades a wealth of material and have formed the foundation of an exhaustive monographic study of the family by Dr. A. L. Quaintance and the senior author. Free use has been made of the published portions of that monograph and the writers are indebted to Dr. Quaintance for his many suggestions (\*).

It has been the writer's aim to bring up to date our knowledge of South American Aleyrodidae and to prepare a work that might be used as a handbook by South American students. With these points in view, a short general account of the group, and generic keys, have been presented.

Many of the new forms described have been forwarded to the Bureau by Prof. Carlos E. Porter, whose inter-

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(\*) All bibliographical citations in synonymy are given in full «Literature cited».

est and untiring efforts as a collector have done much toward making the present paper possible.

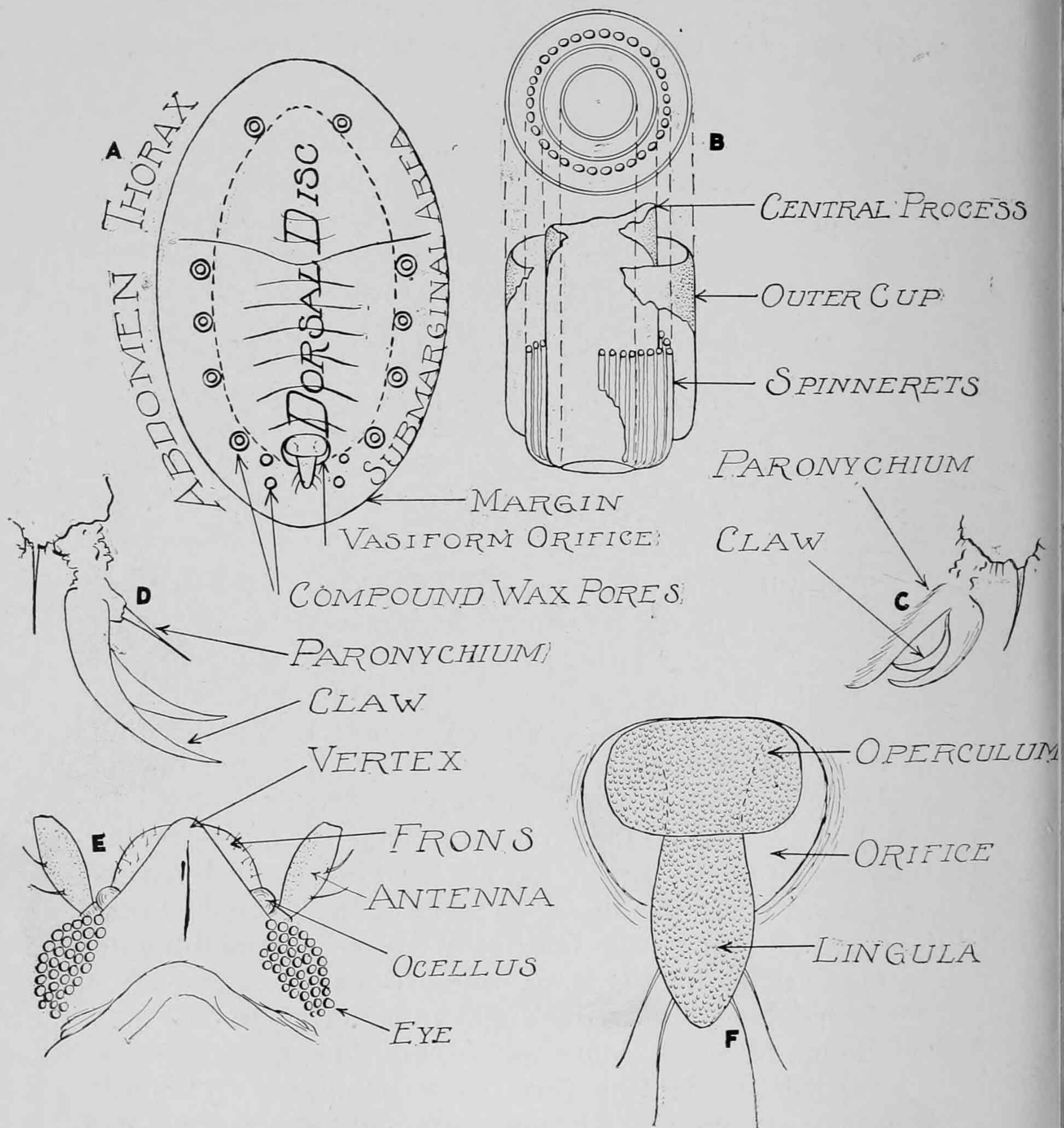


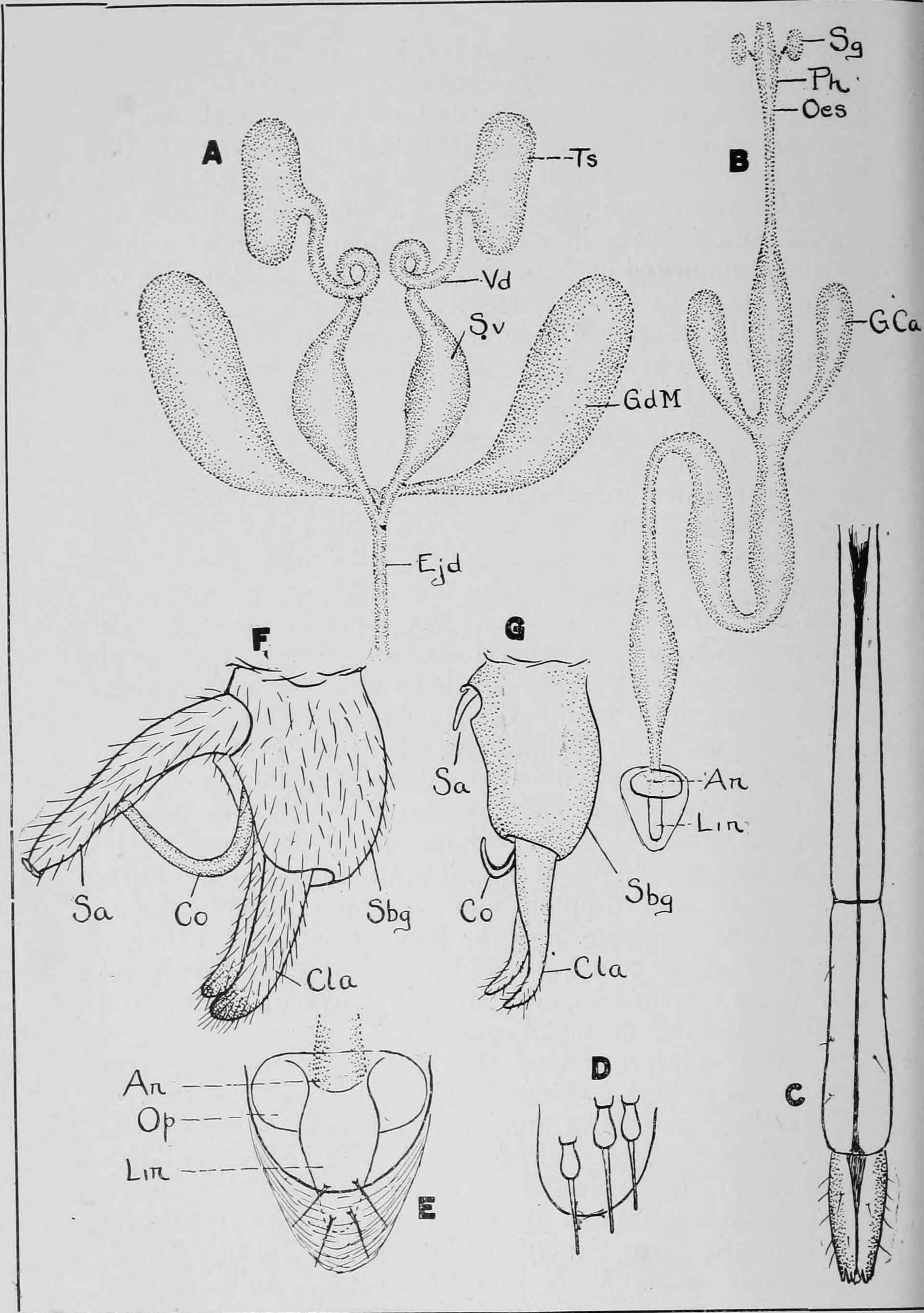
Fig. 57.—Diagrams of Aleyrodid structures: A, Pupa case.—B, Compound wax pores.—C, Foot of subfamily Aleyrodinae.—D, Foot of subfamily Aleurodicinae.—E, Head.—F, Vasiform orifice (ORIGINAL)

The *Aleyrodidae* or white flies have six life history stages: egg, three larval, pupal, and adult. All six stages may be found at any time up on the leaves, stems and flowers of

the host plant. Rarely, however, are the early stages in the latter places. The eggs are elongate-oval, brown, yellow, or light green in color and are placed on the leaf by means of a stalk of varying length. They are usually laid in a more or less spiral or circular arrangement but many species place them irregularly. The body of the adult is small and delicate in color, with white roundel wings, either unmarked or with small dusky areas. It is with the pupal stage that we are mostly concerned, as the characters in this stage are the ones used mostly in the determination of the genera and species, and the destructiveness of the insect is produced in this stage. The pupae and larvae are oval in shape, flattened, quiescent on the leaf during the three last stages. There are four moulting periods from the hatched egg to the adult stage, and during these stages many characters are added and many lost. The pupae are generally supplied with wax glands and produce wax in varying amounts which, spread out on the leaf away from the dorsum of the pupae in many beautiful patterns. In some species the wax secretion seems to be lacking or very slight, while in others it is so copious as to cover the whole leaf and body of the insect.

The white flies seem to attack nearly every type of plant, settling mostly on the under side of the leaves, and while not always seriously damaging the host, they cause many unsightly blemishes where the pupal stage of the insect has rested. When the infestation is serious the leaves may curl and drop off, and even though the leaves do not drop the resistance of the plant is so lowered that it becomes a prey to other insect pests and fungi. The larval forms are attacked by fungous and insect parasites, and both may act as means of control.

The greater part of the systematic work on this group has been done since 1895, after the publication of Maskell's paper. From that time until 1907 only two genera of the family were recognized, *Aleyrodes* and *Aleurodicus*. With the publication of the works of Quaintance and Baker a system of classification was worked out based upon the natural relationships of the various forms, the family as a whole revised, keys made, and many new genera and species described. Many smaller papers have



since been added to the Aleyrodid literature, some systematic, others economic and altogether too few on biology and life histories. Because of its wide-spread distribution the family had been of interest to many foreign writers.

Until the work of Quaintance and Baker appeared, the Aleyrodidae had been considered in an intermediate position between the Aphididae and Coccidae, but these writers after a careful morphological study, decided that it was rather an offshoot from the Psyllid group, being very closely allied to this group in many particulars (Láms. LXVII and LXVIII). Similarities were found in wing venation, genitalia, mouth parts and legs, and during the past year we have received specimens of Aleyrodids from Australia which have the habits of the Psyllids. Enderlein and Quaintance and Baker have divided the family into three large subfamilies, Udamoselinae, Aleurodicinae and Aleurodinae. In the latter classification the Udamoselinae are restricted to those forms in which both the media and cubitus are present in the forewing, the Aleurodicinae to those forms where the media is retained, but the cubitus is lost, and the Aleurodinae with the media lost and the cubitus retained. Each subfamily contains one or more genera and subgenera, and the species of the family number into the hundreds.

#### Family ALEYRODIDAE Westwood

Small or minute insects; oviparous, eggs stalked; metamorphosis intermediate; larval stages (except first) quiescent upon leaves of plant; most species surrounded or covered with a waxy secretion.

Mature sexes with four wings which are transparent white, clouded or mottled with spots or bands. Antennae in most genera of seven segments; compound eyes single or divided (reniform); ocelli two. Tarsi of two segments, terminating in two claws, and a medium process or paronychium; mouth parts suctorial, labium long, 3-segmented, setae four; male genitalia a pair of prominent claspers; female genitalia an acute ovipositor. Anus opening dorsally at the so-called «vasiform orifice».

Sub-families of the *Aleyrodidae*

- I. Forewing with radial sector, media and cubitus present, compound wax pores often developed, vertex produced..... *Udamoselinae*
- Forewing with radial sector, cubitus or media almost entirely absent, vertex not always produced ..... 2
- II. Forewing with media almost entirely absent, cubitus present, compound wax pores not developed..... *Aleyrodinae*
- Forewing with media present, cubitus absent, wax pores often developed..... *Aleurodicinae*

Sub-family *Udamoselinae* Enderlein

The members of this sub-family have the forewing with the costa and subcosta distinct. The radius, radial sector, media, cubitus and anal veins are present. One genus only, *Udamoselis*, is known.

***Udamoselis pigmentaria*** Enderlein (Lám. LXIX, fig. A)

*Udamoselis pigmentaria* Enderlein, Zoologischer Anzeiger, Bd. 34, N.º 7/8, p. 231 (1909).

The original description of this species is based on one male, and its habitat given as «in all probability South America». It is the largest member of the family *Aleyrodidae* recorded, having a wing length of 5.5 mm. for the forewing, and of 3.75 mm. for the hind wing, and body length of 7 mm.

Sub-family *Aleurodicinae* Quaintance and Baker

The members of this sub-family are characterized by the presence in the forewing of the radial sector and media. Radius may or may not be present and the cubitus is rarely faintly indicated.

The type genus is *Aleurodicus*.

Five genera are at present included in the sub-family. They may be distinguished as follows:

Genera of *Aleurodicinae*

- I. Pupa case with compound wax pores..... 2  
     Pupa case without compound wax pores.... 4
- II. Pupa case with large compound wax pores,  
     lingula conical ..... 3  
     Pupa case with reduced compound wax pores,  
     lingula broadly rounded..... *Eudialeurodicus*.
- III. Forewing with radius and media well developed,  
     antennae of seven segments.. *Aleurodicus*  
     Forewing with radius absent, antennae of  
     four segments..... *Paraleyrodes*
- IV. Pupa case with agglomerate pores, radius  
     and media well developed, antennae of seven  
     segments..... *Leonardius*  
     Pupa case without agglomerate pores, radius  
     and medial well developed..... *Dialeurodicus*

*Genus Dialeurodicus* (Ckll.) Quaintance & Baker

Forewing with radius, radial sector, and media retained. Vertex produced into a prominent cone-shaped process. Antennae of seven segments, of which the third is the longest. Paronychium of the foot represented by a stout spine. Pupa case flat; no compound pores present, but simple pores, either scattered over the surface or somewhat collected into areas; vasiform orifice small, lingula setose, short conical, included and armed with four spines.

Type.—*Aleurodicus cockerellii* Quaintance.

Species of *Dialeurodicus* (1)

- I. Dorsum with wax tubes forming the marginal  
     rim; shape, large, oval, flat..... 2  
     Dorsum with margin entire; shape, elongate,  
     elliptical, narrowed cephalad..... *pulcherrimus*

(1) The following keys to the species, are complete only for South American forms.

- II. Dorsum dark brown to blackish, with reticulations on its surface..... *tessellatus*  
 Dorsum light yellow, surface without reticulations, but with scattered simple pores..... *cockerellii*

**Diadiculeuros cockerellii** (Quaintance) (Lám. LXIX, J-L)

*Aleurodicus cockerellii* Quaintance, Tech. Series 8, Bur. Ent., U. S. Dept. Agr., p. 45 (1900).

*Dialeurodicus cockerellii* Quaintance and Baker, Tech. Ser. 27, pt. 1, Bur. Ent., U. S. Dept. Agr., p. 26 (1913).

We have not seen this species in nature but it has been described by Mr. Adolph Hempel as «Dorsum covered with a dense, thick mass of white secretion, arranged in a marginal fringe, and a submarginal oval ring. Habitat, Campinas, State of S. Paulo, on the underside of leaves of a cultivated guava (*Psidium cattleianum* Sabine). The entire under surface of the leaves become coated with a fine white powder, while the upper surface is usually covered with a black fungus». Specimens have been received from Dr. F. Noack, Instituto Agronomico, Campinas, Estado de S. Paulo, Brazil, on leaves of *Myrtaceae* sp. March 30, 1898, and again on the same species of plant June 14, 1898. Quaintance states that the adults «are unique in the genus *Aleurodicus*» due to the circular, dusky spots on the wings of the adult.

Type—Cat. N.º 14761, U. S. National Museum.

**Dialeurodicus tessellatus** Quaintance and Baker.  
 (Lám. LXIX, B-E)

*Dialeurodicus tessellatus* Quaintance and Baker, U. S. Dept. Agr., Tech. Series, 27, Pt. 1, 1913, p. 30.

The larvae of this species have a narrow fringe of wax from the marginal tubes, while the adult pupa cases are without wax. The pupa cases on the leaf are shiny dark brown or blackish. Specimens have been received from Ceara, Brazil, on *Eugenia uniflora* Linn., January 1906, from Mr. F. Richa.

*Adults.* Unknown.

*Type.*—Cat. N.º 14762, U. S. National Museum.



**Dialeurodicus pulcherrimus** Quaintance and Baker.  
(Lám. LXIX, F-I)

*Dialeurodicus pulcherrimus*, Quaintance and Baker, U. S. Dept. Agri. Tech. series 27, Pt. 1, 1913, p. 31.

This species has been fully described and figured by Quaintance and Baker. One slide has been received from G. E. Bodkin, Georgetown British Guiana, collected on an unknown plant March 2, 1914, in the Botanical Garden.

*Type*.—Cat. N.º 14778, U. S. National Museum.

*Genus Eudialeurodicus* Quaintance & Baker

Forewing similar to that of *Dialeurodicus* with radius, radial sector and media retained. Vertex rounded; frons produced beyond the vertex; antennae of seven segments. Paronychium a stout spine.

Pupa case flat, resembling *Dialeurodicus*, but with one or more pairs of reduced compound wax pores. Vasi-form orifice small, the lingula included and broadly rounded.

*Type*.—*Eudialeurodicus bodkini* QB.

**Eudialeurodicus bodkini** Quaintance and Baker.  
(Lám. LXX, A-I)

*Eudialeurodicus bodkini* Quaintance and Baker, Ann. Ent. Soc. Am. Vol. VIII, N.º 4, p. 369, 1915.

Mr. G. E. Bodkin sent this interesting white fly from British Guiana in 1915. It was collected on the leaves of *Erythrina glauca* Wild., at the Rose Hall plantation Berbice. The pupa cases are yellow in color with large dark brown areas on the thorax and abdomen. They are usually found along the mid-rib and larger veins of the leaf, are nearly covered with a copious secretion of white wax, which occurs in two concentric rings or banks. The leaves upon which the adults are found, are frequently powdered with fine white wax. A single reduced compound pore is found on the abdominal portion of the pupa case on either

the right or left side, but more often on the right. The adults vary greatly from others in closely related genera in having the frons extended and armed with tubercles, and in a widely rounded forewing, marked with groups of small dots. On the caudal abdominal segment of the adult male is found a structure which has not been observed before in the family, a paired organ arising from the segment cephalads of the genital segment. It is a long curved process extending caudad well beyond the end of the anal segment.

*Type*.—Cat N.º 19592 U. S. National Museum.

### *Genus Leonardius* Quaintance & Baker

Forewing with radius, radial sector, and media forming the veins; cubitus present in freshly emerged wing and traces of it sometimes present later; form of wings rounded, color generally mottled. Vertex produced, somewhat coneshaped. Antennae of seven segments of which the third is the longest. Paronychium a narrow spined process; pupa case with a series of agglomerate pores, some of which (the two anterior abdominal pairs) take on the nature of compound pores. Lingula of pupa case conical, included, setose, and armed with four spines.

*Type*.—*Aleurodicus lahillei* Leonardi.

***Leonardius lahillei*** (Leonardi) (Lám. LXIX, M-O).

*Aleurodicus lahillei* Leonardi, Bollettino del Laboratorio di Zoologia generale e agraria della R. Scuola superiore d'Agricoltura in Portici, Vol. 4, p. 316 (1910).

*Leonardius lahillei* Quaintance and Baker, U.S. Dept. of Agriculture, Tech. Ser. 27, Pt. 1, 1913, p. 33.

The original description with a translation is given by Quaintance and Baker. The habitat of the species is given as Argentina, upon a plant not classified.

### *Genus Aleurodicus* Douglas

Forms in this genus have radius, radial sector, and the media present in the forewing, with sometimes an in-

dication of the cubitus. The paronychium is represented by a large spine and the pupa case has large compound wax pores. A study of the forms indicates three subgenera.

*Type.*—*Aleurodicus anonae* Morgan.

*Key to the subgenera of Aleurodicus*

- I. Lingula of pupa case long, spatula teor conical, exserted; lingula of adult long, narrow and included ..... 2
- Lingula of pupa case short, conical, usually included; lingula of adult broad, rounded, and exserted..... subgenus *Metaleurodicus*
- II. Sides of pupa case flat, not deflexed under the ventral surface; vertex of adult rounded..... subgenus *Aleurodicus*
- Sides of pupa case deflexed under ventral surface; vertex of adult slightly bilobed.....  
..... subgenus *Lecanoideus*

We have only one example each of the subgenera *Lecanoideus* and *Metaleurodicus* in the South American collection, and these are *Aleurodicus (Lecanoideus) giganteus* Quaintance and Baker, and *Aleurodicus (Metaleurodicus) pigeanus* Baker and Moles. It has not seemed wise to include *anonae* Curtis, *conspurcatus* Enderlein nor *phalaenoides* Blanchard in the key of the subgenus *Aleurodicus*. The descriptions of *anonae* and *phalaenoides* are too vague and the immature stages of *conspurcatus* are as yet unknown.

*Key to the species of the subgenus Aleurodicus*

- I. Dorsal disk as well as submarginal area covered with numerous simple pores ..... *neglectus*
- Dorsal disk without simple pores, but the submarginal area all around with very many forming a band..... 2
- II. Pupa case with two large, dark latero-dorsal areas extending the full length of the case. *pulvinatus*

Pupa case without dark latero-dorsad areas but of a uniform yellowish color .....	3
III. Sub-margin with large boat shaped single pores. Forewing of adult with two faint dusky markings ... ..	<i>cocois</i>
Sub-margin without large boat shaped single pores but with circular minute glands set close together. Forewing of adult with three transverse dusky areas.. ..	<i>flumineus</i>

**Aleurodicus (Aleurodicus) cocois** (Curtis) Lám. LXX, J-M).

*Aleurodes cocois* Curtis Gardner's Chronicle.

*Aleurodicus iridescens* Cockerell, Psyche, Vol. 8, p. 226 (1898)

*Aleurodicus cocois*, Quaintance and Baker, Tech Ser 27 Pt. I. U. S. D. A. p. 47.

In the original description of this species, very little was given which would distinguish it from others in this same genus. Riley and Howard in *Insect Life*, Vol. V, p. 314, described it very fully, and later in *Psyche*, June 1898, Dr. T. D. A. Cockerell described the same species as *Aleurodicus iridescens*. Quaintance and Baker in the *Proceedings of the U. S. National Museum*, Vol. 51, placed the species as *Aleurodicus cocois* and gave all three of the early descriptions. With Riley and Howard's specimens, Cockerell's types and plenty of Bureau material, they had little doubt that the forms represented one species. We have two lots of material from South America in the Bureau collection, one taken in Venezuela on guava by Dr. A. Ernst, the other taken in British Guiana on cocoanut by G. E. Bodkin. The adult pupae vary greatly in size, depending on locality and food plants. The adults vary also in wing markings and in sizê. The wax secretion, which is very abundant, is made up of clocculent, cottony filaments, which completely covert he light yellow pupa case. The pupa cases are placed in regular rows on either side of the ribs of the leaf, and the wax secretion reaches from rib to rib.

**Aleurodicus (Aleurodicus) flumineus** Hempel.

*Aleurodicus flumineus* Hempel. Museu Paulista Revista v. 10, 1913-15 pub 1918 pp. 211-214.

This species was collected on the leaves of «oity» (*Moquillea tomentosa* Benth) by Dr. Eziquiel da Boeba Brito at Rio de Janeiro and sent to Mr. Hempel. The individuals are usually found on the lower surface of the leaves along the mid rib, and are entirely covered with a wax secretion. The wax is very dense on the margin, with radiating long curled glassy filaments. Hempel states that the longest of these filaments measure 25 mm. This species is closely related to *Aleurodicus neglectus* Quaintance and Baker, and *Aleurodicus dugesii* Cockerell, the main difference between this species, *A. neglectus* and *A. dugesii* being in the transverse bands of color on the forewing *Aleurodicus flumineus*. has three dusky transverse areas, while *A. dugesii* has four and *A. neglectus* has a series of dusky spots which are so close together as to almost form bands. The color markings upon the wings of *A. neglectus* are so variable that we believe the two species, *A. flumineus* and *A. neglectus*, will prove one and the same when a larger series of adults has been studied.

**Aleurodicus (Aleurodicus) neglectus** Quaintance and Baker (Lám. LXXI, G - I)

*Aleurodicus neglectus* Quaintance and Baker, U. S. Dept. of Agriculture, Tech. Ser. N<sup>o</sup>. 27, Pt. 1, p. 63.

The first collection of this species came from Pará, Brazil, taken on guava by Mr. Albert Koebele, December 1882. In 1892 and 1893 Mr. Robert Newstead sent specimens taken from *Annona squamosa* Linn. and *Ficus bengalensis* Linn., at Demerara, British Guiana. On the leaf the pupa case is completely covered by a copious wax secretion made up of long, glassy wax rods and overlaid with a flocculent wax mass.

*Type*.—Cat. N<sup>o</sup>. 14774, U. S. National Museum-

**Aleurodicus (Aleurodicus) pulvinatus** (Maskell) (Lám. LXXI, B—F)

*Aleurodes pulvinatus*, Maskell Trans. New Zealand Inst. Vol. 28, p. 439 (1895).

We have one South American collection of this species. It was taken on the stems of *Montrichordia aculeata* Crueg., at Georgetown, B. Guiana, by G. E. Bodkin. The pupa case, which is bright yellow in color, with two dark brown stripes on the dorsum, is covered with a flocculent wax secretion. The insects are thickly congregated on the stems and overlaid with wax.

*Type*.—In the Maskell Collection.

*Subgenus Metaleurodicus Quaintance & Baker.*

**Aleurodicus (Metaleurodicus) pigeanus**, n. sp.

This species collected on *Quillaja saponaria* Mol. was sent to us by Prof. Carlos E. Porter from Chile in March 1913. Only a few pupa cases were on the leaf and the wax secretions on them were so broken that it is impossible to tell what the original shape of the wax fringe was. The cases have a lateral fringe of flocculent filaments which we think must have extended on the leaf to half the width of the case. The color of the case is light yellow with a darker yellow meson.

*Pupa case*.—(Lám. LXX, fig. N) Size: length 2. 12 mm., width 1. 36 mm; color, light yellow, with the central portion of the dorsum dark brown. Margin (Lám. LXX, fig. P) entire, the submarginal area darker in color than the rest of the pupa case and marked at definite intervals with darker horizontal lines. The width of the sub-margin is 0. 06 mm; the dorsum is slightly convex, the abdominal segments distinct. On the third, fourth and fifth abdominal segment are groups of small circular pores, varying in number from ten to five. On the third and fourth segments an irregular light area is in the center of the group of small pores. There are seven pairs of simple, compound pores, six pairs of which extend on the dorsum at the end of the abdominal segments and around the orifice, and one pair at the cephalic portion of the case. Between the abdominal compound pores and the cephalic ones are two light colored rounded areas resembling pores. Vasiform orifice (Lám. LXX, fig. O) subcordate; the cephalic margin straight; operculum sub-elliptical; the caudal margin concave; lingula long; extending 0. 011mm below the cau-

dal margin of the operculum, spatulate, with two pairs of long setae near the tip.

*Type.* Cat. 23075, U. S. National Museum.

*Subgenus Lecanoideus* Quaintance & Baker

**Aleurodicus (Lecanoideus) giganteus** Quaintance and Baker (Lám. LXXI, J-K).

*Aleurodicus (Lecanoideus) giganteus*, Quaintance and Baker, Dept. of Agriculture Tech. Ser. N.º 27, Pt. 1, p. 70.

Three lots of this species have been sent to the Bureau from South America. They have been collected on *Annona muricata* Linn., at Georgetown, British Guiana by G. E. Bodkin, February 1914; on an unknown plant by A. Koeble, December 1882; and also on *Annona cherimola* Mill., at Manaus, Brazil, by Dr. Alfredo A. Damatta in 1919. The adults are the largest of any species of this genus thus far recorded, the female having a wing spread of 3.75 mm; and a body length of 2.75 mm. The pupa cases are light yellow in color, covered with a great mass of flocculent wax. As in the other species of *Aleurodicus*, they are placed in more or less of a row along the ribs of the leaf and especially along the median one.

*Type.*—Cat. N.º 14767, U. S. National Museum.

Species of the genus *Aleurodicus* not sufficiently known to indicate their correct subgenus:

**Aleurodicus anonae** Morgan.

*Aleurodicus anonae* Morgan, Ent. Mo. Mag. (2) Vol. 3, p. 32 (1892).

The original description of this species was very meager and so far the insect has not been rediscovered. Its hosts were stated as *Annona muricata* Linn. and «*Richardia pacifica*» and it was found in Demerara, British Guiana.

**Aleurodicus conspurcatus** Enderlein, (Lám. LXXI, A).

*Aleurodicus conspurcatus* Enderlein Stett. Ent. Zeit. 1909, p. 282.

This species is unknown to us in nature. It was found in South Brazil at Santa Catharina.

*Type*.—In Stettiner Zoologisches Museum.

***Aleurodicus phalaenoides*** (Blanchard).

*Aleurodes phalaenoides* Blanchard, in Gay's *Historia Física y Pol. de Chile, Zool.*, Vol. 8, p. 319, (1852).

*Aleurodicus phalaenoides* Quaintance and Baker, U. S. Dept. of Agriculture, Tech. Ser. N.º 27, Vol. 1, p. 79.

This species has never been rediscovered or redescribed since the original description in 1852. The form and venation of the wing are, however, those of *Aleurodicus*. When rediscovered, therefore, the insect may prove to fall in a genus more primitive than *Aleurodicus*, but for the present we place it in that genus. The insect, as quoted from the original description, was found rather common in Santiago on leaves of Parqui (*Cestrum parqui* L'Her.) and infests this plant principally during the month of January.

*Genus Paraleyrodes Quaintance*

Forewing with the radial sector and a small rudiment of the media retained; cubitus sometimes faintly indicated by a fold; vertex rounded, antennae of four segments, of which the third is the longest; claspers of male short and stout; penis bilobed; paronychium of the foot represented by a long stout spine. Pupa case with a number of large compound wax pores; vasiform orifice with a very long, setose, spatulate, exerted lingula, which is armed with four long spines. Size small.

*Type*.—*Aleyrodes persicae* Quaintance.

***Paraleyrodes goyabae*** (Goeldi).

*Aleyrodes goyabae* Goeldi, *Mittheil. schweiz ent. Ges.* Vol. 7, p. 248 (1886).

Goeldi in 1886 placed this species in *Aleyrodes* where it has been left by all subsequent writers. The presence of copious wax secretion of «ten or twelve» wax pores, of a four segmented antenna and of three transverse bands of color on the forewings, as described by Goeldi,



places it without a doubt in *Paraleyrodes*. The food plants of *Paraleyrodes goyabae* are given as «Goyabeiro» («*Psidium goyaba*») Myrthaceae and «abacateiro» (*Laurus* sp.). Habitat Rio de Janeiro.

Sub-family **Aleyrodinae** Enderlein

The members of this sub-family are characterized by the presence in the forewing of the radial sector and cubitus, with media almost entirely lacking. Radius may or may not be present.

The type genus is *Aleyrodes*.

Twenty-one genera are at present included in the sub-family. These may be distinguished as follows:

*Key to the Genera of the Aleyrodinae*

- I. Forewing of adult with radius<sub>1</sub>, present as a distinct vein..... *Aleurochiton*
- Forewing of adult with radius<sub>1</sub>, lacking..... 2
- II. Pupa case with a sub-marginal row of papillae-like pores..... 3
- Pupa case without a sub-marginal row of papillae-like pores..... 4
- III. Thoracic tracheal folds visible and ending in a comb of teeth; operculum nearly filling orifice, obscuring lingula..... *Aleuoparadoxus*
- Thoracic tracheal folds not distinct, lingula visible caudad of operculum and lobed... *Trialeurodes*
- IV. Dorsal disk distinctly separated from the sub-marginal area by a suture-like line or depression..... 5
- Dorsal disk not separated from the sub-marginal area by a suture-like line or depression..... 9
- V. Dorsum with large irregular shaped pores .. 6
- Dorsum without large irregular shaped pores 7
- VI. Dorsum with mammiform pores..... .. *Aleurotithus*
- Dorsum without mammiform pores, but with chitinized pores of varying length..... *Siphoninus*

VII. Sub-marginal area with elevated and papillae-like folds.....	<i>Aleuromigda</i>	
Sub-marginal area without elevated and papillae-like folds. ....		8
VIII. Vasiform orifice subcordate, surrounded by a definite lobed area with a channel extending caudad. ....	<i>Aleurolobus</i>	
Vasiform orifice rounded or cordate, elevated and not surrounded by a lobed or palmate area .....	<i>Tetraleurodes</i>	
IX. Pupa case with thoracic folds present.....		10
Pupa case with thoracic folds not present....		12
X. Thoracic tracheal folds ending in a comb of teeth.....		11
Thoracic tracheal folds not ending in a comb of teeth, but in a more or less circular pore .....	<i>Dialeurodes</i>	
XI. Vasiform orifice small, transversely rounded, operculum almost entirely filling it.....	<i>Aleuroplatus</i>	
Vasiform orifice subcordate, acute caudad, rounded, operculum filling 2.3 of orifice, and leaving caudad portion of lingula exposed .....	<i>Asterochiton</i>	
XII. Dorsal disk deflexed to meet shortened ventral disk, marginal wax pores showing through ventral disk.....	<i>Tetralicia</i>	
Dorsal disk flattened with margin showing as usual.....		13
XIII. Vasiform orifice situated in a pit or depression which is usually transversely ribbed or furrowed .....	<i>Pealius</i>	
Vasiform orifice not situated in a pit.....		14
XIV. Lingula long, extending caudad one-half to one-third of its length.....		15
Lingula short and obscured by operculum....		18
XV. Vasiform orifice triangular, very elongate.	<i>Bemesia</i>	
Vasiform orifice sub-cordate.....		16
XVI. Vasiform orifice with cephalic margins straight, lingula not knobbed.....		17
Vasiform orifice with cephalic margins curved, lingula knobbed.....	<i>Aleurotulus</i>	

- XVII. Adults with antennae of seven segments, of which III is the longest, IV and VII sub-equal..... *Aleyrodes*  
 Adults with antennae of seven segments, of which IV (in male) is the longest, being as long as the remaining ones together... *Aleurocybotus*
- XVIII. Operculum rectangular, very short, lingula broad and short, truncate caudad... *Nemoskellia*  
 Operculum subcordate or subcircular, lingula straplike when seen..... 19
- XIX. Dorsum with several series of prominent setas, margin with very distinct teeth. *Aleurocanthus*  
 Dorsum without such a series of prominent setae..... 20
- XX. Dorsum with a central ridge or tracheal-like elevation margin with a double series of teeth, wax not abundant... .. *Aleurotrachelus*  
 Dorsum without central trachea-like elevation; margin with single row of teeth; dorsum with several pairs of prominent spine-like setae; wax secretion very abundant, flocculent or woolly..... *Aleurothrixus*

*Genus Aleurocanthus* Quaintance & Baker

Pupa case medium in size, subelliptic in outline, usually dark brown or black in color; margin of case toothed, the wax tubes very prominent; submarginal area not separated from dorsal disk; dorsum without papillae or pores, though bearing many heavily chitinized spines variously arranged; tracheal folds usually not discernible, though evident in a few species; wax secretion usually present as a narrow fringe from marginal wax tubes. Vasiform orifice small, rounded or subcordate in outline, situated on a tubercle-like projection of dorsum; operculum similar in shape and almost entirely filling it, obscuring the lingula.

Adult with one flexure in radial sector of forewing and no spur of media; wings usually blotched or shaded. Males much smaller than females.

*Type.*—*Aleyrodes spinifera* Quaintance.

***Aleurocanthus fumipennis* (HEMPEL).**

*Aleurodes fumipennis* Hempel, Psyche, Vol. 8, 1899, p. 394.

*Aleurotrachelus fumipennis*, Quaintance and Baker, Tech. Ser. 24, Bur. Ent. U. S. Dept. Agr. 1914, p. 103.

There are no specimens of this species in the Bureau collection, but Hempel describes it as «black in color, with a short fringe of white wax. Around the margin are 32 sharp sword-like hairs with the wings of the adult smoky in color on the basal half and on a portion of the rest of the wings». Quaintance and Baker placed this species in *Aleurotrachelus* due to the statement in Hempel's original description, «There is a prominent median, longitudinal ridge, and about six transverse furrows», but the marginal spines and the dusky wing of the adult would place it without much doubt in *Aleurocanthus*. Habitat. Under side of the leaves of grass growing on swampy ground, Sao Paulo, Brazil.

***Genus Aleuoparadoxus* Quaintance & Baker**

Pupa case medium in size, elliptic in outline, margin toothed, the wax tubes only moderately developed; submarginal area not separated from dorsal disk; just within margin a series of papilla-like pores and dorsum with numerous irregular shaped pores; tracheal folds present, terminating on margin in a comb of teeth; wax secretion brittle glass-like rods from the submarginal papillae and usually a secretion from the dorsal pores. Vasiform orifice subcordate or triangular, the operculum similar in outline, obscuring the lingula.

Adult with a single flexure in radial sector of forewing and no spur of media. Antennae seven-segmented, IV the longest; distal segments subequal. Sexes nearly equal in size.

*Type.*—*Aleurodes iridescens* Bemis.

***Aleuoparadoxus punctatus* Quaintance and Baker**  
(Lám. LXXII, K-M).

*Aleuoparadoxus punctatus* Quaintance and Baker, Proc. of U.S. National Museum, Vol. 51, p. 380.

This species which has been found only in Chile, was taken on *Lithraea caustica* Hook and Arn., at Santiago, by Manuel J. Rivera, October 25, 1905; also taken on *Quillaja saponaria* Mol. and *Duvaua* sp., by Professor Carlos E. Porter, March 1913 and January 1915, at Santiago and La Ligua. On the leaf the pupae appear black with a very short, scanty lateral wax fringe made up of iridescent filaments. They are very numerous on the under side of the leaf and when removed leave light colored areas where they have been located, giving the leaf a very mottled appearance.

*Type*.—Cat. N.° 20205, U. S. National Museum.

### *Genus Aleuroplatus* Quaintance & Baker

Pupa case usually flat, elliptical, oval or subcircular in outline, often notched on cephalo-lateral margins; some species are elongate; color varying from a transparent yellowish or whitish to black, but mostly dark brown; many species variously dotted with darker markings; margin toothed, wax tubes moderately developed, incisions shallow; thoracic and caudal tracheal folds present and in most cases plainly visible and ending on the margin in a distinctly differentiated comb of teeth from which arise pencils of waxy secretion, differing from the more or less amorphous secretion of wax surrounding the case, secreted by the marginal wax tubes. Dorsum with the disk not separated from the submarginal area and without prominent pores or papillae, though usually with a number of minute clear pores. (In rare exceptions there are many wax pores). Vasiform orifice small, transverse, rounded, or elongate, the inner margin rarely armed with teeth; operculum filling from a third to all of the orifice and obscuring the lingula.

Adults with wings unmarked, clouded, or spotted; the radial sector of forewing with a single flexure; no spur of the media, but the cubitus faintly indicated. Antennae of seven segments, segment III the longest; the other distal ones subequal, with IV, however, usually the shortest. Claspers of male considerably curved at their distal extremities and possessing a number of prominent

spines. Proximad of the distal spur of each clasper there is either a lobed structure or other smaller spurs,

*Type*.—*Aleyrodes quercus-aquaticae* Quaintance.

*Key to species of Genus Aleuroplatus*

- I. Marginal comb of thoracic fold distinguishable, but the teeth little differentiated from adjacent marginal teeth..... 2  
 Marginal comb and thoracic fold scarcely distinguishable ..... *oculireniformis*
- II. Dorsum arched, possessing distinct rachis. *cockerelli*  
 Dorsum flat, without rachis, suture between thorax and abdomen not curved cephalad beyond the third thoracic segment... *cococolus*

**Aleuroplatus (Aleuroplatus) cococolus** Quaintance and Baker (Lám. LXXIII, A -C).

*Aleuroplatus (Aleuroplatus) cococolus* Quaintance and Baker, Proc. U. S. National Museum, Vol. 51, p. 385.

While this species has been collected only in the South American countries, at Ceara, Brazil in 1906, collections have been taken in the outlying island of Trinidad; in Cuba, and in Panama. The pupa case is jet black, with radiating wax filaments extending from it on the leaf to half of its width. This wax pattern shows most clearly when the cases are scattered on the leaf. When they are so numerous as to thickly incrust the surface of the leaf the wax is spread from one case to another in an amorphous mass.

*Type*—Cat. No. 19193, U. S. National Museum.

**Aleuroplatus (Aleuroplatus) oculireniformis** Quaintance and Baker (Lám. LXXIII, G -I).

*Aleuroplatus (Aleuroplatus) oculireniformis* Quaintance and Baker, Proc. U. S. National Museum, Vol 51, p. 391.

Two lots of this species have been received from F. Rocha, in Ceara, Brazil, one collected in January 1916 in *Passiflora* sp. and the other collected in September 1906 on an unknown plant. Two other species are very

closely related to *A. oculireniformis*, namely, *vinsonioides* Cockerell and *oculiminutus* Quaintance and Baker. The separation of these species is made on the pupa case, as adults of *vinsonioides* in the collection are fragmentary females only.

*Type*—Cat. No. 19200, U. S. National Museum.

**Aleuroplatus (Aleuroplatus) cockerelli** (Ihering)  
(Lám. LXXIII, D - F).

*Aleurodes cockerelli* Ihering, Rev. Mus. Paulista, Vol. 2, 1897, p. 393.

*Aleuroplatus (Aleuroplatus) cockerelli* Quaintance and Baker, Proc. U. S. National Museum, Vol. 51, p. 384.

*Dialeurodicus cockerellii* Quaintance was incorrectly described as this species by Hempel and so cited by Kirkaldy in his catalogue. We have in the Bureau only one collection, taken on *Baccharis* sp. in Brazil.

*Genus Aleurothrixus* Quaintance and Baker

Pupa case medium to small size, elliptic; margin sometimes angled; color variable, ranging from yellow to almost black; margin of case usually with an apparent double row of teeth, the wax tubes well developed; submarginal area not separated from the dorsal disk; dorsum without papillae or pores, but bearing along median line a few pairs of prominent spinelike hairs; tracheal folds not discernible; wax secretion usually copious, flocculent, or woolly, secreted by marginal wax tubes. Vasiform orifice small, transversely elliptic; lingula obscured by the operculum, which nearly fills the orifice.

Adult with one flexure in radial sector of forewing and no spur of media. Antennae of seven segments, of which III is longest. Sexes nearly equal in size.

*Type*.—*Aleyrodes howardi* Quaintance.

*Key to the species of the Genus Aleurothrixus*

- |   |   |
|---|---|
| I. Pupa case with a row of distinct spines on submarginal area..... | 2 |
| Pupa case without such row of spines.....                           | 3 |

- II. Vasiform orifice with a caudal comb of elongate finger like teeth..... *graveli*  
 Vasiform orifice without such comb but entire.. ..... *aëpim*
- III. Spines latero-cephalad of the vasiform orifice and on caudal margin of pupa case short and vasiform . . . . . *porteri*  
 Spines latero-cephalad of the vasiform orifice and on caudal margin of pupa case very long and prominent; color varying from yellow to brown..... *floccosa*

**Aleurothrixus (Aleurothrixus) aëpim** (Goeldi) (Lám. LXXII, G—J).

*Aleurodes aëpim* Goeldi, Mitth. Schweiz. Ent. Gesell., Vol. 7, 1886, p. 250.

This form was described originally as from «Mandioca doce» at Rio de Janeiro, and we have two collections in the Bureau, one from cassava (*Manihot utilissima* Pohl) at Rio de Janeiro, taken by F. Noack; the other taken on citrus at Sao Joao del Rey, and in Minas, Brazil, by P. H. Dorsett, January 5, 1914. None of the other described species of *Aleurothrixus* has sub-marginal spines similar to those described by Goeldi.

**Aleurothrixus (Aleurothrixus) floccosa** (Maskell) (Lám. LXXIV, fig. M).

*Aleurodes floccosa* Maskell, Trans. New Zealand Inst., Vol. 28, 1896, p. 432.

*Aleurodes horridus* Hempel, Psyche, Vol. 8, 1899, p. 394.

*Aleurothrixus floccosus* Quaintance and Baker, Journ. Agri. Research, Vol. 6, 1916, p. 466, Fig. 3.

This species which is closely related to *howardi* Quaintance has been collected in four of the South American countries. It is also abundant in the islands off the coast of South America and in Panama and Mexico. The typical color phase and that represented by the types of *floccosa* and *horridus* is the yellow one. All of the pupa cases are a uniform yellow. This phase is by far the most abundant in the collection, being represented by 25 lots



of material from different parts of the Americas. Two lots—one from Jamaica and one from Mexico—show a median dark brown stripe more or less developed. One collection from Brazil, of which the host is unknown, is remarkable in that the thorax of all the pupa cases is yellow, whereas the abdomen is uniform dark brown. This phase is very striking and so far has not been met with in any of the other collections. A fourth phase, and a fairly common one, has the dorsal disk dark brown and the sub-marginal area, together with the marginal tubes yellow. *Floccossa* differs from *howardi* only in the comb-like projections caudad of the vasiform orifice. They are found side by side on citrus and the relation of these two forms will only be determined after careful life history studies of both. The species has been collected in the following places in South America: Typical *howardi* seems to be a more northern form.

Locality	Host	Collector	Date	Bureau N.o
Bahia, Brazil...	? .....	?	March 1883	Q. 3150
Cera, " ...	Guava .....	F. Rocha	Jan. 1906	Q. 746
" " ..	Citrus .....	" "	" "	Q. 1832
Brazil .....	" .....	?	April 1914	Q. 8863
Argentina .....	" .....	?	May 1910	Q. 5261
Tucuman, Argentina .....	" .....	T. C. Barber	June 1914	Q. 8883
Georgetown, B. Guiana .....	" .....	G. A. Bodkin	Jan. 2, 1913	Q. 8832
Villa Encarna- ción .....	<i>Baccharis genis- telloides</i> .....	Schrottky	Nov. 1905	Q. 1680

**Aleurothrixus (Aleurothrixus) graveli** BLANCHARD.

*Aleurothrixus graveli* Blanchard, Physis, IV (1918) p. 344.

This species is very closely related to *Aleurothrixus aëpim* Goeldi. It possesses in the pupa case the same number of marginal spines situated in the same regions and the cases are otherwise the same with the exception of the vasiform orifice. There is the same difference between *graveli* and *aëpim* as between *howardi* and *floccosa*. The orifice is armed with an apparent comb on its posterior margin.

**Aleurothrixus (Aleurothrixus) porteri** Quaintance and Baker, (Lám. LXXIV, fig. J-L).

*Aleurothrixus porteri* Quaintance & Baker Journ. Agric. Research, Vol. 6, 1916, p. 466, fig. 3.

Collections of this species so far have come only from Chile and Brazil. It has been received from the following places:

Locality	Host	Collector		Bureau N.º
Santiago, Chile	Citrus (orange).	M. Lataste	Feb.	1894 Q. 4062
»	»	»	May	1894 Q. 4063
»	?	»	March	1895 Q. 4064
Rancagua, »	Citrus (orange).	E. C. Reed	Feb.	1896 Q. 4065
Viña del Mar, Chile.....	<i>Solanaceous</i> sp.	D. G. Fairchild	Apr.	1899 Q. 351
Santiago, Chile.	<i>Schinus</i> sp.....	M. J. Rivera	Oct.	1904 Q. 12022
San Bernardo, Chile.....	Citrus (orange).	»	Nov.	1994 Q. 3214
Santiago, Chile	<i>Lithraea caustica</i> Hook Vand Arn...	»	Nov.	1909 Q. 6513
»	<i>Schinus molle</i> Linn.....	C. E. Porter	June	1912 Q. 8726
Arica, Chile	<i>Schinus molle</i> Linn.....	»	May	1912 Q. 12016
Santiago, Chile.	Citrus (orange).	»	July	1913 Q. 12013
»	»	»	Mar.	1913 Q. 8820
Rio Janeiro, Brazil.....	«Zaboticaba»...	Popenoe & Dorsett	Jan	1914 Q. 12004
Santiago, »	»	D. G. Tower	June	1916 Q. 12094
San Jose de Maipo, Chile.....	<i>Lithrea molle</i> Linn.....	C. E. Porter	Sept	1916 Q. 12119
Santiago, Chile.	<i>Myrtus</i> sp.....	»	Aug.	1915 Q. 12062
»	<i>Cestrum parqui</i> L'Her.....	Leopold Hoffmann		1919 Q. 12473
»	<i>Persea americana</i> Mill...	»		»
»	<i>Lippia citriodora</i> H. B. K...	C. E. Porter	?	Q. 12024

Type Cat. N.º 20171 U. de National Museum.

### Genus *Aleurotulus* Quaintance and Baker

Pupa case elliptical or oval, flat, color usually yellowish; margin of case toothed; submarginal area not separated from dorsal disc; no prominent papillae or pores present; tracheal folds faintly discernible. Vasiform orifice subcordate or somewhat rounded; operculum similar but shorter in proportion, usually occupying about

two thirds of orifice. Lingula long and distinctly knobbed. Adult with one flexure in fore wing, and no spur of media. Antennae of seven segments of which the third is the longest. Segment VII usually longer than IV, V, or VI.

*Type.*—*Aleyrodes nephrolepidis* Quaintance.

*Key to the species of the Genus Aleurotulus*

Pupa cases possessing pairs of long, stout spines on venter of pupa case..... ..	<i>flicium</i>
Pupa case without such spines, but with more or less of a dorsal ridge..... ..	<i>bodkini</i>

**Aleurotulus flicium** (Goeldi).

*Aleyrodes flicium* Goeldi, Mittheil. Schweiz. ent. Ges, Vol. 7, 1886, p. 248.

*Aleurotulus flicium* Quaintance and Baker. Tech. Ser. 27, Pt. Bur. Ent. U. S. Dept. Agriculture, 1914, p. 102.

Specimens were taken from *Asplenium cuneatum* Lam., at Rio de Janeiro, described and figured by Goeldi as having 5 pairs of long, slender spines on the under surface. Specimens of *extranius* studied by Quaintance and Baker show the two to be alike, only in *extranius* the five spines are on the dorsal surface. The condition of the ventral spines is so remarkable that these two co-authors felt that Goeldi had made a mistake, but the same thing was described by Douglas in 1890, and because of the statements of these two describers they retained the two specific names.

**Aleurotulus bodkini** Quaintance and Baker (Lám. LXXII, D-F).

*Aleurotulos bodkini* Quaintance and Baker, Proc. U. S. Nat. Mus. (In. press).

This species was collected on leaves of an ornamental plant at Berlice, British Guiana, by Mr. G. E. Bodkin, July 1913. We are unable to describe it as it appears on the leaf as the only material we have is mounted on seven slides.

*Type*.—Cat. N.º 23074, U. S. National Museum.

*Genus Aleurotrachelus* Quaintance and Baker

Pupa case small to medium in size, elliptic in outline, the cephalic end often somewhat pointed; margin of case usually with an apparent double row of teeth; submarginal area may or may not be separated from dorsal disc. Dorsum without pores or papillae; body segments usually very distinct. In typical forms there is along each side of dorsum a prominent fold. Along median line of dorsum is a tracheal like ridge terminating cephalad in typical forms, in an arrow-shaped figure, and caudad in an ovate or polygonal figure, surrounding the orifice. Tracheal folds not discernible; wax secretion usually present, frequently copious, as a fringe from marginal wax tubes, and as a covering of the dorsum. Vasiform orifice small to medium in size, sub-cordate; operculum usually similar in outline, obscuring the lingula.

*Type*.—*Aleyrodes tracheifer* Quaintance.

***Aleurotrachelus parvus*** (Hempel).

*Aleurotrachelus parvus* Hempel, *Psyche*, Vol. 8, 1899, p. 395.

*Aleurotrachelus parvus*, Quaintance and Baker, *Tech Ser. 27*, Bur. Ent. U. S. Dept. of Agriculture, 1914, p. 103.

No specimens of this species are available for study. Quaintance and Baker placed it in *Aleurotrachelus* because of Hempel's description of the double row of marginal teeth and the longitudinal ridge on the dorsum. Hempel describes it as «small, flat, black in color, and oval in shape, usually enveloped in a mass of white, felt-like hairy secretion. Marginal edge thickened, with a double row of crenulations. Wings transparent. Habitat, under side of leaves of *Maytenus* sp., Sao Paulo, Brazil.

*Genus Aleyrodes* Latreille

Pupa case small to medium in size, elliptic in outline; color usually yellowish or brownish; margin of case

toothed; the wax tubes irregular in outline and rather poorly developed; submarginal area not separated from dorsal disk. There are no well developed papillae or pores as in *Asterochiton*, though minute pores may be present in some species. Tracheal folds not discernible; wax secretion usually absent. Vasiform orifice subcordate, the operculum about half filling the orifice; lingula included within the orifice, but visible caudad of the operculum; the distal extremity setose and armed with a pair of spines.

Adult with two flexures in radial sector of forewing, and media as a very short spur; forewings usually with faint patches of dusky coloration in flexures of radial sector. Antennae of seven segments, of which the third is the longest, the distal ones being subequal; segments imbricated. Sexes nearly equal in size; claspers of male with a few spines.

*Type*.— *Aleyrodes proletella* Linn.

#### ***Aleyrodes tinaeoides* Blanchard.**

*Aleyrodes tinaeoides* Blanchard, Hist. Fisica y Polit. de Chile. Zoología, Vol. 7, p. 320 (1840).

The description given of this species is so inadequate that its position among the genera of *Aleyrodidae* cannot be positively stated. For this reason we have left it in the genus in which it was originally described. Its habitat is given as Chile.

#### ***Aleyrodes youngi* (HEMPEL).**

*Aleyrodes youngi*, Hempel, Ann. Mag. Nat. Hist. (7) Vol. 8, p. 385, 1901.

*Aleyrodes youngi*, Quaintance and Baker, Tech. Ser. 27, Pt. 2, Bur. Ent. Dept. of Agriculture, 1914, p. 101.

We know this species only from the original description. It was collected at Iguagse and Campinas, State of Sao Paulo, Brazil, on cabbage and collards. The describer states that it is found on the underside of the leaves and sometimes scattered on the upper surfaces.

### *Genus Bemesia* Quaintance and Baker

Pupa case variable in size, elliptic or oval in outline, broadest across the thorax; margin toothed; submarginal area not separated from dorsal disk, dorsum without papillae though sometimes with a very coarse papilla-like granulation. Vasiform orifice triangular, long and narrow; lingula long and narrow, less than half covered at its cephalic end by the short operculum. Lateral margins of vasiform orifice sometimes showing a distinct ridge which extends to the caudal margin of pupa case forming a furrow.

Adult with one flexure in radial sector of forewing; no spur of the media present. Antennae of seven segments of which segment III is usually the longest, although in some makes segment VII is the longest.

*Type*.—*Aleyrodes inconspicua* Quaintance.

***Bemesia berbericola*** (COCKERELL) (Lám. LXXIII, J-M).

*Aleyrodes berbericola* Cockerell, Journal N. Y., Ent. Soc. 1896, p. 207.

*Aleyrodes inconspicua* Bemis, Proc. U. S. Nat. Mus. Vol. 27, 1904, p. 505.

*Bemesia berbericola* Quaintance and Baker, Tech. Ser. 27, Pt. 2, U. S. Dept. Agr. 1914, p. 100.

We have only one lot of material of this species from South America. It was collected on *Colliguaya* sp., by Dr. C. E. Porter, at Santiago, Chile, October, 1915. It is very closely related to *inconspicua*, the length of the caudal setae being the only observable difference.

*Type*.—Cat. N.º 23073, U. S. National Museum.

### *Genus Dialeurodes* (Ckll.) Quaintance and Baker

T. D. A. Cockerell, in his Classification of the Aleyrodidae (1) published in 1902. established the subgenus *Dialeurodes* and pointed out several important characteristics of the group. *Aleyrodes citri* Riley and Howard was

(1) Proc. Acad. Nat. Sic. Phila., 1902, p. 280.

indicated as type and *A. eugeniae* and *A. aurantii* were also referred to this subgenus.

In a subsequent paper, the white fly (*Aleyrodes citri*) and its allies (2), Cockerell cites as additional examples of *Dialeurodes*, *Aleyrodes croceata*, *A. fodiens* and *A. piperis*. Some of the species referred to *Dialeurodes* by Cockerell do not belong to the group, as understood by us—i. e., *cotesii*, *piperis*, and *croceata*. The writers believe that *Dialeurodes* is of generic rank and have so indicated (3).

While the species of *Dialeurodes* present a general uniformity in the presence of certain prominent characters, there are to be recognized several minor groups for which it has seemed necessary to erect subgenera. Species of this genus are largely oriental, and some of them are of especial interest by reason of their injuries to plants, as *D. citri*, *citriifolii*, etc.

Pupa case variable in size, elliptic to subcircular in outline; color usually yellowish, varying in outline and but little developed; submarginal area not separated from dorsal disk; dorsum usually without papillae or pores; tracheal folds evident, in some species very conspicuous, terminating on margin of case in a pore, the folds often showing dot-like, linear, or polygonal markings; wax secretions absent or very scant. Vasiform orifice relatively small, transversely oval or subcircular, with or without comb of teeth on inner lateral and caudal margins; operculum large, mostly filling the orifice and obscuring the lingula.

Adult with one flexure in radial sector of forewing and no trace of media. Antennae of seven segments; segment VII not distinctly shorter than segments IV, V, and VI, but usually longer than these. Sexes about equal in size, the claspers of male with a few prominent spines.

*Type.*—*Aleyrodes citri* Ashmead.

(2) Bull. 67, Fla. Agric. Exp. Sta., 1903, p. 662.

(3) Tech. Ser. 27, Pt. 2, Bur. Ent. U. S. Dept. Agr., 1914, p. 97

*Key to Subgenera of Dialeurodes*

- Vasiform orifice of pupa case armed with teeth on its inner caudal and lateral margins ..... subgenus *Dialeurodes*  
 Vasiform orifice of pupa case not armed with teeth on its inner caudal and lateral margins ..... subgenus *Gigaleurodes*

*Key to the species of the Subgenus Dialeurodes*

- I. Pupa case yellowish or whitish, without blackish coloration..... 2  
 Pupa case with more or less dark brown or blackish coloration ..... 3
- II. The three tracheal folds with minute circular dots, tracheal pores situated just within margin of case, marginal mesad with a few blunt teeth and distad with two claw-like lobes, the ends of which are almost in contact..... *citri*  
 The three tracheal folds clear, tracheal pores made up of four small teeth slightly chitinized and brown in color..... *natickis*
- III. Color yellowish excepting a longitudinal dark brown stripe ..... *kirkaldyi*  
 Color of submarginal area lemon yellow, within this a dark irregular band; dorsal disk orange, margin white..... *tricolor*

***Dialeurodes* (*Dialeurodes*) *citri* (Ashmead). (Lám. LXXV, A-D).**

*Aleyrodes citri* Ashmead, Florida Dispatch, new ser. Vol. 11, 1885.

*Aleyrodes citri* Riley and Howard, Insect Life, Vol. 5, 1893, p. 219.

*Aleyrodes eugeniae* var. *aurantii* Maskell, Trans. N. Zealand Inst., Vol. 27, 1896, p. 431.

*Aleyrodes aurantii* Cockerell, Bull. 67, Fla. Agr. Sta., 1903, p. 666.



*Dialeurodes citri* (Ashmead) Quaintance and Baker, Journ. Agric. Research, Vol. 6, 1916, p. 469.

While no specimens of the citrus white fly have been received from the South American countries, it has been stated on good authority to occur in Chile, and G. W. Kirkaldy gives Brazil as one of its localities.

**Dialeurodes (Dialeurodes) kirkaldyi** (Kotinsky) (Lám. LXXV, E-G).

*Aleyrodes kirkaldyi* Kotinsky, Bull. 2, Bd. Agr. and Forestry, Hawaii, 1907, p. 95.

We have in the Bureau collection paratypes of this species, and also specimens collected on Jasmine, at Georgetown, Demerara, British Guiana, February 1912, by Mr. G. E. Bodkin. The pupa cases are light yellow in color without wax secretion of any sort.

**Dialeurodes (Dialeurodes) natickis**, n. sp.

Two specimens on one small leaf is all the material of this species that has been sent to us. It was found on *Eugenia luma* (Mol.) Berg., by Prof. Marcial R. Espinosa B., in Chile and sent to us by Dr. C. E. Porter.

The pupa case on the leaf is light yellow, without wax secretion and almost circular in outline.

*Pupa case*.—(Lám. LXXII, Fig. A). Size; 1.92 mm in length, 1.63 mm in width; color light yellow; margin finely crenulate, the submarginal area a darker yellow than the rest of the dorsum. Marginal and caudal tracheal comb (Lám. LXXII, B) simple, made up of three or four small teeth slightly chitinized or darker brown in color. Dorsum marked with reticulate lines. Vasiform orifice (Lám. LXXII, C) sub-cordate, cephalic margin arched, the lateral and caudal margins thickened, the inner margin of the orifice being armed with six small teeth; operculum sub-cordate, cephalic margin straight, filling three-fourths of the orifice. Lingula entire, seen through operculum, straplike with bulbous termination. Laterad and cephalad of the orifice are two small setae. No marginal setae were found. Abdominal segments distinct.

*Adults*.—Unknown.

*Type*.—Cat. No. ... U. S. National Museum.

**Dialeurodes (Dialeurodes) tricolor** Quaintance and Baker (Lám. LXXV, H-L).

*Dialeurodes tricolor* Quaintance and Baker, Proc. U. S. Nat. Museum, Vol. 51 (?), p. 419 (?).

This species which is large and beautifully marked was collected at Eubato, Brazil and was received from Dr. F. Noack in July, 1898.

We have only one representative from South America of the subgenus *Gigaleurodes*. It is *Dialeurodes (Gigaleurodes) struthanthi* (Hempel).

**Dialeurodes (Gigaleurodes) struthanthi** (Hempel) Plate X, M-O).

*Aleurodes struthanthi* Hempel, Ann. Mag. Nat. Hist., Vol. 8, 1901, p. 387.

The Bureau has only one collection of this species, that sent by Dr. H. von Ihering, collected at Sao Paulo, Brazil, on an unknown forest tree. The pupa cases are light brown in color with various dark brown markings. In some, nearly the whole case is dark brown with a light area at the cephalic portion of the dorsum, in others the pupa case is light with small areas of dark brown. Around the margin of each case is a dark brown band. Other collections have been reported from Parnahyba and Sao Paulo, Brazil, on *Struthanthus flexicaulis* Mart., orange, and «*Mechilia flora*».

#### *Genus Trialeurodes* (Ckll.) Quaintance and Baker

Pupa case medium to small in size, elliptic, usually elevated from the leaf by a palisade of white wax; color variable, ranging from whitish to dark brown; margin of case toothed, the wax tubes moderately developed; sub-marginal area not separated from dorsal disk; sub-marginal area with a row of, or a number of, large papillae or pores; thoracic tracheal folds rarely distinguishable; usually a distinct furrow from vasiform orifice to caudal margin of case; wax secretion a series of brittle, glassy rods from dorsal papillae or pores and a palisade of white wax elevating case from leaf; vasiform orifice subcordate, usually notched on caudal end; operculum transversely elliptic,

about half filling the orifice; lingula spatulate, the distal extremity exposed caudal of operculum, lobed, and usually armed with two prominent spines.

Adult usually with one flexure in radial sector of forewing and no trace of media excepting in freshly emerged specimens. Antennae of seven segments, Segment III the longest, IV to VI subequal; segments imbricated. Sexes nearly equal in size.

*Type.*—*Aleyrodes pergandei* Quaintance.

*Key to the species of the genus Trialeurodes*

- I. Pupa case with a row of setae mesad of the margin and around the entire dorsum... *shawundus*  
 Pupa case without a row of setae mesad of the margin and around the entire dorsum.... 2
- II. Pupa case with varying number of large papillae on dorsum near the meson..... *vaporariorum*  
 Pupa case lacking papillae, other than those mesad of the margin..... *unadutus*

***Trialeurodes unadutus*, n. sp.**

It is with some hesitancy that we place this form in the genus *Trialeurodes*. The closeness of the papillae of the pupa case to each other and their nearness to the margin give them the appearance of marginal teeth but a study of the early stages resulted in placing the species here. We have only one collection and this was taken on *Drimys Winteri*, by Prof. C. E. Porter, February 1913, in Prov. Malleco (Chile).

*Early stage.* Size 0.45 mm. long, 0.56 mm. wide; color, light yellow. Margin entire, sub-marginal papillae closely set together and projecting to the margin, bluntly rounded at apex. Vasiform orifice sub-cordate, cephalic margin straight, the caudal portion of the orifice crossed with many reticulate lines, operculum sub-cordate, filling one-half of the orifice; lingula not visible, two long setae at caudal margin of the case.

*Pupa case.* Lám. LXXIV, Fig. D. Size, 1.44 mm. in length, 0.84 mm. in width; color bright yellow. Margin

(Lám. LXXIV, E) entire, in some specimens not visible, being covered by the sub-marginal papillae. Sub-marginal papillae rounded at the apex, slightly chitinized, so closely set together that they join each other. Dorsum unmarked, abdominal segments distinct. Vasiform orifice (Lám. LXXIV, F) sub-cordate, elongate, cephalic margin straight, the caudal portion of the orifice crossed by many reticulate lines; operculum of the same shape as orifice, bluntly rounded at the caudal margin, filling one-half of the orifice; lingula with four, indistinct lobes, setose and with two small setae arising from the caudal lobes. A pair of long setae are found on the caudal margin of the case.

*Adults.* Unknown.

*Type.* Cat. N.º 23,071, U. S. National Museum.

### ***Trialeurodes shawundus*, n. sp.**

There is only one slide of this species in the Bureau collection, with many individual pupa cases on that slide. The material was collected in Chile on an unknown plant.

*Pupa case.* (Lám. LXXIV, Fig. G.) Size; 0.72 mm. in length, 0.48 mm. in width; light yellow in color with tinges of orange. Margin (Lám. LXXIV, H.) slightly crenulate, with even, shallow teeth; from each tooth extending mesad 0.03 mm. is a shallow groove, mesad of each marginal tooth is a small sub-marginal papilla. Dorsum marked with light reticulate lines, a row of small setae around the entire dorsum, just mesad of the sub-marginal area. Vasiform orifice (Lám. LXXIV, I) sub-cordate, elongate, with cephalic margin straight, lateral margins thickened and chitinized; operculum sub-cordate, filling one-half of the orifice. Lingula setose, twice lobed, with two long setae arising from the caudal lobes; abdominal segments distinct with six small papillae in a line along the lateral extremities of the abdominal sutures, and one on either side of the cephalic portion of the vasiform orifice. Caudad of the orifice and 2.01 mm. from the margin are two small setae.

*Adults.* Unknown.

*Type* Cat. N.º 23,070, U. S. National Museum.

**Trialeurodes vaporariorum** (Westwood) (Lám. LXXIV, A-C).

*Aleurodes vaporariorum* Westwood, the Gardener's Chronicle, 1856, p. 825.

*Aleurodes nicotiane* Mskll., Trans. N. Zealand Inst., Vol. 28, 1896, p. 436.

*Aleurodes papillefer* Mskll., Trans. N. Zealand Inst., Vol. 22, 1890, p. 173.

*Asterochiton lecanioides* Mskll., Trans. N. Zealand Ins., Vol 9, p. 215.

*Aleurodes sonchi* Kot., Bull. Ent. 2, Brd. Agr. and For. Hawaii, 1907, p. 97.

*Aleyrodes coryli* Britton, Ent. News, Vol. 18, 1907, p. 337.

*Aleyrodes waldeni* Britton, Ent. News, Vol. 18, 1907, p. 339.

*Asterochiton vaporariorum* Quaintance and Baker, Tech. Ser. 27, Pt. 2, Bur. Ent. U. S. Dept. Agr. 1914, p. 105.

*Trialeurodes vaporariorum* Quaintance and Baker, op. c. 1905, p. XI.

This comon «greenhouse white fly», which is to be found in nearly every greenhouse in the United States, has been collected frequently in the South American countries. It is to be found in the Bureau collections, from the following places:

Locality	Host	Collector	Date	Bureau N.º
Santiago, Chile:	<i>Aquilegia</i> sp.	Prof. C. E. Porter	July 1909	Q. 5257
Los Andes »	Fuchsia	» » »	1912	Q. 8727
Chile	<i>Nothofagus</i> sp.	E. R. Larsen	Feb. 14, 1912	Q. 8063
Bogota, Colomb.	<i>Digitalis</i> sp.	J. R. Horton	July 18, 1917	Q. 12178
Santiago, Chile:	<i>Cestrum parqui</i>	Leopold Hoffmann	1919	Q. 13473
	L'Her			
	<i>Persae americana</i> Mill	J. N. Thomas	»	»

## Literature referred to in Text

*Ashmead, W. H.*

1885. In the Florida Dispatch. New Ser. Vol. 11.

*Bemis, F. E.*

1904. «The Aleyrodids, or Mealy Winged Flies of California»  
Proc. U. S. N. Mus. Vol. 27, pp. 471-537.

*Blanchard, E.*

1852. In Gay's Historia Fisica y Política de Chile. Zool. VII, pp. 319-320.

*Britton, W. E.*

1907. «Some New or Little Known Aleyrodidae from Connecticut».  
III Ent. News, Vol 18, 1907.

*Curtis, J.*

1845 «Aleyrodes cocois», Gardener's Chronicle, Vol. 7, p. 284.

*Cockerell, T. D. A.*

1896. «New Insects from New Mexico», Journ. N. Y. Ent. Soc.,  
Vol. 4, p. 207.

1898. «Three New Aleurodidae from Mexico», Psyche, Vol. 8,  
p. 225.

1903. «White Fly (Aleyrodes citri) and its Allies». Bull. 67, Fla.  
Agri. Exp. Sta., pp. 599-666.

*Enderlein, G.*

1909. «Udamoselis eine neue Aleurodiden». Gattung, Zool. Anzei-  
ger, Bd. 34, n. 7/8, pp. 230-233.

*Goeldi, E. A.*

1886. «Beitrage zun Kenntnis der kleinen und kleinsten glieder-  
thirerwelt Brasilien II Neue braisilianische Aleurodes  
Arten». Mitth. Schweiz. Ent. Gesell. Vol. 7, pp. 241-250.

*Hempel, A.*

1899. «Descriptions of three new species of Aleurodidae from Bra-  
zil». Psyche, Vol. 8, pp. 394-5.

1901. «A preliminary Report on some new Brazilian Hemiptera»,  
Ann. Mag. Nat. Hist. Vol. 8, 1901, pp. 383-391.

1918. «Descrpsao de una nova specie de Aleurodidae», Museu.  
Paulista Revista, Vol. 10, pp. 211-214.

*Ihering, H. von.*

1897. Os piollios vegetaes (Phytophires) do Brazil», Rev. Mus.  
Paulista II, pp. 290-294.

*Kotinsky, J.*

1907. «Aleyrodidae of Hawaii and Figi, with descriptions of new  
species», Bull. 2, Div. Ent. Board of Agri., and For, Ha-  
waii, pp. 93-101.

*Leonardi, G.*

1910. «Due nuove specie die Aleurodicus», Bollitino del laborato-  
rio di Zoologia generale e agraria della R. Scuola supe-  
riore d'Agricoltura in Portici, Vol. 4, p. 316.

*Maskell, W. M.*

1896. «Contributions towards a monograph of the Aleurodidae»,  
Trans. New Zealand Inst., Vol. 28, pp. 411-449.

*Morgan, A. C. F.*

1892. «A New genus and species of Aleurodidae», Ent. Mo. Mag.  
(2), Vol. 3.

Quaintance, A. L., and Baker, A. C.

1913. «Classification of the Aleyrodidae», Tech. Ser. 27, Pt. 1, Bur. Ent. U. S. Dept. Agri.

1914. «Classification of the Aleyrodidae», Tech. Ser. 27, Pt. 2, Bur. Ent. U. S. Dept. Agric.

1915. «A new genus and species of Aleyrodidae from British Guiana», Ann. Ent. Soc. of Amer., Vol VIII, pp. 369-371.

1917. «A Contribution to our Knowledge of the White Flies of the Sub-family Aleyrodinae (Aleyrodidae)», Proc. U. S. Nat. Mus., Vol. 51.

Riley, C. V. and Howard, L. O.

1893. «The Coconut and Guava Mealy Wing» (*Aleurodicus cocois*, Curtis?). Ins. Life, Vol. 5, pp. 314-317.

Westwood, G. O.

1856. «The New Aleyrodes of the Greenhouse». The Gardener's Chronicle, 1856, pp. 852.

## Explanation of plates

### LAM. LXVI

#### Diagrams of Aleyrodid Structures

Fig. A.—Pupa case. Fig. B.—Compound wax pores. Fig. C.—Foot of subfamily Aleyrodinae. Fig. D.—Foot of subfamily Aleurodicinae. Fig. E.—Head. Fig. F.—Vasiform orifice. (Original).

### LAM. LXVII

#### Anatomical Details in the Aleyrodidae

Fig. A.—Male reproductive organs: Ts, testis; Vd, vas deferens; Sv, seminal vesicle; GdM, glandula mucosa; Ejd, ejaculatory duct. Fig. B.—Digestive tract: Sg, salivary glands; Ph, pharynx; Oes, oesophagus; GCa, gastric caeca; An, anus; Lin, lingula. Fig. C.—Labium of *Aleyrodes* sp. Fig. D.—Taste sensoria on lobe of apex of labium. Fig. E.—Vasiform orifice, ventral view: An, anus; Op, operculum; Lin, lingula. Fig. F.—Diagram of genital segment of male *Psylla*: Sa, supraanal plate; Co, copulatory organ; Cla, claspers; Sbg, subgenital plate. Fig. G.—Diagram of genital segment of male *Aleurodicus*: Sa, supraanal plate; Co, copulatory organ; Cla, claspers; Sbg, subgenital plate (Original).

### LAM. LXVIII

#### Wing Venation in the Aleyrodidae

Fig. A.—Theoretical origin of the veins of the psyllid genus *Trioza*, showing tracheae. Fig. B.—Forewing of *Trioza* sp. Fig. C.—Theoretical origin of the veins of Aleyrodidae, showing tracheae. Fig. D.—Forewing of *Udamoselis pigmentaria*. Fig. E.—Forewing of *Dialeurodicus cockerelli*. Fig. F.—Forewing of *Aleurodicus conspurcatus*. Fig. G.

—Forewing of *Aleurodicus destructor*. Fig. H.—Forewing of *Aleurodicus (Metaleurodicus) minimus*. Fig. I.—Forewing of *Paraleyrodes perseae*. Fig. J.—Forewing of *Aleurochiton aceris*. Fig. K.—Forewing of *Aleyrodes* sp. Fig. L.—Forewing of *Neomaskellia comata*. (Original).

## LAM. LXIX

A, *Udamosilis pigmentaria*; B-E, *Dialeurodicus tessellatus*; F-I, *Dialeurodicus pulcherrimus*; J-L, *Dialeurodicus cockerellii*; M-O, *Leonardius lahillei*.

## LAM. LXX

A-I, *Endialeurodicus bodkini*; J-M, *Aleurodicus cocois*; N-P, *Aleurodicus pigeanus*.

## LAM. LXXI

A, *Aleurodicus conspurcatus*; B-F, *Aleurodicus pulvinatus*; G-I, *Aleurodicus neglectus*; J-K, *Aleurodicus giganteus*.

## LAM. LXXII

A-C, *Dialeurodes natickis*; D-F, *Aleurotulus bodkini*; G-J, *Aleurothrixus aepim*; K-M, *Aleuroparadoxus punctatus*.

## LAM. LXXIII

A-C, *Aleuroplatus cococolus*; D-F, *Aleuroplatus cockerellii*; G-I, *Aleuroplatus oculireniformis*; J-M, *Bemesia berbericola*.

## LAM. LXXIV

A-C, *Trialeurodes vaporariorum*; D-F, *Trialeurodes unadutus*; G-I, *Trialeurodes shawundus*; J-L, *Aleurothrixus porteri*; M, *Aleurothrixus floccosa*.

## LAM. LXXV

A-D, *Dialeurodes citri*; E-G, *Dialeurodes kirkaldyi*; H-L, *Dialeurodes tricolor*; M-O, *Dialeurodes struthanthi*.





